NORTH-HOLLAND

Industrial Marketing Management 32 (2003) 291–300

INDUSTRIAL MARKETING MANAGEMENT

The relationship between technology adoption and strategy in business-to-business markets The case of e-commerce☆

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Received 28 May 2001; received in revised form 4 April 2002; accepted 4 June 2002

Abstract

Firms have been traditionally advised to adopt information and communication technologies (ICT) to support the achievement of existing business objectives. However, entry into business-to-business e-commerce may require the concurrent adoption of new business strategies. This paper argues, therefore, that ICT analysis needs to be considered at the same time and at the same strategic level, as internal, competitor and market analysis. This is because the source of the competitive advantage brought by ICT has changed, to be largely obtained through increase in customers' perceived value. The literature presents a confused picture of the likely consequences to a firm of its adoption of e-commerce. This paper concludes that any such adoption must be evaluated in the environment of the individual firm. A multidimensional analytical framework, taking a combined informational and marketing perspective, is presented to assist with such evaluations.

Keywords: E-commerce; Technology adoption; Business objectives; Business strategies; Competitive advantage; Analytical framework

1. Introduction

Business-to-business markets have fewer partners, closer buyer–seller relationships, better technology and better information exchange than business to consumer markets [1]. Not surprisingly, they form the largest growth sector in terms of e-commerce and earn somewhere over 80% of the e-commerce revenues [2]. The proportion of these firms engaged in business-to-business e-commerce that have developed specific strategies for their use of the Internet, cognisant of its potential impact on existing business practices, is not known.

Digital technology, particularly the Internet, has been described as an enabler of a new, quasi economically efficient marketplace: one that is only limited by the unpredictability of consumers' behaviour. The new marketplace has been characterised by "perfect information for all," or at least, "equal access to information about products, prices and distribution" (Ref. [3], pp. 157–163). The Internet and e-commerce have also been predicted to underpin a structural shift in business orientation, towards price convergence, with subsequent realignment of business networks [4,5].

However, the impact of information and communication technologies (ICT) remains uncertain. Moderating environmental and circumstantial constraints include, *inter alia*, the variable rate of business representation on-line, logistics inefficiencies, imperfect information search capabilities, political boundaries and the black-box that business relationships are still today. Grover and Ramanial [6] cite six myths and what they call counter-myths concerning the impact of emerging ICT on markets, listing competing influences, which could, for instance, challenge the conventional assumption that the new business environment benefits the customer side of a supply relationship, rather than the supplier.

If a firm adopts ICT-based innovations without a clear understanding of the scope and implications of that adop-

☆ A multidimensional analytical framework that help firms evaluate whether to adopt e-commerce.

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doi:10.1016/S0019-8501(02)00237-7

tion, then not enough attention may be paid to realigning business strategy. As a result, business resources needed to achieve competitive advantage from the ICT investment may not be made available [7] and the investment in innovation may in the end be wasted, or even be detrimental to the firm's pre-adoption competitive position.

The development of effective marketing strategy involves conducting internal, competitor and customer analyses as preliminaries to formulating strategies for market segmentation, targeting and positioning. Within this process, ICT is mostly considered either as (a) an environmental influence on the business-to-business market, along with economic, political and competitive influences (Ref. [1], p. 33) or (b) as an element of internal analysis, under the potentially misleading label of "technological environment analysis" (Ref. [1], p. 168). The conventional wisdom is that "technology strategy must reinforce the competitive advantage a firm is seeking to achieve and sustain" [8].

This paper argues that ICT analysis needs to be considered on par and interdependently with internal, competitor and market analyses. More specifically, it argues that decisions about potential adoption of business to business e-commerce affect these analyses and, therefore, e-commerce adoption may require the concurrent adoption of new business strategies. Here, e-commerce is interpreted generally as "the use of electronic means and technologies to conduct commerce" [9].

In developing this argument, the paper looks first at the way the source of the competitive advantage brought by ICT has changed over time. Next, lack of consistency in the use of the term "e-commerce" is linked to the confusing picture of the advantages and disadvantages of e-commerce adoption that has been painted in the literature. It is concluded that e-commerce adoption must be evaluated in the environment of the individual firm. The need for marketing strategies to be adjusted interdependently with adoption strategies is then justified. Section 6 presents a framework that may assist managers in designing a marketing/adoption strategy, by taking into account informational and market considerations.

