E-commerce processes: a study of criticality

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Introduction

E-commerce covers a wide span of activities. Within the e-commerce environment there are a number of sub-environments, these are: business to business (B2B), electronic data interchange (EDI) through formal information systems (IS) and local and wide area networks (LANs and WANs) using either bespoke protocols or generic protocols such as UN/EDIFACT (United Nations Electronic Data Interchange for Finance, Administration, Commerce and Transport); B2B via the Internet through modems and personal computers; and business to consumer (B2C) via the Internet. It is difficult to look at any financial or business publication today without being bombarded by dot-com enthusiasm, from Internet start ups to initial public offer (IPO) by established dot-coms, to traditional bricks and mortar (BAM) companies jumping on the e-commerce bandwagon.

It is not easy to find a generally accepted definition of e-commerce; the UK government's e-centre organization (www.e-centre.com), created to promote e-commerce awareness, defines it as:

Electronic commerce covers any form of business or administrative transaction or information exchange that is executed using any information and communications technology (ICT).

This view is slightly old fashioned and illustrates the centre's background in predominantly B2B and EDI. The Economist (2000) argues that the following is a broad definition of e-commerce, when in fact the opposite is true, it is a very narrow and journalistic interpretation pandering to the alleged consumer boom.

E-Commerce refers to trade that actually takes place over the Internet, usually through a buyer visiting a seller's Web site and making a transaction there.

Daniel et al. (2000) quote Zwass when defining e-commerce:

…the sharing of business information, maintaining business relationships and conducting business transactions by means of telecommunications networks …

This definition is much wider in scope, making allowance for the wide range of activities that e-commerce spans.

The definition of e-business is not as problematic, working in collaboration with E-Centre, Score Research (www.scores.com) defines it as:

…what you are or will become. Becoming an e-business means enabling your people, business partners, suppliers and customers to work together, share information and transact electronically, making your organization much more effective in creating and delivering value.

While this definition is along the right lines, it is too marketing oriented, trying to sell a product or service with its focus on employee empowerment and partnerships. Perhaps a fairer definition of an e-business, derived out of analysis of the literature and not specifically laid down in any one publication, is:

…where a company has integrated all of its business processes and functions electronically so that information can be shared amongst all users, partners and systems; an e-business would have its Internet functionality linked in to its back office procurement, administration, stock holding and delivering systems, allowing major efficiencies and data accuracy to be achieved.

In an e-commerce matrix produced by the The Economist (2000) it is claimed there are four general classes: B2B, B2C, consumer to business (C2B) and consumer to consumer (C2C), While this is a clear and easy to
understand representation of the e-commerce landscape, the C2B link is tenuous and is probably included for the sake of neatness and balance rather than any conviction that C2B represents a significant part of e-commerce.

The focus of the study described in this paper was the identification of the generic and critical processes across the e-commerce value proposition. The data on which the study is based were obtained from semi-structured interviews with a selection of consultants from a major international management consultancy, based on their experiences in undertaking e-commerce engagements. From this primary data and supplemented by analysis of the literature, a number of key processes of e-commerce organisations have been identified, they are: order generation; order fulfilment; revenue generation/collection; financial control; IT/Web changes; business processes; e-integration; call centre integration; 24/7 operation; consumer behaviour; international legislation; effective management; and speed of environment. In making an examination of the individual processes, it is clear that many of them are closely related and there is overlap. These processes are first described and this is followed by relating them to the modes and models of e-commerce.

**Key processes in e-commerce**

**Order fulfilment**

The types of problems differ from sector to sector, but are predominantly centred on logistics cash flow companies rather than the infomediaries and service providers. Nonetheless, service providers can have their logistical problems (e.g. centre manning and responding to e-mails within a realistic timeframe).

In the past, customers were expected to purchase their requirements and perform the home delivery function; therefore, the distribution models in place were predominantly focused on bulk deliveries to regional distribution centres and spoke and hub distribution to the retailers. However, with the advent of disintermediation, the retailer is expected to perform the whole delivery chain, hence the flourishing of the small parcel delivery industry. Issues from the provision of a B2B service are noticeably different from those encountered when providing a B2C service. Furthermore, there is a considerable difference between an established BAM company entering into the e-commerce environment, and a start-up dot-com; the levels of infrastructure vary widely. Typically, a start-up dot-com would outsource its logistics requirements, as it does not have the capital or experience to build its own logistics infrastructure. This quite often causes the loss of visibility and, more importantly, control of one of the most influential areas of customer contentment and loyalty. In contrast, an existing organisation would be more likely to have an extensive logistics organisation which could be adapted to the new requirements of e-commerce. Even if it had outsourced its logistics operation, it is more likely to have some form of integration with the third party and developed effective working relationships, allowing a degree of control.

