E-business performance measurement:
Internal processes explored

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## Abbreviations and acknowledgements

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>B2B</td>
<td>Business to business e-commerce</td>
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<tr>
<td>B2C</td>
<td>Business to consumer e-commerce</td>
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<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
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<td>EDI</td>
<td>Electronic data interchange</td>
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<td>EFQM</td>
<td>European foundation for quality management</td>
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<td>ERP</td>
<td>Enterprise resource planning</td>
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<tr>
<td>ICT</td>
<td>Information and communication technologies</td>
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<td>JIT</td>
<td>Just-in-time</td>
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<td>MRP</td>
<td>Materials requirements planning</td>
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<td>ONS</td>
<td>Office of national statistics</td>
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<td>TQM</td>
<td>Total quality management</td>
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We would like to thank CIMA (the Chartered Institute of Management Accountants), OUBS (the Open University Business School) and the numerous case study collaborators.
Executive summary

This project examines the impact of e-business practices for internal performance measurement. Using a case study approach, we investigate twelve companies in different industries, including both manufacturers and service providers. The cases include companies undertaking business to business (B2B) and business-to-consumer (B2C) e-commerce, and clicks-and-mortar converts to e-business as well as dotcom start-ups.

The key finding from the study is that there is little performance evaluation taking place despite a desire amongst organisations to do so. Currently, there is no agreement as to which performance measures are effective, or how accurate such measures are. We observe widespread difficulty facing businesses in trying to measure the benefits of e-business.

This study has developed a framework that allows e-business performance to be mapped at various stages. We look at the investment decision, operational processes, and delivery or end-state measures.

We recommended that organisations should map their performance activity and that management accountants should play a key part in this. Further, that a comprehensive set of measures should be developed to help drive performance activity.

Our findings highlight that organisations should not just implement new technology without considering how the new technology can redesign their processes. And organisations, management accountants and academic researchers should seek ways of tracking the positive impact of e-business benefits. We conclude that management accountants should be encouraged to promote the use of both qualitative and quantitative performance measures within their organisations and organisations should attempt to map their performance activity.

We believe that this is an important area of research and recommend further study to discover the extent of performance measurement in other e-businesses.
E-business has been defined as
 ‘the sharing of business information, maintaining business
relationships, and conducting business transactions by
means of telecommunications’ (Zwass, 1996).

At its simplest, electronic business may be defined as
 ‘doing business electronically across the extended
enterprise’ (Till, 1998).

In the late 1990s, new technologies started to be developed
that have enabled the Internet to be exploited commercially.
This has led to the emergence of e-businesses that have
incorporated the use of the Internet into their operations.
These can be dotcoms who undertake most of their activities
online or traditional bricks-and-mortar businesses, who have
transformed themselves to become clicks-and-mortar
businesses.

Although much attention has been focussed on these new
e-businesses, it is unclear what impact adoption of e-business
practices is having on the way performance of e-business
processes is measured. Some recent research suggests that
different approaches towards business performance
measurement has implications for the practice of
management accounting (Marr, 2000). Consequently, the
principal objective of the research reported herein is:

‘To investigate the performance measurement implications
of e-business and identify how this differs from more
mainstream approaches, given e-business’ role in
integrating the value chain.’

This research was undertaken as an integral part of a larger
empirical study being undertaken at the Open University
Business School (OUBS) investigating the impact of
e-business on the internal business processes of
organisations. Particular focus was placed on understanding
how organisations engaged in e-business, operate their
business processes for order fulfilment and delivery, and
whether there were any common patterns. This was based on
case studies of different organisational types, including
examples of B2B (business to business) and B2C (business to
consumer) e-businesses, using interview based qualitative
research methods.

We undertook extended interviews in the first 12
organisations in the existing study. These were designed to
probe key staff specifically involved in the performance
measurement process.

The rest of this report is structured as follows. Section 2
reviews the literature and develops the framework. Section 3
describes the research methodology. Section 4 presents the
case study findings, Section 5 the analysis and Section 6
presents the conclusions. Finally, Section 7 provides a
summary and sets out recommendations and plans for
further research. The substantive project is described in more
detail in Appendix A.

Note:
Some writers seek to distinguish between the terms e-business and
e-commerce. However, this report seeks to make no such distinction,
and is happy to use the terms more or less interchangeably.
2. Literature review

2.1 The growth of e-business
The growth of e-business applications has been identified as a key area for business process innovation. The commercial application of the Internet and worldwide web (www) has been driven by developments in the USA, where 42% of US capital investment is spent on enhancing information technology annually. Furthermore, 35% of growth in US gross domestic product has been associated with growth in information technology (Papows, 1999). In addition, online business trade of goods is set to grow from $43 billion in 1998 to $1.3 trillion by 2003 according to Putman (1999).

In the UK an estimated 63% of companies have a web site (ONS, 2001) and total e-commerce revenues were worth over £11 billion in 2000 and are forecast to rise to nearly £200 billion by 2004 (Forrester, 2002). There are many claims being made about the impact of the Internet and e-business. Consequently, it is proving difficult for consumers and businesses alike to distinguish between the hype and the reality.

This new technology has the capability to radically transform some industry sectors and supply chains, regardless of whether they are service or manufacturing based. Current developments are driven not by changes in production and transportation but by changes in co-ordination, reflecting a new emphasis on the interaction between a wide variety of managers, brokers and agents ranging across global as well as organisational boundaries. As Evans and Wurster (2000) explain:

‘Information is the glue that holds value chains and supply chains together. But that glue is now melting. The fundamental cause is the explosion in connectivity and in the information standards that are enabling the open and almost cost-free exchange of a widening universe of rich information. When everyone can communicate richly with everyone else, the narrow, hardwired communication channels that used to tie people together simply become obsolete. And so do all the business structures that created those channels or exploit them for competitive advantage’.

These processes are equally as important in e-business as they are in traditional business. Whilst a web site might capture or even create demand, the concomitant supply required for customer satisfaction, depends on effective and efficient operations management. The management of the e-business supply processes appears to be a neglected area of study. However there seems to be a growing recognition that successful e-business depends on the business processes that facilitate order fulfilment and delivery (e.g. Keating et al., 1999; Hall, 2000).

The way that these business processes are managed in e-business may vary according to a number of factors, including:

- The types of e-business – business to business (B2B) or business to consumer (B2C).
- The product – whether physical goods or intangible services are dominant.
- Whether the organisation is solely e-business based or also engages in traditional business.
- Whether order fulfilment and delivery processes for e-business are integral to, or separate from, these processes for any traditional business being conducted.
- Approaches to performance measurement.
- Organisational objectives – profit seeking or not for profits.
- Organisational size – multi-national, SME, etc.
- The fit with existing information systems and business processes.

E-business is a young field of study and most of the published work has come from practitioner journals. There have, to date, been few examples of e-business related research being reported in the academic journals. There seems to be a dearth of published research examining the impact of e-business on internal business processes, although there has been some work examining its impact on external supply chains (e.g. McIvor et al., 2000; Evans and Wurster, 2000). Research in this area can also usefully draw on studies of what in many respects is the precursor of e-business, EDI (e.g. Threkel and Kavan, 1999; Hinton and Lawrenson, 2000).

Appendix A offers a more detailed exploration of the literature relating the importance of e-commerce business processes and a theoretical framework for their study. This section continues by highlighting some of the key issues for the performance management agenda. These are then discussed with respect to their impact on e-business performance appraisal.
2.2 The performance perspective
Accounting measures of performance have been the traditional mainstay of quantitative approaches to organisational performance measurement (Otley, 2001). However, there has been much dissatisfaction with using financial measures to evaluate business performance. Many organisations worry that financial figures are better at measuring the consequences of past decisions than they are at indicating future performance (for example earnings per share). In addition, traditional accounting measures often fail to support the investments in new technologies and markets that are essential for successful future performance (Eccles, 1991). In recent years, a great deal of attention has been paid to the development and use of non-financial performance measures. A range of specific indicators has emerged whereby performance is assessed against externally oriented measures as opposed to the internal, historical focus of financial measures. These include, for example, assessments of the quality of products and services, such as defect rates, response times, delivery commitments and so on. This has meant that performance can be assessed throughout a supply chain, spanning the operations of several organisations. Three further areas for non-financial measures are market share, customer satisfaction and benchmarking. Benchmarking involves identifying competitors and organisations in other industry sectors that exemplify best practice in some process or activity, and comparing performance. The external emphasis of benchmarking leads to radical improvements which would not be recognised by internally focused measures (Holloway et al., 1999). Given this new perspective, Kaplan (1995) observes that there is a clear need for management accountants to accept the validity of less quantifiable benefits and to translate strategic intent into operational and managerial measures. Furthermore, Kaplan points out management accountants need to move away from being ‘score keepers of the past to become designers of the organisations critical management information systems’. With part of this message in mind, a number of approaches have been developed which attempt to bring together financial and non-financial measures into one coherent framework. The most widely used approaches are the balanced scorecard and the European Foundation for Quality Management (EFQM) scheme. The balanced scorecard (Kaplan and Norton, 1996) has proved particularly popular because it makes an explicit link between the strategies advocated by an organisation and the performance measures used to monitor and control strategic implementation. There is not an all encompassing set of measures that are suitable for all organisations, rather specific measures need to be devised for specific circumstances. Furthermore, this approach develops performance measures which map on to the main organisational stakeholders (financial, customer, business process, and innovation and learning) so that key success factors are identified in each area (Otley, 2002). This helps to make the distinction between capital investment appraisal and on-going performance.

