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Identification and realisation of the benefits of participating in an electronic marketplace : An interpretive evaluation approach

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**IDENTIFICATION AND REALISATION OF THE
BENEFITS OF PARTICIPATING IN AN ELECTRONIC
MARKETPLACE: AN INTERPRETIVE EVALUATION
APPROACH**

ROSEMARY STOCKDALE BA (HONS), PG CERT.

Submitted in fulfilment of the requirements for the
award of Doctor of Philosophy (Business)

31st December 2003

ABSTRACT

Electronic marketplaces have proliferated as use of the Internet has become widespread in business. A rapid growth in the number of marketplaces, followed by a period of stringent consolidation, as market makers develop a greater understanding of effective business models, has resulted in a climate of uncertainty and confusion. As with many aspects of e-commerce the drive towards participation is fuelled less by strategic planning than by a fear of lagging behind competitors or losing first mover advantage. In this climate of uncertainty organisations often bypass effective evaluation of the benefits that can be realised from participation in e-marketplaces, thereby exacerbating the problems facing them and hampering effective decision-making.

Evaluation is perceived as a fraught subject within the Information Systems field, and particularly within the business community which adheres to tried and trusted, albeit often inappropriate, methods such as financial or technical evaluation. The difficulties involved in effective evaluation of systems are well documented; these will increase as systems become more pervasive throughout organisations and those of their trading partners. Calls for a more holistic approach to evaluation are increasing, based on a developing appreciation of interpretive methods of research within the Information Systems discipline. However, the understanding that the social, political and cultural factors affecting an organisation have an impact on the uses and advantages of systems is by no means universal, and empirical evidence of this view is only slowly emerging.

Abstract

This research examines the benefits that can be realised from participation in an electronic marketplace by taking an interpretive approach to the evaluation. It examines the nature of electronic marketplaces to provide clarity to a confused and dynamic environment. The study then focuses on the development of evaluation studies within the IS discipline to identify how an effective evaluation method for assessing the benefits of e-marketplace participation can be achieved. An empirical examination of an organisation's participation in an electronic marketplace is used to identify the benefits that are realisable and the issues that impact on them. The case study is conducted through an interpretive lens, using a content, context, process (CCP) approach based on existing IS literature. This enables a crucial understanding of the internal and external environments influencing the organisation and its realisation of potential benefits. To allow for the range of interpretations and reflections required to fully address the complexity of the issues involved in such a case study, a variety of research influences such as dialectic hermeneutics, critical realism and case study theory are drawn into the research model.

The case study organisation's motivation for participating in an e-marketplace was primarily cost savings. Over the two years of the study, several more potential benefits were identified, such as supply chain efficiencies, greater market awareness and a widening of the supplier base. However, the organisation's commitments to its local and regional communities, its need to retain status and some consideration of existing relationships needed to be balanced against the gains that might be realised. In some cases the organisation chose to forego a potential benefit in favour of socially or politically motivated actions. Cultural factors also influenced their actions, particularly as they moved towards

Abstract

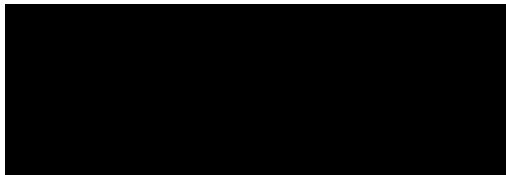
extending participation in the marketplace to gain from a global sourcing strategy.

The contribution of this research lies in two areas. Firstly, it uses existing evaluation literature to develop a framework for the evaluation of benefits in the complex area of electronic marketplaces, thereby extending and informing the call for more inclusive and interpretive evaluation studies. Secondly, the research contributes empirical evidence to support the recognition of benefits to be gained from electronic marketplaces and shows how the realisation of the economic benefits is impacted by the social, political and cultural factors that influence an organisation.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

- i. incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education
- ii. contain any material previously published or written by another person except where due reference is made in the text
- iii. contain any defamatory material.

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ROSEMARY STOCKDALE

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CHAPTER 1

INTRODUCTION

In discussing any research related to the Internet and business there appears to be a necessity to use powerful adjectives such as dynamic, complex, vast, and rapid. A new vocabulary is required to deal with terms such as dot.coms, interconnectivity and digital strategy. The reality is that e-commerce has existed for over 20 years (Timmers, 1999) in many forms, including Electronic Data Interchange (EDI), Computer Aided Logistics Support (CALs) and Electronic Point of Sale (EPOS). However, the speed of development since the adoption and use of the Internet, and particularly the World Wide Web, by business has been explosive and it is difficult to avoid the powerful adjectives. As described by Timmers (1999, p.4);

Through the combination of interactivity, networking, multimedia and data processing, Internet electronic commerce offers a tremendously wide variety of electronic business opportunities, limited only by imagination.

For many in the e-commerce environment imagination has led to swift and exciting changes to the business landscape, where innovative use of the Internet as a successful tool has enabled firms to operate efficiently and profitably. For others, the electronic environment remains a nightmare, where firms struggle to adopt the new ways of working that Internet commerce facilitates. A common theme through the turmoil is the need for firms to remain current and keep abreast of progress if they are to succeed in today's business environment (Downes & Mui, 1998).

One specific area of e-commerce that has brought a measure of confusion is the development of electronic marketplaces. The evolution of electronic markets has long been studied and discussed as advances in information technology (IT) have allowed for their development (Bakos, 1991; Clemons, Reddi, & Row, 1993; Malone, Yates, & Benjamin, 1987). The Internet has extended the ability of electronic markets to present a range of value-add services and to aggregate services into Web-based marketplaces (Bakos, 1998) that offer firms a number of benefits along with the ability to trade in a virtual market space. A resulting proliferation of electronic marketplaces has led to some turmoil in the online trading environment as market makers have sought to gain competitive advantage. The current period of consolidation is bringing some stability to the marketplace environment although there remains confusion with a range of different interpretations of the terminology used and a variety of business models evident.

The pressure on firms to move into this e-marketplace environment is intense with press coverage of many of the developments, and business publications extolling the benefits and offering strategies for meeting the challenges (Downes & Mui, 1998; Modahl, 2000; Sculley & Woods, 2001). More cautious approaches to the Internet and electronic marketplaces are few and far between (Porter, 2001, Wise & Morrison, 2000). The purported benefits of participation include the contribution to simplifying procurement, the advantages of seamless integration, global networks and extensive new relationships (Downes & Mui, 1998; Raisch 2001; Sculley & Woods, 2001; Tumolo, 2001).

With technological advances and ever more ubiquitous use of the Internet, electronic marketplaces will evolve and adapt to prevailing

market conditions. Early indications are that some form of online markets will provide the medium for an increasing share of online transactions in the next few years (Aberdeen Group, 2001). It is estimated that trillions of dollars worth of trade will be transacted through e-marketplaces by 2004 (Forrester Research, 2000; Keeney, 1999; Afuah & Tucci, 2001; Hurwitz, 2000) or approximately 50% of business to business (B2B) trade (Shachtman, 2000). Non-participation in these marketplaces will, therefore, be potentially damaging to firms as the impetus to majority participation gathers pace (Leebaert, 1999; Downes & Mui, 1998).

The main driver towards participation can be seen as competitive necessity rather than competitive advantage and firms need to question not only whether to participate, but also what they will gain, or lose, by doing so. The dynamic online environment, where many purported benefits remain unrealised, exacerbates the difficulties of evaluating the results of participation and clouds the picture of gains and losses. Traditional measures of evaluation, based in the mechanistic paradigm (Smithson & Hirschheim 1998), will not allow for an effective appreciation of the many competing influences that impact on a system such as an e-marketplace. Act of faith participation (Powell, 1992) and gut feeling assessments (Irani & Love, 2002) will not suffice in the current business environment. Effective evaluation, particularly in such an environment, is a difficult process and currently there is little empirical evidence of actual benefits, beyond cost savings, being realised¹ by organisations participating in e-marketplaces. Evaluation

¹ In referring to benefits in this study, the word realise is used in the context of 'bringing to fruition' or 'making concrete' rather than 'to become aware of' (Collins English Dictionary).

measures that were designed to assess the effectiveness or success of applications installed in perhaps one department within a firm cannot capture the complexity of a system that goes beyond the firm's boundaries and affects its interaction with its trading partners. To evaluate an interorganisational system (IOIS) without reference to the external and internal environments in which it must work ignores the social, culture and political elements that interact with the economic factors in any human system.

If firms are to gain the advantages of virtual marketplaces, there is an urgent need for a clearer understanding of the development of electronic marketplaces, how they function and what benefits they can offer. The difficulties involved in carrying out effective evaluation often lead firms to bypass the process and remain with inappropriate methods because they are more easily understood and measured. Evaluation processes better suited to the marketplaces can then be applied to enable participating firms to recognise the benefits they are seeking, other potential benefits that may be realisable, and external and internal factors that may impact on them. This will enhance not only their procurement processes, but also the strategic planning capabilities needed to meet the new challenges and opportunities available to them.

This research undertakes an examination of electronic marketplaces to establish a view of their stage of development and the possible benefits they may offer a participating firm. This is followed by an examination of evaluation literature within the information systems (IS) discipline to establish a framework against which an evaluation of e-marketplace participation can be carried out. An interpretive case study of Alcoa, an Australian aluminium producing organisation and part of a multinational

firm, is used to empirically examine the benefits that are available to them through participation in an electronic marketplace. The benefits are evaluated using a content, context, process method identified from the literature to determine the factors that affect benefit realisation. This enables an evaluation framework for further empirical research into interorganisational systems to be proposed.

The next section discusses the research questions that this study seeks to answer. This is followed by an assessment of the contribution of the thesis and an explanation of how the thesis is structured.

1.1 Research Questions

As discussed in the introduction, there are many business publications and reports advocating the benefits of electronic marketplaces. These include books (for example, Sculley & Woods, 2001; Modahl 2000), consultancies (for example, Forrester Research, 2000; Aberdeen Group, 2001) periodicals (for example, *Harvard Business Review* and *Sloan Management Review*) and newspapers such as the *Financial Times* and *New York Times*. Such a wealth of press coverage leads to a great deal of speculation on the outcomes of participation in this trading environment. However, there is little empirical evidence of the actual benefits that are available to an organisation participating in an e-marketplace for many of its procurement needs.

This research identifies the processes an organisation, Alcoa World Alumina Australia, follows in moving to the e-marketplace environment. It uses a case study to examine an organisation's initial perception of benefits and assesses the significance of both realised and achievable benefits over a period of time, from pre-implementation through a two-

year post-implementation phase. Alcoa World Alumina Australia, part of a multinational organisation, is based in Perth, Western Australia. This region can be regarded as particularly valuable in examining the benefits of online trading as it has distinct characteristics that are suited to the advantages of electronic trading: being a regionally remote area, with a small but well educated population, advanced technological capabilities and large-scale industrial organisations. In short, it has the capabilities and the need to participate in electronic commerce.

The significance of this research is twofold. Firstly, it enables an understanding of the benefits available from e-marketplace participation and examines what factors affect the realisation of identified benefits. Secondly, the research supports the building of an evaluation framework to support effective evaluation of the benefits of participation in an interorganisational information system (IOIS) such as an electronic marketplace.

This study uses existing IS benefits evaluation theory to examine the extent to which evaluation methods, developed in the past, are relevant and appropriate for electronic marketplaces. This enables an evaluation framework to be developed that will encompass the broader requirements of evaluating Internet based interorganisational information systems such as electronic marketplaces. This study addresses how organisations that are participating in electronic marketplaces are realising the benefits and assessing their significance. (It does not address the question of why organisations participate. In this case study, motivation to participate was driven by the need to achieve cost savings.)

The research question is as follows:

How are organisations realising the different types of benefits and assessing the significance of these benefits gained from their participation in electronic marketplaces?

This main question is influenced by the following subsidiary questions:

- i. How does the process of evaluation affect the level and type of benefit recognised?
- ii. How do the benefits change over time and is this a result of changes in benefits or changes in the ability to realise those benefits?
- iii. How are the level and type of benefits impacted by the type and features of the electronic marketplace?

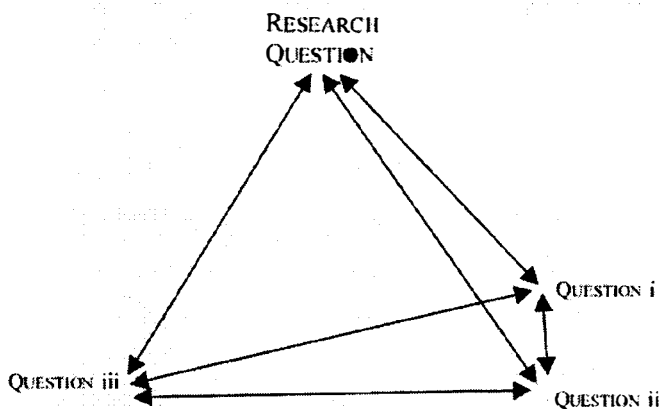


Figure 1: The Research Questions

As indicated in Figure 1, the subsidiary research questions are interrelated and contribute to the many aspects of benefit realisation from e-marketplaces. By examining the benefits over time it is possible to take account of changes in process as the case study organisation gains

experience of participation. This case study examines one organisation and its participation in one electronic marketplace. Question iii relates identification of benefits to other marketplaces that may display different features and thereby alter the types of benefits offered.

1.2 Contribution of the Thesis

The research study examines a significant area of electronic commerce, that of electronic marketplaces, to bring clarity and understanding to a confused but important area of the business environment. The use of existing IS evaluation theory to underpin the development of a framework to inform the complex area of e-marketplace benefit evaluation provides continuity within the IS discipline. The framework synthesises the literature to recognise what processes effectively meet the needs of the current business environment, particularly in the realisation of benefits. The contribution of this thesis can be summarised as follows:

1. Recognition of the factors that affect benefit realisation in an electronic marketplace. The thesis uses a case study to empirically examine the recognition of benefits to be gained from an electronic marketplace and assesses the issues that affect the realisation of those benefits. Although the literature offers many ideas and anecdotal reports of the benefits to be gained from this environment, empirical assessment of the reality are sparse. There is a marked assumption, particularly in the business press, that potential benefits are all realisable. However, firms moving into online trading through marketplaces continue to struggle to gain any benefits, or fail to realise the full potential of what the environment can offer. This can have costly implications for the firms themselves. It also inhibits the fluid development of electronic marketplaces and their ability to

respond to the needs of participants. With trillions of dollars worth of goods and services being trading through e-marketplaces there is an urgent need for some clarity in the situation. The contribution of benefit recognition and realisation is therefore significant for both participating firms and for the market makers.

2. The development of an evaluation framework for interorganisational systems evaluation. The framework is based on existing IS theory and is developed to encompass the broad requirements of IOIS evaluation. Although the benefits from an e-marketplace often only appear to accrue to the procurement function within an organisation, the perception gained from the literature is that these benefits have implications in a wider social, organisational and interorganisational context. There is a significant need for more holistic evaluations, taking into account the complexity of e-commerce systems, to be conducted if firms are to understand and benefit from the developments in the electronic environment.
3. Evidence supporting the richness and value to be gained from the use of an interpretive methodology in the evaluation of information systems. Evaluation remains a difficult area for firms. Although the academic literature shows an appreciation of the benefits of applying interpretive methods to the evaluation process, firms either avoid the process altogether or remain with tried and trusted mechanistic methods. This research shows the effectiveness of interpretive evaluation, and the importance of considering how the economic factors are influenced by the social, political and cultural. The interaction of all these factors are shown to have a significant role in identifying and realising the benefits of e-marketplaces and informs

the debate on the value of such processes being applied to interorganisational systems.

4. The research methodology in this study makes a contribution towards overcoming the divide between academic rigour and practitioner relevance. Although the methodology is grounded firmly in the interpretive, hermeneutic perspective, it takes account of differing influences in the perceptions and attitudes of the case study stakeholders and their environment. The influences are summarised in a research model, which also recognises the role of context in an interpretive study and the need for appropriate, and rich, data gathering and analysis techniques. Recognition of the research influences in such a model will enable more widespread, fruitful and effective understanding of information systems.

1.3 Thesis outline

This research evaluates how Alcoa, a large mining company, is realising the benefits of participation in electronic marketplaces, how they are evaluating those benefits and where, how and why the benefits change over time. Although these benefits are examined from the perspective of the procurement role, the implications of participation in an electronic marketplace influence and, in their turn, are influenced by the organisation. The economic gains of participation are impacted by the social, cultural and political factors within organisational, interorganisational and external contexts.

The thesis begins with an examination of the electronic marketplace environment. This enables an understanding to be gained of the different perceptions, definitions and constructs of this complex and dynamic

environment. Benefits of participation are identified from the literature and the constructs that inform the theory of the development of electronic marketplaces are discussed. An analysis of the motivations of market makers is followed by an examination of the many structures they use to define the different types of e-marketplaces. The role of the e-marketplace in the global business environment is then briefly discussed to facilitate an understanding of where the perceived future of such interorganisational systems lies.

A literature review of information systems evaluation gives a brief history of evaluation before discussing the development of evaluation processes within the IS discipline and the advantages of an interpretive paradigm for such processes. The conceptual approach of content, context and process (with its sub-elements of *why*, *what*, *how*, *when* and *who*) and how it can be developed within IS evaluation is examined in detail and is then used as a base for an evaluation framework to inform the study.

The conceptual approach of the evaluation framework requires that an interpretive lens be used to plan the research. Elements from the evaluation framework (the *why*, *how*, and *when* of the study) are incorporated into this section. The complexity of an interpretive evaluation calls for a holistic approach to the case study. The theoretical influences of the research methodology, namely dialectic hermeneutics and case study theory, are discussed in detail and framed by the research model. The context of the case study is examined to shed light on the environment within which the case organisation operates. In addition to data on the environment, other data sources are identified and the data analysis discussed.

The findings of the case study are reported within the relevant sub-elements of the framework of the evaluation model (the *what* and *who*) and enable an understanding to be formed of the many potential benefits and the influences impacting on them. These are discussed in the next chapter to address the research questions. The findings and ensuing discussion are used to inform a reassessment of the evaluation framework. Implications that can be drawn from the single case study for other organisations are examined to support the framework as a working model for further empirical testing.

Finally, the conclusion draws together the case study and the theory. It shows how an interpretive approach to social, economic, political and cultural factors can be used to identify potential and real benefits arising from the complexity of participation in an interorganisational information system. The limitations of the research are addressed and used to inform a call for future research to further test the findings of this study. A list of terms and abbreviations, and a list of addresses for all websites referred to in this study are given in the appendices.

CHAPTER 2

ELECTRONIC MARKETPLACES

An examination of the electronic marketplace environment enables an understanding of the different perceptions, definitions and constructs of this dynamic environment. This is particularly important when analysing the benefits that can be gained from participation and conforms to the need to fully comprehend the context of an evaluation. This chapter examines the literature on electronic marketplaces to establish how they have developed, the key processes of their operation, the value that they offer to participants, and the factors that influence organisations to enter an e-marketplace. The differences in the way market makers have structured their marketplaces are discussed and the implications of the changing business environment are identified. To avoid confusion of what is meant by the term marketplace, the chapter begins with an overview of marketplaces and a definition of how an electronic marketplace is regarded within the context of this research.

2.1 The Marketplace

‘A market for something exists if there are people who want to buy it and people who want to sell it’ (McMillan, 2002, p.5). The existence of marketplaces in human society has a long history from before the Agora of ancient Greece to the online trading places of the 21st century. Trading of goods and services for other goods or for money is central to the concept of human socialisation. The advent of the electronic environment

has not changed the principles of markets and marketplace trading, merely the way we go about it.

It is important when discussing the theory of markets to differentiate between the market and a marketplace. The former refers to an abstraction as in 'the free market' or 'the market system'. The latter refers to 'a specific physical place or cyberspace where goods are bought and sold' (McMillan, 2002, p.6) and is usually referred to both on and offline as a marketplace. The functions of the marketplace are essentially to match buyers with sellers, facilitate the exchange of information, goods and services, and payments for market transactions, and to establish and maintain an institutional infrastructure (Bakos, 1998) while keeping transaction costs to an acceptable level (McMillan, 2002).

All governments regulate markets to a greater or lesser degree (McMillan, 2002) and all markets have regulation devices, or market mechanisms, to promote the essential element of trust in the marketplace. For example, the diamond market in New York, dominated by an ethnic group sharing a common outlook, is able to function on contractual handshakes, while the film industry is renowned for its watertight legal contracts. However, the rules of the marketplace should not impinge on the freedom of participants to make their own decisions, constrained only by their own resources and the framework of the marketplace. Decision-making autonomy is the key to a successful market (McMillan, 2002) and participation must be voluntary.

In addition to decision-making autonomy there are certain key processes that characterise a market transaction. These are summed up by Kambil and van Heck (2002) as search, price discovery, logistics processes, payment and settlement, and authentication of goods and credibility of

buyers and sellers. These processes are as important in the electronic environment as in any traditional, offline marketplace.

The development of electronic marketplaces has been rapid since the adoption of the Internet for business purposes in the mid 1990s. An initial proliferation of e-marketplaces proved unsustainable and an anticipated consolidation of both marketplaces and market models began by 2000 (Forrester Research, 2000). The number of e-marketplaces in any one industry has been considerably reduced and the methods of transacting business and generating revenue have matured. Many firms are now faced with participating online through such marketplaces either to follow a trading partner, maintain legitimacy or to exploit the benefits the electronic environment offers (Grewal, Comer, & Mehta, 2001).

In the dynamic environment of electronic business, it is often overlooked that markets are social constructs that relate to people, not technological constructs imposed on market participants. The technology facilitates the business of the market, but is not the reason for the market to exist. Online markets must therefore offer better service than offline markets if they are to succeed and encourage firms to overcome any difficulties that arise from using the technology. Consequently, an online market must be as rich, complex and complete as a traditional market and must create extra value for its users (Kambil & van Heck, 2002).

There are many factors that affect the development of e-marketplaces and the efforts of market makers to create value in order to attract participants. There are also a wide variety of business models with different transaction mechanisms and revenue streams. An initial examination of what constitutes an electronic marketplace is necessary

owing to the confused vocabulary that surrounds Internet business applications.

2.2 Definitions of an Electronic Marketplace

The vocabulary that has grown up around electronic commerce and the wide range of business models to be found in the e-environment has complicated the search for a definitive description of an electronic marketplace. Terms such as e-hub, portal, e-market, exchange and auction are used widely in different contexts, with contradictory meanings and classifications assigned to them. Timmers (1999), for example, identifies eleven e-commerce business models evident on the Internet from e-shops to value-chain integrators. He classifies the different models according to the degree of innovation they exhibit against the level of functional integration present. Weill and Vitale (2001) differentiate between electronic auctions, electronic markets, aggregators, electronic malls, portals and intelligent agents based on the completeness of service, or level of functional integration, and number of participants of each business model.

Each business model bears some common characteristics in the different definitions given. For example, Mahadevan (2000) defines a portal's function as engaging primarily in building a community of consumers of information, products and services, where the value comes from channelling traffic to product/service providers. This is supported by Weill and Vitale's discussion of portals as 'access points for aggregated information', although they foresee the ability of portal owners to develop their business models as they recognise new value propositions (Weill & Vitale, 2001, p170).

Mahadevan (2000) further differentiates between market makers who facilitate market transactions between buyers and sellers, and product/service providers who deal directly with their own customers. He gives a broader interpretation of a market maker than many, and raises the issue of the role of the intermediary and the added value that they bring to their customers.

These different perceptions of Internet business models require that the scope of electronic marketplaces as referred to in the context of this study is made clear. Definitions of electronic marketplaces are numerous (Bakos, 1991, 1998; Choudhury, Hartzel, & Konsynski, 1998; Malone et al., 1987; Raisch, 2001; Sculley & Woods, 2001; Weill & Vitale, 2001) and Grieger (2003) gives a list of a dozen different version. However, for the sake of clarity, Table 1 gives only four of the most recognised definitions from the last decade.

Definition	Source
Information technology based governance mechanisms. An interorganisational information system that allows the participating buyers and sellers to exchange information about prices and product offerings.	Malone et al., 1987 Bakos, 1991
A distinct system of suppliers, distributors, commerce service providers, infrastructure providers and customers that use the Internet for communications and transactions.	Federal Trade Commission, 2000
Interactive business communities providing a central market space where multiple companies can engage in B2B e-commerce and/or other e-business activities.	Brunn, Jensen, & Skovgaard, 2002

Table 1: Definitions of an Electronic Marketplace

The definitions in Table 1 illustrate how the recognition of the capabilities of e-marketplaces has developed from information exchange mechanisms to include a range of services delivered by and to a number of different stakeholders. The identification of e-marketplaces as an interorganisational information system (IOIS) by Bakos (1991) is supported by Barrett and Konsynski's (1982) identification of IOIS levels of participation, and has been widely accepted (Choudhury et al., 1998; Clemons et al., 1993; Grieger, 2003). Grieger (2003) further clarifies the definitions by emphasising multiple buyers and sellers and the dynamic pricing ability of e-marketplaces. Any definition of an electronic marketplace can be seen to be complex, because it includes buyers, sellers and other service providers within an interactive community. There is also the notion of the added value that a marketplace brings to its participants. Based on the above, an e-marketplace can be defined as follows:

An interorganisational information system that allows multiple buyers and sellers, and other stakeholders, to communicate and transact through a dynamic central market space, supported by additional services.

This definition is broader than many discussed above and encompasses such models as electronic auctions within the marketplace definition by recognising that they supply added value to the buyer/seller interaction.

2.3 Constructs of the E-Marketplace

The early perception that the Internet would 'usher in perfect markets that would in turn replace traditional, inefficient corporate hierarchies and supply chains' (Bar, 2002, p.27) proved to be a myth. Virtual marketplaces are as subject to architectural bias as any physical

marketplace, although it is network control rather than ownership of physical space that sets the rules of access, positions and functions (Bar, 2002). However, there are recognisable constructs that affect the arguments for the move to the electronic market and that influence how market makers set up their marketplaces and encourage the participation of buyers and sellers. A review of the literature allows for an examination of the concepts and conflicting arguments that surround the development, adaptation and use of e-marketplaces.

2.3.1 Benefits of E-marketplaces

The benefits of electronic marketplaces are well advertised (Downes & Mui, 1998; Raisch, 2001; Sculley & Woods, 2001) although many gains from participation remain anecdotal. However, there is a wealth of literature on the advantages and disadvantages of e-marketplace participation, their sustainability, the possible benefits to be gained and their future development.

A well-recognised primary benefit of electronic markets is efficient price search (Bakos, 1998; Choudhury et al., 1998; Malone et al., 1987). This, it is argued, will lead to disintermediation in the marketing channel and commoditisation leading to sharply heightened price competition (Bakos, 1991, 1997; Choudhury et al., 1998; Malone et al., 1987).

Further identified benefits are speed and efficiency of transactions and large numbers of participants (Hurwitz, 2000; Tumolo, 2001; Yoo, Choudhary, & Mukhopadhyay, 2003). Network effects increase the value of the marketplace to buyers and sellers, although negative effects arise for suppliers when more suppliers are present in the marketplace (Wise & Morrison, 2000; Yoo et al., 2003). E-marketplaces support

personalisation and customisation in two ways: they facilitate greater knowledge of customers and allow for products (particularly information rich ones) to be customised. They also have the potential to add value to the logistical stream by addressing the problem of information overload and transaction cost inefficiencies (Bakos, 1997, 1998; Lin & Hsieh, 2000; Lucking-Reiley & Spulber, 2001; Mahadevan, 2000; Timmers, 1999; Tumolo, 2001). Mahadevan sees the value streams of net businesses as increased margins over bricks and mortar businesses, and increased sales (2000), while Hurwitz (2000) and Tumolo (2001) emphasise the process and supply chain efficiencies. A list of benefits, drawn from the literature is given in Table 2.

In contrast to the benefits discussed above, Wise and Morrison (2000) are less enthusiastic about the ability of e-marketplaces to survive and flourish. Their arguments emphasise the effect that intense competitive bidding, seen by many as a benefit of e-marketplaces, has on the close, strategic relationships developed in recent years by many organisations. They express doubts on the value offered to suppliers in the e-marketplace environment and they have great reservations about the business models of market makers, which they describe as at best 'half baked'.

Such contrasting views have become more prevalent as the dynamic environment of the Internet continues to influence the way in which market makers can adapt their sites to retain or encourage participants. An examination of the constructs of e-marketplace development illuminates the divergent views and shows how market makers are developing their business models.

Benefit	Source
Efficient price search Price competition Speed and efficiency of transaction	Bakos, 1991, 1998; Choudhury et al., 1998; Malone et al., 1987 Modahl, 2000 Bakos, 1991, 1997; Hurwitz, 2000; Lin & Hsieh, 2000; Lucking-Reiley & Spulber, 2001; Mahadevan, 2000; Modahl, 2000; Timmers, 1999; Tumolo, 2001; Yoo et al., 2003
Network effects Improved customer service (Personalisation/customisation)	Bakos, 1991; Tumolo, 2001 Bakos, 1998; Tumolo, 2001
Increased margins Reduces inventory levels	Bakos, 1991; Mahadevan, 2000 Choudhury et al., 1998; Lin & Hsieh, 2000; Tumolo, 2001
Flow of information	Bakos, 1991, 1998; Clemons et al., 1993; Downes & Mui, 1998; Hess & Kemerer, 1994; Lin & Hsieh, 2000; Malone et al., 1987; Tumolo, 2001
Extension of buyer/supplier base Extension of market Transaction cost savings Value add facilities (e.g. information services, logistic & financial services, data warehousing, delivery tracking, escrow, customer risk management, customer and product information channels, research, consumer reports, selection of supplier)	Hurwitz, 2000; Tumolo, 2001 Modahl, 2000; Tumolo, 2001 Bakos, 1991, 1998; Clemons et al., 1993; Downes & Mui, 1998; Hess & Kemerer, 1994; Malone et al., 1987; Modahl, 2000; Tumolo, 2001 Bakos, 1991, 1998; Choudhury et al., 1998; Downes & Mui, 1998; Brunn et al, 2002; Raisch, 2001; Sarkar, Butler, & Steinfield, 1995; Steinfield, Kraut, & Plummer, 1995
Lower prices	Tumolo, 2001

Table 2: Benefits of E-Marketplaces Derived from the Literature

2.3.2 Transaction Costs

Transaction costs, a complex and under researched area of economics (Rindfleisch & Heide, 1997), are seen as a major incentive to use electronic marketplaces (Bakos, 1991; Lucking-Reiley & Spulber, 2001; Malone et al., 1987; Timmers, 1999). The costs of a business fall into two categories: production costs and transaction costs. Production costs are concerned with the process of transforming inputs into outputs. Transaction costs are the costs associated with finding someone with whom to do business, reaching an agreement about the price and other aspects of the exchange, and ensuring that the terms of the agreement are fulfilled (McTaggart, Findlay, & Parkin, 1996). These are summarised by Downes and Mui (1998), based on Coase (1937), as search, information, bargaining, decision, policing and enforcement costs. Transaction costs can make a market dysfunctional if, for example, market information is so bad that the buyer can only find one seller, who can then charge any price. Markets work well only where information flows smoothly and if trust is present (McMillan, 2002).

Coase (1937) contends that it is impossible to understand the workings of the economic system without taking into account transaction costs. A key work on transaction cost economics (Williamson, 1979) identifies the critical characteristics of a transaction and links them to the institutional governance structures. The significant characteristics of a transaction are uncertainty, frequency of exchange and the extent to which investments are specific to certain transactions. According to Williamson (1979), non-specific transactions are efficiently organised by markets, while recurrent specific transactions are more efficiently governed internally. However, IT enables greater use of the market as it significantly reduces

transaction costs (specifically search costs) and thereby challenges the cost advantage of internal production by the development of more efficient markets and hierarchies (Ciborra in Clemons et al., 1993). This view supports the arguments of Malone et al., (1987) that the use of information technology had the ability to significantly reduce transaction costs (as distinct from the costs of production). The reduction in such costs would encourage an increase in the use of markets for outsourcing, based on Coase's theory that firms internalise production when transaction costs are high, but gain cost efficiencies from outsourcing when transaction costs are low. This in turn leads to a larger supplier base from which a buyer can source its requirements (Bakos, 1991; Malone et al., 1987); a situation regarded as favourable by Porter (1980) who argues that a larger number of suppliers increases the bargaining position of the buyer. These search costs are a substantial part of transaction costs, which also include associated costs of administering the transaction (Bakos, 1998).

The 'move to the middle' hypothesis (Clemons et al., 1993) challenges the arguments of Malone et al., (1987). Clemons et al., argue that the significant costs of establishing a relationship with a supplier, the threat of opportunistic risk, the transactional economies of scale and the human factors inherent in a buyer/seller relationship leads to greater benefits being gained by establishing close interorganisational relationships. Further arguments in support of the 'move to the middle' suggest that the cost of technology investment in a relationship hinders an increase in the number of suppliers (Bakos & Brynjolfsson, 1993). Participation in electronic marketplaces, where costs of participation are seen to be low and where there is the potential for a high number of participants,

therefore challenges the 'move to the middle' hypothesis, although this has yet to be adequately addressed in the literature.

2.3.3 Role of the Intermediary

The arguments over the role of the intermediary in the electronic environment are wide ranging. The subject is of crucial importance in relation to e-marketplaces, which actually fulfil many of the functions of intermediaries in business to business trading. Indeed, Weill and Vitale's (2001) identification of the services that intermediaries offer (search, specification, price, sale, fulfilment, surveillance and enforcement) correspond very closely with the key processes of a marketplace (Kambil & van Heck, 2002).

However, the electronic environment allows for greater interaction between manufacturer and consumer and the possibility of avoiding the intermediary. Intermediaries between a manufacturer and a consumer add significantly to the costs in the value chain, which are reflected in higher prices (Benjamin & Wigand, 1995). It is therefore reasonable to assume that in the electronic environment direct contact between manufacturer and consumer will become a reality, eliminating intermediaries from the value chain (Sarkar et al., 1995). This is the argument for disintermediation based on friction-free markets with good information (Benjamin & Wigand, 1995; Gates, 1996; Malone et al., 1987). However, the counter arguments for intermediaries, or cybermediaries (Dai & Kauffman, 2002; Sarkar et al., 1995), are strong, particularly in the e-commerce environment where the case for disintermediation is seen to be negligible (Kambil & van Heck, 2002). Many see new roles emerging for intermediaries (Bakos, 1998; Sarkar et al., 1995) as electronic markets reduce barriers and create greater fragmentation among sellers

(Choudhury et al., 1998; Steinfield et al., 1995). The co-ordination of buyers and sellers is an important function of e-marketplaces and by attracting a large number of participants they can build network externalities to the advantage of all. Intermediaries can also offer exceptional added value by coordinating many facilities and providing a 'one stop shop' at much lower costs than traditional transaction brokers (Bakos, 1998). Examples of these value-add facilities include customer risk management, customer and product information channels, research, consumer reports, selection of supplier, order logistics, and finance and insurance (Bakos, 1991, 1998; Sarkar et al., 1995; Steinfield et al., 1995). Intermediaries can aggregate or disaggregate to great advantage; for example, to lower costs, especially for information goods (Bakos, 1997) and they can provide valuable services to accommodate the information overload caused by the Internet (Mahadevan, 2000; Sarkar et al., 1995).

Sen and King (2003) explain the differences in the intermediation/disintermediation argument by identifying different perceived roles of the brokers by opposing sides. If an intermediary is seen as one who buys products and services to resell, then the argument for disintermediation is strong. However, if the role of the intermediary is perceived as one of offering services of matching, aggregation, facilitation of transactions and information brokerage, then the argument for that role gains credence. Sen and King go further to argue that in the electronic environment there is a role for re-intermediation. This accords with the idea of the new breed of intermediaries that will be able to exploit the advantages of the Internet (Bakos, 1998; Sarkar et al., 1995; Weill & Vitale, 2001). The economic importance of such intermediaries in setting prices and clearing markets, providing liquidity and immediacy, coordinating buyers and sellers, guaranteeing quality and

monitoring performance is becoming more widely identified (Chircu & Kauffman, 2000; Dai & Kauffman, 2002; Weill & Vitale, 2001; Yoo et al., 2003).

Another important attribute of particular relevance to e-marketplaces is the completeness of the service they offer. Weill and Vitale support Bakos' and Sarkar's views that intermediaries will continue to provide a valuable service in the new e-environment and that the winners will be 'intermediaries providing completeness of service to a large number of buyers and sellers' (Weill & Vitale, 2001, p.180).

In considering why intermediaries, who lengthen the value chain, are able to offer a desirable service to buyers and sellers, Weill and Vitale identify the ability of market makers to make markets in areas that did not exist before. Examples of this have been seen in consumer auctions where the market for second hand goods and collectables has achieved new heights of profitability (Lucking-Reiley, 2000) and is now becoming visible in the business market where surplus equipment is auctioned competitively through such marketplaces as Vendorbase and Konkurse.

More importantly when considering the reasons for using an e-marketplace, Sarkar et al., (1995) raise the social and subjective factors of intermediation, identifying that not all decisions are made on economic grounds. The use of intermediaries by either the buyer or seller may rest on more subjective decision making, such as trust, culture, fear of bias or social interaction.

2.3.4 Price

The theoretical outcome of intense online competition resulting from a reduction in search and switching costs should be frictionless markets

and downward pressure on prices. However, Bailey and Brynjolfsson (in Bakos, 1998) found that this was not so in the books and CD consumer market, although Brown and Goolsbee (2002) found marked reductions in retail insurance and retail computer markets.

There appear to be a number of arguments to explain this discrepancy in price levels evident in e-commerce transactions. Daripa and Kapur (2001) argue that online prices are often not significantly lower because the search is not perfect, and the Internet allows sellers to adopt dynamic pricing strategies to react to competition. Multiple pricing gives sellers two distinct advantages: firstly they can make price search more complicated by the use of pricing structures and secondly they can add new opportunities for selling time sensitive products and services. These advantages are well illustrated by the airline industry where multiple prices and last minute sales have added flexibility to ticket sales (Choudhury et al., 1998; Daripa & Kapur, 2001; Mahadevan, 2000).

Dynamic pricing can be a two edged sword for sellers as it can lead to the challenge of price matching, with agent bots available to track competitors' prices with great efficiency. As a result there is no competitive advantage from the price cutting, merely lower revenue which in turn can lead to higher prices if firms cannot price discriminate (Daripa & Kapur, 2001).

A significant advantage for sellers is the ability to accumulate buyer information in order to customise their products and services and enable price differentiation based on the buyers' 'different willingness to pay' (Bakos, 1998; Daripa & Kapur, 2001; Mahadevan, 2000). Buyer information itself becomes a saleable product for sellers, particularly to intermediaries such as the electronic marketplaces.

From the buyers' point of view, e-commerce provides new levels of search and price transparency that reduces the monopoly power enjoyed by sellers in a differentiated product market (Bakos, 1998). Buyers benefit from lower search costs and e-marketplaces can overcome information inefficiencies for the buyer by enabling more efficient price comparisons and greater, more detailed, product information.

Electronic marketplaces also increase price transparency and reduce the threat of collusion amongst suppliers. Conversely, they can protect suppliers from price wars as identification of buyers and more access to information widens a supplier's ability to respond to market demand (Choudhury et al., 1998; Tumolo, 2001).

2.3.5 Suppliers, Buyers and Relationships

The rapid development of information technology over recent decades has changed the nature of B2B relationships. Information systems, and particularly electronic marketplaces, have been significant factors in the changes and developments by allowing for greater ease of communication and more efficient online administration and transactions. There are two opposing views of how technology will affect relationships, based on the optimal number of suppliers.

Malone et al. (1987) anticipated that the development of IT would lead to lower transaction costs and therefore allow for a greater number of suppliers in electronic markets. A greater number of suppliers is seen as an advantage by Porter (1980) who argues that a large number of suppliers improves the bargaining position of the buyer. These arguments are countered by Bakos and Brynjolfsson (1993) who suggest that the cost of technology investment in a relationship hinders the increase in

numbers of suppliers. However, they argue, smaller tighter networks offer advantages in innovation, adoption of new technology, quality, information exchange, trust, flexibility and responsiveness. This accords with the 'move to the middle' hypothesis of Clemons et al., (1993). The hypothesis states that the significant costs of establishing relationships, the transactional economies of scale and the human factors involved leads to more benefits from close interorganisational relationships. Such relationships are advocated as the most effective in the marketing literature (Dwyer, Schurr, & Oh, 1987; Naude & Holland, 1996; Spekman, 1988).

There has been a continued move towards closer relationships along with the development of IT over the last decade (Parsons, 2002). However, there has also been an increase in the different forms of relationship made possible in the current business environment. For example, in interorganisational networks, a long-term relationship, where 'trading partners adopt common values, operate on the basis of trust rather than contract and make accommodations to each other' can be said to represent a hierarchical relationship (Steinfield et al., 1995²). Identification of eight different relationship types are discussed by Cannon and Perreault Jr (2002) indicating that supplier performance and procurement obstacles affect buyer satisfaction and hence influence the degree of relationship they develop. This exploration of the incentives for relationships builds on Heide and John's (1990) argument that there is a degree of asymmetry in the dependence on the relationship, with suppliers often exhibiting a greater need for continuity. This is supported

² Online reference, therefore no page number available (see APA Manual, 5th Ed, pp. 120-121)

by Dai and Kauffman's (2002) argument that suppliers gain fewer benefits from e-marketplace participation and that benefits accrue to the buyer. Nevertheless, the buyer needs to encourage suppliers to make an investment in a relational exchange and will tend towards a smaller network despite the cost advantages of an e-marketplace. However, contrary to Dai and Kauffman's prediction that market makers will accommodate relationship requirements within the marketplace, there are some indications that the drive to cut costs may outweigh full consideration of consequences to supplier relationships (Stockdale & Standing, 2003a).

2.3.6 Trust

Trust in business, as in personal matters, eases co-operation between people and allows for 'resources – physical, emotional, economic – that would otherwise be consumed guarding against harm can be directed toward more constructive ends' (Friedman, Kahn, & Howe, 2000, p.34). Trust reduces frictions in commerce and enables belief in the other party to fulfil obligations (Kambil & van Heck, 2002). These obligations are seen differently by buyers and sellers, where the buyers focus on trust and associated terms of reliability and performance while the sellers view buyers as motivated by performance on product attributes, price and product availability (Holden, 1990).

In the electronic environment trust has added dimensions that need to be overcome if business is to flourish and protect firms from opportunistic behaviour (Bakos, 1998). This view is supported by Ba and Pavlou (2002) who highlight the differences in transaction-specific risks on and offline. They examine the use of feedback mechanisms and analyse the effect of such mechanisms on trust in electronic markets. Surprisingly,

they find that credibility trust (a belief that the other party is honest, reliable and competent) can exist without prior interactions.

The European Union has identified drivers relating to the issue of trust online (Jones, Wilikens, Morris, & Masera, 2000):

- ♦ The digital online environment makes many traditional offline bases for trust irrelevant and introduces more reliance on digital assets.
- ♦ Large-scale open information infrastructures require co-operation from a wide range of stakeholders and increases the risk of fraud.
- ♦ Globalisation increases the issues of culture, distance and legal frameworks in the business arena.

