SURVIVAL AND GROWTH STRATEGIES IN
NEW TECHNOLOGY MARKETS :

A STUDY OF THE ELECTRONIC DATA INTERCHANGE INDUSTRY

M T Cunningham
School of Management
UMIST
PO Box 88
Manchester
M60 1QD
United Kingdom

The author acknowledges the significant contribution to this paper of Kieron Culligan (formerly research assistant at UMIST,), now with the Henley Forecasting Centre) for many ideas and extensive field research work.
The survival and growth of organisations is the spur to competitive behaviour and, according to Alderson (1957), this depends upon three basic principles. First, that the niche which the firm occupies endures. Second that the firm should have special competences at the core of its position where no competitor can invade without operating at a disadvantage. It may lose ground at the fringes, where it only operates on equal terms or disadvantageously to competitors. Third, that the firm has sufficient flexibility to adapt to severe environmental changes so that new capabilities develop to supplant those under threat.

Thus a firm is assumed to occupy a position that is, in some respects, unique. It tries to make the most of its individual character and also to strive to establish some competitive advantage to give itself an edge over competitors. It is unlikely that Alderson’s propositions were intended to hold true in all markets and especially in new technology ones where the 'rules of the competitive game' are unpredictable.

The research reported here is set in the context of a technologically dynamic market where demand is heterogeneous and diversified into widely varying sectors of application of the new technology. This creates a climate where the heterogeneity of the supplier firms entering the market from a variety of backgrounds permits them to survive in special niches. It remains to be seen whether Alderson’s principles of survival will apply in the medium term as this new technology market undergoes further competitive turbulence and the skills of adaptability become more dominant. Such competition is inherently dynamic - a war of movement - where opportunities proliferate for firms to capture the market through innovation, emulation, differentiation and cooperation. The scope for cooperation, as an option for exploiting a market, is often neglected in marketing literature. New technology markets are ripe for firms to achieve a working accommodation with rivals, either as pre-competitive collaboration to promote the new technology to the market, or through co-existence as firms choose to specialise in distinct niches or application sectors. These individual strategic moves and market positioning are key facets of competitive behaviour and strategy formulation.
This paper first reviews current and traditional approaches to strategic planning. The author does not seek to make prescriptions of 'what firms should be doing' but seeks to understand and portray the competitive strategies of firms, by using data obtained from three perspectives, that of the focal firm, its competitors and the customers within the industry. The Electronic Data Interchange (EDI) industry is selected as a challenging example of new technology markets where competitive strategies have to be formulated and implemented in the context of a market subject to rapid technological evolution and new competitive forces. The strategic uncertainty of suppliers and potential customers and the variable patterns of diffusion of the technology in different market sectors are seen to pose special opportunities and problems for marketers and strategists alike. The paper draws upon ideas and findings emerging from contemporary research in related new technology markets (notably by Araujo (1989), Littler and Wilson (1989) and Lockett and Holland (1990)). These illuminate the understanding of the complex competitive area, strategy formulation in the evolutionary stages of technology-driven markets and the development of EDI in the USA.

The paper deals with the special features of EDI as an overlay of telecommunications networks onto bonds of organisational relationships. It then proceeds to identify the user benefits of the new technology and the special structural features of market sectors requisite for EDI to be economically viable.

The various sectoral applications of EDI and the widely varying patterns of diffusion and adoption of the technology are discussed. The paper finally focuses on the competitive activities of those firms who manage data networks as third-party operators, on behalf of other organisations. The competitive strategies of these firms are portrayed and contrasted with particular reference to three elements:— technological innovation, the mobilisation of organisational relationships and the strategic positioning of the firms in the market.

1. BUSINESS STRATEGY

The concept of strategy is appealing in its simplicity. Yet the state of knowledge is beset by considerable confusion. First, there is a blurring of the boundaries between prescriptions of 'what firms should do' and the empirical observations of 'what firms are doing'. More usually the latter
has more relevance to 'what firms say they are doing'. Further obscurity emerges from a failure to distinguish between corporate strategy, business unit strategy and functional strategy.

The unit of analysis of the research portrayed in this paper is at the level of the business unit within an organisation. Special attention is given to technological and marketing strategy.