2.3 Performance issues in e-business
Information technology (IT) has long been used as a change agent leading to greater efficiency and effectiveness. The growth of the Internet and the opportunities this offers for e-business represent the latest phase in the application of IT. Whether for dotcom start-ups or for established organisations converting to clicks-and-mortar, the move to e-business requires considerable financial investment, not just in IT but in changing processes and people. A recent questionnaire, explored the degree of e-commerce activity taking place, how and why organisations are engaged in e-commerce, and the factors that inhibit its development (Hinton and Lawrenson, 2000). Respondents from 954 organisations identified what they perceived to be the main barriers to e-commerce development. These are shown in Table 2.1:

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Respondents</th>
<th>%</th>
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<tbody>
<tr>
<td>Process change</td>
<td>447</td>
<td>46.8</td>
</tr>
<tr>
<td>Linkup with existing systems (legacy problems)</td>
<td>436</td>
<td>45.7</td>
</tr>
<tr>
<td>Implementation cost and financial barriers</td>
<td>361</td>
<td>37.8</td>
</tr>
<tr>
<td>IT skills shortage</td>
<td>342</td>
<td>35.8</td>
</tr>
<tr>
<td>Lack of customer take up</td>
<td>329</td>
<td>34.5</td>
</tr>
<tr>
<td>Transaction security</td>
<td>278</td>
<td>29.1</td>
</tr>
<tr>
<td>Lack of proven benefits</td>
<td>250</td>
<td>26.4</td>
</tr>
<tr>
<td>Legal issues</td>
<td>238</td>
<td>25.1</td>
</tr>
</tbody>
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Total number of respondents = 954
The three main barriers posed by process change, technical system legacy and implementation cost can all be seen as within an organisation’s control. By contrast, the other barriers tend to fall beyond organisational boundaries and are issues for government, specific industry sectors and the wider economy. How then do companies justify such investments, and having made the investment how should they evaluate its worth? To do this requires some kind of performance measurement system for e-business. However, this is problematic as a wide variety of new e-business models have emerged which offer the potential for generating new revenues or savings through electronically enabled processes. E-business offers the potential for incremental process change (for example reduced cycle times, better sales and marketing activity), and/or radical process change (through deconstruction and disintermediation, i.e. dismantling and reformulation of traditional business structures). Consequently, the degree of integration with existing processes varies widely. Accordingly, it is difficult to disaggregate the contribution of e-commerce channels from the entire portfolio of traditional business channels. Marr and Neely (2001) suggest that whilst these new business models have been explored, their performance measurement approaches and needs have not. For these reasons, creating a single benchmark or set of all-encompassing performance measures for e-commerce applications is not feasible (Jutla et al., 1999). Applegate and Collura (2000) have identified a value framework which includes operating performance, knowledge assets, community penetration and brand equity. However, this has yet to be translated into a set of measures which can be applied generically.

Whilst the dotcom companies do not have a historic framework for investment appraisal it might be expected that longer established businesses would adopt a more hard-headed approach to investments in e-business. It might, therefore, be expected that such clicks-and-mortar organisations would have clarity in their objectives for their e-business and about the level of performance from their e-operations needed to achieve those objectives. Thus, it might be expected that successful established businesses would follow good practice by setting clear business objectives in e-business and by linking those objectives to operational performance that can be measured through an appropriate performance measurement system (Neely et al., 1996). However, investment in IT generally has proved problematic as a number of intangible elements exist that cannot be measured easily if at all (Hinton and Kaye, 1996). Equally, there has been a failure to establish any relationship between IT investments and productivity gains (Lucas, 1999; Strassmann, 1999; Ward et al., 1996).

Many companies have found that whilst setting up a website is relatively easy the fulfilment of orders offline is problematic because systems are not sufficiently efficient to seamlessly pass on order information and complete the order without error and/or delay (Cox and Dale, 2001). Unless the goods and services required by customers are produced efficiently and delivered effectively, neither customer satisfaction nor profitability can be achieved (McGuffog, 1999). Achieving a competitive advantage in e-commerce depends on the extent to which the increase in connectivity offered by the Internet can be harnessed to improve efficiency and effectiveness in the business processes that produce and deliver goods and services. As Dedhia (2001) argues success in the e-economy demands ‘continuous business improvements … (from) … quality and business process breakthroughs … (and) … constant improvements in responding to customers’. Proponents of Total Quality Management (TQM) have long advocated its application to an organisation’s business processes as a means of achieving simultaneous improvements in efficiency and effectiveness. Consequently, Chou (2001) calls for the integration of TQM into e-commerce. Dale et al. (2000) also note the potential for TQM to ensure the effective management of key processes necessary for success in e-commerce. The importance of the management of business processes to the achievement of business excellence and quality improvement are emphasised by the central role assigned to them in many of the models of business excellence, like those of the EFQM and Baldrige National Quality Award. The next section attempts to make sense of the disparate areas where performance measures have been used to assess e-business applications.

### 2.4 A framework for understanding e-business performance assessment

The literature suggests that there are four areas where the performance measurement of internal business process in e-business may be assessed. These are:

- Investment measures surrounding the selection and implementation of an e-commerce system.
- Performance measures for incremental process improvements.
- Performance of radical process changes.
- End-state measures surrounding the performance of the end product or service.
Investment measures

Investment measures reflect the financial appraisal organisations engage in when making significant investments, especially in new technologies. Some of the reasons why this is problematic have already been discussed, but it is worth noting that the processes that an e-business application will influence are not taken into account using traditional investment measures such as economic ratio appraisal (e.g. payback, return on capital employed, cost benefit analysis) or economic discounting appraisal (e.g. net present value, internal rate of return). One notable exception is the work of Lloyd et al. (2000) who have explored new process-focused measures, including analysis of the configuration of processes, in an attempt to assess process-technology interactions that may lead to competitive advantage. This appraisal method allows investments to be compared by profile, rather than by simple metrics such as NPV or payback in which most of the underlying assumptions are obscured. Irani and Love (2002) report a shift in the post-implementation evaluation of information systems from a process embedded in capital budgeting to one that recognises IT as integral to the fabric of an organisation’s infrastructure and as such a necessity rather than a choice. There appears to be little controversy that traditional capital budgeting is still valuable, but the contentious issue is the degree of involvement financial appraisal should play.

‘Conversely, the lack of widespread application of many strategic, analytical and integrated techniques, which would appear to partly address many of the shortcomings, may be considered to be due to their complexity, subjectivity and high dependency on resource for selection and application’ (Irani and Love, 2002).

Performance measures

There is potential to measure the performance of e-business applications by applying conventional process and value chain measures to internal business processes and external operational processes at various points in a supply chain. This is easier to achieve where e-commerce has created incremental process improvements, as processes are fundamentally the same as with traditional business processes. By contrast, where e-commerce leads to radical process changes, as with a reconfigured business model, it is more difficult to devise measures for performance. Radical process changes represent a slimlining of business processes which often leads to a blurring of both inter and intra-organisational boundaries, making performance identification problematic (Chorafas, 2001; Evans and Wurster, 2000).

With business conducted electronically, managing performance means measuring both business processes and IT systems, because the two are inextricably linked and not always easily distinguished. This has given rise to a range of technical performance measures that seek to measure the relative performance of the system response times, information flow and scalability in terms of the number of users and transactions a system can support (Jutla et al. 1999). However, it should be noted that these measures only show the performance of the systems supporting the business processes and are not substitute for measuring the processes themselves.

End state measures

End state measures attempt to capture the performance of the fulfilment and delivery of goods and services. In traditional business processes this may include assessments of customer satisfaction, sales and marketing activity. For example, WebQual is a method of providing customer-focused evaluation of web sites. The method is based on the SERVQUAL methodology normally used in more traditional business scenarios. Initial research suggests that WebQual can detect subtle differences in how Internet stores interact with customers (Barnes and Vidgen, 2001). A further area for e-business performance assessment centres on the measurement of web page hits and the subsequent ratios with customers generated and repeat customers.

Figure 2.1 attempts to make sense of the key performance areas in terms of business process flow:
3. Research design

3.1 Rationale
This research is empirically based, its main aim being to identify current, emerging practice in the management of e-operations. As such, the research is essentially descriptive in character. This, as Meredith et al. (1989) argue, is the start point of the ‘the normal cycle of research’, in which description is used to form the basis for explanation which can then be tested against reality until, through a series of research studies, a theory can eventually be built. The research seeks to examine the internal business processes of order fulfilment and delivery in e-businesses, identifying any common patterns and contingent organisational and environmental variables. This requires a level of detail and in-depth understanding that is almost certainly best achieved through a case study approach. A case study is ‘an objective in-depth examination of a contemporary phenomenon within some real-life context where the investigator has little control over events’ (Yin, 1994). Although both operations and information management have strong quantitative methodological traditions, calls for more qualitative research have been answered with increased case study work (Benbasat et al., 1987; McCutcheon and Meredith, 1993). For areas where there is a paucity of empirical research and existing theory seems inadequate, case studies may offer a route to theory building (Eisenhardt, 1989; Meredith, 1998).

This research project therefore uses a case study methodology to study organisations from amongst those engaged in e-business. This research is qualitative in nature and the sample of companies included is not intended to be representative in a statistical sense. Unlike quantitative research, which uses statistical inference to generalise from a sample to a larger population, qualitative research relies on logical inference. As Yin (1994) points out ‘case studies are generalisable to theoretical propositions and not populations’. Where there is more than one case, replication logic can be used to generalise more widely. Voss et al. (2002) assert that ‘case research has consistently been one of the most powerful research methods in operations management’ but acknowledge that it is more widely used in Europe than elsewhere. They further note that one of the challenges of the method is the need to exercise care in attempting to draw ‘generalisable conclusions from a limited set of cases.’ They suggest that triangulation may be used to increase validity. Thus, early case studies may provide breakthrough concepts and theories which could then be further tested through quantitative methods. In this way, it would be possible to obtain a level of breadth, based on statistical analysis, which would add to the depth obtained during the qualitative phase of the research.

3.2 Operationalisation
Gathering sufficient data on business processes can only be achieved from within an organisation, therefore access to the organisation was deemed a prerequisite for this study. An OUBS questionnaire, which addressed broad issues to do with the take up of e-business, identified a number of organisations that were willing to participate in the study. In this way, the case companies were gathered not so as to represent any kind of statistical sample, but rather, on the opportunistic basis of which companies were willing to permit sustained access for interview purposes. The general applicability of the case selection is not viewed from a positivist paradigm given the phenomenological nature of this study. Accordingly, it is possible to generalise from a very few cases, or even a single case, if the analysis has captured the interactions and characteristics of the phenomena being studied. It therefore follows that the patterns, concepts and theories which have been generated in a particular environment can be applied in other environments (Hussey and Hussey, 1997).

Data collection was principally through semi-structured interviews with executives with responsibilities for e-business activities within the organisations. Semi-structured interviews give researchers the freedom to explore interesting avenues for investigation as they emerge. It is particularly important to be able to get close to the key organisational actors, not only to gather factual data from them, but, perhaps more importantly, to gain an understanding of actions and meanings in their context (Bryman, 1988). The interview questions were based on the theoretical framework developed from the literature discussed above, to focus and bound the work. Seven central themes were identified:

1. context for e-commerce
2. motivation for e-commerce
3. internal changes arising from e-commerce
4. external changes arising from e-commerce
5. managing the process
6. evaluating the use of e-commerce
7. performance measures for e-commerce.