These drivers require some consideration as market makers develop mechanisms for instilling trust in an electronic, global environment.

In addition to the challenge of establishing trust, electronic marketplaces must also devote attention to controlling sourcing risk. This is perceived to be a major barrier to extending participation in e-marketplaces (Saeed & Leitch, 2003; Schoder & Yin, 2000). To establish trust and reduce risk, market makers are turning to a number of initiatives, including digital signatures, legal frameworks, insurance schemes and comprehensive security systems. The use of third parties, such as escrow services, risk management companies, certification authorities, and credit agencies are important elements in the establishment of trust (Bakos, 1998; Friedman et al., 2000; Jones et al., 2000; Kambil & van Heck, 2002; Saeed & Leitch, 2003; Schoder & Yin, 2000; Timmers, 1999). However, Ba and Pavlou (2002) point out that at least one mechanism for establishing trust, the positive and negative ratings on eBay, has severe flaws in the

way it is administered and in ways it may be circumvented. Appropriate corrective measures, they argue, are needed if long-term viability in e-markets is to be maintained.

2.3.7 Summary

To select a definition of an electronic marketplace is a difficult task, although there is general consensus that they should be regarded as interorganisational information systems. The many perceptions vary according to the recognition of stakeholders and the level of functionality displayed by the marketplace. This study uses a broad inclusive description to encompass the wide variety of business models identifiable on the Web and in the literature. Within the definition used in this study, there are several identifiable constructs that influence how market makers plan and set up their marketplaces and encourage participation through the identification of benefits. The wide variety of anticipated benefits, many based on anecdotal rather than empirical evidence, are derived from the central arguments for the adoption of electronic markets based on the constructs of transaction costs and the role of the intermediary. In the case of the former there is wide consensus that electronic markets reduce the coordinated costs identified in transaction cost literature. In the latter case, identification of the role of e-marketplaces as intermediaries provides a strong argument for their development and use.

In considering the issue of price on the Internet there is often a perception that prices are lower than in traditional sales outlets and therefore that price is an advantage of online trading. However, growing empirical evidence shows that online prices are not necessarily lower and, significantly for electronic marketplace participants, that price

cutting is not seen as a major competitive action, but as the result of a reduction in transaction costs, recognised and demanded by the buyer.

Electronic marketplaces have the potential to impact enormously on business to business relationships. As yet, the advantages of participation appear to accrue to the buyer, and suppliers have yet to gain significantly. As a consequence, suppliers' incentives to contribute to relational exchanges are lessened and rely on the asymmetry of power within the relationship and the need to follow buyers into the marketplace. However, opportunities for suppliers are possible as e-marketplaces develop and more effectively address the required relationships between buyers and suppliers.

Finally, trust is a necessary construct of business, where it reduces conflict, fears and frictions between trading parties. Fear of opportunistic behaviour has a strong influence on the use of electronic marketplaces where the benefits of low cost searches have to be weighed against the risks of unknown suppliers.

These constructs relate to all electronic marketplaces within the definition given and contribute to the benefits that are realisable provided that they are well addressed by the market makers.

2.4 Business Models and Marketplace Structures

The proliferation of electronic marketplaces in the last five years has led to a wide diversity of business models and marketplace structures, and many different classifications have been offered aimed at providing some level of clarity to prospective participants. This section discusses the literature on business models before examining the motivations of the

market makers and the elements of structure that market makers use to meet their marketplace designs.

2.4.1 Business Models

At the most simplistic level, e-marketplaces have been defined as either vertical or horizontal. This is no longer a clear-cut separation as some larger, vertical marketplaces have moved towards a more 'complete solution' to procurement needs (for example, Quadrem³). Conversely, some horizontal marketplaces, such as FreeMarkets, enable the purchase of industry specific goods.

Kaplan and Sawhney's (2000) well-recognised e-marketplace model focuses on the procurement aspects of electronic marketplaces. It differentiates purchases into manufacturing and operating inputs, then further distinguishes the method of purchasing into spot and systematic sourcing. However, the dynamism of the market makers seeking to survive in an overcrowded environment has led to a blurring of these categories, and marketplaces now offer trading mechanisms to support one or more of the categories in the model.

Kaplan and Sawhney also make the important distinction between aggregation and matching mechanisms. The former is static in nature with fixed prices and either pre-negotiated contracts or meta-catalogues. This is in contrast to the matching mechanism where prices are dynamic and buyers and sellers are fluid. Matching is a far more complex mechanism, but here again the development of software and the

³ Website addresses are given in Appendix B

increasing experience of market makers are contributing to greater accessibility.

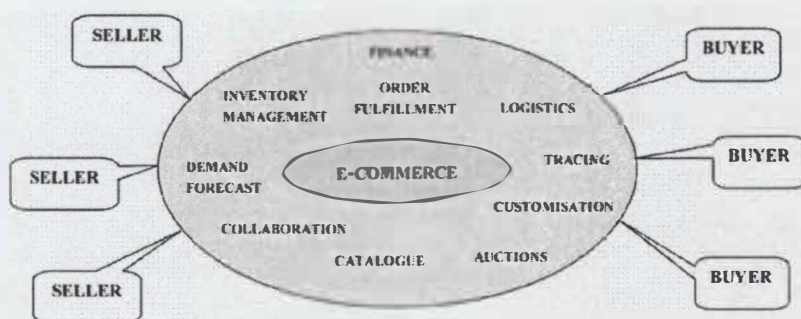
Several further classifications have been developed addressing different aspects of e-marketplaces. For example, Sculley and Woods (2001) have expanded an earlier model by Forrester Research (2000), adding trading hubs and 'post and browse' to Forrester's aggregators, auctions and fully automated exchanges, which support transactions through to the delivery stage. These models are based in the type of transaction mechanism and do not differentiate between what and how businesses buy. As e-marketplaces develop more complex, multiple offerings, the transaction mechanism model becomes less valid.

A further model by Piccinelli, Di Vitantonio, and Mokrushin (2001) takes a different approach and its four categories of e-marketplace are based on the level of automation and the impact of pricing models. By using the level of automation as a criterion, it is possible to distinguish the complexity of the different types of marketplace, which is a useful guide when technological capabilities are important. This model also recognises that other services offered by electronic marketplaces, beyond those of buying and selling, have an impact on pricing and sales. This corresponds with Raisch's (2001) second phase of e-marketplace evolution where the focus on transactions and e-commerce evolves into provision of value-add services, which support the transaction. This will have an influence on the selection of an e-marketplace by a prospective buyer who is seeking more than a trading mechanism.

In contrast to the more complex models, Choudhury et al., (1998) confine their differentiation of marketplaces to the level of service required by the buyer: identification, selection or execution. This distinction has the

advantage of clarity, but it does not take into account the benefits that may be found in the value-add facilities, which are a particular feature of the community portals described by Piccinelli et al., (2001).

The classifications above each have their own perspective. The relevance of the classification feature used depends upon the view of the primary objective of the marketplace. Brunn et al., (2002, p.287) argue that 'the core service of e-marketplaces is to provide a central market space, where e-commerce can be conducted.' Their model (Figure 2) takes into consideration a marketplace's functionality including transaction mechanisms, fulfilment services, information and collaboration facilities.



(Source: Brunn et al., 2002)

Figure 2: E-Marketplace Business Model

The activities included in Brunn et al.'s model relate closely to identified structures of e-marketplaces as discussed in this study.

2.4.2 Motivations for Market Makers

When considering the variety of e-marketplace business models, the motivations of the market makers as a central concept of the development of e-marketplace structures is rarely addressed. There is an inherent assumption that motivations for creating a marketplace are economic and there is little consideration of other motivations reflected in the literature. However, it is possible to trace a broadening of motivations as e-marketplaces become recognised and the technical demands of creation less formidable (Standing, Stockdale, & Tellefsen, 2003). Market maker motivations can be identified as follows:

Economic motive

Initial incentives for the development of an interorganisational information system are economic. These involve three potential benefits for participants: cost reductions, productivity improvements and product/market strategy (Barrett & Konsynski, 1982). In addition to the opportunity for price reductions and greater access to new markets, the economic motive for engaging in e-marketplaces is bound up with transaction costs economics as discussed in Section 2.3.2.

Network View

The network view of electronic marketplaces focuses on the relationships and communication infrastructure of groups of organisations that are bound together in some way. Interorganisational alliances are a form of network with social, political and economic implications. Here, the focus is on the socio-political arrangement. Oliver (1990) proposes six

generalisable determinants of interorganisational relationships that have relevance to e-marketplaces:

- ♦ Necessity - to fulfil legal or regulatory requirements. For example, some private and government procurement systems are based on e-marketplaces and companies wishing to tender must do so through the marketplace.
- ♦ Asymmetry - potential to exert power over other organisations. For example, e-marketplace consortia, formed by major players in an industry are in a position to exert influence over other organisations to participate.
- ♦ Reciprocity - desire to co-operate, collaborate and co-ordinate. Hierarchical e-marketplaces require organisations within their supply chain to cooperate and collaborate in transacting and exchanging information.
- ♦ Efficiency - internally focused efficiencies. E-marketplaces may be seen as a way to reduce procurement costs.
- ♦ Stability - in response to environmental uncertainty. An e-marketplace can reduce dependence on a small number of suppliers.
- ♦ Legitimacy - related to reputation, image, prestige, or congruence with prevailing norms in the environment. This has been shown to be an ineffective rationale for e-marketplace participation as companies that emphasise this as their reason for participation are more likely to remain in the passive state (Grewal et al., 2001)

Service motives

The service motive is concerned with providing a better service to customers, which may include such things as continuity of supply, convenience and speed of processing and greater choice for buyers. The service motive is closely aligned, but not exclusive, to the economic motive. Higher service typically comes at a cost but an organisation may choose to deliver higher levels of service despite the extra cost, for example, to gain competitive advantage.

The five dimensions by which consumers evaluate service quality in traditional markets (Bebko, 2000; Berry & Parasuraman, 1991). are:

- Tangibles – the appearance of physical facilities, equipment, personnel and communications.
- Reliability – the ability to perform the promised service dependably and accurately.
- Responsiveness – providing a prompt service and evidence of a desire to help customers.
- Assurance – the knowledge and courtesy of employees and their ability to convey trust and confidence.
- Empathy – the caring, individualised attention the firm provides its customers.

In the e-marketplace environment, service quality relates to such things as the Web site and e-marketplace software, personnel, marketing literature and supporting documentation, the reliability of the system and help provided.

Community motive

Some e-marketplaces are created with a community emphasis. A major objective of the electronic market is to play a role in the development of a community. This is usually done through stimulating economic activity, working on the premise that if local/regional business flourishes then so will the communities they are a part of. The market maker, usually local or state government, provides encouragement to adopt e-marketplace trading and in doing so raises the level of general e-business knowledge, skills and technologies within the business community. The e-marketplace can be viewed as an online community. However, the ultimate aim underlying such a strategy is to develop a business or industry sector at local, regional or national level.

Hybrid arrangement

Market makers may have a set of objectives to achieve in the construction and management of an electronic marketplace that entails more than one motivation. For example, the community model may be seen as being for the common good but may also need to be economically viable.

2.4.3 Electronic Marketplace Structures

The diversity of business models and different motivations for market makers has led to a wide variety of structures being identified within e-marketplaces. These have previously been identified as key success factors recognised by market makers as essential structures in determining the success of their marketplaces (Stockdale & Standing, 2003b). In considering these structures across horizontal and industry

specific marketplaces it has become possible to identify the main influences that affect a marketplace's operation. These influences can impact on the use of marketplaces by organisations.

Ownership models

Ownership models have become more diverse as the number of e-marketplaces has increased. The earliest market makers were independent companies financed by venture capital at a time when the rush to finance Internet companies was at its height (Skjott-Larsen, Kotzab, & Grieger, 2003). Founders of these marketplaces often had some expertise in a specific industry but many were horizontal marketplaces that concentrated on delivering generic services such as auction facilities or value add facilities.

These intermediary marketplaces bring buyers and sellers together in one place and allow for trading to take place through one or more of the different mechanisms offered. The levels of service also vary from identification through to selection or full execution of transaction (Choudhury et al., 1998).

Yoo et al., (2003) suggest that for intermediary marketplaces it is important to target industries and products where switching costs are low. As IT contributes to lowering switching costs, industry sectors with a high IT infrastructure are the most suited for this type of marketplace. Added benefits are the ability to use information services to attract buyers and suppliers and the advantages to be gained from network effects.

The appearance of the consortia owned marketplaces followed on from the apparent success of the intermediaries. The earlier media publicity

and the large costs of acquiring e-marketplaces encouraged the development of consortia by organisations that could see benefits in not only using but also having some control over an e-marketplace. Unlike the intermediaries the consortia marketplaces were predominantly industry specific, such as Covisint⁴ in the automobile industry, Trade-Ranger in oil and gas and Quadrem in mining. The organisations investing in these marketplaces formed unprecedented collaborations with competitors to launch them, raising fears of monopoly and anti-trust behaviour (Federal Trade Commission, 2000). To date, these fears have not materialised and the structure of these marketplaces is such that the owners are provided with a focal trading point to attract suppliers to a specific industry. The suppliers have, in turn, the advantage of gaining entry, through one access point, to the supply chains of a number of large organisations.

A different route has been taken by other large organisations that have decided to 'go it alone' and establish private marketplaces. These large organisations invest in and host their own marketplaces thereby retaining control of the facilities they develop and offer to suppliers (Bar, 2002; Fox, 2001; Konicki & Whiting, 2001). Although these private marketplaces require a large investment of time, money and other resources, the benefits of drawing interested suppliers to one site are attractive to organisations large enough to afford their development.

Marketplace structures developed by government are akin to these private marketplaces. These often represent the hybrid arrangement of economic, community and service motivations. There has been an increase in the number of government e-marketplaces at State and local

⁴ See Website addresses in Appendix B

level in Australia and these fall into two categories: e-procurement hubs for government and government hosted sites to support and encourage e-commerce in local and national areas. The former category is 'somewhat distinct from procurement in private enterprises, because public institutions often have different objectives and constraints' (Gebauer, Beam, & Segev, 1998, p.168). The latter model has distinct community motivation with economic considerations remaining secondary in the short-term. The structure of this type e-marketplace is representative of a new ownership model that is now appearing; that of the co-operative or large group ownership. Groups of stakeholders, with a common interest in an industry, a regional area or a specific goal, join together as market makers to create a marketplace for a specific purpose (Standing, Sims, Stockdale, & Wassenaar, 2003).

Governance

E-marketplace governance at its broadest level can be either biased or neutral (Kaplan & Sawhney, 2000). The bias may lie with either buyers or sellers depending on the ownership of the marketplace. The intermediary owned marketplace has a greater perception of neutrality as it is governed by a third party, and this is seen as a reason for their early success (Brunn et al., 2002; Sculley & Woods, 2001). In the buyer-owned consortia marketplaces, despite claims of neutrality, there remains a perception of bias, although the asymmetry of power and the need to retain contracts overcomes many of the hesitations of the suppliers.

In discussing marketplace architecture, Bar (2002) compares the lack of neutrality in the physical marketplace, where position and ability to display wares vary across the market area, to the opportunities available in the virtual marketplace. He concludes that there is no such thing as a

neutral marketplace, as control of the marketplace lies with those who have power over the network configuration. In a private e-marketplace, the dominant player or owner creates competition amongst the suppliers, and retains governance of the marketplace. In a consortia marketplace

chances are that the architecture of (for example) the Covisint marketplace will lend itself to help its owners, the automakers, drive down the cost of components, rather than to help component makers set automakers against one another to bid up the price of their products.(Bar, 2002, p.43)

Bar also challenges the notion of neutrality in third party owned marketplaces where the issue of payments raises questions of bias. Marketplaces vary in the charging of transaction fees and there may be implications of bias depending on whether it is the buyer or the seller who is paying for the service. Advertising income may also influence the balance of neutrality in a market maker, but it is harder to discern.

Critical mass

Market makers recognise the need to achieve critical mass and to convince prospective participants that their marketplace is a relevant force. Sufficient numbers of participants are necessary to ensure the effective running of a marketplace and market makers use various strategies to attract them. These include low entry costs and advertising the number of registered buyers and sellers or transaction turnover rate on the home page (Brunn et al, 2002; Stockdale & Standing, 2003b).

Transaction mechanisms

There are a variety of transaction mechanisms evident in electronic marketplaces and while many e-marketplaces offer a variety, others specialise in one or two. For example, FreeMarkets⁵ and AuctionsPlus specialise in auctions, Grainger specialises in online catalogues and Quadrem offers a variety of transaction mechanisms.

The relationship between a particular type of purchase and the transaction mechanism offered by the marketplace can influence participants' choice. For example, in the de-regulated market of power supply the use of auctions for sourcing annual gas and electricity supplies has become popular among larger organisations. In contrast there is anecdotal evidence that SMEs prefer marketplaces with Request for Quote facilities and online catalogues.

The evolving nature of e-marketplaces has led to changes in the way firms are sourcing their goods and it is anticipated that they will continue to adapt to changing market developments. A generalised list of types of purchase against each transaction mechanism is meaningless as market makers develop their transaction mechanisms and firms attempt to find the methods best suited to their individual needs. Nevertheless, there are issues relating to each transaction method that need to be considered by prospective participant firms.

⁵ See Appendix B for web addresses

a. Catalogues

The conventional view of a supplier's catalogue has not been entirely dispersed by the facilities offered by online catalogues. E-marketplaces that offer catalogue services do so at a range of levels from simple representation based on the print catalogue model to multiple supplier catalogues and complete sites. (In business to consumer (B2C) e-commerce Amazon is an excellent example of a complete catalogue site.) A major breakthrough in catalogue usability came with the CDROM and its search facilities, but it was the advent of the Internet Electronic Product Catalogue (IEPC) that changed the extent of the functionality of catalogues. Baron, Shaw, and Bailey (2000, p.93) define e-catalogues in their broadest sense as 'electronic representations of information about the products and/or services of an organisation. However, it is the intelligent end of the definition where catalogues are dynamic and active that are used in e-marketplaces'.

IEPCs offer information, the ordering of goods and services, payment facilities, customer support, feedback and participation in corporate activities (Stanoevska-Slabeva & Schmid, 2000), but retain the traditional specific tasks of product representation, classification and search. In the Internet environment the static nature of the pricing structure of a catalogue is alleviated by the ability to dynamically control the price by continual updating.

Catalogues largely retain their offline uses for the purchase of maintenance, repair and operating (MRO) items, particularly for large volume, low price standardised goods, although B2C commerce is showing that they have potential to service a wider range of goods (Baron et al., 2000).

While the development costs of IEPCs currently prevent smaller businesses from developing their own sophisticated catalogues, the option to purchase through this method may attract prospective participants to particular marketplaces.

b. Auctions

Traditional auctions carry significant co-ordination costs and usually require the physical presence of prospective buyers at a given place and time. They have, therefore, traditionally been reserved for high price goods. The ability of the Internet to substantially reduce the transaction costs has extended the use of the auction process to low value items, second hand goods and collectables (Daripa & Kapur, 2001). The potential to use IT to create virtual auctions was recognised by online user groups over a decade ago when members began to auction memorabilia and collectables. The success of these auctions and development of the World Wide Web encouraged the creation of commercial auctions such as Onsale and eBay (Lucking-Reiley, 2000) and this was closely followed by the business auctions such as FreeMarkets (Chui & Zwick, 1999; Daripa & Kapur, 2001).

Auctions are now part of a broad set of activities to trade goods or services and are the most visible face of B2B electronic marketplaces. Awareness of them is heightened by continued coverage of high profile companies in the B2C market such as eBay and Yahoo. The financial savings advertised for B2B auctions are attracting large organisations to the auction mechanism for sourcing a wide range of goods and services (Emiliani, 2000; Emiliani & Stec, 2002). Problems of bidding manipulation and fraud have been addressed by companies in the consumer market in a variety of innovative ways including rating

systems and escrow services (Kollock, 1999; Smith, Bailey, & Brynjolfsson, 1999) and the B2B auction companies have been careful to learn from this.

An increasing specialisation in auctions to meet the needs of different industries has led to a profusion of auction types. There are more than 30 different formats currently in use in B2B and B2C e-marketplaces (Davis, 2001), although the most common remain the seller-driven auction, based on the conventional auction house method, and buyer-driven reverse auctions (Jap, 2002, 2003; Lucking-Reiley, 2000). These auctions can be characterised into two distinct systems:

- ♦ the English auction, the most common type of auction, where participants bid either up (forward auction), or down (reverse auction), from a starting price.
- ♦ the Dutch auction, where an item is offered at a price that progressively runs up (forward auction), or down (reverse auction), until a buyer makes a bid at the price they are prepared to pay.

It is important that auction formats are designed for the market they are serving (Kambil & van Heck, 2002; Yoo et al., 2003). The formats can vary from the very simple forward auctions of eBay to the complex deregulation auctions custom-designed by game theorists for the US and European governments (Kambil & van Heck, 2002; McMillan, 2002) in the 1990s. Factors such as the time scale, open versus closed bidding, the dynamic bidding process and the ability to weight bids according to the needs of the buyer make auctions a more flexible transaction mechanism than might first appear. For more complex bids the tendering process can take many months to organise if the full benefits of an auction with

multiple, well informed bidders are to be gained. An overview of FreeMarkets' reverse auction process is given in Figure 3.

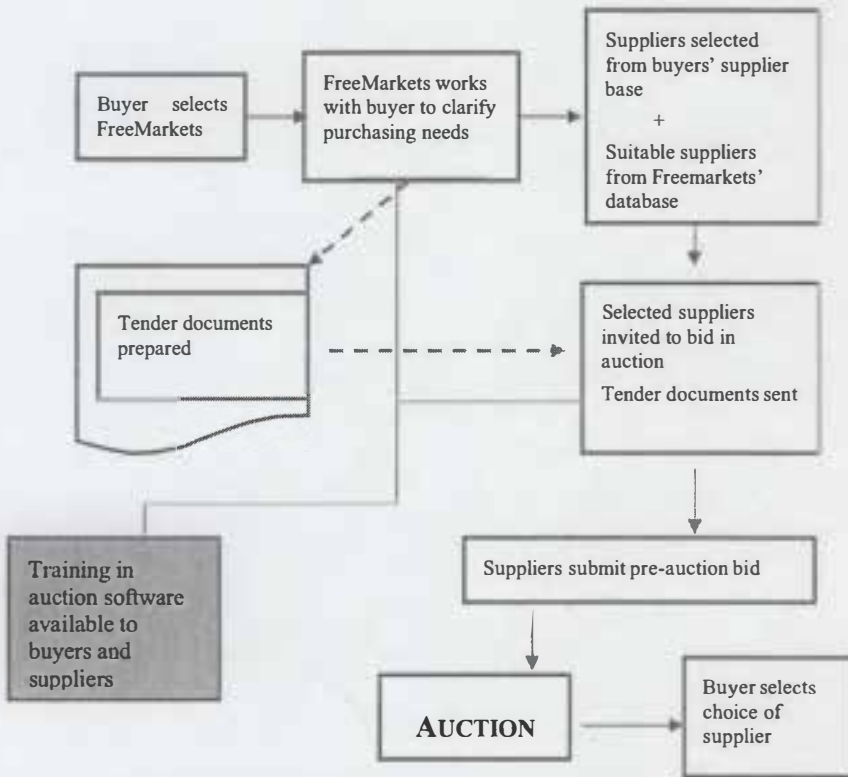


Figure 3: Simplified Overview of the Auction Process (FreeMarkets)

A significant proportion of goods auctioned in the business to business market to date have been direct purchases related to the core activity of the purchasing firm (Davis, 2001). Indirect goods are also auctioned (for example, in the newly deregulated utilities markets where partnerships have not yet formed) and there is a move towards more auctioning of service contracts (Lucking-Reiley, 2000). In addition to new goods, there

are a number of marketplaces that deal specifically in the disposal of surplus inventory or assets through the auction mechanism (Chui & Zwick, 1999). There is little empirical evidence to suggest that there is any one type of good or service that is particularly well suited to the auction mechanism. Research into designing specifications for auctions, using rich descriptions and photographs show that the specifications have a differing impact on auction prices according to the product. For example, in the B2C market, palm pilots sell well if given a rich description and photograph, but prices for collectable dolls appear unaffected by the richness of the specification (Kambil & van Heck, 2002). To date there is very little empirical evidence on how a virtual specification affects prices and buying patterns. Other factors such as the relationship between product complexity and asset specificity, where high specificity is often seen to relate to high complexity, (Malone et al., 1987) is changed by the electronic environment. Complex descriptions are no longer an automatic barrier to the auction process as downloadable documents and multimedia facilities enhance the ability to produce complex descriptions.

c. Negotiation

The negotiation model supports the posting of bids or quotes (RFBs and RFQs) on the marketplace and allows for responding businesses to make their offers. In most cases the firms remain anonymous until a bid or quote is accepted and the host marketplace connects the two parties. In some cases, the e-marketplace accepts the full role of intermediary and the firms remain anonymous.

The flexibility of the negotiation model allows for the bid/tender to be as complex as required on an individual contract basis and many marketplaces allow for further negotiation on the original offer to take place between the two parties. The negotiation model can be used for one-off contracts or may form the preliminary steps in seeking and establishing new longer-term relationships.

The facilities offered by the marketplace may extend to full execution, including financial and logistical services. More specialist marketplaces may offer only identification or selection services where their role of intermediary is more limited (Choudhury et al., 1998), reflecting the level of settlement and delivery complexity that may exist for a contract negotiated through this trading mechanism.

Simple models of the negotiation mechanism are apparent in many of the fledgling local government marketplaces that are beginning to appear in Australia. These are particularly well suited to first stage e-marketplace participation by SMEs (Standing & Stockdale, 2003). Figure 4 illustrates the process followed in an Internet based local government regional electronic marketplace (REM) in Western Australia. The marketplace supports identification and selection of a regional supplier by local buyers.

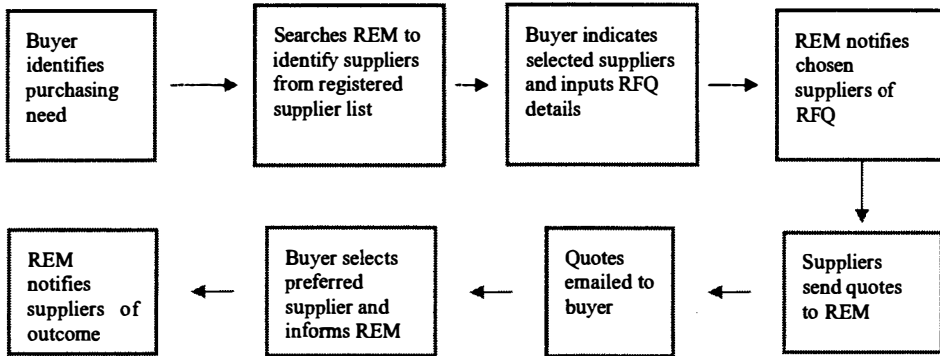


Figure 4: Simplified Overview of the Negotiation Process

d. Exchanges

The exchange transaction mechanism closely resembles the offline trading exchanges for commodities and near commodities (Figure 5), and hosts competitive, anonymous bidding between buyers and sellers. To protect the integrity of the market, exchanges provide financial and logistical services to prevent the failure of settlement (Sculley & Woods, 2001).

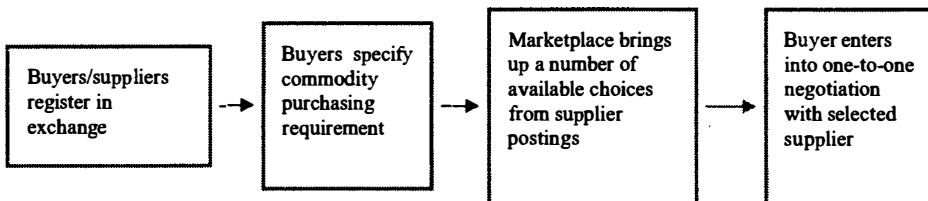


Figure 5: Simplified Overview of the Exchange Process

2.4.4 Value-add Facilities

As the shakeout of e-marketplaces takes place and competition to survive increases, it is the market makers who seek competitive advantage to attract participants and maintain profits (Bakos, 1991) that are likely to survive. To do this, many use value-add facilities to increase their sites' attractiveness. These facilities range from information services such as a listing of industry events, industry research papers, tutorials and news, to transaction orientated facilities offering a number of services such as insurance, completion of customs paperwork, data warehousing, transaction tracking and escrow. As logistics constitute a substantial additional cost to products, the ability of electronic marketplaces to reduce these costs through delivery tracking (for Just-In-Time advantages and better inventory control) and electronic payments is considerable (Bakos, 1998). Value-add services are particularly useful for information products where the versatility to deliver bundled and unbundled goods is exceptional. Value-add facilities also contribute to the establishment of trust as market makers are well placed to offer verification services and screen potential participants to the marketplace (Choudhury et al., 1998).

Some market makers adopt the community site model, well described by Hagel and Armstrong (1997), which offers, in addition to transaction mechanisms, a full range of facilities (bulletin boards, chat rooms, job vacancies, business services etc.) relevant to a specific industry or area. This model is particularly favoured by sites, especially government sites, that aim to play a role in the development of a regional area and where the primary motive is raising the level of e-business knowledge and skills of that area (Standing et al., 2003a).

The ability of an e-marketplace to fulfil participants' needs is an indication of how well the market makers understand their market and will enable them to differentiate themselves from competing marketplaces. Success depends on the value gained by the participant and the market makers ability to increase participants' motivation to use the marketplace (Grewal et al., 2001). As technology develops, a number of services will develop strategic importance for participants such as design collaboration, automated purchasing and data warehousing, and income streams will shift from transaction fees to service fees (Dai & Kauffman, 2002). One example is Covisint's ambitious objective of developing services that will enable car dealers to order customer-specific cars online for delivery within a few days.

2.4.5 Income Models and Revenue Streams

A variety of income streams have been identified in electronic marketplaces that relate both to income from participants and income generated because of the participants. The most common are the transaction related fees or commission plus auction fee (Kambil & van Heck, 2002). These may take the form of a percentage of the transaction; for example, FreeMarkets charges the buyer 'from around 1% of the total auction value' (Earle & Keen, 2000, p.169). In contrast, e-Steel, which specialises in forward auctions in the steel industry, charges suppliers transaction fees proportional to the value of the transaction (Yoo et al., 2003). The advantages of transaction fees are that the favoured party (buyers in reverse auctions and suppliers in forward auctions) pay a relatively small fee and realise cost savings from the auction. The charging of membership fees or subscription charges requires upfront payments and are less attractive to new participants who are reluctant to

commit to one marketplace in the early stages of e-purchasing and consequently seek to keep switching costs to a minimum. This form of revenue has therefore become less popular with market makers and tends to be used for markets with simple functionality (Kambil & van Heck, 2002). The use of transaction fees is also declining as market makers seek to attract more suppliers to the online environment (Aberdeen Group, 2001). They are increasingly being replaced with service fees for value-add facilities (such as logistics, financial services and industry information) that are seen as a potential primary source of significant revenue (Federal Trade Commission, 2000). Participants are seen to be more willing to pay fees for value-add facilities that provide information or services that enhance their company's business.

Another stream of revenue for market makers, advertising, is somewhat contentious and participants may have reservations about e-marketplaces that use banners and other forms of advertising. There are also issues of quality and fear of bias in favour of the advertiser. Advertising is related to an even more contentious form of revenue; the sale of marketing data accumulated by the market maker to third parties. The potential for targeted marketing in vertical marketplaces is enormous. While there are advantages from specifically targeted marketing (or junk) mail for participants, there are also issues of consumer privacy that need to be addressed (Federal Trade Commission, 2000). Sales of such data can produce an income source for these marketplaces; though this needs to be balanced against the potential risk of participants' exposure to invasive marketing.

2.4.6 Technology

The issue of technology and technological standards is a difficult one for e-marketplaces. The simplest e-marketplace models require very basic levels of technology from both buyers and suppliers. For example, regional e-marketplaces such as 2Cities and SWIM⁶ in Western Australia simply require Internet access. This is a deliberate strategy to encourage new participants to the marketplace while keeping costs and technology knowledge at the low levels necessary to support small businesses.

For larger organisations there is a requirement to provide a technology platform that will go some way to supporting integration of existing systems (Dai & Kauffman, 2002) and advanced marketplace tools such as IEPCs and auctions (Brunn et al., 2002). Dai and Kauffman report that lack of compatibility with existing trading technologies and IOIS will result in an organisation resisting the new platform.

Standardisation remains an unresolved issue; Gullidge (2001) reports that over 120 standards that extend XML have been identified. Reportedly, most technology providers are 'committed to open technical standards but have yet to agree on them' (Brunn et al., 2002), but the lack of extensive co-operation between providers will inhibit full acceptance of e-marketplaces until standardisation issues are resolved (Lucking-Reiley & Spulber, 2001).

2.4.7 Security

Security is the key to confidence in an environment where commercially sensitive material and financial data are exchanged. Participants must

⁶ see appendix B for website addresses

have a feeling of security in the e-marketplace if they are to continue to participate, requiring transaction integrity, an audit trail, accurate data and timely information (Hurwitz, 2000). The level of security will vary according to the type of marketplace, but those supporting a wide range of facilities will need to ensure that data are kept secure. Currently, security remains an issue of concern in e-commerce although there is a rise in the number of specialist security firms adopted as strategic partners by market makers, thereby displaying an awareness of the issue (Mott, 2000; Stockdale & Standing, 2003b).

2.4.8 Summary

A diversity of e-marketplace business models has been proposed in the literature, focusing on a number of different aspects. These include: analysing the procurement (i.e. spot or systematic sourcing); the transaction mechanisms offered; the level of automation; and the capability of the marketplace to offer services beyond those of buying and selling. The aspects encompass many of the structures used by market makers to appeal to prospective participants. They often relate to the primary motivation of the market makers and may include economic, network, service, community or a hybrid of factors. The structures of an e-marketplace include ownership models, governance, transaction mechanisms, value-add and income models. Ownership varies from that of the third-party intermediary, to the consortia and the private marketplace, and influences the neutrality of the marketplace. It can be argued that all marketplaces have a bias related to who pays the market maker, although bias is more evident in consortia and private marketplaces.

E-marketplaces may have one or more types of transaction mechanism, although they all are drawn from the traditional world, where auctions, catalogues and negotiation are established methods of trade. In the virtual environment the mechanisms have significantly different characteristics and, as yet, there is little clarity as to which mechanism is best suited to the procurement of which products. It is the potential of value-add that will change the way that e-marketplaces develop. The wide range of facilities becoming available have the ability to contribute significantly to cost efficiencies in such important areas as logistics and finance. Additionally, value-add from community style sites aimed at specific audiences, such as regional areas or individual industries, have the potential to contribute to e-business knowledge development, industry awareness, collaboration and aggregation.

Income models are developing as market makers gain appreciation of appropriate methods of revenue streams. Licence fees are being replaced by transaction fees, and these in turn are being superseded by service fees. In addition, some marketplaces are using advertising and accumulated data sales to enhance income from buyers and sellers.

Technology and security remain areas of some concern in the development of e-marketplaces. Standardisation of technology is yet to be agreed upon. It is perhaps the perception of security problems rather than real evidence of its lack that are of concern. Fraud, theft and information abuse are all evident in the offline environment. However, no comparisons between the offline and online environments have been found.

2.5 E-marketplaces and the Global Business Environment

Technology has changed the way the world communicates and is having a massive impact on business. Connection to the Internet is increasing with more countries coming online and it is estimated that half a billion people will be online by the end of 2003 (Keaveney & Parthasarathy, 2001). The ability of technology, and particularly the Internet, to facilitate business has ensured that economic activity has increased in the electronic environment with B2B transactions calculated in the trillions of dollars (Afuah & Tucci, 2001; Forrester Research 2000; Federal Trade Commission, 2000). The resulting changes to the business landscape are significant and affect all aspects of commercial activity. Major changes brought about by the technology are digitisation, deregulation and globalisation (Downes & Mui, 1998). The demands of these changes have a significant influence on the value chains of organisations. Digitisation has brought about the e-business environment while deregulation has opened up previously closed markets and globalisation is now seen as a significant force in all areas of society. The electronic marketplace is one facet of e-business that is having a significant effect on supply chains and procurement strategies as the capability for global supplier bases is realised.

The concept of globalisation raises a number of emotive issues at many levels from the economic to the social and political. It can be seen as a convenient term to describe the growth of international trade where many economic benefits have been identified. These include lower transaction costs and lower purchase prices through a single global market (Takeuchi & Porter, 1986), the merging of financial markets to facilitate the flow of money (Castells, 2000) and advantages of international management

(Bartlett & Ghoshal, 2002). Alternatively, globalisation can be seen from a sociological perspective with the decline of traditional communities and relationships (Giddens, 1999; Sasson, 1998), increasing migration (Castles & Millar, 1998) and pressure on individual cultures (Hofstede, 1991).

In terms of electronic commerce, globalisation is seen as a driving force in the business landscape, contributing to the breaking down of national boundaries, and enabling firms to trade across the world (Forbes, 1999; Held, McGrew, Goldblatt, & Perraton, 1999; Peppard, 1999) and this is particularly true for e-marketplaces. Access to global markets is not a new phenomenon, but e-marketplaces enable more firms to access larger markets more easily, more often, and at lower cost than previously (Downes & Mui, 1998; Sculley & Woods, 2001). However, the ease with which companies can move from trading regionally to a global environment via e-marketplaces is deceptive. The perception that operating across the globe is an extension of operating within regional boundaries may hold true in the short-term but for sustained benefit realisation many factors require consideration (Ives & Jarvenpaa, 1991; Peppard, 1999). These factors are not exclusively centred in the economic perspective, but entail a good understanding of social, political and cultural factors that impact on firms operating in a global setting. Peppard (1999, p.79) argues that there is little 'by way of guidance for managing IS/IT in the global enterprise' and that there are no easy prescriptions for practitioners involved in global IS. This view is reinforced by Walsham's work on cultural differences at regional, national and organisational levels (Walsham, 2002).

Global issues that affect e-marketplace participation have been identified in the literature and are shown in Table 3 (Standing & Stockdale, 2003). This table highlights the wide diversity of defining characteristics of globalisation in the context of e-marketplaces. It shows that the economic perspective, although a driving force, cannot be viewed in isolation if effective global participation is to be achieved. The social, political and cultural factors that are discussed in many works on globalisation (Forbes, 1999; Giddens, 1999; Held et al., 1999; Segal-Horn, 1994) cannot be ignored in the e-commerce environment.

In the social perspective, the acceptance and development of information technology within a community is affected by the societal influences of that community (Trauth, 2000). Additionally, social forces affect the nature of the relationship between organisations (Grover, Teng, & Fiedler, 2002) and the role of trust remains difficult in a virtual environment where the traditional indications of trust are absent and new ones have yet to be established (Ba & Pavlou, 2002).

Political factors require consideration in a business landscape where interorganisational networks are more widespread (Grover & Ramanlal, 1999). Such networks can affect participation in a marketplace and also impact on subsequent benefit realisation. Motivations for participation in an e-marketplace can be influenced by the need to establish a specific image, whether as a global firm or as a technologically up-to-date firm (Grewal et al., 2001). Such motivations can affect the type of e-marketplace selected and influence the benefits that the firm seeks to gain.

Globalisation Factor	Globalisation Sub-factors	Defining Characteristics in Information Systems/E-markets	References
Social	Relationships/Trust Social structure Community	Role of trust in e-commerce Relational forces in dyads Societal influence on information economy Interconnectedness of community with information economy sector	Ba & Pavlou (2002) Grover, Teng & Fiedler (2002) Trauth (2000) Trauth (2000)
Political	Local verse global issues Political Networks Legitimacy motive	Ownership bias in e-marketplaces Interorganisational alliances Technological image	Brunn et al. (2002) Oliver (1990) Grover & Ramanlal (1999) Tractinsky & Jarvenpaa (1995) Grewal et al. (2001)
Cultural	National/regional culture Organisational culture Management practices	Regional culture Influence of national culture on organisational culture Organisational culture affects managements' ability to achieve IS success.	Walsham (2002) Walsham (2002) Ives & Jarvenpaa (1991) Porter (2001)
Economic	Single Global Market	Lower transaction costs Lower purchase price Extension of markets Extension of supplier base Competitive necessity	Ives & Jarvenpaa (1991) Peppard (1999). Tractinsky & Jarvenpaa (1995) Bakos (1997) Choudhury et al. (1998) Malone et al (1987) Porter (2001)

Table 3: Global Issues in Information Systems/E-Markets

Finally, the impact of culture at national, regional and organisational levels has been identified as a significant influence on e-marketplace behaviour (Ives & Jarvenpaa, 1991; Porter, 2001; Walsham, 2002).

It is possible to identify the complexity of participation from this examination of the global perspective of electronic marketplaces. The multitude of influences from the social, economic, political and cultural factors affecting benefit realisation and a lack of knowledge of the marketplace environment on which to base expectations, make it difficult for an organisation to identify the implications from participation. There is a need for thorough and encompassing evaluation processes to support and inform organisations in their recognition and realisation of benefits in the virtual marketplace. An analysis of existing IS evaluation methods will enable an initial framework to be developed that can then be tested against empirical findings from the case study.

CHAPTER 3

EVALUATION

Organisations are faced by the dichotomy of the need for thorough and encompassing evaluation processes to justify economic outlay and strategic achievements, and the extensive difficulties involved in effectively evaluating interorganisational systems such as electronic marketplaces that affect all parts of the organisation. Currently, many firms continue to evaluate systems, but remain with existing evaluation processes that lead to inaccurate and mechanistic methods and outcomes. This raises the question of why they feel the need to evaluate and what they hope to gain from doing so. The aim in this chapter is to synthesise the literature to support the development of a conceptual framework to facilitate a holistic evaluation approach to information systems. To achieve this a broad overview of evaluation and its development is discussed and consideration given to the evolution of evaluation theory. This is followed by an extensive examination of information systems literature to enable the framework to be constructed.

Evaluation is endemic to human society. People evaluate both themselves and everything around them, sometimes using a structured, taking stock approach, but often in an informal and disorganised way. In the current economic climate of globalisation and privatisation, the need for more formal evaluation of public and private organisations and their activities is arguably greater than ever.

There has been a move towards establishing requirements to measure against international standards, to measure conformance to health and

safety legislation and to measure that students are achieving educational goals. There is, in essence, an overriding need to consider whether innovations, activities, products, and services are 'effective' (Smithson & Hirschheim, 1998). This requires a clear view of what is meant by effective and how appropriate evaluation can be conducted to make a valid assessment. In some cases, such as international standards, the effectiveness is pre-determined by legislation and a process or activity can be measured against the criteria for that standard. In other cases the outcome of an evaluation requires a more comprehensive approach. For example, knowing the percentage of children who can read to a set level by the age of seven does not support the necessary changes to increase that percentage to 99%. This requires a more holistic evaluation that seeks to answer questions such as how children learn, why some fail to achieve basic literacy levels, what factors influence improved reading levels and whether non-educational circumstances affect a child's ability to learn.