In developing strategy, Araujo (1989) views firms as information gathering, processing and interpreting systems. They consist of networks of communications within and beyond the organisation, encompassing customers, suppliers, banks etc. It is the firm's 'primary orientation' or 'dominant logic', comprising its core business and mission which determines and prescribes its internal and external relationships. Yet it is the process by which strategy is formulated that is contentious. The many managerial recipes for action and decision-making criteria more often reflect the firm's history and proven routines than they fit neatly into some academically contrived planning structure. Strategy often has to be inferred retrospectively as:

'a pattern in a stream of actions and decisions'

Mintzberg and Waters (1985)

In his earlier work Mintzberg (1978) argued that strategy encompassed:

- a plan that focussed on intentions and an orderly framework
- a position of a firm in its wider context, focussing on constraints on choice, the acceptance of sunk costs affecting its capabilities and reflecting its strength relative to competitors
- a perspective as a set of deeply engrained shared values and assumptions about the causes and effects of various actions

Yet he also recognised the 'crafting' influences of individual managers in strategy formulation (Mintzberg 1987). This approach is in tune with Pettigrew (1985) in his longitudinal observations of firms by case study research. Pettigrew is much concerned with strategy as a process of managing organisational change where political, cultural and organisation issues prescribe and shape the firm's adjustment to new opportunities and threats.
These approaches of Mintzberg, Pettigrew et. al., have brought a new dimension to the traditional, commonly accepted approach to strategy embodied in the works of Ansoff (1965). Ansoff and others were concerned with the systematic orientation to strategy formulation, based on evaluation of strengths and weaknesses, objectives and environmental analysis. Mintzberg’s and Pettigrew’s view of the real world of strategy is focussed upon the manifestations of firms as political phenomena. Having links with the Behavioural Theory of the firm (Cyert and March, 1963) they argue that strategy emerges, whether explicitly or implicitly, from the processes of management within organisations. In Lindblom’s (1959) terms, strategic management involves ‘muddling’ through, it is concerned with the balancing of competing intra-organisational coalitions such that strategy and strategic choices are, by their nature, ‘satisficing’ rather than ‘maximising’. Mintzberg terms this the ‘adaptive mode’ of strategy formulation. This accords with Lindblom’s (1968) notion of business development as ‘never ending steps’ in which ‘continued nibbling is a substitute for a good bite’.

Consequently, the most realistic view of the pattern of strategic development of a firm is likely to consist of extensive periods of evolutionary, incremental adaptations, interspersed with infrequent revolutionary change precipitating a conscious, structured strategic plan. (Miller and Friesen (1984)).

Firms in the information technology industry epitomise this. Having diverse origins in computing, telecommunications, office systems, etc., they have been subjected to periods of technological and market structural adaptations (which for them is akin to tranquility) followed by major turbulences due to the occurrence of technological convergence and innovations, de-regulation of markets and structural realignments through joint alliances and take-overs. Newly derived competitive strategies have been necessary often running counter to any grand strategic plan.
2. COMPETITIVE STRATEGY IN NEW TECHNOLOGY MARKETS

The research discussed in this paper focusses upon Competitive Strategies in an evolutionary or nascent new technology product market - that of Electronic Data Interchange (EDI) systems. It is the author's view that evolutionary markets are distinguishable from the cyclical patterns of business activity, from product life cycles and its relatives, industry and organisational cycles. The approach here is far less deterministic, rather seeking to explore the concept of emerging new technology markets as a window or perspective for examining competitive behaviour and strategic planning. This approach emerged from an initial belief that many such markets, with a high rate of technological innovation, were likely to exhibit challenges and distinguishable features, particularly with regard to the relevance or appropriateness of formal strategic planning models and of over-simplistic generic competitive strategies. Cunningham and Culligan (1989) have summarised these evolutionary market features in Table 1.

Table 1 here

In their view the nascent or evolutionary phase of market development may not be capable of easy isolation because its boundaries are unclear. Above all such markets are likely to be ones where the experience of suppliers is limited. Instinctive managerial action, profound uncertainty and the absence of reliable information about the most effective strategy to pursue will characterise management behaviour.

It can be argued that competitive dynamics and strategic behaviour of firms in new technology industries (such as EDI) will be strongly influenced by such factors as:-

. The momentum of the firm's previous history, culture and organisational myths about 'best' practice.

. The accumulated experience and risk handling behaviour of the firm in areas of creativity, product development and technological innovation.

