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Using IT to Support Business Innovation: A Case Study of the London Insurance Market

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Abstract

This paper explores the use of information technology to support business innovation with particular attention to human and organisational issues. A theoretical framework is developed for examining IT adoption which is guided at the meta-level by the principles of structuration theory, but explicitly utilises the more familiar perspectives of culture, learning, and leadership in analysing an in-depth case study of the adoption of EDI in the London Insurance Market. The findings from the case study suggest that the initiation activities of innovation were facilitated by visionary leadership and legitimised by crisis in the market. In addition, a counterculture proved to be important in co-ordinating the innovation activities. However, conflicting interpretive schemes held by market participants as

to how the new technology should be appropriated hindered organizational learning. Furthermore, leaders encountered difficulties in gaining commitment to their vision from market participants who anticipated unwelcome changes in power relations related to the introduction of the new technology. These elements contributed to a slow adoption process. The theoretical framework, together with the case findings, offer new insights on the adoption of IT to support business innovation, with a particular focus on large aggregates such as a market or industry.

Key Words: information technology, innovation, adoption, organisational issues.

1. Introduction

The integration of new information and communication technologies has played a key role in transforming the way business is done in a number of sectors, particularly in financial services (Applegate 1994, Bradley *et al.* 1993, Keen 1991). However, until recently, the London Insurance Market has continued to conduct business manually, but has suffered from increased competition and declining profitability. This crisis has accelerated the attempt by Market leaders to use IT for business innovation, aimed at improved quality of service to the customer at lower cost. One of the key communication technologies developed utilises electronic data interchange (EDI) to facilitate the redesign of business practices across the London Market. These technical developments, known as LIMNET services, have been very successful, and they won the British Telecom Award for Innovation in 1993. Whilst most of these services are now experiencing high levels of use, their rate of adoption has been slow. Furthermore, one of the EDI services, the electronic placing support system (LIMNET EPS), has continued to experience low levels of use since its inception in March 1992.

Recent research (Scala & McGrath 1993, Reekers & Smithson 1993) provides support for the view that the major problems associated with the introduction of EDI are organizational rather than technical in nature. Amongst other organizational issues, Scala & McGrath (1993) identified impacts on organizational culture and structure, and low levels of adoption. This paper seeks to investigate how these and other human and organizational issues may have influ-

enced the adoption process of LIMNET EPS in the London Insurance Market. The study of the adoption of IT by aggregates such as markets or industries has received little attention; individuals or organizations have tended to dominate classical innovation diffusion research (Fichman 1992). However, the adoption of IT by aggregates such as markets is becoming increasingly important as there has been a steady growth of inter-organizational networks enabled by IT in recent years.

A theoretical framework was developed based on the perspectives of culture, learning, and leadership, and guided by the principles of structuration theory (Giddens 1984). It was then used to analyse the adoption process of LIMNET EPS in the London Insurance Market. Our research is based on an interpretive epistemology (Orlikowski & Baroudi 1991, Walsham 1993), using a single in-depth case study to draw inferences. The case study approach is an appropriate research strategy as it seeks to address the 'how' and 'why' questions associated with a process study (Yin 1989). The iterative process of data collection and case analysis led to insights on organizational issues that are relevant to the adoption of IT across the market. An appreciation of these issues should prove useful to researchers, users, developers, and project managers seeking to improve the adoption of IT by aggregates such as markets or industries.

The next section of the paper discusses aspects of the relevant literature from which the theoretical framework was developed. This is followed by a section on research methods. The London Insurance Market and the events and actions related to the introduction of the EDI

service are then described. The case is subsequently analysed and discussed from the perspective of the theoretical framework, and the final section draws some conclusions from the research concerning the need to understand key organizational processes of culture, learning, and leadership, and their interaction throughout the adoption process.

2. Literature Review and Theoretical Framework

In the following sub-sections, the development of the topic of innovation in the organizational innovation and information systems literatures is briefly outlined. We then draw from their findings to help develop our theoretical framework.

2.1. Organizational Innovation Research

Wolfe's (1994) comprehensive review of organizational innovation classifies the research into three discernible streams: the diffusion of an innovation (over time and/or space) through a population of potential adopters; the determinants, or factors, of the innovativeness of organizations; and the process of innovation within organizations. These streams of research have developed relatively sequentially. For example, early research on diffusion of an innovation did not incorporate issues unique to organizations, and this led to the growth of factors-based research in organizations. Similarly, factors research is often considered to be static, lacking a solid theoretical framework, and paying insufficient attention to social context (King 1990, Van de Ven 1986, Van de Ven *et al.* 1989).

These concerns have led to an interest in process research in order to understand how and why innovations developed.

