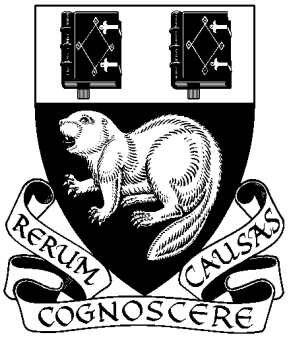
Department of Information Systems
London School of Economics and Political Science



Working Paper Series

74

Susan V. Scott

"IT-enabled Credit Risk Modernisation:
a Revolution under the Cloak of Normality"

June 1999

Department of Information Systems
London School of Economics
Houghton Street
London WC2A 2AE
telephone +44 (0)171 955 7655
fax +44 (0)171 955 7385
e-mail is@lse.ac.uk
home page http://is.lse.ac/

IT-ENABLED CREDIT RISK MODERNISATION: A REVOLUTION UNDER THE CLOAK OF NORMALITY

Susan V. Scott
Information Systems Department
The London School of Economics
T: 0171 955 6185
E-Mail: S.V. Scott@lse.ac.uk

Abstract

This paper focuses on IT-enabled credit risk modernization in commercial retail banking. The empirical material is based upon a longitudinal case study conducted during 1993-1996 using an interpretive approach. It documents the introduction of a leading-edge computer-based decision support system into middle market corporate lending processes in a major UK retail bank. An analysis is constructed against the backcloth of contemporary social theory with the aim of stimulating debate regarding the ethics and politics of corporate risk positions. It is suggested that changes to the definition, assessment and management of credit risk in a major financial services institution, implemented through the introduction of a new technology and enacted in everyday acts of normal consumption, need debating. The paper concludes by asserting that if we turn aside from our responsibility to challenge the epistemological basis of contemporary risk assessment and management we may find that our social, political and economic landscape has changed without our consent.

Keywords: Reflexive modernization, Information systems, Organizational change, Decisions support systems, Credit risk, Financial services, Retail banking, Risk society, Transformation of work, IS and society

Submitted to the journal
Accounting, Management and Information Technology in June 1999.
ã Please do not quote without permission

IT-ENABLED CREDIT RISK MODERNISATION:
A REVOLUTION UNDER THE CLOAK OF NORMALITY

'The potential for structuring society migrates from the political system into the sub-political system of scientific, technological and economic modernization. A *revolution under the cloak of normality occurs*, which escapes from possibilities of intervention, but must all the same be justified and enforced against a public that is becoming critical'
Ulrich Beck (1992, p.186)

INTRODUCTION

In many traditional industries we are witnessing key work practices undergo a far-reaching modernisation (Barrett 1999; Inglehart 1997; Pouloudi 1998). It is widely accepted that demand for this stems from 'turbulence in the business environment [which] puts pressure on organizations to be sure they can effectively meet the fundamental changes that are occurring' (Scott Morton 1991). Modernisation, then, is commonly regarded as a process of technological rationalization and change in organisation, which aims to bring institutions into line with contemporary demands. Recent debates in the management and information systems literature have been concerned with the way in which computer-based information technologies *enable* these change processes (Scott Morton 1991; Benjamin and Levinson 1993; Yetton, Johnson et al 1994; Orlikowski 1996; Markus and Benjamin 1997). To enable means 'to give the means or authority to do something', 'to make possible' or in computing parlance 'to make a device operational, to switch on' (Oxford Concise English Dictionary, 9th Edition).

The topic of this paper is recent IT-enabled modernisation of financial services, and specifically processes of credit risk assessment. In the past, retail banking has often evoked images of grey suits and, in the UK, intimidating cathedral-like branch offices, run by a control-oriented hierarchy. Despite a traditionally rather dull reputation, it is a particularly important area in which to conduct research into modernization processes. There have been various research efforts which have attempted to identify 'forces for change' in the industry (Kearney 1992; Chetham 1995; Gosling 1996), explore notions of strategic redesign (Maull and Childe 1994; Mentzas 1994; Watkins 1994; Lockett and Holland 1996), changing management practices (Ezzamel, Willmott and Lilley 1994) and the role of technology in the transformation of the industry (Howells and Hine 1993; Brady and Targett 1995; McKenney, Mason et al 1997). A few studies have attempted to locate these changes in broader contexts of social transformation (Knights and Tinker 1997), but overall this literature is rather dominated by projective material (Weatherford 1997) and often lacks empirical grounding.

In this paper, empirical material highlighting some of the complex consequences surrounding the introduction of a leading edge decision support system (DSS) into middle market corporate lending processes within a major UK retail bank is presented for analysis. The major clearing bank in the case study, known for reasons of confidentiality as 'UK Bank', was the first to use DSS to implement contemporary IT-enabled approaches to portfolio risk management in the UK retail banking sector. The system chosen by UK Bank, called Lending Advisor, represented a leading edge

technology within UK retail banking and as such evoked considerable interest in the sector. Other major retail banks have since developed similar computer-based DSS for their UK credit risk management divisions. Perhaps understandably at this point in both the development and application of this kind of computer-based technology, literature emerging in this area tends to focus on design issues and 'factors' influencing its successful introduction (Trippi 1990; Mareschal and Brans 1991; Stout and Leberatore 1991; Eckert, O'Connor et al 1993; Watkins and Eliot 1993; Sisko and Zopounidis 1994; Doherty and Pond 1995; Vogtle and Schober 1996; Fuglseth and Gronhaug 1997; Shao 1997).

This paper emphasises the notion that local organizational changes documented in the Lending Advisor case study can be seen as expressions of global trends of societal transformation. These trends are emerging in an uncertain, uneven and complex way. However, an attempt is made here to identify and analyse them in a coherent manner in order to stimulate further debate. The theoretical vehicle that facilitates this critical undertaking is the risk society perspective (Beck 1992) and the associated concept of reflexive modernisation (Giddens 1990; Beck 1992; Beck, Giddens, Lash 1994).

The hypothesis explored in the paper is that computer-based information systems are enabling major changes in work and work life, and that a shift in this primary axis of industrial society is a key part of the transformation of that society. It is proposed that a categorical shift in the dynamic relationship between the individual and society is taking place at many levels. Furthermore, in the stream of choices made by individuals and groups during the period of this transformation, the future is formed. It is therefore critically important to consider the nature of the 'actors' in these processes of transformation and to raise awareness about who, what, where, when and why choices are being offered and key decisions made.

The context of this study

Over the last 15 years the UK banking sector has experienced deregulation (Morgan and Knights 1997), which has heralded an era of intense competition with new entrants (McGoldrick and Greenland 1992; Orton 1994) using computer-based technologies to offer diverse and flexible product ranges (Steiner and Teixeria 1990; Pawley, Winstone, et al 1991; Moules 1997). This hyper-competition has formed the backcloth for several major mergers and the globalisation of financial services institutions (e.g. Hong Kong Shanghai and Midland; Deutsche Bank and Chase Manhattan; Lloyds and TSB).

While the identity of retail banking has been transforming (Cates 1994; Orton 1994), important aspects of its key role in the economic development process in society have remained. There is still a high degree of dependence upon retail banks to sustain communities by providing the primary methods of money transmission, payment guarantee and other key financial services. They perform the crucial function of circulating capital in society between savers and borrowers which, coupled with their ability to create credit, has made them instrumental in both promoting and directing economic growth (Orton 1994).

In order to fulfil this function retail banks have to assess their client in terms of 'credit worthiness'. Lending money is about holding a certain vision and faith in the future which shapes everyday actions. A customer's proposition is assessed in terms of their

current assets, their likely capacity to both service the loan and withstand variations in economic conditions. Propositions vary in terms of riskiness, and most require insurance and evidence of 'security' to support it. The loan manager is, therefore, not just assessing a customer in terms of their current creditworthiness, but is constructing scenarios or projections that colonise the future with various probable outcomes. If a major retail bank changes the way in which credit risk is defined, assessed and managed it leads to changes in the kind of customers that they identify as viable, which can have considerable impact in both the short and long term for a variety of stakeholders (Pouloudi and Whitley 1997). For example, the loans that retail banks make facilitate the growth of small, start-up businesses and are an important as source of capital for economic growth.

A change in the definition, assessment and management of credit risk in a major financial services institution implemented through the introduction of a new technology and enacted in everyday acts of normal consumption, needs debating. The risk society thesis allows us to move from a routine financial concept to an abstraction of risk that perceives risk definitions as a 'position statement' by society. It calls upon us to embrace a 'reflexive learning process', which challenges the epistemological basis of decisions shaping and influencing the future. Beck considers the overlap between processes of modernization and social, biographical risks and insecurities; this is explored through the presentation and analysis of the processes of modernization highlighted in the Lending Advisor case study. The underlying question in Beck's (1992) complex thesis on the shaping of society is - how do we wish to live? The analysis will consider the conditions shaping our perception of these choices and influences upon our decision-making.

The first part of this paper has briefly traced the 'landscape' in which this study locates itself. The following section outlines the methodological approach adopted and describes the use of the Lending Advisor case study. The empirical material is then presented in a substantial section in which the introduction of Lending Advisor and the extensive program of IT-enabled organizational change that accompanied it is documented. The paper then shifts to a lengthy analysis by introducing the reader to the theoretical context of the risk society and reflexive modernization. Having described the main tenets of Ulrich Beck's thesis, the following section presents findings from the LA case in four main sub-sections. The first proposes that we must investigate corporate risk positions for ourselves. The second considers the role of computer-based information systems in enabling modernization processes. The next section considers issues of responsibility, participation and the political governance of corporate risk processes in light of the potential side-effects that they could have for society. Finally, consequences of IT-enabled modernization for the individual and society are considered. The paper is concluded with a brief discussion of the implications arising from the Lending Advisor study.

METHODOLOGY

The findings in this paper are based upon a research project, which was undertaken using an interpretive approach (Orlikowski and Baroudi 1991; Walsham 1993, 1995). At the heart of the research project was a longitudinal case study conducted between 1993-1996 in UK Bank. The case study began when Lending Adviser (LA) was in its

pilot stage, and followed the implementation of the system through to 'business-as-usual' status.

The primary method for gathering data was extensive in-depth interviews with project stakeholders. The fieldwork involved a total of one hundred and forty formal interviews. The interviews were semi-structured in nature and conducted on-site at the interviewee's premises. A set of basic interview questions was developed which covered a variety of issues. These were tailored for different stakeholders, but an emphasis on their understanding of the LA system and their perception of its role remained the same for each interview. Some mainly technical or factual interviews were tape-recorded; otherwise, out of sensitivity to the high-level of job insecurity and in-house politics, notes were discretely taken. These were written up immediately after the interview.

The bedrock of the empirical work was a study across two regions within UK Bank: London (central) and Cambridge (district). Twenty Lending Advisor users were interviewed in the two regions at the regional offices, UK Bank business centers and in local branches. Their progress with Lending Advisor was studied over a period of eighteen months through a series of follow-up interviews.

Method of analysis

The method of analysis has centred upon an on-going, phenomenologically iterative process of reflection and deliberation before, during, and after the fieldwork was undertaken which embraced pre-learning. As the data were gathered, they underwent detailed examination, which began during the write-up of the interview notes and continued through successive readings of the data. This reading and re-reading of the data was at the heart of the analysis process. It has been during this rather arduous, meditative 're-visiting of the now the familiar' that issues formed from the constituent fabric of the data. The aim was not to find 'the interviewee/s that gave the answer closest to the truth', but rather to understand the processes and patterns revealed in multiple interpretations.