. The styles of ownership and entrepreneurial behaviour.

Consequently, in the rapidly evolving markets for electronic data interchange systems, competitive strategy will be formulated and
implemented to cater for unusually high levels of market growth, frenetic technological innovation and emulation, a plethora of different technical solutions being offered to solve customer's needs, and problems of varying diffusion and adoption rates in different market sectors. Wrong choices of technology, sector and customer will be endemic, with great and possibly damaging consequences for longer term success.

The problems common to new technology markets which give rise to false predictions and failed competitive strategies are likely to be:-

. The 'new is good' fallacy, based on the high rate of technological innovation.
. The 'customers can afford it' phenomenon founded on strong underlying economic growth and high profits of user industries.
. The arrogance of 'new technology can be managed successfully' founded on previous accumulated experience.
. The dynamics of 'Diffusion of Knowledge and Adoption' concepts in which new adopters acting as enthusiastic opinion leaders, will continue to generate demand.

The different patterns of adoption of EDI in various market sectors has recently been studied, (Bruce and Rodgus (1989). They emphasise the way in which competitive forces impact upon the adoption process and, paradoxically, how competition not only retards inter-firm communications concerning the benefits of new technology but also speeds up adoption by firms eager to avoid being left behind in the race for competitive advantage.

Hence competitive strategies in new technology sectors may be all too frequently based on undue optimism and a lack of appreciation of the competitive counter moves and of all the sources of threats from existing and emerging technologies. Research by Araujo (1989) into the competitive behaviour of firms points to the complexity of new product markets by arguing that:

. Firms within the same 'industry' regard their competitive environment in different ways. Competitive sub-systems exist and predicting the behaviour of competitors is fraught with difficulty.
Where inter-dependence between firms is recognised as a basis of competitive behaviour then this leads to a wide range of strategies varying from deliberate differentiation to emulation.

Firms with portfolios of products frequently operate in a portfolio of market segments and customer relationships. This implies an array of strategies within a single firm or for different competitive situations.

Alongside the existence of direct confrontation and conflict in competition, there are forms of competitive strategies manifest in coexistence, cooperation and even collusion.

EDI has the characteristics of many new technologies in that it is generating new product markets but it is also reformulating existing ones.

Littler and Wilson (1989) found evidence in their recent study of competitiveness in a new technology market (computerised business systems) that strategy formulation was beset by some of the starkest forms of uncertainty surrounding:

- the optimum technological trajectory to follow
- the product specification likely to be acceptable to customers
- the customer segments that would be most profitable
- the intensity of competition
- the boundaries of the competitive field, given the likely convergence of technologies and lowering of entry barriers.

They argue that firms attempting to achieve and sustain a competitive position as the evolutionary market moves inexorably to greater stability must recognise the major driving forces underpinning this market evolution. These forces will inevitably pose threats to the differential position secured by firms in early stages and include:

- a trend towards technological uniformity
- the increase in customer expertise and buying power
- the reduction in costs and a downward price spiral
- the broadening of the product application from the original segments
- intensified competition through imitation
The major question addressed in this paper is how EDI suppliers ensure their competitiveness as the market evolves and how they adapt their strategy in terms of:

- Technological innovations
- Mobilising the organisational relationships in the industry
- Strategic positioning by making choices of market sectors, product technology and market offerings.

New technology markets cause firms to exit from a sector when their distinctive competences no longer match the prevailing conditions and enter those sectors which have features which do. In the course of market evolution later entrants may have a competitive advantage over incumbents and, in the process of consolidation, the least efficient players are driven out or acquired. This process accelerates collaboration and alliances between firms, either to secure market leadership or to counter the threats of dominant ones.

The EDI product market, as a special case of a new technology sector, offers a challenge for examining the relevance and applicability of strategic planning and competitive strategies. It is therefore important to examine the nature and special features of EDI.

3. EDI - A NEW TECHNOLOGY

3.1 What is EDI?
It is defined as 'the direct exchange between computer-based systems of information about trading transactions' (Euromatica 1986). At its simplest EDI is the process of computer to computer, business to business transfer of information. In effect it is an automated information system shared by two or more companies. It involves the routing of information via computers without the need for transcribing or interpretation. However, the information must be structured to conform to pre-defined formats, standards and rules which a computer can use directly. For two organisations to communicate by EDI requires computer hardware, software packages, processing capacity and telecommunication links between computers.
Some companies choose to inter-connect directly between each other using their own dedicated network. Others, the majority, use a managed data network operated by a specialist third party firm.