The evaluation of information systems has been an integral part of the history of the discipline. The approaches taken to evaluation have varied enormously according to a range of factors including the type of IS, its purpose, the perspective of the organisation and the evaluation methodology employed. This had led to a rich accumulation of evaluation literature within the discipline that documents the wide variety of approaches taken over three decades and, in some cases, the motives given for not evaluating (Powell, 1992). Evaluation processes have been greatly influenced by the perceived need to justify information systems in the light of concerns raised by the spectre of the productivity paradox (Brynjolfsson, 1993). This well documented phenomenon, where increasing expenditure on information technology (IT) does not appear to

be reflected in productivity levels (Willcocks & Lester, 1999), has led to discussions about the true value of information systems and the contribution they make to business. This, in turn, has led to a reappraisal of what benefits can be anticipated from IS and what benefits should be realisable by organisations. This has coincided with, and influenced, a paradigm shift in the way evaluation is perceived, following trends developed in other disciplines, most notably in education. The literature of the last decade is predominantly in favour of the shift towards an interpretive approach to evaluation.

It is not an easy task, either to develop appropriate frameworks for a wide range of evaluation requirements or to convince practitioners and academics that interpretive, holistic evaluations are valid, achievable and richly contributive. The advantages of interpretive evaluation methods need to be emphasised against the disadvantages of cost, complexity and lack of definitive outcomes that result from such processes.

After defining the boundaries and scope of the literature examined in this chapter, the next section briefly traces the development of formal evaluation studies in non-scientific disciplines from their beginnings in 19th education (Guba & Lincoln, 1989; House, 1980). This is followed by an examination of the application of these ideas to information systems to enable the identification of key concepts. These key concepts are then discussed and used to form an interpretive evaluation framework.

3.1 Approach to the Literature - Boundaries and Scope

An initial assessment of the extensive literature identified three main areas to be addressed in setting the boundaries for this section of the literature review:

- i. The difficulties of language. There is a wide range of terminology evident in the literature that complicates the identification of previous research. Terminology includes words and phrases such as appraisal, assessment, measuring success, the impact of IS and evaluating. Some of these terms can be considered synonyms, but do not always carry the same meaning to researchers or their audience. For example, 'appraising the investment' is obviously not the same as 'evaluating the benefits', but in the overarching area of IS evaluation theory both approaches contribute to the field.
- ii. The breadth of contributions to the literature. The range of work carried out in the field of IS evaluation is considerable. All IS journals publish research in this area and all major IS conferences accept papers on the subject. In addition there are annual conferences dedicated to IT evaluation (for example, The European Conference on Information Technology Evaluation) and a very wide range of other papers and books available.
- iii. The subject of evaluation is inter-disciplinary and the evaluation process affects other areas such as organisational change, accounting and finance, and adoption theory. In addition, evaluation research is, in itself, a fruitful area of research and publication and one that is constantly developing new ideas and theories.

This research is concerned with the nature of evaluation rather than specific tools. Consequently, studies that focus on the evaluation of such tools are not included. Inter-disciplinary evaluation studies have been included where appropriate, although the main stream of literature reviewed remains within the IS discipline.

A broad approach to terminology was taken and online searches were conducted through ProQuest/ABI Inform. In many cases there was little discernible difference between the terms IT and IS and therefore the search treated the terms as interchangeable. The following keywords were used: evaluation, benefits, measure, metrics, assess, appraisal and IS success. In addition 'benefits' was further defined to include 'value'.

Changes in the nature of evaluation studies and in the development of information systems indicate the need for a time perspective to be added to the research boundaries. There have been a number of comprehensive review studies of evaluation literature (DeLone & McLean, 1992; Farbey, Land, & Targett, 1993; Powell, 1992) in recent years and these have been added to and built on by subsequent research (Garrity & Sanders, 1998; Molla & Licker, 2001; Seddon, 1997; DeLone & McLean, 2003). Although an assessment of several earlier papers was made to gain an historical perspective, this review is confined to work published in the last ten years thereby building on an established, cumulative base of research.

3.2 Evaluation Studies

Perceptions of what is required of an evaluation study vary widely according to why the evaluation is being done, who commissioned the study and what purpose it will serve. There are obvious differences in evaluating the efficacy of a new cancer drug with evaluating whether a programme to enhance the opportunities for disadvantaged youths in a local community is effective. This section is concerned with evaluation within the social science disciplines and does not address the requirements of scientific evaluation.

The definition of evaluation can be re-interpreted according to each individual evaluation study. The encompassing view of evaluation as ‘a process for determining the significance, worth, or condition of usually by careful appraisal and study’ (Oxford English Dictionary) is very broad and is open to a wide variety of interpretations. These interpretations will vary according to what is being appraised, who is determining the worth, who is carrying out the appraisal, and the methodology employed in carrying out the study.

Evaluation is not a static process, but requires revision and extension as requirements change over time. The use of such studies has progressed as the demand for more effective results has led to the development of increasingly involved theories and techniques. This can be seen from a brief overview of the history of formal evaluation studies.

3.2.1 Historical Overview of Evaluation

The results of formal, structured, non-scientific evaluation studies were first published in the academic press in the 19th century. These studies can be traced to a perceived need to measure schoolchildren’s attainments as state funding of education became more widespread and the IQ test and formal examination results were developed to assess the progress of students (Guba & Lincoln, 1989). Subsequently, as a less rigid school system evolved from changes in society, the focus of evaluation studies changed from the use of students as objects of evaluation to the use of program evaluation (1920s).

Following on from increasing use in the Second World War, evaluation programmes became more widespread in the post war era and by the 1950s evaluation had reached new heights of development. Large-scale

projects became commonplace across a wide range of social programmes in countries throughout the world, as knowledge of health, education, housing and other community activities was sought (Rossi & Freeman, 1989). Research practice continued to grow in the following decade, but the demand for 'knowledge of results' (Rossi & Freeman, 1989, p.23) was moving towards the call to include judgement as an integral part of the evaluation process (Guba & Lincoln, 1989). Rossi and Freeman argue that the computer revolution contributed to the growth of evaluation research by supporting the refinement of survey research and data analysis. It should not, however, be overlooked that the computer revolution was affecting the business sector and that the technology itself was the subject of evaluation programmes as businesses moved to justify expenditure on information technology.

The major steps in the development of evaluation theory are described as the first three generations of evaluation by Guba and Lincoln (1989). They argue that these generations retain severe flaws that inhibit a comprehensive outcome to any study. The problems centre around three main criticisms. Such studies:

- ♦ retain a tendency towards managerialism
- ♦ fail to accommodate value-pluralism
- ♦ over commit to the scientific paradigm of inquiry

To overcome these problems, Guba and Lincoln propose a fourth generation evaluation model in the constructivist paradigm that places the stakeholders in the centre of the evaluation process. This takes the evaluation away from managerialism and increases the role of the stakeholders, the evaluator and the client, along with their wider

spectrum of different values. This increased role of stakeholders and evaluators within the evaluation programme accords with Clarke's (1999) argument for a collaborative process in which all parties are active participants, and with Rossi and Freeman's (1989) recognition of the consumers of the research (policymakers, administrators and planners).

3.2.2 Evaluation Theory

Definitive outcomes from an evaluation are the hallmark of the scientific paradigm. In the context of fourth generation evaluation these outcomes are lost and are ideally replaced with a consensus on the claims, concerns and issues of the stakeholders. This reduces the evaluator's ability to find 'generalisable truths', but allows for findings of a local solution or local meaning (Guba & Lincoln, 1989), reflecting the arguments of other earlier evaluation research studies. House (1980), for example, argues that a qualitative case study approach is intuitive and leads more to understanding than judgement (p.19). The local solution of Guba and Lincoln (1989) is reflected in House's argument that such case studies relate the evaluation to the experience of the stakeholders and leaves generalisation to the perceptions of the audience. In essence the main evaluation question is: 'what does the program look like to various people who are familiar with it?' (House, 1980, p.39)

Once the premise of the role of the stakeholders is acknowledged, those responsible for the programme being evaluated will have some notion of what are the desired outcomes. This allows for some theoretical basis to be given to the evaluation and underpins the framework required to specify the mechanisms by which the programme can be expected to produce change. Clarke (1999) names four sources of information that

contribute to the generation of the programme's evaluation theory: documents, people, prior research and logical reasoning. This accords well with the calls for more interpretive methodologies to be used in evaluation research.

In considering the desired outcomes an important distinction lies between formative and summative evaluation. Formative evaluation is 'done to provide feedback to people who are trying to improve something' whereas summative evaluation assesses the overall effectiveness of a programme (Scriven in Clarke, 1999, p.7). The former emphasises the strengths and weaknesses of the programme through the perception of the stakeholders (improvement assessment), while the latter is more judgmental in its support of success/failure or run/stop decisions (outcome assessment).

The implications of adopting fourth generation evaluation study methods are far reaching, particularly in terms of less definitive, sometimes ambiguous outcomes, implications of less direct managerial control, and the interplay of power and politics amongst the stakeholders. However, it is argued that the gains from a qualitative, holistic approach result in far greater understanding of the programme being evaluated. Also, consideration of the concerns, claims and issues of the stakeholders leads to widespread involvement and consensus (Guba & Lincoln, 1989; House, 1980; Rossi & Freeman, 1989; Stake, 1980).

The arguments for this qualitative, holistic approach to evaluation are gaining credence in the IS discipline. The importance of evaluation has been accentuated by discussions of the productivity paradox and changes in the emphasis of systems to meet the demands of the 21st century e-business environment. The move towards fourth generation evaluation

theory within IS is evident in the difference approaches advocated by researchers

3.3 Evaluating Information Systems

There have been significant changes in the focus of evaluation studies as IT has brought extensive changes to the business environment. The financial outlay, pervasiveness, and complexity of information systems have increased several-fold in the last three decades, complicating the evaluation process and overwhelming the prevailing methods of assessing the worth of a system. Many of these more traditional processes remain embedded in the early evaluation methods that concentrated on the technical aspects of system quality to determine system effectiveness (DeLone & McLean, 1992). By the mid 1980s systems had developed more strategic value and evaluation methods extended beyond the technical to incorporate a broader range of aspects. These included user satisfaction, system usage and more commonly, financial measurements such as cost benefit analysis (CBA) and return on investment (ROI) (Hirschheim & Smithson, 1988; Mirani & Lederer, 1998; Serafeimidis & Smithson, 1998; Walsham, 1993; Willcocks, 1992).

DeLone and McLean's (1992) classic work provided a taxonomy of evaluation measures to consolidate the cumulative body of research that had been achieved by this time. The majority of the studies included in this categorisation were of the 'positivist, mechanistic paradigm' (Jones & Hughes, 2001, p.191) recognisable in Guba and Lincoln's criticisms of previous generations of evaluation theory. (This is in contrast with the range of interpretive studies included in DeLone and McLean's 2003 reappraisal of their success model.)

3.3.1 Towards an Interpretive Paradigm

As information systems became a more integral part of the business landscape and an essential element of an organisation's processes, the traditional methods of evaluation were perceived as less effective. By the late 1980s there were calls for a change to IS evaluation methods to incorporate the recognition of information systems as both social and technical entities (Hirschheim & Smithson, 1988; Symons, 1991; Walsham, 1993). Hirschheim and Smithson argued that the treatment of IS evaluation as a technical problem led to meaningless conclusions that overlooked the social activity inherent in the evaluation process and ignored the political-social environment of an organisation. Their arguments reflect those of Guba and Lincoln (1989) in recognising the importance of stakeholders in the evaluation process and the need to move away from the concept of the evaluation producing an answer. Benefits, they argue, tend to be qualitative and often intangible and require an interpretive approach to evaluation research if a good understanding of the information system is to be achieved.

Symons (1991) describes how changes in the uses of IS, with an increasing emphasis on strategic outcomes, has important consequences on the recognition of benefits that are more frequently of an uncertain and subjective nature. Evaluation, she argues, must look beyond 'a narrow quantification of costs and benefits to an analysis of the opportunities presented by IT, together with the potential constraints on its application' (p.211). This broader approach to evaluation is reflected in the work of Walsham (1993) who argues that evaluation is a dynamic socio-political process within multi-level social contexts. A key aspect of the social contexts is provided by the stakeholders whose personal

assessments of information systems have an effect on the outcomes of evaluation. These perspectives are often acknowledged in an informal context, although Walsham notes that the stakeholders' personal evaluations can be incorporated in the formal evaluation activity. Recognition of the socio-political processes of evaluation and the role of the stakeholders can only be supported by the use of an interpretive approach that allows for a deepening of understanding and generates motivation and commitment.

3.3.2 Evaluation and E-commerce

The advent of electronic commerce into business has complicated the business environment and, therefore, requires to be addressed in a review of IS evaluation. The functionality of e-commerce encourages rapid development of interorganisational systems and more pervasive information systems throughout an organisation, particularly since the adoption of the World Wide Web (WWW) as a business tool. The Internet, although more far reaching in its uses, has engendered a sense of impermanence and some instability brought about by the dot.com crashes of the 1990s. However, it is a major driver of e-commerce and influences the way many firms do business by facilitating access to information and promoting interaction through electronic means (Senn, 2000).

The extent to which changes brought about by e-commerce will alter the fundamentals of business is not yet known. A first step is to briefly examine e-commerce and determine what is meant by the term. Straub, Hoffman, Weber and Steinfield (2002a) describe e-commerce as the transition 'from organisational systems that were heavily dependent on physical processes to those that rely on network-accessible information

for fundamental business processes' (p.116). They argue that it is a mistake to believe that the Internet changes everything and that it is necessary to determine what changes it does enable. This argument is underpinned by Porter's (2001) contention that the Internet does not change the industry, but only the processes; that the Internet's main role is as a business tool for building strategy.

This perception of the Internet is not widely subscribed to, particularly in the business press where talk of digital strategy, technographics, hybridity and value trust networks fuel the enthusiasm for the Internet as a business instrument (Downes & Mui, 1998; Modahl, 2000; Raisch, 2001; Siebel & House, 1999).

There are many promises of benefits to be derived from e-commerce, but little empirical evidence to support these promises with indications that a wide gap exists between anticipated and realised achievements (Molla & Licker, 2001). Evaluation of the benefits of e-commerce systems would therefore seem to be a necessary process. Internet-enabled businesses need understanding about the way forward, what combination of conditions will lead to success and what techniques and methods will best measure that success.

The difficulty lies in the shortage of models available to inform on success in e-commerce systems and no variables have been determined. This raises the question of whether traditional IS success models be extended to examine e-commerce systems (Molla & Licker, 2001). These authors further argue that enhancing existing models would contribute to continuity within the discipline and build on existing theory.

Success models for e-commerce need to consider the additional business functions that the Internet delivers and can then extend traditional success models. Molla and Licker (2001) examined and extended DeLone and McLean's (1992) success model to capture the peculiar nature of e-commerce systems. Their work, however, concentrates on business to consumer (B2C) e-commerce and examines systems for customer informational and transactional purposes. Their measures include hits and visits, website configuration and customer satisfaction that are not so relevant in a business to business situation. A broader approach is taken by DeLone and McLean (2003) who have redeveloped and updated their earlier success model, taking into account the wide variety of modifications that have been proposed over the intervening ten years. DeLone and McLean address the question of e-commerce and the issue of companies that are seeking ways to evaluate the success of their large investments in e-commerce systems. They argue that the most important measure, 'Net benefits', allows for the capture of both positive and negative impacts of e-commerce, but requires examination of the context and objectives for each e-commerce investment. This accords with the developments in evaluation research and the recognition of the need for a more holistic approach including context and the reason for measurement. The parsimonious nature of their revised success model allows for the requirements of an evaluation of e-commerce systems to be included within the interconnected classifications of the DeLone and McLean model. This can be used to 'organise the various success metrics identified in the IS and e-commerce literature' (DeLone & McLean, 2003, p.25).

The need for metrics, within existing evaluation methods, to enable comparisons, strategies and benchmarks to be made by organisations has

been recognised. Two recent editions of *Information Systems Research* have been devoted to measuring e-commerce in Net-enabled organisations (Straub et al., 2002a; Straub, Hoffman, Weber, & Steinfield, 2002b) showing developing recognition of the need to develop methods for evaluating the effects of net-enabled systems. The articles in the two editions deal closely with metrics that can be applied to Internet-enabled businesses. Within a selected, conceptual framework of evaluation these metrics can richly contribute to the measurement of e-commerce systems. A further example of how metrics can be adapted or developed for e-commerce is the ROI Calculator Tool developed by Mogollon and Raisinghani (2003). The tool enables thorough measurement that 'projects the risk, yield and benefit of a project in a risky and fast moving environment' (p.64).

Within the subject of e-commerce and evaluation, the 'risky and fast moving environment' of electronic marketplaces remains an underdeveloped area of research. Despite the success models and the many metrics available, there appears to be some hesitation over how to encompass the scope of the marketplaces in an evaluation process. Two earlier studies examine evaluating electronic marketplaces from the perspective of potential partners (Klueber, Leser, & Kaltenmorgen, 2001; Stockdale & Standing, 2002b). Other studies examine the critical success factors from a market makers point of view (Standing, 2001; Stockdale & Standing, 2003b). However, papers on assessing the performance of electronic marketplaces as interorganisational information systems are only recently emerging. O'Reilly and Finnegan's (2002) conceptual model for assessing performance examines issues such as trust, investment and ownership, but does not address the issue of evaluation from a participating organisation's viewpoint. Stockdale and Standing

(2002b) concentrate on the issues affecting benefits realisation to support organisations in making informed choices about their participation in electronic marketplaces.

Moves to examine the evaluation processes for e-commerce have gathered pace in the last three years. Although many of the studies concentrate on metrics rather than approaches to evaluation, there is greater recognition of the need to consider the wider contexts in any evaluation. The extension of existing success models for e-commerce evaluations appear to be valid and allow for consideration of the new facets that the electronic environment brings to business.

3.3.3 Summary

The arguments for recognition of the need for an interpretive view of evaluation research have increased in the last ten years. This call is based on an understanding of the need to incorporate technological, social and political aspects into the evaluation. It also requires an understanding of the differences in formal/informal approaches reflecting Clarke's (1999) improvement or assessment outcomes (Ballantine, Levy, & Powell, 1998; Ballantine & Stray, 1999; Farbey, Land, & Targett, 1999; Hirschheim & Smithson, 1999; Irani, 2002; Irani & Love, 2001; Jones & Hughes, 2001; Remenyi, Money & Sherwood-Smith, with Irani, 2000; Remenyi, Sherwood-Smith, & White, 1997; Serafeimidis & Smithson, 1998, 1999; Smithson & Hirschheim, 1998; Walsham, 1999; Willcocks & Lester, 1996).

However, acceptance of the arguments for a more holistic approach to IS evaluation does not lead to an easy route for evaluators or researchers. On the contrary, it raises many questions of design and practice and

requires an adherence to rigorous methodological design that acknowledges the requirements for rigour, relevance, validity, reliability and applicability (Stockdale & Standing, 2002a). There are also added pressures for evaluators who must consider social and political consequences of an interpretive approach where stakeholders have many different agendas that can affect their input to the evaluation. The interplay of organisational politics and IS evaluation is context specific (Walsham, 1999) and is demanding of the evaluators' skills and requires an understanding of evaluation concepts. This appears to be particularly true in the dynamic environment of e-commerce and electronic marketplaces.

The next stage of the literature review examines the concepts within IS evaluation approaches to draw together basic concepts for planning effective examination.

3.4 A Conceptual Approach to IS evaluation Literature

To endeavour to meet the requirements of an interpretive approach to IS evaluation and use effective measures in the process requires a framework within which to formulate the evaluation plan. An examination of ideas and approaches within IS evaluation literature enables the identification of concepts that can inform a model for planning effective evaluation.

The socio-political-technical perspective of IS evaluation calls for a simultaneous focus on the information technology and the people engaged with it. The very nature of the two diverse aspects of people and technology require that a broad view approach be taken to any understanding of IS evaluation. It requires an understanding of why the

evaluation is being conducted, who is conducting it, what is to be measured and for what audience (Hirschheim & Smithson, 1988; Symons, 1991; Walsham, 1993). Evaluation is an encompassing activity that takes account of both the positive and the negative side of any IS, the informal and formal, and the subjective and objective, but requires clarity of purpose. There are many different reasons for evaluating a system and many levels of systems, each requiring a different approach if effective outcomes are to be reached. Recognition of the intended outcomes is also required if effectiveness is to be achieved.

Although there are many methodologies for evaluating systems, there are fewer examples of frameworks from which to build evaluation strategies and ensure that the myriad issues are encompassed by the evaluation. One of the earlier frameworks for conducting broad, holistic approaches to evaluation studies was presented by Symons' (1991) in her work on understanding evaluation in terms of content, context and process. The framework originates from Pettigrew's (1985) work in organisational change, but was utilised by Symons as a framework for reviewing information systems evaluation. Content, context and process (CCP) has been accepted within the IS evaluation literature (Serafeimidis & Smithson, 1999; Smithson & Hirschheim, 1998; Walsham, 1999) and remains a viable concept for evaluation development.

Hirschheim and Smithson's evaluation framework (1988) identified a progression of IS evaluation through three zones, beginning with the Efficiency Zone based on a quality assurance approach aimed at precise measurement of performance, efficiency and reliability. This approach, the authors believe, often leads to the measurement of easily identifiable benefits rather than more important but less tangible benefits; a view

supported by Symons (1991) who argues that evaluation studies often concentrate on what is easier to measure rather than what should be measured. The second zone, the Effectiveness Zone, addresses effectiveness and the use of user satisfaction, system usage and cost benefits as evaluation measurements. These measurement approaches remain current and continue to raise concerns about effective measurement. The authors' third zone, the Understanding Zone introduces the ideas of qualitatively different approaches that takes into account the socio-political contexts of the organisation and accords more closely to Guba and Lincoln's (1989) fourth generation evaluation theory. A later reassessment of their ideas led Smithson and Hirschheim (1998) to amplify the framework, which although originally designed for classifying evaluation literature can be applied to different levels of applications.

This argument for different evaluation for different types and complexity of systems is reflected in the Benefits Evaluation Ladder (Farbey, Land, & Targett, 1995). The ladder was proposed to overcome identified problems of IS evaluation, namely the constriction of time-based progressive stages, and the dominance of concern with strategic implications at the expense of decision-making and effective evaluation. There was a perceived need to extend existing frameworks to 'take understanding and awareness through to action and practice' (p.42). To do this Farbey et al. proposed a ladder where each rung represents applications of increasing complexity, offering more benefits and potential risks the higher up the ladder. The higher rungs of the ladder, therefore, require more complex evaluation processes if recognition of an application's impact on the organisation and its decision-making processes are to be supported by effective assessment. Hipkin's (1996)

empirical study based on the ladder underscored the need for methods of evaluation to correspond to the complexity of the application.

To further the understanding of IS evaluation, this review uses a concept approach to extend the examination of the literature. The selection of the concepts in the Content, Context, Process Approach, developed by Symons (1991) has two advantages. Firstly, there is widespread acceptance of CCP among leading contributors to IS evaluation theory (Lyytinen, Klein, & Hirschheim, 1991; Serafeimidis & Smithson, 1998; Smithson & Hirschheim, 1998; Walsham, 1993) that has led to recognition of the concepts in much of the recent literature. Secondly, the concepts are broad enough to accommodate the myriad ideas and arguments, such as the Farbey et al.'s ladder, in this well documented field, but recognisable enough to provide parameters for reviewing them.

3.5 The Concepts of Content, Context and Process in IS Evaluation

The Content, Context, Process (CCP) approach to evaluation allows for questions of what is being measured, by whom and for what purpose, to be asked. The interaction and linking between context, content and process allow for the complicated process of evaluation to be explored in multiple ways, and this flexibility encourages deeper questions in regard to the socio-technical-political aspects of evaluation.

A discussion of the CCP approach enables identification of the potential questions underpinning an evaluation study and allows for an initial framework to be proposed based on the literature.

3.5.1 Content

A crucial factor in any evaluation study is an understanding of *what* is being measured. The content element of CCP relates to the ‘what is being measured’ factor (as discussed in Section 3.4). Researchers in the socio-technological paradigm advocate a shift away from straightforward measures such as the narrow quantification of cost, to include such measures as intangible benefits, risk and an analysis of opportunities presented by the IS (Serafeimidis & Smithson, 2000). The changing nature of IT and its uses mean that the content elements have changed and new methods that account for the richness of more intangible benefits are needed. This does not mean that all previous measurement tools can be discarded or that there is one single instrument that can capture all aspects of an evaluation (Mirani & Lederer, 1998). An IS can impact on social, economic, organisational and management terms (Smithson & Hirschheim, 1998, Weill 1992) and this indicates the need for consideration of measurements against a set of criteria. The choice of criteria determines the content, by what it excludes as well as includes. Frameworks such as the Benefits Evaluation Ladder (Farbey et al., 1995) identify the various levels of complexity and argue that the level of IS dictates the approach of the evaluation process. A similar approach is recognisable in Seddon, Staples, Patnayakuni and Bowtell’s (1999) rather complex model of Effectiveness Measures that uses the level of system to be evaluated as one of two dimensions for their model. Their second dimension is based on the value judgement of five identified stakeholder groups and the different perspectives they may hold. The recognition of stakeholder perspective is an acknowledged facet of interpretive evaluation (Walsham, 1993; Guba & Lincoln, 1989) and does not confine the evaluation to one group. When examining *what* is to be measured,

within the context of a CCP framework, more distinct, less complex taxonomies are required. The use of recognised success measures within a holistic interpretive model enables an evaluator to add flesh to the bones of the evaluation process, building on established IS research, thus contributing to a cumulative body of work within the discipline.

The most tried and tested model is DeLone and McLean's IS Success Model (1992), which has been respecified and extended (Ballantine et al., 1998; Seddon, 1997), empirically and theoretically assessed (Rai, Lang, & Welker, 2002), adapted and tested (McGill, Hobbs, & Klobas, 2003) and updated (DeLone & McLean, 2003). An adaptation of the 1992 model to account for the greater demands imposed by e-commerce evaluation was carried out by Molla and Licker (2002), and further revised by the original authors is a more recent update (DeLone & McLean, 2003). The authors' reappraisal of their model (see Figure 6), based on an examination of a wide number of studies that support or challenge the original, updates the classifications and takes account of e-commerce system success.

Figure 6 shows the interlinking of the model and the cause and process effects of the categories. For example, net benefits are linked back to user satisfaction and use, where a positive or negative experience of benefits will impact accordingly on user satisfaction and use (i.e. a causal effect). In contrast, in a process sense, use must come before user satisfaction. The importance to the evaluator is recognising the process and causal senses within the evaluation process.

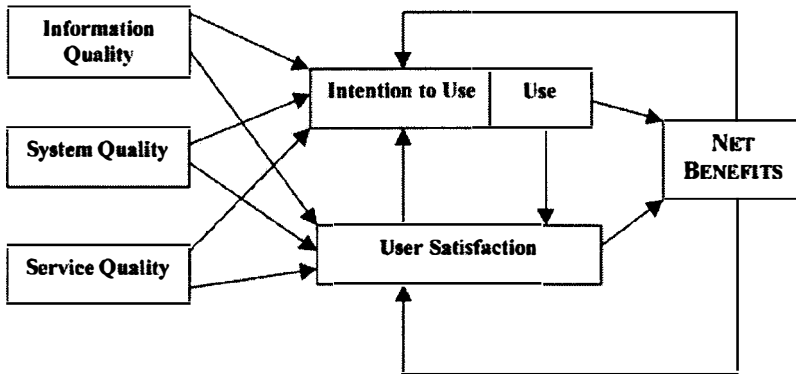


Figure 6: Updated DeLone & McLean IS Success Model (2003)

Greater details of the success metrics contained within the six categories are given in Table 4. These metrics are drawn from the literature to provide a framework to support evaluators in the identification of success in an IS.

The use of the DeLone and McLean model within the concept of *what* is being measured both allows for greater, more detailed identification of the *what* and adds to the complexity of the evaluation by introducing an interlinking of the possible categories. However, evaluation within an e-commerce context calls for an understanding of how the different stakeholders use the system for information and decision-making needs. According to DeLone and McLean, ‘these electronic decisions and transactions will then impact individual users, organizations, industries and even national economies.’(p.24). In other words, the complexity is inherent in the IS and must be addressed when endeavouring to measure success.

<p>Systems Quality</p> <ul style="list-style-type: none"> ◆ Adaptability ◆ Availability ◆ Reliability ◆ Response time ◆ Usability 	<p>Information Quality</p> <ul style="list-style-type: none"> ◆ Completeness ◆ Ease of understanding ◆ Personalization ◆ Relevance ◆ Security
<p>Service Quality</p> <ul style="list-style-type: none"> ◆ Assurance ◆ Empathy ◆ Responsiveness 	<p>Use</p> <ul style="list-style-type: none"> ◆ Nature of use ◆ Navigation patterns ◆ Number of site visits ◆ Number of transactions executed
<p>User satisfaction</p> <ul style="list-style-type: none"> ◆ Repeat purchases ◆ Repeat visits ◆ User surveys 	<p>Net benefits</p> <ul style="list-style-type: none"> ◆ Cost savings ◆ Expanded markets ◆ Incremental additional sales ◆ Reduced search costs ◆ Time savings

Table 4: DeLone and McLean E-Commerce Success Metrics

One aspect that requires attention when discussing what is to be evaluated, and not included in the DeLone and McLean model, is that of financial measures. Measuring the financial return on an investment through Cost Benefit Analysis or Return on Investment is standard business practice. Indeed, Ballantine and Stray (1999) report that these measures are the most commonly used in IS evaluation. The attractiveness of such measures lies in their ability to justify expenditure by measuring the savings or profits that accrue from the installation and use of a system. However, it has long been recognised that ‘the computer is a difficult investment to evaluate because the income from the computer is not as clearly defined as it is with other investments’ (McRae

in Powell, 1992, p.30). Computers have supported the increasing complexity of information systems and the ability to effectively cost either the technology or the systems it supports has become correspondingly more difficult; a root cause of the productivity paradox (Brynjolfsson, 1993). Nevertheless, adherence to financial methods is understandable when faced with a host of seemingly immeasurable intangibles, and where a money value enables everything to be reduced to one recognised acceptable measure or value (Land, 2000). Financial reporting systems are often familiar performance measures within an organisation and are regarded as reliable and consistent (Atkinson, Waterhouse & Wells 1997). The use of financial measurements, therefore, continues to be significant in IS evaluation, not least because of the need to justify expenditure. Also, in many cases the dominance of financial executives in the political structure ensure that measures relevant to them remain in use (Irani & Love, 2002; Mogollon & Raisinghani, 2003; Smithson & Hirschheim, 1998; Tallon, Kraemar, & Gurbaxani, 2000). The appearance of intangibles such as goodwill on the balance sheet and the determining of 'soft dollar' values in calculating the ROI for e-commerce (Mogollon & Raisinghani, 2003) support the continuation of financial evaluations.

DeLone and McLean (2003) recognise the need for their measures to be determined by context and by identifying their success model metrics with the concept of content, it enables them, and other recognised measures, to be fully integrated in a holistic approach to an evaluation.

3.5.2 Context

The development of the concept of information systems as socio-technical entities has brought greater discussion on the importance of the

role of context in IS research (Avgerou, 2001; Serafeimidis & Smithson, 2000; Trauth, 2001a). Avgerou argues that it is crucially important for research that technical innovation is considered within the organisational and environmental context within which it is embedded. This is supported by Pettigrew's (1985) work on analysis of organisational change. Pettigrew distinguished between outer and inner contexts: the outer context included social, economic, political and competitive influences related to Avgerou's environmental context. The inner context refers to structure, corporate culture and political influences on the organisational context. A summary of internal and external influences, as identified by IS researchers, is given in Table 5.

The table highlights the range and complexity of the influences that can affect any evaluation. Recognising information systems as socio-technical entities 'inseparable from the organisational context within which they are situated and interact'(Serafeimidis & Smithson, 2000, p.93), requires an assessment of the impact of context influences on the outcomes of an evaluation process.

It is the organisational context that will also determine the reason for the evaluation and affect the influences of the stakeholders on the process (Smithson & Hirschheim, 1998). For this reason the *why* and *who* of evaluation are discussed within the context section.

Context	Influences on context	References
Inner or organisational context	Organisational structure Organisational goals & strategies Organisational culture Political structures Hierarchical structures (e.g. management structures) Social structures and processes Stakeholders	Irani & Love, 2002; Symons, 1991; Willcocks, 1992, Weill 1992 Mirani & Lederer, 1998 Huerta & Sanchez, 1999; Irani & Love, 2001; Willcocks & Lester, 1996 Farbey et al., 1995; Huerta & Sanchez, 1999; Jones & Hughes, 2001; Remenyi & Sherwood-Smith, 1999; Ward, Taylor, & Bond, 1996; Willcocks, 1992 Jones & Hughes, 2001; Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1999; Smithson & Hirschheim, 1998; Symons, 1991; Walsham, 1993
Outer or external context	Social, political, economic and technological factors including: National economic situation Government policy and legislation Market structures and conditions Competitive environment Industry sector Globalisation Privatisation Cultural influences Technological developments	Huerta & Sanchez, 1999; Jones & Hughes, 2001; Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1999, 2000; Smithson & Hirschheim, 1998; Symons, 1991; Vetschera & Walterscheid, 1995

Table 5: Factors Influencing the Internal and External Contexts of an Organisation

The Why of Evaluation

The *why* of evaluation concerns the purpose, role and objectives of the process. The purpose or perception of the purpose of an evaluation can have a powerful effect on the way in which stakeholders respond to the process. Walsham (1993) describes how evaluation, as an overt or a covert function, can be used to reinforce existing organisational structures and in many firms is seen as a ritual rather than an effective process. In the manufacturing sector, it is often seen as a 'budgetary process that gives a final *yes* or *no* – *pass* or *fail* verdict' (Irani & Love, 2002, p.76), thereby leading to stakeholders focusing on justifications rather than achieving a constructive appraisal. This supports Powell's (1992, p.37) observation that where firms are required to have systems 'in order merely to participate in the current processes', the need to justify outweighs the need to evaluate. Farbey et al. (1999) have identified the perception of evaluation as a hoop jumping exercise, while Remenyi and Sherwood-Smith (1999) recognise the role of evaluation as project closure rather than as an opportunity for improvement. Although the *why* element is often misunderstood, disregarded or undervalued, it has an important influence on the evaluation process and is seen by Walsham (1993) as the key element of the evaluation.

Beyond the ritualistic attitude to evaluation there are a number of, often interconnected, reasons for conducting the evaluation of an information system within an organisation. These reasons are influenced by a range of stakeholders' political and social agendas. They have a powerful effect on the evaluation outcomes that may be used as justification for future actions, or past decisions.

The purpose of evaluation tends to be for the appraisal of value, a measure of success or recognition of benefits (Guba & Lincoln, 1989; House, 1980). This is also true in information systems (Farbey et al., 1999; Jones & Hughes, 2001; Serafeimidis & Smithson, 1998; Smithson & Hirschheim, 1998) where effective outcomes allow for improvement in business goals, organisation effectiveness, investment management or problem diagnosis (Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1999; Smithson & Hirschheim, 1998; Symons, 1991). There are additional recognisable outcomes in consensus achievement and decision-making (Farbey et al., 1999; Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1999), in understanding risk (Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1998; Smithson & Hirschheim, 1998) and in gains through organisational and personal learning (Mirani & Lederer, 1998; Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1998, 1999; Smithson & Hirschheim, 1998). The *why* of evaluation is therefore an important consideration for evaluators from the beginning of the evaluation and identification of the evaluation managers and their purpose essential (House, 1980).

The Who of Evaluation

The *who* of evaluation is a more difficult element to rationalise. Much of the complexity of an interpretive approach to evaluation comes from the different perceptions and beliefs of the different groups of people involved; an aspect that is being recognised in practitioner literature (Boulmetis & Dutwin, 2000). The literature identifies a number of different perspectives on stakeholders including IS personnel (Gover, Jeong, & Segars, 1996; Willcocks & Lester, 1996; Mirani & Lederer, 1998), senior management (Seddon et al, 1999; Jones & Hughes, 2001;

Farbey et al, 1999), users (Farbey et al, 1999; Goodhue, 1998, Doll, Raghunathan, Lim, & Gupta, 1995; Gatian, 1994) and interested parties (Symons, 1991; Willcocks & Lester, 1996; Serafeimidis & Smithson, 2000; Hirschheim & Smithson, 1989, Jones & Hughes, 2001). Stakeholders have different interests in and perspectives on any assessment of an information system. These reflect their different roles within the evaluation process and are identifiable within four broad stakeholder groups:

a. Those who initiate the evaluation (initiators)

The role of those who initiate the evaluation is not widely discussed in IS literature⁷, although Vetschera and Walterscheid's (1996) research concluded that initiators have a striking influence on the evaluation process, a result they believe merits investigation. It is an area examined by Guba and Lincoln (1989) in addressing a major flaw in previous generation evaluation studies; the tendency towards managerialism and the consequences of accountability and dissemination of results. The initiators also have an impact on the purpose of the evaluation and the level of formality inherent in the evaluation process. The application of power with the evaluation process is recognised in IS literature (Serafeimidis & Smithson, 1998) and the need for senior management involvement at every level is well documented (Farbey et al., 1995, 1999; Irani & Love, 2001; Jones & Hughes, 2001; Serafeimidis & Smithson, 1999, 2000; Willcocks & Lester, 1996).

⁷ The lack of recognition of the initiator role in IS evaluation may reflect Walsham's description of an evaluator as not only one who is doing the evaluation, but also anyone concerned with monitoring the actions and consequences of the IS (1993). However, in view of the reported lack of involvement of senior management beyond the commissioning stage, a distinction is made here between initiators and evaluators.

b. Those who carry out the evaluation (evaluators)

Evaluators play a pivotal role in the interpretive evaluation process and are required to have a deep understanding of stakeholder perspectives, human intuition and an understanding of the politics (Serafeimidis & Smithson, 1998, p.830). Interpreting and mediating stakeholder conflict imposes a role as 'moral agent' on evaluators if the results of the evaluation are to be effective (Walsham, 1993) and the different perceptions of benefits recognised (Smithson & Hirschheim, 1998).

c. Those who use the system (users)

User satisfaction, and user information satisfaction have long been recognised as measures of IS success (Bailey & Pearson, 1983; Doll et al., 1995; Srinivasan, 1985) and used as a surrogate for non-measurable results in changes in organisational effectiveness (Goodhue, Klein & March, 2000; Ives, Olson, & Baroudi, 1983). This positivist approach has been reflected in the recognition of the user as a major stakeholder in the interpretive evaluation process. The user brings a wealth of information to the evaluation process, including a different perspective from IS people (Mirani & Lederer, 1998) and a close perception of benefit delivery (Remenyi & Sherwood-Smith, 1999). Indeed, lack of consultation with the user is seen as a negative influence on evaluation (Willcocks & Lester, 1996).

Additionally, concerns over the subjectivity of both users and evaluators are often seen as a negative element of evaluation, but Belcher and Watson (1993) argue that differences of opinion amongst the various stakeholders should be seen as a rich source of data.

- d. Those who have an interest in the system, both internal and external (interested parties)

Stakeholders are seen as the central element in fourth generation evaluation (Guba & Lincoln, 1989), but the identification of stakeholders and effective analysis of their input can be problematic, (Serafeimidis & Smithson, 1998). This fourth group of stakeholders is perhaps the most problematic encompassing as it does a broad approach to those with an interest in the IS. This may include senior management, financial personnel, IS personnel, managers and workers affected by changes, trade unions or external parties such as shareholders (Gregory & Jackson, 1992; Willcocks & Lester, 1996; Seddon et al., 1999). These groups of people may seek to shape the evaluation outcome for reasons of their own and use the evaluation as an arena for organisational politics (Jones & Hughes, 2001; Symons, 1991), influenced by the organisational and external contexts within which they function (Serafeimidis & Smithson, 1999). The resultant 'stakeholder conflict' is a recognised part of the evaluation process (Farbey et al., 1999; Guba & Lincoln, 1989; House, 1980; Walsham, 1993) and, in an interpretive evaluation, consideration of the varying agendas can be used to inform the evaluation.

The actual composition of the stakeholders in an evaluation process will be affected by the selection of the evaluators and other factors. The *what* that is being examined and the *how and why* of the evaluation process will influence the nature of the organisation's interested parties, both internally and externally, as well as the evaluator.

3.5.3 Process

The process of evaluation concerns the actual carrying out of the evaluation and the factors to be considered when doing so. Symons (1991) describes the process as the 'how of evaluation' and examines the literature to discuss some of the process methodologies used in the past. These methodologies are closely connected to what is being considered in the evaluation and can involve a range of methods. As discussed above in their comparison of evaluation approaches to IS and non-IS capital investments, Ballantine and Stray (1999) report that Cost Benefit Analysis and Return on Investment were the most widely used approaches for IS investments. In contrast, Giaglis, Mylonopoulos and Doukidis (1999) advocate the use of simulation modelling to identify both hard and soft benefits for quantifying systems. An examination of DeLone and McLean's (1992) work identifies a wide range of instruments and methodologies for assessing success in information systems. For example, an instrument for measuring user satisfaction was developed by Bailey and Pearson (1983), then evaluated and refined by Ives and Olson (1984) and further adapted by Goodhue (1998). Instruments for measuring user satisfaction continues to be an important evaluation method for assessing the success of an IS (Doll et al., 1998; Goodhue, 1998). Although there is some evidence for the construct validity of user satisfaction as a measure of IS effectiveness (Gatian, 1994), it does not enable a holistic approach to evaluation to be achieved, unless it is included in a wider framework of an evaluation process. Irani (2002) maintains that a wide variety of interacting social and technical factors complicate the evaluation process and make generic techniques impossible. This view is supported by the work of Farbey et al., (1995)

that reflects an organisation's need to consider the type of application and the type of objective when planning an evaluation process.

Nevertheless, evidence suggests that organisations remain with more traditional generic styles of evaluation such as investment appraisals or feasibility studies (Smithson & Hirschheim, 1998). In the interpretive paradigm, which requires a broad view of what is to be evaluated, many factors can significantly influence how the evaluation is conducted. These include recognition of the role of evaluation in organisational learning, more examination of the strategic value of systems and exploration of the softer methods for determining benefits (Farbey et al., 1999). For example, there is some evidence that informal evaluation procedures are often ignored by senior management (Jones & Hughes, 2001), but that informal communication is an essential element in effective evaluation (Farbey et al., 1999; Jones & Hughes, 2001; Serafeimidis & Smithson, 1998, 1999; Smithson & Hirschheim, 1998). Symons (1991) describes the informal procedures and information flows around an IS as integral to the work done using the system and argues that evaluation should consider the diversity of official and unofficial information flows. Other *how* factors to be considered include the involvement and commitment of stakeholders and the conducting of both formative and summative evaluations. Remenyi and Sherwood-Smith (1999) assert that continuous formative evaluation helps to minimise cases of failure, whereas summative evaluation is aimed at assessing outcomes and impacts and is by nature more financial/statistical. This view is supported by Farbey et al., (1999) who see accounting and control as essentially a summative evaluation process.