2. Competitive advantage

The impact of ICT innovation on business can be viewed as a succession of stages over the history of ICT. In the initial stages, the technological environment could be described in terms of product technology—the set of ideas embodied in a good or a service—and process technology—the steps involved in producing that good or service [10]. Decisions about the adoption of ICT were, therefore, able to be made in the framework of production theory, in which adoption creates benefits in the form of lower production costs for a given level of output. Productivity benefits included operational gains (via rationalisation, product standardisation and such) and economic gains (via lower costs of labour, economies of scale, knowledge acquisition and such). Technology adoption by a firm led to competitive advantage through productivity based efficiency, provided that access to the technological development was restricted, that is, provided there were effective barriers to entry [8,11–14].

Porter's prerequisite of barriers to entry for the achievement of competitive advantage was tested as ICT became more affordable and accessible. Accordingly, the idea of ICT-based, production related, competitive advantage became less sustainable during the 1980s and 1990s, when ICT penetration increased rapidly. Indeed, by the late 1990s, technology was increasingly forcing business operations to follow the standardised models of behaviour and terminology required by off-the-shelf business software, whether small business accounting packages or sophisticated enterprise wide systems such as SAP [15–17].

In the face of wide diffusion of production technology and a market increasingly perceived as global, firms therefore needed to differentiate themselves and/or their products in the consumers' eyes, in order to establish or maintain competitive advantage [18]. During the last decade, the source of competitive advantage has increasingly been seen to reside in the supplementary benefits provided to customers, leading to the creation of sustainable perceived value for customers [19,20]. As well as high perceived quality, control over costs, and product innovation (all of which are helped by ICT support), a firm has to have excellent service, a market-driven learning-oriented culture and speed, that is, the ability to deliver quickly and to quickly solve customer problems [20]. In business markets, speed also involves time to market [21], because being first to the market is usually associated with competitive advantage [22]. Managerial attention refocussed on ICT, therefore, not for production, but for management of procedures associated with sales and business administration [10]. Thus, for example, Kalakota and Whinston (Ref. [23], p. 9) claimed that "in order to be competitive, marketing executives must employ technology to develop low-cost customer-prospecting methods, establish close relationships with customers, and develop customer loyalty."

Value creation is important for business because customers compare the perceived net value associated with each competing business offering and choose the highest value [24,25]. However, competition based on customer's perceived value has a two-tier consequence for firms. First, it shifts business orientation towards the market [26]. Specifically, adoption of the marketing concept directs the efforts of the firm as a whole to satisfaction of customers' needs, subject to business objectives and societal interest. Because the acquisition of new customers is believed to be more expensive than the retention of existing ones, business strategy focuses on customer loyalty and the development of long-term relationships with good customers [20]. This focus in turn has the consequence that a firm needs to know its market and, more precisely, what actual and potential customers consider in their valuations, in order to position itself as the best provider of satisfaction to its customers, and to closely control and allocate resources. Focussing on supplementary benefits for creating value obviously requires the identification of which supplementary benefits provide competitive advantage, a task made especially difficult once variability across industries and across countries is considered.

Creation of customer perceived value brings a renewed dependence on ICT. This is illustrated, for example, by the growth of marketing and management support modules in ERP systems, or by the importance attributed by firms to "customer solution" or call centres. Better ICT systems contribute to competitive advantage because they allow for more efficient use of business resources to meet customers' needs, and support delineation of positioning strategies that can gain customers' preference and loyalty. Hence, if firms perceive e-commerce as encapsulating the opportunities afforded by better ICT systems, e-commerce adoption may surge as it is seen as necessary for the development and/or maintenance of competitive advantage.

3. E-commerce and business strategy

A firm cannot evaluate the need for e-commerce strategies or for associated changes in business strategy without a clear notion of what e-commerce encompasses. Unfortunately, what is meant by the term varies [27,28].