A number of issues surround order fulfilment: availability of stock to satisfy the requirement; time taken to deliver the purchase; and delivery scheduling. Many e-commerce companies, although they have a creditable Web presence, are poorly integrated into their other business IT systems. For example, experience indicates that when orders are taken on the Web site there is often no cross-checking to ensure stock availability. Therefore, a situation is encountered by the customer where their credit card has been debited and a number of days later they receive either an e-mail or letter advising them that, due to stock unavailability, their purchase will not be delivered for “x” days. E-consumers are now able, by the use of the Internet, to search an almost unlimited source of products and suppliers within seconds. They have distinctly different expectations to traditional catalogue shoppers; mostly they expect their requirements to be met by next-day or 48 hour delivery. Often the experience varies wildly from the expectation – the typical gap five in Parasuaman et al. (1985) gap model, and stories abound of deliveries that either fail to arrive or are days, if not weeks, late. Christmas 1999 proved to be a particularly bad time for e-commerce toy retailers, with many companies failing to deliver orders (Computing, 2000). An Andersen Consulting survey (Marr, 2000), prior to Christmas 1999 on consumers’ attitude to Internet shopping reported: “item out of stock is the number one irritation of on-line shoppers; followed by items not delivered on time”. Many of the current Internet consumers are professional, people who go to work Monday-Friday, 8 a.m.-6 p.m., and are not at home when traditional deliveries take place. This is where logistics will have to answer a challenge by allowing consumers to stipulate windows of opportunity for deliveries.
Revenue generation/collection
The process of receiving funds exchanged for goods is critical for infomediaries/junction-box ventures, as they rely almost solely on costs generated by the use of their service to survive. However, there is a variety of methods they can use to calculate costs (i.e. transaction costs; notional savings; and category fee.) Transaction costs are the simplest. Notional savings are the most complicated, as an in-depth analysis of previous purchasing is required to assess previous costs as opposed to current costs, then an agreed percentage is charged. Category fee is where a client is charged a set fee for using each product category of the infomediary service. As e-commerce organisations have a number of sales channels, the established companies are looking to protect their core business by using technology. It is important that they have an overall process to co-ordinate their revenue collection, otherwise financial discipline will dissipate, resulting in cash flow problems.

As with revenue generation, the overall purchase to payment (P2P) process is equally important for many companies using e-commerce, B2B infomediaries are completely reliant on the process being conducted as quickly and accurately as possible, to receive payment for their services. The overall P2P process is complex, consisting of multiple micro processes; however, it is generically considered as one process. Nonetheless, despite the general lack of awareness, it is considered as one of the critical success processes within many junction-box/infomediary companies.

Financial control
Boo.com is the most notable casualty of the lack of financial control within an e-commerce company; however, its financial indiscretion was caused by over extending its hospitality and advertising requirements. Among the interviewees there was a general awareness that to be successful firms engaged in e-commerce had to exercise strict control on both revenue and expenditure. With multi-channel outlets for goods, as well as outsourced order fulfilment and call centre operation, it is vital to ensure that all discounts, credits, payments, deliveries and credit card clearance are monitored and ideally controlled by one financial system.

Business processes
It would appear from the interviews that very few e-commerce organisations are aware of their key business processes. There are two major reason for this. First, due to the speed of the Internet there is no time to map a process and changes are made to procedures and processes in an ad hoc “firefighting” manner. From a quality perspective, this approach is fraught with dangers. However, it does appear that this is the method that the vast majority of e-commerce companies favour out of necessity. Many have tight budgets and manpower is used to lever most advantage from the technology and matters such as process mapping are likely to fall through the cracks. The second reason is the organisational immaturity, both from a business and quality perspective.