The indirect transfer of information between systems via magnetic tape has been available for twenty years.

The direct transfer of information between geographically disposed sites of the same organisation is also well established.

What is new about EDI is that data interchange is between separate organisations. If it is undertaken by the network operator as a third party, there is scope for adding value to the information through using special protocols.

3.2 The Marketing of EDI: The User-Benefits Perspective
EDI lies at the forefront of attempts to replicate the benefits of improved efficiency, greater accuracy and faster speeds of information handling for firms previously occurring within the organisation but now available between the firm and its trading partners in industry. Benefits accrue to suppliers and customers linked by EDI - though not necessarily equally balanced.

It is claimed that lots of paperwork can be reduced, clerical errors can be eradicated, improved cash flows realised, reduced inventory holdings achieved. EDI systems can be adapted and new applications developed in such a way as to provide the EDI user with considerable competitive advantage.

There is mounting evidence of success achieved by user firms in adopting and developing EDI systems. For example Lockett and Holland (1990) in their study of twenty USA firms point to the achievements of adopter firms in such areas as:

- Reduced transaction costs
- Higher speed of information
- Greater accuracy and quality of data transmission
It was originally believed that, as more firms adopted EDI, uniformity would set in and no competitive advantage would be sustainable in the longer term. The USA study argues that the progressive evolution of EDI within these firms has allowed them to secure further competitive advantage through

- Differentiating their product offering
- Providing greater service support to customers
- Establishing proprietorial standards
- Adding value for their customers
- Tie-ing in or locking-in key customers

To achieve these gains, the organisations have had to face the challenges involved in making effective use of EDI through:

- Learning to handle their external relationships with suppliers and customers differently by EDI than by traditional methods.
- Focussing only on those 'time-sensitive' transactions where EDI is vital.
- Utilising EDI information to improve their management decision-making.

3.3 Sectoral Evolution of EDI

In the UK there are nine independent suppliers of managed EDI networks operated on behalf of many sectors of industry. Three major suppliers tend to dominate the total market in terms of numbers of customers or spread of sectors but some suppliers operate successfully in their own specialist niches or sectors. The sectors covered are:

- Retail and Distribution
- Retail Pharmaceutical
- Health Care
- Automobile
- Shipping and Freight
- Travel
- Banking
- Financial Services
- NHS
- Chemicals

There is a marked variation and uneven pattern of adoption of EDI in these and other potential sectors, explained by:

- 'Technofear', based on a resistance to change in practices and use of information technology.
- 'Industry structure', the need to achieve a critical viable mass of customers.
- 'Community of Interest', requiring cooperation among several firms to launch a viable EDI system.
'Cost/Benefit Perceptions'. Increased efficiency and lower costs are offset by financial investment and perception that all firms will benefit but no individual firm will secure a competitive advantage in the longer term.

4. RESEARCH FOCUS
This paper focusses upon competitive strategies in electronic networks, in particular those strategies of operators of managed EDI networks. It should be noted that users of EDI can either manage their own private networks, as applies to very large dispersed organisations such as the international oil and chemical companies, or they can work through managed third party operators who provide the clearing house electronic mailbox between various suppliers and customers (see Figure 1). It is with the latter system that we are concerned, and we address how these third party network operators compete.

Fig.1 here

For illustrative purposes we use information collected relating to three such operators, designated E₁, E₂ and E₃.

Company E₁ is a joint venture between three firms.
Company E₂ is a spin-off firm from a parent company in the automotive industry.
Company E₃ is a subsidiary of a multi-national firm.

5. COMPETITION, COMPETITIVENESS AND COMPETITIVE STRATEGIES
In our research, competition is viewed as a dynamic process where there is active rivalry between firms. Littler and Wilson’s (1989) argument is accepted that competition is purposeful and is pursued with varying intensity on a spectrum from constructive to destructive competition. Competition does not exclude collaboration especially in pre-competitive initiatives or in agreeing on common standards for new technologies, such as EDI.
Sustainability of competitiveness over time is vital as firms seek to manage uncertainty, change and technological threats and opportunities. Businesses which possess strategic advantage should have the ability to determine the bases of competitive behaviour and shape the 'rules of the game'. Competitiveness manifests itself in securing customers to the exclusion of others, gaining market share and either innovating or emulating other players.