The prime source of data for this report was provided from interviewees’ responses to themes six and seven, however, their responses to the other theme also provide valuable contextual data. Interviews were conducted face-to-face, mostly at the organisations’ premises during 2001 and 2002.
3.3 Methods of analysis and interpretation

Data analysis was undertaken using the Atlas.ti qualitative data analysis software package. Atlas.ti is very similar to the NUD-IST software for the analysis of qualitative data. Texts – in this instance, the interview transcripts – were formatted and pulled into a hermeneutic unit within the framework Atlas provides. In Atlas the hermeneutic unit consists of the primary documents, and the codes, quotations, memos and networks which are generated from the primary documents. Atlas is less well known than NUD-IST, although it performs all the same functions, and has the benefit of an enhanced, thus more intuitive, user interface. In analysing the interviews, a preliminary set of pre-determined top level coding categories (based on the conceptual framework) was imposed on the data, as recommended by Dey (1993). His advice was also followed in the subsequent development of lower level codes within each category, as suggested by the data. This is an iterative process because ‘categorisation of the data requires a dialectic to develop between categories and data’ to ensure that the categories are ‘grounded empirically and conceptually’, and that the analysis achieves ‘reliability, efficiency and flexibility’ (Dey, 1993).
4. Findings from the case studies

This section of the report contains the analysis of the 12 case study organisations. A synopsis for each case company is provided in the following sections. Each case company is described in turn, emphasising how the adoption of e-business applications has changed its business processes and how the organisation has responded to this with respect to performance measurement. Where requested by the companies, pseudonyms are used and some case material has been disguised in order to protect confidentiality.

As Table 4.1 illustrates, these include three manufactures, five financial service providers, one legal service provider and one retailer. Eight are in B2B e-commerce and four in B2C. Eight are clicks-and-mortar companies and four are dotcoms.

| Table 4.1 Breakdown of the twelve case study organisations |
|---------------------------------|--------|--------|--------|
| Manufacturers | 3 | 3 |  |
| Financial services | 5 | 2 | 5 | 2 |
| Legal services | 1 | 1 |  |  |
| Retailers | 1 |  | 1 |  |
| Total | 8 | 4 | 8 | 4 |

4.1 Aon Ltd

This case examines the use of e-commerce within the reinsurance and specialist insurance divisions of the UK subsidiary of a large US insurance broker. E-commerce is used in business-to-business (B2B) dealings, as the company operates as an intermediary between its corporate clients and underwriters on the London insurance market. The company is focusing its e-commerce activities primarily on its ‘low-value’ business, where the risks to their existing business are perceived to be low, and the potential benefits from cost-savings high. E-commerce is primarily used in the company’s supply market where a secure website offers access to information for underwriters. In some instances, depending on the quoting arrangements, a structured workflow enables the contract to be negotiated wholly electronically.

The company has not integrated its e-business processes with other internal business processes. The e-commerce processes are run separately from all other processes and the staff that handle e-commerce do not handle any other business. As such, e-commerce has brought little internal change for most of the company. At the same time, there appears to be a high degree of internal information systems integration, and considerable effort seems to have been made to overcome legacy system problems. The company has a longer-term strategy in place to continue to extend and develop its e-commerce activities, with the aspiration of becoming a technological leader within the industry.

Currently, the company’s main motivation for engaging in e-commerce stems from the threat of competition and the potential for disintermediation by insurance companies dealing directly with clients. The company is also attracted by the efficiency and cost-savings offered by e-commerce. The main issues and obstacles identified by the company are cultural issues around the acceptance of new technology, and the reluctance to move away from the face-to-face dealing which has been fundamental to the maintenance of trust on which the insurance industry relies.

The company has not used any pre-implementation investment appraisal techniques nor do they post-analyse cost-benefits of IT/IS investments. However, they have been keen to develop performance measures that capture broad process improvements, such as metrics for volume and value of e-commerce trading and the number of underwriters who participate in a given month. These measures are adapted from conventional measures for this industry.

4.2 Rebankco

The case concerns the central mortgage office of a large retail bank. Previously, mortgage sales were obtained from customer contact with mortgage advisers based in local branches. Customers who wished to secure a loan were required to fill in an application form manually, which would then be posted to the bank’s central mortgage office for processing. Here the application would be progressed by conducting credit checks on the applicant and a valuation of the property to be purchased. Alternatively, customers could apply over the telephone by calling the central mortgage office directly. Here, operators would take the caller’s details over the telephone, completing an application form for them based on the verbal information provided. As part of the bank’s move to Internet banking, it is now attempting to move some of its mortgage services online. However, the company’s retail website presently only has a ‘call me’ button to trigger a telephone call to the customer from the central mortgage office.

The situation is complicated by the fact that the bank has recently taken over a major competitor, whose mortgage products are more developed than those of the bank; applicants are able to submit a mortgage application electronically. The online mortgage applications are currently still processed within the former competitor’s offices. The bank is in the process of merging the two operations, but currently it is obliged to run them in parallel. When the operations are merged, all mortgage applications will be dealt with by the bank’s central mortgage office. Whether received online, by telephone or by post, applications will be handled by the same staff, using the same business process.
Although e-commerce in the form of Internet retail banking is a priority for the bank, online mortgage application processing is not. However, the bank is carrying out further development of its website and intends to extend the online application process to its own mortgage products. The bank feels that a clear demonstration of customer benefit from e-commerce will be a significant issue in generating more online mortgage business.

Rebankco have not conducted any formal investment appraisal and have a limited set of formal performance measures. They measure the number of visits to the website, product sales and some customer profiling, but do not proactively manage this. With this in mind, the bank is developing this measure so that it is possible to measure the number of online applications enquiries with the number of completions and to measure a customer fall off rate. Initial results suggest that fall-off rates online are greater than for traditional applications and the bank is looking to respond with greater online support for customers. Rebankco recognise that the measures they are working with only focus on the front end and that they are not capturing performance of their full end to end process. This is in part due to the problems they are experiencing with integrating the e-commerce channel with existing processes.

4.3 IKS

The company is a multinational UK-owned insurance broker, placing insurance business for clients, advising on risk management and providing funds management. Two years ago, the company launched a web-based system aimed at medium-sized company customers whereby claims could be reported and their progress checked electronically. Clients still have the choice at the moment of having their records issued on paper, on CD or on a disk. But the company would eventually like a direct, electronic site-to-site transfer of records. Loss adjusters can also interrogate the system to check policy cover. The company’s most recent e-commerce venture is the provision of the facility, through a partner organisation, to trade all insurance products and claims over the Internet. The company has also set up partnerships with affinity groups and is working with them to set up web-based links to insurance products.

The organisation’s main objective in the use of e-commerce is to improve efficiency. It has many branch offices, both domestic and international, but can foresee a time when e-commerce will allow for a reduction in their number. The company seems acutely aware of the cultural and social issues involved in electronic commerce, recognising that young people in particular are becoming used to working with e-commerce and expect to have products and services available over the Internet, often on an around-the-clock basis.

The company does not conduct any formal performance measurement of its e-commerce activities. They point out that where information is initially obtained from a website, and subsequently confirmed by telephone, there is an issue of whether performance measures would be tracking an electronic, or a telephone transaction. The company does have financial measures by which it assesses its conventional business operations. Additionally, it reconciles a monthly budget against the branch offices each month, but this is not broken down into conventional versus electronic transactions:

‘We don’t break that down between the different methods so one of the problems is that you may only be substituting the benefits you will have got from existing channels anyway.’

Clearly, the main obstacle IKS sees to developing performance measures for its electronic operations is the problem of disaggregating their benefits from the contributions made by the other business processes.

4.4 Creditinsure

This insurer is a European-owned company whose main business is export credit insurance. The company has a ‘dual strand’ e-commerce strategy, that comprises (1) business that can be confined within the existing clicks-and-mortar processes; and (2) a spin-off business (E-insure, described on the next page) that offers an integrated automated on-line credit and risk management package for online trading companies.

The parent organisation’s e-applications are used to enhance service-side processes. It has developed a web-based communication tool which allows applications for credit insurance to be posted and agreed electronically, via a document and messaging system. The communication tool is also used as a marketing device for the company’s other services, e.g. debt collection. The parent company also uses its website to try to market directly to clients, for example, inviting them to submit their details in return for a regular news and information service.

The company’s motivation for e-commerce has been mainly to achieve efficiency gains through customer-friendly applications, and greater information transparency. At the same time, the company appreciates that there is reluctance on the part of some of its clients to move to e-commerce. The company does not maintain live processing links with its supply chain partners, the underwriters and the re-insurers. It relies on the existing system of three to four year written contracts. Present concerns about e-commerce relate to the role of the company’s intermediaries, primarily brokers, and how they will fit with future strategy for online business. At present some eighty per cent of the business comes through intermediaries.
Evaluation of e-commerce activity focuses on two areas. Firstly, Creditinsure look at this from a cost of transaction perspective. However, it is difficult to isolate the contribution e-commerce makes as part of the whole service offering. Secondly, Creditinsure analyses costs prior to, throughout and post project completion. These broad project investment measures are difficult to apply as invariably the scope of the e-commerce projects changes. Nevertheless, as a broad measure Creditinsure find project evaluation a useful activity:

‘One thing we do is we evaluate our projects, make sure we are getting the sorts of benefits that we envisaged in the first place, and therefore compare numbers. Have we been able to reduce, for example, certain numbers of people? Have we been able to see that our costs of maintaining service-side relationships with clients is reduced? It’s those sorts of things that we look at.’

Given this, a key performance area is the assessment of customer retention rates and Creditinsure use customer surveys to assess customer perceptions of their service, including e-commerce system efficiency.

4.5 E-insure

E-insure is a dotcom start up, spun out from Creditinsure (described on the previous page). The company is an attempt to harness the connectivity of the Internet to develop business that is considered to be outside of Creditinsure’s clicks-and-mortar operation. E-insure is an online provider of credit services to companies that trade online. Its product offering is based on proprietary software that enables it to screen and verify potential purchasers for credit worthiness, and insure the credit risks. It operates as an invisible portal, through which its clients can interface with their customers using the clients’ own websites. This enables its clients to utilise their own names as they are recognised brand traders rather than using E-insure’s own brand, which is not sufficiently recognisable.

When the company was first launched the overall performance measures they first used were the number of clients it signed, rather than profitability. As the company has developed its online offering to the out-sourced credit management model, the primary measure of success is still by and large the number of ‘signed contracts’. However, now that the business has been up and running for around two years, there is an increasing feeling that revenue generated needs to become a greater focus for performance assessment. E-insure is now very much focused on the ‘cash burn rate’ and there is a lower tolerance for a high burn rate than there had been at start-up. Consequently, steps have been taken to reduce costs, mainly through out-sourcing some of E-insure’s own internal functions. Performance assessment of internal functions has been undertaken with this in mind, and the company now has what it describes as ‘pay as you go’ HR, and ‘pay as you go’ legal departments.