E-integration
Almost universally the interviewees suggested that there are few organisations that are totally e-integrated. Many organisations use human intervention to interface between different systems, sometimes referred to as a “swivel chair interface”. Even companies that are held up as excellent in the field of e-commerce use marketing to suggest e-integration, with the reality different from perception.
Order generation
While order fulfilment is considered as one of the main stumbling blocks for many of the logistics and cash-flow e-tailers, order generation is equally important to get consumers to view the Web site. For start-up dot-coms a vast amount of money is spent on advertising. One of the business processes critical to success is to enter into partnerships with established Internet brand names, to engineer visibility and Internet trustworthiness. The most cost-effective method of achieving this is by working in collaboration with the junction-box/informediaries. When a search is performed by an individual looking for a particular product or service, the search engine promotes the sites of partners. This is more readily observed when using a bespoke search engine. When a search is requested, the answers are inevitably biased in favour of certain companies, those that either pay for this preferential treatment or pay a transaction fee for every user who enters the partner’s Web site via the Web site. Another method of using partnerships to increase order generation is to use a well known brand name.

Call centre integration
The call centre must be fully integrated into the technological backbone of the enterprise. Call centre staff must have the ability to have visibility of the overall business scenario to resolve customer queries in an efficient manner. Some dot-com businesses have an outsourced call centre that has access to the Web site but no access to the underlying database which underpins the site and to the warehousing or transportation systems.

24/7 operation
The 24 hours seven days a week culture is more evident in e-commerce, where globalisation means that someone, somewhere, is probably looking at the Web site. Therefore, the maintenance and availability of the Web site is a critical process. An inability to access a Web site, for whatever reason, is akin to a traditional shop advertising and then locking the door when the customer arrives.

Consumer behaviour
In a traditional BAM store, shop assistants can watch customers and react accordingly, offering help and even asking customers why they have decided to leave without purchasing. On the Internet, the consumer is more intangible, like the service itself, and gives no reason for his/her departure. Increasingly, e-commerce organisations are attempting to identify why their customers leave without purchasing; there are many software products which record every facet of customer activity and traffic visiting the Web site, and although software tools provide extensive data analysis, it is not straightforward. Linked inextricably with consumer behaviour is the ability to adapt and change the Web site to keep up with new initiatives identified or gleaned from other sites.

E-commerce modes and models
Marr (2000) has proposed five new models of e-commerce:
1. The logistics and cash flow model (an organisation looks to use the benefits of e-commerce to change the rules of engagement and use the new technology to reduce stocks, increase cash flow, maximise choice by increasing the available sourcing options, and to reduce the accounts receivable risk).
2. Customer lifetime value model (an organisation seeks to develop long-term loyalty-based relationships with its customers).
3. Customer aggregator model (used by an organisation seeking to create a virtual community around an area of interest, the organisation’s main asset then becomes the customer aggregation).
4. Channel harmonisation model (companies can reconcile the opposing forces between their traditional business and an on-line service).
5. Junction box or “info-mediary” model (an organisation which wants to be info-mediary seeks new markets with lots of buyers and sellers and then provides a Web-site where business can be conducted and overseen by the independent third party provider) that underpin the emerging e-commerce culture.

The customer lifetime value and customer aggregator models represent a fraction of the potential e-commerce market and should not be considered with the same level of authority as the others in terms of meaningful modes of future business. Therefore, in conducting an analysis of modes and models, these two models have not been considered.

The analysis is based on three modes of e-commerce (B2B, B2C and C2C) and three e-commerce business models (the logistics and cash flow model; channel harmonisation model; and junction box or “info-mediary”). This rationalisation of modes and models.
allows a matrix to be developed showing the relationships between modes and models; not all models apply to all modes and vice versa. Table I shows this relationship in the form of an L-type matrix.

It is argued that while the three models apply equally to B2B and B2C, the logistics and cash flow and channel harmonisation are not applicable to C2C. The principal C2C Web sites are those allowing auctions and while there are transactions, with financial exchanges and logistics requirements taking place, they are between the two consumers involved and predominantly conducted offline; the Web site owners are not involved in the transactions, and merely facilitate the process. Nonetheless, some of the C2C Web sites also take advantage of their Web traffic to sell to consumers in a traditional logistics and cash flow model. These instances are covered by treating them as B2C logistics and cash flow operations. Similarly, there are no retail channels to harmonise, as it is C2C and therefore this model can also be discounted. Table II relates these modes and models to the ten critical processes.