Two types of process research can be distinguished. Early process research was rather rigid in nature, conceptualising innovation as a series of stages that unfold over time (Wolfe 1994). While this approach has contributed to our understanding of innovation by identifying stages, and by indicating the contingencies which affect their order, it does not capture the complex organizational processes involved in the implementation of the innovation. Recent research has replaced this 'stage model' approach with a new generation of process research which calls for interpretive, in-depth studies to examine how phenomena develop over time (Van de Ven & Rogers 1988, Van de Ven 1986). These research methods are currently less developed than those for conducting factors and stage model research (Wolfe 1994).

2.2. Innovation in the IS Literature

The development of innovation in the IS literature has many parallels with the development of the organizational innovation literature as described above. As Iivari (1993) notes, innovation research concerning the diffusion/adoption of information technology has predominantly taken place at the macro-level (Zmud 1982 & 1984, Brancheau & Wetherbe 1990, Cooper & Zmud 1990, Hoffer & Alexander 1992), following the macro theory of innovation diffusion in traditional innovation research. Fichman (1992) provides a useful review of empirical research in IT diffusion. He develops a framework building on classical diffusion theory and other more recent conceptual work, and maps existing re-

search on to the framework. Whilst he notes the need to study the adoption of IT by aggregates such as markets or industries, the locus of adoption of his framework is limited to individual adopter studies (i.e. adoption by a single organization) and organization adoption studies (i.e. adoption by companies, departments, business units).

Factors research in the IS literature has tended to view IS implementation as a technical innovation, and to analyse the factors behind the success and failure of the use of the innovation (Lockett 1987, Kwon & Zmud 1987). These approaches to the study of innovation have strengths and limitations for similar reasons to those outlined previously in section 2.1.

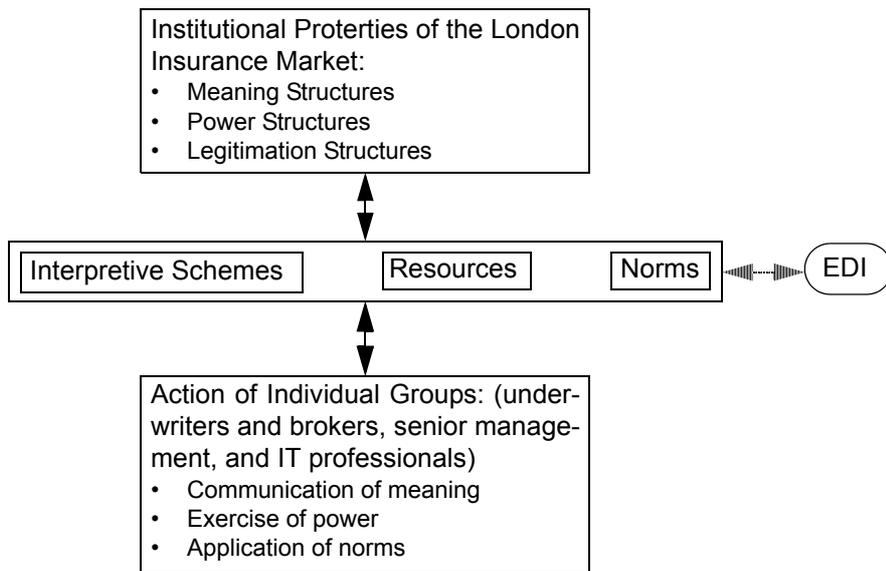
Recently, Iivari (1993) has proposed a framework for a micro-innovation theory of IS adoption to complement the dominant macro-innovation focus of IT diffusion. In his framework, the major idea of the micro-innovation theory is that "the adoption process is analysed in a single adopting unit, viewing it as a social process." We agree with this conception of the adoption process as a basis for developing our framework to investigate human and organizational issues that may influence the adoption process. We also draw on recent developments in process research within the IS field to develop our theoretical foundations. A number of authors (e.g. Markus & Robey 1988, Orlikowski 1992, Robey & Azevedo 1994) have recommended interpretive approaches in explaining the emergent process of organisational transformation through information technology. Interpretive approaches to gathering research data require an underlying guiding theory, and in this paper we draw on structuration theory which has recently

been utilised in the IS literature (Orlikowski 1992, Walsham 1993) to provide a basis for a dynamic process perspective.

We do not have space here to describe structuration theory in detail, but would refer the interested reader to the considerable body of literature on structuration theory and its applications within IS (e.g. Poole & DeSanctis 1990, Walsham & Han 1991, Orlikowski and Robey 1991, Orlikowski 1992, Lyytinen & Ngwenyama 1992, Whittington 1992, Walsham 1993). Core concepts of structuration theory include structure, system, and the duality of structure (Giddens 1984). Structure, in structuration theory, is viewed as rules and resources recursively implicated in the reproduction of social systems. A social system is the patterning of social relations across time and space, understood as reproduced practices or relations between actors and collectives organised as regular social practices. Structuration theory suggests that any process study needs to consider the interlinking of human action and social structure. Furthermore, it proposes that human action and structure represent a duality. That is, social structure provides enabling and constraining elements that are drawn on in human interactions, and in so doing social structures are produced and reproduced.