Having begun to tease out issues, themes and concepts from the data, one has to decide upon a coherent and sensible way of communicating them. The approach chosen in this research study is based upon innovative use of social theory, which situates this paper among a particular community of researcher studying information systems, organizations and management (Boland 1985, 1987, 1989; Willmott and Knights 1982; Lyytinen 1985; Winograd and Flores 1986; Cooper 1989; Poster 1990; Star 1991; Orlikowski and Robey 1991a; Jones and Nandhakumar 1993; Walsham 1993, 1997; Barrett, Sahay and Walsham 1996; Introna 1997). The research design intends the social theory to serve as a 'backcloth' against which the findings are analysed, and for it to form the basis of a narrative, which would connect up logical clusters that emerged in the data. The aim was to highlight the character of their association and discuss the possible implications and insight that had arisen from this analysis. In so doing the author uses the theoretical vehicle to represent the findings in a way that is not just convincing, helpful and insightful for him/herself, but also serves as a medium for communication to a community of authors interested in the broader debates in the area of study.

The empirical data is used to ground the social theory, to 'test' it although not in the traditional positivist way. The challenge that is set before us as interpretivist researchers is rather: is this social theory a useful model with which to further understand contemporary society, and if so, what are the implications of this for research and practice? How far does an analysis of empirical data in this theoretical context both contribute to our understanding and extend the theory? The status of the findings that are reached through this method of analysis are 'interpretive generalisations' (Walsham 1995). The author is not searching for prescriptions for practice, or to find the 'best social theory' to use in research, rather to construct an analysis that is insightful and informs the actions of the researcher herself, fellow researchers and practitioners.

Using empirical evidence: Presentation of the Lending Advisor case material

One of the strengths of conducting longitudinal field studies is the way in which the researcher accumulates a depth of knowledge, an absorptive understanding of a subject and context. However, as with all strengths this can also prove a limitation in certain respects, particularly when the analysis process demands that the researcher assume critical distance in order to move from subject and context to analysis of process. Subject and context are integral to the study and intertwined with analysis of process (Pettigrew 1985, 1990), but should be held in check so that they compliment and inform rather than swamp the study. The aim is to communicate the details of a case without fatiguing the reader, which entails balancing overview with insight and taking care not to indulge one's own introverted interest in the micro-world in which the case is situated.

As frustrating as it may be for the author, and regrettable to the reader in search of 'Zuboff-style'[1] illumination, the 'personal voice' of interviewees cannot be given as much space as they deserve in such a short paper. Journal papers present some of the most arduous challenges in this respect due to limitations of space. If the reader is interested in a full-length version of the case study, this is available elsewhere (xxxx 1998).

These qualifications regarding the style and method of empirical data presentation were felt necessary in order to prepare the reader, since what follows is far from a holistic case study in all its length and glory. It is, rather, a necessarily selective, crafted version of the case which serves as background and 'base camp' for the evidence presented in support of the analysis.

[1] Shoshana Zuboff's seminal work (1988) offers one of the best examples of using empirical material to illuminate a thesis.

EMPIRICAL MATERIAL:
THE INTRODUCTION OF LENDING ADVISOR INTO UK BANK

Background

The current UK banking system traces its origins back to the early 19th century when joint stock banking was permitted by an Act of Parliament in 1826 (Goldie-Scot 1991). The UK banking sector has traditionally consisted of the following institutions: retail banks, discount houses, British merchant banks, and other British and overseas banks. Competition was restricted and a division between retail banks and building societies was legally enforced by industry demarcation at parliamentary level.

From the mid-1960s to the 1990s, retail banking has been dominated by the 'Big Four': Barclays, National Westminster, Lloyds and Midland; they handle the majority of the UK's cheque and credit clearing. This involves the transfer of funds from one bank to another via balances at the Bank of England, necessary when payments are made between individuals or companies which bank with different banks (Pawley, Winstone et al. 1991). The retail clearing banks cater for corporate and personal loans, saving plans and money transmission. They also provide a range of other income producing services: leasing, unit trusts, credit cards, executor and trustee, investment and tax advice, share dealing and portfolio management, insurance and estate agency (Pawley, Winstone et al. 1991). It is the provision of such a wide range of products, complimented by their well established reputations (Egan & Shipley 1995), that continues to make the Big Four major forces in this market.

The origins of the major retail bank in this study, go back to 1896 when twenty family-owned, private banks amalgamated to form UK Bank. Descendants of those original families continued to play a significant part in the running of UK Bank throughout the succeeding one hundred years. Indeed, it was not until 1988 that a man who was not a member of one of those founding families became Chairman of UK Bank. This was very much an 'old boys network' that owed its culture to a tradition of gentlemanly financial exchange, stretching back to the London coffeehouses of the seventeenth century.

Traditional risk management in UK Bank

Credit risk on corporate loans was assessed through a hierarchy of discretionary limits. A local branch manager would have an upper limit to which he could lend money to any credit-worthy individual or company. If the borrower required a sum above that figure, his request would be passed on to local directors at the local head office. Likewise, each local director had his own discretionary limit, and any request for a sum in excess of that would be discussed by the local board of directors which, again, had a maximum to which it could lend to any individual borrower. Requests for any sum in excess of the local board's discretionary limit would be considered by the 'advances committee'[2], which was selected from the senior local directors and held regular meetings in the head office in London.

All branches were subject to regular, random inspections by internal UK Bank inspectors, appointed and controlled by the head office in London when, among other

[2] 'Advance' was the local term used to denote a loan or extension of credit.

matters, all lendings would be reviewed. Copies of the inspection report would be sent to both the local head office and head office in London. Should more than 1% of lendings be considered 'doubtful' at the time of an inspection, the manager would be the subject of a special report. One of the local directors would visit each branch every three months and, on this occasion, all lendings of any significance that were causing difficulty would be discussed with the local branch manager.

Finally, company law required that banks underwent an annual external audit. This marked the final layer of supervision of credit loans made in the regions and preparation for it was carried out by a centralized bank audit office. The audit office would examine loans from the middle market and above with the aim of monitoring the 'connections' (total exposure of an individual or group over various loans), the security upon which the loan was based and how it was being maintained. Since the bank lacked advanced information technologies to break down exposure in terms of sector, they focused their effort on searching for deteriorating accounts. The dullness of these methods as a weapon for slicing through portfolio, combined with the timeframes involved in the formulation, implementation and management of credit policy was a key reason why the bank insisted that managers live in the immediate vicinity of their branch office. The local branch managers were expected to become involved in the community with the aim of familiarizing themselves with the local people and their business markets. If anything started to go wrong with a local company to which UK Bank had made a corporate loan, the manager would hear about it and be in a position to act in a timely way.

In summary then, criteria for credit risk assessment only began to be formalized within UK Bank during the 1970's. Before then, it was partly a matter of local knowledge, partly instinctive and arranged by a network of relationships rooted in notions of 'credit worthiness' in its broadest, almost literary sense. It was managed through traditional relationships of trust that rested upon notions of class, gender, status and hierarchy. More formal and precise risk management methods could be found but these tended to be in highly specialized areas, not at the general branch level. Local knowledge was, therefore, highly valued by UK Bank at this time and an integral part of its risk assessment expertise.

The modernisation of credit risk in UK Bank: The arrival of Lending Advisor

The motivation behind the introduction of Lending Advisor emerged from significant losses experienced by UK Bank during an economic recession in the early 1990's. A managing director was appointed to review the way that the organization managed risk. A small multi-functional design and development team was formed and they began by focusing on some fundamental questions: what is the basis of our lending expertise? What are the best practices in lending? What is a quality portfolio? The conclusion of the LA design and development team was that a quality portfolio was achieved by the 'rules' that guide the loan assessment process. 'These rules had to be 'flexed' in a timely way in anticipation of the economic cycle and be in line with the overall strategy of the Bank' (director, design and development team, 1996).

At about this same time, developments in database management, artificial intelligence and risk management had combined to produce a new way of approaching the issues being raised by the design and development team. UK Bank's portfolio represented approximately 23% of the UK domestic market. During the course of the millions of

transactions that UK Bank processed, they accumulated a massive amount of data on their customers. These data had the potential to tell them a lot both about their customers, their best practices and about the UK economy but it lay redundant in transaction processing mainframes.

During the course of their research, the design and development team went to the USA where the financial services industry, especially the credit card companies, had already begun to try and harness the data on their mainframes through their use of datawarehousing (Inmon 1992) and other decision support systems (for example see Mareschal and Brans 1991; Stout and Leberatore 1991). Developments in computer-based information technologies were being used to realise quantitative approaches to risk management. Although the application of these programmes on a large scale in the financial services was an innovation, the programmes themselves were based upon 200-year-old mathematical theories (Bernstein 1996).

The basis for modern techniques of quantifying risk are discoveries made by Jacob Bernoulli and Abraham de Moivre in the 18th century popularly know as the 'law of averages' (Bernstein 1996). Lending Advisor was the 'brain child' of a group of US-based academics who had been involved in artificial intelligence research in the 1980s at Stanford, USA. LA blended well known notions of the 'law of averages' with Thomas Bayes' theorem (1752), which aims to inform decision-making by mathematically blending new information into old in order to understand the probability of events as they unfold. In sum, this is a highly rational, discrete method of conceptualising and quantifying risk that emerged from a pedigree of academic research.

The Lending Advisor software package was extensively customised during the next two years. 'Knowledge engineers' worked with groups of managers in order to rationalise the loan process and identify 'best practice'. There was initial resistance, as most managers regarded lending as 'part art, part science' and felt uncomfortable structuring the process in this quantitative format. However, using the powerful influence of 'figureheads' within the UK Bank hierarchy and 'survival rhetoric', these reservations were over come and LA was implemented on time and within the original budget.

Assessing a credit loan using Lending Advisor

When Lending Advisor is introduced to the loan process, the manager enters data gathered from the interview and application form into the relevant fields of up to 52 Lending Advisor screens. The user interface display is based on the metaphor of a business form. The Lending Advisor introductory training manual (1995) informs us that the 'principle purpose of Lending Advisor is to provide lenders with an analysis of a borrower's capacity to repay debt out of future cash flows.' The LA assessment is shown in the form of a fuzzy 'meter' or sliding scale, with strong cases appearing on the right of the meter and weak cases on the left (see Figure 1).

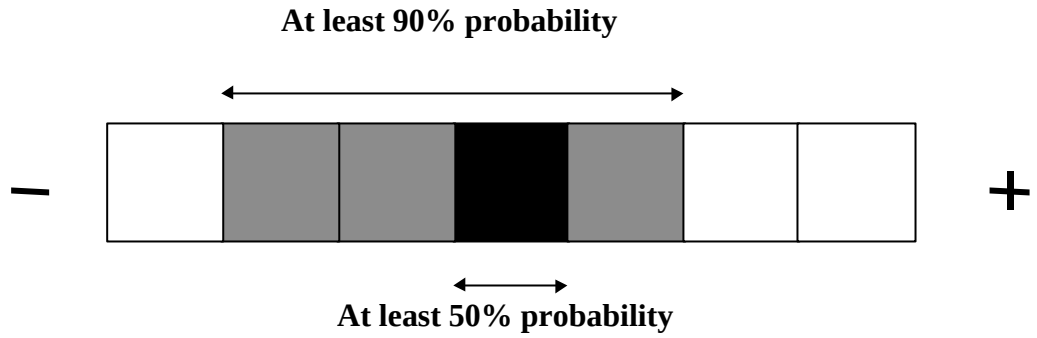


Figure 1: Typical Lending Advisor assessment meter

If the initial Lending Advisor assessment is negative, the loans manager either abandons the application, pursues additional data that might influence the meter further or 'overrides' the meter reading by writing a 'footnote' mitigating why it is negative.

The attraction for the UK Bank design and development team was Lending Advisor's capacity to calculate exposure, impose lending policy, provide central access to data and monitor the decisions made by loans managers. They decided that 'this technology fitted our strategy' (director, design and development team, 1996) and felt they had finally found the means to achieve some of the changes necessary within the domestic risk management function of UK Bank.