As can be seen, there are a number of repetitions, such as a B2B logistics and cash flow organisation having e-integration as one of the critical processes, exactly the same as B2C logistics and cash flow. Critical processes have no exclusivity to particular modes or models; nonetheless, there will be other occasions when the process has the same name but the considerations underpinning it will be different. The paper examines each mode and model combination individually, with commentary on why some of the critical processes have been omitted from the mode and model combinations shown in Table II.

**Table I**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Logistics and cash flow</th>
<th>Channel harmonisation</th>
<th>Junction-box/infomediary</th>
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<tbody>
<tr>
<td>B2B</td>
<td>A</td>
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<tr>
<td>B2C</td>
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<tr>
<td>C2C</td>
<td>B</td>
<td>B</td>
<td>A</td>
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**Table II**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Model</th>
<th>Critical process</th>
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<tbody>
<tr>
<td>B2B</td>
<td>Logistics and cash flow</td>
<td>Business processes</td>
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<td></td>
<td>E-integration</td>
<td>24/7 operation</td>
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<td>B2C</td>
<td>Order generation</td>
<td>Call centre integration</td>
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<td></td>
<td>Order generation</td>
<td>24/7 operation</td>
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<tr>
<td>C2C</td>
<td>Revenue generation</td>
<td>24/7 operation</td>
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**Business to business**

As discussed by writers such as Goodley and Lauchlan (2000), Kesselyack (2000) and Torrisi et al. (2000), B2B represents the largest proportion of the e-commerce market, and the majority of the predicted future growth. B2B incorporates: logistics and cash flow; channel harmonisation; and junction box or “info-mediary”. The characteristics of each of these are discussed, with explanation of why some processes are applicable and others are not.

**Logistics and cash flow**

For any organisation in the B2B mode and operating a logistics and cash flow model, there are a number of critical processes which have to be considered and adapted to
ensure the total operation is successful – business processes; e-integration; and 24/7 operation.

The other seven processes were not considered as critical success factors. Order generation has been omitted, as the majority of activity will be handled in the traditional manner using a sales team and relying on their selling power; there will undoubtedly be some e-advertising, but this is considered a secondary means of order generation. With respect to order fulfilment, the organisation will have some form of logistics infrastructure in place, in-house or contracted out, and the expectations of business customers are not as demanding as private customers. Dynamic IT/Web changes is important, to maximise the potential of advertising revenue and partnerships with other e-commerce vendors but in the B2B environment this is considered less important, as the majority of interaction is conducted by the participants’ computer systems, not potential consumers. Financial control and revenue generation/collection are addressed under the same explanation; the majority of B2B companies operating the logistics and cash flow model are existing businesses and will have accounting and financial control processes in place and their revenue generation/collection will be along traditional lines. Finally, call centre integration is less important, as the volume of customers is less, a typical B2B operation will have hundreds of customers compared to hundreds of thousands for a B2C operation; therefore, an on-site help desk is more important than a call centre, which is more than likely fully integrated into the IT system.

Channel harmonisation
In the B2B mode, operating a channel harmonisation model, order generation; business processes; e-integration; and 24/7 operation are considered as critical. The reasons why the other four processes were not deemed critical in this combination are largely the same as for the logistics and cash flow model.

Junction box/infomediary
While logistics and cash flow, and channel harmonisation models are ostensibly similar and represent more traditional means of conducting business, albeit in a slightly different guise utilising electronic automation, the junction box model is a new model with customer and supplier aggregation as its core principle. As such there is a difference in the critical processes present in this model. Those considered pertinent are: revenue generation/collection; financial control; IT/Web changes; business processes; e-integration; and 24/7 operation.

The remaining four processes were deemed non-critical. Order generation is not a significant for a junction box model, as transactions take place between customers and suppliers; the only consideration is marketing to create brand awareness. With respect to order fulfilment, there are no logistics requirements as transactions take place at a third-party level between suppliers and customers, with responsibility for logistics lying with one or the other. Call centre integration is also not an issue, as the underlying process of supplier and customer registration is invariably automated. Consumer behaviour is also not an issue, as the choice is much less than for B2C; in many instances there will be only one or two junction boxes available in the particular market sector.