Recent developments in the IS literature have related structuration theory and information technology (Orlikowski 1992). This has provided a deeper and more dialectical understanding of the interaction between technology and organizations. It has also been shown to be particularly useful in studying the process of introduction into organizations of new communications technologies, such

FIGURE 1. Structuration Theory and technology: application to the London Market



as GDSS and Lotus Notes (Poole & DeSanctis 1990, Orlikowski 1992). In these studies, structuration theory is used as a way of examining how groups appropriate the new communication technology, and in so doing produce and reproduce the social structure linked to the new technology. Technology is viewed as being linked to a set of rules (interpretive schemes and norms) and resources that people draw on to interact with it; these rules and resources do not determine but rather shape social practices and consequences.

2.3. Theoretical Framework

The theoretical framework for our study drew from two sources: recent developments linking structuration theory and technology; and research findings from the organizational innovation research literature. With respect to the first of

these, Figure 1 illustrates our application of structuration theory and technology to the process of adoption of EDI in the London Insurance Market. This included an examination of the London Market’s institutional properties, and the interpretive schemes, resources, and norms drawn on by market participants. In addition, the way that these groups understand and appropriate the technology as they interact with it was investigated.

In this paper, the role and use of structuration theory is as a ‘meta-theory’. We were guided by the broad principles of this rich meta-theory, but did not use it explicitly as a basis for the analysis of the empirical data. There are a number of problems associated with using structuration theory for empirical work as discussed recently by Garnsey & Kelly (1995). The complexity and subtlety of this meta-theory is often misunderstood

TABLE 1. Theoretical framework: using IT to support business innovation

<i>Components</i>	<i>Associated Elements</i>
Structuration theory and technology	Interconnectedness of structure and actions by which groups appropriate new technology over time
Cultural perspective	<ul style="list-style-type: none"> • Counter-culture as a source of innovation • Organisations have sub-cultures with multiple sets of shared meanings
Learning perspective	<ul style="list-style-type: none"> • Double-loop learning important in the initiation and adoption activities of innovation • Organisational memory facilitates the transfer of individual learning to the organisation through shared maps
Leadership perspective	<ul style="list-style-type: none"> • Visionary and transformative leadership important in the innovation process • Importance of institutional leadership in fostering innovation

even by experienced social scientists, and Giddens' esoteric use of standard terms may be confusing, particularly to those less familiar with his work. This does not suggest that the theory is too abstract or not valuable in empirical research, but does imply the need for a careful use of the theory to make it accessible and useful to the reader. Following this argument, our approach has limited the explicit use of structuration theory, particularly in the case analysis. However, the principles outlined in Figure 1 guided the research by providing a frame of reference, which was drawn on in conducting the fieldwork. In addition, strands of the theory were valuable as a 'sensitising device' in analysing the data, and in developing insights.

Our theoretical framework also drew from the research findings of the organizational innovation literature, which has identified the perspectives of culture, learning, and leadership as being particularly useful in investigating the process of adoption of an innovation. These per-

spectives serve as a bridge to link structuration theory with organisational life, and when taken together with the broad approach of structuration theory and technology resulted in the theoretical framework shown in Table 1. The associated elements of the perspectives presented in the framework have been developed from the relevant literature as being important in investigating adoption activities of innovation, and are explicitly used in the case analysis in section 5. We now provide a brief description of each of these perspectives, and the reasons for their inclusion in our framework.

The importance of organisational *culture* in innovation studies has been widely recognised (Nystrom 1990, King 1990, Kanter 1983, Fischer & Farr 1985) and the need for its empirical investigation in innovation studies has been strongly suggested. Such studies could examine the type of culture that facilitates or inhibits innovation and the extent to which innovation necessitates changes

in culture. Indeed, of major concern to many organisations is how they can develop and maintain a culture of innovation (Van de Ven 1986). In addition, cultural analysis has the potential to illuminate the complex relationship between IT and its organisational consequences (Robey & Azevedo 1994). The concept of culture incorporated in the framework is that of a root metaphor (Smircich 1983) which promotes the view that a culture is something an organization is, as opposed to something an organization has. Furthermore, large organisations are not typified by a uniform culture, but rather there are many different and competing value systems which create a mosaic of organisational realities (Morgan 1986). These resulting sub-cultures can develop across functional divisions and invest events and social relationships with multiple sets of shared meanings (Young 1989). Counter-culture, a type of subculture, articulates values which are a direct challenge to the core values of a dominant culture, at the same time existing in an uneasy symbiosis (Martin & Siehl 1983). The importance of sub-cultures and counter-cultures in providing a source of creativity which stimulates innovation in an organisation has been identified in the literature (Martin & Siehl 1983, Morgan 1986), but not explored to any great extent through empirical work.