Above all competitiveness is concerned with relative performance and may involve some element of dominance of a product market, yet within the regulatory framework set by government. It may have as much to do with managing growth and contraction as with gaining market share and it focusses on active rivalry over time by effective response and flexibility. Traditional measures of competitiveness (e.g. profitability) are frequently static short-term measures, lacking in a future orientation. More challenging approaches to competitiveness are to be found in addressing:

1. Positioning the firm or product in the appropriate market segment, technological trajectory and customer perceptual map.
2. Differentiation from competitors on some vital dimensions.
3. Proprietariness by capturing exclusively the benefits of a particular innovation.
4. Networking through bonding with appropriate customers and suppliers.

Competitive strategies take many forms. Here, attention is focussed on three elements. First the role of technological innovation and how the market players are catalysed to compete with former and newer technologies. Second, the creation and mobilisation of the network of inter-organisational relationships within the extended industry. Third, strategic positioning by firms by virtue of their 'choice' of, or commitment to, certain market sectors for EDI development, specific product technologies and market offerings to customers. Each is now discussed in turn.

5.1 Catalysing the Market through Technological Innovation
The strategic role of technological innovation is dominant in evolving product-markets. Whereas key customers act as innovators, early adopters and opinion leaders, the suppliers themselves can exercise technological
power as industry catalysts and thereby induce a competitive spirit or emulative spirit among the industry's participants. Since the basis of a successful EDI service is the breadth of its user base, the suppliers of EDI endeavour to rapidly accelerate the adoption of this new technology to make it viable.

Yet the threat of substitute technologies poses anxiety for suppliers and users of EDI alike. At certain times there emerges a 'dominant' technological solution to a generic need but the period of dominance of any particular solution will vary with what (Ansoff 1984) has termed the 'technological fertility' of the demand cycles. Successive technologies constitute 'new outlooks' on existing user requirements (Dosi 1982). These outlooks emerge as threats from preceding technologies and from even newer technologies.

For EDI a range of alternative preceding technological solutions have been identified:

- paper transfer
- magnetic tape
- dedicated packet switching links
- and perhaps electronic mail in its earlier form

In our earlier research each of the major EDI suppliers cited different combinations of these old technologies as posing threats.

As for newer technologies offering future competition, all suppliers pointed to the long term impact of ISDN (integrated services digital network), a proposed national broadband telecommunications highway capable of linking all users for voice, data and image transfer. Companies E₁ and E₂ were members of large corporate groups with likely future investment in this ISDN technology.

Competitive strategy in the EDI industry is seen as comprising maintaining rivalry with other suppliers of the dominant technology but also competing with suppliers of the former technology and also keeping a close watch upon or participating in research for the newer technology.
Market education and collaboration with other suppliers has been established, with Government support, to secure the diffusion and adoption of the dominant technology. Furthermore, customers have had to be insulated from disturbing knowledge about the impending newer technology until adequate payback of investment in the existing technology has been gained by suppliers.

5.2 Mobilising the Network of Organisational Relationships

Since markets and industrial systems can be regarded as a network of relationships between firms, competitive advantage can be gained by creating and harnessing the resource potential of the network in a more effective manner than competing firms. A company’s view of its world is through the ‘windows’ of a series of individual interfaces with customers, suppliers, banks or sources of know-how. The individual firm is in an ever-widening web of relationships. These relationships can be compared according to their closeness, information flows, bond strength and interdependence in addition to their complementarity and competitive features. Research in other industries shows that process innovations occur through technical collaboration between suppliers and customers (Hellman 1987). Similarly, the benefits of effective management of supply chains within a network have been highlighted by Axelsson (1987). Hakansson (1987) has observed that the network facilitates knowledge development, resource mobilisation and resource coordination. All these are sources of competitive advantage open to individual firms in the way in which they position themselves in the network.