The consideration of formative and summative evaluation studies introduces another element to the process concept, that of 'the when of evaluation'. Symons (1991) argues for 'treating evaluation as continuing throughout the various stages of system development' (p.211). This argument is well supported by academics advocating an interpretive approach to evaluation (Farbey et al., 1999; Jones & Hughes, 2001; Serafeimidis & Smithson, 1998; Smithson & Hirschheim, 1998; Willcocks, 1992), although the importance of lifetime evaluation is 'fundamental but neglected' by practitioners (Willcocks, 1992, p.244). The lifecycle approach would extend the current preoccupation with pre-implementation or feasibility evaluations to include post-implementation studies. This would allow for changes in organisational objectives, the information system, as well as stakeholders' and organisational learning to be incorporated into the evaluation process (Farbey et al., 1999; Jones & Hughes, 2001; Remenyi & Sherwood-Smith, 1999; Serafeimidis & Smithson, 1998, 1999; Ward et al., 1996). It also goes some way towards alleviating the difficulties caused by the perceived gap between pre-implementation benefit expectations and post-implementation perceptions of realised benefits, when these evaluations are carried out as separate processes (Fearon & Philip, 1998; Ragowsky, Ahituv, & Neumann, 1996). Additionally, lifetime evaluation enables recognition of benefits that only become apparent long after system installation (Ragowsky et al., 1996; Smithson & Hirschheim; 1998, Jurison, 1994). Thus, formative evaluation is seen as an essential part of the evaluation process.

3.6 Summary and Framework

In Information Systems, the adoption of a broader view has become more important as systems have become more pervasive. Information systems are no longer confined to one department, but often interconnect an entire firm or cross into interorganisational roles. This is particularly true with the advent of e-commerce where systems connect firms and customers in new ways, and where the system is a competitive necessity rather than a competitive advantage.

In the rich field of IS evaluation literature, the single most important point that arises is the complexity of an effective evaluation process. The problems that surround an organisation in setting out to achieve an effective process are numerous. Systems are often purchased as an 'act of faith' (Powell, 1992, p.37) and the decision to evaluate can lead to perceptions of chaos and out of control costs (Irani, 2002), where CEOs fall back on informal 'gut feeling' methods of assessment (Irani & Love, 2002, p.76). There is also evidence that this lack of willingness to be rigorous and analytical in the evaluation process is more common in information system projects than with other capital projects (Ballantine & Stray, 1999). This raises serious questions at a time when information systems are moving beyond internal, departmental systems and becoming capable of capturing benefits at strategic, tactical and operational levels (Weill 1992, Irani & Love, 2002).

IS evaluation literature follows two strongly identifiable themes; the development of instruments and tools to measure identifiable constructs, such as user satisfaction and system use, and at a meta-level, discussions on the paradigms that should be used to approach the evaluation process. These two themes are not mutually exclusive and can be drawn together

within the concepts identified by Pettigrew (1985) and Symons (1991). The choice of the Content, Context, Process (CCP) approach is validated by a review of the IS literature where it is possible to identify the rich vein of work that considers the *what*, *why*, *who*, *how* and *when* factors of evaluation. Placed within an interpretive paradigm as advocated by many IS evaluation researchers, the CCP concepts allow for the recognition of a wide scope of factors that need to be taken into account in an effective evaluation. These factors are interlinked and cannot be considered in isolation. For example, *how* the evaluation is to be carried out and *when*, (the process) is closely informed by *what* is being evaluated (the content). These factors are affected by the different perceptions of the stakeholders involved, the *who*, and the reason for the evaluation (the context). Informing the entire evaluation are the internal and external contexts of the organisation in which the evaluation is being carried out.

The consideration of all the identified concepts within an evaluation demands an interpretive approach to capture the interlinking of factors and the richness of the data available. This can be far more demanding than the single instrument approach evident in the literature, but once the need for a more holistic approach is accepted, the outcomes from an evaluation process can change from a judgmental function to one of learning through understanding (House, 1980). This is only achievable if the results are widely disseminated and the learning cycle is taken through the organisation, leading to organisational change. This is clearly highlighted in Serafeimidis and Smithson's (2000) case study where changes in evaluation procedures were ineffective because of lack of organisational change, lack of senior management support and lack of formal dissemination of changes throughout the large organisation.

A framework showing the concepts discussed in this literature review is given in Figure 7 to provide a theoretically justified model giving guidelines for establishing key issues in an evaluation (Clarke, 1999). The concepts of Content, Context and Process were further divided into elements of *what*, *why*, *who*, *how* and *when* to enable more accurate reflection of the influences within an interpretive evaluation approach. Figure 7 illustrates the interlinking of the three primary concepts and their smaller elements in this approach as discussed above. The concept of the external context encompasses the whole framework as the factors provide perspective for the organisation and its environment. The element of *who* is discussed within the concept of context, but its central relationship to the other elements is emphasised by placing it in the middle of the framework. Symons (1991) argues that a consideration of the interactions draws in the qualitative aspects of IS evaluation and prevents the narrowing of focus on the technical or quantifiable economic elements that has been a focus of the majority of IS evaluation to date. The content, context, process approach allows for the social, political, and economic consequences of evaluation by examining the interplay of the elements, including the many stakeholder perspectives that can influence the outcome of an evaluation study.

A parsimonious framework enables it to be used in a wide variety of evaluation situations, but empirical testing is required to ensure that all the concepts arising from an interpretive evaluation process are included. This research uses a case study of a major organisation to gather empirical evidence to test the framework. The evaluation is considered through an academic context rather than an organisational situation and the thesis is structured around the examination of the construct elements. The *what* or content element refers to the identification of potential

benefits that are realisable from participation in an electronic marketplace. The next chapter, methodology, discusses in detail the process, or *how*, of evaluation and includes an examination of the context from both external and internal perspectives.

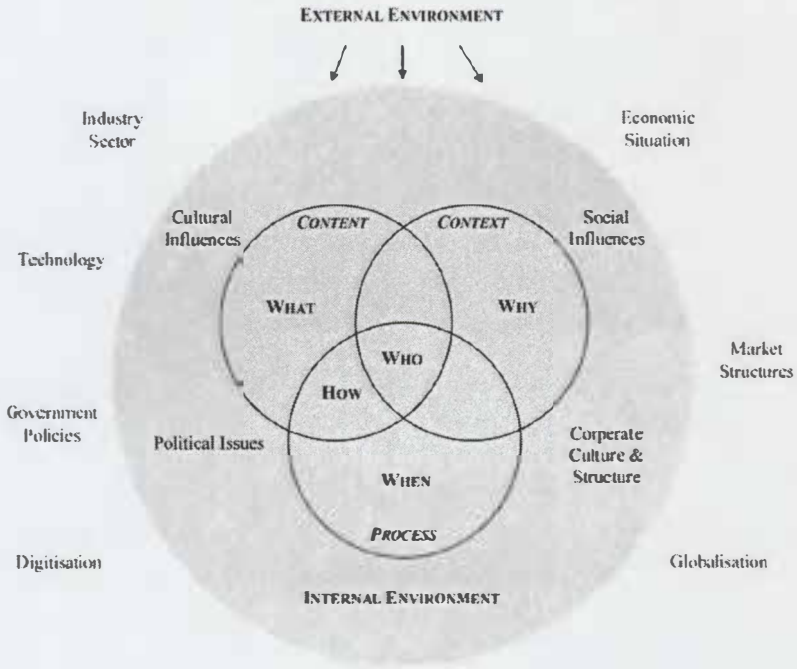


Figure 7: Content, Context and Process Framework.

CHAPTER 4

METHODOLOGY

The previous chapter discussed the need for an interpretive approach to evaluation. It therefore follows that such an approach is required for this study in order to fully understand the nuances, influences and perceptions of those involved in the research and the way they are, in turn, influenced by the context of the study. The evaluation framework in Chapter 3 describes the content, context and process approach to an evaluation and the methodology of this study is designed to relate to the process, or *how*, of evaluating the benefits of an electronic marketplace. This cannot be done without reference to the content and context, which are therefore used to inform the methodological process.

An interpretive case study approach to this research was selected as the most appropriate to meet the needs of the research questions and relate to the evaluation framework. Stake (2000) defines an instrumental case study as where 'a particular case is examined mainly to provide insight into an issue or to redraw a generalisation. The case is of secondary interest, it plays a supportive role and it facilitates our understanding of something else' (p.437). In this situation, the case provides insight into the use of an electronic marketplace within an organisation and supports an understanding of how the case study organisation is realising benefits from participation in that marketplace. The use of a case study in this context relates to Yin's (1994) more general definition of the scope of a case study as 'an empirical inquiry that investigates a contemporary

phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident' (p.13).

The choice of a philosophical approach in designing a research methodology in information systems has traditionally resided in positivism, based on the research methods of the natural sciences (Trauth, 2001b). This perspective assumes that reality is objectively given and quantifiable measures are independent of researchers and their instruments (Orlikowski & Baroudi, 1991). In contrast, an alternative perspective, that of interpretivism assumes that knowledge is socially constructed through language, consciousness and shared meanings (Myers, 1997). Interpretivism enables research to extend beyond the fact that people communicate to enable examination of what and why they communicate. For example, in the prevailing positivist approach to IS evaluation, the concentration on technical rather than social aspects of a system leads to 'an overly rational, simplistic notion of evaluation which is dysfunctional in the long run due to the inherent unintended consequences it invariably brings about' (Hirschheim & Smithson, 1999, p.381). In contrast, an interpretive approach allows for an understanding of phenomena through the meanings that people assign to them and encompasses the range of interpretations and reflections required to address the complexity of the issues.

The development of a cumulative body of knowledge regarding the use and assessment of interpretive research has been gaining pace with several researchers presenting the case for a more holistic approach to IS research (Klein & Myers, 1999; Lee, 1999; Myers, 1994, 1997; Orlikowski & Baroudi, 1991; Trauth, 1997, 2001; Walsham, 1995). The need to consider IS issues in an organisational, societal and global

context has become more pressing in the current dynamic business environment (Trauth, 2001a). This is particularly important if more effective use and appreciation of information systems is to be achieved in an era where globalisation and interconnectivity are becoming increasingly significant. These arguments support the need for greater acceptability of interpretive research within the IS discipline.

However, the application of research theory within the interpretive framework in the IS discipline remains somewhat confused. Attempts to label the different stances under headings such as epistemology, ontology, theoretical perspective, methodology and method (Crotty, 1998) can disguise the real issues being addressed. While underlining the valuable role that a theoretical framework plays in IS research, Walsham cautions against 'using the theory in a rigid way, which stifles potential new issues and avenues of exploration. It is desirable in interpretive studies to preserve a considerable degree of openness to the field data, and a willingness to modify initial assumptions and theories.' (Walsham, 1995, p.76). The research design must therefore remain flexible enough to take advantage of an array of techniques and influences. This does not excuse the researcher from providing a comprehensive description of the range of influences on which the research is based and a proposed framework of how the research will be carried out.

The influences that affect an interpretive study are many and if the research is to maintain validity and rigour a clear explanation of how the research was conducted is essential. This requires the researcher not only to recognise, but also to document the influences that affect the work in order to maintain clarity for subsequent studies. The methodological

approach to this study and the influences affecting its conduct are now discussed.

4.1 Theoretical Influences of the Research Methodology

By taking into account a range of influences that have emerged from the literature (Darke, Shanks & Broadbent, 1998; Denzin & Lincoln, 1994; Jones & Hughes, 2001; Klein & Myers, 1999; Knights, 1995; Lee, 1991, 1999; Mingers, 2001; Myers, 1997; Orlikowski & Baroudi, 1991; Walsham, 1993, 1995, 1999; Yin, 1994), it is possible to conceptualise the research design in a broad fashion while underpinning the study with the vital elements of interpretive research. In this way the reliability and validity of the research can be justified without imposing the restriction of a particular research stance and ‘restating comfortable orthodoxies’ (Silverman, 2001, p.xiii).

The consideration of philosophical, ontological and theoretical issues in Information Systems interpretive case studies is an important underpinning of the researcher’s need to reflect on their own philosophical stance (Walsham, 1995) that affects the methodological issues in their work. While it is not the purpose of this research to undertake an in-depth assessment of philosophical and theoretical stances, the influences affecting the methodological issues are important to the outcome of the research and, therefore, require some explanation.

4.1.1 Dialectic Hermeneutics

The main theoretical underpinning of this research design is dialectic hermeneutics, which requires meanings to be set in the context of the micro environment and allows for consideration of macro issues. Dialectic hermeneutics is primarily concerned with the meaning of text

or text analogue and seeks to make sense of confused, incomplete or seemingly contradictory meanings to bring out the underlying coherence or sense (Myers, 1994). This is achieved by a reiterative examination of the parts (of the text analogue) through to the whole, until a sense or coherence is achieved. This cycle of re-examination is termed the hermeneutic circle and is seen as a fundamental principle of interpretive field studies (Klein & Myers, 1999). Dialectic hermeneutics allows the researcher to critically examine conflicts and contradictions within the complexity of social, cultural and political systems from many different perspectives within the organisation. People within the organisation will have personal interpretations that colour their perceptions of any given situation. The resulting differences can be addressed in the reiterative nature of hermeneutics (the hermeneutic circle) which 'fosters comparing and contrasting divergent constructions in an effort to achieve a synthesis of same' (Schwandt, 1994, p.128). The benefits of dialectic hermeneutics to a study are that it allows for differing subjective and objective opinions both inside and outside the organisation to be expressed.

In addition to divergent constructions, an understanding of the context, social structures and history of the organisation is crucial, as is a perception of the researcher's role within the study (Darke et al., 1998; Lee, 1994; Myers, 1994). Myers explains the difference between pure and dialectic hermeneutics by highlighting the critical nature of the latter and its emphasis that social reality is historically constituted. However, there are few techniques explained for interpreting the wider environment, let alone distinguishing the relevant forces on the case study.

4.1.2 Critical Realism

Although critical realism is an ontology based in the postpositive paradigm it has been included as a research influence. It is not intended that a positivist stance to the research be taken, but to ignore the influences that may be present would impact on the interpretation of the data collected and the final conclusions reached. The contradictory nature of including a positivist influence in an interpretive case study is understood (Mingers, 2001), but elements of the theory of critical realism help to address an aspect of the research that is often overlooked.

The epistemological stance of positivism comes from the belief that scientific knowledge consists only of factors or 'unambiguous and accurate knowledge of the world' (Crotty, 1998, p.18). Critical realism has an implication of objectivism when it asserts that reality exists outside the mind and reality 'must be subjected to the widest possible critical examination to facilitate apprehending reality as closely as possible.' (Guba & Lincoln, 1994, p.110). This stance seems consistent with that taken by the business world when evaluating tangible benefits such as an audit report or balance sheet. While the research may not evaluate at this level, tangible benefits are expected to be discernible in any information system evaluation. Using the critical realist ideas of structure and agency, it may be that some of these benefits are not only tangible but relate to a broader environment (structure) that is not open to interpretive construction by the 'actors' in the organisation.

4.1.3 Case Study Theory

Yin (1994) defines a case study as 'an empirical investigation that investigates a contemporary phenomenon within its real life context,

especially when the boundaries and context are not clearly evident.’ (p.13). He further considers an exemplary case study should:

- ♦ be significant
- ♦ be complete
- ♦ consider alternative perspectives
- ♦ contain sufficient evidence
- ♦ be composed in an engaging manner (i.e. to be readable and enthusiastic).

The use of case study research in IS has become more widespread and is particularly useful where research and theory are at their early, formative stages (Benbasat, Goldstein, & Mead, 1987); a situation that applies to many interorganisational information systems. Darke et al., (1998) describe case studies as ideal for understanding the interactions between IT and organisational contexts in that it allows for a multitude of sources to be used for data collection to investigate the phenomena at issue. This facilitates the gathering of data relating to the micro and macro environments that address the context of the social, cultural, political and organisational issues within their historical setting.

The acceptance of interpretive case studies as a research method is not universal and such studies attract criticism concerning lack of rigour, difficulties of generalisation and of excessive amounts of data (Yin, 1994). However, many counter-arguments are offered (Benbasat et al., 1987; Darke et al., 1998; Myers, 1994; Stake, 1994) and questions on the conduct and quality assessment of such studies continue to be addressed (Klein & Myers, 1999). In her interpretive field study using qualitative

methodology, Davidson (2002) uses the principles of case study research proposed by Klein and Myers (1999) to suggest three perspectives; rigorous application of sound qualitative research methods, adherence to recognised principles and compelling and plausible presentation of findings. This can be done by providing detail and transparency in the research process and aligning the case to relevant literature and theory. Such work provides persuasive arguments for the value of interpretive case studies and this research endeavours to incorporate the principles involved. Such principles require the consideration of several aspects of case study research that are fundamental to the research influences and were therefore integrated into the study:

Validity and reliability

The authenticity of interpretive case studies is often questioned because of doubts over reliability and validity. This relates to the perception of a purely anecdotal element to qualitative research and the subjectivity that is evident in it (Garcia & Quek, 1997). To distinguish between merely anecdote and good research requires a recognition of the crucial role of theory in interpretive research; a key point raised by Klein and Myers' (1999) principle of abstraction and generalisation.

In its simplest form the measure of reliability is whether the study can be replicated by someone else (Yin, 1994). This is a positivist view that still retains some relevance for an interpretive case study. As Kirk and Miller argue for all qualitative research:

Qualitative researchers can no longer afford to beg the issue of reliability. While the forte of field research will always lie in its capability to sort out the validity of propositions, its results will (reasonably) go ignored minus attention to reliability. For

reliability to be calculated, it is incumbent on the scientific investigator to document his or her procedure. (in Silverman, 2001, p.226)

Silverman (2001) argues that reliability can be addressed by using standardised methods and this is particularly important for interview transcripts. Detailed record keeping, including a study journal, and careful transcribing are essential to achieving reliability and a consistent approach to analysis of the data collected.

Garcia and Quek (1997) argue that validity in qualitative research depends not on the validity of the questions in a questionnaire, but on the interpretations from the questionnaire responses. This requires that the method of data collection, the research method, and the analysis are valid. For the validity to be visible it is extremely important that the steps of the research study are carefully recorded and that data records are meticulously kept. While it is not possible for subsequent researchers to replicate the study (given the position of the researcher within the original study) for purposes of validity, they must be able to trace all the steps of the interpretation.

Relevance and rigour

The continuing argument of rigour versus relevance in the IS discipline (Benbasat & Zmud, 1999; Davenport & Markus, 1999; Hirschheim, 2001; Lyytinen, 1999) should not be used to obscure the fact that both are important in the conduct of an interpretive case study. Academic rigour is maintained by an adherence to properly theorised questions, with clearly defined concepts and using a research method that is appropriate to the questions and the context. Transparency in the research

process and reporting is also required so that the research is visible to other researchers. Relevance refers to the need to take account of 'real world' people and situations while addressing a significant problem applicable to multiple audiences (Hirschheim, 2001); a necessary condition where empirical validation of theory is sought.

Text and data analysis

The consideration of how the data should be analysed in a single-case, interpretive study is vital to the ultimate interpretation of the data and the outcome of the research itself. The influences of the case study method, together with those of the theoretical perspective of dialectic hermeneutics within an interpretive stance required that a plan of analysis is included in the research design (see Section 4.3.2).

The researcher

The role of the researcher in interpretive research is very different from that of a positivist researcher. Trauth (1997) discusses the dilemma of the researcher in participating in the context of the research, but needing to remain apart to note and process observations. The researcher is an integral part of the process (the instrument) and depictions of the researcher's activities are legitimate (Kvale, 1996). The researcher's involvement in the study requires a good understanding of the subject matter, a self-questioning approach and a recognition of the bias that the researcher brings to the study (Garcia & Quek, 1997; Trauth, 1997; Walsham, 1995). This accords with the principle of interaction between research and the subjects, that summarises the need for reflection on the way in which both researchers and stakeholders communicate and interact (Klein & Myers, 1999). The subjective role that the researcher

has in the collection and analysis of data must be addressed to highlight this bias rather than make assumptions that it does not impact on the study. There is also a question of trust between the researchers and the participants in the study, particularly over a longer period and the social interaction with the subjects will affect the interpretation of data.

Generalisation

Quantitative research is seen as the stronghold of generalisation. Schofield (2002) argues that the association of the case study with its early roots in anthropological research has hampered the acceptability of generalisation from qualitative research, particularly case studies. She further argues that the use of case studies has moved beyond the study of 'exotic, foreign or deviant local cultures' to become of real importance in both evaluation and educational research where generalisation 'assumes real importance' (p.175).

The acceptability of case study research has suffered from two points; a perceived lack of ability to generalise the findings to achieve a clear outcome, as in quantitative research studies (Yin, 1994) and the issue of external validity, or the ability to replicate the study (Schofield, 2002). From an IS perspective this is challenged by Walsham (1995). Drawing on Yin (1994), Walsham argues that case studies are generalisable to theoretical propositions, and identifies four from interpretive studies: the development of concepts, the generation of theory, the drawing of specific implications and the contribution of rich insight. In giving examples of these generalisations he states that they should 'be seen as explanations of particular phenomena derived from empirical interpretive research in IS settings, which may be valuable in the future in other

organisations and contexts.’ (Walsham,1995, p.79). In discussing their principles for conducting interpretive field studies, Klein and Myers (1999) observe that there is a philosophical basis for their principle of abstraction and generalisation. Unique instances can be related to ideas and concepts that apply to multiple situations of social action and human understanding. These approaches are supported from the wider social sciences perspective where there is growing agreement that generalisation ‘in the sense of producing laws that apply universally is not a useful standard’ (Schofield, 2002, p.179). This does not imply that studies cannot inform other studies but use of rich description can enable judgement as to whether conclusions from one study can be useful elsewhere. Schofield suggests that case studies can be generalised to three domains: what is, what may be and what could be. In other words, studying the norm, illuminating issues that may suggest future trends and studying what is going on in exceptional cases.

These calls for a better appreciation of generalisation from qualitative case study research illustrate the growing consensus that case studies can provide rich insights and inform other situations. Walsham (1995), Klein and Myers (1999) and Schofield (2002) all emphasise the need for rich description to enable insights into social action and enable informed judgement and understanding across other situations to be made.

4.1.4 A Research Model

The research model in Figure 8 summarises the factors and influences that the researcher is subject to in the conduct of the research as laid out in this study. It summarises the influences that come into play in a single-case study while maintaining the necessary theoretical design perspectives that are required in the interpretive research paradigm. The

research model advocates that due regard is given to the macro and micro forces that form the context within which the research is carried out. This adds to the amount of data that will require interpretation, but the rich insights that are to be gained from the rigorous conduct of such research will contribute much to IS research.

The conducting of such single-case interpretive studies in areas of the information systems discipline are becoming more prevalent. IS evaluation is one area that will benefit from in-depth interpretive field studies. As yet, a 'positivist, mechanistic paradigm' still dominates the process (Jones & Hughes, 2001) and research has shown that effective studies are rare with few organisations able to gain meaningful information from the evaluation process (Ballantine & Stray, 1994; Hirschheim & Smithson, 1999; Ward et al.,1996).

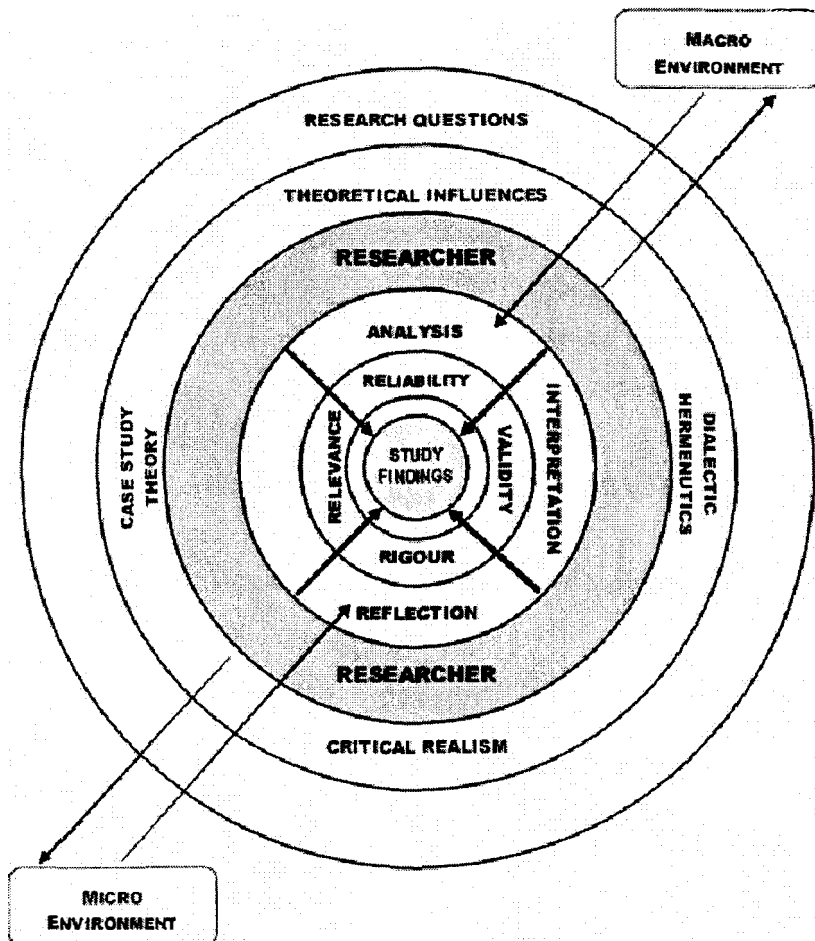


Figure 8: Model of Research Influences

4.2 Context of the Research

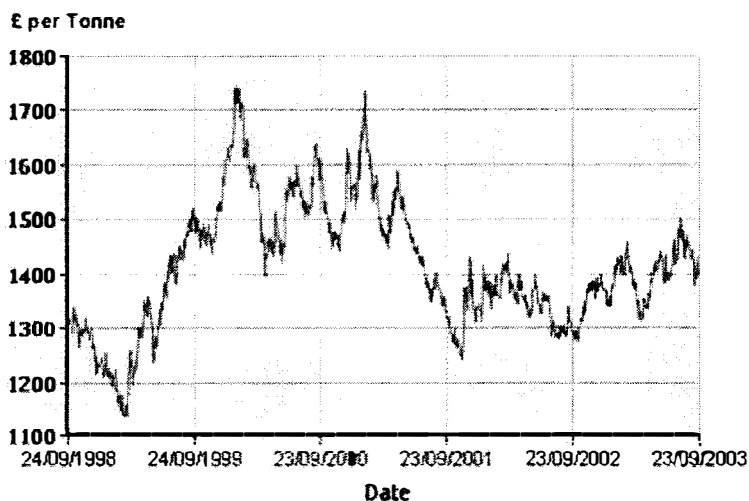
The requirement to consider a wider environment in the context of interpretive research is often referred to in the literature, but the importance of the context of the research is often underestimated. In the global, networked environment in which many organisations now

function the influences of the macro environment are strong. The political and legal consequences of operating in a global environment can impact on an information system at regional, national and global levels. Infrastructure, industrial relations, the skills of a workforce and cultural factors will also impact an IS and need to be considered in the research design. In the same way the internal culture, or micro environment, of an organisation will have an influence on the perspectives and opinions of those that work within it. Consideration of both the macro and micro environments, therefore, have a central role in the research design. In this section, a discussion of the context in which the case study organisation exists includes an understanding of the aluminium industry, both global and within Australia. This is used to frame a picture of the organisation in order to examine the influences that impact on its behaviour and thereby affect the realisation of the benefits in this study. Additionally, a short overview of the e-marketplace (FreeMarkets) used by the case study organisation is given to provide further background to the case.

4.2.1 The Aluminium Industry

Aluminium has been in commercial production for less than 150 years (International Aluminium Institute, 2003) and the industry has developed somewhat differently from other metal industries. As a new metal in an old established metals market, aluminium competes by 'gouging out a place as a substitute for traditional metals', but is also vulnerable to competition from the plastics industry (O'Connor, 1999, para. 5). This makes the aluminium industry susceptible to market conditions as customers can switch to alternative materials, resulting in a continuous pressure on prices. Aluminium is traded on the London Metals Exchange, (which holds more than half of the global stocks) and prices are

established through daily trading (Industry Commission, 1998). Figure 9 shows the volatility of price experienced in the industry, which are partly due to the difficulties of increasing and decreasing supply in response to world demand.



(Source: London Metals Exchange, September 2003)

Figure 9: Primary Aluminium Price Variation

In response to continuous pressure on prices, the industry has developed a culture of cost cutting as a fact of life to maintain the low, steady prices that attract customers. The combination of the competitive nature of the industry and the dominance of a few major players in the post-war era, has led to the development of an unusual structure of vertical integration. Aluminium companies operate from raw material to finished, custom-tailored products within the organisation. By controlling every stage of production, the producers of aluminium realise huge cost savings through integration of production stages to improve their ability to respond to

global market trends (Casey, 2002; O'Connor, 1999). The companies also maintain a flexible approach to their business to maximise opportunities. For example, in reaction to the global slowdown in 2000/2001, global production fell nearly 1% (Suddeutsche Zeitung, 2001) and aluminium companies began to lay off workers. Faced with a slower market, a US aluminium company took advantage of the country's power crisis to close plants and sell electricity back to the power companies, thus 'eliminating 1.6 million tonnes of aluminium from the market'. This had the effect of supporting the market price of aluminium and gaining a profit for the company from the electricity sales (Casey, 2002, p.36).

By maintaining control of production to achieve competitive prices and emphasising the advantages of the lightweight qualities of the metal, the aluminium industry has seen a large increase in the use of aluminium in cars. Other forms of transport and the building and packaging industries have also increased interest in the use of aluminium (Anon, 1998).

Following on from a downturn caused by Russia flooding the market in the early 1990s, a climate of mergers and deals has led to a period of consolidation, mostly at the expense of smaller, European firms. Despite the problems, there is a steady growth in demand for aluminium.

Challenges currently facing the industry are competition from the plastics industry, and increased research to develop demand in the steel industry. This comes at a time when research and development investment in aluminium has been severely restricted following a trend of a broad decline in the industry's margins. There is an ongoing trend towards further developments in the recycling industry, which is in part to do with environmental concerns directed at the industry, particularly as

regards greenhouse gas emissions (Anon, 1998; Anyadike, 1999; Casey, 2002; Lindquist, 2001; O'Connor, 1999).

4.2.2 The Aluminium Industry in Australia

Mining is a vital contributor to the Australian economy accounting for more than 60% of Australia's commodity exports (Subhabrata, 2000) and the aluminium industry is an integral part of that contribution. Aluminium production in Australia began after the Second World War and in the 1950s the Government built a small alumina refinery and aluminium smelter in Tasmania. The discovery of large deposits of bauxite in Queensland and Western Australia led to the growth of the industry which now accounts for more than one third of the world's bauxite output (Mining Journal Annual Review, 1999, p139) and 30% of alumina output (Australian Aluminium Council, 2000). Australia is the third largest exporter of aluminium after Canada and Russia.

There was a rapid expansion of refining and smelting in Australia following a growth in world demand for aluminium in the 1970s. Despite the cycle of growth and depressed markets in the last three decades, Australia has continued to move towards a leading position in the global industry and in the previous five years has seen the fastest growth.

Seven companies control the Australian aluminium industry with mines and refineries situated predominantly in Western Australia (60%), in Queensland and the Northern Territories, with smelters in New South Wales, Victoria and Tasmania (Industry Commission, 1998).

Australian exports of aluminium are substantial and were valued at A\$4.8 billion in 1996-97 (Industry Commission, 1998), A\$5.99 billion in 1997-98 (Mining Journal Annual Review, 1999) with a further increase

to A\$6.3 billion in 1998-99 (Australian Aluminum Council, 2000). In 1998 production was valued at over A\$9 billion and the industry directly employed 16,000 workers.

There are several issues that affect the environment in which the aluminium industry operates. Governmental factors at local, state, federal and international levels impact on the industry. Foreign and state governments have entered into joint ventures with mining companies (Donnan & Comer, 2001) while sensitive issues relating to the environment, the economy and the issue of aboriginal land rights, ensure participation from local and federal government interests (Industry Commission, 1998). The export market is almost exclusively to Asian countries and is susceptible to economic changes in that region, such as the downturn in the Japanese economy.

The Australian Aluminium Council stresses the contribution the industry makes to the Australian economy and the substantial indirect benefits it contributes in the way of technological development and infrastructure. Their claims to be a world leader in environmental management methods (Australian Aluminum Council, 2000) are, however, disputed by critics of the industry. The Australia Institute claims that the aluminium industry is responsible for 6.5% of the country's total greenhouse gas emissions, encouraged by a Government that provides them with exceptionally cheap electricity prices and no tax on emissions (Salleh, 1999).

Despite the environmental arguments the status of the aluminium industry in Australia remains high with its earnings and export contributions placing it within the top five industries in the country (Australian Aluminum Council, 2000).

4.2.3 Alcoa

Alcoa⁸ is a leading producer of aluminium in Australia and is 60% owned by Alcoa International Holdings Co. based in Pittsburgh, USA and 39.25% owned by Western Mining Corporation. Alcoa is the world's leading producer of primary aluminium, fabricated aluminium and alumina. It is active in all major segments of the industry: mining, refining, smelting, fabricating and recycling. It has 127,000 employees operating in 40 countries and had revenues of US\$16.3 billion in 1999 rising to US\$20.3 billion in 2002 (Alcoa Annual Report 2002). The Australian company, Alcoa World Alumina Australia, is based in Western Australia (WA) with smelting plants in Victoria. It owns the world's largest bauxite mine at Huntly in WA and has refining facilities at Kwinana, Pinjarra and Wagerup in the same state.

Alcoa (then the Aluminium Company of America) was granted a mineral lease to mine bauxite in Western Australia in 1961 following an agreement with three smaller Australian mining companies (Blainey, 1997). The company rapidly developed and the Kwinana refinery began work in 1963 with the first shipment to the newly built smelters in Victoria beginning in 1964. In Australia, a climate of industrial unrest in the early 1970s led to strikes in the Alcoa sites. These were eventually resolved by more consultative management methods with the unions and the workers (Blainey, 1997); an outcome that is reflected in the current climate of employee consultation and emphasis on teamwork. These, together with Alcoa's high reputation for achieving cost savings (O'Connor, 1999) are reflected in its adoption of change management

⁸ The name Alcoa is used throughout this thesis to refer to Alcoa World Alumina, Australia. Where the parent company, Alcoa International Holdings Co, is referred to this is made clear in the text.

processes. All new employees and many contractors are required to undergo training in the Alcoa Business System (ABS), which is ‘an integrated set of principles and tools used to manage Alcoa businesses’(ABS Training Manual). The ABS is a change management process based on the Toyota style of management and emphasises teamwork and the vital contribution all employees can make in meeting the improvement goals of the organisation. ABS has led to significant cost savings and Alcoa is on track to achieve savings of US\$1 billion in the three years up to the end of 2003. This emphasis on cost savings is particularly important in a volatile industry that suffers from price fluctuations and intense competition.

The organisation is committed to making full use of business to business electronic commerce and has successfully implemented a number of Web related supply chain initiatives. Alcoa is currently implementing a new eBusiness solution that aims to bring its procurement processes into the online environment. The process is to be implemented in stages through 2003 and will alter the way the organisation interacts with its suppliers. Alcoa anticipates that its new system will streamline and simplify many of its processes and eliminate waste, delays and errors. Suppliers will gain the ability to track information from the purchase order to final payment and gain from improved administration procedures. Although Alcoa will continue to support existing EDI suppliers, it appears to be encouraging the adoption of Internet or email. Their online catalogue system is being incorporated into the Alcoa Master Catalog (AMC), hosted by an external catalogue hosting service connecting into the eBusiness solution. Online bidding is seen as ‘the main tool that we use

to establish a contract to purchase goods and we will continue to use this process' (Alcoa website⁹).

Globally, Alcoa has a strong commitment to the environment and to its local communities. It is the only organisation to win the United Nations Environmental Programme's 'Roll of Honour' for environmental achievement (in 1990). This is not to say that environmental concerns are not raised and Alcoa has experienced some adverse publicity in regard to emissions and health scares. For example, in the local communities of Wagerup and Pinjarra in Western Australia recent concerns have regularly resulted in local press stories and compensation claims. However, Alcoa maintains a high profile within the local communities within which it operates. The global organisation has a policy of contributing to educational, charitable and environmental community initiatives that is reflected within Australia. For example, the Alcoa Frog Watch campaign, as a member of Friends of Kings Park, and the Millennium Kids project. Alcoa's commitment to its local communities is a strong feature of the organisation and includes a range of initiatives, a continuous process of communication and involvement with local businesses.

4.2.4 FreeMarkets

FreeMarkets was selected as Alcoa's choice of e-marketplace and a brief overview of the company is given to provide additional information to the context of case study.

⁹ Website details are given in Appendix B

FreeMarkets, established in 1995, was one of the first business-to-business electronic marketplaces to take advantage of the Web. It specialises in auctions and has developed a clientele amongst the Fortune 1000 companies. Originally their business model centred on their expertise in running large scale auctions (FullSource) for buyers, using a global supplier database that they have built up over time. FreeMarkets organises FullSource auctions for their clients, using their knowledge and extensive supplier database to set up and run large global auctions. They provide a high level of service to the buyer, assigning project managers to the client, and including training for both buyer and invited sellers, advice on the best way to organise the auction, hosting the actual auction and collating information. For their services they charge a percentage (approximately 1%) of the total value of the auction. In their first five years of operation, FreeMarkets carried out auctions in over thirty countries and operated across nearly sixty different industries (Earle & Keen, 2000); a situation that is reflected in its current operations.

They have since widened their business model from an auction house to include a further range of services. In 2001 they introduced a further level of service known as QuickSource. This supplies clients with the software to run their own, smaller scale auctions and run a range of other services, such as processes for request for information (RFI) and requests for proposals (RFP), online negotiations and sealed bids. In 2003 they introduced a supply management package (FreeMarkets ES) that offers a wide range of additional services. FreeMarkets' website projects the company as a leading provider of global supply management solutions that help companies achieve lower costs, reduce risks, and increase profitability.

4.3 Data Collection and Analysis

Putting the research design into practice requires a methodical and rigorous approach to both data collection and analysis. An interpretive case study approach underpinned by dialectic hermeneutics requires a wide variety of data sources to be accessed and the data to be interpreted. This section addresses the process of data collection and describes the sources used before discussing analysis of the data.

4.3.1 Data Collection

An interpretive case study requires that a wide variety of data sources be accessed to allow for an understanding of the case study organisation and to enable the context of the macro environment within which the organisation is operating to be interpreted. Yin (1994) sees multiple sources of data as a major strength of the case study method and he describes six types of data source to be considered by the researcher; documents, archival records, interviews, direct observation, participant observation and physical artefacts. However, within an interpretive case study the emphasis on interviews is greater and they are usually seen as the primary source of data (Walsham, 1995).

The Interviews

As is often the case with case study research, interviews provided the bulk of the data collected. The successful conduct of an interview requires much thought and preparation to gain spontaneous, rich and relevant answers. An open interview approach was adopted to encourage the flow of discourse (Kvale, 1996) and following the dialectic hermeneutic approach, transcripts of taped interviews were treated as text

analogue and contributed significantly to the interpretation of perceptions and opinions.

Twenty-three in-depth interviews of between fifty minutes and three hours were conducted over a two year period. The interviews were conducted with:

- ♦ The purchasing manager. He is responsible for policy regarding the procurement of operating supplies and capital expenditure across the organisation.
- ♦ The procurement manager. He is responsible for the buying function, as distinct from the administration, systems, inventory management and raw materials.
- ♦ Eleven of the organisation's buying officers¹⁰ from the procurement department.
- ♦ Two suppliers. These suppliers are based in Perth and have developed long-term relationships with Alcoa.
- ♦ Two e-marketplace representatives (one from Quadrem and one from FreeMarkets), based in Australia.

The emphasis of the research is buyer orientated and supplier interviews were used for confirmation of several of the points made by the case study organisation as well as supporting an understanding of how the e-marketplace participation was affecting relationships.

¹⁰ Alcoa refers to its procurement staff as buyers. To avoid confusion with the generalised use of this term in the text, and to avoid identifying titles of individuals, procurement staff are referred to as buying officers.

A list of potential interviewees from the procurement department was given to the researcher by a liaison officer (a volunteer from the department) and the purchasing manager. (Two people declined to take part in the study but it was not possible to ascertain why.) Interviews with the suppliers and the marketplace representatives were organised directly with the companies and took place in their company offices. The Alcoa interviews were conducted on-site at the head office and three remote sites within WA. The interviews were recorded and transcribed verbatim to allow for nuances in the interview to be apparent in the text. The interviewees' details were coded to allow for anonymity, although all those interviewed were aware that the context of the findings might allow for identification of individual's comments.

Other data sources

Access was obtained to company reports (both on and offline), e-mails, minutes of meetings and organisational manuals. Promotional material from FreeMarkets and Quadrem was also obtained and the websites of all three organisations studied.

These documents were used to corroborate and augment other information and give an insight into the cultural, social and political make-up of Alcoa. Searches were also made across a broad range of data sources such as newspapers and government reports to gain information about the macro environment, such as reports on national and international legislation, industry perspectives and economic analyses. The importance of the aluminium industry to Australia and the role of Alcoa in the development of the industry in this country has led to a number of reports being generated by government and business organisations over the last five decades.

This research was conducted from a direct observation stance. Direct observation allows for both formal and informal observations of the workplace, which provided additional information on the context of the subject matter within the organisation.

In addition to the above data sources, a study journal was used as a valuable source of data for reflection on the researcher's bias. A journal also serves as a record of less formal influences and allows for the tracing and verification of the research trail (Trauth, 1997).

4.3.2 Data Analysis

In interpretive case studies, analysis is not an isolated stage in the research process, but an integral and ongoing part of the data collection process. This is particularly true of the interview method of data collection where meaning, clarification and interpretation are continuous throughout the interview and subsequently. The theoretical basis also provides a context for the decisions to be made about the analysis that must draw together the research influences in an appropriate manner. Hermeneutics particularly suggests a way of understanding textual data: 'The object of the interpretive effort becomes one of attempting to make sense of the organisation as a text analogue.....the aim of the hermeneutic analysis becomes one of trying to make sense of the whole, and the relationship between people, the organisation and information technology' (Myers, 1997¹¹). The influences of the case study method, together with those of the theoretical perspective of hermeneutics within an interpretive stance require adherence to the principles of dialogical reasoning, multiple interpretations and suspicion as proposed by Klein

¹¹ Online reference, therefore no page number available (see APA Manual, 5th Ed, pp. 120-121)

and Myers (1999). Within a hermeneutic study, dialogical reasoning allows for the inherent prejudices of the researcher to be recognised and used to improve understanding through the interpretation process. This process needs also to take account of the multiple interpretations that will be evident among the participants (the sixth of Klein and Myers' principles). The reconsideration of the different interpretations within the context of all the data sources enabled recognition of where and why views diverged.