It has been suggested that innovative organisations must be designed as *learning* systems (Morgan 1986), since the ability to learn faster than one's competitors may be the only sustainable competitive advantage (Garratt 1987, De Geus 1988). In addition, the importance of organisational learning has become a major feature in the examination of tech-

nological and organisational change (Clark & Staunton 1993). The concepts of learning incorporated in the framework involve double loop learning and organisational memory. Double loop learning has been proposed as being particularly useful in improving the innovation process during the initiation and adoption activities (Van de Ven 1986). It refers to the organisation's ability to detect and correct errors in the operating norms and values themselves, and not merely deviations from a set of existing norms and values. Organisational memory facilitates the transfer of individual learning to the organisation (Argyris & Schön 1978, Kim 1993). Individual images and the shared maps of organisational theory-in-use are encoded in the organisational memory, and subsequently drawn on by members.

King (1990) in his review on the innovation at work literature identifies *leadership* as important in facilitating or inhibiting innovation at all levels of analysis from the individual level to the organisational level, and Van de Ven (1986) notes the importance of institutional leadership in the fostering of innovation. In our theoretical framework, the concept of visionary leadership and the importance of the transformative capacity of leadership are utilised. Visionary leadership deals with the ability to develop and gain commitment to a vision, which is considered a creative and intuitive process (Nadler & Tushman 1990). Drawing from Giddens (1979), the transformative capacity of leadership refers to interactions of power in which leaders draw on resources in getting commitment to their vision. These resources can be authoritative (by virtue of one's posi-

tion) or allocative (with the ability to allocate material resources).

Whilst the three perspectives of culture, learning, and leadership may be simpler theories with arguably weaker analytical development than that of structuration theory, they are nevertheless linked to the concepts of the latter. For example, culture emphasises structures of meaning and norms, while transformative aspects of leadership are related to the exercise of power and the use of resources. In addition, double loop learning relates to contested norms producing new legitimate ways of doing business, while organizational learning requires the development of shared interpretive schemes to facilitate the transfer of individual learning. The key advantage of these perspectives is that, unlike structuration theory, they are readily understood by market participants and other researchers in the field. As a result, they are valuable in providing a common basis for communication as to how human and organisational issues relate to the process of innovation.

3. Research Methods

The London Insurance Market was selected after an exploratory phase in which a sectoral study on the use of IT for business innovation in the U.K. general insurance industry was carried out. The London Market was felt to be particularly interesting since the IT-enabled initiatives being undertaken were radical in nature and were an integral part of the pervasive changes intended throughout the Market. The focus of the research concerned the development and use of the LIMNET electronic placing system

in the Insurance Market. The in-depth case study research involved both a historical reconstruction of the period October 1989 - September 1993, as well as some real time observation during the research period of October 1993 - September 1994.

The principal method of data collection was through in-depth semi-structured interviews with a range of London Market participants who were involved in the process of innovation. These included IT developers, managers at different levels, underwriters and brokers within Lloyd's, London Market Associations, and London Market organisations participating in the development and use of the pilot EPS system. A total of 36 interviews were conducted comprising: 16 interviews with brokers and underwriters, 10 interviews with IT development staff, and 10 interviews with senior managers actively involved with the process of innovation. The interviews typically lasted between one and two hours. They focused on stimulating discussions around the meaning of the technology to the different groups and their expectations around its use (Orlikowski & Gash 1994), particularly with respect to their social, cultural, and work contexts. This was supplemented with non-participant observation in the marketplace. This included a number of visits to the London Market in the city of London, as well as to underwriting offices and the trading floor at Lloyd's where brokers and underwriters actively conduct business.

Further data were gathered from a number of primary and secondary sources. Primary sources included strategy plans, mission statements, newsletters, and annual reports. Secondary sources included sectoral studies, trade journals,

and local newspapers. Finally, on-line demonstrations were arranged and screen printouts were obtained to get a better understanding of the system's functionality and the changes in the work practices that the system facilitated. The selection of people who were interviewed was mainly determined by asking each interviewee who else in the group it was worthwhile to interview (Kling 1987). Data were collected by taking detailed notes of interviews. This form of data collection was deemed appropriate, rather than tape recording, for two main reasons. Firstly, there was a need to be sensitive to the cultural tensions in the market which were associated with the radical, pervasive changes, as well as to engender trust with the interviewees from the early stages of the research. Secondly, the intensity and quality of competition in the rapidly changing London Market accentuated the perceived need for confidentiality by participants across the Market. These conclusions were reached after some initial taping was carried out. Even with key informants who were co-operative and agreed to be taped, there was a distinct reluctance to discuss sensitive issues with the tape recorder on. By the time the tape recorder was shut off, the flow of conversation was disrupted and the discussion 'filtered'. There was also cautiousness and uneasiness detected by informants with furtive glances to the tape recorder when discussing sensitive issues. As a result, the decision to use detailed notes as the mode of data collection was adopted.