The complexity inherent in the view that "electronic commerce includes so many activities that it can be difficult for managers to decide where and how to use it in their businesses" (Ref. [29], p. 23) may explain its interpretation as a continuum of levels of adoption, from basic use of communication technologies through to increasing transfer of business transactions [30]. Complexity also supports the argument that e-commerce has different valid definitions depending on the perspective taken, namely: (a) communications (the delivery of information, products/services or payments via telephone lines, computer networks or any other means); (b) business process (the application of technology toward the automation of business transactions and workflows); (c) service (a tool that addresses the desire of firms, consumers and management to cut service costs while improving the quality of goods and increasing the speed of delivery); (d) online (the provision of the capability of buying and selling products and information on the Internet and other online services) [23]. However, the failure of many business and academic authors to define their usage of the term 'e-commerce' [31,32], or to agree on a unique description of what the term involves, complicates the determination of which activities a firm should consider, and adds to the imprecision of its usage.

Rosen (Ref. [33], p. 5) explains that "e-commerce covers the range of online business activities for products and services, both business-to-business and business-to-consumer, through the Internet." This description is similar to that given by Schneider and Perry [29] for 'e-business,' a terminological interchangeability that is at odds with the view of e-commerce as an element of e-business [3]. There are also instances of the use of the terms 'e-commerce' and 'Internet' being so confused that the advantages of the latter are appropriated by the former [27,34], and instances of the term 'e-commerce' being used where the emphasis is on a particular Internet characteristic such as 'electronic interactivity' [5]. Ultimately, the definitional lacuna around e-commerce is reflected in widely varying statistics on current and predicted e-commerce activity [2], and inevitably blurs understanding of the advantages and disadvantages of its adoption for individual firms, and of their need for an integrated business strategy.

At any level, adopting technologies associated with major ICT innovation has implications that are multidimensional and, potentially, pervasive to many facets of business activity. Such implications will be uncertain in their reach and scope, and difficult to control. Still, evaluation of the impact of adoption of innovation is often hasty, especially in business-to-business markets where the importance of time-to-market lends a perceived urgency [20,35] and where there is, perhaps, a sentiment of inevitability of adoption. This may affect firms' decision-making regarding e-commerce strategies and, more holistically, the continuous optimisation of their activities through digital technology. Poor strategic decision making may be exacerbated by optimistic assessments of the implications of e-commerce for business-to-business market participants, made by academics and practitioners alike, and which appear to assume that, given time:

- All businesses have access to the skills and ICT hardware and software required by e-commerce.
- All participants—customers, suppliers and competitors—have ready and low-cost access to information about every organisation, process or product in the global market. This allows information parity to develop across participants.
- Information parity leads to price convergence. Competition directed to the generation of the highest customer perceived value is therefore via supplementary benefits, many of which are ICT-based.

Such a philosophical basis, reminiscent of assumptions of perfect information and perfect competition in economics, denies the fact that information in the business world is imperfect and highly dynamic, and that decision making, particularly in business-to-business markets, is often constrained by speed requirements. Each firm can (and, arguably, should) be seen as a separate and unique entity with its own culture, own goals and own way of doing things, more or less resource rich, more or less risk averse, whose performance is likely to reflect particular strengths and weaknesses (including the access and ability to use ICT), core competencies, stage of the life cycle, orientation, nature of existing relationships with business partners, market power and such. From this perspective, it is natural to argue that the impact from the adoption of e-commerce must depend on the firm's internal and external environments.

A review of a cross-section of 21 papers in the business and academic literature yielded over 50 advantages and forty disadvantages that may impact on firms when they adopt e-commerce in business-to business operations. While the time of writing of these papers spanned the dot.com downturn of 2001, different assessments of advantage and disadvantage were not easily related to this. Tables 1–3 classify impacts, respectively, into those concerned primarily with internal, market or competitive factors. Thus,