This last point relates closely to the last of Klein and Myers' (1999) principles for the conducting and evaluating of interpretive field studies, that of suspicion. This principle had a strong influence on the data analysis. In the remote environment of WA, where business relationships are close and of long standing, it was necessary to take a critical perspective of the statements made by interviewees. This allowed for the recognition of possible distortions caused by 'the social world behind the world of the actors' (Klein & Myers, 1999, p.78). The loyalties of those interviewed lie not only with their own department, but in many cases with their long-term suppliers. Their statements and actions were made within this context, with negatives from the global trading experience often attributed to outsiders of this local scene.

The majority of the data was in text form, with the transcription of the interviews forming the bulk of the data. Silverman (2001) highlights the problems of analysing text and cautions that although content analysis is an accepted method of textual investigation, it can be confining in its use of a set of categories, which Kvale (1996) calls 'categories of meaning'. Kvale suggests that ad hoc methods for generating meaning allows the researcher access to 'a variety of common-sense approaches to interview

text using an interplay of techniques such as noting patterns, seeing plausibility, making comparisons etc' (Kvale, 1996, p.204).

The analysis was carried out using the NVivo software package¹². This supports Kvale's suggestion of an organic approach to coding in that it allows for triggers or categories of interest in the text to be coded and used to keep track of emerging and developing ideas. These codings can be modified, integrated or migrated as the analysis progresses and the generation of reports, using Boolean search, facilitates the recognition of conflicts and contradictions (the final codings used are shown in Figure 10). The use of qualitative research software, such as NVivo, has advantages in handling a large amount of data over a long period as the research unfolds. It does not, however, replace the need for the researcher to remain in touch with the research data and to maintain adherence to rigorous principles such as those proposed by Klein and Myers (1999).

¹² Licence No. 20-US-163-200212-3605-034571

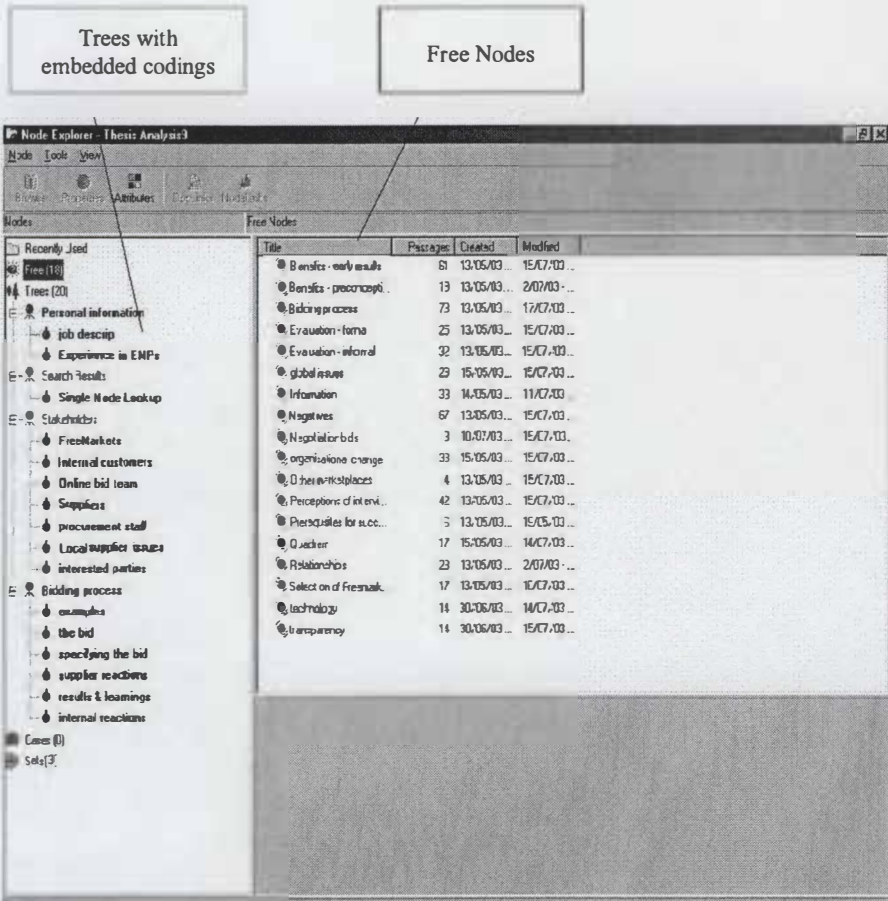


Figure 10: NVivo Final Coding Categories (Nodes)

Figure 11 shows the steps of data analysis, indicating the two separate, concurrent methods of interviewing and additional data collection, culminating in the reiterative analysis of the hermeneutic circle.

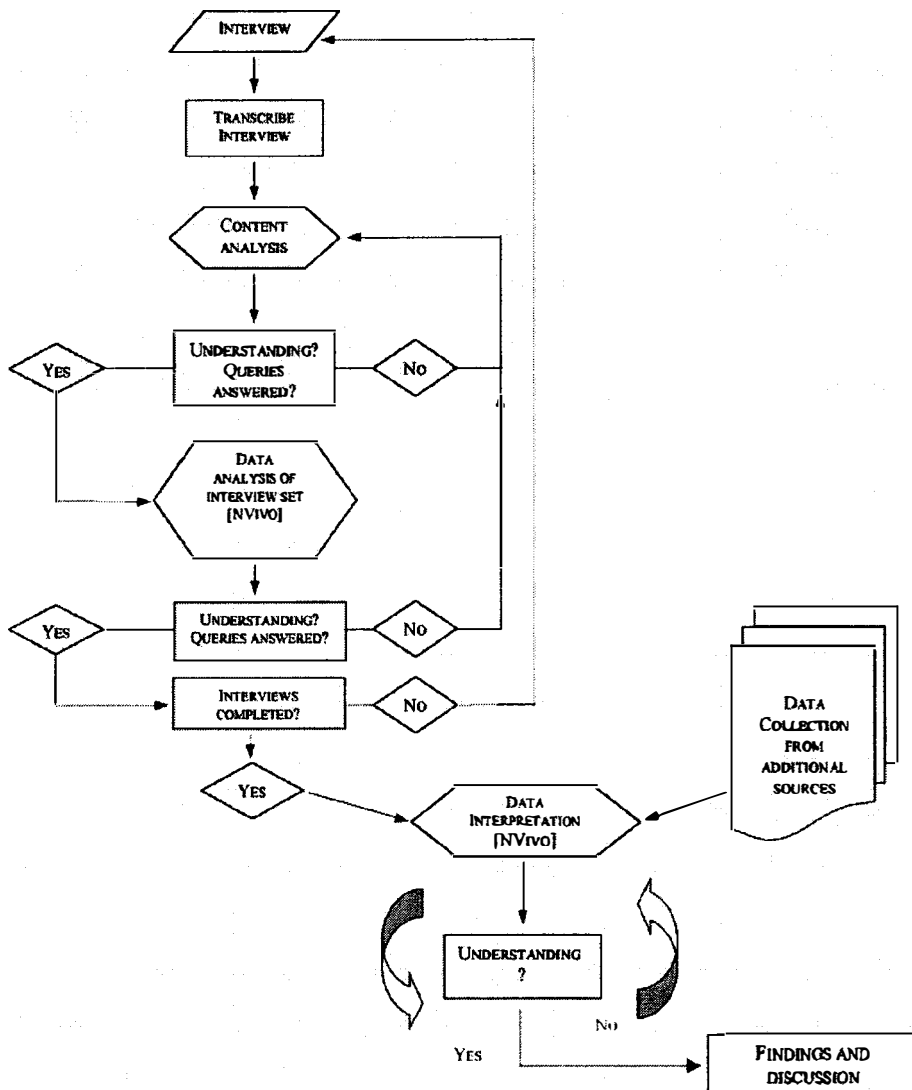


Figure 11: Data Analysis Steps

The methodology has described the influences that contribute to an interpretive case study and summarised them in the research model. The

context of the case study has been discussed along with the methods of data collection and analysis. The research approach taken has enabled an understanding of the many factors that influence and impact on the evaluation of a complex information system such as an e-marketplace and allows for a rich stream of findings that inform the case study.

CHAPTER 5

FINDINGS

An interpretive case study was conducted to consider how an organisation is realising the different benefits derived from participation in the e-marketplace. A process was designed to meet the needs of an evaluation framework, based on the constructs of the CCP approach. The framework was drawn from an examination of the literature and is tested against the empirical data collected during the study.

A more detailed measurement of any aspect of the information system would be possible at a later stage using existing instruments, such as measuring user satisfaction (Bailey & Pearson, 1983; Gatian, 1994; Gelderman, 1998) or ROI (Mogollon & Raisinghani, 2003), if the *why* of the evaluation supports this. At this early stage of e-marketplace participation, where benefits are more anecdotal than empirical, it is first necessary to approach the evaluation with a holistic framework to enable a more inclusive identification of benefits and potential benefits.

The context of the evaluation takes place within two dimensions; that of the external environment of the aluminium industry and of the internal organisational environment of Alcoa (see Section 4.2.3). The *how* of the evaluation is discussed in Chapter 4 (Methodology), which also outlines the longitudinal nature of the evaluation (*when*). The stakeholder element is a strong factor in the realisation of benefits both from their different perspectives of what the benefits are and from the effect the e-marketplace processes have on the organisation's relationships that may

have consequences for the realisation of those benefits. This chapter deals with the *what* and the *who* of the framework, using the *how*, *why* and *when* dimensions to inform the findings.

5.1 The *What*. Identifying the Benefits

Prior to participation in the e-marketplace the procurement staff's perception of benefits to be gained were derived from those of senior management and focussed on cost savings. However, the purchasing manager anticipated further benefits 'down the line'. Cost savings were the dominant, identified reason for introducing the use of FreeMarkets, a strategy that was felt to be necessary in the current state of the global aluminium industry. A notoriously volatile commodity, aluminium prices have suffered downward pressure in the current period of global business instability (Casey, 2002; O'Connor, 1999) illustrated by Alcoa's 10% drop in sales in 2002 (Alcoa, 2003). As the use of FreeMarkets' processes has progressed the staff's perception of benefits and attendant issues has broadened and there is greater understanding of the effects and potential benefits to both the procurement process and the organisation. This section first addresses the information system and how FreeMarkets, as a service deliverer, was perceived by the procurement staff. It then proceeds with an appraisal of how the staff used the system and the impact this use had on both the people and the procurement process. Finally, the effects of use on the organisation are addressed in the following section.

5.1.1 FreeMarkets as Service Deliverer

Service quality within the context of this study is seen as the procurement staff's satisfaction with the levels of service delivery by FreeMarkets.

Their responsiveness to the requirements of Alcoa and the procurement team were discussed, along with their identification with the organisation's interests and ability to achieve required outcomes.

With only one truly dissenting voice, the interviewees held a high opinion of the overall expertise of FreeMarkets and its role as an intermediary in putting together a 'workable package'. The dissenting voice came from a buying officer who had spent twelve months on deferment with another e-marketplace during its development phase. He believed that more benefits could be achieved from participation in the other marketplace, although development was at a less mature stage than that of FreeMarkets. This second e-marketplace (Quadrem) was founded by an industry consortium, including Alcoa, and its business model was very different from that of FreeMarkets. Quadrem aspires to a more 'complete solution' and offers a range of transaction mechanisms and value-add facilities including logistic and financial services.

At the stages of planning and very early participation attitudes to the details of the FreeMarkets' system, as distinct from the concept of adoption of the system, were related to the e-commerce experience levels of the interviewees. For example, two interviewees with very limited experience of e-procurement had some reservations over the training offered although they remained positive for the longer term. Conversely, one buying officer with extensive experience in both procurement and the electronic environment was very enthusiastic and had no fears of the new initiative. These differences in attitude disappeared as participation progressed and perceptions of FreeMarkets as a service deliverer were generally positive. These positive perceptions remained despite issues of cultural frictions that unfolded as participation progressed.

Systems tend to reflect the nationality of an organisation's headquarters (Tractinsky & Jarvenpaa, 1995) regardless of their global image and this was the case with FreeMarkets. Cultural frictions included the closing of the help desk on a US public holiday (with no prior notice), use of US East Coast time and the use of American English. FreeMarkets offices have now been established in Europe and Asia that overcome the first two frictions, but bring frictions of their own, especially since Alcoa has extended its use of the auction process and begun looking at a more global supplier base. Cultural differences in the way people interacted caused some concerns when using a non-US help desk although these did not appear to be raised at management level. Although these frictions at the early stages of participation related directly to FreeMarkets, criticisms were attributed to the marketplace environment rather than the market maker.

After two years of service, the procurement department continued to remain positive in their opinions of FreeMarkets, citing the market maker's capabilities in maintaining information flows, giving timely updates and keeping people informed of forthcoming changes.

Interestingly, the lack of connection between FreeMarkets' service and the quality of the system, a traditional measure of IS success (DeLone & McLean, 1992), continued throughout the interviews. Attitudes to FreeMarkets remained positive despite several other concerns that were raised over the time period relating to experiences in using the system. These included:

- ♦ version control issues for software. In one auction this led to suppliers bidding against different information; a problem that had

the potential to cause serious damage to relationships with all the suppliers involved.

- ♦ refresh rate problems
- ♦ lines dropping out
- ♦ bids not recording within specified time limits. Initially, response time problems were experienced where suppliers' bids, placed in the last few minutes of an auction, had not been recorded. The closing bid period was extended from two to five minutes to correct this.

The discrepancy between comments on service and system quality appears to result from the swift way FreeMarkets addressed each of the problems that arose. Some blame was also directed at the telecommunications infrastructure within Western Australia where the network capabilities are viewed as 'not up to scratch'.

One result of technological problems that is considered to be a serious consequence, relates to the psychological effects on suppliers of re-running bids. Suppliers new to the auction process were already uneasy with the system and problems during an auction were inevitably traumatic:

When you're a lone supplier sitting up there, trying to deal with this technology remotely, and you think you're winning, and an hour later somebody rings you up and says 'we're about to re-open the bid because we've had some difficulties on the way through'. Then you suddenly find you're not the lowest bidder any more, you get very distraught, and you don't trust the technology and the ethics. (purchasing manager)

Lack of familiarity with the technology can also put a barrier between a buyer and the supplier, leading the purchasing manager to ask ‘how do you marry technology with supplier relationships?’ Suppliers were less willing, or had fewer opportunities, to question as they had in relationships of a more traditional cast; a situation made more difficult by extending the use of e-commerce into areas like invoicing and ordering processes and ‘people are not comfortable with that’ (procurement manager). The matter of comfort with the system goes beyond technology problems. It is interlinked with the information the system provides, the way the system is used, and how people react to its use.

5.1.2 Information

The quality of information within an interorganisational information system relates to its completeness, relevance and security (DeLone & McLean, 2003). It must also be presentable in terms that are appropriate and relevant to its audience.

The amount of information available through participation in an e-marketplace is considerable (Bakos, 1998; Weill & Vitale, 2001). This proved to be the case with Alcoa where the handling, ownership and sharing of information were differentiated from types of information and discussed as follows:

Market information

The purchasing manager differentiated between the types of information available from different e-marketplaces. When discussing the information available from vertical consortium marketplaces such as Quadrem he believed that:

there is a significant difference between that type of information and the information that FreeMarkets provides, which is about getting good, clear specifications, making sure everybody's on the same page, getting instantaneous feedback to suppliers about where they are in a particular bid, giving them multiple opportunities to look at, whether or not they want to continue to participate in a bid. And providing good feedback in terms of what marketplaces are doing generically so you can look at old bids, and other people's bids, to see what's happening. (purchasing manager)

FreeMarkets provided good clear information relevant to running the auctions. This was different from information of a more generic nature that required a greater appreciation of how specific and relevant it was to an individual organisation and knowledge of how it could be applied. Where the information related directly to the company, it was held to be accurate, but with generic information:

you need to be careful that the information they are providing is specific to you or to your industry or that particular bid. We've had occasions where savings have been touted....but you have to look behind the software to understand how the saving is comprised. You have to be careful, knowing what you're getting and what you're going to do with that information and how you are going to apply it. (purchasing manager)

This differentiation of the types of information related to the differing business models of the FreeMarkets and Quadrem marketplaces. The former, a horizontal, intermediary-owned e-marketplace is focused on the auction mechanism and information directly relating to it. In the latter model, a vertical, consortium e-marketplace, there is more emphasis on

value-add, where more generic industry information is available. This type of marketplace also introduces a transparency issue where market makers have the ability to coordinate extensive information from multiple buyers and sellers on their access patterns to catalogues, their negotiation patterns and their auction strategies. This could potentially influence the market, theoretically leading to a state of perfect market information as anticipated by industry figures such as Bill Gates (1996), although discounted by others (Bar, 2002).

Supplier information

The amount of supplier information available from analysing the bids was held to be very valuable. It showed supplier trends and allowed identification of supplier strategies for 'building in fat' to pre-qualifying bids. The transparency of the process illuminated supplier strategies and enabled greater identification of efficient suppliers and facilitated the recognition of supplier alliances, or in some cases, supplier collusion. As use of the system progressed there was a recognition of market price that also contributed to the understanding as to which suppliers were efficiently pricing their goods and those that were carrying the costs of inefficiency.

Supplier details, accessed via FreeMarkets, were in one case criticised for being less encompassing than in previous paper tenders. Previously, suppliers sent brochures and supporting evidence of their profile, but with FreeMarkets it tended to be a 'tick the box exercise'. It was not clear if this comment resulted from an aversion to learning about and dealing with new suppliers, after a period of close relationships, or a real concern that not enough information was available.

Ownership of information

Ownership of information was widely discussed with some concerns being expressed at buying officer level that FreeMarkets had access to a great deal of Alcoa's procurement information. These concerns included the problem of the volatile electronic environment where e-marketplaces might not retain viability over a longer term, and raised the question of what would happen to the information if the market maker was acquired by another firm or went out of business. The idea that an intermediary firm retained detailed information of Alcoa's procurement history was unfamiliar to buying officers. The issues of trust in an online environment were seen to differ from the offline landscape where organisational information was not shared to the same extent with offline intermediaries. These were not seen as issues of concern by management who stressed their level of confidence in FreeMarkets and in the back-up systems put in place for Alcoa.

Handling of information flows

Information overload was a recurrent theme. The ability of the system to deliver information to a buying officer in a short space of time was enormous and to date there were few strategies for dealing with it. There was a tendency for suppliers to exploit the easy availability of e-mail to ask questions rather than read through the tender documents. A buying officer reported receiving nearly 2000 e-mails in the week before an auction, few of which were necessary as in almost all cases the information was contained in the documentation. There was further evidence that suppliers were not dealing well with information in electronic format; for example, terms of conditions, that should have been scrutinised at an early stage, became an issue at the contract signing

stage on more than one occasion. The apparent aversion of suppliers to reading electronically delivered documents differed significantly from their ability to deal with print delivered documents. Procurement staff were puzzled by this and offered no explanations, but hoped that matters would improve as suppliers became more adjusted to the electronic environment.

One further issue in the handling of information was the level of security required, particularly with the easy flow of electronically available commercial-in-confidence information. Transparency gave staff greater access to a wider range of, sometimes sensitive, information than ever before. Training in the handling of such information appeared to be on an individual basis, rather than a formal part of the training process.

Sharing of information

At one site, a buying officer was concerned as to how information from the new system was to be disseminated to internal customers. He believed that there was a real issue in getting the information across in a format that was accessible to those working in the refineries (a point that relates to DeLone and McLean's (2003) concern for the ease of understanding and personalisation of information). To win over the internal customers to the new system would benefit everyone and if 'a way of advertising' information (for example, savings made on major purchases) could be found in the refineries this would be a valuable step in this direction. This point relates to the organisation's current practice of showing 'work safe days' or productivity levels on billboards at the entrance to the work sites.

5.1.3 Using the System

Use of the system and its effects on the procurement staff were found to be very closely connected and therefore the findings are reported together to avoid splitting the rich data that is so closely intertwined.

In a business to business situation, where use of the system is mandated by the CEO of the organisation (as in this study), the impact of the system on the staff is not a significant element of the decision. In discussing the stress caused by the extra workload undertaken by procurement staff, the procurement manager stated that:

the CEO says 'Well, that's your job...reduce the cost. And if that means you've got to work to..... put in some effort to reduce those costs to running the business, that's your job.' So he's not sympathetic to that view at all.

Use does not therefore indicate the willingness of staff to use the system, and it is not a measure of how long, or how often, the system is used. Rather, it addresses the nature of that use and the operation of the system. The effect that use has on the procurement staff impacts on the way they react both to the system and to those involved in its use. Satisfaction levels varied over the period of time of the study, and also within the interviews where the experiences of the buying officer were relived in the telling, displaying some ambiguity in their regard for the system. For example, where one buying officer experienced problems during a bid his reaction was understandably irate, feeling that he carried the blame for a software problem:

The whole supply department was down in the staff room.....they were actually watching the bid on the big screen. Everyone was

watching it. So everybody knew something had gone wrong and initially it looked like,what's he done, he's stuffed it up. By the time we investigated it, it was a problem with the software. (buying officer)

This buying officer was positive in his attitudes to the system as a whole and saw it 'as a positive tool, especially from a time saving perspective'. After the failed bid, his comments were more critical, and he considered his views from the perspective of both supplier and buyer. However, overall there was loyalty to the team effort in implementing the system, and errors and problems were considered in the light of experiences to be learned from.

The procurement department was tasked with introducing FreeMarkets' auction tools into their procurement process rapidly and efficiently. Drawing on some limited experiences from the US organisation, the implementation of auctions as a procurement tool was rapid. Within the first twelve month period an A\$118 million spend was put through the online bid process, in approximately 350 FullSource auctions.

The use of the system affected all buying officers who were tasked with identifying contracts that could be put to auction. Initially, they worked closely with FreeMarkets' representatives using the FullSource facility of a global auction with invited suppliers, identified in part from FreeMarkets' extensive database. Within a few months, FreeMarkets had introduced the QuickSource facility that provided the software for buying officers to construct their own, smaller auctions drawing heavily on the knowledge of the online bidding team. The nature of the use of these auctions required an understanding of the specification process, the bidding process and the handling of customer use (customers in the

broadest sense of internal customers and suppliers) and the awarding of contracts.

The specification

Use of the auction process required precise, detailed specifications to be written for the goods and services to be purchased. The procurement staff saw this as a difficult task, but one they perceived to be a long-term gain.

With the development of long-term relationships, specifications have become less formal as incumbent suppliers have negotiated variations over the years. The nature of some relationships has led to high levels of governance passing to the contractors who have virtually become 'part of the workforce'. This has led to great difficulties in preparing bids for tender where Alcoa's workforce do not have the knowledge to describe the necessary detail for the auctioning system. The previous relationship allowed for:

descriptions to be written on the back of a cigarette packet. He (the contractor) knows what I want, I know what I want and he gives me a price. (buying officer)

This informality has been replaced by the need for stringent descriptions in the tender documents, and the requirement to garner this information from a diverse number of people both internally and externally. In at least one case, the supplier has provided the specifications for Alcoa, to ensure that the tender was an accurate one and the auction based on an equitable basis:

he (the supplier) was concerned that only he knew the real price of things. Say, for example, we put out a description for a nut and bolt which cost \$1, but really we needed a different one which cost \$5.

Our incumbent knows this so he bids the realistic price while everyone else bids what we've asked for and he disadvantages himself at the bid stage. So it's in his interest to help us put the bid together, as he's then bidding on a level playing field. (buying officer)

The degree of informality and 'comfort' visible in previous approaches to specification through close-knit relationships with suppliers has been replaced and the emphasis is now in 'getting it right'. There has been some concern in the early stages from new suppliers regarding the standard of specifications and this has contributed to questions raised for the procurement staff:

how do we work with the suppliers to make sure they are the lowest cost? How do we make sure that we are getting specifications right? (purchasing manager)

Now people are being pushed into testing the market and reassessing the scope of the product or service that they require, to see if there is a cost justification for every part of the specification.

By way of example it could be a \$200 service for a car when we wanted only a \$50 service for a car. (purchasing manager)

Over time the specifications have grown organically and the auction process requires that there is a new start from a clean sheet. This entails a great deal of work in re-learning the detailed knowledge required to specify purchasing needs, particularly in service areas with high labour content. Procurement staff saw the benefits of 'the spring cleaning' and believed that 'there has been a step change in the cultural acceptance of what we are doing, in the last 12 months' from the internal customers

(purchasing manager). They were beginning to appreciate the advantages of reassessing every part of their procurement spend and being consulted in the process:

there have been places involved in the process and feel they've had a say in it. And you know some of the feedback we've had is really positive from the guys, which is good for us as well. You know, they are happy with what we've done, whereas in the past they were always saying 'what do you want' and things like that.... And they are really pleased they have been involved in it. (buying officer)

Although many of the specifications could be regularly updated for future use, there were areas, particularly in engineering, where one-off specifications were required. The learning process of specification writing was particularly important in these areas.

The bidding process

FreeMarkets bidding process in both FullSource and QuickSource is very flexible and enables the buyer to adjust the auction to their needs. Examples of the many configurations that this allows were identified through FreeMarkets and Alcoa data sources and discussed by the procurement staff.

a. Pre-qualifying bids

In some auctions a pre-qualifying bid was used and this became the first bid requirement in certain auctions. Pre-qualifying bids prevent suppliers coming into the auction with high bids and encouraging other suppliers to keep the price high. In the early stages of learning suppliers, keen to gain the contract, have bid against themselves so as not to upset Alcoa by

leaving the bidding above their pre-qualifying bid when competition failed to materialise.

...and the three companies came into the bidding process and they start their bid, with Company A coming in at 800 and Company B came in at 750 and then C came in at 700 and they just sat there. Then one or two put in a bid and then they thought 'well, we put in a pre-qualifying bid and Alcoa know. We're going to upset them if we put in a pre-qualifier at 500 and we're now asking for 700 so we'll do the right thing and we'll bid down' and that's what they did. They actually bid lower against no competition! (buying officer)

This has become less apparent as suppliers gain confidence in the online auctions.

b. Transformational bidding

Transformational bidding allows for the pricing to be based upon other aspects of the suppliers' abilities by adding weightings. There is a wide variety of criteria that can influence the setting of weightings, including experience, known expertise in a certain area, safety reputation and consideration of switching costs.

Transformation bidding is a very powerful mechanism that is, ostensibly, not visible to the suppliers and is therefore considered to be very sensitive. One buying officer expressed some concerns over supplier reactions if they realised that transformational bidding was being used. However, experience in the auction process is making transformational bidding more apparent to suppliers, particularly where prices are visible in the auction (prices can be shown during an auction although there is

the option only to show the position of each bidder). This has not yet been raised as a major concern by suppliers.

c. Lotting strategies

Lotting strategies can be used for either/or situations. For example, the tender can be bid in three lots with a further fourth, collective lot incorporating the three bids. The award of the contract can go to three separate bidders or one bidder depending on the outcome of the auction. This mechanism has the dual advantage of flexibility in price and allowing smaller local suppliers, who cannot fulfil the fourth lot, to bid in areas of expertise. This flexibility has worked to Alcoa's advantage in identifying smaller suppliers of high standard. For example, Alcoa has identified small fabrication firms that offer high quality work at competitive prices that have previously been excluded from the supply chain because they were unable to bid for larger contracts.

d. Aggregation and Disaggregation

Aggregation and disaggregation mechanisms are very similar to lotting strategies where the bid may be split into several smaller parts to benefit smaller companies. FreeMarkets enables flexibility in the aggregation or disaggregation of bids and experience can enable future bids to be more appropriately structured to take advantage of market conditions for each product or service group. The breaking up of contracts previously 'lumped together' has advantages in broadening the potential supplier base, but raises difficulties in specification, cooperation and sometimes in attracting appropriate suppliers:

putting it all together involved quite a number of people from different backgrounds, from different business units and different

ideas on how they wanted their logistics to be handled. The market out here for transport is controlled by a small handful when you are looking at it on a regional basis and we lost a lot of the smaller, very good transport operations in the individual states. It was too big for them because they weren't represented in one of the other states. (buying officer)

In contrast to this, disaggregating an Australia-wide contract may attract competitive bidding in Victoria, but cause difficulties in identification of suitable suppliers in WA. Conversely, disaggregation of a contract may allow for differences in equipment requirements for individual industrial sites to be met more efficiently, such as the need for different safety equipment in mines, refineries and smelters. For example, each work site has a different requirement for safety boots that relates to working conditions, involving different specifications in regard to heat resistance, steel toe caps, and different materials for the soles of the boots.

Alternative mechanisms

Although the primary transaction mechanism of FreeMarkets is the online auction, there is the capability for online negotiations. One such negotiation was used to bid for a purchase of seeds (Alcoa has a nursery for land regeneration purposes and owns farms around the perimeters of the refineries). It was felt that the auction mechanism was not suited to the complexities of the seed market. The online negotiation is conducted in the same way as an offline bid, with suppliers' submissions sealed (i.e. not available online) until the pre-specified opening day.

Alcoa also maintains catalogues of spare parts and low cost, high volume goods for stores purchases within the smelters, refineries and mine sites. Currently the organisation is developing the Alcoa Master Catalog as part

of its integrated development of an e-business strategy. Alcoa will push for greater participation in electronic delivery of purchase orders, payments and other administrative work with its suppliers, and, although EDI partnerships will continue to be supported, Alcoa is moving towards broader electronic mechanisms. However, evidence from the current use of an e-marketplace indicates that concerns related to such issues as technological capability and back-end integration remain to be addressed within suppliers' organisations if a smooth transition to electronic business platforms is to be achieved.

Transparency

The transparency of the system had an effect on both the use of the system, and on user satisfaction, or perhaps more accurately on user comfort. While it had many advantages there remain issues affecting users that were widely discussed in the interviews.

Two issues arose in the first stages of participation in respect to internal and external aspects of transparency. The former has the potential to cause concern to staff as their work is very visible to peers and management and was described as:

*the transparency issue that is coming at us like a freight train.
People become a little more concerned, a little more aware that
everybody can see what they're doing. (procurement manager)*

The procurement manager, who understood that the transparency of the whole process engendered fear in some people as their way of working became clearly visible with errors and difficulties being more exposed, echoed this view.

The second issue of external transparency has enabled Alcoa to recognise supplier alliances and collusion where ‘the system has highlighted how much back scratching goes on in the supplier base.’ It has also provided suppliers with the ability to assess competitors’ prices. The downside of this, from Alcoa’s perspective, is that the use of transformation bidding becomes more visible if the weightings are wrongly applied to favour smaller bidders. Auction participants know the final price of an auction and can see where the lowest bid is not the accepted one and may question the outcomes. On the upside, suppliers have a clear view of market prices and this contributes to smoothing out the peaks and troughs of auction bids.

In the later stages of participation there has been more recognition of the benefits of transparency. For example, it allows for greater regional and global networking of procurement staff, and opens possibilities of aggregation of information and buying opportunities. In one case this enabled a buying officer in the United States to identify a duplicate auction by a counterpart in Australia. This provided the opportunity to exchange information about suppliers and opened the possibility of aggregate buying.

5.1.4 Relationship Issues

In the somewhat isolated environment of Western Australia, Alcoa is a major employer and has the power end of largely asymmetrical relationships with suppliers. Identifying customer use (in terms of the suppliers) is, therefore, not a viable measure of success as few suppliers have been willing to walk away from the relationship. In the same way internal customers are subjected to the directive from the Board that the auction process be implemented as a procurement tool within the

organisation. However, the economic, social and political issues affecting both groups in the use of the auctions impact on staff within the procurement department and influence the way the system is used. Procurement staff have to reconcile the tasks of integrating the FreeMarkets' processes into the supply chain and bringing both internal users and suppliers to acceptance of the changes.

Suppliers

Suppliers' reactions to the bidding process were many and varied. Overall, there were two extremes of reaction; incumbent suppliers did not like the auctions while new suppliers tended to be very enthusiastic. In a small number of cases suppliers refused to be part of an electronic procurement process and 'walked away'. One of these previously incumbent suppliers did return to bid in the second round of auctions and was determined to recapture the business:

the incumbent elected last time not to bid on this particular piece of equipment because they didn't want to know about FreeMarkets. They came back afterwards and said they'd like to be included on the next one. The company that won the last one and this incumbent company were just going hammer and tongs. But it wasn't about 'we were going to make any money out of this'. It was a matter of 'we're going to win this bid no matter what, even if we have to lose money' and you can see that by actually watching the bid and knowing what the historic cost is. (buying officer)

This was a concern to the procurement staff in the long-term, as they are 'not in the business to send people broke', but would rather have suppliers learn the necessary strategies to bid effectively.

Incumbent suppliers that remained in the process from the early stages were less than enthusiastic with comments ranging from 'you've ruined my business' to reluctant acceptance. Initially, some suppliers saw the process as a 'price chasing exercise' to force cost savings from them, but 'going with a new supplier on the first bid showed that we were serious about the business and about working with new suppliers'. As they gained experience and confidence, those incumbents who retained their contracts became more favourable in their attitude. They gained from a greater appreciation of market price and have worked to:

bring cost structures down to remain competitive, but I think in the end that is going to be a very positive outcome because there's nothing worse than not knowing what the rest of the market is doing... this gives them early warning. (purchasing manager)

In contrast new suppliers were very positive from the beginning, as the auctions opened up Alcoa after a period of close, tight relationships that were difficult to penetrate. They saw the process as a learning experience and a chance to explore Alcoa as a new business opportunity. New suppliers, who are keen to retain their contracts in the future, have been seen to make contributions to the relationships. For example, they:

have come up with a report saying 'if you change this and did this and moved here and change so and so then you will in fact take another 20% out of your costs'. (purchasing manager)

Even in the early stages of the auction process, there was evidence that suppliers were learning strategies for dealing with the new environment. Some were carried away with the excitement of the bid the first time, although were unlikely to do so in future auctions. For example, one supplier continued to bid although the competition has ceased to do so.

Other suppliers have shown more restraint and followed closely on the bidding leaders before pre-empting them in the last stages. As participation has progressed suppliers are showing that they are learning about and planning strategies to gain advantage in the auctions. One such supplier had clearly planned a strategy on how to react to the auction and won the contract because the incumbent supplier was unable to respond adequately to the process.

The procurement staff are continually learning as suppliers adjust to the marketplace. They have identified concerns in maintaining a viable marketplace when some suppliers see the market pricing structure moving below their capability. These suppliers will likely not participate in future auctions where pricing levels are seen to be too low. In cases where it appears that suppliers have bid very low, they are asked to justify their pricing to ensure that they can fulfil their contract. This is particularly true in new relationships, which take a while to assess, as the organisation seeks to bring new suppliers 'up to speed.'

The nature of the previous relationship also affects the approach that suppliers take in responding to bids. For example, in one bid where a mistake in transferring figures to the online specification was made, no suppliers came forward to say that they could not meet the price, resulting in no bids being placed in the auction. This lack of communication led to an expensive re-setting of the auction. Conversely, in another case, the incumbent supplier advised staff to delay an auction for a product suffering from volatility in the market until 'prices had become more settled'. The nature of the relationship was such that the organisation took the advice and achieved the desired results when the

auction was finally held. The diversity of opinion amongst supplies was recognised by the procurement manager:

you see all the emotions good and bad, depending on how the bids have gone and the nature of the previous relationship. The relationships required do depend on the commodities in question. Where you get your electricity from is not a problem as long as it comes down the wire, but buying servicing for your car demands more of a relationship.

The organisation continues to learn which commodities are most suited to the auction process and how relationships are affected by the use of the auction mechanism.

Internal customers

Social and cultural issues arose for internal customers as a result of the auction process. There is an identification with work and an ownership perspective to areas of expertise that affect people's attitudes to changes in their work area:

I think that there's a recognition that it may make their life harder in terms of specification, in terms of challenging what they've done over many years.....it really does challenge arrangements that they've put in play over many, many years and it calls into question how effective they've been in their roles. (purchasing manager)

This personal ownership perspective was evident in the an early bid for safety equipment for the smelters and refineries:

People take it on as their personal ownership you know. If their boots don't fit their feet properly, it's a major problem to them

.....it's a very personalised thing and they can get very upset with things. (buying officer)

To overcome the challenges of the complexity of the safety equipment bid, the ownership perspectives of safety equipment, and to meet health and safety obligations, a process of close consultation was used. Working committees spent a great deal of time in reviewing pre and post bid issues in this very complex area to achieve a good outcome and overcome antipathy to the auction process.

Again, after the initial antagonism, there was some diversity of attitude towards the auction process once the auctions were underway. Some customers said 'you don't understand the value of our relationship with our suppliers' and believed the push to re-bid all the contracts had an adverse effect on their work. Other customers said 'this is terrific, you've taken 20% off the price of my goods'.

5.1.5 Summary - Perceived Learnings from Use of the E-marketplace

The interesting variety of reported results from the initial round of the auction process came from the diverse range of products and services auctioned. The difficulty lay in achieving a high level of procurement spend through auctions without a clear idea of what could or should be put to auction. This resulted in different success levels based on the criteria of cost savings. However, the seeking after cost savings did not result in automatic acceptance of the lowest bid. After bidding, procurement team members decided which companies to consider before weighing up the pros and cons of the selected companies and then

deciding which one to go with. The pros and cons consisted of several factors including:

- ♦ switching costs incurred in moving from incumbent suppliers
- ♦ Alcoa's commitment to local suppliers
- ♦ perceived ability and reputation of the supplier to fulfil requirements of contract with regards to quality, reliability, safety etc.
- ♦ viability of the auction price, where a supplier may have undercut rivals to an unprofitable level thereby jeopardising their ability to fulfil the contract
- ♦ where a reserve price was not reached, Alcoa retained the option of returning to negotiations.

Buying officers also reported that in many cases they would structure their bids differently in future, aggregating or disaggregating across regional and national boundaries. The flexibility of this would enable future bids to be more appropriately structured to take advantage of market conditions for each product or service group. The size of the supplier base also affected the structuring of bids, particularly given bids based within the WA region where supplier numbers were more restricted.

A major advantage of the bidding process for suppliers and buyers alike is the ability to tender multiple bids, rather than be restricted to the one paper bid of conventional tendering. This does, however, require that participants 'do their homework', developing a bidding strategy and being very aware of their walk away price. As participation entered a more mature stage, the behaviour of suppliers during auctions was

becoming less reactive and more considered. This ability to learn through the auctions is also evident in the procurement staff who analyse the bidding of each auction. They are learning how 'bids could have been set out better in some cases' and also to take the necessary time to set up the auctions effectively despite the pressures of the new environment.

5.2 Impact on the Organisation

The implementation of a set of powerful tools, such as those offered by FreeMarkets, will have an impact on any organisation. While the primary objective of introducing the use of the e-marketplace into Alcoa's supply chain was to gain cost savings, there is evidence of more far reaching effects as participation matures. The speed of implementation, as with most aspects of current e-commerce systems, brings additional challenges as organisations move to cope with a continually changing e-environment. One member of the bid team believed that the problems that were arising came from the need for the organisation to change rather than as a result of the auction process. The use of the e-marketplace was dictated by the needs of the organisation to change its processes to meet the current market conditions and, in effect, the auction process was the result of change not the cause. Another member referred to the 'frustration in the modern business world is the lack of answers ...because the goal posts keep changing'. However, once auctions were underway, procurement officers became much more confident in their own assessment of benefits. These benefits were seen to be much as predicted by the senior managers with comments on achieving market price, speeding up the tendering process and the need to embrace technology and education of people. The issues that impacted on the

organisation were recognised by the procurement staff and are now discussed.

5.2.1 Cost Savings

Cost savings are held to be a major advantage of electronic markets (Bakos, 1998; Malone et al., 1987; Raisch, 2001) and were identified as a driving force behind the decision to use FreeMarkets. However, there is a distinct difference in the cost savings referred to in the literature, which strongly relate to transaction cost savings, and those sought by Alcoa from price reduction. The purchasing manager reported that senior management in the US saw the FreeMarkets initiative as a way of delivering lower pricing outcomes, that is cost savings. The data support the belief that cost savings had been achieved, with an overall assessment of savings of '10 – 20% on historical costs'. The 'online bidding process drives costs down to the optimal market price' with 'almost instantaneous payback'. Where the cost of goods and services had risen over the year, savings on the amount of the rise were contained to lower than estimated percentages and seen as cost reduction.

However, the calculation of savings was felt to be more involved than the market maker made clear, with hidden costs involved in bid preparations:

we do not cost the time spent in pre-bid work, we do not have the management systems to do this which perhaps distorts the outcomes. (buying officer)

Reported savings based on historic costs were also questioned by three buying officers. For certain procurement needs, such as service contracts, some costs were believed not to be accurate and therefore reported

savings from the bids ‘were quite arbitrary.’ However, the purchasing manager did not support this view.

Another concern related to sustainability of cost savings. Where suppliers were seen as efficient, it was believed that cost savings came from margin compression and were not sustainable over the longer-term. However, in subsequent rounds ‘we are finding there is still further opportunity to reduce costs’ (purchasing manager), and there was more activity to persuade suppliers to gain further efficiencies from second tier sourcing. Where suppliers were perceived as less efficient there had been some gains from lower prices that were seen to be a result of improvements in work practices.

In cases where cost savings were not achieved, there was confirmation that the organisation had been paying the market price as all the suppliers within the auction were ‘in the one area’ as regards price.

5.2.2 Time Savings

Anticipated time savings from the e-marketplace were not immediately realisable and there were reservations about the speed and ease of the process. However, this was seen as temporary, particularly until the specification process was up and running and staff were familiar with setting up and running bids. Once the re-specification of products and services had been assimilated and streamlined, then time savings would be achievable through the electronic tendering methods for documents and drawings. There were examples of bids that had been ‘rushed to the detriment of the work’, which had impacted on the benefits gained ‘down the line’. This was related to one employee’s expressed concern that the timescales expected of people in the more aggressive electronic

environment 'lead to very high stress levels. The environment is results driven and is very stressful for everyone, including the suppliers.'

5.2.3 Job Satisfaction

Interviewees did not directly address the issue of how use of the e-marketplace impacted on their work processes and the corresponding personal impact this had. However, from issues raised elsewhere it was evident that changes in personal perceptions were taking place. For example, the earlier informality in some of the supplier relationships had been replaced with stringent tendering procedures, bringing a 'cold, clinical approach' to the process. This had some effect on job satisfaction for those who had established close relationships over a long period and would likely impact on job satisfaction in the longer term. In contrast, two buying officers saw this new approach as preferable as it was more effective and 'less time wasting' than the previous informality.