There are specific performance measures which are applied to the actual credit management process. Data is prepared on a monthly basis, and reviewed by the company. Key measures are the number of registered buyers, number of transactions per buyer, number of problem transactions as a percentage of total transactions, the number of dunning (reminder) letters, and responses to dunning letters. In addition, the average value per transaction and the type of client that the company is serving are measured. Traditional measures that any credit management company would expect to apply are tracked closely. These include time delay on invoice payments, buyer concentration of sales, sales from certain types of buyers (either on a geographic or industry sector basis) or whether one buyer represents a large proportion of a seller’s sales. Invoice measures include days overdue, average days overdue, and average days that sales are outstanding. E-insure believes that it can provide a level of detail on all of this information that would not normally be available, and attributes this to the electronic systems that it uses to track transactions and invoices.

4.6 MM Holdings Ltd

The company is a London based market-maker, primarily trading shares in small and medium-sized companies. The company has recently moved from a bricks-and-mortar to a clicks-and-mortar business model. Previously, all share dealing was done over the telephone, but recently the company has developed a web-based information system to provide information to investors and enable them to buy and sell shares online. The online trading facility is aimed at small private investors, rather than large-scale institutional investors whom the company expects will remain as telephone traders. Despite the move to some online trading, the company has not yet made significant changes to its internal operations. All share transactions are channelled through the dealers, whether they are received via telephone or via the website. The company has recently invested in new infrastructure for its internal information systems, enabling a reduction of back office staff by approximately one-third.

The company’s main motivation in using e-business processes is to test the connectivity of Internet-based operations. The company is seeking to transfer what it describes as its ‘bread and butter’ B2C trade from the telephone dealing system, into a discrete, online system which can nurture and operate a specialist, niche market. The company maintains that online dealing can improve efficiency through lowering transaction costs, and will also enable the company to charge lower fees. Although the online trade is described as low margin business, the company will achieve acceptable returns if volumes are high. The company hopes that its move to e-commerce will attract new investors.
MM Holdings have found it difficult to devise a performance measurement framework that captures these areas. They have tried measuring website hit rate against turnover but this has not been a useful measure as not all turnover is attributable to the online channel and hit rate does not record how many hits become online business or the volume of that business.

4.7 ARB plc
ARB is the UK arm of a major European metals producer, serving a specialist niche market with a range of made-to-order products. The company has created a specialist industry portal, developed in conjunction with a number of its European competitors. The portal facilitates access to all the participating companies’ websites thereby offering a one-stop shopping facility for multiple products via a group of suppliers. It enables customers, suppliers and other divisions within the company to communicate more effectively with each other. The collaboration minimises the costs of establishing an e-channel for each of the suppliers and aims to enable the participants to compete more effectively with producers in other parts of the world, and encourage greater use of these products rather than alternative materials.

Once accessed via the portal, ARB’s website operates at two levels. Entry is via an open area, with general information. The website also has a search facility to enable customers to identify which of the portal’s suppliers manufactures the product they require. From this website, only registered customers are then allowed to access the secure websites of each of the portal’s companies. The ARB website seeks to address the needs of the full range of the different functions of customers’ business from designers and specifiers, purchasing, accounts payable and so on. From the website, approved customers can make enquiries, request and receive quotations, place orders, receive acknowledgements, test certificates, despatch notes and invoices. Additionally customers can register order queries and complaints, whether these concern the quantity or quality of goods despatched. Customers can track and trace their orders in the manufacturing process. Information on order progress is updated every 24 hours, and late and potentially late orders are flagged. ARB believes its website will offer an improved service to its customers and reduce its transaction costs helping it to survive in a fiercely competitive market.

The introduction of e-commerce had forced ARB to assess new business technology in terms of how it can improve operations rather than for its technical excellence. Its e-commerce applications capture a tremendous amount of information and they are developing a performance measurement framework to utilise this resource. For example, every interaction they have with a customer is logged and reported on weekly at two levels. At a technical level there is a need to check the performance of the system to ensure that user experience is satisfactory and that it continues to deliver the operational utility customers expect. At account managers level the system provides feedback from the commercial perspective in terms of customer perceptions. So the thrust of these measures is towards evaluating customer expectations. Whilst no formal investment measures were used, an initial business case was produced prior to system implementation. The case centred on gaining significant advantage by improving customer experience. This has provided the backdrop for the process measures being developed. Given this, ARB state that they are interested in:

‘Understanding the amount of cost, not the product cost, but people cost that goes into managing a given customer. It’s not only about customers, it’s what route an order comes in. We want to understand the through cost for an e-transaction’.

The measures ARB use have not changed greatly with the introduction of the e-commerce platform, but the system has allowed ARB to analyse sales and orders to a far greater depth than conventionally, and to generate a far clearer picture of process performance.

4.8 Pharmco
The company was founded as a research and development organisation. It has recently received a government licence to manufacture and sell its products, mainly therapeutic pharmaceuticals. The company is not using e-commerce in sales, but rather, as a communication tool between its various sites in the UK, the US, and Australia. It needs to be able to manage documents very securely, as well as to control its inventory of raw materials. It is also developing e-commerce applications for financial accounting, and setting up links between its various logistics groups and the accounts department, with that information made available across key managerial functions. The company aims to move towards electronic ordering. It presently uses a manual system, based around faxes, written and telephone orders. The company would like to use e-commerce processes in order to assist production planning, especially as it requires and relies on specialised, certified raw materials, and needs to be able to check on their availability. However it feels that it must first get its manual systems running properly. As a small company, investment in IT poses two significant problems. First, specifying costly hardware that will not rapidly become technologically obsolete is problematic. Second, there are issues around software and IT training. There is a lack of time in which to provide training, which tends to be done on a semi-formal basis (e.g. during lunch hours).
The company does not have any formal financial performance measures for e-commerce in place. Projects are reviewed upon completion in order to learn from their success or otherwise. The company’s main objective is to bring down its costs of goods sold. In aiming to achieve this it has identified key success factors. One key success factor here would be using an inventory management system to reduce its inventory levels. Whilst focussing on metrics like stock levels the company also recognises that it needs to measure the performance of its inventory information available for all key managers. In a small company which at present has no revenue, finance is inevitably an issue. The company quite freely admits that there are many issues that it is facing in both understanding and implementing technology, and says that it would tend to spend any additional available resource on increasing manufacturing capacity rather than on implementing electronically based information systems and processes. However, the introduction of its e-commerce systems has been the catalyst for the company to develop a performance management framework where the performance benefits that the system offers are recognised as being interwoven with incremental improvements in other business processes. The performance of radical processes changes, to do with new arrangements for linking the internal processes of the company across geographically spread sites, are proving harder to measure.

4.9 RER
RER manufactures a range of industrial equipment used mostly in fluid processing applications. As its products are technically complex, and its customers geographically dispersed, the company mostly sells through agents and distributors, who can offer the level of expertise required to ensure that customers order the most appropriate equipment for their requirements.

Historically, RER received new equipment enquiries from customers via sales agents or distributors. The enquiry would be routed to the internal sales office via a letter, fax, or e-mail, where an RER engineer would select the correct product for the requirement by using paper based product performance data. The customer would then be sent a proposal including price, normally via a fax. If the customer wanted to proceed, he would need to raise a purchase order, which when received by RER was then manually entered into the RER central computing system and manufacturing information systems.

RER has developed a software tool to assist with equipment selection, quotation and order entry. The tool sits as a web-based interface between the organisation and its customers via an RER password-protected extranet. By entering relevant required performance factors, the tool then selects the appropriate product, prices it, provides all supporting documentation (engineered drawings etc.) and generates a fully detailed quotation to the customer. If the customer decides to order the product, the program creates an order file that can be electronically transmitted to RER’s manufacturing computer system creating the seamless entry of the customer order. The tool is installed on an individual PC, normally that of the sales agent, but some customers have also installed it. The main function of the software tool is to support RER’s local agents, to ensure the best technical solutions are offered to customers and to reduce lead times. It has, also enabled RER to reduce its own headcount.

RER has a separate e-commerce tool for spares sales. This enables customers to place orders for spares via the RER extranet, accessible to RER’s registered customers. The extranet displays real-time data on price and availability of spares. Each customer has its own unique password, which enables RER to offer differential prices to individual customers. Customers can place their orders on the website, indicating the selected parts number and quantity. The extranet then sends a file through to RER’s central computer system so that the spare part can be ordered, scheduled, and in due course picked and shipped. To encourage e-commerce use, RER also offers a discount on spares ordered via the web. Over 80% of orders are now placed in this way. Use of the extranet speeds up the entire order cycle. Customers are also invoiced electronically, and debtors days have been reduced significantly.

RER’s main motivation for its use of e-commerce is to differentiate itself from its competitors by being a service leader, recognising that it can not hope to compete on price alone. The company does not know whether its on-line ordering tool is increasing sales, arguing that in any event, it would be difficult to know if any increase in sales are incremental or substitutional. This has made performance measurement problematic. The company believes that once customers adopt e-commerce applications they will become reliant on them and would not like to see them withdrawn. As such, RER sees e-commerce as a means of locking-in customers and distributors to the web-based ordering process thereby raising the barriers to exit. The company has not measured customer perceptions yet, but plans to find a customer oriented measure that identifies if additional order volumes are linked to their use of the e-commerce application.
4.10 E-financial Management Ltd
This small financial management company runs the finance and accounting function for other companies and provides some financial consultancy services. The company’s main customers are SMEs, often themselves technology, computing or service-based, where many of the business processes lend themselves to the online model. E-financial Management describes itself as a ‘halfway house’ because its services are both traditional and e-based. Although started as an on-line only business, it soon recognised that some of its clients were not willing or able to use a fully online accounting solution. The original motivation in setting up the company was to exploit the benefits of e-commerce within a highly information rich environment, but this has to some extent had to be scaled back because of the value many clients put on face-to-face dealing. Technology remains a key issue for the company. The company’s own internal systems are not yet fully integrated because it has been unable to find an appropriate software package. Externally, integration is also problematic. The issue is not one of client confidentiality, but rather of the necessary software and technology platforms to enable E-financial Management.com to access the necessary transaction information between its clients and their bankers.