Yet these relationships, as market investments, are assets which can lose or gain value. Supplier–customer relationships have existed for many years in the various sectors of industry reported in section 3.3. Yet changes in these networks are now arising through technological developments and so EDI operators who seek market entry recognise the ‘entrance fee’ to be paid to join a network. Conceptualisation of networks and network dynamics by Scandinavian scholars (Mattson (1985, 1986), Hakansson and Johanson (1984) and Johanson and Mattson (1985)) have led to propositions about the use of network perspectives to influence competitive behaviour by pointing to challenges arising from:

- policies for selecting collaborative partners in the network
- handling network relationships with other organisations
- establishing competitive positions in the network
monitoring the company's and competitor's changing position within the network

In EDI markets the research has already produced evidence of the manner in which companies are using the network to achieve competence enhancement, technical development, added value and market opening by overlaying existing relationships with an electronic means of communication (Cunningham and Culligan, 1989).

The competitive strategy dimension involved in creating and mobilising the network is to be found in capturing a community of trading companies, establishing exclusivity within that community, acting as a change agent and building credibility to operate an EDI network effectively.

The key to gaining competitive advantage is seen to be in the ability to identify a sectoral community within which the relational potential exists to overlay such a net and then to capture the major players within that sector. This is illustrated by Figure 2.

An examination of the initial EDI implementation of the three suppliers E₁, E₂ and E₃ shows that E₁ developed a user base in the retail sector, E₂ in the automotive sector and E₃ in the financial services sector. In each case this was done with the cooperation of a formal or informal Trade Association or Standards Body. Crucially, for E₁ and E₃ these developments represented an extension of an existing net of relationships which had evolved in the context of computer hardware supply - E₃ being the dominant supplier of systems to the financial community and the parent company of E₁ being the dominant supplier to the retail trade. For example, at the time of the setting of industry standards, E₁ was classed as 'preferred supplier' in hardware terms by a dominant customer in the retail sector.

It is then not surprising that these players should win approval in the respective industry fora, since they were not only able to demonstrate a superior understanding of the mechanics of business in the relevant target sectors but also to exploit those elements of trust, confidence and
understanding which accumulate through the ongoing process of social interaction and occur within the context of evolving inter-firm relationship (Hakansson (1982)).

In the case of E₁, its established presence in a sector derived not from an accumulated history of supply in related technologies but from its parentage in a leading automotive manufacturer. Its subsequent marketing of that facility as a service to the rest of the automotive community again demonstrated a logical extension of existing knowledge and expertise. Moreover, its established role within its major market allowed it to exploit existing personal contact and influence patterns in order to win the backing of the relevant Trade Association.

The effective operation of an EDI service involves the implementation of numerous intermediate relationships between traders and the service supplier. Since that service supplier acts as a channel for the exchange of highly sensitive commercial data, it must demonstrate complete data security, reliability and above all impartiality in the service’s operation. In terms of basic security and reliability, customers suggested that all three services were of similar quality. In terms of perceived impartiality, however, service supplier E₂ has suffered precisely because of that close association with the automotive industry.

While the automotive parent has floated off E₁ and thus distanced itself from E₁’s operation, E₂ is still perceived within the industry to be closely associated with the parent. Consequently, several major players have been unwilling to commit themselves to E₂’s service despite the fact that it now holds ‘approved status’ from the industry trade association. The result of this lack of trust within the trading community has been fragmentation and, in terms of the industry as a whole, inefficiency in the use of EDI. Two rival services from E₁ and E₂ now hold industry recommendations.

5.3 Strategic Positioning

One problem arising immediately from an acceptance of the dependent and emergent nature of strategy discussed in section 1 is that any attempt to discuss specific strategic choices of market sectors, technology or competitive market offering has no clear point of departure. Each
'choice' is interdependent with all others. In particular, the choice of
target market to serve and the nature of the total offering to these sub-
markets are inextricably linked. These emerge from an ongoing process of
iteration, adaptation and incremental change. In developing positions
which represent these separate choices it is useful to bear in mind what
Mathur (1988) has referred to as the 'threads' of strategic thinking
linking a firm's previous activities with its present or proposed ones.
These threads are identified as needs thread, customer thread, product-item
thread, skills and assets threads and new opportunities threads.

5.3.1 Choice of Sectors for EDI Development
For suppliers $E_1$ and $E_3$ in the EDI arena, major EDI communities have
clearly developed from the pursuit of a Customer Thread. $E_1$ had
previously specialised in computer supply to the retail sector, so it had
established customer relations in place. Moreover, as a dominant supplier
of related systems such as Electronic Point of Sale (EPOS) to the retail
environment, it was also instrumental in establishing the infrastructure
necessary for the rapid adoption of high technology products.