In a potent political move, senior management soon appropriated Lending Advisor and it formed the 'bow wave' of a program of public relations and extensive organizational change which fell far beyond the original scope of the project. A process of IT-enabled modernization followed, which took four years to implement and transformed UK Bank. A summary of the main changes that took place is summarised in Table 1. As shown in the table, major changes took place in both the culture and the structure of the organization.

According to the Lending Advisor project manager (1995), the organizational changes focused on creating 'one-stop relationship management'. This involved reducing the bureaucratic hierarchy and using the analysis provided by Lending Advisor to justify raising the loan managers' discretionary lending limits. This translated into a wholesale rationalization accompanied by compulsory redundancies. More mature managers were encouraged to take early retirement and as a consequence a noticeable demographic shift occurred among the loan manager community. Employment contracts were transformed away from the job-for-life paradigm to pluralized, performance-related criteria. The regional network was swept away and local branch managers reorganized into clusters of mobile 'corporate managers'. Training programmes instituted a shift from the 1980's tendency of justifying lending with security (for example, the clients' property) towards an LA-driven historic cash flow analysis. These changes represented a massive culture shift, and for many came as a culture 'shock'.

THE TRADITIONAL BANK	IT-ENABLED CHANGES
Hierarchical 17 layers in the traditional risk management structure	3 layers Traditional career ladder swept away Customer gets one-to-one contact
Formal	Demographic shift: different attitudes. CEO with no prior banking experience brings a 'roll-up-your-sleeves' culture
Job-for-life	Compulsory redundancies Performance-related pay Flexible, pluralized contracts
Focus on the administration of bad debts	Focus on 'most profitable' accounts, which could be accounts in credit as well as those who have taken out a loan
Branch managers semi-autonomous	Lending Advisor enables asynchronous supervision and global transparency of loans managers' activities. Loans must meet the parameters of bank policy embedded in LA or have robust mitigating circumstances accompanying it. Higher discretionary limits
Local branches/local focus	Majority of lending is now done through 'business centers'. Job title changes from 'branch manager' to 'corporate manager'. Laptops are issued and geographical areas dissolved.
National network	Unprofitable branches in rural areas and degenerate urban spaces shut down.

Table 1. Main areas transformed by the IT-enabled organizational change

The next section will briefly outline the way in which the loan managers experienced this transformation and how they coped with the new UK Bank. The purpose of the following sub-section is not to document the loan managers' response to every aspect of the changes that took place around them, but to provide the reader with a flavour of the pressures that they experienced and how they responded to them.

How the loan managers coped with the introduction of Lending Advisor and the changes to worklife that accompanied it

The way in which managers coped with the introduction of Lending Advisor, and adapted their everyday work practices, seemed to vary from individual to individual, according to the amount of support that they received, and the environment in which they were trying to learn. However, there were certain commonalties in the data centering on the key issues of change management, job insecurity and survival skills.

The Lending Advisor was implemented into a 'green-field site', and there was a significant degree of 'technophobia' among managers. The local application manager in the Cambridge region said that:

> 'Lending Advisor has taken them all through a range of emotions, from amazement to frustration...I go to install the Lending Advisor system...I've never felt so uncomfortable throwing so much information at so many blank faces so quickly' (1994).

The introduction of Lending Advisor marked the beginning of a stressful phase in the career of most users/managers.

One of the aspects of LA implementation that proved hardest on the managers was that a loan application on Lending Advisor would take them significantly longer than the paper-based 'Form 21' that they had been used to working with. Although trainers at the LA residential course maintained that 'applications should take about 45 minutes', the data collected from the loan managers was very different ranging from 4-5 to 15-20 hours depending upon the complexity of the case. Far from realising a timesaving, loan managers worked longer hours than ever before. The project director said, in June 1995, that managers were 'being sweated harder now

than at other times. I know that some of them are currently finding themselves between a rock and a hard place'.

This had a serious impact on users' home lives, particularly if they also had to commute long distances every day to work, as they did in the London central region:

> 'My wife has put her foot down since our first child was born. I used to be in every weekend, all weekend. Now she is saying that I have to come in at 8am and be out by 6pm. I am not supposed to work weekends either - however, I haven't managed to keep to this yet' (loan manager OL 1995).

This situation was eased to a certain extent with the introduction of laptop computers, but they did not arrive until *four years* after the initial LA implementation and were not available to all loan managers.

Despite these hardships managers were reluctant to indulge in wholesale, overt resistance to the introduction of Lending Advisor during interviews. When asked if LA had changed his job in a positive or negative way, a loan manager replied with the follow comment, which turned out to be a typical response:

> 'To date it has been negative, but that is because it took so much time during loading, time that should have been spent doing other things, developing business. In the medium term, I am ambivalent. I am not hugely positive, but not really negative either' (loan manager KL 1995).

This owed much to the conditions of dependency in which they found themselves. They were witnessing a major re-organization at regional level across the UK, with the obliteration of several layers of upper-middle management. Branches were clustered in wider geographical groups than ever before and, in a further symbolic bid to uproot UK Bank from its geographical origins, the title of 'branch manager' was changed to corporate manager. One manager interviewed said that he would work with whatever cluster arrangement he was asked to, but adamantly refused to accept a change in title. He would adapt to everything else, so long as branch manager remained at the bottom of his letter paper. Meetings followed at which senior management insisted, and he continued to resist. The issue was never resolved. The managers' overall stress level contributed to a serious heart attack on his local golf course, and was forced into early retirement on health grounds.

The later stages of implementation were characterised by further radical changes in the organization of UK Bank, in particular the introduction of the 'corporate market program'. This involved the re-grading of accounts, which led to re-organization and 'migration' of portfolios between managers. The introduction of new 'business grades' to categorise each loan was enabling UK Bank to realise a revolution in its approach to portfolio management. The business grades formed the basis of a 'peer group' comparison made during the LA analysis, and also identified 'doubtful' accounts for UK Bank's revised 'exit policy'.

Loan managers tend to see many of their client's as unique cases, and often had problems adjusting to the concept of standard categories and the rigid industry codes used in Lending Advisor assessments:

> 'The [UK Bank industry code] is such a blunt tool. I am troubled by that. At the moment, the classifications are running to catch up with the business.

> ...There should be a health warning on these classifications. You don't draw too many conclusions from them' (loan manager PL 1995).

The use of LA industry codes and business grades, combined with the increasing hurdles put before companies seeking credit loans, concerned all the managers in this study.

> 'The current changes are squeezing the bottom of the portfolio....Lending Advisor has made it hard for [medium sized] businesses to get a loan, but so bloody difficult if you are a small business. It is an information driven system and provides an entry barrier for small businesses' (loan manager OL 1995).

This was the part of the portfolio spectrum that had previously engaged much of the loan managers' time, and been an expression of their judgement and expertise. Knowing which small or failing business to take a gamble on, assessing the subjective data and quality of the people involved required an entrepreneurial artistry that many managers had been proud to display.

Evidence began to emerge of the loan managers' frustration at both the rigid structure imposed by the business grades and industry codes, and the amount of time that it took to address each query raised by LA's system of alerts:

> 'Some have seen it almost as an arcade game seeing if they can move the meters up by playing with the figures. They are manipulating it, not using it. There have been cases where if a manager gets an alert, he will manipulate the figures until it is back in the acceptable zone, rather than have to go through the process of explaining it to head office. It maybe that the customer is a good marketer, but due to the current conditions in the recession is not showing up well on the meters. Rather than go through the process of explaining this fact, they will 'play with it' until it is marked as reasonable. We are trying to manage this response to the system' (local application manager, 1994).

For the majority, however, the redefinition of credit risk policy and implementation necessitated a shift in the kind of skills that they needed to display in order to be a loan manager in the new UK Bank. The key difference between credit risk assessment before and after Lending Advisor centred on understanding what constituted a risk and why a loan defaulted.

With the introduction of Lending Advisor, the ratio between subjective (local, character-based, intuitive judgement) and objective (scientific-rational, rule-based) criteria for risk assessment shifted in terms of influence. The objective component was increasingly weighted more heavily on LA. Pre-LA there was a belief that if a loan was secured (for example by property) it reduced the risk of default. In practice what it actually meant was that the bank secured the *possibility* of recovering the outstanding debt if the loan defaulted. Post-World War II Britain had experienced a boom in home ownership and property prices had soared. Loan managers in the south of Britain had relaxed into the routine of securing loans with property, rather than challenging the capital structure and assets of a company.

Early versions of Lending Advisor did not even have a 'security' screen as it was devised as a predominantly cash-driven, quantitative method of risk assessment. LA assessment corralled both customer and loans manager through 52 screens, forcing the

customer to produce more cash flow data in the form of management accounts than ever before. For some managers this shift in emphasis proved hard.

> 'Some managers are weak at credit. The training and LA use showed this and raised some training and skills issues that they weren't expecting…Some problems have arisen because Lending Advisor is a cash-driven model. The manager using it therefore has to understand cash flow' (project director, 1995).

The project director (1995) maintained that he had identified a 'north-south divide in this respect'. He attributed this to the

> '…predominance of tradable services vs. manufacturing industries in the south east of England. The basic approach to manufacturing is a longer term one that involves having assets to back loans. You need to have that experience. In the south of England they don't have those skills. Loans were mostly supported by property. They dealt with the services industries, and had experienced a mainly Tory government'.

All loan managers would have had to examine this dimension of risk assessment, however the degree to which they did so would vary according to their experience.

In order to effectively use LA, many loan managers now had to go back and learn basic skills of cash flow analysis. Customers and their advisors (usually accountants) also had to change their skill sets and support their loan application with robust statistical evidence of their management controls (including balance sheet summaries, margin statistics, expenses and stock turnover). As a consequence of LA assessment, accounts that might have looked 'healthy', and indeed be associated with a family that had banked with a branch for generations, may now look awkward and in risk of default. The shift to LA-style risk assessment also created a significant hurdle for certain kinds of unorthodox companies, for example, 'one-off' media or film production companies with no history. Other areas challenged by LA assessment are agriculture, due to its irregular seasonal cash flow yet demanding capital intensity, and rather ironically in light of its role in the 1992 losses for UK Bank, property, which has high development costs representing a long term investment in an uncertain market.

A further, quite different concern rests with the possibility that the combination of Lending Advisor and new performance related pay schemes would generate risk aversion among loan managers. The intervention of Lending Advisor into the manager's risk assessment has altered the stakes. It has altered the terms and scope of the risk interpreted by the manager. More of the entrepreneurial risk involved in making a loan that does not conform to Lending Advisor's parameters is assumed by the manager in a shift that could prove to have high consequences not only for UK Bank, but for the nation's economy and the way modernity is being shaped.

ANALYSIS OF THE LENDING ADVISOR CASE

Introduction

In this section the Lending Advisor case study material, presented above, is analysed. Social theory is used to support this analysis in a way that highlights the connection between local events within the organization under study, and broader debates concerning the transformation of society. The analysis is divided up into two sections, the first of which describes the theoretical context in which the analysis will

be conducted: the risk society and reflexive modernization. The second substantial section uses conceptual links drawn from the risk society thesis to communicate findings inferred from the empirical material. The aim of the analysis is to initiate and explore a line of debate concerning the nature of IT-enabled modernization in credit risk processes.