Business to consumer
As discussed by writers such as Daniel et al. (2000) and Torris et al. (2000), B2C represents the public face of e-commerce, and also represents the majority of the current growth with venture capitalists spawning a multitude of dot-com businesses. Therefore, if e-commerce is to be perceived as a success by the public, this area must answer the critics (e.g. Gann (1999) and Kesselyak (2000)) who propose that within five years, 80 per cent of dot-com launches will be bankrupt. As with B2B, B2C incorporates the three e-commerce business models: logistics and cash flow; channel harmonisation; and junction box or “info-mediary”.

Logistics and cash flow
In recognition of the fierce competition in this arena, coupled with the robust expectations of today’s consumers, all but one of the critical processes are considered critical to e-commerce success in this mode/model combination. The process omitted is revenue generation/collection. It was felt that all logistics and cash flow operations will use credit card payment as their primary means of revenue collection, so while there are some issues surrounding collection of credit card payments, in this instance they are not deemed critical.

Channel harmonisation
As with logistics and cash flow, operating a channel harmonisation model in the B2C mode means that all the critical processes are
included, with the exception of revenue generation/collection.

**Junction box/infomediary**

As explained in B2B junction box, there is a major difference in the applicable critical processes present in this model compared to the logistics and cash flow and channel harmonisation models. The critical processes considered pertinent are: revenue generation/collection; financial control; IT/Web changes; business processes; e-integration; and 24/7 operation. The reasons for the four remaining processes being deemed as not critical were principally the same as for B2B junction box.

**C2C - junction box model**

The sites using this mode are primarily the auction sites, which is why only the junction box model is represented. While there is interest in auction sites, it is considered that they will not provide significant growth. The critical processes considered pertinent are: revenue generation/collection; financial control; IT/Web changes; business processes; and 24/7 operation. The reasons for the remaining five processes being considered as non-critical are the same as for the B2B and B2C junction box sites. For C2C, e-integration is also not considered a critical process due to the simple nature of the model and its relatively simple implementation. There is very little other functionality associated with a C2C junction box with which to electronically integrate.

**Critical process mitigating factors**

Each of the modes of e-commerce has been broken down into its perceived critical processes. The following section of the paper will examine in brief, each process individually.

**Order fulfilment**

Order fulfilment is a major consideration for B2C operations and is without doubt one of the foremost critical success factors. Although important for B2B operations, it is not a critical success factor.

**Revenue generation/collection**

The process of revenue generation/collection applies only to junction-box/infomediaries and the three primary means to calculate costs are: transaction costs; notional savings; and category fee.

**Financial control**

As with traditional business models, financial control is an essential requirement for any successful business; however, in e-commerce, and especially within B2C dot-coms, it is critical. Venture capital is invested on the promises of future profits, and is often the only real income. In these scenarios, financial prudence counts for more than innovative Internet ideas and swish Web sites. An Internet company will survive and fail by virtue of its financial plan.

**IT/Web changes**

One of the most overlooked aspects when creating an e-organisation is the support for the IT/Web environment. Many people starting off such a venture focus on producing a Web site then believe that will suffice for a few years; this is not the case. From day one of starting a Web site, changes will need to be made on a continual basis; the frequency dependent on the mode and model of operation. Advertising is a good source of income for many Internet sites and the ability to strike a deal and conduct the advertising within a short period of time will predicate whether the deal is completed. Additionally, consumer behaviour information when analysed and solutions generated will need to be actioned to the site immediately to be of any competitive advantage.

**Business processes**

Within any e-commerce operation the importance of business processes cannot be underestimated; the whole ideology of utilising e-commerce is for the gains in efficiency that automation brings; therefore, slick and efficient processes are essential. For B2B ventures, the reduction in transaction costs is the driving consideration, and reducing costs can only be achieved by streamlining and understanding the underpinning business processes. Within B2C and C2C ventures it is essential to have efficient processes that staff understand. This becomes doubly important for call centre staff.