For supplier $E_1$ in particular, a powerful implicit element of this initial
'choice' of target sector was the opportunity afforded to avoid direct
competition with $E_3$. By concentrating on the retail environment, $E_1$ was
able to develop an initial base among users of its parent's computer
hardware. This provided it with a platform from which subsequently to
develop its EDI service among users of hardware supplied by the parent of
$E_3$ - which is a dominant force in computer mainframe supply.

In the case of $E_2$ the guiding thread has been most directly a skills one
which has led to the spin-off of internally developed capabilities to serve
the wider automotive and manufacturing sector. Indirectly, of course, the
customer thread has also been influential in the sense that the initial
users of the EDI service were the existing trading partners of the
automotive parent.

After initially specialising in distinct niche sectors, each of the major
EDI operators has expanded and developed into other sectors. Some such
moves have confirmed their avoidance of direct competition, but in other
sectors they are now locked into confrontational competition with each
other and with minor competitors.
5.3.2 Choice of Product Technology
Uncertainty surrounds the optimum technological trajectory (Nelson and Winter (1977)) given that there are several from which to select. Within the EDI arena both E₁ and E₃ developed appropriate technologies out of an interest in computer networking. To a large extent customer organisations themselves then translated this technology into a business solution.

One influential source of differentiation between the two technology solutions has been the choice of networking standards. From the outset, supplier E₁ advocated open standards permitting the interconnection of all types of computer. E₃, in contrast, implemented proprietary standards. In the event the outcome was to E₁’s advantage as it won several contracts largely on the strength of its Open Systems commitment. E₃ has subsequently recognised the problem and now advocates open standards itself but concedes that an adverse perception still persists in the market and that this perception is promoted, for obvious reasons, by its rivals. Clearly this is an instance where market forces have overcome the power of a major industry player in setting a dominant design.

5.3.3 Choice of Product-Market Offering
EDI suppliers are faced with the prospects of developing their whole range of product and services offerings within the context of the market space for various data communications services. EDI is but one of these offerings, others include E-Mail, file transfer, teleconferencing, data base services and business communications services. It is apparent that these service providers can develop their offerings in three directions; over time, over customer groups and over related services.

Of the EDI suppliers, firm E₁ sees itself as a provider of ‘paperless business communications services’ (EDI) so that its market space is also easily defined. It relies on one of its joint venture partners to provide the basic communications network.

Firms E₂ and E₃, however, see themselves as being providers of ‘business communications services’ so that EDI represents only one element of their total market offering. For E₂ this translates into a strategy of providing those communications solutions most appropriate to the user’s needs. Potentially, E₂ sees itself as offering any type of computer based
communications service. For E, the approach is subtly different. It bases its solutions on the core communications network. EDI then forms one of a range of possible network applications to be supplied in addition.

For each service supplier, EDI is consequently a 'different market offering' in its contextualisation within the total product portfolio. The nature of this contextualisation reflects both competences and resources available to the firms and a genuine choice of market strategy. At present what evidence there is suggests that E,’s simple and focussed strategy has allowed it to gain an advantage and lead in the market.

6. DISCUSSION

Competitive behaviour is unique to the individual firm as managers strive to establish and defend a market position founded on the firm's core competences and sustainable when technological and structural upheavals occur. New technology markets such as EDI are inherently volatile due to the uncertainty affecting both suppliers and potential customers. Survival strategy is of paramount importance because the sheer pace of innovation and market evolution is formidable. The competitive arena is unclear as spin-off firms, new entrants and technological convergence offers scope for a variety of strategic approaches. Formal, deterministic strategy formulation is seen to be unrealistic in dynamic, evolutionary, technology driven markets such as applies to several information technology industries. Alderson’s views of survival, through holding onto one's core business, is both sensible and yet unrealistically simplistic as new opportunities and threats abound.