THEORETICAL CONTEXT: THE RISK SOCIETY AND REFLEXIVE MODERNIZATION

This section will attempt to outline the concepts of reflexive modernization and the risk society which form the theoretical backdrop for the analysis that follows. Ulrich Beck developed the idea of reflexive modernization in his 1992 book, *The Risk Society* (1992). He is part of a community of social scientists who share a common belief that 'we are witnessing not the end, but the *beginning* of modernity – that is, of a modernity *beyond* its classical industrial design' (Beck 1992 p.10; See also Giddens 1990; Beck, Giddens and Lash 1994). What motivates proponents of reflexive modernization is a shared conviction that traditional research categories have stagnated and do not focus on the dynamic shifts taking place in society (Wynne and Lash in Beck 1992). Beck's work has had a profound impact on many academics, and the risk society thesis represents a breakthrough in a long-running debate between modernity versus post-modernity. The concept of reflexive modernization is not presented as a new orthodoxy, but as a stimulus to 'political will', and should be engaged with at an 'oblique, interpretive and very critical distance' (Lash 1994 p.198).

For Beck (1992), human development consists of three phases: pre-modernity, simple modernity (industrial society) and reflexive modernity (risk society). The very success of industrial society in harnessing techno-economic innovation, establishing welfare states and democratic freedoms, will according to Beck (1992), bring about its transformation. Our efforts at modernization in western societies have brought us many complex systems: for example, advanced nuclear capability, genetic modification, reproductive technology and sophisticated computerization. These developments have introduced new dimensions of risk that transcend time and space. Undesired side-effects remain latent, following silently in the wake of 'progress' until an event occurs which moves them from the hypothetical to the menacing. For example the computer generated mayhem of Black Monday on the global financial markets, the appropriation of nuclear arms by unstable governments, or the arrival of 'Dolly' the cloned sheep. We are faced by a future that 'looks less like the past than ever before and has in some basic ways become very threatening' (Beck 1994 p.vii).

Reflexive modernization is a phase of 'active critique' when modernization means not just automation and rationalization, but a stage characterized by *confrontation.* This has particularly intensified around issues relating to the rules and resources of society, and has involved the interrogation of social forms. For example, Beck focuses on the ecology debate (1992, 1995) and Giddens' has written extensively on life narratives, intimacy and love relationships (1990, 1991, 1994). The stimulus for these efforts has been the observation of acute personal and collective vulnerability, and the breakdown of traditional protective institutions (for example parliament, trade unions, marriage, family) in the face of growing social, political and economic risks. Beck

explores this in *The Risk Society,* and organizes the thesis around three main themes: individualization, redistribution of wealth and risk, and the destandardization of labor.

Individualisation

Looking back in history, one can see that feudal roles and traditions were superseded by those of industrial society, namely the nuclear family and wage labour. Beck (1992) argues that the welfare state dissolves dependencies, relations and institutions by providing a standard of living that releases people from the traditional commitments and consciousness of class stratification, family and gender. Emphasis has been put on individuals to sustain and advance themselves by entering the labour market. This process of individualisation progressively releases agents from traditional structural constraints.

In the emerging post-traditional environment, individuals have more freedom to choose how to live their life within society, for example what job to try for, whether to marry, if and when to have children, how to arrange child-care, where to live. Previous generations within western societies had the answers to these questions predetermined by gender or class. Although choices in contemporary society have become 'obligatory' (Giddens 1994 p.76), they are constrained by power relations and will refract back upon decisions made elsewhere.

The key to understanding reflexive modernization is to make the shift from seeing the redefinition of industrial society traditions as an 'out there' phenomenon, and to begin to see them as 'concerns of the everyday' (Giddens 1994). The risk society is emerging in the context of globalization (Robertson 1992, Albrow 1996), and in order to develop a sense of the contemporary 'personal political' we need to recognize an intensification of the link between the local and the global (Barrett and Heracleous 1999). The way in which we appropriate and interpret the world, our everyday choices and the conditions that shape them will have far reaching consequences in the risk society.

Redistribution of the production of wealth and risk

The second key theme in Beck's reflexive modernisation thesis is the belief that the industrial and scientific developments that have taken place in modern society have put wealth production above risk production. Beck defines the concept of risk in a particular way in order to make his thesis. 'Risk may be defined as a systematic way of dealing with hazards and insecurities induced and introduced by modernisation itself' (Beck 1992). He suggests that we now face a set of risks and hazards to our existence that have never been faced before, and which will dominate the next period of our history. The distinctive quality of these risks is that they are no longer bounded by time and space, for example the Chernobyl atomic accident. The phrase that he constructed to communicate the transformation in risk is: poverty is hierarchic, smog is democratic (Beck 1992). Beck asserts that a transformation in our logic is necessary '...while in classical industrial society the 'logic' of wealth production dominates the 'logic' of risk production, in the risk society this relationship is reversed (Beck 1992).

If we are going to learn to live in a risk society, we have to move on from the belief that science is infallible and embrace the critique of science and technology - a critique of progress itself (Beck 1992 p.160). Instead of denying reports of risks, scientists and those who use the products of techno-scientific effort should accept

them as 'empirical challenges', and work towards constructing a managed response. Rather than rejecting science, Beck emphasises that we are more dependent upon experts now than ever. However, he calls for a cross-discipline approach that embraces ethics and public debate to replace the stainless steel modernist position of non-responsibility adopted by the majority of the scientific community to date.

Destandardisation of labour

The third aspect of reflexive modernization is the destandardization of labor. Industrial society has traditionally been conceived of, and organized around, an employment system centered on the concepts of 'firm', 'job', 'career' and 'wage labor'. Beck (1992) maintains that information technologies and new forms of organizational rationalization are dissolving the standard spatial and temporal assumptions about work. Computer-based information and communication technologies enable many work processes to be independent of geography, and allow organizations to construct more flexible working arrangements. These innovations are not, however, leading back towards the traditional goal of full employment. Instead, Beck argues, they are serving to generalize underemployment, pluralize contractual relations and change the visible character of work previously recognizable by offices in dedicated buildings with associated 'front stage' paraphernalia. So occupation, like the family, has lost many of its former assurances and protective functions (Beck 1992).

Beck's (1992) notion of the destandardization of labour helps us to make sense of some of the events taking place within contemporary corporations, and relate them to broader processes of social transformation. He suggests that we are currently witnessing a process that he refers to as *second rationalization*. For Beck (1992), an expression of the 'first' rationalization was Frederick Taylor's philosophy of scientific management. The second rationalization is different in that it is a reflexive rationalization, in which seemingly stable organizational boundaries within and between divisions, sectors and so on, become malleable (Beck 1992). As a consequence, we are presented with choices about the kind of future that we want to shape, for example opportunities to change company policy regarding the governance of the workplace and its dynamic with the community in which it is situated.

Reconceptualizing modernization processes

The majority of research into the modernization of industry tends to be myopic in focus and narrow in scope, regarding modernization as a process of technological rationalization and change in organisation. The purpose of this paper is to adopt Beck's broader understanding of modernization in order to extend the focus of analysis and identify emerging trends, which are often overlooked by more traditional approaches. According to Beck (1992), modernization means:

> '…surges of technological rationalization and changes in work and organization, but beyond that it includes much more: the changes in societal characteristics and normal biographies, changes of lifestyle and forms of love, change in the structures of power and influence, in the forms of political repression and participation, in views of reality and in norms of knowledge. (Beck 1992)

The distinctive way in which scholars of reflexive modernization have conceptualized societal change is interesting and insightful. However, like any theoretical model it

has limitations. The work of Beck and Giddens has remained, for the most part, at the level of macro social theory. Although they ascribe a key role to information and communication technologies, they lack an understanding of its nature or in-depth case studies which illuminate their claim. It is hoped that the analysis that follows both extends and contributes to the literature on reflexive modernization by grounding it with empirical material.

The particular value of the risk society thesis is that, in a context of widespread uncertainty as we spin in the face of 'black boxed' decision-making processes about key issues of societal development, it supports and encourages us to engage in what Beck calls 'justified critique'. One has two choices: to sit back on the 'runaway train' of societal transformation and wait for destruction, or try to understand and influence the direction that it is going to take.

AN ANALYSIS OF THE FINDINGS FROM THE LENDING ADVISOR CASE STUDY

Introduction

This section analyses the Lending Advisor case study against the backcloth of reflexive modernization and the risk society thesis. The findings presented explore how the theory of reflexive modernization may be manifesting in practice and raises a number of social, political and economic issues for further debate. It is divided into four sub-sections. The first pursues Beck's (1992) suggestion that we must challenge the epistemological basis of decisions shaping and influencing the future by investigating corporate risk positions for ourselves. The second sub-section aims to raise awareness about the role of computer-based information systems in enabling modernization processes. Attention is drawn to the particular management demands made by strategies of computer-mediated work processes in the context of globalization. The third sub-section considers issues of responsibility, participation and politics of unforeseen side-effects generated by IT-enabled modernization of credit risk processes. The fourth sub-section concludes by reflecting upon the way that individuals choose to appropriate, interpret and survive IT-enabled processes of modernization processes in corporations like UK Bank. It is suggested that a transformation of work and work life means a transformation of society, which demands a redefinition of our approach to both research and practice.

Investigating corporate risk positions for ourselves

It was suggested in the introduction that lending money is about holding a certain vision and faith in the future which shapes everyday actions. Risk is not an object, but a way of perceiving potential positives and negatives in a situation, a choice about what is important and what can be scoped out when making a decision. When sanctioning a loan, the loan manager is not just assessing a customer in terms of their current creditworthiness, but simultaneously constructing scenarios or projections that colonize the future with various probable outcomes. As Bernstein suggests, 'the ability to define what may happen in the future and to choose among alternatives lies at the heart of contemporary society' (Bernstein 1996 p.2). If a major financial services institution changes the way in which credit risk is defined, assessed and managed it leads to changes in the kind of customers that they identify as viable, which can have considerable impact in both the short and long term for a variety of stakeholders. The premise of this paper has been that the implementation of this

redefinition through the introduction of a new computer-based technology and enacted in everyday acts of normal consumption, needs debating.

The risk society thesis is particularly supportive of such an effort, with Beck encouraging researchers to 'engage in controversial and alternative discussions on the risks of certain steps and plans' (Beck 1992 p.253) drawing upon all the interdisciplinary resources that they can. In making this point, he appropriates Popper's well-known assertion that 'criticism means progress' (Beck 1992, p.234). For Beck:

> 'The concept of risk is like a probe which permits us over and over again to investigate the entire construction plan, as well as every individual speck of cement in the structure of civilisation for potentials of self-endangerment' (Beck 1992 p.176).

Despite any protest from corporations like UK Bank that a change to their corporate policy is an *internal matter*, the work of Beck provides powerful rhetorical fodder with which to take a strong theoretical stance claiming legitimate cause to challenge their activities. It is, therefore, proposed that from this perspective risk definitions can be understood as a 'position statement' by society, effectively statements about how we want to live. As Charles Perrow put it:

> 'Ultimately, the issue is not risk, but power; the power to impose risks on the many for the benefit of the few'
> (Perrow 1984 p.306)

The risk society thesis calls upon us to embrace a 'reflexive learning process', which challenges the epistemological basis of decisions shaping and influencing the future. It prompts us to consider what the conditions underpinning risk positions are, what social situational questions arise from them, and how these relate to forms of knowledge held by people other than the technological or economic elite.

> 'This reflexive learning process…[means] negotiation between different epistemologies and subcultural forms, amongst different discourses; and as such it [entails] the development of the social or moral identities of the actors involved.' (Wynne and Lash in Beck 1992 p.2)

The anxiety generated when the basis of legitimate knowledge creation, and therefore the source of support for decision-making, is questioned is a key part of the risk society thesis. Furthermore, it gets to the heart of the issue in credit risk assessment and, in so doing identifies the epistemological tension that characterizes the Lending Advisor case. This is the debate between those who maintain that better decisions are made using a quantitative approach, and those who believe that subjective methods need to be taken into account.