**E-integration**

The lack of e-integration amongst organisations was considered by the consultants interviewed as being the norm and not the exception, and while many companies wish to portray themselves as innovative and trailblazing in their use of IT to integrate their disparate functions, the reality is less glamorous. Without doubt, the benefits to be gained by efficiency and
reduction in costs that e-integration brings are enormous. Nonetheless, the journey to true integration is an exceptionally difficult, expensive and perilous one. An example of a lack of e-integration is given below:

One of the researchers, while gathering data for the study spent many hours looking through different Internet sites. Eventually the temptation to make a purchase became too great and a new PC was purchased on the Internet from a computer company, generally regarded as one of the innovators in e-commerce. The e-mail order confirmation arrived, followed a few days later by a hard copy. Unfortunately, the delivery dates varied, so a check via the on-line order status revealed that the PC was still in pre-production, despite having exceeded the hard copy advertised delivery date. Therefore, a phone call was made to the call centre order help line. The information received was that the PC was “in production” with a revised delivery date, different to that on the hard copy and e-mail. The on-line status was checked daily; for the following week the order was noted as in pre-production. Then on a date not suggested by any of the three methods of communication, the PC arrived, followed three days later by an e-mail advising that the PC had been dispatched and should be received within three working days. It was obvious that no integration was present between the different working areas of production, shipping, and customer support.

Order generation
Although the obvious means of order generation may well be advertising, the analysis of this critical process will exclude this and consider other means of order generation. For a variety of reasons, order generation will be different for each mode/model relationship; nonetheless, what underpins all the influencing factors is the need to construct beneficial partnerships with complementary Web sites and junction boxes. One of the more obvious means of improving order generation is to improve the ratio of users entering the Web site to those purchasing. However, this is a separate study in itself and is covered in more detail in the research carried out by Cox (2000).

Call centre integration
Within any service encounter that involves person-to-person communication, it is essential that the call centre operators have real-time robust information if they are to deal with the anomaly effectively. Without credible information a call-centre operator will appear inept and the customer’s perception of the organisation will deteriorate and they will become more embittered and entrenched in their demands, with little likelihood of a repeat order. Therefore, an operator must have the autonomy and ability to expedite a resolution to the irregularity and this can only be achieved if the access to the data is complete.

24/7 operation
One of the main tenets of e-commerce is the ready access or availability of a Web site. The e-commerce business models are based on business conducted 24 hours a day, seven days a week. Any downtime of the Web site or lack of access is a real loss of potential profits and to be avoided. Additionally, if a consumer attempts to access a site and finds access is denied then they are likely to go to a competitor’s site. Cox (2000) details consumer dissatisfaction on delays in accessing a site and suggests that a waiting time in excess of eight seconds for the main screen to download is excessive and will result in consumers aborting the access in favour of a quicker site.

Consumer behaviour
If all the preceding considerations from the previous nine critical processes are put into place, then chances are the site will be attracting consumers with a high opinion of the organisation. Nonetheless, if too many of these consumers exit the site without making a purchase, then the site will not be generating the profit to match its potential. In a traditional retail environment consumers can be observed, and perhaps questioned, on why they decided not to purchase; however, in e-commerce this is not as easy, though not impossible. There are many data mining tools in the marketplace and associated software that can analyse consumer access patterns and behaviour.

Conclusions
Undoubtedly, the greatest growth in e-commerce will be in the area of B2B, with a proliferation of trade/exchange activity in almost every sector. Therefore, the importance of the B2B mode with the junction box business model cannot be underestimated. Substantial growth in the junction box area is expected, with a paradoxical reduction in market participants and new entrants. This reduction will be due to the cascade effect of perceived success and the swing of popularity to the successful Web sites away from other competition, which over time will have a cumulative effect, resulting in financial success for a few large organisations and financial uncertainty for others. This growth will have a rationalising
effect on industry costs and attitudes, and over the next five to ten years will radically change the business landscape. From a critical process perspective, the overall challenges facing B2B are business processes, e-integration and 24/7 operation. While there will always be an element of consumerism in B2B, the majority will be pre-ordained business partnerships, where the purchaser is tied to contracts with suppliers. It is also envisaged that IT systems will conduct the bulk of transactions, hence the lack of soft process issues in the analysis of B2B critical processes.

While the bulk of economic growth is represented by B2B, the proliferation of B2C Web sites clearly demonstrates the popularity of this medium, and, as with B2B there will be considerable rationalisation in the future. The rush to become a dot-com will inevitably leave too many businesses chasing too few consumers as the market becomes swamped. Once again the perceived popularity of certain sites will result in a groundswell of consumers switching to these sites, which in turn leads to a self-perpetuating situation where success for the few, results in ruin for the many. To succeed in this hostile environment, entrepreneurs will have to demonstrate considerable foresight in identifying new markets and opportunities, as yet not exploited.