4. The Case Study

4.1. *The London Insurance Market*

The London Insurance Market is a distinct part of the UK insurance industry which has grown up around Lloyd's of London, but includes divisions of many of the world's major corporate insurers. London is the leading world centre for international insurance and reinsurance, providing cover for large and complex commercial lines risks. The market comprises approximately 750 independently owned and managed businesses. It is a complex structure of linked but diverse players. While there is no central authority governing the market, each of the participants is affiliated to a trading association. These participants include Lloyd's, representing syndicate insurers of all types of marine, non-marine, and aviation risks, and three market associations.

The market has suffered financial difficulties over the last few years for two main reasons, namely a high cost base and major losses. With respect to the first of these, the London Insurance Market has the reputation of being the only major financial services sector that conducts business manually using paper based systems. This has led to low levels of productivity with a high cost base for processing business in the Market. With respect to major losses, a reinsurance crisis developed during the late 1980's and early 1990's. The intensity and frequency of catastrophes during that period substantially multiplied, resulting in Lloyd's experiencing serious losses (in excess of £8.5 billion) since 1990. This led in turn to under-capitalisation of the market world-wide. The turbulence in the general insurance industry, both in

the London Market and globally, were intimately connected with the trend towards the use of IT for business innovation in the industry. Advances in IT such as reduced hardware and software costs, and greatly improved global communications, have transformed information processing and communications, and given rise to a range of product and process innovations. One strategic vehicle used to facilitate these innovations both in the London Market and the global marketplace is the use of electronic data interchange (EDI).

4.2. *The Development of the LIMNET EPS System*

Since 1989, the London Insurance Market Network, LIMNET, has improved many of the back office procedures such as post accounting administration and claims processing. Shortly after the development of the network, Lloyd's, along with the three key London Market associations, formed LIMNET Ltd. It is a co-ordinating body charged with helping the four sponsoring organisations create a coherent cross-market approach to EDI developments, and it is responsible for strategic planning and the development of networks standards and applications to meet local and international insurance needs.

During 1990, much attention was given to designing an electronic placing support system called LIMNET EPS. This challenging EDI application was to provide support for the coverage of insurance and reinsurance risks transmitted to the underwriter by the broker. The impetus behind these initiatives was the recognition of a need for greater efficiency of a largely manual process, along with the consistent major losses suffered

by Lloyd's and other underwriters since 1990. In 1991, a task force was set up to address these issues at Lloyd's and the London Market. In the task force report that followed, several references were made to the positive impact technology would have on improving the speed with which the market would respond to client needs, while significantly reducing administrative costs and increasing the international competitiveness of Lloyd's and the London Market as a whole. Furthermore, Lloyd's five-year plan included making the market a fully electronic one by 1996. Through LIMNET, EDI has been applied to a world of paper and procedures which has gradually evolved over 300 years, and in so doing entirely new methods of operation have been developed. The LIMNET EPS system has been of increasing importance, and its application has significant implications for changes to the traditional business process, as discussed in detail below.

4.2.1. *The Traditional Business Process for Risk Placement*

The broking firms in the London Market procure insurance cover, typically for large risks such as satellites or catastrophes, for clients throughout the world from one or more of the underwriting markets. Brokers sell lines against individual risk (i.e. commitment to take on the risk) to underwriters, each of whom typically takes on a very small percentage of the large, complex risk. Traditionally, the broker will describe the risk in narrative form on a paper 'slip', and then physically visit a series of underwriters who specialise in the class of business involved. In addition to the slip, the nature of the complex risk requires the broker to provide supporting information to assist

the underwriter in the evaluation of the risk. The broker's first interview is usually with a potential 'lead' underwriter, so that if s/he agrees to take on some of the risk, other underwriters will follow this lead and participate in the risk on the same terms. The broker solicits further participation, recording all activities on the slip, until the risk is fully covered. This process to place the risk with many underwriters is very time consuming. After its completion, the broker presents the cover to the client, who pays the required premium if the proposed package is accepted. The broker then initiates payment to participating underwriters in relation to their share of the risk. During the life of a policy, it is often necessary to repeat all or parts of the process described above.

4.2.2. The Use of the LIMNET EPS System to Facilitate Electronic Trading
During the systems development phase of the LIMNET EPS system, the participating brokers either relied on software providers to supply the front end of the EPS system or they developed it in-house. The underwriting associations, Lloyd's, London Insurance and Reinsurance Market Association (LIRMA), and the Institute of London Underwriters (ILU), designed compatible EDI software for their members using joint market specifications. The LIMNET EPS was designed as a batch EDI concept using value added data services (VADS) on the IBM network to co-ordinate the passing of risk packages between brokers and selected underwriters. Between January and March 1992, Lloyd's and the market associations were involved in the user testing of the new electronic placing support system, and further training was

conducted with both underwriters and brokers who were participating in the market pilot system. On March 30 1992, history was made in the London Market as the first electronic trade was transacted using the LIMNET EPS system.