Table 1
Implications for business from adopting e-commerce: internal factors

Advantages	Disadvantages
Increased profits [29]; leverage of scarce corporate resources [56]	Advantages may be negated by critical mass requirements [29]; nonsustainable advantage [64]
Increased revenue [23] and sales [29]	Costs in staying on top of ICT [4]
Reduced start-up capital needs and lower overheads once started [5,23,34,37,39]	Specific skills required [5,29,34]; reskilling required [52]
Reduced costs: material, transaction, operation, marketing, distribution [4,23,29,31,34,37,51–53,65]; reduced inventories [27,58]	Small businesses have to carry more stock [4]
More diverse business activities and economies of scope [23]	Resistance to payment for services offered via the web [34]
Economies of scale possible [23]	Unreliability and risk [37,54]
Better control over industry supply chains [4,23]	Loss of control through loss of relationships [4]
Disintermediation [39,53]; enhanced supplier–reseller relationships [56]	Disintermediation [5,53,55]
Improved sales tracking [27] and improved marketing [34]	Measurement challenges: difficult to determine the audience reached, costs and benefits [29,34]
Shorter product development cycles [27]; shorter supply chain [59]	Long access and search times for information [5,34]; traffic congestion [34,37]
Accelerated transactions, with faster cash generation [52]; automated buying processes [27]	Time and expense in setting up new processes for handling orders, dispatch and freight [4]
Increased flexibility and responsiveness [29,34,52,53]	Difficulty in integrating existing databases and transaction-processing software designed for traditional commerce into the software that enables e-commerce [29]
Improved internal processes and sharing of internal best practice [49]; access to commercial research [34,37]	Confusing and anarchic information environment [5]

Table 2
Implications to business from adopting e-commerce: market factors

Advantages	Disadvantages
Company location becomes irrelevant [33]	Potential inability to accommodate global differences—may justify exclusion of information such as prices [34]
Closer customer relationships [23,37] with higher switching costs through structural bonds linking computer systems [58]	Disruption to existing relationships along the selling channel [51,64]
Widens existing markets to the global level [29,34]	Risk from dealing with shoe-string businesses [5]
Reaches/creates new markets [23,37] virtual communities [29]	Sceptical buyers [34]; risk from unknown customers [55]
Buyers gain easy access to more suppliers [5,29,52] more often [58]	Big companies band together to screw suppliers on prices [4]
Suppliers can affordably reach more buyers [29,52] Larger potential customer base [58]	Suppliers forced online (a benefit if compliance costs are reasonable) [4]
Better customer service [23,34,37,53] increasing customer value [50]; contributes to societal gain [27]	Restricts competition: big businesses deal only with suppliers that have e-procurement systems [4]
Shifts advantage from seller to the buyer [52,65]; buyers can quickly and thoroughly compare attributes of competing products [4]	Shifts advantage from seller to the buyer [53]
Service information more accurately distributed [23,53]; customers' problems solved faster [37,58]	Security problems [5,29,34,37,60]
Improved communication [5,23,37] and increased feedback [30] in real time [62]. Information can reach more people without sacrificing content [61]	Websites are dull [37]; confusing and anarchic information environment [5]
Enables narrowly targeted marketing efforts [29,34]	Cultural and legal impediments [29]
Alternate sales/delivery channels [23,34]	Unwieldy URLs [34]
Number of products carried by suppliers independent of physical display area [60]	Need bricks-and-mortar evidence [64]
Creates new information-based products [23] and enables prosumption [63]	Specific skills required [60]
Increases supply chain efficiency [58,65]	

Table 1 lists advantages and disadvantages concerning factors internal to the firm perceived as being important for aligning resources to the market environment. These

Table 3
Implications to business from adopting e-commerce: competitive factors

Advantages	Disadvantages
Business size becomes irrelevant [33]	Spells the end for small businesses [4]
Small businesses can compete on a more equal technological footing with multinationals [23]; more opportunities for small businesses [4]	Greater power for large businesses [5]
Big businesses may minimise inventory and increase cycle [4]	Risk from dealing with shoe-string businesses [5,55]
Reduced costs for big business (through accepting only suppliers that practice JIT delivery) [4]	Bad for small business as big business can reduce costs by accepting only suppliers that practice JIT delivery [4]
Price convergence at a lower price level [4,5]; viral marketing [57]	Reduced competition [4]
Nonprice competition stimulated [4,5]	Levelling of business practices [64]
Low cost distribution of information goods [60]	
Online synergy effects from cross-selling lead to one-stop shop offerings [Lee] and increase customer perceived value [62]	Need to maintain a trust relationship with customers, providing constant value-added information, products and quality on-line experience [60]
Faster launching of new or revised products [58]	
Eliminates some national and global barriers to entry, such as marketing costs, distribution and shelf-space acquisition [37]	Creates barriers to entry [5,58] via IP, exclusivity arrangements and creation of customer communities [64]
Competitive intelligence [34]	Blurring of traditional boundaries [57]
Virtual enterprises may mimic benefits of vertical integration [49]	