> 'This is a controversy that has never been resolved. The issue boils down to one's view about the extent to which the past determines the future. We cannot quantify the future, because it is an unknown, but we have learned how to use numbers to scrutinize what happened in the past. But to what degree should we rely on the patterns of the past to tell us what the future will be like? Which matters more when facing a risk, the facts as we see them or our subjective belief in what lies hidden in the void of time? Is risk management a science or an art?'
> (Bernstein 1996, p.6)

The basis of risk management tools, like Lending Advisor, are economic and statistical theories whose aim is to bring risk under control by identifying patterns in financial data. The assessment produced by LA represents a *partial* view of the data input, and therefore a partial understanding of the customer and their proposal. Before its introduction the way in which risk was weighed up in UK Bank was almost personal; despite a general training each loan manager had his or her own idiosyncrasies, priorities and beliefs which weighed-in when they undertook assessment of credit loan applications. Lending Advisor's introduction was not only designed to influence decisions by presenting an assessment of a loan's likelihood to default based upon historic data, but also impose a standardization of credit risk assessment.

Every definition of risk creates winners and losers, therefore a major shift in methods of risk assessment and management within an institution should draw our attention. The method embedded in LA evokes particular concern since intangibles, like the impact on community, tend to be scoped out of this kind of scientific-rational risk assessment process. The attention of this analysis is not just on institutional reflexivity, but also on 'reflexive community' and the consequences of its marginalization and suppression in the current definitions and management of risk[3]. This is illuminated by interview data from loan managers who were either concerned about LA's impact upon small and/or weak businesses or working in areas with concentrations of unorthodox or irregular forms of business, for example media as well as certain kinds of research and development, agriculture and property.

The purpose here is not to suggest that computer-based technologies, like Lending Advisor, are *bad* and should not be used, but rather to emphasize the particular demands of managing such technologies in society. Perrow (1984 p.342) suggests in the conclusion to his book, *Normal Accidents: Living with high-risk technologies*, that the consequences of a method of risk assessment reflect the quality of the organization and the way in which it is managed. A major concern in the Lending Advisor case is that the epistemological shift, which occurred alongside its implementation, redefined UK Bank's management priorities.

For example, for LA to be used effectively it has to be positioned vis-a-vis human expertise with great care. Lending Advisor is, as one of its users wisely said, 'a piece of interpretive software', which has the potential to augment and support human expertise. However, in the second round of interviews, many managers felt that lending was becoming more meter-oriented and that their expertise, and particularly their *experience* counted for less and less. Compulsory redundancies and early retirements continued unabated, and by the close of the period of study, all the loan managers over fifty years of age interviewed for this study had left UK Bank.

> 'When you talk to analysts at regional level, they discuss cases more in terms of meters and [UK Bank] business grades, nowadays'
> (user/manager LL 1996; user/manager RL 1996)

Evidence from the case study reveals that many senior figures within the organization had been seduced by Lending Advisor's particular brand of credit assessment.

[3] The work of Scott Lash (1993, 1994) and Brian Wynne (1996) are particularly insightful on this point.

'Automated credit rating is more effective than the judgement of Bank staff – and certainly cheaper'
(CEO UK Bank, 4th June 1995)[4]

Knowledge of local conditions had been institutionally re-prioritized, and many of those who had aspired to the identity and lifestyle of a traditional local branch manager found their expected career trajectory wiped out by organizational changes. With the emphasis now placed upon the value of LA assessments, the timely entrepreneurial artistry of the loan manager with its basis in situated, local lay expertise seems itself…at risk.

The commercial hubris with which computer-based information systems, like LA, are heralded into organizations promises senior managers a 'dream of perfect control, which can heal egos wounded by their need for certainty' (Zuboff 1988). The concern is that in the shadow of this dream, and in the light of the demographic shift taking place within UK Bank, loan managers may lose the experience of critical judgment that would allow them to 'know better than, to question, to say no' (Zuboff 1988). In other words, as a generation of 'LA-first' lenders ascends, UK Bank may lose the embodied, situated knowledge that allows loan managers to respond, rather than simply react. Lending Advisor brought many positives benefits: organizational memory, central access to data, e-mail, 'what-if' projection facilities. Notwithstanding, it is suggested that it will be the quality of the management of expertise within UK Bank that will prove crucial to the longevity of the corporation. The need for changing management practices will be an important part of the next sub-section, which discusses the role of IT in enabling modernization of key work processes.

The role of computer-based information systems in enabling the modernization of industry

In the previous sub-section it was proposed that corporations have choices about the kind of risk definition and method they decide to implement, and a discussion about the consequences of deciding to implement the approach embedded in Lending Advisor's was initiated. In the following sub-section, the paper goes on to suggest that the choice of medium to enable modernization processes, such as these, shapes the way in which those processes emerge[5]. Despite widespread belief that introducing computer-based information systems are the way to cope with turbulence in the business ecology (Ives and Learmouth 1984; Scott Morton 1991), few people have an in-depth understanding of their nature, even the senior managers who decide to introduce them.

Beck (1992) ascribes 'micro-electronics' a key role in fuelling the transformation of society, but does not provide further insight. Analysis of empirical material, like the Lending Advisor case, can provide depth to current understanding, and extend research by illustrating how macro theories, like the risk society, may be manifesting

[4] His parting comment to me, as he left the reception after his public lecture at xxxxxxxxxxx in 1997, was that 'We had to bring in Lending Advisor, because bank managers fall in love with their customers'.

[5] Monteiro and Hanseth's (1996) work on the introduction of information systems standards is an insightful expression of this notion of social shaping, which of course has its roots in the work of Bijker, Hughes and Pinch (1986). For a recent discussion, see Williams and Edge (1996).

in practice. This is important because of the distinctive capacity for IT to both *enable and constrain* modernization processes (Orlikowski 1991a, 1993, 1996), or indeed sustain the status quo which places particular demands upon management at every level within the corporation. It is suggested that this situation is further complicated by the context of emerging globalization (Albrow 1996) in which IT-enabled organizational change takes place.

The foundation of any attempt to discuss the distinctive nature of computer-based information systems has to be the evocation of Zuboff's seminal (1988) work. In her book 'In The Age of the Smart Machine', she suggests that computer-based information systems don't just automate, they *informate.* Even though Zuboff's term is now widely used in information systems research, it is worth quoting her recent description of it for further consideration in relation to the LA case:

> '…even when technologies are applied to automate, they simultaneously set into motion an entirely unique set of reflexive processes, translating newly automated activities into data and information for wide-ranging display. Information technologies symbolically render processes, objects, behaviors, and events so that they can be seen, known, and shared in a new way. In other words, these technologies codify and illuminate interior detail, creating transparency where there was opacity, an explicit public text where there was once fragmentation, privacy, and intuition.'
> (Zuboff 1996, p.15)

The Lending Advisor case is manifest with examples with which to explicate this 'rich insight' (Walsham 1995). One of the attractions of the Lending Advisor software for senior management was its capacity for creating transparency in order to increase monitoring and control of loan managers. A computer-based executive information system was built, driven by the LA database, which allowed management to 'drill down' through the data to monitor lending activities. Although loan managers were accustomed to regular supervision and inspection of their accounts, Lending Advisor provided a physical reminder of the new 'panoptic' methods in use. As the local application manager (LAM) for the Cambridge region noted:

> 'LA marks the first time that technology has arrived on the desk of the branch managers. One manager referred to it as the "malevolent blue and yellow eye sitting on the desk staring at me".[6]
> (local application manager, 1994)

This resonates with the risk society thesis which suggests that, with the emergence of the *transparent organization*, the place of orders and obedience is being taken by the electronically monitored self-coordination of functional elements under presumed and much more strictly enforceable principles of efficiency (Beck 1992 p.218).

Lending Advisor has forced into public view a codification of the 'interior detail' of local lending processes. As illustrated by the section on traditional credit risk assessment processes within UK Bank, many loan decisions used to be based upon scanty fragments of customer and economic data. So long as the level of defaults remained acceptable, lending was regarded as almost a private and personal matter within the local branch managers' discretionary limit. Credit loans were often

[6] The Lending Advisor information system displays a bright blue and yellow LA logo over the computer screen when active.

sanctioned on the basis of intuition, the quality of the customer relationship and a few high level statistics. Lending Advisor now forces loan managers to be explicit about the strengths and weaknesses of the application, populating 52 screens with detailed customer data. If the loan manager does not populate a screen, or ignores an aspect of bank policy, LA flags this and the loan manager has to provide mitigating circumstances.

As discussed in the previous section, the challenge set before those who use, supervise and manage Lending Advisor will be to promote its potential to augment human expertise in order to counterbalance the apathetic, decontextualized calculations underlying it. The increased capacity to monitor and manage UK Bank's portfolio is enabled by an exacting and transparent discipline, which could systematically inhibit intuitive risk-taking. LA generates a valuable organizational memory within its database, a resource that UK Bank hope will form the basis for information products and services in the future, however it also has the potential to engender a demanding sense of faceless 'data-overload' to harry both loan managers and clients.

This situation is further complicated by the context of emerging globalization (Albrow 1996) in which IT-enabled organizational change takes place. The social theorist Anthony Giddens (1991) has referred to IT as modernity's 'own media', bound up in the development and expansion of modern institutions. It is proposed that the distinctive nature of IT as a medium for modernization processes converges with globalizing tendencies and intensifies them. Whilst an extensive discussion of IT and globalization cannot be presented here, a brief insight into one of the most important aspects of it will be afforded, in order to emphasize its complexity and significance[7]. The aspect selected for further discussion is a key characteristic of the emerging global age: the intensification of dynamic relationships between the local and the global (Albrow 1996; Borja and Castells 1997).

It should be stressed that processes of globalization are emerging in an uneven, sometimes problematic way and its very definition is contested (Robertson 1992 p.182). Having sounded this note of caution, it is proposed that computer-based information systems focus our attention on a fairly identifiable dynamic because of their recognized capacity to reorganize data across time and space. Information systems generate what Castells refers to as 'electronic flows', that mould and shape the economy through relations between units that are far away from each other in terms of space (Castells 1996; Borja and Castells 1997).

In rationalizing credit assessment processes and providing a central repository for data, Lending Advisor facilitates their selective resurrection and reconstitution at another time, in another place, for use by any manager within UK Bank. Lending Advisor frees UK Bank from the constraints associated with traditional risk management where data was held in local, paper-based data morgues. The global transparency and central database established by LA means that the results of the decisions made by loans managers are no longer bounded by time and space. Lending Advisor accumulates data associated with specific local decisions as historic

[7] See Barrett and Heracleous 1999 for a more comprehensive discussion of IT and globalization.

data, and uses it as the basis for its assessment of other loans, which influences the future lending behavior of managers and informs national bank lending policy.

Whilst this may play an important role in protecting UK Bank shareholders from major losses in the future and provide the loan managers with a further means of risk assessment, there may also be less desirable implications. In making the shift to the 'glocal' (Robertson 1992 p.186), it might be forgotten that this is a realm of patterned space, of structured data, not *information*. A further caution to managers, then, comes from another seminal piece of information systems research, this time by Richard Boland (1987), which is updated and illuminated by data from the LA case.

Evidence from the Lending Advisor case shows that, contrary to the prejudice of the design and development team, mature managers were actually more effective LA users because they could *interpret* the data and relate its assessment to their own experience. In contrast, trainers became frustrated with younger managers who were quick to pick up the necessary computer skills, but not as skilled in interrogating the data that LA presented to them. How then do we understand UK Bank's decision to retire or 'fire' the majority of its managers over 50 years old? It is suggested that this reflects a basic and frighteningly persistent miscomprehension about the difference between data and information.