The electronic trading process is based on similar principles to the traditional manual process. As a senior official explained, it was hoped that by keeping the degree of radicality low, there would be a higher probability of adoption of EPS across the market. A summary of the risk was broadcast to the underwriters as a combination of data and text selected by the broker. The quotation phase included the underwriters signifying their wish to participate, perhaps subject to certain conditions. An electronic dialogue ensued, which could be supplemented by selective face-to-face consultation where the parties consider this to be beneficial. For each complex risk, the business decision calls for detailed analysis based upon the interpretation of large volumes of textual and statistical material.

When a firm order is placed, underwriters are able to indicate their intention to participate on the risk by writing an electronic line. Electronic line details are transmitted to the broker who monitors underwriter responses on screen until the risk is fully placed. Finally, an electronic contract is formed. The process differs from a 'classical' EDI transaction as the applications link not only a wide variety of different players in the market, but also support professional decisions rather than replacing administrative routines. The development of the LIMNET services has undoubtedly been impressive, but serious debates on a number of issues, particularly those concerning the

use of the EPS system, persist in the marketplace.

There has been a slow rate of adoption of the use of the EPS system by brokers and underwriters, even amongst pioneer firms involved in the initial implementation phase. Almost two years from the start of the pilot, only a few individuals in the large brokerage and underwriting firms are currently using the systems to trade, even though the system is widely available on market participants' (underwriting and brokerage companies) hardware. While the number of trades has increased recently, the relative proportion of risks traded electronically is very low, and they tend to be the small, simpler risks. Despite these setbacks, system developers and IT staff across the industry, as well as the senior management of the large brokerage firms, are committed to the technology and the market initiatives. They are 'encouraging' brokers to use the system to trade by developing policies requiring brokers to carry out a certain percentage of their trades electronically.

There were technical limitations with the first version of LIMNET EPS as well as human and organisational issues which are related to these low levels of adoption. The technical problems included the following: it was commonly agreed that the extent of structured information on risks that could be captured was very limited and somewhat inadequate for supporting the business; a number of complex risks called 'multi-sectional risks' could not be supported by EPS; long system delays were experienced during use; EPS did not allow easy scrolling through a risk packet in order to highlight salient information; and the system did not allow the transmission of

important supporting documents containing non-textual files such as images, PC files and the like.

It was commonly believed, however, that the human and organizational issues were even more significant. User's 'fear and unfamiliarity with the system' has contributed significantly to its low usage. In particular, both underwriters and brokers 'feared a loss of control', and the importance of face to face negotiations was deemed critical in the continued development and maintenance of business relationships, as well as in the facilitation of effective negotiations. A senior broker explained it in the following way:

"The business is based largely on relationships and trust. This is why it is so vital to carry out business in a face to face manner. ... You are negotiating the business. It is important how well you put across the case. ... You use a lot of different skills in negotiating. You emphasise and de-emphasise certain aspects, handle objections. ... It is a sales situation."

All market participants, however, did not agree on the extent to which face-to-face communication was needed. For example, the common feeling amongst senior broker management and IT developers was that there is "an unfounded fear of having no face-to-face communication." At the same time, they were not convinced by the story which circulated throughout the market which argued that "they (the brokers) have to see the white of their eyes, and to see if their hands are trembling when they (the underwriters) sign the slip (risk)." While it was agreed that face-to-face communication could not be totally eliminated, these groups generally believed that the large majority of the risks required little or no face-to-

face communication. One senior IT director viewed the anxiety and underwriters and brokers as “vested interest getting in the way of progress.” On the other hand, the few users of the system felt it could only replace face-to-face communication for simpler risks, and that a balance of face-to-face communication along with using the EPS system was needed for other risks. For underwriters and brokers alike, the use of the EPS system involving asynchronous communication was felt to eliminate the spontaneity and ‘excitement’ of the negotiation process that face-to-face communication allows. These feelings are borne out by the remarks of an underwriter using the EPS system that: “the actual bargaining is the reason most of us like to do underwriting.”

The introduction of the EPS system was viewed by underwriters and brokers as changing the unique character of the London market, in particular Lloyd’s. The unique market structure of Lloyd’s provides a massive pool of expertise and a tremendous marketing advantage. A whole new product can be developed in a short period of time through face-to-face interaction between brokers and underwriters in a single geographical area. This is particularly useful for new large and complex risks. There is concern that the remote placing of business could erode Lloyd’s flexibility and competitive advantage in the global market place. Associated with these new ways of conducting business, underwriters and brokers perceive the need for significant changes in work and social practices. A general feeling within the broker community is that “there is a loss of humanity to electronic wizardry.” As a senior broker manager explained, insurance

broking is a social job where brokers meet their buddies in the underwriter’s waiting room, and socialise with the underwriters with whom they do business. A key underwriter explained the resistance amongst underwriters in the following way: “there is a great deal of inertia with respect to the use of EPS by underwriters ... they don’t want to be typing into keyboards all day.”