include factors such as production capacity, costs, operations and sales, revenue and profit objectives.

While there is almost universal agreement about benefits from reduced costs, new costs (for example, those associated with keeping up with ICT developments, reskilling and setting up new processes for handling orders, dispatch and freight) are also identified. Table 1 shows that advantages from economies of scale may be either negated by critical mass requirements or be unsustainable. While e-commerce is usually viewed as leading to reduced inventories, the need for small businesses to carry more stock has also been reported.

Further illustrations of ambiguity in assessing the impact of e-commerce are provided by operational efficiency and supply chain management. Assumptions of improvement in these areas are apparently challenged by loss of control due to disruption of existing relationships, by measurement difficulties, and by the limitations perceived in the integration of existing databases and transaction-processing software designed for traditional commerce into the software that enables automation of the buying process in particular, and e-commerce in general. Faster cash generation from accelerated transactions can be countered by possible resistance to payment for services offered via the web.

Table 2 shows that the impact of e-commerce is similarly ambiguous for market factors such as definition of markets, relationships, customer service, customer value, delivery channels and new products. While the adoption of e-commerce is claimed to facilitate a firm's ability to affordably widen its market, to reach new markets and to access virtual communities, this ability is also claimed to increase the risk of dealing with unknown customers. In addition, potential benefits from wider reach may be overestimated due to customers' scepticism about purchasing online with associated security risks. Similarly, the view that e-commerce is weakened by lack of bricks-and-mortar presence contrasts with the perceived benefits to firms that may ensue from determining their product mix independently of the need to keep to a physical display area.

In regard to relationships, the table summarises reports that e-commerce fosters the development of closer customer relationships, although it also records the view that existing relationships may be disrupted. The view that reduced human involvement ensuing from the adoption of e-commerce facilitates a more accurate distribution of service information contrasts with the view that a firm's inability to accommodate global differences may limit what information is available.

Shifting attention to competitive factors, reported in Table 3, it is apparent that the assessment of the impact of e-commerce is similarly ambiguous. Arguments that e-commerce stimulates nonprice competition appear to clash with arguments that big businesses may band together to push down their suppliers' prices, as well as with the proposition that e-commerce fosters word-of-mouth promotion (viral marketing) rewarded by merchants with lower prices. Barriers to entry are variously reported to be created or removed. The claim that business size is irrelevant appears to contradict the views that online access will give greater power to large businesses and will create more opportunities for small businesses or, more dramatically, that e-commerce will spell the end for small businesses.

While the allocation of items to tables has an element of subjectivity, the comparatively fewer entries in Table 3 suggests that the impact of the adoption of e-commerce on competitive advantage is not well understood and has not been extensively investigated. The complexity of interactions between buyer and supplier highlighted by Grover and Ramanial [6] have not yet been unravelled. Overall, the apparently contradictory arguments presented in the literature beg the conclusion that e-commerce adoption must be evaluated within the environment in which it is to be applied. This means that each business will need to take its unique circumstances into account.

4. Illustrations of the interrelationships between e-commerce and business strategy

In order to emphasise how the potential impacts of e-commerce adoption are more complex than supposed by the "perfect information" philosophy or by the static-strategy assumption, the remainder of this section looks at distribution, market segmentation and the realignment of business networks. These three areas of impact, respectively, affecting internal, market and competitor analyses, serve to justify why marketing and organisational strategies must be adjusted interdependently with e-commerce adoption strategies.