It is perhaps not surprising that of all the case companies, E-financial Management is the one most focused on performance measurement. It maintains that appropriate and accurate methods for assessing e-business have not been fully developed, and while this is the case, traditional measures for performance assessment remain applicable and are still effective. Most of these are financial, but the company does use ‘softer’ measures in assessing its internal structure and staff effectiveness. Central to this is the identification of utilisation rates for staff, and relative comparison of performance of e-commerce systems through involvement with benchmarking activities with different organisations and through DTI initiatives. In the future, the company would like to develop an online solution that can be used with much larger clients. At the moment it feels that the accounting package it provides is adequate for SMEs, but not for very large clients. The way forward lies both in finding the right technological solution, and making the investment commitment to that solution. The company recognises that as the online offering is expanded appropriate new performance measures will need to be developed to manage this expansion.

4.11 Amplebosom.com
The company sells specialist clothing, mainly aimed at the older customer, as well as those who may have difficulty finding what they require elsewhere. Amplebosom.com began life as a mail order business and it retains its printed catalogue alongside its online operations. They feel that this approach allows customers to ‘look through the shop window’, find what they require and order in the way they are most comfortable with. The company says it is aiming, as far as possible, for a P2P (person to person) focus in its business model. Technology has been, and remains, a key concern for the company. Online customers e-mail their order, and those ordering from the printed catalogue order by telephone or post. Whatever the method received, all orders have to be re-keyed into the company’s main system. The company’s lack of a more integrated system is largely due to bad computer advice at start-up. The company has no Internet links with its suppliers and it has to fax all orders. It describes some of the suppliers as being ‘in the Stone Age’ and not prepared to do business online, or with a small company. The company outsources its delivery, website design and computer maintenance operations.

As with many of the other case companies, very little formal performance measurement is carried out:

‘Once we’re making money and measuring that our orders are getting despatched within 24 hours, then what do we measure after that?’

Nevertheless, the company feels that it has a reasonable knowledge of its customers, although it maintains that ‘until you’ve sold to a lot of customers, the figures don’t mean anything.’ Given this, they recognise the need to measure customer perceptions of service and retention figures resulting from marketing activity. The company is currently trying to build up further sales and a brand for itself through marketing efforts. Accordingly, they are looking to refine their understanding of their customers through end state measures such as customer perceptions, value and frequency of orders.
4.12 Legalco
This is a London based dotcom, employing around 25 people, that was set up two years ago by a team of lawyers. The company believes that access to law requires access to information. Information is at its most powerful when it is presented simply and without jargon, and the best disseminator of information is the Internet. Through Legalco’s website, clients, whether individuals or companies, can access a range of free or very low cost (via an annual subscription) legal advice services 24 hours a day. The site also enables clients to purchase reduced or fixed price packages for such things as conveyancing, will writing, etc., for individuals and personal injury claim settlements for small companies. The website hosts a directory that enables people to ask for quotations from law firms in their local area. The law firms pay a fee to be included in the directory. The company believes the main advantage of its dotcom model is the anonymity offered to customers, at least in their initial approach for legal advice. Legalco has continued to experiment with its operations and its products. The company block purchases such commodities as conveyancing and divorce processing. Its main role is to check reliability and quality of its suppliers. Legalco has a number of high profile directors and backers from the legal and banking professions. A major motivating factor was the desire to reshape the legal industry, which it sees as backward and inefficient. As such its specific operational objectives are speed and efficiency, as well as increasing the company’s PR profile through its Internet presence. The company says that it has very good technical staff and has not experienced any significant problems of functionality. The venture has been a great success, generating very positive cashflow.

Financial measures form the mainstay of how they evaluate their e-commerce activities:

‘It’s dead simple. Cash in the bank. That’s it. There’s nothing more complex than that.’

Despite this clear financial emphasis, the company measures a range of other performance indicators which associate technical and customer focussed measures. For example click-through rates help inform its thinking about how its business processes can be reconfigured to provide additional revenue. However, it is the more intangible areas of performance assessment that are the most challenging. With this in mind, Legalco is experimenting with how best to seek feedback from customers about their experience, using follow-up emails and phone calls. It is also keen to try to measure the quality of it’s suppliers (the law firms and barristers it deals with). It has always been very conscious that the money invested in the company relies on processes and expertise to be successful.
This section brings together the variety of performance activities observed in the 12 case organisations. Table 5.1 presents the specific performance measures identified in the cases, with respect to the e-business performance assessment framework presented in Section 2.4.

In the majority of circumstances the case study companies have yet to establish a formal performance measurement framework for gauging the performance of their e-commerce systems. They see this as being hampered by difficulties in separating out the benefits of the e-commerce system from the rest of the organisational processes. In the case of IKS, their e-commerce system is interwoven with their telephone operation so disaggregating benefits is problematic. Equally, the implementation of e-commerce applications demands a level of integration with existing business processes. This assimilation of the new technology is an ongoing process, making the fixing of performance measures problematic (as with Rebankco).

**Investment measures**
Generally there is a lack of investment appraisal. The majority of companies do not conduct either any investment appraisal or post-analysis of the costs and benefits of e-commerce systems. One exception is Creditinsure who analyse costs prior to, throughout and post project completion. These broad project investment measures are difficult to apply as invariably the scope of the e-commerce projects change. Nevertheless, as a broad measure Creditinsure find project evaluation a useful activity. The dotcom companies tend to focus on general profitability measures for the business as a whole, rather than specific investment appraisal (Legalco use cash flow as a proxy measure and E-insure look at revenue generation and cash burn rate). However, this is a feature common to a lot of small and medium sized organisations. At ARB no formal investment measures were used, however an initial business case was produced prior to system implementation. The case centred on gaining significant advantage by improving customer experience and this has provided the backdrop for the process measures being developed.

**Process measures**
A number of organisations have tried developing a range of process measures. Measures include the volume of e-commerce business, and the number of users. For example, Rebankco will try to capture application completions and customer fall off rates. Aon Ltd record the number of underwriters using the system, whilst E-insure record the number of registered buyers, number of transactions per buyer and percentage problem transactions. In addition, E-insure record the average value per transaction and the type of client that the company is serving are also measured. Traditional measures that any credit management company would expect to apply are tracked closely. E-insure believes that it can provide a level of detail on all of this information that would not normally be available, and attributes this to the electronic systems that it uses to track transactions and invoices.

Process measures have not changed greatly for e-commerce applications within the manufacturing companies (ARB and RER) and are invariably adapted from conventional measures. For example, at ARB every interaction they have with a customer is logged and reported on weekly at two levels. At a technical level there is a need to check the performance of the system to ensure that user experience is satisfactory and that it continues to deliver the operational utility customers expect. At account managers level the system provides feedback from the commercial perspective in terms of customer perceptions. So the thrust of these measures is towards evaluating customer expectations. In recognising that their e-commerce processes are embedded with their generic business process, Pharmco have taken a holistic approach and are trying to use traditional measures across the whole range of processes. This of course means that they are not able to isolate the contribution made by the introduction of e-commerce.

**End-state measures**
These commonly focus on some assessment of customer perceptions of the service they receive. For example, where a tangible good is supplied organisations are trying to measure customer satisfaction with delivery and retention figures resulting from marketing activity (e.g. Amplebosom). Where a service is provided more qualitative measures are utilised. Creditinsure assess customer retention through the use of customer surveys. Legalco is experimenting with techniques to measure customer perceptions of quality.

There is a clear desire amongst the case companies to measure the contribution of their e-commerce applications. However, problems arise concerning the issue of what to measure and how accurate the newer measures are (see for example ARB, E-insure). The speed of change in terms of application development, customer take-up and the reshaping of industry sectors complicates the identification of performance measures. Some organisations have responded by transferring traditional measures, but these only begin to capture incremental process changes. Where e-commerce creates radical change none of the case companies have found a means of measuring the performance of this new process and industry structure (for example Creditinsure).
### Table 5.1 Performance measures

<table>
<thead>
<tr>
<th>Case</th>
<th>Investment measures</th>
<th>Process measures</th>
<th>End-state measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aon Ltd</td>
<td></td>
<td>Volume and value of e-commerce trading. Number of underwriters in a given month.</td>
<td></td>
</tr>
<tr>
<td>Rebankco</td>
<td>No formal investment measurement of e-commerce activities</td>
<td>Measure website visits, product sales and some customer profiling. Developing a measure for online applications enquiries and completions to measure customer fall off rate.</td>
<td></td>
</tr>
<tr>
<td>IKS</td>
<td>Broad project investment measures.</td>
<td>Budgeting measures but problems disaggregating e-commerce operations from other business processes.</td>
<td></td>
</tr>
<tr>
<td>Creditinsure</td>
<td></td>
<td>Some financial measures: revenue generated as focus for performance assessment, also interested in cash burn rate. These measures relate to process.</td>
<td>Assessment of customer retention rates. Customer surveys to assess customer perceptions of service, including e-commerce system efficiency.</td>
</tr>
<tr>
<td>E-Insure</td>
<td>Some financial measures: revenue generated as focus for performance assessment, also interested in cash burn rate. These measures relate to process.</td>
<td>Number of ‘signed contracts,’ Number of buyers, number of transactions per buyer, number of problem transactions as percentage of total, the number of reminder letters. Invoice and sales data.</td>
<td></td>
</tr>
<tr>
<td>MM Holdings</td>
<td></td>
<td>Website hit rate against turnover.</td>
<td></td>
</tr>
<tr>
<td>ARB plc</td>
<td>No formal investment measures instead an initial business case was produced.</td>
<td>Through cost for an e-transaction. Analysis of sales and orders.</td>
<td></td>
</tr>
<tr>
<td>Pharmco</td>
<td></td>
<td>Performance benefits that the system offers are recognised as being interwoven with incremental improvements in other business processes, so attempting to apply traditional measures.</td>
<td></td>
</tr>
<tr>
<td>RER</td>
<td></td>
<td></td>
<td>Plans for customer oriented measure that identifies if additional order volumes are linked to e-commerce application use.</td>
</tr>
<tr>
<td>Amplebosom</td>
<td></td>
<td>Order completion measures.</td>
<td>Trying to measure customer perceptions, value and frequency of orders with a view to understanding customer retention.</td>
</tr>
<tr>
<td>Legalco</td>
<td>Some assessment of cashflow.</td>
<td>Trying to measure the quality of suppliers feeding into their processes.</td>
<td>Customer feedback on experience. Click-through rates.</td>
</tr>
</tbody>
</table>
6. Conclusions

This section presents the findings in terms of the key themes that have emerged. These concern the motivation for e-commerce, e-commerce’s influence on business process change and the subsequent impact on performance measurement. Lastly, the implications for future research are considered.