As Boland (1987) suggests, a human agents' capacity to appropriate data is part of the distinctive way a person has come to understand the world. An encounter with data changes the knowledge, beliefs, values or behavior of a person. Computer-based information systems can store, process and manipulate data, rendering it observable on a computer screen, whereas information is a skilled human accomplishment. If managers confuse this basic difference and construct strategies around the notion that information can be unproblematic, predefined, and pre-packaged by a computer, they will exacerbate the possibility that the introduction of Lending Advisor will have negative consequences.

The speed and scope with which information systems, like Lending Advisor, are being taken up by financial institutions lends some urgency to this debate because as Beck says, along with the growing capacity of technical options [Zwekrationalitat] grows the incalculability of their consequences (Beck 1992 p.22). It is the governance and management of these potentially high-risk consequences that will concern us in the next sub-section

Who, what, when, where and why? The stork doesn't bring consequences - they are made

In the preceding sub-sections, the social construction of corporate risk positions and approaches to the management of information systems used to enact them have been discussed. It has been asserted that there are multiple possible responses to the dilemmas of modernization, and that there is no inevitable outcome to the use of new technologies like Lending Advisor. In this sub-section, the notion that our societies are being 'shaped by a stream of choices' (Giddens 1991; Beck 1992) made by individuals and groups during its transformation will be examined further. Whilst the intensification of links between the local/global are again emphasized, it will be suggested that laying bare certain aspects of local agency is not straightforward. If we are to take seriously the notion that, as Geertz says, the local becomes both the

'models of' and 'models for' the global we need to explore the possibility that some key decision-making processes are being 'cloaked' from view with potentially problematic consequences for responsibility and participation in societies.

Considering the potential social and economic risks associated with IT-enabled risk modernization, the limited general knowledge about who, what, when, where and why new technologies like Lending Advisor are being implemented is concerning. This lack of debate may be partly explained because these are emerging technologies in an industry experiencing tumultuous change, however perhaps there is something deeper here that should disturb an otherwise routinized quiescence to brushes with 'progress'. It is suggested that it is often hard to identify who actually *is* involved in decision-making processes surrounding the governance of new systems like Lending Advisor. The reasons for this are complex[8], but for the purposes of this discussion they will be focused upon two main points. Firstly, using evidence from the Lending Advisor case it will be argued that the implementation of software like LA falls between networks of personal responsibility and interest. Secondly, it is proposed that this reinforces a prevailing corporate interest to establish faceless positions of non-responsibility, particularly when using new technologies to implement risky changes. Finally, the potential consequences of this will be highlighted.

One of the strengths of a longitudinal case study is that the dynamic context of project work emerges. Each time another round of interviews was arranged for the three-year case study, the movement of staff on and off the project was striking. The Lending Advisor case was littered with examples of individuals who were enticed, or made sure they crafted themselves, away by career moves. For example, the former LA project director (1996) joked that the 'key was to move on before you actually had to use the system yourself'. The team member working on 'expert user input' (1995) declared that ' I only chose to work on the LA project so that I could come into contact with high level people who could help my career. I'll only be here eighteen months'.

The revolution of human resources on projects like Lending Advisor means that, among other things, responsibility is regularly diffused. This flaccidity makes project definitions easy prey for the shifting interests of dynamic political networks. It may also help understand emergence of the unexpected on some projects (Mintzberg 1994; Mintzberg and Waters 1985; Orlikowki 1996; Orlikowski and Tyre 1993) and contribute to a phenomenon that has evoked recent interest, the 'drifting' (Ciborra 1991; Ciborra and Jelassi 1994; Yetton, Johnson and Craig 1994) of corporate strategy. The most important point for the purposes of this paper is that project abdications, however brought about, come with a certain sense of *absolution* for project legacies. Positions of non-responsibility for the consequences of IT-enabled modernization are constructed; thus, 'systems come into being in which perceivable *rulers* are becoming a rarity' (Beck 1992 p.218).

It is suggested that a growing tendency to use the term 'IT-*enabled'*, in both research (Scott Morton 1991; Yetton, Johnson and Craig 1994; Markus and Benjamin 1997)

[8] Beck (1992) would assert that this is a symptom of the rise of corporate 'sub-politics', a complex concept with profound implications for the role of science in society, the nature of participation in political systems, and ethics of corporations. Since this is a difficult concept to fully engage with, for clarity it will be selectively appropriated here. It can be found in Chapter 8 of Beck (1992).

and practice, raises further concerns in this respect. The variety of terms used to describe the role of technology in change processes reflects a broader debate among researchers about agency and technology (Smith and Marx 1994). An expression of this is the use of terms like 'IT-induced', (Venkatraman 1991), 'computer-mediated' (Herring 1996), 'computerization' (Kling 1996), 'actor' and 'actant' (Latour 1987, 1999; Walsham 1997); all of which imply subtly different ways of conceptualizing agency and technology. One remarkable aspect of the literature is that, despite the potential academic implications, authors rarely define terms like 'IT-enabled'. Indeed, recent research efforts have questioned whether we have adequate resources to understand the 'essential characteristics' of technology, and to assess its relationship to our work and organizations (Grint and Woolgar 1997).

As noted at the beginning of the paper, 'to enable' means 'to give the means or authority to do something', 'to make possible' or in computing parlance 'to make a device operational, to switch on' (Oxford Concise English Dictionary, 9th Edition). For the most part, usage of this term is probably chosen to emphasise that without a specific technological innovation, certain kinds of organizational change could not take place. To an extent this makes sense of many situations, for example, it is clear that the introduction of Lending Advisor provided the *means* to make the modernization of credit risk processes within UK Bank *possible*. However, it is suggested that there is a fine line between IT providing the means, and using the implementation of IT to provide the *authority* for a course of action. The implications of this ambiguity in the term 'enable' should be considered carefully.

One of the most extensive, and widely read, pieces of literature that chooses to present IT as an 'enabler' is Scott Morton's (1991) edited book *The Corporation of the 1990s*. In the chapter by McKersie and Walton (1991) evidence is presented from multiple, empirically-based research projects to illustrate the role of IT implementation in various organizations. They describe three different ways in which technology has been used to 'enable' organizational transformation. Firstly, they discuss examples of employees pulling a technology into organizations, secondly they present cases where senior management use IT to enable 'strategic alignment', and, lastly, they examine instances where new technology has been used as a catalyst for organizational change (McKersie and Walton 1991, p.253).

Evidence from the LA case often resonates closely with McKersie and Walton's (1991) last grouping, where technology is used as an agent for 'unfreezing the status quo', marking a 'significant emotional event' (McKersie and Walton 1991, p.254) within UK Bank. Reluctant to bear responsibility for the 'blood on the floor' (McKersie and Walton 1991) necessary to implement a program of extensive organizational change, senior management used Lending Advisor as their foil. After the initial implementation, when LA was taken out of the hands of those who had originally constructed the 'vision' of LA within UK Bank, further extensive change was given authority by the necessity to ensure the technological and social 'fit'.

Corporations maintain that IT-enabled modernization is an *internal matter*, and that the consequences for society are not part of their mandate. Being *in business,* at the end of the millennium, seems to imply writing a 'blank check to progress' (Beck 1992 p.203) and responding to any challenges to corporate governance by decrying the times we live in. This is reflected in the words of the UK Bank CEO:

> ‘It does not fall to every generation, in every corporation, to do good in society’
> (Public lecture at XXXX 1997)

In rushing to modernize, using the ‘justifying cloak of techno-economic progress’ (Beck 1992 p.184), it seems the political consequences related to the direction of societal change are not the responsibility of those who generate them. We may have established the principle of the ‘polluter pays’ in ecological domains, but are prepared to allow techno-economic progress to become ‘the continuous changing of society without a program or a vote’ (Beck 1992 p.214).

The local changes documented in the LA case study have potentially significant side effects for both individuals and societies. Not only has Lending Advisor been used to enable major changes in work and work life within UK Bank, it is also regarded as a leading edge computer-based information system that has established an industry trend towards automated credit lending processes. The events at UK Bank brought about a categorical shift in the dynamic relationship between individuals and their ecology at many levels. The next sub-section looks at the implications of IT-enabled credit risk modernization for the individual and society.

Consequences of IT-enabled modernization for the individual and society

It has been proposed that computer-based information systems are deeply implicated in the processes that comprise and reshape corporations and with them the institution of work, work relationships, work life - key characteristics of industrial society. Issues of responsibility, participation and politics have been discussed with regard to the governance of these influential changes. This sub-section focuses upon the response of the individual to IT-enabled processes of modernization, and the new challenges that they face in their work lives as a consequence. A key aspect of the line of argument presented in this paper, supported by the risk society thesis, is that a transformation in work and work life means a transformation in society and this will be considered further here.

The experience of work and work life in contemporary western society is a complex one in which the individual finds themselves forced to make decisions which plot their own course through a stream of the unexpected. On one level they find themselves with greater independence and opportunities; for example new technologies like Lending Advisor supported the introduction of higher personal discretionary limits for loan managers, and swept away the somewhat repressive, nepotistic old family networks to make way for a meritocracy. Loan managers were liberated from local geographical boundaries, and (eventually) supplied with laptops to support a shift away from their role as ‘local branch manager’ in the community, towards the notion of mobile ‘corporate manager’. However, such changes were inextricably intertwined with the imposition of harsh cost-reductions, uncertainty in career trajectory, challenges to expertise and the loss of social status.

These were stressful years for the loan managers whose secure, traditional ‘job-for-life’ career was transformed into a far riskier life-position. In the days of paper-based credit loans, managers cherished their reputation and polished their ability for presenting credit applications that would be sanctioned, without comment, from regional risk analysts. In what was perceived as a ‘big bang’ implementation, loan

managers were suddenly sat in front of a computer-based information system that the majority of them did not understand. Many of them, particularly in the early stages of implementation, felt they no longer knew how to do an integral part of their job. One loan manager (1995) said, 'When I was told that there were 52 screens on the system during the training week, I felt like they had put me in front of a maze. I mean… I felt as if they were saying, "Now find your way out"'.

Before Lending Advisor and the organizational changes that accompanied it, local bank managers were noted for their loyalty to their company and there was a sense of trust between the employer and employee. However, researchers have noted that as modernization advances, most forms of social activity – collective and individual – take place in contexts that are increasingly stripped of traditional mechanisms of support (Thompson 1996; see also Heelas, Lash et al 1996). Occupation, like the institution of family, has lost many of its former assurances and protective functions (Beck 1992 p.140).

Loan managers found themselves in a declining job market, experiencing an organizational 'climate of attrition' (Hallier and James 1997). Realizing their new personal and professional risk position, many individuals have been forced to redefine their 'psychological contract' with their employer (Hallier and James 1997). This can be both liberating and immensely stressful, demanding creative thinking and risk-taking with an uncertain outcome. The success of the labor market in liberating us from traditional gender or class fates means that we are now more susceptible to institutional changes (Beck 1992), such as those within UK Bank.

> 'In the individualized society the individual must therefore learn, on pain of permanent disadvantage, to conceive of himself or herself as the center of action, as the planning office with respect to his/her own biography, abilities, orientations, relationships and so on'.
> (Beck 1992, p.135)

Individuals have to shift their focus from 'job' to 'career', but not career in the sense of progressing up an institutionally pre-determined hierarchical ladder judged by 'time served'. Rather, this is a set of decisions concerning the next steps to take when faced with many sets of paths that traverse a potentially risky terrain. In effect, individuals and groups now have to pursue their own 'organizational foreign policy' (Beck 1992 p.217). Contemporary conditions demand that individuals engage in a constant monitoring of the changing corporate ecology, and be prepared to adapt their skill set in order to avoid slipping to the 'other side' of the internal job market (Giddens 1991; Beck 1992). For example the loan managers had to make a critical shift from the 1980's tendency of justifying lending with security (for example, the clients' property), towards an LA-driven historic cash flow analysis.