B2C is without doubt the most difficult mode to get right, as illustrated by the preponderance of critical processes deemed applicable. Both logistics and cash flow and channel harmonisation have nine of the ten critical processes, with junction box having six. However, it does not necessarily mean that it is the most difficult to be successful in, as the profit margins within B2C will be higher than B2B, but the prevalence of critical processes does demonstrate that consumers now expect a certain minimum level of performance when purchasing goods or services. The fickleness of consumers, coupled with the ease that e-commerce provides in contrasting prices and value added services, requires that B2C sites must work hard to exceed customer expectations. As traditional business has discovered, drastic improvements in performance can only be achieved by using robust and effective quality tools and techniques. To succeed in B2C an organisation not only needs good products and marketing, it needs excellence within its processes, with a culture of continuous improvement and excellence.

The most important process for B2C is logistics and cash flow, and channel harmonisation in order fulfilment. It is to no avail to get the front-facing aspects of the Web presence right, only to let down the credibility of the whole organisation by not providing the goods or services when promised. It is considered that the organisations which will do well in this field will be those with years of experience in order fulfilment, which have the logistics staff, expertise and infrastructure.

C2C has emerged as conceptually the simplest mode to operate, especially as it only operates one model, junction box/infomediary. Nevertheless, it does present its own challenges and has five of the ten critical processes. From a consumer's perspective, the preference on which C2C site to use will be largely dictated by Web presence issues (see Cox, 2000). The focus of perspective for this research has been the assumption that users are accessing and using the site; therefore, process considerations have been skewed to represent the issues for financial success rather than user satisfaction. Hence the representation of the critical processes which relate to financial control, income streams and continuous operation.

In comparison to B2B and B2C, C2C has room for a variety of new entrants, albeit in the niche markets. While the general C2C market is being consolidated by two large players (i.e. QXL.com and eBay.com) there remains scope for specialist junction box ventures to emerge. If they are clever they will build on the development already carried out by these companies and take best practices from each of them to develop their own effective sites.

Many of the critical processes, such as e-integration, call centre integration and order fulfilment, highlight the importance of integration of all the main benefits which e-commerce brings (e.g. automation and reduced staff overheads with the commensurate reduction in costs) are to be achieved. Many e-consultancies have identified this and are publicising it on their Web sites. They see their futures inextricably linked to, first of all, e-enabling organisations and then providing them with total integrated solutions as they become aware of the limitations of their short-sightedness in not integrating at the outset. Although this is a cynical view, in reality very few organisations can afford an integrated solution at the inception of their e-commerce venture. It is only as they grow and look for increased profitability that the inevitability of integration will surface. Additionally, as the popularity of open protocol systems becomes greater, so the cost of procuring them will decrease, bringing the
possibility of true integration to the mass of e-businesses.

The findings indicate that the logistical fulfilment of on-line purchases is the biggest problem and challenge to B2C logistics and cash flow companies, hence the current boom in consumer delivery services.

The junction-box/infomediary organisations have their own distinct challenges which are mainly concerned with revenue generation and collection. The pace of the e-commerce environment presents its own challenges, with 24/7 expectations from consumers and the ability to respond with speed to opportunities and threats in the marketplace.

There is little doubt that over the next two to five years the importance of quality will come to the fore in e-commerce. As the rush to fund dotcoms by the venture capitalists and rationalisation starts to take place, traditional business improvement techniques will be considered to provide the competitive advantage required to stay in business.

From a quality management perspective, e-commerce is immature, however, there is a variety of quality tools which can be used:
- quality function deployment can be used to capture the voice of the customer and the data used to build a Web site that the customer wants;
- statistical process control can be employed to monitor the voice of the process, to check if the processes are in control and provide guidance for improvement;
- design of experiments can be used to find the optimum interaction of technical features in a site with marketing requirements.

Although some difficulties may be expected in adapting some of the quality tools to fit, it is not impossible; all that is required is some innovative and lateral thought to consider how to use them in a different environment. This is an area of future research.

References