A second version of the EPS system was scheduled to be implemented in December 1994 which would include a number of additional technical facilities. In addition, Lloyd’s has shown its commitment to electronic trading by requiring that underwriters and brokers trading in the market put all their insurance risks through the EPS system electronically by January 1, 1996. However, despite the progress on system development and Lloyd’s commitment to electronic trading, there is still little movement towards gaining active support from underwriters and brokers across the market in using the EPS system.

5. Case Analysis

5.1. *Cultural Perspective on Using IT to Support Business Innovation*

The concepts of sub-cultures and counter-cultures which were developed in the theoretical framework proved to be valuable in explaining the innovation process in the context of this case. At a minimum, three distinct sub-cultures can be identified across the London Market: brokers and underwriters, senior management, and IT personnel. The independence and strength of these sub-cultures can be best understood from the

culture of the market as a whole. As a senior market official explained:

“(The different groups) have been used to consultation, a floating condition of consensus. In organisations, people can go to boardrooms, salute the flag, and leave doing nothing afterwards. In the London Market, people can openly, overtly, and legitimately state their opinions and views. They have the independence to express what they think is right.”

The rapid changes towards a more efficient market after 11 years of stalemate in reform coincided with the growing financial crisis at Lloyd's in the early 1990's. The development of LIMNET Ltd. during this period was significant. LIMNET was allowed the independence and freedom to develop its own distinct counter-culture seeking to develop EDI services for business innovation across the market.

It is useful to consider underwriters and brokers, taken together, as a distinct sub-culture which has shared meanings. They perceive that the introduction of the EPS system will have a radical effect on the institutionalised work culture. The inherent nature of their jobs is very social, and the introduction of the EPS system may limit the social contact between brokers and underwriters. This is deemed by them to be critical to the development and maintenance of business relationships. In addition, they perceive that the negotiation practices in the trading process may be significantly reduced, as asynchronous communication via the EPS system becomes the norm of the business. The EPS system is not viewed as adequately supporting work practices, particularly the negotiation for large complex risks, which provide a great deal of job satisfaction. Finally, the

general feeling by critics is that underwriters and brokers believe the automation of their work may “drive out the mystique often associated with financial services jobs in the city (of London).” These fears of impending cultural change are manifested through resistance in adopting the EPS system.

5.2. Learning Perspective on Using IT to Support Business Innovation

As the theoretical framework suggested, double loop learning was important in the initiation and adoption activities of innovation. In the development of the LIMNET EPS system, EDI was not used to simply replicate previous ways of doing business, but was developed with a view to redesigning key business and organizational processes and rethinking market norms. However, there were problems with organisational learning throughout the market in the use of the EPS system. This can be traced to the lack of development of shared interpretive schemes in organisational memory. As explained below, there was an incongruence in the interpretive schemes held by particular groups of market participants as to how the EPS system should be appropriated. This was particularly evident between the group of brokers and underwriters, and the group of IT developers and senior broker managers.

The IT developers viewed the EPS system as a support tool to be designed and utilised to fundamentally change the business practices and culture of the market through improved market efficiency. The senior broker managers' schemes were closely related to this. Their expectations were that the EPS system would transform the market, significantly improve the productivity of

brokers, and facilitate monitoring of their activities through the network. The expectations of these groups, therefore, involved radical shifts from the market's status quo. They believed that the majority of the risks could be traded through the EPS system without any face-to-face negotiations, except for large, complex risks. On the other hand, those amongst the brokers and underwriters who were willing to embrace the technology viewed it as incrementally improving the communication capabilities in the market by supplementing the face-to-face negotiations in the trading process. They expected, however, that only simpler, smaller risks could be traded solely by the EPS system, with all others needing face-to-face communication at different stages of the trading process. They also believed that the EPS system would significantly curb their autonomy in the marketplace, and dehumanise their work. These incongruences in interpretive schemes concerning the use of the EPS system created conflict and presented difficulties in organizational learning throughout the market. This has contributed to the slow adoption process of the EPS system.

5.3. Leadership Perspective on Using IT to Support Business Innovation

The change of leadership at Lloyd's during their financial crisis of the early 1990's was instrumental in developing a new focus of 'putting technology to drive process'. This visionary leadership by the new top management at Lloyd's was very important in initiating innovation, as described in our theoretical framework. Leadership was facilitated by the context of financial crisis in the

market. A senior market official described the change in the following way:

"It was leadership created through crisis. This would not have been possible if underwriters had not lost a lot of money in the last few years. If they had been profitable, then they would have said "we were sharp on our feet, independently making money", and would likely not have co-operated or had any commitment to plans."