While many colleagues agreed that the workload was stressful, and that this was related to the e-marketplace processes, there was little consensus on the impact this had on job satisfaction. As already mentioned, while some found the e-marketplace processes to be unfriendly, others welcomed it and found it less stressful on relationships. The initial differences in enthusiasm between procurement staff and their levels of e-environment experience were not evident after the first stages of participation. There remained a difference between those staff who were enthusiastic about the use of the auction system and those who found the system added considerably to their workload. However, this difference was no longer related to previous use of the Internet, although no discernible single reason was evident for the differences in attitude. The purchasing manager acknowledged the stress levels caused by the

process, but also remarked that it had 'shaken out some lethargy'. This was evident in the more mature stages of participation, where confidence had grown and staff were more comfortable with their tasks.

5.2.4 E-capabilities

The more senior procurement management emphasised the use of FreeMarkets' mechanisms as a procurement tool that would enable Alcoa to maintain its competitive edge by bringing cost savings and skills in the e-environment. This view was widely adopted by the buying officers who believed that it was necessary for Alcoa to maintain its reputation as a benchmark for e-commerce innovation for the industry.

The purchasing manager also saw the auction process as one of a set of electronic procurement tools that would contribute to skill building across the organisation and extend the organisation's abilities in the e-commerce environment. The procurement manager added that he believed Alcoa would save time and effort in the longer term and they would benefit from speed and cost savings in administration.

The need for e-capable suppliers was well recognised, particularly in the maintaining of a strong supplier base, and Alcoa went to some lengths to support smaller suppliers in their move to the e-environment. Alcoa recognises that technology problems and a resulting lack of confidence by suppliers are issues that need to be overcome. Once suppliers have gained experience, the opportunities for them to extend their businesses through other marketplaces are attractive, although there are few examples of suppliers moving this way as yet. This could be due to the slow uptake of online procurement and e-marketplace participation in the region, and suppliers must wait to take advantage of their technology

capabilities until there is an increase in other organisations' e-business capabilities.

5.2.5 Expanded Markets

The advantages of a global supplier base are seen as a significant benefit of e-marketplace participation (see Section 2.4). In the early stages of participation there was little recognition of the benefits of a global reach amongst buying officers (although the more senior managers were aware of future possibilities). Perceptions of extending the supply base to allow purchasing from overseas centred on the difficulties of delivery and on the impact to local markets. For example, one MRO buying officer discussed the problem of spare parts for emergency repairs in the refineries, where downtime was extremely costly:

We can have all the technology we want, but the fact is Waroona (the local refinery town) is a couple of hundred kilometres from Perth and Perth is thousands and thousands of kilometres away from the rest of Australia, the rest of the world, so we're fairly isolated and that distance doesn't go away. It doesn't get any shorter. Transactions can be quicker but getting goods from one place to another doesn't get any quicker. You have a breakdown, a major breakdown, a missing part of a piece of equipment. It doesn't matter what technology you've got if you can't get it to the site.

This buying officer believed that the distances involved in buying directly from abroad were a major barrier to extending the supplier base for maintenance and repair items.

Another buying officer was very concerned at the idea of moving away from a WA supplier base, where the remoteness of the State has led to strong relationships with locally based suppliers:

we deal with people more so not from an economic perspective, but from a social, economic and political perspective in so much as you can't have a large industrial site in a small country town and not expect to interface with any of the local businesses.....we have a situation here where a person has built his whole business around his contract with us and you can't sit there and say that's not Alcoa's problem. It's not, but effectively at the end of the day, Alcoa will be the one that's seen as the bad guys if we re-tender out.

From a senior management perspective, as participation reaches a more mature stage, there are opportunities to be gained and Alcoa is preparing to move towards strategic sourcing on a global level. To this end the procurement manager has been given a role as manager of global procurement to drive the global opportunities for Alcoa's major regions. He is aware of the difficulties of distant markets and local issues that need to be factored in to developing global strategies as the organisation moves towards more global sourcing strategies. The main concern is that although global sourcing is seen as a real opportunity there is, as yet, little understanding or identification of realisable benefits. There are concerns that the drive towards cost savings may be overly dominant at the expense of local relationships, the importance of which are not fully appreciated at the global level of the organisation. These relationships are particularly important in WA where community issues are closely related to refineries in rural locations and where there is a need to display loyalty to local supplies.

Cultural and social issues also affected the ability of countries to trade globally, particularly with regard to customs, local legislation, import/export laws and logistics:

When you start to practice a global perspective, you then may find a low cost provider who has the technology or capability locally, but hasn't got the currency issues or hasn't got the language capabilities, hasn't got something.....so you get constrained again by these boundaries that are around you which are national/regional boundaries as such. (purchasing manager)

There are many different issues facing the procurement team in moving to a global strategy, some of which will be dealt with by bringing in expertise from other parts of the global organisation. For example, the Perth office has planned a visit from a tax expert to discuss sales taxes across Europe. Other issues are more mundane, but require to be dealt with competently if global sourcing is to be done effectively. One example in this respect is the differences in measurement between the United States and Australia that resulted in patterns having to be re-drawn in inches.

The ability to source from overseas has always been a possibility, particularly for larger organisations like Alcoa. However, the use of e-business processes facilitates global trade and accommodates many of the differences such as currency, freight and tariff considerations. A remaining concern is whether the supplier base can compete in global source pricing and enable Alcoa to pursue a global sourcing strategy to benefit from reduced costs across the entire organisation.

5.2.6 Supply Chain Efficiencies

Efficiencies in the supply chain are recognised as a benefit of e-procurement (Essig & Arnold, 2001; Kumar, 2001). Initially for Alcoa, recognised efficiencies referred to changes in the supplier base. Bringing incumbent suppliers to the auction had forced those suppliers to re-examine their own business efficiencies. The auction process has also identified inefficient or overly expensive suppliers and opened access to new suppliers. These new suppliers have been keen to access the Alcoa market and have often brought new ideas and efficiencies with them. The auction process has also enabled a greater appreciation of market price, and allowed Alcoa to recognise inefficiencies in both their own organisation and in their suppliers.

As participation progressed further identified benefits to the supply chain were:

- ♦ Disaggregation of larger contracts to enable smaller suppliers to compete. This has proved effective in many cases where local suppliers were able to offer very competitive prices for parts of contracts.
- ♦ Transparency in the system has enabled the recognition of common purchases across previously separate business units leading to coordination of buys.
- ♦ Process efficiencies and the speed of communication allow for instantaneous orders, information and payment, with lower transactional costs and the ability to cut out a lot of waste, particularly in the paperwork. These identified benefits have yet to be

realised, but complement the Alcoa Business System that promotes the reduction of time and waste as one of its key precepts.

- ♦ More access to global suppliers. Although this access was available via conventional sourcing it was not a procurement strategy to approach overseas suppliers. Global sourcing is still in its early stages, but senior management anticipates significant benefits.
- ♦ Improvements in specifications and reassessment of description processes, for example, in the managing of casting patterns, facilitate the ability to canvas a wider supply base.
- ♦ Suppliers have new technologies to work with to support a wider network of e-capabilities leading to improved competition. For example, suppliers outreach to distant suppliers enhances second tier sourcing.
- ♦ One team member believed that the online process would ‘remove personalities from negotiations’, which he foresaw to be a benefit as it streamlined social and cultural issues that caused friction in the supply chain.
- ♦ Surplus equipment could be disposed of through specialist e-marketplaces more efficiently and cost effectively than before.

5.2.7 Market Awareness

The move to the e-marketplace was a new and sudden development in the procurement strategy of the organisation. Experience of e-marketplaces was limited and the way they affect the market was not known. The purchasing manager stated that:

a key point was our inability to see the issues, the real potential, but now 12 months down the track it has exceeded our expectations and opened up avenues and opportunities. (purchasing manager)

One developing area of interest is the market awareness that the auction process has contributed to the organisation. A major asset has been that it drives prices ‘to the point of achieving market price’ and

takes away the need to paw over justifications around exchange rate changes, or world price increase, or labour...or the energy issues which are the key cost drivers within their business. We can simply run an auction and come out with the marketplace cost, that is what the market is sustaining. (procurement manager)

A greater knowledge of market price will enable Alcoa to avoid earlier problems arising from dealing with price increases. In one case, they had resisted a price increase from an incumbent supplier and went to auction with the contract only to find that the other suppliers refused to drop their prices. They ended up paying more than the incumbent had originally asked for:

all that managed to do was flush out an acceptance of the rate increase because when we tried to introduce new competition into the market they just weren't competitive....(buying officer)

Other learnings that the procurement staff, and the suppliers, gained related to the market and its ability to respond to the auction process. Alcoa lost ground in some auctions ‘where the market went where we didn’t expect’ and led to higher than anticipated prices. The transparency of the market in these cases led to suppliers seeing that they could raise their prices and still remain competitive in the existing supplier base.

Conversely, other auctions highlighted price disparities that put pressure on suppliers to work internally to bring cost structures down to remain competitive. Suppliers were encouraged to see this as beneficial:

there is nothing worse than not knowing what the rest of the market is doing and in 5 years time finding out you have to shut your business because you weren't able to keep up with the training that's always going on. So this gives them some early warning around what's happening. (purchasing manager)

The difficulties experienced in specifying products and services led to some errors in the segmenting of contracts. Even in the early stages of participation, Alcoa had a deliberate strategy that 'everything is biddable' to ensure that they identified all possibilities. As a consequence they lost suppliers and business opportunities through mistakes in segmenting the market and being too flexible in what could be auctioned. This was seen as a learning curve that enabled identification of areas that were not suited to the FreeMarkets process.

A greater awareness of the market also provides more transparency in competitiveness issues. In some areas there was a greater willingness for suppliers to actively compete against each other. Understanding the market conditions that encourage more competitive bidding is problematic although contributing factors include a larger number of suppliers in the auction and recognition of the level of negativity evident in the suppliers.

Continued downward pressure on prices may have greater implications in the future. Buying officers were concerned that the pressure for lower prices may impact on the quality of the product, if suppliers had no incentive to provide that quality. This led to concern over Alcoa's

standing in the community at a time when other external issues were affecting the organisation's image. If the auction process is seen merely as a way to reduce prices with no benefits to the supplier, then the market will begin to react unfavourably.

5.2.8 Summary – Impact on the Organisation

The way use of the e-marketplace has impacted on the organisation has changed from the early stages of participation. The main driver in the move to the marketplace was cost savings, which have been achieved at an average 10-20% on historic cost. These savings are not perceived as transaction cost savings, but seen rather as price cuts resulting from great efficiencies in the suppliers.

Time savings are anticipated once the re-specification of products and services is assimilated. This is being supported by the organisation's e-business strategy where they are encouraging suppliers to move to the electronic environment to replace the paper-based office. There were concerns that the new environment would have an impact on stress levels within the workforce. This was seen in the job satisfaction of those interviewed, although there was no consensus on the effects of the e-marketplace processes on levels of stress. There were also mixed reactions to changes in relationships, which have previously been close and very personalised in some cases.

Alcoa's reputation as a benchmarking organisation was upheld by the procurement team who saw the development of e-capabilities within both the organisation and amongst suppliers to be a positive move.

The perceived impact on the organisation developed from more local issues in the early stages of participation to a consideration of the growth

of market reach and supply chain efficiencies. The development of a global sourcing strategy is now underway and this in its turn will bring further challenges to the organisation.

5.3 The Stakeholders

In discussing the *who* of evaluation there are a wide variety of stakeholders concerned with the process. This section addresses those identified in the data and reports on their active and passive roles in affecting the realisation of benefits from the e-marketplace. Although relationship issues are discussed in the section on identifying benefits (Section 5.1.4), the reactions of stakeholders have a considerable impact on the social, political and economic assessment of the e-marketplace and are further addressed in this section.

5.3.1 Procurement Staff

In the first months of introducing the online procurement tools, broad differences in staff attitudes were evident, with some 'leaping in boots and all, while others are still sitting on the fence' (procurement manager). The reasons for reticence were seen by the procurement manager as an aversion to change, and to challenging arrangements made over years. Staff were also concerned that the transparency inherent in the new tool would lead to questions about their effectiveness and to comparisons of their work with other procurement officers.

The question of staff effectiveness was felt to be a contributor to the stress amongst the staff, where there was believed to be a need to be seen to have achieved. One procurement officer felt that the organisation was becoming a 'results-driven organisation and does not see the tremendous amount of work in setting up a bid, but judges on the results of the bid'.

This was in part confirmed by the purchasing manager, who recognised the increase in workload and consequent pressure on staff, but stated that this was not an element of concern to the top management who had mandated the use of the e-marketplace. They required results. However, the purchasing and procurement managers were very aware of the pressures on their staff:

There is pressure on staff. No question of that. They've got some pretty tough goals out there and we're in the commodity business so we put the pressure on them. And it's for all these reasons... getting the data and impacting with the community and talking about things with their suppliers and their internal customers as well and so on. So yes, they're certainly pressured. (purchasing manager)

Two interviewees believed that it was unrealistic not to expect a more streamlined department once use of e-marketplaces had been assimilated. This early stage of participation involved no extra staff and increased individual workloads were not expected to revert to former levels.

The stress was also increased by results of using online auctions for many purchasing needs and the resultant dismay and antagonism from incumbent suppliers and internal customers.

Despite these concerns there was positiveness to the implementation of the e-marketplace. Procurement staff displayed an enthusiasm in discussing the auctions they had arranged and the way they needed to interact with suppliers and internal customers. There was satisfaction expressed where internal customers had responded well to the results of an auction or been pleased with a new supplier. Two buying officers believed that there was a tendency to 'dwell on the negatives' when

discussing work. Other apparent contradictions may lie in team loyalty and recognition of Alcoa's standing as an innovative, benchmarking organisation.

5.3.2 Internal Customers

First reactions to the use of an e-marketplace from the internal customers were very negative. They initially saw the move to the e-marketplace as threatening from several points. They were concerned at the changes that disturbed the status quo and at the threat to long-term relationships that have been developed and nurtured over many years. There were implications resulting from the break up of such relationships, including the lack of goodwill, loss of organisational knowledge and adverse attitudes towards Alcoa. In some cases the internal customers perceived the new process from the suppliers' point of view; that it was designed to pressurise suppliers into price cutting. They were also concerned at the formalisation of the relationships with suppliers and the extra work demanded of them in writing detailed specifications of all the work. The previous informal 'chat over a cup of coffee' ability to discuss and resolve required changes has been replaced with the requirement for formal scoping of all the work carried out. The 'bedding in' of new suppliers has added to the workload and extended the time element in getting things done. A third area of concern was the transparency of the online process that some saw as a way of identifying their work inefficiencies.

The procurement team have worked hard to involve the internal customers in all aspects of the online process and have achieved some positive results. In areas where incumbent suppliers have previously proved unsatisfactory the internal customers have welcomed the

opportunity to extend their supplier base. The use of the ability to disaggregate bids to the advantage of local suppliers, a big issue in the small communities surrounding the refineries, has contributed to the management of internal politics and to overcoming resistance to change. Results from some of the auctions have been surprising to both procurement staff and internal customers, with large cost savings and new innovations being achieved.

There was a noticeable change in the attitude of the procurement team towards internal customers over the period of the study. There was less acceptance of the internal customers' moves to avoid the bidding process by invoking single source justifications. Buying officers were also investing time and resources in bringing internal customer teams into the procurement decision-making processes including the awarding of the contracts, and this had given rise to 'a step change in cultural acceptance in the last 12 months'. While some internal customers remained negative, where there was clear evidence of cost savings, more efficiencies, and in some cases new products, a more positive attitude was becoming evident. The purchasing manager summed up the full range of views:

(people) from one end of the spectrum saying to us 'this is the best thing that we've done, we've halved the price and our service is still just as good. We like our new supplier and we should have done this 6 years ago'. And we have people at the other end of the spectrum where they're saying 'This has cost me an enormous amount of time because each supplier doesn't know what they're doing. I'm having to re-teach them all of our processes and procedures and despite the cost saving I'm not sure it's been worth it.' So, you know the full spectrum.

The differences in attitude were not evident across specific areas of production, but rather appeared in a range of situations.

5.3.3 Online Bid Team

An online bid team was created to provide a focal point within the procurement department for the transition to the online environment. A team of eight, mostly volunteers, both full and part time members, use their knowledge of the FreeMarkets' system within their own areas of expertise and every procurement area has a team member assigned to them. The team is generally popular with buying officers who see it as a source of help and advice and a central point for reporting and then assimilating learnings. The team has a process for capturing learnings including post auction reports, informal discussions and weekly meetings. This had proved very beneficial particularly when used in conjunction with skills for disseminating information in accessible and appropriate ways.

5.3.4 Suppliers

There were several issues affecting Alcoa's suppliers in the use of an online marketplace. Suppliers initial reactions to the introduction of the online auction process were identifiable in three broadly similar ways, although reactions have noticeably changed over time. Local supplier issues are dealt with separately (see Section 5.3.5) as there are many political and social implications arising from the local environment that do not apply to other suppliers.

The first identified group of suppliers, the incumbents, was, for the most part, dismayed by the requirement to compete with other suppliers in online auctions, particularly where a long-term relationship has been

established. Alcoa has spent time in recent years building up a small, closely aligned network of regular suppliers in keeping with the trends of the 1990s (Dwyer et al., 1987; Spekman, 1988). This supplier base has not been restricted to relational exchanges, but has extended across a broad range of procurement needs. The policy of supporting local suppliers and the restricted supplier base for this relatively remote part of the world has widened the range of products and services procured within a relational context that might otherwise be supported by a discrete one (Dyer & Singh, 1998). The reaction from suppliers ranged from intense antagonism to resignation and acceptance, with enthusiasm not recorded in the spectrum of responses. In some cases, where a firm had not previously adopted e-commerce, there were extraordinary examples of adaptability. These were particularly evident amongst smaller, local suppliers where computers had been borrowed, children recruited to train and support their parents' firm through the auction, and steep learning curves undertaken by previously computer-free small businesses.

Other suppliers worked closely with Alcoa to ensure that specifications were written to reflect the true nature of purchasing requirements, or that the organisation was made aware of prevailing market conditions that might affect the auction. The existence of long-term relationships and personal contacts contributed to the level of support forthcoming from suppliers that were prepared to assist in preparing for auctions.

The second group of suppliers were those who had previously had contracts with Alcoa, but refused to participate in online auctions. There were only a handful of such suppliers with two firms, both part of multinational organisations, objecting on the grounds that it was not

company policy to take part in online auctions. Other suppliers believed that the auction process was a device to grind prices down and were not prepared to 'play this game'. However, in at least one case a previous incumbent returned to participate in a second round of auctions and 'went hammer and tongs at the new incumbent' to regain the contract.

The third group of suppliers were those who did not hold contracts with Alcoa, but were keen to break into the market. They saw the auction process as an opportunity to do this and were more enthusiastic than existing incumbents. Buying officers saw the broadening of the supplier base as an advantage, particularly as they believed new suppliers 'have often learned to be competitive, smarter and more cost effective' when not buttressed by the relational advantages of Alcoa's incumbents. They were also keen to raise the profile of the newly achieved relationship by contributing added value. For example, by:

coming up with a report saying, 'if you change this and did this and moved here and changed so and so, then you will in fact take another 20% out of your costs'. (purchasing manager)

At this early stage of participation in the e-marketplace, there was little real knowledge of the way things would go with suppliers. Although advice was forthcoming from the US firm, where the process had been underway for longer, the unique conditions of WA and its limited supplier base raised different challenges. The gaining of cost benefits was evident, but few believed it to be sustainable over the longer term and there was concern as to how suppliers would react as re-bidding of auctions occurred in the future.

The buying officers fed information back to the bid team and there was informal discussion on each of the bids. This resulted in several points being made by the different interviewees on how suppliers were coping with the auction process. The supplier base was expected to change further as a period of mergers and acquisitions of local companies became more widespread. Overseas companies were coming into Australia, assisted by e-commerce, and buying up local firms to gain local expertise. Curiously, this trend was not seen by the buying officers as globalisation, but as a cyclical trend of the market.

The auction process was seen as the optimal tool for establishing market price, not only for Alcoa but also for suppliers. The process showed up instances where suppliers had been charging high prices, taking advantage of long-term relationships, and in rare cases identified unacceptable interactions between competing suppliers. It also identified suppliers that were efficient and cost effective with good business practices and low overheads. These suppliers had the advantage of competitive prices and no switching costs, and were unlikely to lose their contracts.

Learning curves for both suppliers and Alcoa were steep. From the suppliers' perspective they were learning about strategy:

Don't come in here on bid day without knowing what your strategy is. Do you want this market? Do you want it in this particular area?. What is your order book like? What do your marketing people say? Make sure you've got your financial people there, make sure you know what your margins are and don't get caught up in the heat of the bidding activity. In face to face negotiations

you took for granted that there was time to consider. These days there isn't. (purchasing manager)

There were the beginnings of a recognition that e-enabled suppliers had a competitive edge and there was evidence they were beginning to use the tools for their own inputs to gain second tier savings. Alcoa anticipate that the next stage of cost savings would come from second tier savings, and are encouraging suppliers to pass efficiencies down the line of their own supply chains.

From the procurement staff perspective, they were learning how to minimise the impact of the e-marketplace initiative amongst suppliers in order to maintain a larger and more efficient supplier base. They started from a point of very little knowledge and learned along the way, and mistakes have been made such as contracts being bid that should not have been put to auction. After two years the procurement staff have learned how to manage the auction process well. They are achieving better responses from new and old suppliers as they too come to terms with online bidding processes.

The procurement staff recognised the need for more encouragement and trust in the supplier relationship to be established, in essence more input into the suppliers' lives. The technology can put up an impersonal barrier and hinder suppliers from asking questions and negotiating, for example, for different trading terms. People needed to learn different ways of interacting and staff were actively encouraged to make more face-to-face meetings and personal contact. This is particularly true in encouraging smaller businesses to become e-enabled for two main reasons: their ability to contribute to the supplier base and to support the organisation's reputation within the local community.

The move of 'the business model from a more relationship based, long return, type business to a shorter, more cost focused type arrangement' was seen as inevitable: 'due to the pressure on our industry that's something that we have to do anyway' (procurement manager).

Alcoa will likely return to a smaller group of suppliers drawn from a larger base once the 'market has been investigated.' They have succeeded in establishing and consolidating a good base of suppliers, including new suppliers many of whom have contributed to improvements.

5.3.5 Local Suppliers

Alcoa has a long-term policy of interaction with, and support for, their local communities. This is particularly important from a political and social perspective in the current environmental context. They are experiencing problems with environmentalists and sections of the local community concerned about emission levels and plans to expand the refineries.

The online bidding process has affected the ability of some local suppliers to compete effectively for contracts, particularly given the low level of e-enabled businesses in the area. Buying officers in the regional areas have been particularly affected by the need to tell local people who have serviced the sites for many years, that they must open bid for their livelihoods in online auctions.

Alcoa has addressed this in several ways. They have devoted resources to encouraging and educating local suppliers in the move to the electronic environment. They have overcome pricing differences in some cases by avoiding lowest price or taking a contract off the bidding list altogether.

Alcoa has also disaggregated some contracts to enable smaller suppliers to bid for work.

The procurement manager believes that results have been encouraging and by opening up to new suppliers they have placed more work with local companies than ever before and benefited from them in terms of new ideas and greater flexibility. The ability of local suppliers to respond to new challenges has, in some cases, been surprising and provided some interesting insights into the ability of small firms to react to the e-environment.

However, the purchasing manager reported that there were more local supplier issues than originally envisaged. These were addressed by:

- ♦ considering the impact on the local community when awarding contracts
- ♦ looking at arrangements for employing local people within larger contracts
- ♦ weighting bids to give preference to local suppliers
- ♦ considering the disadvantages to the organisation, where local suppliers were losing contracts.

Alcoa has also put some thought into disaggregating larger contracts, supporting the restructuring of local businesses to overcome problems of, for example, the financing of manufacturing projects. They have also devoted time to instilling new e-commerce processes in the smaller companies. The organisation has reported a few surprising results where some smaller businesses had provided unexpectedly effective competition against larger firms. However, concerns remain that many

smaller firms will not be able to compete in the long-term, particularly in global sourcing initiatives, in an era of mergers and acquisitions.

5.3.6 Other Interested Parties

Other interested parties that may have an interest or may affect the realisation of benefits in the longer term were identified, although input to the e-marketplace at this stage was not identified. For example, Alcoa holds an important position in the economy of WA and government concerns at state or federal level may impinge on their relationships within the local communities. At this stage of participation there was little evidence that these parties have impacted on the progress of the e-procurement initiative, beyond concerns for the local community. To this end, the organisation has made efforts to reassure local communities by initiating a series of consultations with local people, by maintaining community projects and by sharing skills with smaller firms to enable them to remain in the supply loop. Other Alcoa organisations in, for example, South America and Europe have taken an interest in the results of auctions in WA as they begin their own participation in FreeMarkets.

5.3.7 Summary – The Stakeholders

There are five main groups of stakeholders identified in the findings, although other stakeholders might need consideration at a later stage, as e-procurement develops within the organisation. These include shareholders, other Alcoa procurement divisions in other continents, and government.

The online bid team and their position within the procurement department appears to be a successful focal point for the adoption and

participation in an e-marketplace. The training and support offered to the procurement staff was a contributory factor to the success of many of the auctions carried out. The procurement staff, though ambivalent on several issues, remained on the whole positive in their attitudes and contributed to the ability to realise benefits. They were very proactive in bringing internal customers and suppliers to the auctions and devoted effort to include local suppliers. These local suppliers had, perhaps, the hardest task in not only conforming to the auction process, often doing so from a position of no previous knowledge of e-commerce. The effort expended by the procurement department is an indication of the importance of these suppliers to Alcoa despite their relatively low economic standing.

The internal customers within Alcoa have been a major concern for the procurement department. They have displayed antagonism to the process, caused by a range of reasons: loss of long-term relationships with trusted suppliers, adjustment to new suppliers, extra work caused by the need to re-write specifications and a sense of interference in their own areas of work. There has been some success in bringing internal customers to appreciate the benefits they have gained, although this acceptance is by no means fully accomplished.

The skilling up of all suppliers involved has enabled Alcoa to move to a more mature stage of e-marketplace participation and is likely to considerably enhance the organisation's ability to institute their new e-business initiative more widely. It also seems likely that suppliers will benefit from their e-capabilities in other markets although, as yet, there is little activity in this area.

CHAPTER 6

DISCUSSION

In answering the principal research question of how organisations are realising the different types of benefits and assessing the significance of these benefits gained from participation in e-marketplaces, three subsidiary questions were posed (Section 1.1). These address how the process of evaluation affects benefit recognition, how benefits change over time and how the type of marketplace affects the type of benefits identified. The subsidiary questions are used to frame the discussion to enable an understanding of the complexity of the benefits realisation process.

This chapter discusses the findings that are identified in Chapter 5 using a content, context, process evaluation approach to a wide range of documents and interviews. The discussion uses the interpretive approach to collate real and potential benefits from the data and analyses how the process of evaluation has impacted on the identification of these benefits. It then traces how the benefits have changed over the two year period of the study before discussing how the type of e-marketplace may have an influence on the range of benefits that are realisable.

6.1 How Does the Process of Evaluation Affect the Level and Type of Benefit Recognised?

In evaluating the use of the e-marketplace for procurement purposes, using a holistic approach to include the perspectives of stakeholders and

the external and internal contexts, it is possible to identify factors that affected the level and type of benefits being realised. The evaluation also shows how social, political and cultural factors impact with the economic, causing apparent contradictions and affecting realisation of benefits. Such recognition is essential if action is to be taken to overcome the frictions and barriers that hinder benefit realisation.

The section begins by collating the potential and actual benefits identified from the findings and it discusses how the outcomes are impacted by the issues found in the data collection. This is followed by an in-depth discussion of six key areas, which illustrate the way that myriad factors, including the evaluation approach, impact and influence the realisation of benefits.

The first area concerns the implementation of the e-marketplace within the organisation and is then followed by a discussion of how its use has impacted on staff and the procurement process thereby affecting potential benefit realisation. The third area then addresses the organisation's key benefit of cost savings, before discussing the issues surrounding the perception of the benefits of information and a widening of the supplier base. Finally, Alcoa has identified expanded markets as a developing key benefit and, therefore, global issues in e-marketplaces are examined to identify how realisation of this benefit can be affected.

6.1.1 Benefits

Alcoa's initial perception of benefits was concentrated on the requirement for cost savings; a view derived from senior management strategy to reduce overall costs in response to falling world prices for aluminium.

As implementation of the e-marketplace strategy has progressed, the ability to realise benefits beyond cost savings has been affected by stakeholder reactions and perceptions. A list of perceived benefits, together with the expected outcomes and the identification of issues affecting realisation arising from the findings discussed in Chapter 5 is given in Table 6.

As can be seen from the table, there is a range of issues affecting the outcomes of each potential benefit. These issues have been identified from the case study organisation and require validation to apply them on a more generalised basis.

Perceived benefit	Outcomes	Issues
Cost savings	<ul style="list-style-type: none"> ◆ Lower prices 	<ul style="list-style-type: none"> ◆ Validity of calculation of historic cost ◆ Cost of time and effort involved in writing tender documents ◆ Sustainability of cost savings over a longer period and the effect it will have on suppliers ◆ Effect on supplier relationships caused by downward pressure on prices ◆ Effect on local community of inability of local suppliers to compete effectively
Time savings	<ul style="list-style-type: none"> ◆ Lower costs 	<ul style="list-style-type: none"> ◆ Need to assess savings (search, transactional, administrative) ◆ Pressure on staff
Regaining of governance ceded to some suppliers through informal purchasing methods	<ul style="list-style-type: none"> ◆ Greater understanding of company needs ◆ Smoother running of contracts ◆ Time savings ◆ Closer control of suppliers ◆ Cost savings 	<ul style="list-style-type: none"> ◆ Loss of flexibility in meeting changes in supply requirements ◆ More formal relationships based on specified tenders ◆ Greater ability to share knowledge within the organisation ◆ Impact on cultural aspects of a regionally remote area where networks are tight and inter-connected ◆ Pressure on staff to reassess and regain detailed knowledge of purchasing needs

Table 6: Summary of Identified E-Marketplace Benefits

Perceived benefit	Outcomes	Issues
Opening up of the supplier base	<ul style="list-style-type: none"> ◆ Wider range of goods and services ◆ Encouraging greater efficiencies in suppliers through more competition ◆ Ability to disaggregate contracts to the benefit of smaller, local suppliers 	<ul style="list-style-type: none"> ◆ Threats to close alliances with specialist suppliers ◆ Potential disruption to internal customers' relationships/ supplier alliances ◆ Disruption to long term relationships with trusted suppliers ◆ Increased level of risk from unknown suppliers ◆ Allows for new supplier relationships ◆ Effect on Bexhill's commitment to the local communities within which it operates ◆ Remoteness - distance and delivery times may remain a problem for some procurement needs
Increase in e-capabilities	<ul style="list-style-type: none"> ◆ More knowledgeable and well trained staff ◆ Increased efficiencies ◆ Greater awareness of the electronic environment ◆ Extends organisations e-capabilities ◆ Adds efficiencies in the supply chain ◆ Supports an extended e-enabled supplier base 	<ul style="list-style-type: none"> ◆ Staff retention against potential poaching of e-enabled staff ◆ Job satisfaction ◆ Learning curve of less e-capable staff adds to workload ◆ Saves time and effort for staff over the long term ◆ Benefits administration costs and efficiency ◆ Suppliers slow to move e-activities down the value chain ◆ Lack of confidence needs to be overcome
Staff reductions	<ul style="list-style-type: none"> ◆ Cost savings 	<ul style="list-style-type: none"> ◆ May lead to higher stress levels amongst remaining staff ◆ Effects on staff loyalty ◆ Job satisfaction
Information	<ul style="list-style-type: none"> ◆ Information through organisation ◆ Some ability to analyse supplier data 	<ul style="list-style-type: none"> ◆ Follow supplier trends ◆ Identify some supplier strategies ◆ Handling of information flows ◆ Need to disseminate information in appropriate formats
Transparency Internal	<ul style="list-style-type: none"> ◆ Networking of staff on regional and global basis ◆ Facilitates identification of aggregation of information and buying opportunities 	<ul style="list-style-type: none"> ◆ Fear of open view of work among staff. Can see what everyone is doing
External	<ul style="list-style-type: none"> ◆ Facilitates recognition of supplier alliances and collusions ◆ Suppliers assess competitive prices – can see market price 	<ul style="list-style-type: none"> ◆ Suppliers can see where advantages given to others for non-economic reasons ◆ May increase price for Alcoa

Table 6: Continued

Perceived benefit	Outcomes	Issues
Flexibility of bidding process	<ul style="list-style-type: none"> ◆ Dynamic pricing ◆ Multiple bids ◆ Flexibility to weight bids ◆ Allows other considerations to be factored into auction ◆ Drives bidding to optimal market price 	<ul style="list-style-type: none"> ◆ Need for auction strategy for suppliers
Expanded markets	<ul style="list-style-type: none"> ◆ Global supplier base ◆ Facilitates global sourcing across the organisation 	<ul style="list-style-type: none"> ◆ Balancing existing relationships with more cost effective alternatives from overseas ◆ Cultural and social issues of trading globally (customs/legislation/logistics etc) ◆ Supplier base competent to meet demands of global sourcing.
Supply chain efficiencies	<ul style="list-style-type: none"> ◆ Suppliers re-examine their own business process to remain competitive ◆ New suppliers bring new ideas and perspectives ◆ Recognition of inefficiencies along supply chain ◆ Disposal of surplus equipment 	<ul style="list-style-type: none"> ◆ Can encourage suppliers to pass efficiencies down the supply chain
Market awareness	<ul style="list-style-type: none"> ◆ Accentuates knowledge of market price ◆ Greater appreciation of market capabilities 	<ul style="list-style-type: none"> ◆ Highlights supplier price disparities ◆ Can lead to higher prices as suppliers identify competitors' prices ◆ Encourages suppliers to identify their own inefficiencies

Table 6: Summary of Identified E-Marketplace Benefits

6.1.2 Implementing the E-Marketplace

The aluminium industry is seen as somewhat volatile and susceptible to market conditions. As a relative newcomer to the metals market it competes with other metals for market share, but is also vulnerable to competition from the plastics industry. In addition, the nature of aluminium production makes it relatively unresponsive to levels of demand and supply. To cope with its difficult market environment, the industry has developed a climate of innovation and a continual search for cost cutting advantage to maintain competitiveness. The adoption and use of e-marketplace facilities to achieve lower costs can, therefore, be seen as a logical step for a leading organisation such as Alcoa. The e-marketplace they have selected specialises in online auctions, which are seen as another tool in the procurement toolbox, albeit a major one at the present time.

Alcoa is in a position to be relatively flexible in its procurement spend with a choice of sourcing mechanisms, namely negotiation (this can also be done online through FreeMarkets) and catalogues. The organisation has an online catalogue (The Alcoa Master Catalog) that has been developed by a service company to include a wide range of suppliers' products. The variety of sourcing mechanisms enhances the potential realisation of benefits because items that are found to be unsuitable for the auction process can be dealt with elsewhere. For example, low cost, high volume goods are purchased by departments through the internal online catalogue, where goods are supplied by contracted suppliers who are required to deliver within 24 hours. Some of the original sourcing for the catalogue items is done through auctions, although the stipulation for 24 hour delivery has, to date, restricted the supplier base to regional

suppliers. If delivery within the required time can be met, some of these contracts may move to global sourcing. More complex and unusual items, such as the contract for a three year supply of seed to the organisation's nurseries (for land regeneration purposes), can be sourced through closed bids. In the case of seeds the negotiation was conducted online through FreeMarkets.

The organisational culture has had an impact on procurement staff's behaviour in implementing the auction process. There is a perception within the industry of Alcoa as a market leader in e-commerce innovation and it has a history of early adoption of technology. Alcoa employees exhibit a positive attitude to new innovations and the procurement staff were keen to retain the organisation's benchmark status by successful implementation of the auction process. They were supported in this by the social interaction within the department where loyalty and support between the procurement staff, the online bid team and the purchasing and procurement managers appeared to be a strong factor in the success. From the researcher perspective the social and cultural aspects provided an explanation for many of the contradictions evident in the interviews. For example, there were competitive undercurrents among Buying officers and between refineries and headquarters, but a united ambition to achieve success in implementing the auction process. These contradictions centred on individual personalities within the team and between a perceived lack of understanding by 'office workers' of conditions in the refineries. Buying officers in the refineries identified closely with their colleagues, but also displayed loyalty to the procurement staff, particularly the bid team. The divisions were not deeply felt, as many of the headquarters' staff had

previously worked in the refineries and the procurement team had a positive team atmosphere.

There was a contradiction in some negative attitudes towards the system and the enthusiasm for successful implementation, and there was evident disparity between the reluctance of the less technical staff to engage with the system and their keenness to see contracts moved to the auction process. From an observer's viewpoint, these contradictions appeared to lie in positive attitudes towards Alcoa's reputation for innovation and of being part of a dynamic work environment against the need for constant learning of new systems. (A new enterprise resource planning (ERP) system was being implemented towards the end of this study, which drew several comments of exasperation). There was also an element of apprehension that the auction process would prove complicated and difficult. As participation progressed and these fears were allayed, there were fewer negative comments and more acceptance of the auction system as part of the procurement 'toolbag'.

The issue of technology is an area where further contradictions were identified. Technology also was recognised as a potential barrier between buyer and supplier and extending the use of e-commerce was 'uncomfortable to many suppliers' (procurement officer). The extremes of antipathy and enthusiasm were evident in those involved in the use of the FreeMarkets' auctions. It would be reasonable to assume that the level of technological competence related to the degree of enthusiasm from the 'sitting on the fence' to the 'boots and all' attitudes seen in buying officers, internal customers and suppliers. However, this was not the case and some people with high levels of e-capabilities were more negative in their attitudes than others with low levels of IT competence.

There was little correlation between an individual's experience of IT and references to the regret at losing 'the traditional way' of doing things. Many stakeholders expressed an inherent regret at losing something in the transition to the electronic environment. Giddens (1999, p.59) argues that:

For someone following a traditional practice, questions don't have to be asked about alternatives. However much it may change, tradition provides a framework for action that can go largely unquestioned.

There were three contexts during which the term 'traditional way' was raised during the study. In the first case two suppliers (both multinationals) refused to participate in any online bidding as they believed that this would not allow them to 'present themselves in the traditional way' and the process would overlook 'the intrinsic value they offered customers'. They maintained this position despite assurances that lowest cost was not the only criteria in awarding contracts. A later informal comparison of prices with one company showed that their proposed bid would have been competitive with the final auction price, but as yet neither of these companies has returned to the supplier base. The second context involved the issue of sourcing low cost, high volume goods and maintenance contracts. Buying officers believed that the 'traditional way' of sourcing locally could not be improved by overseas sourcing. In the third case, there was resistance from internal customers who did not want to disturb traditional relationships by introducing competition from further afield.

The second and third contexts were not visible in later interviews, supporting Giddens' (1999) argument that it is the process of change that causes the sense of regret. This view was also recognised by the purchasing manager who, while tasked with forcing the change, understood that many of his staff had an aversion not to the system itself, but to change. Once the changes were absorbed, the traditional way was adapted and enthusiasm for the current state became more evident. Ignoring the preference for maintaining the status quo could be problematic in a more confined evaluation where the negativity is not recognised as a resistance to change, but seen as a reflection of satisfaction with the system.

Satisfaction with the system is itself an established measure of IS evaluation as previously discussed (Section 3.5.1). In the case study, satisfaction of the procurement staff was closely linked with perceived quality of service and the relationship with the market maker. There was a discrepancy in attitudes over satisfaction with system quality, although the majority of the procurement staff believed that the system worked well. From a social viewpoint, procurement staff were happy with their relationship with FreeMarkets and saw the quality of service they received as acceptable. From a cultural stance there were problems related to the nationality of FreeMarkets' head office and although relatively minor frictions were identified, they did cause a disproportionate amount of comment. This was unexpected as Alcoa's parent company is also American and it would be expected that differences in culture would be familiar. There is no apparent cause for these discrepancies, although it may be that there are underlying causes of dissatisfaction that have not been acknowledged by the staff. Alternatively, it is possible that too much has been read into the negative

comments that could be the result of frictions of the moment resulting from immediate stresses. This latter explanation is perhaps the most likely as negative comments were not consistent and came from different staff members at different points during the two-year study.

Satisfaction of the internal customers, and to some extent the suppliers, was largely dependent on the actions of the procurement staff. The time taken to ensure that customers were included in the decision-making processes and that suppliers were capable of joining in auctions was extensive. As participation reached a more mature stage, there was evidence that many customers and suppliers were adjusting to the system and gaining benefits from it.

6.1.3 Using the System

As discussed in Chapter 3, use is often regarded as a reliable measure of IS success. The driving force behind the initial use of the system was the severe downturn in the aluminium industry driven by a number of global business factors such as the impact of the weakening Japanese economy. There are several problems in identifying use of an e-marketplace with success, particularly in circumstances such as those experienced in the case study. In their updated paper, DeLone and McLean (2003) restate their argument for the inclusion of system use as a success measure even where use is mandated from a senior level, as in this case. Use, they argue, is voluntary at some level within the organisation and continued use is therefore dependent on a judgement of achieving desired results. This is problematic in the case study where the decision for use was made by the CEO of the global organisation to achieve cost savings. Perceptions of achieving that result varied, as the calculation of such savings was not clearly definable. Subsequent benefits have also been

identified at a different, lower level of management with a consequent change in perceptions, albeit still with the view of cost efficiencies.

Seddon's (1997) argument that use is behavioural and DeLone and McLean's view that the nature of the use impacts on benefit realisation are supported by this study. The behaviour of the procurement staff and their interaction with other stakeholders had an important effect on the realisation of benefits. Use of the system was very unpopular with incumbent suppliers and internal customers in the early stages. The procurement staff were working in an antagonistic atmosphere that needed to be overcome if benefits were to be gained. For example, in the early stages of use internal customers were applying for exemption from auction for many of the contracts coming up for renewal (single source justification). Initially, there was some leeway given to single source justification and considerable time and effort was put into including internal customers in decision-making processes and keeping them updated and informed. As time progressed the procurement staff were less willing to allow these justifications and pushed more purchases to auction, a move that was facilitated by the policy of an inclusive approach to customers. With regards to suppliers, there was a need to nurture and encourage e-capabilities to retain a viable supplier base, particularly amongst local firms that are important to Alcoa for social and political reasons. In the initial stages of participation, the three parties (procurement, internal customers and suppliers) involved in the realisation of cost savings had no input into the decision to use the system. Measuring their system use without an appreciation of the motivations and factors influencing their behaviour cannot give a clear view of the outcomes. In particular, the procurement staff have experienced contradictory pressures in balancing the need to extend the

supplier base with the need to maintain status and credibility with existing suppliers and the need to protect the organisation's image within its regional communities. This requires an appreciation of stakeholder pressures, including senior management's need to see cost savings, incumbent suppliers requirement for assurances of trust and inclusion in the new processes and regional communities' need to see commitment and economic benefits.