Individuals pursue a negotiated future in which the interconnectivity between changes in institutional policy and the structuring of private lives is all too clear. For example, the policy decisions to provide day-care facilities at work places or, in the case of Lending Advisor, the provision of laptops can have a direct impact on the way that families organize their interaction. The long hours involved in LA use disrupted family life and caused tensions, for example, one manager had not seen his five-month-old daughter put to bed since the week she was born.

Personal adjustments to institutional change not only happen at the level of family and relationships, they also challenge self-identity. Traditional occupations, such as those within UK retail banking, provided guiding social norms as to appropriate behavior and expectations. During the course of the LA fieldwork important issues relating to the shifting status and identity of work practices emerged. For example, in the midst of large-scale re-organization and redundancies it was curious to find that the most persistent and emotive issue raised by middle managers during interviews was *typing*. Indeed, it threatened the implementation of Lending Advisor in one region. Most managers associated keyboard work with clerical status and regarded it as the domain of 'the girls in the back office'; in sum, typing appeared to threaten some managers' sense of masculinity. Another example of the 'personal political' emerged as a side effect of the major re-organization at regional level during which the title of 'local branch manager' was changed to 'corporate manager'. This broke a crucial link between the loan managers and their local community that had provided a further important traditional source of identity.

As mentioned at the beginning of the sub-section, the risk society offers opportunities as well as increased perceptions of risk. Even in situations of dependence, such as the compulsory use of new technologies in key work practices, individuals find ways of making the system work for them. It is suggested that this resonates closely with Giddens' (1991, 1994) notion of local empowerment, which is representative of the optimistic nature of reflexive modernization theory. This was expressed in many ways in the LA case study; for example, some found ways to 'fiddle' the system, playing with the meters 'like an arcade game' until it gave them the assessment that supported their own analysis of a credit application. Loan managers were frequently drafted onto user-groups by the LA project team and used these opportunities to provide personal feedback on the system that might shape future LA development efforts. One of the most effective ways of appropriating LA was when loan managers used their local, lay expertise to present mitigating circumstances that would justify overriding alerts on the LA system. Many loan managers combined this approach with the energetic cultivation of a network of colleagues with whom they could talk to by phone and negotiate the interpretation of LA assessments.

Having noted some of the methods developed by individuals to assert their expertise in the face of apathetic and partial LA assessments, it has to be acknowledged that their responses were bounded by institutional constraints, global decisions made elsewhere by individuals and groups in positions of power. The introduction of performance-related, commission oriented contractual arrangements intensified the personal and professional riskiness involved in circumventing LA. The destandardization of labor contracts represented an added disincentive to take on risky or problematic cases that did not fit neatly into Lending Advisor's categories. A positive result on a loan now has more implications for the organization, but less for the individual. Before Lending Advisor, the success was attributed to the individual. Now Lending Advisor is part of that success.

UK Bank faces the problem of 'positive feedback', whereby 'multiple feedback from a system's own outputs continuously modify, and amplify, elements, processes or sub-systems within itself...[and] carry the actual state away from some 'reference state' that was chosen to identify the system' (Angell and Smithson 1991). The intervention of Lending Advisor into the manager's risk assessment has altered the

terms and scope of the risk interpreted by the manager. It is naïve to presume that managers will approach their lending with a purely rational-calculative risk assessment. Lending is part of the loan managers' 'total experience of the world' (Boland 1987, 1989, 1990, 1991), their response will be situated in a particular life context and represent a thoroughly hermeneutic process (Gadamer 1975). The introduction of Lending Advisor means that if loan managers make loans that do not conform to its parameters they have to decide to take an additional level of entrepreneurial risk, which may adversely impact their pay packet and promotion opportunities. This shift from corporate to personal responsibility could have high-risk consequences (Giddens 1994) not only for UK Bank, but for the nation's economy and the way modernity is being shaped.

The introduction of Lending Advisor may have been catastrophic for individual loan managers who could not cope with the changes that followed in its wake, however it is suggested that individual responses to and appropriation of LA holds no less threat to UK Bank and beyond. Just as institutions shape the 'self' in the risk society, so the 'self' shapes institutions as a consequence of the intensified interconnectivity between local and global. As traditional institutions and ways of being associated with them are redefined, agents are less and less constrained by them (Beck 1992). UK Bank has seriously depleted its community of experienced local lay expertise with a programme of IT-enabled cost-reduction and rationalization. It has compounded by losing sight of its market focus, for example losing the small business niche that it had diligently built up during the 1970s and 1980s. Lending Advisor had the potential to augment the loans process, but at the close of the case study was not being strategically positioned to this effect. Lending Advisor has drifted to the foreground in an organization populated by less experienced (and less expensive) loan managers who must face its potentially disciplining influence and the tendency towards risk aversive lending behaviour against a background of performance related contracts.

IMPLICATIONS: A REVOLUTION UNDER THE CLOAK OF NORMALITY

This paper has considered the possibility that an IT-enabled shift in corporate risk position might generate 'high-consequence' side-effects as 'stowaways of normal consumption' (Beck 1992; Giddens 1994) embedded within routine decision-making. It is suggested that if we turn aside from our responsibility to challenge the epistemological basis of contemporary risk assessment and management we may find that our social, political and economic landscape has changed without a vote, or a program - without our consent (Beck 1992).

The potential of computer-based intelligent systems to introduce systemic risk to the global financial system has been recognized, even by those who regard themselves as supporters of such technologies. For example, having presented the architects of modern risk management in a heroic light, Peter Bernstein (1996) goes on to say that:

> 'The science of risk management sometimes creates new risks even as it brings old risks under control…we must be wary of adding to the amount of risk in the system.'

Yet public debate and government counter-measures are lagging sadly behind technological development (Beck 1992). The consequence is that:

> '…industrially produced problems of the present, being based on *yesterday's* investment decisions and the technological innovations of *the day before yesterday*, will at best meet with counter-measures *tomorrow*, which will perhaps become effective *the day after tomorrow*'
> (Jaenicke in Beck 1992)

Discussions about risk bring to the foreground, with some agitation, 'the fissures and gaps between *scientific* and social rationality in dealing the hazardous potential of civilization' (Beck 1992, p.63). The kind of research that needs to be conducted on risk positions needs to look across theoretical academic borders and the divided realms of institutional responsibilities. This is because:

> '…the specific potential of 'intelligent' electronics for automation which is only gradually becoming visible, falls through [the] grid in which industrial society and sociology think and conduct research…The characteristic of the impending waves of rationalization, then, is their *boundary-crossing* and *boundary-changing* potential'.
> (Beck 1992 p.217)

We are currently witnessing changes in societal characteristics that require us to go beyond the 'zombie' categories[9] used in parliaments and media. We depend upon expert researchers and practitioners to 'define agendas and impose boundaries on debates' (Beck 1992 p.41). It is therefore the mindset of experts that we must change, to persuade them to sit down and use the concept of risk and risk positions, as Beck describes them, to consider the various stakeholders in decision-making.

We have become acclimatised to the notion that 'risk belongs to progress as much as a bow-wave belongs to a speeding ship' (Beck 1992, p.45). Indeed, this approach is the fuel driving the emergence of a risk society, as new technologies are introduced that have the potential to generate systemic risks with minimum debate. In most western societies we now have the democratic freedoms to both make choices in our everyday lives, and to participate in policy-making process that will shape choices made elsewhere. It is hoped that this research study has initiated debate about some of the conditions shaping these choices.

[9] This is an expression used by Ulrich Beck during his public lecture at XXXX in 1999.

REFERENCES

Albrow, M. (1996). *The Global Age: State and society beyond modernity.* Cambridge, Polity Press.

Angell, I. and S. Smithson (1991). *Information Systems Management: Opportunities and risks.* London, Macmillan.

Barrett, M. I. (1999). 'Challenges of EDI Adoption for Electronic Trading in the London Insurance Market.' *European Journal of Information Systems* **8**(1-15).

Barrett, M., S. Sahay, et al. (1996). '*Understanding IT and Social Transformation: Development and illustration of a conceptual scheme'*. International Conference on Information Systems, Cleveland, Ohio.

Barrett, M. and L. Heracleous (1999). *Understanding Globalization as a Structurational Process in the Context of the London Insurance Market*. Academy of Management, Chicago, USA.

Beck, U. (1992). *The Risk Society: Towards a new modernity.* London, Sage.

Beck, U. (1994). The Reinvention of Politics: Towards a Theory of Reflexive Modernization. *Reflexive Modernization: Politics, tradition and aesthetics in the modern social order.* U. Beck, A. Giddens and S. Lash. Cambridge, Polity**:** 1-56.

Beck, U. (1995). *Ecological Politics in the Age of Risk*. Cambridge, Polity.

Beck, U., A. Giddens, et al., Eds. (1994). *Reflexive Modernization: Politics, tradition and aesthetics in the modern social order*. Cambridge, Polity.

Benjamin, R.I and Levinson, E (1993). 'A Framework for Managing IT-Enabled Change', *Sloan Management Review*, (Summer) pp. 23-33.

Bernstein, P. L. (1996). *Against the Gods: The remarkable story of risk*. Chichester, Wiley.

Bijker, W., T. P. Hughes, et al., Eds. (1987). *The Social Construction of Technological Systems: New directions in the sociology and history of technology*. London, MIT Press.

Boland, R. J. (1985). 'Phenomenology: A preferred approach to research on information Systems'. *Research Methods in Information Systems.* E. Mumford. Amsterdam, North-Holland.

Boland, R. J. (1991). 'Information: A hermeneutic perspective.' *Unpublished working paper*.

Boland, R. J. (1990). '*Information System use as a Hermeneutic Process'*. Proceedings of the IFIP WG 8.2 Conference.

Boland, R. J. (1987). ‘The in-formation of information systems’. *Critical Issues in Information Systems Research*. R. J. Boland and R. A. Hirschheim. Chichester, John Wiley**:** 363-379.

Boland, R. J. and W. F. Day (1989). 'The experience of system design: A hermeneutic of organizational action.' *Scandinavian Journal of Management* **5**(2): 87-104.

Borja, J. and M. Castells (1997). *Local and Global: Management of cities in the information age*. London, EarthScan Publications Ltd.

Brady, T. and D. Targett (1995). 'Strategic Information Systems in the Banking Sector - Holygrail or Poison Chalice.' *Technology Analysis & Strategic Management* **7**(4): 387-406.

Castells, M. (1996). *The Rise of the Network Society.* Oxford, Blackwells.

Cates, D. C. (1996). 'Managing risk when you're reinventing the bank.' *Banking Journal* **October**: 61-64.

Chetham, J. (1995). *The Future of the UK Financial Services Industry*. London, Pearson Publishing.

Ciborra, C. (1991). *‘From Thinking to Tinkering: The Grassroots of Strategic Information Systems’*. Proceedings of the 12th ICIS, New York.

Ciborra, C. and T. Jelassi, Eds. (1994). *Strategic Information Systems: A European Perspective.* London, Wiley.

Cooper, R. (1989). 'Modernism, post-modernism and organizational analysis: The contribution of Jacques Derrida.' *Organization Studies* **10**(4): 479-502.

Doherty, N. and K. Pond (1995). 'An Expert-System Solution to Mortgage Arrears Problems.' *Service Industries Journal* **15**(2): 267-285.

Eckert, J. K., P. M. O'Connor, et al. (1993). 'Computer-assisted real estate appraisal: A California Savings and Loan case study.' *The Appraisal Journal* **61**(4): 524-532.

Egan, C. and D. Shipley (1995). 'Dimensions of customer orientation: An empirical investigation of the UK financial services sector.' *Journal of Marketing Management* **11**: 807-816.

Ezzamel, M., H. Willmott, et al. (1994). 'Changing management practices in financial services.' *Journal of General Management* **20**(1): 22-27.