4.1. Distribution

The business-marketing channel must be designed and managed to ensure that distribution is effectively channelled to the needs of the customers. The performance of any intermediaries involved in this distribution is often crucial to the success of the overall strategy. Good intermediaries add value to the business through their knowledge of and relationships with their local markets. Intermediary selection and the development of any contractual arrangement are therefore important processes, which may lead to long-term relationships [1,36].

E-commerce may facilitate long-term relationships with intermediaries, through enabling shared databases and processes that contribute to closer customer relationships [23,37,38]. It can also replace traditional intermediaries by process-focused technology, enabling direct contacts between buyers and suppliers—that is, disintermediation [39]. While the adoption of process-focused technology is supposed to reduce transaction costs, the analysis should also consider the contribution intermediaries make to value. This contribution may make disintermediation more costly overall [40].

4.2. Market segmentation

Business logistic strategies take customer groups into account. According to Table 2, e-commerce potentially widens existing markets to the global level and creates new markets. Because electronic access is not universal, however, the global electronic market is some subset of the global market. To ask whether this subset is larger than the current potential market for a firm is a valid question if the latter includes many businesses without Internet access. Estimating the projected increase in market also requires understanding of cultural, fiscal and legal factors.

There is little consensus on what business-to-business segmentation is, and how, when, and why it should be done [41]. We take the view that market segmentation is about organisational needs, resources and buying attitudes [42], all of which are dynamic and require successive and timely reappraisal. Whether a segment will be targeted depends on a firm's ability to influence that segment, and on the segment's contribution (relative to alternative segments) given available resources and corporate objectives. Because segmentation is based on behaviour, different strategies need to be developed and implemented for different segments.

Such an explanation of segmentation has been claimed to be normative and thus prescriptive, and alleged to ignore the theory-vs.-practice gap [41,43]. It has been recommended that segmentation be based on geography, demographics, usage rate of industrial products, similarity of need and strategic orientation [43,44]—although Nakip [42] has claimed that the theoretical underpinnings for these criteria are lacking. Rate of e-commerce adoption/usage has also been recently proposed as a segmentation factor [35,45]. If the use of e-commerce as a segmentation criterion is applied to a market, when the firm already targets segments of this same market using other criteria, some customers may be allocated to more than one segment. Subjecting the same customer to different strategies risks cognitive dissonance, misallocation of marketing efforts and, ultimately, inefficient use of business resources.

4.3. Business networks

Global access to information and ICT, enabling e-commerce, has been pictured as leading to a level and competitive field in which size and location are irrelevant [33]. This scenario, however, is challenged by the development of the e-consortium, "in which a set of organizations...-create an online entity in an area in which their individual strengths can be better leveraged to create value" [31], and of online buyer exchanges or cooperatives, also referred to as e-procurement. These are created for the purpose of buying in larger quantities in order to reduce prices. Large businesses in competition may band together to increase efficiency and streamline purchase systems, while simultaneously gaining better control over industry supply chains. This involves (a) pushing prices down, (b) reducing the number of suppliers able to supply the larger quantities and (c) forcing suppliers to adopt e-commerce [3,4]. While e-commerce may not spell the end for small business as feared by Gome [4], firms operating in the industrial market do need to realign to new structures of business networks.

Disintermediation, market segmentation and the realignment of business networks therefore illustrate the reciprocal influence between e-commerce adoption and each of internal, market and competitor strategies. This justifies the need for business strategies to consider the adoption of e-commerce concurrently and interdependently with internal, market and competitor analysis. While the blueprint for this strategic design can be expected to be case specific, a framework to organise managers' considerations of the scope or immediacy of adoption of e-commerce is discussed in Section 5.

5. A framework for structuring decisions about adoption of e-commerce

Managers have traditionally been advised to analyse investments in ICT from a multidimensional perspective [46]. Ambiguity in predicting and establishing benefits is well-recognised [47]. However, traditional ICT analyses assume that the technology will support existing business objectives and evaluation frameworks have tended to have an internal focus. As a typical example, Licker [48] suggests that *evaluation* of information systems projects be undertaken from the following perspectives: business/organisational (including the impacts on the business and the strategic fit of the new technology), economic (return on investment and other financial measures, as well as intangible benefits and hidden costs facing the organisation), societal/cultural (including the effect of the technology on relationships in the organisation, and ethical and legal issues), personal (the effect on the tasks that technology users perform, as well as changes in morale, etc.) and physical (covering technical characteristics, ergonomic factors and facilities).