Use of the e-marketplace has led to Alcoa regaining governance that had been ceded to suppliers over a period of close relationships that supported a measure of informality in specifying products. The re-appraisal of product specifications is linked to the benefits of more control over the size of the supplier base and the issue of relationships. There is some evidence that formalising specifications at the same time as putting a wide range of products and services to auction is having an impact on the organisation's relationships. Rewriting the specifications and 'spring cleaning' the process has enabled a new perspective to be taken in reassessing what the organisation actually wanted in terms of goods and services. Informality in the process has been replaced by stringent descriptions, resulting in some loss of flexibility, but an increase in accountability, as changes to requirements now need a more formal process. The increase in formality, together with the antagonism felt by some longer-term incumbent suppliers, will result in some suppliers assigning less priority to maintaining flexibility. Displaying commitment to the buyer through non-contractible investments (Bakos & Brynjolfsson, 1993) may well be curtailed, particularly from an incumbent supplier perspective. In this context, it could mean changes and amendments to contracted specifications will be charged for and knowledge previously seen as a contribution to the relationship will

become a commodity (Stockdale & Standing, 2003a). New suppliers, however, continue to show enthusiasm for their recently gained business and appear intent on forging good relationships by making intangible contributions. The disparity of views between suppliers clearly relates to the length and nature of the relationship they have maintained with Alcoa.

As a main industry buyer in Western Australia, Alcoa can balance the risk of some disruption in relationships against the greater advantages of reassessing the contracts and gaining cost savings. In the short-term, the advantages of cost savings reflecting in the profit line can have a positive effect on market confidence and shareholder value; valuable commodities in the current industry environment. The organisation is currently using the auction process to widen the supplier base and explore options by identifying new sources of supply. It is anticipated that this phase will be followed by a period of consolidating suppliers into a more controlled supplier base, once greater knowledge of the market has been achieved. The procurement manager has recognised that the auction process has affected relationships with long-term incumbents and may threaten close alliances with specialist suppliers. However, the positive benefits seen by the organisation, mostly cost savings, have encouraged Alcoa to extend the auctions to a wider range of goods and services.

The impact of respecifying goods and services and widening the supplier base also affects the internal customers. These internal customers have a major input into the re-writing of specifications and this has led to some unexpected changes in originally negative perceptions of the auction process. Although the formal re-specification task is an onerous one, in

some cases it has brought an element of ownership and a feeling of control back to the customer. This was particularly evident where customers had reservations about their existing suppliers. However, where relationships were previously enduring and close, in a region where networks are integrated and interconnected, the whole auction process had the potential to impact on the social aspects, leading to some resistance to the work.

The advantages of flexibility in the 'procurement toolbag', evident from the implementation phase, facilitate Alcoa's ability to maximise its realisation of benefits. The use of an auction is only one method of procurement, although it is currently the most dominant. Where other than economic factors play a part in the supplier choice, the organisation can opt for the most advantageous method. For example, specialist requirements that need intensive collaboration and design can be met through negotiation, and emergency spare parts for refineries can be ordered through online catalogues. In the case of local suppliers, where social and political pressures come into play, Alcoa has the option of avoiding the auction process, or using mechanisms to favour the local suppliers. The former option is not always viable in a period where the organisation is pursuing a policy of testing as many contracts through auctions as possible. It has been used in exceptional circumstances such as where a one-man business has retained a small maintenance contract for several years and is entirely dependent on that contract. The latter course, the auction, has a number of advantages; it necessitates a reassessment of the product or service specification, it enables testing of the market price, it supports identification of other suppliers, it pushes local suppliers towards more e-capabilities and it encourages suppliers to reassess their own business processes. To mitigate the difficulties that

local suppliers experience in competing in a broader supplier base, Alcoa has taken advantage of the mechanisms, discussed in Section 5.1.3, that enable them to configure the auction to better meet their needs. This has supported Alcoa's strategy of retaining a number of local supplier contracts as part of its commitment to the local communities surrounding the work sites. This is particularly important at a time when the organisation's local image has been affected by a number of social and political concerns, including environmental issues, health and safety matters at both Kwinana and Wagerup refineries and a controversial expansion at Wagerup. Alcoa's commitment to its local suppliers also maintains and supports variety in the supplier base, shows commitment to the local area and supports employment thereby contributing to the infrastructure needed to maintain viable communities in the regional and rural areas surrounding the mines and refineries.

The ability to allow additional considerations into the auction process, other than price alone, has brought further benefits beyond that of supporting local companies. The use of lotting strategies has facilitated the identification of local firms that offer significant benefits in for example, fabrication capabilities. While such firms cannot compete for large-scale contracts, they have much to offer in terms of price and quality when competing on smaller bids. Lotting and aggregation mechanisms have enabled Alcoa to take more advantage of the diversity of the supplier base to meet individual refineries' requirements, to address local issues and to widen their supplier base by aggregating contracts across regions.

6.1.4 Cost Savings

The e-marketplace strategy was felt to be necessary within the organisation for Alcoa to remain competitive in a period of downward prices in the aluminium industry. Cost cutting is reputed to be a way of life for the aluminium industry, which suffers from intense competition both internally and externally. The culture of the aluminium industry has led to Alcoa maintaining a high profile in e-commerce, seen as an effective cost reduction path, and has led to widespread acceptance of e-commerce tools, at least within the offices of the organisation. As shown in Table 6, the potential outcomes from the identified benefits of e-marketplace participation are substantial, but the issues affecting realisation are numerous and complex. By considering one benefit in-depth, it is possible to see a range of impacting issues that are not immediately evident.

In the case of cost savings, there was some dispute as to the accuracy of using historic cost to determine the level of savings, with the purchasing manager disputing the claim that some costs were 'arbitrary'. Where specifications had been rewritten to reflect the true nature of purchases, or where suppliers had brought in alternative products, historic cost would not be an entirely true comparison against which to measure cost savings. Cost savings are, in most cases, difficult to verify as an evaluation of both historic and current costs need consideration of such issues as price rises over time, supply and demand pressures, changes in production procedures and new suppliers. The costs of using FreeMarkets are also a factor. Transaction fees, plus all the changes within the procurement procedure need to be costed against previous methods if a true picture of savings is to be calculated. It is unlikely that

an organisation such as Alcoa does not realistically cost its strategies and, therefore, it is reasonable to assume that other factors, beyond the economic, come into play when cost savings of 10-20% are announced. There are several potential advantages from Alcoa showing savings of between 10 and 20% on its procurement spend. From an external viewpoint, Alcoa maintains legitimacy by retaining its reputation for positive action on cost cutting strategies and its benchmark status as an innovative organisation. Internally, it reinforces its commitment to cost savings and encourages a culture of cost awareness and innovation. The organisation also stands to gain from a procurement method that has proven capable of achieving some level of real cost savings in other major organisations.

An interesting facet of these cost savings is that they are perceived by the organisation to be related to reductions in price, whereas the literature on e-marketplaces focuses heavily on transaction cost reduction. This aspect of savings was rarely mentioned and not seen to be a contributory reason for the price cuts, although there is some reference to such savings from time efficiencies. The reasons for the concentration on price cuts, as opposed to transaction cost savings, may lie in two areas. Firstly, the organisation's internal e-marketplace strategy emphasises price savings. Secondly, the stress that FreeMarkets puts on its services, i.e. lower costs, reduced risk and increased profitability, by expanding the supply management processes (FreeMarkets). FreeMarkets do not specifically address transaction costs, but by implication savings in this area will come about through supply chain efficiencies that come into play through the use of their system.

While the exact level of cost savings, taking all factors into account, are not discernible there is ample evidence that the suppliers are selling at lower prices. This is generating concerns over sustainability of cost savings in the long-term and the effect cost savings may have on supplier relationships, particularly in the local areas. As discussed in Chapter 5, a number of reasons for gaining lower prices were identified. Where savings come from margin compression their sustainability is questionable and raises concerns over pressurising suppliers. In a remote regional area such as WA, where the supplier base is limited and networks are tight, the gains from using the organisation's dominant economic position would be short-lived. The need to recognise socio-political effects is evident amongst the procurement staff and accords with Alcoa's ethical stance on commitment to the communities in which it operates. However, this may alter if a changing economic climate requires Alcoa to balance its status in WA against its need to maintain its status as a global mining organisation.

The purchasing and procurement managers believe that future cost savings from suppliers lie in the ability to encourage those suppliers to develop efficiencies both within their own businesses and from second tier sourcing. There are additional benefits to be gained on both sides. As suppliers become efficient and gain experience of e-capabilities, they are able to extend their own markets beyond WA and gain competitive advantages over less e-enabled competitors. For Alcoa the gains lie in maintaining a vibrant, competitive and effective supplier base within the region.

The visibility of market price from the auction process can assure Alcoa that they are paying a good price for their purchases. It also enables

suppliers to see how well they are competing with other suppliers and allows comparisons of efficiency achievements. Nevertheless, this is not a utopian answer to reading supplier effectiveness, as other factors impact on the market price. For example, in the short-term, suppliers have been seen to cut costs below market price to gain a contract to fill under-capacity in their workshops. This has implications for quality, future relationships and competitiveness and Alcoa has to balance the gains from a one-off low price against future sustainability.

A further aspect of cost savings arises with the internal customers' reactions to the e-marketplace strategy. Where the auction process has brought cost savings to internal project budgets, the customers usually become more accepting of the new strategy. However, in some cases the auction has brought new suppliers and the difficulties of 'bedding in' the new suppliers are seen to outweigh the cost benefits. Whether such attitudes are the result of resentment at the breaking of old established relationships, or arise from a real problem with training new suppliers, is not clear. The closeness of relationships in WA is often a factor when the organisation is weighing up the benefits of accepting a lower cost supplier, particularly when the issue of small suppliers in local communities is involved. For this reason suppliers are informed that the lowest bid is not automatically accepted on completion of an auction and some considerable effort can be expended on identifying the most suitable supplier after an auction.

Cost savings are a realisable benefit from e-marketplace participation, but the economic benefits need to be weighed against a range of social and political factors and the culture of the organisation. Alcoa has not defined categories of spend against a strategy for achieving savings, but

has rather experimented with a wide range of contracts at auction. They continue to learn from the outcomes and use the range of auction mechanisms and other procurement tools to adjust their future moves in an effort to maximise cost savings, but with due regard to the factors influencing them.

6.1.5 Information and Transparency

Two distinct types of information are recognised in the marketplace: generic, industry specific information and information related directly to an individual organisation. Industry specific marketplaces, such as Covisint and Quadrem, have developed value-add facilities that offer a wide range of information beyond that applicable to one organisation. The type of marketplace plays a role in the information available to participating organisations (Section 6.3), which, in the case of FreeMarkets, relates more closely to personalised information.

The distinction between types of information was very plainly made in the context of this study. Alcoa made it clear from the beginning of participation that value-add facilities were not a priority from the e-marketplace and information from value-add sources was not accessed. Their participation in a horizontal marketplace also restricted the amount of industry information available. The consensus, underscored by the purchasing manager's comments, appeared to be that information directly related to the transactions in hand was reliable and targeted. This was later broadened to include market information, although this was derived from the activities of suppliers in the auctions. FreeMarkets offers a very personalised service in its auctions and has established a high reputation with several multinational organisations (Heinz is used as a case study on the FreeMarkets website) and its information was seen as

reliable. Information of a more generic nature was perceived as less trustworthy as it did not apply directly to Alcoa and was therefore perceived not to be relevant.

Although there is a broad acceptance of the view that the electronic environment is particularly suited to information dissemination (Bakos, 1991 1998, Downes & Mui, 1998, Tumolo, 2001), Mahadevan (2000) argues that an e-marketplace can contribute to the problem of information overload. This is reflected in the context of this study where the benefits of information delivery and use were seen to be double-edged.

From the positive standpoint, information flows are a benefit if the content can be disseminated in a manner relevant to the audience. This relates to the ability to understand and personalise information, as discussed by DeLone and McLean (2003). The dissemination of information relating to both the workings of the auction process and to the learnings to be gained from the auctions was directed through the online bid team. The procurement staff believed that the bid team handled this very well and that they were very supportive to the buying officers. In turn the buying officers were able to resolve problems amongst suppliers in preparing to go to bid, even to the extent of tutoring a local company in how to send e-mails. The inclusion of internal customers in the information loop through more consultation and inclusion in decision-making saw a rise in an appreciation and acceptance of the auction process. The delivery of information in an acceptable format was key to extending acceptance of the e-marketplace processes.

The downside of the information flows remains the difficulty in coping with the volume. The main issues here related to how to handle the excessive volume, and generally deal with electronically delivered information in an efficient manner. Suppliers were seen to struggle with the receipt and delivery of electronic information, illustrated by the constant clarification of detail they required prior to auctions and the delivery of company information to Alcoa. The former point led to some frustration for buying officers, who were inundated with e-mails, although it is hoped that this will be a short-term problem as suppliers become more e-enabled. Against this lies the evidence from the internal organisation where e-mail has been an accepted tool for years, but where overload is reportedly a continuous problem.

The latter point, the delivery of company information, refers to the 'tick the box' actions of suppliers in response to the FreeMarkets' process. This may indicate that they were intimidated by the process and followed it to the letter, rather than send more detailed printed information on their own initiative. Alternatively, at a time when the supplier base was being widened, supplier information may have been monitored more closely at a senior management level, and through the services offered by FreeMarkets. FreeMarkets verifies suppliers for FullSource auctions, which substantially reduces the risk related to unknown suppliers. In addition, the pursuit of a more global supplier base as participation progressed has been initiated and closely monitored by senior management supporting the view that supplier information may be dealt with at a higher management level than is usually the case.

The transparency issues raised by the use of the FreeMarkets' processes were extensive and to some extent, unexpected. The literature on the

subject of transparency is not extensive and the advantages and disadvantages not widely discussed. However, it became clear at an early stage that the bidding processes gave both suppliers and Alcoa more opportunities to anticipate the way the market was moving. As more maturity was achieved in participation, there was more accumulation of data on suppliers and the market. It became possible for Alcoa to follow supplier trends and, in some cases, their bidding strategies, and to gain an appreciation of the market price. This raised social and political issues for the organisation when suppliers began to recognise that other forces (for example, transformational bidding) were at play in the auction process. While such recognition was of benefit where local suppliers gained the advantage, it was detrimental to the attitude of other suppliers who felt unfairly penalised. Transparency in the system also enabled suppliers to assess competitive prices more accurately. This had an advantage in encouraging some to reassess their own efficiencies in order to become more competitive, and a disadvantage in enabling efficient suppliers to charge a higher price through recognition of competitor inefficiencies. In some cases, suppliers gave up the opportunity to gain higher prices in an auction, even bidding down on their own price, well aware that their bidding strategies were visible to Alcoa and that their behaviour could be construed as opportunistic.

Concern was expressed over the lack of training in how to handle commercial-in-confidence material. The breadth of transparency in the system promoted greater access to material that previously would have been restricted on a 'need to know' basis. Currently, this has not become an issue, although there are questions of sensitivity and privacy that may require to be addressed.

Internally, the question of transparency was sensitive to the culture of the organisation, where high levels of visibility in individual work became apparent and engendered feelings of insecurity in some procurement staff. The development of a culture of transparency has the potential to provide widespread benefits in an organisation if it can grow in an atmosphere of trust. Peer groups may measure their own performance against the department norm, and interact with other departments within the multinational organisation, for example, to aggregate spend and share information. Such benefits can only be realised if staff are not intimidated by the visibility of their work being used as a performance measure. In the same way, if suppliers see the transparency of the system being used for solely economic pressures, an open culture of benefit realisation from the advantages of transparency cannot be achieved.

6.1.6 Flexibility in the Supplier Base

The purchasing manager discussed how Alcoa is widening its supplier base through the auction process by identifying new suppliers and inviting suitable ones to the relevant auctions. This widening of the supplier base follows a period of concentrating on a small number of close supplier relationships, where new entrants were discouraged from applying to join. The intention is to identify a broader range of suppliers, but eventually to restrict procurement spend to a number of those suppliers in any one period.

There are several advantages to be gained in widening the supplier base at this stage of e-marketplace participation. A major consideration is the functioning of the auction process, which operates more effectively on price with a larger number of suppliers, by increasing competition. Increased competition also encourages higher levels of efficiencies

within supplier organisations; these in turn contribute to a more competitive supplier base. Another advantage is extending identification and knowledge of potential suppliers and accessing a correspondingly wider range of goods and services. The auction process also offers mechanisms that give flexibility in controlling the supplier base, in the way of transformational bidding, aggregation and lotting strategies. This opens up opportunities to include a wider range of suppliers by varying the scope of a bid through disaggregation or lotting strategies.

As with all the potential benefits from e-marketplaces that have been identified in this research, there are a number of issues that affect their realisation (Table 6). For example, although some contracts that require specialist knowledge and a collaborative relationship have not been put to auction, other contracts with the same suppliers have been. This has caused some alienation by the suppliers who believe that previous contributions to the relationship have not been recognised by this action. In one case, an engineering company that prides itself on its troubleshooting capabilities and commitment to their customers is determined to withdraw intangible contributions from the relationship and cost all its inputs to future projects. In effect, it is going to put a price on imparting its knowledge. Alcoa, the power holder in the relationship, can find alternative suppliers eager for the work, but they are reluctant to do so after twenty years of collaboration, and accommodations on both sides will have to be made. Such cases also disturb the internal customers' relationships with the suppliers. The trust and loyalty established between the internal customer and the supplier is disrupted by these procurement actions and personal loyalties are tested to the limit. For example, suppliers feel an obligation to perform to previous standards for their customers, but are not inclined to provide the same

level of intangible contributions to the organisation. The buying officers are not immune to the question of loyalties and, in at least one case, have worked hard to mitigate the changes by supporting a long-term supplier to bid for an overseas contract through an online auction. The Alcoa staff worked hard to lobby for their supplier and the supplier in turn recognised their own ability to move beyond their current regional boundaries through their newly acquired e-capabilities.

Positive effects of disruption to previous supplier alliances include a re-assessment of work by both customers and new suppliers. New eyes are brought to bear on the work and there are often benefits to be gained from the enthusiasm of the new suppliers. Negative effects are seen in the possible loss of intangible commitments to a relationship, the time necessary to establish a new supplier into the Alcoa work mode and to build up a relationship. Additionally, there is always an element of risk with a new supplier. (This last point is somewhat mitigated by the stringent vetting carried out by FreeMarkets in the FullSource auctions, although this is not the case in the QuickSource auctions.)

Finally, there is the issue of Alcoa's commitment to its local communities and the effect of bringing in new suppliers to those communities. Alcoa's move towards a global sourcing strategy may have larger implications for these communities depending on the nature of the new suppliers. This revolves around local employment issues, the cultural implications of involvement in Australian country towns and the distances involved affecting delivery time of urgent repair items.

The organisation is assessing many of the effects that widening the supplier base has had. It continues to learn from the results and is becoming more pro-active in recognising issues that may arise from its

actions in the e-marketplace. These are balanced against the benefits it believes it can achieve and that will contribute to Alcoa retaining its status as a major aluminium organisation.

6.1.7 Global Issues

Although Alcoa has retained a commitment to local and regional suppliers there has been a shift towards a global perspective that was not evident in the earlier stages of participation. As it reaches a mature stage of e-marketplace participation, it has identified the cost savings advantage of a global supplier base and has appointed a manager to develop a global sourcing strategy

Although Alcoa is in the very early stages of developing global sourcing, issues are already becoming evident that will need to be addressed to enable benefits to be achieved. As an established global concern, the organisation has considerable experience of buying and selling across major regions. However, from the e-marketplace perspective this is seen as a new venture that will eventually cross national boundaries within the organisation. The possibility of aggregating certain purchases has already been identified through the transparency of the system.

Economically, the advantages of the global market are very attractive. These follow the benefits recognised in the globalisation literature such as lower transaction costs and lower purchase prices (Takeuchi & Porter, 1986; Ives & Jarvenpaa, 1991; Peppard, 1999), extension of supplier base (Bakos 1997; Choudhury et al., 1995) and competitive necessity (Porter, 2001). However, the social, political and cultural perspectives are more problematic, although the issues are best described as frictions rather than barriers to benefit realisation (Standing & Stockdale, 2003).

By using the defining characteristics of e-marketplaces from Table 3 derived from the identified globalisation sub-factors it is possible to examine the drivers and frictions that would affect benefit realisation in a global sourcing situation in the case study.

The economic advantages of the global market as described above are evident in the case study. Alcoa is achieving lower costs through the auction process and has extended its supplier base. However, the benefits being achieved are impacted by the sub-factors of globalisation.

Defining characteristics of the social factors of globalisation as related to e-marketplaces are associated primarily to trust and relationships¹³. Moving to a global market will have a significant effect on Alcoa's standing in WA. The organisation has committed resources to maintaining honesty and goodwill within its supplier base and has a policy of supporting its local communities. Its ethical business behaviour is underpinned by the Alcoa Business System. The loyalty of long-term suppliers will be put at risk, together with the advantages of intangible contributions from relational partners, if Alcoa moves to a global supplier base. It may be that the advantages of a global supplier outweigh the benefits being gained in an existing relationship, and the organisation will choose to move to the more beneficial option. However, remaining suppliers within the region will perhaps lose trust in the organisation as they see the changes taking place. This in turn may have an impact on internal relationships, where there is an evident reluctance to change from traditional partners and methods on the part of internal customers. Inclusion in the new processes has won over many customers by

¹³ Relationships in this context refer to the broader interpretation of societal influences as well as local community and relational exchanges.

instilling a greater feeling of ownership over specifications and decision-making, but this may not extend to overseas contracts where additional cultural influences come into play.

The issues of global versus local, political networks and the legitimacy of the organisation are important to the organisation's image within its community and its status and credibility amongst suppliers. Alcoa retains a high status within Australia as a major representative of an industry that contributes significantly to the country's economy. They gain advantages offered to the industry by government, such as cheap electricity and a favourable view in infrastructure planning. A global sourcing strategy may not impact at this level although buying from abroad may impact on the organisation's status within the regional business community.

From a local community viewpoint, Alcoa has foregone more efficient contracts in favour of some local suppliers to retain its commitment to its regional communities. This is particularly important at a time when environmental and health and safety issues arising from emission levels in the WA refineries are in the news.

Alcoa is also aware that the current climate of acquisitions and mergers is bringing changes to its more traditional supplier markets. Larger overseas firms are buying into regional supplier bases to gain local knowledge and access to the market. This is driving smaller firms to merge in order to counteract the outside threats. The organisation will have to differentiate between local firms and foreign firms that have bought into the regional supplier base and monitor the effect this may have on the social and political balances within local communities. In the longer term this may be an advantage in the move to global sourcing as it reduces the

dependency of local suppliers, but alternatively it reduces the supplier base and curtails competition.

Cultural issues exist at national, regional and organisational level. At national and regional level there is often a perception that culture is not an issue in a global organisation. Despite this, there was little awareness of the possibilities of global sourcing evident from the buying officers. The dominance of the national culture and an adherence to the traditional way of doing things prevented most of the buying officers appreciating that any benefits are potentially obtainable from sourcing out of the region. There was an interesting dichotomy between the open-minded view of the organisation and the stakeholders involved in the e-marketplace process, and an acceptance of the restrictions of the remoteness of the State being immutable. This was not evident in the purchasing and procurement managers who early identified global markets as a future possibility to be examined at a more mature stage of participation.

In an organisational culture that strongly supports the innovative use of technology, the application of technology to source beyond national boundaries appears inevitable. Despite being part of a global organisation, the staff have experienced a number of frictions that have to be addressed to facilitate the gaining of benefits and the move towards global sourcing. The major frictions to date have largely come as a result of the strongly American character of FreeMarkets (for example, spelling, time zones and public holidays). It appears likely that other cultural frictions will arise as global sourcing goes ahead and some appreciation of these will smooth the path to greater benefit recognition.

The global sourcing manager is tasked with addressing the drivers and frictions that are anticipated in the development of Alcoa's move to a global procurement strategy. The need to address the factors beyond the economic has become more evident throughout the use of the FreeMarkets processes and will inform the future developments of global sourcing.

6.2 Do Benefits Change Over Time?

This study has taken a longitudinal approach to the examination of benefits within the organisation. In this section, the question of whether benefits change over time is address. The progressive recognition of benefits is examined to establish whether the benefits increase with participation, or if it is the recognition of them that increases.

With hindsight, Alcoa's experiences in moving to procurement via the e-marketplace can be demarcated into stages (Table 7). From the organisation's point of view these stages are somewhat arbitrary and not recognised as significant points along the way. However, from the researcher's perspective, gathering confidence amongst the procurement staff led to greater recognition of benefits in line with the stages identified. The initial research phase of this study began as Alcoa in Australia was formalising the decision to use an e-marketplace, FreeMarkets, for a substantial portion of its procurement spend. Although the decision to use FreeMarkets was initially made at the global headquarters in the United States, Alcoa companies elsewhere were strongly encouraged to follow their lead. This was accomplished by charging the national organisations for a portion of FreeMarkets' costs.

Stage	Title	Characteristics	Outcome
Stage 1	Awareness	Environmental scanning Awareness raising	Recognition of opportunity
Stage 2	Planning	Defining strategies Analysis of potential benefits	Decision to adopt global e-marketplace
Stage 3	Adoption	Trading in the e-marketplace	Confirmation of cost savings
Stage 4	Use	Greater use of the e-marketplace	Recognition of frictions
Stage 5	Maturity	Assimilation processes to address frictions	Greater realisation of economic benefits

Table 7: The Stages of Electronic Marketplace Adoption

The first stage of e-marketplace adoption (Stage 1), identified through reports and e-mails, was a pre-planning awareness of changes in the global business environment and a perceived need to counteract an economic downturn in the mining industry and maintain competitiveness. Action to adjust to developments in the business environment is identifiable from the literature as a normal sensitivity to changes in a volatile industry environment (Casey, 2002; O'Connor, 1999). Cost cutting strategies are an integral part of the aluminium industry's environment and enable them to overcome the difficulties inherent in adjusting levels of production to react to supply and demand. Additionally, Alcoa is seen as an innovative organisation that takes a lead in adopting cost cutting innovations and particularly in e-commerce applications. The combination of a downturn in industry prices and an awareness of potential benefits to be gained from e-commerce, therefore,

resulted in raised awareness of the need to identify opportunities for achieving cost savings.

Once the possibilities of e-marketplaces had been recognised, the organisation determined a strategy to take advantage of the opportunity to gain an identified principle benefit, that of economic savings (Stage 2). Initial planning took place at the executive level of the global organisation and participation in the selected marketplace was first implemented in the United States. Following early results there, the decision was made to extend the use of FreeMarkets to other regions. It is perhaps not coincidental that the headquarters of the marketplace selected is in the same city as Alcoa's global headquarters (Pittsburgh), although it is equally likely that selection of FreeMarkets may have rested solely on their growing reputation amongst Fortune 500 companies.

The adoption of e-marketplace trading (Stage 3) confirmed the economic benefits of participation with perceived cost savings of between 10 and 20% being achieved. It also enabled further recognition of benefits to be made, although many of these benefits were anticipated rather than realisable at this stage. For example, time spent in setting up and running auctions added to the workload of staff at the adoption stage, but this was felt to be part of the learning curve and once the process was assimilated into the department, time savings would be gained. The writing of specifications was also very time consuming, but once the 'spring clean' had been achieved, specifications could be kept current more easily as Alcoa regained detailed knowledge of their procurement requirements.

Stage	Characteristic	Outcome	Recognition and realisation of benefits
Adoption	Trading in the e-marketplace	Confirmation of cost savings	Cost savings realised Time savings anticipated as specifications rewritten and administrative tasks coordinated Regaining of governance becoming apparent as specifications rewritten Beginnings of e-capabilities as staff run auctions and suppliers participate in bidding.

Table 8: Stage 3, Recognition and Realisation of Benefits

The success of Stage 3 led to more widespread use of FreeMarkets for procurement purposes (Stage 4). The introduction of FreeMarkets' QuickSource facility increased the use of the auction mechanism for smaller sourcing requirements as it enabled the auctions to be set and run within the organisation. At this stage, Alcoa remained unsure of the effects of using auctions on their relationships with suppliers, but the benefits of cost savings were seen to be sufficient to outweigh potential negative effects and encouraged more extensive use of auctions. As use increased, the recognition of frictions became more apparent and these were addressed in a variety of ways. For example, the political and cultural issues deriving from the organisation's need to retain its status and credibility within its local communities led to the use of mechanisms to support local companies in the auction process (Section 5.1.3). Global sourcing capabilities were being discussed by senior management, although at the buying officer level this was still not widely seen as a viable alternative to regional suppliers mainly for logistical and social and political reasons. Frictions of a cultural nature were highlighted at

the user level as use of the auctions increased. These included both frictions relating to the culture inherent in the marketplace and also minor comments from procurement staff arising from dealings with e-marketplace staff in Europe and Asia. The latter appeared to the researcher to relate to different work styles, where the informality of business dealings seen in WA was not reflected in other regions.

As the e-capabilities of stakeholders improved, there was more recognition of the benefits to be gained from the different types of information facilitated by the e-marketplace, such as supplier information and market information. There was also more recognition of the need to address issues of ownership, handling, and sharing of information.

Stage	Characteristic	Outcome	Recognition and realisation of benefits
Use	Greater use of the e-marketplace	Recognition of frictions	More controlled supplier base Extension of e-capabilities Recognition of information sources Transparency Expanding of market Market awareness developing

Table 9: Stage 4, Recognition and Realisation of Benefits

Transparency was more of an issue as use of the e-marketplace increased. Although there were benefits to be gained, the purchasing and procurement managers were well aware of difficulties caused by the transparency in terms of both staff and suppliers. Increased use of the system also brought greater potential benefits in market awareness. Captured learnings from the auctions resulted in more knowledge of

market prices, supplier behaviour and awareness of market capabilities in terms of transaction method versus product requirements.

These potential benefits were the basis for the graduation to Stage 5. The organisation is exhibiting maturity in e-marketplace participation through the assimilation of procurement processes and in mechanisms to facilitate the full realisation of benefits. These include the appointment of a manager to oversee the move to a global sourcing strategy for the multinational organisation, greater use of auction tools to improve supply chain efficiencies and a greater understanding of the issues impacting the benefits that are realisable. This understanding contributed to the organisation's ability to recognise how to address the frictions that had arisen. For example, the use of auction mechanisms to alleviate some of the problems in retaining local suppliers for non-economic reasons; improving the e-capabilities of both Alcoa staff and those of suppliers, and a greater appreciation of market capabilities. This stage is characterised by the ability of the organisation to learn from the previous stages and to implement the learnings throughout the procurement system.

There was a distinct change in perception of benefits as Alcoa moved through the identified stages of participation. The implementation of the e-marketplace strategy began with a need to achieve cost savings, although with a recognition at senior management level that further benefits might be available as participation increased. Perceptions of staff were, therefore, initially focussed on the cost savings and it was only as experience was gained that a broader view was taken. The realisation of benefits improved over the two year period of the study as skills and learnings increased and the potential benefits became more apparent to

the procurement staff. Whether these benefits could have been achieved earlier if they had been recognised and sought is difficult to predict. The learning curve for e-marketplace adoption was steep and many of the frictions and barriers to realisation were only recognised through participation.

Stage	Characteristic	Outcome	Recognition and realisation of benefits
Maturity	Assimilation of processes to address frictions	Greater realisation of economic benefits	Greater ease with auction processes Adoption of auction mechanisms to support local suppliers E-capabilities of staff Greater market awareness (price, potential suppliers etc) Process of consultation and information sharing with internal customers Appointment of global manager to oversee future global sourcing strategies

Table 10: Stage 5, Recognition and Realisation of Benefits

6.3 How are the Types of Benefits Gained Impacted by the Type and Features of the E-marketplace?

As discussed in Chapter 2, the business models of electronic marketplaces vary greatly. However, there are recognisable types of marketplace, often designated by their ownership. The e-marketplace selected by Alcoa is an intermediary owned firm that specialises in reverse online auctions. Its customers are large organisations from a wide

variety of industries seeking to purchase goods and services at optimum prices.

This section addresses the speculative question of whether Alcoa's selection of FreeMarkets has affected the benefits it has been able to gain. There are two assumptions required to examine this aspect of e-marketplace participation. Firstly, that Alcoa is seeking more or alternative benefits than those it has gained. Secondly that another marketplace could offer different benefits through a range of facilities and services not available with FreeMarkets.

The first assumption is not, at this stage of participation, true. Alcoa's stated aim of participation was cost savings and these they have achieved to their satisfaction, despite the issues identified in this research. Their more recent strategy to gain further benefits from a global sourcing strategy has not been related to an alternative marketplace, but remain embedded in the current situation. Nevertheless, Alcoa does have a stake in Quadrem, a minerals and mining e-marketplace, and may actively participate in it at a later stage.

The second assumption of gaining different benefits from different marketplaces is supported by the literature, although there is little empirical evidence to back this up. This section examines how, if Alcoa were seeking more benefits than it has actually realised, different benefits might be gained from another e-marketplace. Quadrem is used as the alternative e-marketplace to examine whether different benefits would be achievable from an industry specific consortium marketplace.

6.3.1 Benefits Gained from FreeMarkets

A list of identified benefits is given in Table 6 and an explanation of the stages of recognition given in Section 6.2. In the early stages of participation, Alcoa's concern was to realise cost savings. At this time there was no perception of the benefits of value-add facilities and indeed, little understanding of the global possibilities that have now become the focus of the organisation. Alcoa's selection of FreeMarkets appears to be based on the premise that their services would offer cost reductions. FreeMarkets, as an intermediary owned marketplace, specialises in running auctions for large companies. They stress the cost savings aspect of their services, along with risk reduction, based on their extensive, validated global supplier database covering many different industries. This database is a major benefit of using FreeMarkets' FullSource package, as it identifies a wide range of suppliers in both regional and global areas. The suppliers are vetted by FreeMarkets and can contribute to extending the potential supplier base thereby improving the competitive conditions for auction.

When Alcoa first moved to e-marketplace participation, FreeMarkets largely concentrated on their FullSource package. This provided the reverse online auctions, closely organised by FreeMarkets staff in conjunction with the buyer organisation. Within a few months Alcoa had adopted FreeMarkets' new QuickSource option that enabled them to run their own lower key auctions, using their own supplier database. As with all e-marketplaces, FreeMarkets is developing its value-add offerings and has recently (January 2003) launched a more comprehensive supply chain management package (FreeMarkets ES) that offers a wider range of services. At this time, however, Alcoa remains with the auction

processes. This follows from the purchasing manager's early statement that Alcoa was not particularly interested in value-add facilities. It has remained relatively single-minded in its approach to what it hopes to attain from participation in the e-marketplace, although this has not prevented them from recognising many of the potential benefits that have developed.

When comparing the list of identified benefits (Table 6) with the list of benefits discussed in the literature (Table 2), there are a small number of benefits that have not been recognised in the examination of Alcoa's participation. This includes the rich seam of value-add facilities that is often regarded as the enticement to participate. Other benefits are network effects, improved customer service, reduced inventory levels and increased margins. As this research centres on the procurement function increased margins and customer service are understandably not recognised. Where the latter could be construed to refer to internal customers, the closeness of relationships within the organisation in WA substitutes for many of the factors of this benefit. Evidence of this has been displayed in the way that the procurement staff have worked hard to include internal customers in the e-marketplace processes.

An examination of Alcoa and its environment shows that the organisation has already anticipated factors contained in the other unrecognised benefits. For example, inventory levels are restricted by the use of an internal online catalogue for spare parts and low cost, high volume items. Suppliers are required to deliver goods ordered from the catalogue within 24 hours and inventory levels are kept to a minimum in this way. The move to the online Alcoa e-Business solution will enable other features, such as network effects, to be incorporated into the procurement function

as more suppliers become electronically enabled. There are already early signs that suppliers brought into the online auction process perceive that their new e-capabilities extend beyond interaction with Alcoa and enable them to enter into other e-procurement activities and alliances.

To a great extent, the business system developed by Alcoa reflects many of the functions offered by an e-marketplace. This system, in conjunction with the FreeMarkets auction process, which is seen as one ‘tool in the procurement toolbag’, gives Alcoa the flexibility of a private marketplace without the costs of building their own site. The size of the organisation plays a large part in the ability to achieve this, as they have the expertise, the capital and the power to take their suppliers into this environment, and include FreeMarkets (who deal only with very large organisations) in their system. Alcoa’s choice of marketplace would obviously be influenced by its procurement strategy and by its perception of benefits that it wishes to achieve. That the e-marketplace offered more in the way of benefits, and more in the way of issues impacting on the organisation, was a consequence of participation not of planning. This leads to the question of whether the choice of a different marketplace would have brought different benefits.

6.3.2 Different Marketplaces, Different Benefits

In discussing differences in benefit recognition, Quadrem has been selected as representative of the consortia e-marketplaces for two reasons. Firstly, it is an industry specific marketplace specialising in the metals and mining industry of which Alcoa is a member. Secondly, it is the logical alternative marketplace for Alcoa to have selected, as the organisation is one of the founding members of the consortium that owns Quadrem. The reasons for non-participation at this stage are not clear

although it appears to be partly due to the marketplace executive and the Alcoa executive selecting different technical platforms. Another factor appears to be the established brand name of FreeMarkets, offering greater potential for success than Quadrem, which was still in an embryonic state during Alcoa's planning stage.

The significant differences in the business models offered by the two e-marketplaces are summarised in Table 11. The relative simplicity of the FreeMarkets model, compared with Quadrem, highlights the different target participants and the length of anticipated participation. In the case of FreeMarkets, a relationship is expected to be established where they work closely with the buying organisation to set up Full Source auctions, gaining a close understanding of the needs of the buyer and identifying potential suppliers. In the case of Quadrem, the relationship between market maker and participants is purely functional and the relationships exist between other buyers and sellers. As these relationships are within the same industry there is more likelihood of network effects taking place in Quadrem.

Information sources from the two marketplaces differ greatly. Quadrem, as a vertical marketplace, has the additional emphasis of the value-add of industry information, while FreeMarkets is focused on the auction mechanism and information that facilitates the conduct of an auction. The industry specific information is not seen as a benefit of interest by Alcoa and is not, as yet, a major feature of the marketplace. Its usefulness may lie with suppliers who are seeking to enter the mining and minerals industry, rather than large industry buyers who have developed their own information sources.

E-marketplace features	FreeMarkets	Quadrem
Founded	1995	2000
Ownership	Intermediary	Consortia
Participant base	Horizontal – Global 1000 companies. Buyers	Mining and metals industry – all sizes of firm. Buyers and sellers
Revenue streams	Buyer transaction fee (%)	Buyers and suppliers registration fees and transaction fees
Supplier base	Invited suppliers from vetted supplier base (FullSource only)	Open to buyers/suppliers on registration
Information	Largely company specific	Industry specific
Transaction mechanisms	Auction Some negotiation facility	Auction, catalogue and negotiation
Annual throughput of business (source: Net-Markets-Alert mailing list)	US\$7.5 billion	US\$1.7 billion

Table 11: Differences between Quadrem and FreeMarkets

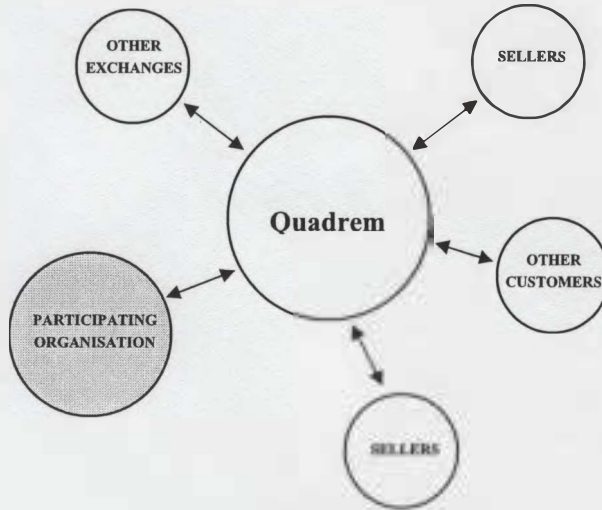
Quadrem sees itself as a ‘one stop solution’ for a firm’s supply chain processes. Buyers and sellers can integrate their back-end systems to the sourcing solutions operated by the marketplace, and use the marketplace from ‘source to settle’ in a transaction. Sellers can showcase their products through online catalogues, or take part in auctions and negotiations. The opportunities for trading online with Quadrem are growing and as the number of participants increases, so do the potential benefits. The e-marketplace has faced the same problem of achieving critical mass that faces many market makers: buyers wait for an extensive supplier base to be established and suppliers seek a good range of buyers. Quadrem’s registered buyers and sellers have increased steadily over the period of study, although true figures are difficult to estimate (EmarketServices).

Quadrem is also developing connections to other online marketplaces and companies. For example, they offer a method of disposing of surplus assets through an auction and valuation firm (Dovebid) and are negotiating to link with another e-marketplace in the chemical industry (Elemica). This follows a general trend that is observable in other marketplaces such as Covisint's alliance with E-Steel. The potential network effects of this trend will be enormous, as it requires a participant to register with only one e-marketplace, but enables them to have access to the services of the network alliance.

Quadrem identified the creation of far reaching networks through alliances with other marketplaces as a future strategy in its very early stages. It recognises its potential to enhance the attractiveness of the marketplace, particularly to suppliers. As participation grows, buyers will have the advantage of greater identification of suppliers at lower cost, albeit with more risk than supplier connections vetted through FreeMarkets FullSource.

Figures 12 and 13 show a comparison of the interconnections identified in the two e-marketplaces that highlights the essential difference between them.

The diagrams highlight the essential differences in the relationship between the marketplace and a buyer. Quadrem is a hub that acts as the co-ordination point between buyers, sellers, other customers (these may include logistics firms, finance companies, security consultants and information vendors) and connecting e-marketplaces. Quadrem does not have a close relationship with any of the participants, but hosts the virtual space through which they trade.



(Source: adapted from Quadrem Website)

Figure 12: Quadrem Interconnections

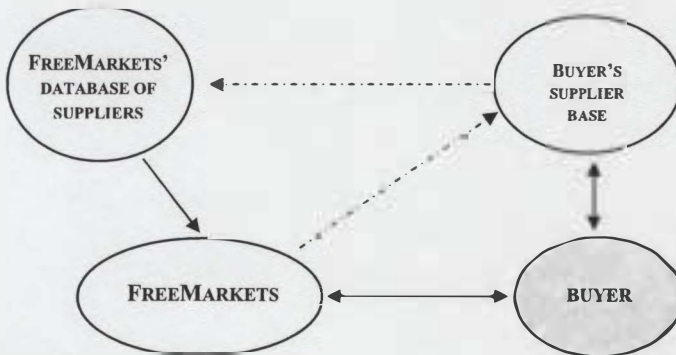


Figure 13: FreeMarkets Interconnections

In contrast, FreeMarkets has a close relationship with its buyer and shares relevant connections from its supplier base. In turn it can absorb buyer’s supplier connections into its own database. Benefits drawn from

the Quadrem marketplace will be largely selected by the buyer and therefore requires the buyer to know what is achievable and what they wish to achieve from participation. For example, Quadrem hosts the connection to other organisations that may offer value-add facilities, or the connection to the supplier that most suits the buyer. In contrast, FreeMarkets offers a greater personalised service and guides participation to a far greater extent. The ability to choose benefits is therefore more restricted as all connections go through FreeMarkets directly. This may alter as FreeMarkets extends its offerings, such as its newly launched supply chain management package (ES). This is already evident in Alcoa's use of the Quicksource option that enables them to tailor smaller auctions to take account of the prevailing conditions surrounding the purchase.