Based on the evidence, we can conclude that there are ill-defined motives for the adoption of e-commerce, and that e-commerce applications fail to lead to radical and/or integrated process change. Applications are currently treated as an isolated entity, kept apart from the traditional operational processes. In part, this reflects the degree of experimentation taking place. It is against this backdrop that the case organisations have tried to assess the performance of their e-commerce applications with varying success.

The main conclusion from the research is that there is a lack of formal performance measurement in e-commerce, with little evidence of any evaluation of the impact of e-commerce investments or of the performance of e-commerce operations. Where formal performance measures are applied, they are used on an ad hoc basis and there is no agreement as to which e-commerce performance measures are effective. Common performance measures are frequently adapted from existing, traditional measures, where these exist. One area of interest that is emerging is the need to measure the performance of customer perceptions of using these new business channels.
7. Summary and recommendations

7.1 Summary
This project has examined the impact of e-business practices for organisations in their measurement of the performance of internal business processes. However, before performance measurement activity could be considered it was first necessary to understand some of the business processes being reshaped by the new technology.

The broader research project has identified various models of the business processes used for order fulfilment and delivery in e-business. These were drawn from a variety of case study organisations. The cases helped to explore potential differences in the key dimensions of manufacturing versus service organisations, business to business versus business to consumer operations, and clicks-and-mortar organisations versus dotcom startups.

As discussed in Appendix A, a number of key themes have emerged. A central theme is the availability of the technology that is driving investments in e-business. Organisations seems to be driven by a fear that they will be placed at a competitive disadvantage if they fail to adopt e-business. Consequently, there is no clearly articulated strategic perspective. Further evidence of this is that e-business investments are only automating existing processes. Their potential to redesign processes is largely being overlooked. This situation is compounded by the lack of integration between e-operations processes and traditional processes. E-operations are being run as a discrete set of processes out of a desire to reduce the risk to the existing business or to use the e-business systems as a learning exercise prior to any expansion of these operations. The lack of process integration is also being hampered by legacy system issues. Problems associated with the incompatibility of existing information systems and e-commerce applications are believed to be a major encumbrance to information system integration. This is also driving the isolation of e-business operations from mainstream operations.

Clearly, this context has implications for the application of performance measurement techniques. Scant attention is being paid to the performance evaluation of either ongoing e-operations, or to evaluating the impact of e-commerce investments. Given the importance of e-commerce to these companies and the cost of some of the investments made, this seems surprising. A logical assumption might be that these initial investments in e-commerce would be subject to the closest scrutiny, as organisations seek to determine the future scope and direction of their e-business. Where formal performance measures are applied, they are used on an ad hoc basis and there is no consensus as to which e-commerce performance measures are effective. This seems a neglected area of study and practitioners are evidently confused. Despite this, several of the case study companies are exploring or adapting potential longer-term performance measures and applying these at various stages of their e-operations. This study has attempted to map their performance activity onto a framework which recognises key areas for performance measurement. These are:

- Investment measures surrounding the selection and implementation of an e-commerce system.
- Performance measures for incremental process improvements.
- Performance of radical process changes; and
- End-state measures surrounding the performance of the end product or service.

The use of this framework has highlighted some interesting findings. The case companies exhibit a clear desire to measure the contribution of their e-commerce applications. However, problems arise concerning the issue of what to measure and how accurate these measures might be in the new context. The broad lack of investment appraisal or post-analysis of costs and benefits has already been mentioned. This situation is compounded by the difficulty in isolating benefits and attributing them solely to the e-business application, and in many cases the scope of the project shifts significantly over time making the initial investment scenario obsolete.
Several organisations have tried to develop measures that help to identify the performance of their e-operations processes. The most successful of these measures tend to adapt existing measures that would be used to measure similar operational activity within traditional operations. The successful application of these measures occurs where e-commerce represents only an incremental process improvement. Assessing the performance of radical process change is proving more illusive. In this way the tendency for e-commerce to merely automate existing business processes appears to have some benefits in terms of the transfer of performance related knowledge and the comparability of performance data between traditional operations and e-operations. Similar findings were evident between manufacturing and service organisations. Interestingly, some organisations have begun to take a holistic approach and are using conventional measures across the entire organisation. The value of the organisational level measures is traded off against the inability to isolate the contribution specifically attributable to their e-operations.

Some organisations are using end-state measures as a surrogate performance measure. The focus is on the performance of the end product or service. This appears to be of most benefit where e-operations were introduced to improve some component of service delivery. Accordingly, the measures being developed tend to be qualitative in nature and address key issues around customer satisfaction, retention and perceptions of service or product quality.

This research has highlighted several interesting areas for further study, summarised in the recommendations below. Our continuing research will explore and develop further many of the issues raised in this report, including theory development.

### 7.2 Recommendations

Several recommendations can be made as a result of the findings of this project. These reflect both general guidance on the adoption of e-business technology for operational activity as well as specific guidance related to the assessment of organisational and process related performance. The conclusions also provide an indication of the issues for further research.

Several important themes have emerged from this study (see Section 6) and the broader study (see Appendix A). Consequently, further attention needs to be paid to the ongoing motives for developments of e-commerce applications. At the same time there is a need to understand why organisations are limiting the scope of their e-commerce systems. Furthermore, what implications (and limitations) are there from the integration of existing processes with the new process opportunities offered by e-commerce technology?

### Given this:

**Recommendation 1:** organisations should consider how the new technology can redesign their processes.

In particular, they need to consider how this might be used to facilitate the integration of their own internal operations as well as the operations of their supply chain network. In this regard, organisations should be mindful of the potential technological issues associated with system integration.

Naturally, these issues have consequences for the performance management of e-business operations. How useful are the initial, somewhat tentative measures organisations are using and how could these be refined and/or adapted for future scenarios?

**Recommendation 2:** organisations, management accountants and academic researchers should seek ways of tracking the positive impact of e-business benefits.

The benefits reported as a result of investment in e-business technology have generated savings from operational efficiencies. However, these benefits are proving hard to measure. They include for example improved information flow and better relationships with customers. Furthermore, organisations are keen to measure performance despite problems concerning what and how to measure performance in this fast changing area. The difficulty in measuring such benefits does not diminish their significance. Quite the reverse, their importance should encourage all concerned (organisations, management accountants and academic researchers) to seek ways of tracking their positive impact. As such:

**Recommendation 3:** management accountants should be encouraged to promote the use of both qualitative and quantitative performance measures within their organisations.

With this objective, it is recommended that:

**Recommendation 4:** organisations should attempt to map their performance activity.

A suggested way of achieving this is to employ the framework for performance measurement developed as part of this study. This recognises the key areas where performance of an e-business application may be considered. Further research is required to assess the usefulness of this framework as a way of understanding e-commerce performance, and to explore the range of specific measures organisations are currently using within this context. One recommendation would be:
Recommendation 5: for management accountants and academic researchers to develop a comprehensive toolbox of measures that organisations may use as a driver for performance measurement activity. CIMA should consider ways in which it might encourage its members to promote this process. In addition, it may be appropriate to test the transferability of good practice in performance measurement between organisations, both within and beyond industry sectors. In this regard, it will be useful to assess whether the toolbox of measures is an appropriate vehicle for this transfer of knowledge.

In order to further this agenda it is necessary to continue work with the existing case study organisations to provide a longitudinal dimension. This will mean that an assessment can be made of the applicability and robustness of the specific measures in use over time. It is also desirable to extend the range of cases. Whilst the existing cases have provided a reasonable spread of organisational types (for instance services, manufacturers, B2B, B2C, dotcom start-ups) it is inevitable that results will be limited in terms of their representativeness. Accordingly:

Recommendation 6: further cases and survey work should be sought to expand the range of industry sectors and scope of performance measurement practice. Indeed, the cases so far have offered substantial qualitative understanding of the issues surrounding performance measurement and e-commerce, and it may be appropriate to conduct large scale survey based work to discover the extent of performance measurement practice in other e-businesses.
Appendix A

The impact of e-business on the internal business processes of organisations – a research project at the Open University Business School

Appendix A describes the existing research being undertaken by the Open University Business School (OUBS).

Background
This work investigated the impact of e-business on the internal business processes of organisations. Particular focus was placed on understanding how organisations engaged in e-business operate their business processes for order fulfilment and delivery, and whether there were any common patterns in their business processes.

E-commerce business processes
The literature from both operations management and information management can usefully inform the study of e-business. Although operations management and information management have evolved from different roots (operations management from scientific management and operations research; information management from computer science) they have some common conceptual underpinnings. Three principal commonalities are: systems theory (and in particular the transformation model), the concept of process flows and the differentiation between constituents of hardware and software.

An operation can be thought of as an activity in which resource inputs are transformed into outputs. This may involve the transformation of customers, materials and information in the production of outputs of physical goods and/or intangible services (Slack et al., 2001). Traditionally the academic study of operations has tended to focus on operations at the micro-level (e.g. Vollman et al., 1997). However, modern approaches to operations management take a more holistic view of organisational activity, emphasising the linkages between the various micro-operations that constitute an organisation’s macro-operations. From this follows the idea of a business process as a logical sequence of interconnected activities that use organisational resources to create products and services to meet customer needs (Childe et al., 1994). Such perspectives of operations fit well with the broader strategic models of organisational activities, such as Porter’s (1985) value chain. Operations management is especially concerned with the business processes that comprise order fulfilment and delivery. The business process literature (using titles such as business process improvement, business process reengineering and business process redesign) draws extensively on systems theory (Armistead and Harrison, 1995). This literature emphasises that business processes are likely to cross boundaries inside organisations (typically those between functions) and between organisations. Thus operations management needs to be viewed holistically within the broad context of the organisation rather than within the narrow confines of a functional discipline (Armistead and Machin, 1997). Supply chain management takes the business process perspective of operations management further, and goes beyond the boundaries of the organisation to encompass relevant operations inside the organisations of suppliers and customers (and suppliers’ suppliers, and customers’ customers).

The notion of flow, as exemplified in the business process perspective, is prevalent in operations management. Techniques such as production flow analysis, process flow-charts, and service blueprinting are widely used to assess the movement of materials, people and information within business processes.

Writers taking a strategic perspective, notably Hayes and Wheelwright (1984), distinguish between two broad elements of operations management: structure (the physical elements of operations especially the nature, extent and scope of its technology) and infrastructure (the way in which the technology of the operation is planned and controlled, the quality managed, the workforce managed and organised, etc). These may be thought as the hardware and software respectively, of operations management.