Fuglseth, A. and K. Gronhaug (1997). 'IT-enabled redesign of complex and dynamic business processes: The case of bank credit evaluation.' *Omega-International Journal of Management Science* **25**(1): 93-106.

Gadamer, H.-G. (1975). *Truth and Method*. London, Sheed & Ward.

Giddens, A. (1990). *The Consequences of Modernity.* Cambridge, Polity.

Giddens, A. (1991). *Modernity and Self-Identity: Self and society in the late modern age*. Cambridge, Polity.

Giddens, A. (1994). 'Living in a Post-Traditional Society'. *Reflexive Modernization: Politics, tradition and aesthetics in the modern social order*. U. Beck, A. Giddens and S. Lash. Cambridge, Polity**:** 56-109.

Goldie-Scot, J. (1991). The Bankers' Almanac Reports. East Grinstead, Sussex, Reed Information Services Ltd.

Gosling, P. (1996). 'Financial Services in the Digital Age: The Future of Banking, Finance and Insurance'. *Work in the Digital Age*. P. Gosling. London, Bowerdean Publishing.

Grint, K. and S. Woolgar (1997). *The Machine at Work: Technology, work and organization*. Cambridge, Polity.

Hallier, J. and P. James (1997). 'Middle managers and the employee psychological contract: agency, protection and advancement.' *Journal of Management Studies* **34**(5): 703-728.

Heelas, P., S. Lash, et al., Eds. (1996). *Detraditionalization*. Oxford, Blackwell.

Herring, S. C. (1996). 'Gender and Democracy in Computer-Mediated Communication'. *Computerization and Controversy: Value conflicts and social choices*. R. Kling. London, Academic Press**:** 476-489.

Howells, J. and J. Hine, Eds. (1993). *Innovative Banking: Competition and the management of a new networks technology*. London, Routledge.

Inglehart, R. (1997). *Modernization and postmodernization : cultural, economic, and political change in 43 societies*. Princeton, N.J., Princeton University Press.

Inmon, B. (1992). *Building the Data Warehouse*. London, QED Publishing Group.

Introna, L. D. (1997). *Management, Information and Power*. Basingstoke and London, Macmillan.

Ives, B. and G. P. Learmonth (1984). 'The information system as competitive weapon.' *Communications of the ACM* **27**(12): 1193-1201.

Jones, M. and J. Nandhakumar (1993). 'Structured Development: A structurational analysis of the development of an executive information system'. In *Human, Organizational and Social Dimensions of Information Systems Development*. D. Avison, J. E. Kendall and J. I. DeGross. Amsterdam, North-Holland**:** 475-496.

Kearney, K. J. (1992). 'Forces For Change in Banking.' *The World of Banking* (Jan-Feb): 18-21.

Kling, R., Ed. (1996). *Computerization and Controversy: Value conflicts and social choices*. London, Academic Press.

Knights, D. and T. Tinker, Eds. (1997). *Financial Institutions and Social Transformations: International Studies of a Sector*. Basingstoke, Hants, Macmillan Press Ltd.

Latour, B. (1987). *Science in Action: How to follow scientists and engineers through society.* Cambridge, Harvard University Press.

Latour, B. (1999). 'On recalling ANT'. *Actor Network Theory*. J. Law and J. Hassard. Oxford, Blackwells**:** 15-26.

Lash, S. (1993). 'Reflexive modernization: the aesthetic dimension.' *Theory, Culture and Society* **10**(1): 1-24.

Lash, S. (1994) 'Reflexivity and its doubles: Structure, Aesthetics, Community'. In Beck, U., A. Giddens, et al., Eds. *Reflexive Modernization: Politics, tradition and aesthetics in the modern social order*. Cambridge, Polity.

Lockett, A. and C. Holland (1996). 'The Formation of a Virtual Global Bank.' *European Journal of Information Systems* **5**(2): 131-140.

Lyytinen, K. J. (1985). 'Implications of theories of language for information systems.' *MIS Quarterly* **9**(1): 61-74.

McKersie, R. B. and R. E. Walton (1991). 'Organizational Change'. *The Corporation of the 1990's: Information technology and organizational transformation*. M. S. Scott Morton. Oxford, Oxford University Press**:** 244-278.

Mareschal, B. and J. P. Brans (1991). 'Bankadviser: An industrial evaluation system.' *European Journal of Operational Research* **54**(3): 318-324.

Markus, M. L. and R. I. Benjamin (1997). 'The Magic Bullet Theory in IT-Enabled Transformation.' *Sloan Management Review* (Winter): 55-68.

Maull, R. and S. Childe (1994). 'Business process re-engineering: an example from the banking sector.' *International Journal of Service Industry Management* **5**(3): 26-34.

Mentzas, G. (1994). 'Information Systems Strategy for Electronic Banking: The case of countries in reform.' *International Journal of Information Management* **14**: 159-175.

McGoldrick, P. J. and S. J. Greenland (1992). 'Competition between banks and building societies in the retailing of financial services.' *British Journal of Management* **3**: 169-179.

McKenney, J., R. Mason, et al. (1997). 'Bank of America: The Crest and Trough of Technological Leadership.' *MIS Quarterly* **21**(3): 321-353.

Mintzberg, H. (1994). *The Rise and Fall of Strategic Planning*. New York, Prentice-Hall.

Mintzberg, H. and J. A. Waters (1985). 'Of strategies, deliberate and emergent.' *Strategic Management Journal* **6**(3): 257-272.

Monteiro, E. and O. Hanseth (1996). 'Social shaping of information infrastructure: On being specific about the technology'. In *Information Technology and Changes in Organizational Work*. W. Orlikowski, G. Walsham, M. Jones and J. DeGross. London, Chapman & Hall**:** 325-343.

Morgan, G. and D. Knights, Eds. (1997). *Deregulation and European Financial Services*. London, Macmillan.

Moules, J. (1997). 'Technology raises the stakes.' *The Banker*(September): 102-104.

Orlikowski, W. J. (1996). 'Improvising organizational transformation over time: A situated change perspective.' *Information Systems Research* **7**(1): 63-91.

Orlikowski, W. J. and J. J. Baroudi (1991). 'Studying information technology in organizations: Research approaches and assumptions.' *Information Systems Research* **2**(1): 1-28.

Orlikowski, W. J. and D. Robey (1991a). 'Information technology and the structuring of organizations.' *Information Systems Research* **2**(2): 143-169.

Orlikowski, W. J. and M. J. Tyre (1993). 'Exploiting opportunities for technological improvement in organizations.' *Sloan Management Review*(Fall): 13-25.

Orton, I. (1994). *Banks in All But Name: How non-banks are increasing their global market presence*. Dublin, Lafferty.

Pawley, M., D. Winstone, et al. (1991). *UK Financial Institutions and Markets.* London, Macmillan.

Perrow, C. (1984). *Normal Accidents: Living with high-risk technologies*. New York, Basic Books.

Pettigrew, A. M. (1985). *The Awakening Giant: Continuity and change in ICI.* Oxford, Basil Blackwell.

Pettigrew, A. M. (1990). 'Longitudinal field research on change: Theory and practice.' *Organization Science* **1**(3): 267-292.

Pouloudi, A. (1998). *NHS Net: Opportunities, problems and lessons for inter-organisational systems implementation.* Proceedings of the 6th European Conference on Information Systems, Aix en Provence.

Pouloudi, A. and E. A. Whitley (1997). 'Stakeholder Identification in Interorganisational Systems: Gaining insights for drug use management systems.' *European Journal of Information Systems* **6**(1): 1-14.

Poster, M. (1990). *The Mode of Information: Poststructuralism and social context*. Cambridge, Polity.

Robertson, R. (1990). *Globalization: Social theory and global culture*. London, Sage.

Scott Morton, M. S., Ed. (1991). *The Corporation of the 1990s: Information Technology and Organizational Transformation*. Oxford, Oxford University Press.

Shao, Y. (1997). 'The Infusion of expert systems in banking: An exploratory study.' *Expert Systems with Applications* **12**(4): 429-440.

Sisko, Y. and C. Zopounidis (1994). 'An integrated DSS for financing firms by an industrial development bank in Greece.' *Decision Support Systems* **12**(2): 151-168.

Smith, M. R. and L. Marx, Eds. (1994). *Does technology drive history? The dilemma of technological determinism*. Cambridge, MA, The MIT Press.

Star, S. L. (1991). 'Power, technologies and the phenomenology of conventions: On being allergic to onions'. *A Sociology of Monsters: Essays on Power, Technology and Domination*. J. Law. London, Routledge.

Steiner, T. D. and D. B. Teixeira (1990). *Technology in Banking: Creating value and destroying profits*. Homewood, IL, Dow Jones-Irwin.

Stout, D. E. and M. J. Leberatore (1991). 'Decision support software for capital budgeting.' *Management Accounting* **73**(1): 50-53.

Thompson, J. B. (1996). 'Tradition and Self in a Mediated World'. *Detraditionalization*. P. Heelas, S. Lash and P. Morris. Oxford, Blackwell**:** 89-108.

Trippi, R. R. (1990). 'Decision support and expert systems for real estate investment decisions: A review.' *Interfaces* **20**(5): 50-60.

Venkatraman, N. (1991). 'IT-induced Business Reconfiguration'. *The Corporation of the 1990s*. M. Scott Morton. New York, Oxford University Press.

Vogtle, M. and F. Schober (1996). 'Results of an empirical investigation on the strategic importance of intelligent information systems in banking.' *Wirtschaftsinformatik* **38**(5): 497.

Walsham, G. (1993). *Interpreting Information Systems in Organizations*. Chichester, John Wiley.

Walsham, G. (1995). 'The emergence of interpretivism in IS Research.' *Information Systems Research* **6**(4): 376-394.

Walsham, G. (1997). *Actor-Network Theory and IS Research: Current status and future prospects.* Proceedings of the IFIP 8.2 Conference , Philadelphia, USA.

Watkins, J. (1994). 'Business process redesign in the UK retail financial services sector.' *Business Change and Re-engineering* **1**: 38-48.

Watkins, P. R. and L. B. Eliot, Eds. (1993). *Expert Systems in Business and Finance: Issues and applications*. Chichester, Wiley & Sons.

Weatherford, J. M. (1997). *The history of money: From sandstone to cyberspace*. London, Crown Publishing Ltd.

Williams, R. and D. Edge (1996). 'The Social Shaping of Technology'. *Information and Communication Technologies: Visions and Realities*. W. H. Dutton. Oxford, Oxford University Press**:** 53-68.

Willmott, H. and D. Knights (1982). 'The problem of freedom: Fromm's contribution to a critical theory of work organisation.' *Praxis International* **2**(2): 204-225.

Winograd, T. and F. Flores (1986). *Understanding Computers and Cognition: A new foundation for design*.

Wynne, B. (1996). 'May the sheep safely graze? A reflexive view of the expert-lay knowledge divide'. *Risk, Environment and Modernity: Towards a new ecology*. S. Lash, B. Szerszynski and B. Wynne. London, Sage publications**:** 44-83.

Wynne, B. and S. Lash (1992). 'Introduction to Ulrich Beck's Risk Society'. *The Risk Society: Towards a New Modernity.* London, Sage.

Yetton, P., K. Johnston, et al. (1994). 'Computer-Aided Architects: A case study of IT and strategic change.' *Sloan Management Review* (Summer): 57-67.

Zuboff, S. (1988). *In the Age of the Smart Machine: The future of work and power*. Oxford, Heinemann.

Zuboff, S. (1996). 'The emperor's new information economy'. *Information Technology and Changes in Organizational Work*. W. J. Orlikowski, G. Walsham, M. R. Jones and J. DeGross. London, Chapman & Hall.