There are clearly distinct differences in the two e-marketplaces discussed here and although the range of benefits realisable does differ, there are some benefits that would appear to be common to both types of e-marketplaces. These include e-enablement, time savings, information (albeit at varying levels), access to new suppliers and cost savings.

Alcoa appears to be gaining a number of the benefits offered through Quadrem by implementing its own e-business solutions. It has an internal online catalogue rather than a range of suppliers' catalogues, an auction mechanism (FreeMarkets), a supplier base partially identified through FreeMarkets and partially by itself, and it is automating payment and tracking services. Where Quadrem can potentially offer Alcoa more than it has developed itself, is from the networking effects that will take place if e-marketplaces begin alliances to share resources. This has the potential to substantially increase the available supplier base, the

recognition of new markets, and identification of other participants offering a range of additional services.

Early indications of the network trend, denoted by Quadrem with their Dovebid alliance, can also be seen in the alliance of E-steel and Covisint reported on the latter's website. There is also the possibility that the larger mining organisations could seek benefits by concerted purchasing actions through the marketplace. However, there are anti-trust implications in such a situation. The Federal Trade Commission in the United States (Federal Trade Commission, 2000) has investigated the possibilities of concerted action by consortium owners in the automobile industry. The European Union and other regional governments also closely monitor such situations.

Participation in FreeMarkets is an option that is not available to many firms. Quadrem offers a viable alternative for firms (in the mining and metals industry) seeking to gain benefits from online trading. The differences between the marketplaces appear to be large, but at this stage of e-marketplace development the main difference appears to be one of concentration of facilities.

6.4 Summary of Research Questions

The principal research question asked how organisations were realising the different types of benefits and assessing their significance through participation in an e-marketplace. The answer was sought by using three subsidiary questions that are discussed in this chapter, using the findings of the case study organisation.

The level and type of benefits identified from Alcoa's participation were wide ranging. By examining benefits through a holistic evaluation

process it has been possible to analyse the issues that affect the realisation of the benefits and identify how the stakeholders have impacted on the procurement process. The social, political and cultural factors have played a significant role in the identification of many of the issues. This can be seen when considering previous evaluation measures such as user satisfaction and use of the system. The in-depth examination of individual benefits has also highlighted the myriad issues that impact on the level of benefits that can be realised. The longitudinal nature of the study has also enabled an appreciation of the way that benefits change over time. With hindsight, it has been possible to identify five stages of development in e-marketplace participation and to follow the realisation of benefits as they have been recognised and the issues affecting realisation dealt with. Finally, the features of FreeMarkets are compared with that of another e-marketplace, Quadrem, to identify further or different benefits that the organisation could potentially realise from participation in a different type of e-marketplace. The principal benefit to be gained from a marketplace such as Quadrem is that of network effects and value add facilities. Although FreeMarkets offers a great source of suppliers at the FullSource level of auction, Quadrem offers a more general range of suppliers that is freely accessible to registered buyers. These suppliers are self selected and have joined Quadrem to gain contracts in the mining industry and therefore can potentially increase the supplier base available to Alcoa. However, the element of new supplier risk is higher as, unlike FreeMarkets, there is little vetting of suppliers. From the case study findings it appears that the benefits to be gained from different types of e-marketplace are influenced less by the features offered, but rather by the organisation's e-

procurement strategies. In this case, the strategies were not defined in advance beyond the organisation's need to achieve cost savings.

The discussion of the case study organisation's recognition and realisation of benefits from the e-marketplace in which it participates allows for a more informed framework to be presented. The findings are used to inform a reassessment of the evaluation framework that was devised from the literature. The next chapter revisits the process of evaluation and discusses the implications for other organisations seeking to evaluate such complex systems.

CHAPTER 7

DEVELOPING THE EVALUATION PROCESS

The research findings and the ensuing discussion of the case study organisation's recognition and realisation of benefits from the e-marketplace in which it participates enables a reassessment of the evaluation framework (Figure 7) that was derived from the literature. The use of a single case study, as a basis for informing a new framework, can be the subject of contention, most notably because of the issue of generalisation. This chapter initially addresses the issue of generalisation from the perspective of both benefit realisation and evaluation, before revisiting the evaluation framework. This approach enables implications for other organisations to be identified and thereby supports the framework as a working model for further empirical testing.

7.1 Generalising to Other Organisations

Identifying benefits from e-marketplace participation and revising an evaluation framework to take into account the results from the study of Alcoa is of little value beyond the organisation if it cannot be applied to other situations. There is an urgent need for the development of evaluation processes for complex information systems, such as electronic marketplaces. There is also a requirement for more understanding of the issues affecting benefit realisation from such marketplaces. These requirements emphasise the need for, and concerns about, generalisation from a single case study, previously discussed in Section 4.1.3. In essence, it is not the quantitative approach to generalisation, such as the

application of statistical sampling procedures to a larger population, that is required in the qualitative context. It is an assessment of the 'fit' between the situation studied (the case study) and other firms where one might apply the concepts and conclusions from the study (Guba & Lincoln in Schofield, 2002). To achieve this fit, full detail or rich description is necessary to ensure an understanding of the case; a point reiterated by Walsham (1995) and Klein and Myers (1999). If other organisations or researchers are to recognise value from the study, they need to see the complexity of the environment framing the case study. In this case study the nature of the aluminium industry and Alcoa's position at the forefront of that industry has been seen to influence the organisation's ability to realise benefits. Examining the case over time also enriches the data as it allows for an ongoing view of the situation, rather than confining data to a snapshot of time (Schofield, 2002).

In the case study, Alcoa's participation in an electronic marketplace is examined in detail over a two year period to establish what benefits were identifiable and what issues affected their realisation. Alcoa is an organisation that is known for its innovative strategies, particularly in e-business, and this has the advantage of informing the case study from the view of 'what may be' (Schofield, 2002, p.85), or from 'the leading edge of change'. The use of Alcoa as the case study, therefore, contributes to the ability to generalise the findings as a view of possible ways that e-marketplace participation may progress.

The value to other organisations in the consideration of the benefits that were identified in Alcoa's case, lies with the ability to recognise that a wide range of social, political and cultural issues interact and impact on the economic. The list of benefits drawn up from the findings, therefore,

includes potential outcomes and issues affecting or enhancing realisation (see Table 6). For example, the case study shows that cost savings are very achievable from e-marketplace participation. It also highlights that the level of savings may be impacted by validity of previous costs, time and effort involved in writing tender documents, the effect on supplier relationships and, particularly in Alcoa's case, the effect on the local community. Other organisations may have different issues related to cost savings, but can draw on the experience recorded in the case study to be pro-active in identifying their own issues. In the same way, the flexibility of the bidding process is not widely recognised in the literature and an understanding of how one organisation has addressed the use of such mechanisms can contribute to effective planning in other organisations.

The position of Alcoa as an innovative organisation gives it many advantages over less e-enabled organisations, which could learn much from Alcoa's experiences in addressing stakeholder issues. For example, the creation of an online bid team and the processes of stakeholder inclusion and learning are inventive. These contributed to the organisation's ability to realise benefits over time.

It is in the evaluation process, however, that the capacity to generalise the results will be most valuable. Schofield (2002) identifies the significance of the case study to large-scale evaluations and the ability to generalise from the findings as of great importance.

The evaluation framework presented in Figure 7 is at a meta-level. This accords with Irani's (2002) argument that generic evaluation is not effective in IS. A more detailed framework would be too specific. A generic solution hinders the ability of the evaluators to apply the relevant questions to the constructs and to explore the range of influences from

the social and political to the cultural. This is seen as particularly important in e-commerce, where change comes rapidly. The innovative circumstances of Alcoa's participation in e-marketplaces may be in advance of many other organisations. Additionally, the aluminium industry has a history of great flexibility and the ability to respond to changing circumstances. This will not be the case with other, more traditional, industries such as oil, automobiles, and construction. An understanding of the context is a very necessary element in the design of a specific evaluation process. The evaluation framework is re-examined and modified to take account of the need for a parsimonious framework that, nevertheless, encompasses the important elements required for an effective evaluation.

7.2 Evaluation Revisited

The identification of key constructs of the content, context, process approach to IS evaluation was made in Chapter 3 and used to inform the evaluation of benefits obtainable from e-marketplace participation. The use of the CCP approach allows for questions of *why*, *what* and *who* to be asked and enables the *how* and *when* of evaluation to be included in the evaluation design. The framework given in Figure 7 shows the interrelationship between the identified factors in the CCP approach derived from the literature. The study examines the validity of the factors within the three concepts through an evaluation of the benefits that could be realised from the case study organisation's participation in an electronic marketplace. It supports a reappraisal of the framework based on the empirical evidence gained from the research that may be applied to other organisations participating in e-marketplaces.

7.2.1 Content, Context, Process

The content construct of the CCP approach to evaluation relates to what is being measured. In this research, this relates to identification, and ultimately realisation, of potential benefits to be gained by an organisation participating in an e-marketplace. The more recent literature on IS evaluation supports the view that the content should not be confined to a narrow metric, but should embrace a broad and deep approach (Mirani & Lederer, 1998; Serafeimidis & Smithson, 2000). There is little empirical evidence of the benefits to be found in e-marketplace participation and therefore no list of metrics was drawn up as a basis for this evaluation. Rather, the richness of both tangible and intangible benefits was sought through the evaluation process, informed by understanding of existing success measures, to provide guidance and continuity within the IS discipline. This enabled insights into the social, political, cultural and economic benefits to be gained with some regard to e-commerce success metrics. An understanding of the context within which the case study organisation operates enabled a more comprehensive view of the *what* factor to emerge. In addition to the identifiable economic benefits and impacts (e.g. cost savings), social (e.g. job satisfaction), political (e.g. maintaining local commitment) and cultural (e.g. benchmarking role) factors were identified.

The political, social and culture structures of an organisation are influenced and formed by its environmental context. An understanding of the context of the organisation and the external environment is advocated by proponents of the CCP approach, as discussed in Chapter 3. This was confirmed by the evaluation where an understanding of the outer and inner contexts enabled understanding of several factors influencing the

realisation of benefits. For example, an understanding of the case study's pre-occupation with cost savings was gained from an examination of the aluminium industry, where competition is tight, substitute materials readily available and prices are volatile. The industry environment has led to an innovative culture. An acceptance of e-business within the organisation has contributed to its ability to address issues that arose from participation. In the same way, the market structure, where prices and demand change quickly, but production levels are slow to respond to supply requirements, affects the need for legitimacy and for a perception of cost savings.

The purpose, role and objectives of evaluation (the *why*) are also considered within the context construct. The *why* was not clearly defined in the case study and lay within the research itself. Alcoa's contribution to supporting the research highlighted its need for understanding of what it was doing by participating in an e-marketplace. Driven by market conditions to gain cost savings, the organisation was committed to the auction process of the e-marketplace, but without an understanding of how it would affect their procurement processes. This required knowledge of the stakeholders affected by the process and awareness of the impact that the social, political and cultural issues brought to bear.

The roles of several stakeholder parties were considered within the evaluation. The principal users, the procurement staff and the suppliers, were not homogenous bodies, but further divided by social and political factors. For example, the procurement team included the online bid team. This was seen to be a strong influence on the success of the auction processes, but was also loosely divided along head office and work site lines. In the same way, suppliers from the local communities had

different issues to those from the regional areas, while the forthcoming global sourcing will bring a new sub-division of users. Other stakeholders included the FreeMarkets' staff and the internal customers of the case study organisation. The role of the evaluator also needs to be considered within the evaluation process. The *who* of the evaluation process are very central to the outcome of the identification of issues and the realisation of benefits is affected by a combination of the stakeholders, the organisation and the external environment. As evidenced in Table 6, which lists the potential benefits and the issues that affect realisation, the social, political and culture issues impact on the people involved. The identification of these issues was a result of the process of evaluation.

The process or *how* of the evaluation was discussed in Chapter 4. An interpretive, holistic approach took account of the social, political and cultural issues, as well as examining the economic. This approach enabled identification of several factors impacting on the *what* and the *who* of the evaluation. For example, the apparent simplicity of the realisation of cost savings was challenged by a deeper look at the myriad issues affecting the savings as described in Section 6.1.4. In the same way, the benefits of extending the supplier base to national and global levels is impacted by the suppliers' responses to current relationships and the political issues relating to local communities. This type of evaluation process requires a long and detailed look at many aspects of the organisation and its environment and this can be seen as a distinct disadvantage for organisations already under pressure from the e-business environment. However, the gains from such a process are extensive and can be better achieved from an informal as well as formal approach to evaluation. Within the organisation a continuous learning

process was observed by the use of formal and informal feedback to the online bid team. This learning was shared within the procurement department and used to develop ways of approaching issues that impacted on the auction processes. For example, in the early stages of participation, an inclusive and consultative approach to the internal customers was used in an auction for safety equipment. This produced more positive participation and returned a sense of ownership to those customers. This in turn generated more positive attitudes to the e-marketplace. Such continuous learning accords with the literature and the call for more longitudinal evaluation.

The *when* of evaluation in this study took an ongoing, formative approach from the first days of adoption through a period of two years. This enabled different stages of benefit identification and illustrates how the different benefits become realisable over time as issues are recognised and addressed. The longitudinal approach also enabled the change in perceptions of the case study organisation to be observed as they moved from cost savings to recognition of the potential advantages that can be gained from a global sourcing strategy.

7.2.2 Summary and Revised Framework

In reviewing the content, context, process approach, post-evaluation it has been possible to revise the framework to reflect the outcomes of the research. The revised framework is shown in Figure 14.

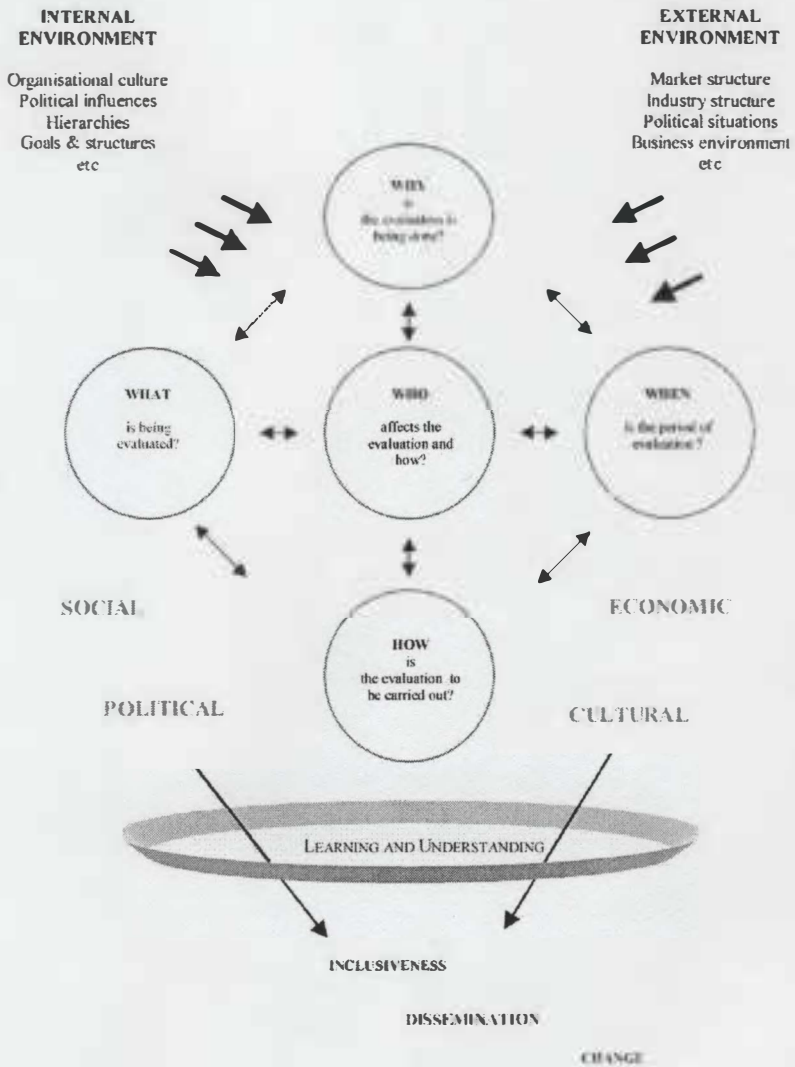


Figure 14: Revised Evaluation Framework

The elements of the constructs as identified in the original framework (Figure 7), rather than those constructs themselves, are shown in the framework as this gives more flexibility in indicating the inter-relatedness of the different aspects of the evaluation. The *who* of evaluation is shown as central to the other elements since the stakeholders were seen to affect every aspect of the evaluation, from *why* the evaluation was being carried out, to the examination of *what* was to be evaluated and *how* it was to be done. The *what* of evaluation can include a range of measures as advocated by Mirani and Lederer (1998) who argue that any single instrument cannot capture the complexity of any evaluation. Using recognised IS measures enables a cumulative tradition to be carried forward within the discipline, although this does not preclude new measures that can account for the richness of intangibles in the complex environment of interorganisational systems. There may be social or political reasons for including a financial measure within the *what* of the evaluation as advocated by Mogollon and Raisinghani (2003), or for examining a combination of measures contained in the D&M model (2003). These should, however, not ignore the need for a consideration of intangibles, which requires that an open approach be taken when contemplating *how* the evaluation measures are to be examined. The *how* also requires a consideration of the period of evaluation. The *when*, is also influenced by the stakeholders as the different stages of e-marketplace participation involves different people from different perspectives, as well as changes in the views of stakeholders as participation progresses.

The evaluation framework reflects the connections observed between the decision on what is being evaluated, with the process of carrying out the evaluation and the timescale in which it takes place. The time element is

particularly important in the evaluation of dynamic e-commerce systems where changes can occur rapidly and where stages of development can be observed. This supports the calls in the literature for more formative evaluation and also for a greater acceptance of informal evaluation findings.

The internal and external environments were found to have a significant influence on understanding the many factors affecting the realisation of benefits and this is indicated in the framework. The social, political, cultural and economic factors are actually inherent within these environments, but are also indicated as background to the framework because of their intrinsic importance to the evaluation process.

Finally, the evaluation process becomes meaningless if there are no outcomes. Drawing on the experiences of the case study organisation, there was a recognisable layer of learning and understanding being filtered through the online bid team. The ability of the team, and other members of the procurement staff, to use that learning and understanding to disseminate their experiences, to include other stakeholders in the learning process, and to implement change, facilitated the organisation's ability to realise benefits.

CHAPTER 8

CONCLUSIONS

This study has brought together a deep examination of electronic marketplaces and an analysis of current IS evaluation literature to support the development of an evaluation framework for examining the benefits of interorganisational information systems. The research uses an interpretive case study of a multinational organisation to provide the empirical evidence necessary to inform the framework and show the complexity of participation in an IOIS. The study enabled a number of benefits from e-marketplace participation to be identified and facilitated the recognition of issues impacting on the realisation of those benefits. These issues were identified through the social, political and cultural factors affecting the organisation from the external and the internal influences that play an important role in the ability of the organisation to recognise and realise benefits. Although Alcoa has a strong history of social responsibility and commitment to its communities it is not an altruistic organisation. It exists to make a profit and its position as a leading member of the aluminium industry, with a reputation as an innovative, benchmarking organisation is vital to its well being. Nevertheless, it cannot operate with a disregard for the social and political factors that influence its environment. Its organisational culture also raises frictions in the gaining of benefits from participation in an electronic marketplace.

The process of evaluation in this study was seen to have a significant effect on the ability to recognise a wide range of different benefits,

arising from the organisation's participation in an e-marketplace. The benefits identified from the literature added up to an extensive list, but few of them have been validated by empirical evidence. Existing evaluation methods that would enable the validation of benefits remain somewhat 'mechanistic' and appear inadequate to address the complexity of interorganisational systems. For example, measurements such as financial measure or use of the system can provide evidence of success or failure of a system. They cannot supply in-depth understanding of how the success can be achieved or benefits realised. In other words they cannot provide understanding of the influences affecting an organisation's recognition and realisation of benefits. This seems particularly important at a time when systems are becoming extremely complex and pervasive affecting all aspects of an organisation's environment. The all-encompassing nature of interorganisational systems demands an interpretive approach to IS evaluation to provide a more holistic evaluation leading to understanding, rather than the existing judgement/justification outcomes of more traditional evaluation processes.

If one accepts that systems are social as well as technical entities and that the stakeholders are key to every stage from planning to post implementation, then technical measures are no longer sufficient. This questions the tradition methods of evaluation and requires more consideration of the stakeholder influences.

The use of existing evaluation methods was examined and considered to be inadequate in the identification of the influences that affect benefit realisation in a complex system such as an electronic marketplace. The complexity of the e-marketplace was unravelled by using an interpretive

lens to examine the benefits that could and should be realised through a content, context, process approach to evaluation. This approach allowed for a range of potential benefits to be identified. It enabled an appreciation of the factors, economic, social, political and cultural, that influence the realisation of those benefits. An examination of the elements of the three concepts of the CCP approach supported a deeper understanding of these factors than could be found by traditional evaluation methods such as financial measures, or use of the system.

In the discussion of the findings, other measures of evaluation such as user satisfaction were considered. A number of cultural issues were identified as frictions that were unexpected given Alcoa's role as an international organisation. These frictions were identified by a range of people at different times and are thought to be more related to momentary or temporary stresses than real evidence of dissatisfaction. The irritations caused by the frictions came from both those who had a very positive view of the system and from less enthusiastic stakeholders and were not consistent over the times of the research meetings and interviews. This highlights the shortcomings of a survey approach to evaluating satisfaction, where a more negative or positive approach may dominate because of immediate circumstance. This relates to Schofield's (2002) recognition of the advantages of the rolling film approach of ongoing interpretive evaluation over the snapshot effect of the positivist approach. The former approach enabled the relationship between greater acceptance of the system by internal customers and suppliers, and the actions of the procurement staff to be identified. The inclusiveness of the customers in the e-marketplace processes, and the learning support given to suppliers, enhanced satisfaction with the system. This supports the

importance of longitudinal approaches to evaluation to track the changes in attitudes of the stakeholders.

Use of the system is another traditional measure of IS evaluation; one that is slightly more problematic in the area of e-commerce evaluation. Use in these circumstances is often mandatory. Although DeLone and McLean (2003) argue that use is never completely mandatory as there is choice at some level within the organisation. In this case, as in many cases, the decision-making is rarely within the control of stakeholders in the study. Use was driven by the market conditions of the aluminium industry, mandated by senior management, but influenced by the procurement staff. Over the period of the evaluation, the procurement staff increased the use of the auction process and became less accepting of customers' applications for exemption. This was connected both to increasing confidence in the procurement staff, and to their ability to increase acceptance of the system amongst the customers. Measuring use of the system as the main criteria for assessing benefits would curtail recognition of the benefits, although as an element of an evaluation it would enable different perspectives to be identified. For example, in this case study, use was strongly influenced by the external environment conditions and the nature of use varied according to stakeholder needs. Senior management needed evidence of cost savings, suppliers needed evidence of trust, procurement staff needed to be seen as efficient and regional communities required evidence of commitment and economic benefit.

In the process of moving to the electronic marketplace, Alcoa has had to balance the organisation's need against the economic, social and political effects of the initiative. These are not mutually exclusive, and the

economic has dominated, but consideration of all the factors has enhanced their ability to realise a wider range of benefits. For example, the organisation's recognition of the social and political pressures of the local communities surrounding the refineries has enabled them to mitigate some of the adverse effects of widening the supplier base. In return they have also found economic benefits from the identification of highly skilled, cost effective local suppliers overlooked for the larger contracts of the offline procurement methods.

The process of evaluation has been seen to affect the recognition of benefits and the organisation's ability to realise them. By identifying the many factors, from the economic to the social, the political to the cultural, that influence the benefits, it has been possible for the organisation to mitigate the effects impacting the desired economic advantages.

The longitudinal approach to the research identified the way in which Alcoa was able to increase benefit realisation over the period of study. With hindsight it was possible to identify the stages of participation as the procurement staff gathered confidence and gained experience in the marketplace processes. The awareness and planning stages were carried out at senior management level as they responded to market conditions in the aluminium industry. Adoption of the e-marketplace, Stage 3, gave confirmation of the cost savings sought as the principal reason for participation, and enabled identification of other benefits. It was the increase in use of the system that saw the recognition of frictions and the realisation of benefits beyond that of cost savings. Greater use brought more confidence to the procurement staff and more consideration of the issues that affected the perceived benefits. There was recognition of the

issues of ownership, handling and sharing of information, the disadvantages, as well as advantages of transparency in the processes, and a greater awareness of the market in terms of price, supplier behaviour and market capabilities. Towards the end of the research period, a stage of maturity was identified that was enabling greater realisation of economic benefits by addressing a range of social, political and cultural issues. This included consultation and information sharing with internal customers, enhancing e-capabilities of suppliers and encouraging them to extend their markets, and adopting auction mechanisms to support local suppliers. This stage was characterised by the ability of the procurement staff to learn from their gathering experience and to apply that learning throughout the procurement system.

Finally, the benefits that were potentially obtainable from a second e-marketplace were considered in the light of Alcoa's experience with FreeMarkets. Many of the benefits identified from participating in FreeMarkets' system are believed to be achievable from the consortium marketplace considered (Quadrem). These included enhancing e-capabilities of staff, time saving, information, widening the supplier base and cost savings. However, the relationship between the market makers and the buyers in the two marketplaces were substantially different and this will inevitably alter the way in which participants interact. One area that will bring a completely different, but as yet undefined, range of benefits is the move towards networking of marketplaces. As Quadrem develops links to other marketplaces, such as Elemica and Dovebid, participants will have the opportunity to extend their activities, and their achievable benefits, through network effects. In contrast, FreeMarkets is developing its business model to offer a wider range of supply

management tools and will, therefore, be offering more benefits from this area.

Overall, there is a range of different benefits available to buyers in the e-marketplace environment. Assessing the benefits, and their significance to an organisation, requires effective evaluation processes that encompass the complexity of the external and internal environments of the participating organisation. In this regard, the elements of the CCP constructs, influenced by the internal and external environments, are essential to effective evaluation. The case study has been used to inform an initial evaluation framework, based on IS literature. The revised framework (Figure 14) supports the call for more inclusive and interpretive evaluation studies.

In the case study example, the external environment had a considerable influence on the original decision to seek cost savings via participation in an e-marketplace. The downturn in aluminium prices, the uncertainty in the Asian market and the competition from new developments in the steel industry demanded some action from Alcoa's management. Participation was, therefore, based on the premise of cost savings being obtainable. The internal structures and culture of the case organisation had a major impact on the way the organisation moved into the e-marketplace, and then influenced the benefits that could be readily realised and those that required more negotiation or adjustment to realise.

Although the primary driver for participation was economic, the social political and cultural factors that came into play were influential in their effect on the identification and realisation of benefits.

CHAPTER 9

LIMITATIONS AND FURTHER RESEARCH

As with any research there are identifiable limitations to this study. This research was based on a single case study and as such, it concentrates on the empirical evidence from one organisation. Despite addressing the argument for generalisability of the case, there are inevitably limitations to the conclusions that can be drawn. The identifiable limitations inform the call for further research to be conducted that will further extend the identification and realisation of benefits that can be gained from interorganisational information systems. In this final chapter, the limitations of the research are identified and then used to inform suggestions for further research. Further research is required to advance the work being carried out in identifying the effects of e-marketplace participation. It is also necessary if IS evaluation research is to continue to retain academic rigour, while having relevance to the evaluation processes of organisations.

9.1 Limitations of the research

The limitations of the research have been identified as follows:

- ♦ This research used a single case study approach to examine the benefits identified by one organisation using one type of e-marketplace. Although some comparisons were drawn with potential benefits that might be gained from another e-marketplace, further empirical evidence is needed to examine an actual participant of the second e-marketplace.

- ♦ Alcoa uses a variety of e-business systems in its procurement toolbag and utilised the e-marketplace mainly for auctions. This excluded an examination of the use of a range of other transaction mechanisms, which in Alcoa's case are organised internally and not through an electronic marketplace.
- ♦ The case study was conducted from the buying organisation's perspective. Although two suppliers and two e-marketplace staff were interviewed, data gathered were used mainly to validate the buyer's perspective.
- ♦ The research dealt primarily with large organisations from both the case study and the market maker perspective. The power asymmetry that lies with large organisations usually acts in their favour and there is a scarcity of evidence that benefits identified from the marketplace would be available to smaller organisations. In this study the evidence of such benefits was reported by Alcoa rather than the suppliers, who were more concerned with the effects of Alcoa's marketplace strategy than with recognising the benefits they might themselves accrue.
- ♦ The case study organisation has a reputation as an innovative organisation that puts it at the leading edge of e-procurement and e-marketplace use. There are distinct advantages for less innovative organisations in learning from the experiences of the case study. However, there are likely to be differences in their ability to realise the benefits identified. This may apply both to organisations in different industries and to other organisations within the mining and metals sector.

- ♦ The evaluation framework has been empirically tested against the case study findings. However, it has been designed from an academic perspective, using the literature and academic theory to develop the constructs. If it is to be of relevance to organisations, there is a requirement for it to be tested by organisation to assess its viability as a business tool.

The limitations identified here relate largely to the use of a single case study in the research. This is not to deny the value of the case study method, but to highlight that the outcomes cannot be universally generalised. Rather, the outcomes can be used to inform other organisations of the concepts and conclusions that may be applicable to their own case. Additionally, the case study findings, based on the analysis of an innovative organisation, can be used to illuminate the ways that e-marketplace participation might progress. As with all research there is a requirement to extend it, to test and validate the findings in different circumstances and in different areas. Possible research directions are discussed in the following section.

9.2 Further Research

The future directions for research arising from this study lie in two areas: evaluation research and in the further examination of electronic marketplace participation.

9.2.1 Evaluation Research

The literature on evaluation research in information systems is rich and varied. It covers a range of approaches, although increasingly it addresses the use of interpretive, holistic evaluation processes as used in this study.

Future paths for IS evaluation research, as developed from this study, are identified as follows:

- ♦ The evaluation framework developed from the case study findings requires further validation, both from an academic and a practitioner perspective, using a range of organisations. The framework is intended to support evaluation of complex e-commerce systems, but has, as yet, only been tested on e-marketplace participation.
- ♦ There are indications in the literature that organisational change is an implicit requirement of successful evaluation outcomes (Serafeimidis & Smithson, 2000). There was some support for this, indicated by the findings where aversion to change was identified in the early stages of participation, but the subject area of organisational change was not explored. The relationship between evaluation and organisational change is identified as an important future direction for evaluation research.
- ♦ There remains a gap between those who advocate the interpretive approach to IS evaluation and those who remain convinced of the value of more traditional ways of assessing a system's worth, particularly through financial measures. Research appears to be conducted on an either/or basis and there is no empirical evidence of direct comparisons within one case being carried out. Given the business need for firms to be seen to make financial evaluations, there is a gap in the research on identifying how the two streams of evaluation theory can be more united. The framework presented in this study allows for the inclusion of financial assessments within the *what* of the evaluation context. If this is to achieve more than a concession to tradition, further research is required to develop

effective processes for including the conventional with the interpretive approaches to evaluation.

9.2.2 E-marketplace Participation

Electronic marketplaces will continue to be an area requiring research if the benefits of participation are to be realised and the real potential from the electronic environment is to be achieved. There remains a concentration of research on the technical aspects that are used to inform the social and political effects of participation. Substantial future research from the perspective of e-marketplaces as social and political entities is required. Suggestions for some key areas are as follows:

- ♦ There is a need for greater understanding of the effects of participation on relationships. These include not only buyer/supplier but also internal and external stakeholders affected by the e-environment. Such research should be grounded in the interpretive paradigm to assess the range of effects that impact on relationships and how these can be successfully addressed.
- ♦ E-marketplaces have the potential to support any size of organisation planning to extend their trading across regional boundaries. Currently the emphasis lies in favour of large organisations that have the resources to move into the new environment. Smaller companies identified through the case study were pulled into the marketplace because of their relationship with Alcoa. As yet few of them have used their new capabilities to search for other business, or to identify other marketplaces more suited to their needs. More research should be directed at supporting the development of small and medium sized businesses through the stages of participation.

- ♦ The case study organisation expressed several concerns about the lack of knowledge over which transaction mechanisms best suited different products and services. The traditional offline differentiation between spot and systematic sourcing does not appear to hold in the online environment and Alcoa has been quite experimental in putting a wide range of goods and services to auction. There would be great benefits to be gained from a real understanding of how far the traditional procurement methods are mirrored by the online transaction mechanisms and what differences do actually exist.
- ♦ An appreciation of what benefits suppliers can realise from participation in e-marketplaces will greatly enhance the understanding of participation. Such research can support suppliers that are brought into the marketplace by their buyers to extend their participation and realisation of benefits. It would also be of benefit in encouraging new suppliers to the electronic environment.
- ♦ The trend of connections developing between marketplaces is in its infancy, but there are indications that it will become a significant development, offering a range of benefits from the network effects. To date little empirical research has been conducted to determine the implications of this trend.

On a more general note, there is a need for more case studies and empirical evidence to investigate the many aspects of electronic marketplaces. This includes the benefits to be gained, the impact of global sourcing on regional areas, the drivers and barriers to more widespread participation, network effects, market makers' business models and the validation of the constructs of e-marketplace theory.

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APPENDIX A

LIST OF TERMS AND ABBREVIATIONS

Aggregation

Aggregation in online auctions refers to the ability of the auction process to unify bids across regional areas to enable suppliers to bid for complex contracts. Traditionally, such contracts would be awarded on a regional area for cost reasons.

Aluminium (*British*)/Aluminum (*US*) and Alumina

Aluminium is the name of the metal. Alumina is the common name for aluminium oxide, a naturally occurring white powder that is used in the production of aluminium.

Bots/agent bots

An Internet program used to perform a repetitive function (e.g. posting a message to multiple newsgroups or searching for information). Bots are also used for comparison shopping to identify the best price in both B2B and B2C situations. Agent bots can be programmed to transmit summary files on specific dates or to send alerts when a certain price has been located.

Cybermediaries

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A term that plays on the use of 'cyber' to refer to many online functions, a cybermediary refers to an intermediary that operates in the online B2B environment.

Disaggregation

Disaggregation enables online auctions to be adapted to local or regional conditions. For example, where there is a restricted regional supplier base, a larger contract can be cost effectively separated into smaller contracts. Disaggregating the contract enables smaller companies to effectively bid for work.

Disintermediation

There is a school of thought that argues that the Internet supports greater interaction between customers and manufacturers. This reduces the value and cost of the intermediary in the supply chain, thereby leading to a process of disintermediation.

Dutch Auction

In a Dutch auction, an item is offered at a price that progressively runs down (reverse auction) until a buyer makes a bid at the price they are prepared to pay. The movement in price may be called by the auctioneer, or recorded by an auction clock that indicates the current price until a bid is made. References to forward Dutch auctions where the price rises until stopped are evident on the Internet, but are rare.

E-Hub

The term is used synonymously with electronic marketplace.

Electronic Marketplace

An interorganisational information system that allows multiple buyers and sellers, and other stakeholders, to communicate and transact through a dynamic central market space, supported by additional services.

English Auction

This is the most common type of auction, where participants bid either up (forward auction) or down (reverse auction) from a starting price. In a B2B electronic auction, there is a range of mechanisms for determining the starting price. For example in a buyer run auction, the buyer can set the starting price. Alternatively, it can be set by pre-qualifying bids submitted by participating suppliers, first bid placed by the suppliers or by a pre-submitted sealed bid, opened and recorded at the start of the auction.

Exchange

The term exchange is often used interchangeably with electronic marketplace. However, exchange is also used in the B2B environment to refer to a transaction mechanism that reflects traditional offline exchanges' sale of commodities. For example, the London Metals Exchange has an online site that functions as an exchange for the sale of metals.

Forward auction

See also English auction and Dutch auction. In a forward auction the bidding runs up from a starting price.

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FullSource

FreeMarkets' FullSource auctions are run by FreeMarkets, through their own server, on behalf of their clients. FreeMarkets has a substantial database of vetted suppliers that is used, in conjunction with the client's database, to compile a list of suppliers to be invited to the auction.

Generalisability

The application of findings from research to other settings or cases. Generally recognised as an outcome from quantitative research, the arguments for generalisability in qualitative research centre on the ability of other cases to learn from qualitative case studies.

Hermeneutics

Originally developed as a term for the interpretation of biblical texts, hermeneutics is now recognised as an interpretive methodology. It is concerned with the meaning of text and seeks to make sense of the context from which the text originates. The hermeneutic circle reflects the iterative nature of hermeneutics that requires reflecting and revisiting of meanings until the whole is understood through the parts of the text.

Horizontal E-marketplace

A horizontal e-marketplace operates across a range of industries and does not specialise in one particular industry sector. A horizontal e-marketplace such as FreeMarkets can offer its clients expertise in specific areas, but they do not restrict themselves to clients from a single industry.

IEPC

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Internet Electronic Product Catalogue. An online catalogue that reflects the function of the traditional printed catalogue, but has dynamic pricing (continually updated) and incorporates a number of automated services. These may include online ordering and payments, customer support and tracking of deliveries.

Intelligent agent

See bot

Intermediation

Intermediation is the role of intermediaries in the marketplace. These intermediaries, or middlemen, may include wholesalers, financiers, insurers, transporters and warehouses.

IOIS

Interorganisational information systems. An information system that links two or more organisations: for example, Electronic Marketplaces.

JIT/Just in Time

A strategic philosophy of manufacturing involving the total elimination of waste. In simple terms, just-in-time is a system of supplying to each process what is needed, at the time it is needed, and in the quantity it is needed. It is most commonly used in inventory control, where deliveries are timed to keep inventory holdings to a minimum.

Network Effects

Network effects occur in an e-marketplace when there are increasing potential benefits resulting from an increasing number of participants.

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As more buyers and sellers participate the benefits increase because the amount of information and range of choice increases, whereas prices do not necessarily increase.

NVivo

A software program for qualitative data analysis.

Portal

A website that provides access and links to other sites and pages on the Web. A portal aggregates information and offers value by channelling its users to the sites of product and service providers. Yahoo is one of the most commonly cited examples of a portal.

QuickSource

FreeMarkets has extended its range of services to include the QuickSource software package. QuickSource enables clients to run their own auctions and a range of other services, such as online negotiations.

Re-intermediation

The process of reintroducing intermediaries to the online business environment, where a 'new breed' of intermediaries are adding value to the supply chain by offering a wide range of services to a large number of buyers and sellers.

Reverse Auction

See also English auction and Dutch auction. In a reverse auction the bidding runs down from the starting price.

RFB

Request for Bid. See Request for Quotation

RFQ

Request for Quotation. An RFQ is issued when an organisation wishes to buy a product or service. It makes the specifications available to suppliers and invites them to submit competitive bids. Electronic marketplaces with negotiation mechanisms support the RFQ process online.

Spot sourcing

The purchase of goods or services for immediate need. The lowest cost is sought, as there is little requirement for a relationship between buyer and seller. Commodity trading is seen as an exemplar of spot sourcing.

Systematic sourcing

The purchase of goods and services through negotiated contract. The nature of the goods and services often requires that a relationship be developed between buyers and sellers. These relational exchanges offer intangible benefits to both parties that encourages the maintenance of the alliance.

Transformational bidding

An online auction gains flexibility by allowing weightings to be added to a bidder's prices. For example, a buyer running an auction may add a weighting to the incumbent supplier's bid to take into account the cost of switching suppliers or to favour a local supplier. Transformational

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bidding is considered a sensitive mechanism as it is not openly apparent to the bidders.

Vertical e-marketplace

A vertical e-marketplace is industry specific. For example, Covisint is an automotive e-marketplace where the participants are buyers and suppliers from the automotive industry. This does not restrict non industry specific goods from being traded in a vertical marketplace, but the majority of participants will be members of one particular industry.

WA

The State of Western Australia

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APPENDIX B

WEBSITES

Website	Industry Focus	URL
2Cities	The twin cities of Joondalup and Wanneroo in Western Australia have developed a Regional Electronic Marketplace (REM). Its purpose is to provide e-procurement solutions for local businesses and organisations	www.2cities.com.au
Alcoa	Home page of the Alcoa World Alumina, Australia	www.alcoa.com.au
AuctionsPlus	An electronic marketplace for the Australian livestock industry, specialising in auctions	www.auctionsplus.com.au
Australia Institute	An independent public policy research centre. It is funded by grants from philanthropic trusts, memberships and commissioned research	www.tai.org.au
Covisint	Consortium owned electronic marketplace for the automotive industry	www.covisint.com
Dovebid	The company runs non-industry specific auctions of capital assets and carries out valuations of industrial assets.	www.dovebid.com

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Elemica	A consortium owned e-marketplace for the chemical industry. Transactions are primarily through online catalogues. Elemica has associations with a number of other electronic marketplaces.	www.elemica.com
EmarketServices	E-marketplace information source. It provides knowledge and information about electronic markets across many industries. It is funded by trade promotion organisations from several countries and is operated on a not for profit basis	www.emarketservices.com
E-steel	E-steel was an early example of an intermediary owned B2B e-marketplace for the steel industry. In 2001 it changed its name to Newview and expanded into an 'inter-enterprise business process software innovator'. However, it continues to maintain the e-steel exchange	www.e-steel.com www.newview.com
FreeMarkets	A non-industry specific, e-marketplace that specialises in auctions. FreeMarkets is one of the earliest established intermediary owned marketplaces (1995).	www.freemarkets.com

Grainger	Grainger is a leading distributor of industrial supplies in North America. Its online service specialises in electronic catalogues.	www.grainger.com
Konkurse	Konkurse is an information and trading service that specialises in surplus inventory and insolvency sales. It conducts auctions for a wide range of products. (The company is based in Germany and the website is in German. It is included as an excellent example of a surplus inventory e-marketplace)	www.konkurse.com
London Metals Exchange	The LME diverged from the Royal Exchange in 1877 to standardise activity in metals trading in the UK. It is now one of the world's leading markets for non-ferrous metals.	www.lme.com
Quadrem	A consortium owned mining and metals e-marketplace. It has online catalogues and some auction facilities.	www.quadrem.com
SWIM	SWIM (South West Internet Marketplace) is a regional e-marketplace run by the Bunbury Chamber of Commerce. It is linked into a local area community site and encourages online trading by local businesses.	www.mysouthwest.com.au

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Trade-Ranger	A consortium owned e-marketplace for the oil and gas industry. The site offers online catalogues, actions and exchange mechanisms	www.trade-ranger.com
Vendorbase	Vendorbase specialises in auctioning excess technology products. It offers a service to locate hard-to-find computer parts for business customers and auctions excess, obsolete, off-lease, and refurbished IT equipment.	www.vendorbase.com