Information management literature also displays these key features of transformation, flow, and soft and hard infrastructures. Like operations management, systems theory underpins much of the thinking in information management (Checkland and Holwell, 1998). The transformation model lies at the heart of the consideration of any information system, although its focus is the processing of information. Similarly, the analysis of information flows is central to the understanding of information systems. As with operations, the boundary-spanning property of information is emphasised. The added value to be realised from information, as input and output to business processes, has been recognised throughout and between value chains, most notably by Porter and Millar (1985) and with respect to e-business by Evans and Wurster (2000).

Information management also has its own set of methods and techniques to aid this analysis (e.g. SSADM, data flow diagrams, systems flowcharts etc.). Commonly, these methods identify a system as having a set of inputs, a set of outputs, and a set of processes that convert inputs to outputs (Avison and Fitzgerald, 1995).
The differentiation between hardware and software has long been a key consideration in information processing, despite the inextricable link between the two. Indeed, the recent and rapid application of information technologies seems mainly to be driven by a kind of technological determinism from within the organisations that these technologies serve.

Consequently, the study of the processes of order fulfilment and delivery in the Internet era necessitates an understanding of the interaction between operations management and information systems (Lyons, 1998). As Grover and Malhotra (1999) note,

’this interface is critically important at this juncture, particularly more so since it is highly relevant and not very well understood’.

Yet this is not virgin territory. The impact of e-commerce on supply chain management has clear echoes of a previous IT application in operations management, namely EDI (Threkel and Kavan, 1999). The business process re-engineering (BPR) literature emphasises the use of IT in the transformation of operational activity (Knights and Willmott, 2000; Jahnke and Tijok, 1998; Loeffler et al., 1998) and the impact of information systems integration on business process improvements (Bhatt, 2000; Weerakkody and Hinton, 1999).

However, previous research has mostly focussed on IT applications which were commonplace prior to the widespread adoption of the Internet and its associated technologies. For example, Venkatraman’s (1994) framework for assessing IT-driven organisational change could, perhaps, be used in the examination of transformations driven by the adoption of e-operations. However, as it precedes the advent of e-commerce, both historically and technologically, it may have its limitations.

The dramatic increase in connectivity offered by the Internet can create almost unlimited information flows within, and especially into and out of organisations. It can be conjectured that the successful adoption of e-commerce in an organisation’s operations will largely depend on the extent to which information flows can be harnessed to enhance the management of the affected internal business processes. As Amar (1999) argues,

‘how well a business of any form or size repositions itself in the marketplace and adjusts its practices in the light of the evolving principles of the Internet will decide for it the difference between success and the struggle for survival.’

Therefore, the implications for e-operations, including the potential benefits available, seem to centre on the degree of integration that an organisation can achieve within and between its business process and its information systems. Industries are finding the adoption of Internet-based forms of e-commerce a more complex process than they had anticipated. This is particularly the case when this adoption involves integration with internal applications systems and existing methods of doing business (Chan and Swatman, 2000).

A Framework for e-commerce business processes
Investigation of the management of business process in an e-commerce organisation needs to consider the extent of integration both internally and externally. Consideration of integration can be drawn together under three headings that can be used as the basis of a theoretical framework for empirical research (Barnes et al., 2002).

Business process integration Internal business process integration concerns the extent to which the business processes for e-commerce within a clicks-and-mortar organisation (i.e. one conducting both e-commerce and traditional business) are integrated with the traditional business processes. External business process integration is the extent to which the business processes are outsourced, including the extent to which any such outsourcing for e-commerce is integrated with outsourcing for traditional business. Another key concern is how the interface with the external supply chain, forwards and backwards, is managed, especially any disintermediating effects of the new technology. Equally, where there is re-intermediation, or the formation of strategic alliances, lack of standardisation can be a key issue. As Choi and Whinston (2000) state,

‘e-commerce business interoperability is built upon technological interoperability, which provides an open computer and networking structure. However, technological standards at the infrastructure level are relatively easier to reach than those at the applications and business process levels.’

Information systems integration
The consideration of information systems integration needs to encompass the extent to which information systems are integrated internally (both across functions, and between e-commerce and traditional activities) and externally (along the supply chain to suppliers and customers). It also needs to include the extent to which existing (i.e. legacy) information systems are able to facilitate integration (e.g. through the use of EDI, ERP or CRM) or, indeed, to circumvent the Internet altogether. As Davenport (2000) says,

‘EDI is sometimes described as an expensive technology, but its costs pale in comparison to the human costs of agreeing on information and process standards’.

’
The operating context
Due regard also needs to be paid to the operating context in which e-commerce is taking place. This can be considered under three broad headings: customer context, e-commerce context, and organisational context. The customer context is the extent to which the organisation is engaged in B2B and/or B2C e-commerce. As Mahadevan (2000) notes, ‘the Internet economy allows an organization to position itself at an appropriate level of the supply chain, depending on the nature of its business’.

The e-commerce context is concerned with the present business model (i.e. whether it is a dotcom, or a clicks-and-mortar organisation), the path to that model and the extent to which the business processes and information systems have had to change to facilitate the adoption of e-commerce. The organisational context concerns factors such as the organisation’s objectives (profit-seeking or not-for-profit), its size (multi-national, SME), its organisational culture, its industry sector, and other relevant factors that influence its business activities. Figure A.1 illustrates this theoretical framework, demonstrating the interrelationship between these factors.
Research objectives
The main objectives of the work undertaken at OUBS were:

- To identify and describe various models of the business processes used for order fulfilment and delivery in e-business.
- To identify how various organisational and environmental factors may affect or constrain its choice and operation of those processes.
- To develop a series of testable propositions that will form the basis of future research projects in this area.

Research methods
Examples were sought from B2B (business to business) and B2C (business to consumer) e-business. The research was exploratory in nature, and so assessed the order fulfilment and deliver processes that support e-business by analysing current practice. This involved the examination of how organisations process materials, customers and information internally as well as how they interface with their external supply chain. The research aimed to model these processes and identify key factors which impact their operation.

The aims of these case studies were to identify the context and motivation for e-commerce, internal and external changes arising from e-commerce, how the process has been managed and their approach to the evaluation and performance management of their e-commerce applications.

The interview questions were aimed at discovering the firms’ objectives for their e-commerce activities, how they were managing their e-operations and how they were adapting their operations and related performance measurement practice to incorporate e-commerce. The questions were specifically structured around the areas and issues identified for the framework. In particular, whether processes for conventional business and e-business were integrated internally and externally; whether the information systems supporting these processes were similarly integrated, internally and externally, and what impact, if any, the organisational context had on the e-operations. The interview questions were open-ended, aiming to gather as much information as possible about the impact of e-commerce within the organisations, but also upon its impact on the organisations’ customers, supply-chain partners, intermediaries, as well as interaction with competitors. Interviews were tape recorded to facilitate subsequent transcription. The advance question guidelines for participants and semi-structured interview question framework may be found in Appendices B and C.

Findings
Some of the key findings from each of the cases have been drawn together in a cross case comparison displayed in Tables A.1 and A.2, covering the clicks-and-mortar and dotcom cases respectively. The organisations display a range of uses of e-commerce, which as Table A.1 shows, covers both B2B and B2C business models. The focus of the use of e-commerce also varies. In most cases the main focus is customers (ARB, RER, MM Holdings, IKS, and Rebankco). However, it is not confined to customers, as in some cases, the focus is rather the company’s distributors (RER), suppliers (Pharmco, Aon and IKS) and/or its own internal users (Pharmco). The organisation’s motives for use of e-commerce can be broadly categorised as either associated with improving efficiency (Pharmco, IKS, Creditinsure) or effectiveness (RER, MM Holdings) or both (ARB plc, Aon Ltd). Rebankco stands out, as it seems to have no clear motivation for its use of e-commerce.

The risks and problems in the use of e-commerce identified by the organisations can be broadly classified as either technologically related or socio-organisationally related. Technologically related problems include a lack of IT support and a shortage of skilled staff (Pharmco), the lack of agreed operating standards in the industry (Aon Ltd), problems of integrating e-commerce business processes and information systems with those of the conventional business (Aon Ltd, MM Holdings, IKS) and the costs of IT investments (Pharmco and Aon Ltd). Socio-organisationally related problems included cultural problems internally (ARB, RER, Aon Ltd, MM Holdings) and externally with supply chain partners (ARB plc, RER, Aon Ltd, MM Holdings, Creditinsure and IKS).
<table>
<thead>
<tr>
<th>Case</th>
<th>Use of e-commerce</th>
<th>Motivation</th>
<th>Risks and problems</th>
<th>Competitive advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB plc</td>
<td>Internet portal.</td>
<td>Move away from EDI. Customer focus. Reduction of supply chain costs.</td>
<td>Resistance to change both internal and external. Ensuring successful collaboration.</td>
<td>Re-intermediation and collaboration; raised barriers to entry.</td>
</tr>
<tr>
<td>Pharmco</td>
<td>Primarily email communications internally and using web-based information systems to check suppliers’ stock.</td>
<td>To support manufacturing production planning.</td>
<td>Recent loss of IT support following a de-merger. Would prefer to use surplus financial resource to increase, manufacturing capability. IT/IS training and implementation.</td>
<td>Better co-ordination within the supply chain.</td>
</tr>
<tr>
<td>Aon Ltd</td>
<td>Information exchange for risk placing and underwriting. Used for low-value high-volume business.</td>
<td>To speed up exchange of information and establish contract. Desire to eliminate perceived threat from competition. Desire to create client loyalty, 'stickiness'. Lowering of transaction costs through client self-service.</td>
<td>Lack of industry standards. Conservative attitude within the industry. Towards technology fit of e-commerce systems with the company’s conventional systems. Risks associated with being a technology leader.</td>
<td>Differentiation on cost and technology. Attempt to create barriers to exit.</td>
</tr>
<tr>
<td>MM Holdings</td>
<td>Online share dealing.</td>
<td>Test of connectivity. Using the Internet channel to leverage increased business. Desire to target private investors as a 'high growth' market.</td>
<td>Expensive investment in IT/IS. Cultural issues; conservative industry; negative image of share dealers.</td>
<td>Position as market-leader. Tapping into new and potentially fruitful markets.</td>
</tr>
<tr>
<td>IKS</td>
<td>Online claims reporting. Sale of insurance products via partner organisations in other industry sectors.</td>
<td>Need for 24/7 operations. Improved efficiency.</td>
<td>Difficulty of collaborative ventures. Multiplicity of sales channels = multiplicity of processes.</td>
<td>Responding to customer needs. Exploiting non-obvious partnerships (e.g. with other sector).</td>
</tr>
<tr>
<td>Rebankco</td>
<td>Online mortgage information, application, valuation.</td>
<td>Acquisition of competitor whose online systems are more advanced.</td>
<td>Lack of conviction about benefits from e-commerce. Non-interoperability of processes.</td>
<td>No obvious source at present.</td>
</tr>
</tbody>
</table>
Seven of the case companies seem clear about the basis on which they are seeking to achieve a competitive advantage from their use of e-commerce. These include improved supply chain co-ordination to raise entry barriers for competitors (ARB, Pharmco, IKS), differentiating their service offering to raise exit barriers for customers (RER, Aon Ltd), improving customer service (MM Holdings and IKS), better cost management (Creditinsure) and entering new markets (MM Holdings, IKS). Rebankco stands out as it seems to have no clear idea about e-commerce can be used to achieve a competitive advantage.