The electronic data interchange product market is particularly challenging to strategists since it requires the overlaying of a computer based trading, transaction system onto sensitive relationships between suppliers and customers in a variety of sectors such as retailing, financial services, transport, chemicals and automotive industries. EDI operators have moved into specialised niche sectors and are moving ahead with the evolution of their chosen sector. The real world of strategy formulation for growth and survival in such a setting is inevitably characterised by adaptability, yet constrained by the momentum of the firm's history and the operating style of its managers.
The enthusiasm for and obsession with the economic benefits of new technology has to be offset by the special 'take-off' circumstances in which there must be a viable mass of cooperating users of EDI. This also depends upon the users acceptance of a common technical standard together with their confidence in the credibility and impartiality of a third party, independent operator of their EDI computerised links for trading transactions. Strategists working in these EDI network operating firms are confronted by the challenges of making appropriate technological choices in developing their innovations, identifying and mobilising the network of organisational relationships in a market and then positioning themselves in relation to their competitors by deciding upon the market offerings to secure a sustainable competitive advantage.

Competitive strategies of major 'players' in the EDI market have been examined and contrasted under these themes. Table 2 summarises the strategies of three key suppliers E₁, E₂, and E₃. This is done in terms of their strategic positioning, their technological differentiation and their product market offerings. The table also portrays the way in which their different origins and bases for their EDI strategy have led to their respective market strengths.

Table 2 here

The competitive strategies of the three EDI operators have common but also distinct features. Common to all three firms has been the dilemma of whether to accept a measure of co-existence by operating in different sectors or to engage in confrontational competition. Their historical origins and their early involvement in separate specialist market sectors was based on parentage and their technical credibility with customers. This first phase of 'strategy' has been followed by a growth phase achieved by widening their market to comprise several sectors. This 'choice' has been forced upon them due to the activities of minor competitors and new entrants. Survival will depend upon their ability to consolidate and defend their core expertise in their original chosen sector and also to engage for the first time in direct competition with other suppliers in key sectors such as financial services, distribution and automotive industries.
REFERENCES


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Characteristics of Nascent Markets

1. Turbulence in Markets and Technology
   - High market growth rate
   - High entry rates
   - Spin off companies created
   - High rate of technological innovation
   - Absence of universal product standards

2. Supplier Strategic Uncertainty
   - High strategic consequences
   - No established 'successful rules of the competitive game'
   - High technological uncertainty
   - High R & D costs to sales

3. Customer Uncertainty and Risk
   - First time buyers (limited experience)
   - High initial product costs
   - High technological uncertainty
   - Risks of adopting inappropriate design

Table 1: Principal Characteristics and Manifestations of Nascent Markets
FIGURE 1 - ELECTRONIC DATA INTERCHANGE THROUGH DIRECT INTER FIRM LINKS

C1 - CUSTOMER 1
C2 - CUSTOMER 2
S1 - SUPPLIER 1
S2 - SUPPLIER 2

FIGURE 2 - ELECTRONIC DATA INTERCHANGE THROUGH A CLEARING HOUSE SERVICE

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Stage 1:
Commercial relationships exist between focal firms 1 & 2 and their net of suppliers and customers.

S: Sectoral supplier
C: Sectoral customer

Stage 2:
EDI supplier establishes commercial relationships with focal firms 1 & 2 in a specific sector.

Stage 3:
Electronic links are imposed upon existing sectoral relationships. Commercial relationships established between EDI supplier and all firms in the focal nets.

---

Electronic link

Commercial Relationship
<table>
<thead>
<tr>
<th>Features of Competitive Strategies</th>
<th>EDI COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$E_1$</td>
</tr>
<tr>
<td>Origin of Company</td>
<td>Joint Venture</td>
</tr>
<tr>
<td>Basis for EDI Strategy</td>
<td>Computer Hardware and EPOS Specialist</td>
</tr>
<tr>
<td>STRATEGIC POSITIONING</td>
<td></td>
</tr>
<tr>
<td>a) 1st Phase</td>
<td>Retailing and Distribution Sector</td>
</tr>
<tr>
<td>b) 2nd Phase</td>
<td>Automotive Shipping Pharmaceutical Financial Services Sectors</td>
</tr>
<tr>
<td>TECHNOLOGY DIFFERENTIATION</td>
<td></td>
</tr>
<tr>
<td>a) Current</td>
<td>Open Systems for Interconnect with other computers</td>
</tr>
<tr>
<td>b) Future</td>
<td>Investment in New Technology (ISDN)</td>
</tr>
<tr>
<td>PRODUCT-MARKET OFFERING</td>
<td>EDI Specialist for Paperless Business Communication Systems</td>
</tr>
</tbody>
</table>

Table 2: Competitive Strategies of EDI Suppliers