The transformative capacity of leadership has proved difficult in this traditional market where political sensitivity to changes in power relations between market participants is of paramount importance. The adoption of the EPS system was perceived by particular groups of market participants to involve changing power relations between them as described below.

Senior broker management perceived changing power relations between themselves and underwriters with the introduction of the EPS system. The traditional process typically involves brokers queuing up for a few hours of the day to see the underwriter. The EPS system would no longer requires the broker to queue up to see the underwriter to place the business. A senior manager of a large broking company put it this way: "what brokers need to understand is that is in not the underwriter paying our commissions. Without the client paying the premium, there is nothing (no commissions). ... The underwriter is put on a pedestal, and we are trying to cut that pedestal down, changing the perception in our people's (broker's) minds towards underwriters." EDI technology allows placement of the risk with several underwriters simultaneously and immediately, reversing the concept of many brokers

waiting to see the underwriter. Furthermore, the broker's ability to use new technology to place risks outside the London Market contributes to this shift in power relations.

Another perceived change in power relations exists between broker managers and brokers. Traditionally, the brokers have had a lot of autonomy in the market place. In particular, the very successful brokers "would determine the course of business, business practices and the like." However, the recent thrust by broker managers to cut costs and improve the overall efficiency of the market through the use of technology has significant implications towards future monitoring and surveillance of brokers. A senior broker manager explained "it was (currently) difficult to measure the productivity of brokers. No one keeps tabs as to whether the broker is indeed placing business." Large brokerage houses are already requiring their brokers to place a percentage of their business using the EPS system, and in the future all activities concerned with the trading process could be monitored.

The market leaders had great difficulty in getting commitment to their vision of using the EPS system to support the trading process. As the financial crisis deepened, the leadership looked to Lloyd's for assistance in gaining commitment from the market. The latter had traditionally played an administrative role, and as a key underwriter explained they were often viewed as "a dedicated civil service only empowered to do so much ... the direction they were going was sanctioned." However, the context of a financial crisis legitimised Lloyd's to take unprecedented action. They exercised their regulatory power and set a

mandatory deadline by which market participants were required to use the EPS system to put through all their insurance risks. Nevertheless, it remains to be seen whether this mandatory deadline will be upheld, and what the future use of the EPS system will be at that time.

6. Conclusions

As discussed throughout the previous section, the theoretical framework proved to be a valuable basis for our investigation of the use of IT to support business innovation. Whilst the case analysis presented the three perspectives separately, this was done for purely analytical reasons. Indeed, there is significant integration between the perspectives which can help to explain the successful initiation of the innovation process, and the difficulties involved with the slow adoption of the EPS system. We now briefly summarise our main conclusions, utilising all three perspectives, firstly with respect to the initiation of innovation, and secondly with respect to its adoption.

The initiation process of innovation involved the development of vision which required effective double loop learning to rethink the norms of conducting business in this market, and how new technology could effect this. The independence of the sub-cultures in this market provided the right conditions for LIMNET Ltd. to be established as a counter-culture. This strategic vehicle was an important source of innovation which fostered the successful development of LIMNET services in the market.

With respect to the adoption process, the difficulties of organizational learning

across the market were related to the incongruity of the interpretive schemes that developed amongst the groups of market participants. These interpretive schemes were significantly influenced by the shared meanings the sub-cultures had with relation to the market's social and work contexts. Furthermore, the different groups' interpretations perceived shifts in power relations across the market, which made the transformative aspects of gaining commitment to the vision of use of the technology in the marketplace particularly difficult.

The case reinforced the significance of crisis as a facilitating condition of radical change as suggested by a number of scholars previously (e.g. Hage 1980, Child & Smith 1987, Loveridge and Pitt 1990). It also illustrates that while the context of the financial crisis legitimised Lloyd's action to specify mandatory deadlines for the use of the EPS system, underwriters and brokers were still able to exercise power through the slow adoption of the EPS system. This relates to Giddens' (1984) concept of the 'dialectic of control' where even the most dependent actors possess a certain degree of control with respect to those in authority over them.

The insights from our theoretical framework and the case study may be of particular relevance for practitioners contemplating radical innovation efforts. A number of techniques, such as business process re-engineering, have a primary focus in redesigning processes enabled by information and communication technologies. While such techniques recognise the need to manage cultural change, this case suggests the need for improved understanding of key organizational processes and their interaction

throughout the process of innovation. We have proposed and illustrated the examination of these processes through the perspectives of culture, learning and leadership, and guided by the broad principles of structuration theory. The process of IT for business innovation will undoubtedly continue to be an important topic for investigation, and further research could utilise our framework to examine this process in other contexts. These contexts could include organisations, but could also involve large aggregates such as a market or industry which have been the focus of this paper.

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