Such frameworks are useful for taking into account the breadth of impact that an ICT investment might have on existing business strategy. Urbaczewski [35] developed a framework of *critical success factors* specifically for e-commerce, which nevertheless has much overlap with this traditional information systems evaluation approach. This framework encompassed six areas: managerial/organisational (management approaches, organisational change, product suitability and so on), economic (departures from physical markets, economic theory validity, price of information, etc.), societal (e.g., privacy and ethics), legal (such things as government subsidisation of the Internet and liability), behavioural (including customer satisfaction, and community and social needs) and technical (including issues such as security and standard protocols). A different approach is needed when a firm assesses e-commerce adoption knowing it may also have to redesign business strategies.

Feeny [49] advises firms to look at the opportunity that ICT provides in terms of operations, marketing and services, prior to considering the sustainability of the advantages. Operations opportunity is seen to be related to product information content and to the characteristics of the use of information in the supply and value chains. Marketing opportunity relates to the potential to either improve sales effectiveness or to improve the customer’s buying and usage experiences. Service opportunities relate to understanding value as perceived by the customer, the role of increased service flexibility, and how competitors’ goods and services are positioned relative to these opportunities.

The decision-making framework developed in this paper also requires taking a dual marketing and informational perspective to e-commerce adoption, but recognises more explicitly the different time frames of potential advantage. Taking the marketing perspective leads to an analysis in terms of internal, customer and competitor factors. Taking the informational perspective, Mirani and Lederer [50] have characterised the advantages flowing from ICT adoption as being one or more of *strategic*, *informational* or *transactional*. Strategic benefits include change to a firm’s products or way of operating, including any competitive advantage brought by realignment and improved customer relations. Informational benefits are those accruing from improved support for communication, reporting and decision-making, with better information access, quality and flexibility. Transactional benefits are those achieved through improved efficiency in operations. Combining the essence of the two perspectives gives a three-by-three table of factors that the manager should consider when assessing the cost relative to advantages of adopting e-commerce (Table 4).

Internal strategic factors are those internal to the firm that will impact on strategic positioning. *Internal informational* issues are those relating to communication within

Table 4
A dual informational marketing framework for organising issues relating to e-commerce adoption

	Internal	Customer	Competitors
Strategic	Factors internal to the firm that will impact on strategic positioning, such as organisational capacity for change.	Long term impacts on the customer base, such as have been the focus of strategic planning.	Planning for the competitive business environment, involving activities such as formation of alliances.
Informational	Factors relating to communication within the firm, such as have been considered in traditional ICT evaluations.	Issues to do with communication with the customer, which has been the focus of traditional marketing.	Factors relating to information flow across market sectors, which have been assumed to lead to price convergence.
Transactional	Factors relating to operation of the firms, which have been the traditional focus of ICT evaluations.	Methods of dealing with the customer, and thus a key focus of popular analyses of e-commerce.	Competitive advantage through transactional improvements, which involve the traditional, production-related, benefits of ICT.

the firm. *Internal transactional* factors relate to operation within the firm and, along with *internal informational*, have been the traditional focus of ICT evaluation. *Customer strategic* factors concern long term impacts on the customer base and have been a focus of strategic planning exercises. *Customer informational* concerns communication with the customer, the traditional staple of marketing. *Customer transactional* involves methods of dealing with the customer, including call centres and automatic transactions, and has thus been the centre of attention of much of the commentary on e-commerce and the new business environment. *Competitor strategic* concerns planning for the competitive business environment, and involves activities such as formation of alliances and joint ventures. *Competitor informational* factors are those relating to the spread of information across market sectors and, as discussed above, have been assumed to be key to price convergence and the changed business environment resulting from e-commerce. Finally, *competitor transactional* factors concern efficiency improvements that lead to competitive advantage: again, these were the traditional production-related ICT benefits.