Table A.2 Cross case comparison (dotcoms)

<table>
<thead>
<tr>
<th>Case</th>
<th>Use of e-commerce</th>
<th>Motivation</th>
<th>Risks and problems</th>
<th>Competitive advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-insure</td>
<td>Integrated automated on-line credit and risk management package for online trading companies.</td>
<td>Use experience of credit management to leverage e-commerce. Differentiated business focus.</td>
<td>Conflict with the parent company over the role, focus and fit of the e-business.</td>
<td>Open new business channels.</td>
</tr>
<tr>
<td>E-financial Management</td>
<td>Online information exchange for outsourced financial management.</td>
<td>Service can be provided no matter where clients are based. Provide flexibility and services which can be customised to client need.</td>
<td>Internal systems integration is problematic due to legacy system issues.</td>
<td>Differentiation through flexibility and service. Better co-ordination with customers.</td>
</tr>
<tr>
<td>Amplebosom</td>
<td>Online B2C clothing retail.</td>
<td>Perceived gap in the market. Advantage in terms of stockholding.</td>
<td>Insufficient internal integration. No Internet links with suppliers.</td>
<td>Offer new channel to market.</td>
</tr>
<tr>
<td>Legalco</td>
<td>Online information provider for legal advice. Portal to a range of legal service providers.</td>
<td>See legal services as essentially information-based, thus amenable to the dotcom business model. Create a new model for legal services.</td>
<td>Need to improve its internal efficiency.</td>
<td>Re-intermediation providing quality of service benefits. Trade on anonymity of providing legal advice online.</td>
</tr>
</tbody>
</table>
As with the clicks-and-mortar organisations, the dotcom start-ups cover both B2B and B2C applications. However, in all cases the applications are customer facing. Motives include improving effectiveness and flexibility (E-financial Management) and recognising the potential for new markets or radical new business models (Legalco, E-Insure, Amplebosom). A common problem for dotcoms in this study appears to be the lack of internal system integration. Competitive advantage is being derived from either creating new business channels (E-Insure, Amplebosom) or offering greater customer service flexibility (Legalco, E-financial Management).

**Conclusions**

**Motivations for e-commerce**

The findings from the case study organisations suggest that investment in e-commerce is primarily technology driven. The main motivation appears to be to make use of the Internet for business because use can be made of it. Underlying this is a fear of being left behind by competitors, that if the company does not seize the opportunities on offer, it may be left at a competitive disadvantage by those that do. This perspective was evident regardless of industry sector.

Companies do not always seem to have a clearly articulated strategic logic for their e-commerce investments, and do not appear to be following Wigand’s (1999) proposition to align their use of ICT with their business processes. Improving business process performance seemed to be a largely posthoc rationalisation. All companies seemed to be seeking lower operating costs through the potential efficiency gains available through e-commerce, although some recognised that this would take time to achieve. Whilst some companies spoke of using e-commerce to improve customer service and create customer ‘stickiness’ some of this may have been aimed at reducing the risk to existing business and/or to learn as much as possible from early forays into e-commerce. In other cases, problems with IT hardware or software militate against integration. Indeed, a further conclusion from the cases is that their e-operations are tending to automate, rather than re-design existing processes. This reinforces existing, largely functionally based, organisational structures rather than creating process-based structures. This may be a surprising finding especially given all the interest in business process re-engineering (BPR) over the last decade, much of which was driven by those who saw the possibilities for IT driven business process improvement. It very much runs counter to the calls for the ‘obliteration rather than automation’ of existing organisational activities led by Hammer (1990) and other advocates of BPR.

A further conclusion from the cases is that their e-operations are commonly run as a discrete set of processes. There is little or no integration between e-operations information systems and those of the bricks-and-mortar operations. In some cases this perhaps stems from a desire to keep e-commerce as a separate activity, either to reduce the risk to existing business and/or to learn as much as possible from early forays into e-commerce. In other cases, problems with IT hardware or software militate against integration. Indeed, a further conclusion is that legacy systems and a lack of industry standards are major encumbrances to information systems integration. The legacy system issue is primarily an internal factor within organisations, and is particularly acute where organisations have been subject to merger and acquisition. This is by no means surprising as to undergo an organisation-wide IS change is bound to involve major expenditure. However, it is clear that ongoing IS incompatibility represents a significant barrier to the integration of e-business within larger organisations. It is much easier and cheaper for small business to undertake complete wholesale replacement of both hardware and software. The lack of industry standards is, of course an external issue, but it has a major impact on those companies operating in an industry that relies on the widespread interaction of many inter-linked organisations offering very specialised services. This is typically the case in the financial services industry and is perhaps typified by the insurance industry. It is clear that in this sector in particular greater use of e-commerce B2B is being held back by lack of agreed standards.

**E-commerce and business process change**

Much has been made in the professional and academic media of the role e-commerce can play in stimulating business process change. It has been stressed that this new technology has the capability to radically transform ways of doing business and help organisations realise dramatic process improvements by slimlining existing processes and enhancing the flow of information throughout and beyond an organisation. However, the case study organisations provide a different picture, as it would appear that investments in e-commerce are tending to automate, rather than re-design existing processes. This reinforces existing, largely functionally based, organisational structures rather than creating process-based structures. This is by no means surprising as to undergo an organisation-wide IS change is bound to involve major expenditure. However, it is clear that ongoing IS incompatibility represents a significant barrier to the integration of e-business within larger organisations. It is much easier and cheaper for small business to undertake complete wholesale replacement of both hardware and software. The lack of industry standards is, of course an external issue, but it has a major impact on those companies operating in an industry that relies on the widespread interaction of many inter-linked organisations offering very specialised services. This is typically the case in the financial services industry and is perhaps typified by the insurance industry. It is clear that in this sector in particular greater use of e-commerce B2B is being held back by lack of agreed standards.
Advance question guidelines for participants

The Open University Business School
Research project on electronic commerce and business processes

Thank you very much for agreeing to take part in an interview on e-commerce. Here is a short list of questions. This is intended to serve as a general guide to the issues on which we will be seeking your comments.

1. The context for e-commerce

2. The motivation for e-commerce
We will ask you to tell us something about when your organisation first began using e-commerce, and about the motives and objectives which are driving your e-commerce applications.

3. Internal changes arising from e-commerce
Are your e-business processes integrated with conventional business operations within your organisation?
Have your conventional business operations changed as a result of e-commerce?
Is there integration between the organisation’s internal information systems? (As between, for example, sales and marketing, manufacturing and accounting functions?)

4. External changes arising from e-commerce
Have you been able to integrate your e-business processes with those of your supply chain partners?
If so, has there been any noticeable effect in terms of adding or removing intermediaries to and from the supply chain?

5. Managing the change to e-commerce
What were the most significant issues in making the change to e-commerce?

6. The future
What are your future plans for the use of e-commerce?

7. Performance measures for e-commerce
Are you using any formal or informal performance measures for e-commerce?
Appendix C

Semi-structured interview question framework

Preamble:
In the research we are interested in the way that organisations are using e-commerce, and in particular the way that the organisation is managing its business operations as a result of using e-commerce.

1. The context for e-commerce
   (a) Please give a brief profile of your organisation and its activities.
      (Note: or confirm details with them if significant information has been gathered prior to interview.)
   (b) When did your organisation start using e-commerce?
   (c) What is the e-commerce business model (e.g. dot com start-up, clicks-and-mortar)?
   (d) Do you use e-commerce for B2B or B2C?
   (e) Please describe the nature and scope of the activities that you undertake using e-commerce.
   (f) What proportion of your organisation’s business is transacted using e-commerce?

2. Motivation for e-commerce
   (a) What motivated your organisation to adopt e-commerce? (e.g. competitive pressure, technology-driven)?
   (b) What are the organisation’s objectives in its use of e-commerce?

3. Internal changes arising from e-commerce
   (a) To what extent are your e-business processes integrated with conventional business operations within your organisation?
   (b) How have your conventional business operations changed as a result of e-commerce?
   (c) To what extent are your information systems integrated within the organisation? (i.e., do they have separate systems within the organisation, e.g. for sales and marketing and manufacturing. To what extent is there a dichotomy between functions and processes in terms of informational flow?)

4. External changes arising from e-commerce
   (a) Have you been able to integrate your e-business processes with those of your supply chain partners (customers, suppliers etc.)?
   (b) Have you been able to integrate your information systems with those of your supply chain partners (customers, suppliers etc.)?
   (c) Have your organisation’s e-commerce processes had any noticeable effect in adding or removing intermediaries to/from the supply chain?

5. Managing the process of change to e-commerce
   (a) What were the most significant issues in managing the process of a change to e-operations? (Prompt for both positive and negative issues/whether there were any technical, financial or organisational factors that significantly helped or hindered the process.)
   (b) What advice might you give to a similar organisation contemplating a move to e-business?

6. Evaluating the use of e-commerce
   (a) What are the issues that still need to be resolved before your organisation can move further forward with e-commerce? (How do they intend to resolve these issues?)
   (b) What are your future plans for the use of e-commerce?

7. Performance measures for e-commerce
   (a) How do you evaluate the success of your e-commerce activities?
   (b) What (formal) measures are you using to assess the performance of your e-commerce activities?
   (c) How do these measures differ from the performance measures you use in your conventional business activities?
   (d) How useful/accurate are these measures?
   (e) What do you see as the main issues in devising and implementing suitable performance measures for e-commerce activities?

8. Any other issues?
   Are there any other operational or general issues which are relevant and which we have not touched upon?
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