Given the inconsistent findings from the sample of literature discussed above, it is not sensible to prescribe generic items that should be considered in each of the nine cells of the informational/marketing analysis table. This paper has already concluded that e-commerce adoption must be evaluated within the environment in which it is to be applied. Nevertheless, the following illustrates some issues that a manager might address in systematically considering each of the cells in Table 4.

5.1. Internal strategic

Given the importance of customers' perceived value to business, adoption of e-commerce activities should not decrease this value in pursuit of business objectives. Maintaining perceived value may involve re-evaluation of existing target markets with respect to the competitive environment they face. It may also involve re-evaluation of markets on all criteria for effective segmentation, including compatibility, in which case new target-markets may be chosen.

5.2. Internal informational

Increase in value may involve refining intranet operations, staff skilling in e-customer service and communicating the added value to customers.

5.3. Internal transactional

Process efficiency has been identified as a key benefit derived from e-commerce [23,34,39]. However, efficiency gains through adoption of ICT should only be sought if there is no net loss of customers' perceived value.

5.4. Customer strategic

The changed relation between the business and its customers does not alter the fact that loyal long time customers ought to be recognised—even when they are first-time visitors to new websites. This may require relatively sophisticated interactive sites backed by detailed customer information.

5.5. Customer informational

E-commerce requires businesses to establish a presence in the virtual world, usually via a website. This has been argued to shift the balance of power away from businesses to the consumers [27]. While the net power shift may not always be in the direction of customers [6], wider dissemination of information to customers does alter the power balance. Information must be kept updated and reliable in order to prevent loss of customers' trust of that information and, inevitably, of the business itself. Published information must also be perceived as consistent and fair by customers. For instance, global access may allow customers to identify price discrimination, dumping practices, etc. across markets. Moreover, because all products are essentially intangible when presented through electronic means, e-commerce marketing strategies need to draw on services marketing principles. The unique characteristics of services apply even when, in the physical market, the tangible element of the product is dominant (that is, the product is a good rather than a service).

5.6. Customer transactional

The physical market aphorism that all products (goods and services) are not equal also holds on the Internet. Hence, there will not be a single optimal operational paradigm for e-commerce/commerce, because the sources of customer perceived value are likely to differ across product segments [45].

5.7. Competitor strategic

Entry into e-commerce markets may complicate what is already often a diverse business to business environment. Sources of competitive advantage must be identified in the new context. Partitioning of markets between alliance partners may be viable given improved communication made possible by ICT.

5.8. Competitor informational

Freely available information about firms, processes and products has been argued to lead to price convergence. How much this benefits a firm, and how much it needs to be taken into account in designing content of web pages depends on the firms' positioning in the global market, rather than on the local market against which it customarily has measured itself.

5.9. Competitor transactional

Competitive advantage in operational areas may be achieved through increasing quality, control over costs or product innovation. Transactional advantage may also be obtained through offering easier access to business services to customers and suppliers, for example, by using non-proprietary software.

6. Conclusion

It is no longer credible to claim that e-commerce is just a tool that enhances current ways of doing business [51]. E-commerce impacts on firms' internal, market and competitive environments, hence, it must impact on their competitive position. At the very least, e-commerce changes consumer and supplier behaviour [5,28] and this, by itself, should justify an overhaul of existing strategies. Determining whether a business should design a new strategy for its participation in the business market post-e-commerce, or retain existing strategies unchanged, or simply augment existing strategies with e-commerce features, is a decision mostly overlooked in the literature.

The review in this paper of reported advantages and disadvantages of the adoption by business to business market participants of e-commerce identified multidimensional implications for a variety of facets of business activity. Because e-commerce has the potential to modify the competitive environment, all participants in the business market are likely to be affected by e-commerce, regardless of whether they are proactive about adoption or not. The impacts need to be analysed on a case specific basis.

A framework for analysing such impacts from a dual informational/marketing perspective was provided, along with some issues general enough to apply to most firms seeking to design e-commerce inclusive business strategies for their participation in business markets. Testing of this framework, and the identification of further general issues, would be useful for practitioners and researchers alike.

More research is needed in this area, particularly as new studies of cases of e-commerce adoption by businesses are generated. As well, the focus of this paper has been on business to business markets and no attempt was made to consider strategy in a business to consumer context.

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