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E-Business Transformation: An Emerging Model of Change in the E-Fulfilment Industry

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ABSTRACT

This paper presents the results of a two stage study examining the capabilities of 48 leading e-fulfilment suppliers in the UK. A theoretical model of e-fulfilment was derived from the literature and used to evaluate actual practices of these companies; from this a staged model of transformation is developed and evaluated in the context of knowledge capabilities within the e-fulfilment industry; finally four case studies were used to identify future transformations and the basis for ongoing research.

INTRODUCTION

Over the last decade organisations have been forced to re-examine the role of ICT as a support tool and accept that it has become a major driver for business change (Ash and Burn 2003). Indeed new business opportunities have arisen solely based on e-business: e-Fulfilment is one such example (Alexander and Burn, 2004). These services were estimated to be worth US$1.006 Trillion in the US alone, or 10.1% of their GDP in 2000 (Rogers 2002). Furthermore, 21% of all logistics transactions are expected to be online by 2005, with the long-term possibility that traditional freight companies will ultimately cease to exist (Homs, Meringer et al. 2001). This paper explores the concepts which are encompassed in the term e-fulfilment, and presents a model of e-fulfilment activities. This model is then validated through the analysis of e-fulfilment capabilities of 48 UK based e-fulfilment companies. The findings from this analysis lead to an extension of the model and suggest a long term transformation model for the industry as a whole.

THE SCOPE OF E-FULFILMENT

A review of the literature on e-fulfilment and online retailing identifies the following issues which need to be considered:

- location design and picking systems;
- packing – specific packaging for delivery of products; can include breaking original packages and repackaging; often must be customised for each order;
- customer service – managing customer queries and complaints;
- financial transactions – calculating and including fulfilment costs, and electronically settling these with appropriate organisations;
- warehouse costs – associated with product storage;
- delivery – systems and delivery alliances;
- transport mechanisms and flows – using multiple delivery mechanisms to ensure deliveries arrive on time and undamaged
- procurement management – purchasing arrangements automatically (electronically) integrated with fulfilment suppliers, triggering delivery transactions;
- management information systems – concerned with integrating and managing all aspects of the process;
- front end (ordering) services – which electronically trigger the fulfilment process automatically from a web-purchaser's mouse-click;
- after-sales service – to ensure fulfilment problems are resolved;
- returns – manage reverse logistics related to incorrect, damaged or fit-for-use product issues; this must not only ensure convenient and quick return of goods, but often must initiate re-delivery (of the correct goods);
- realtime tracking – for management of all pools of product, and also commitment to promises made by front-end ordering systems.

These are recognised as integrated components which create virtual proximity between e-trader and customer and cover everything a company does to satisfy customer demand within an e-commerce framework, and a succession of activities which are necessary for the successful supply of customers and markets (Cooper and Davis, 1984; Klaus, 1998; Strader and Lin, 1999; Chopra, 2003; Rabinovich and Evers, 2003).

Fig 1 collapses these concepts into a single diagram, and illustrates the scope of what, in this study, is explicitly termed e-fulfilment, and underpins any hypotheses that will emerge from the research conducted.

In order to explore in depth how e-fulfilment companies are meeting these challenges a study was conducted on a sample group identified as the main e-logistics operators in the UK. This study was used to assess their current capabilities and identify areas of future growth or concern.

THE STUDY STAGE 1

The annual report produced in the UK by E.logistics Magazine and known as the e-Fulfilment Index. [e-Fulfilment Index, 2003] provided the basis to examine 48 third party e-fulfilment service providers based in the UK

The range of capabilities offered by the e-fulfilment providers examined is shown in figure 2. These 13 capabilities are in the following categories, which align with aspects of the model outlined in fig 1:

a) Capabilities for carrying out physical parts of the fulfilment process.

Figure 1. e-Fulfilment Scope

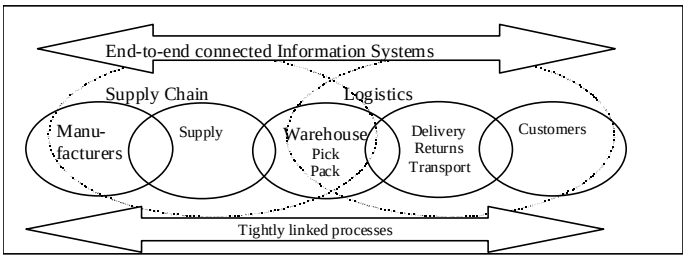


Figure 2. Percent of Sample Showing Specific e-Fulfilment Capabilities

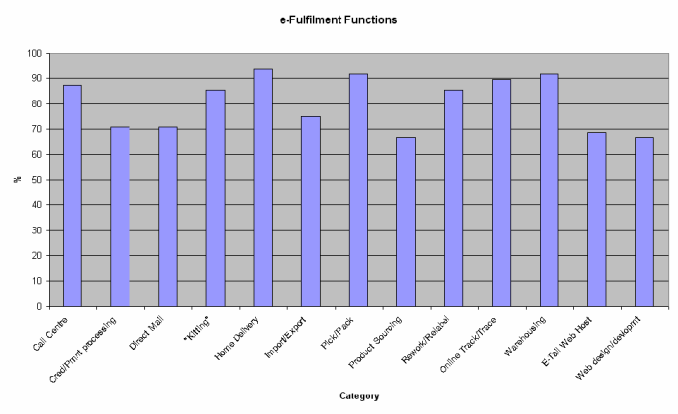
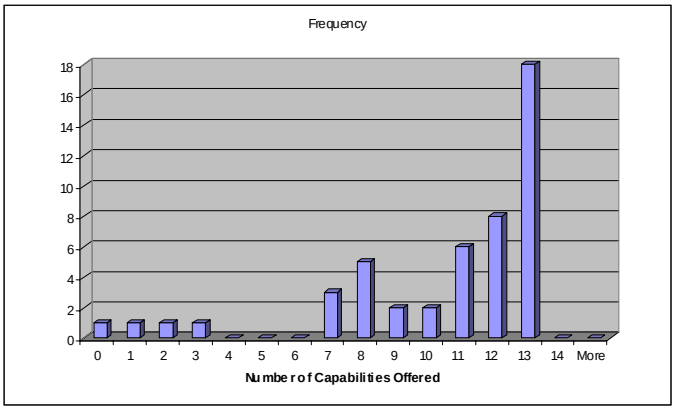


Figure 3. Specialists or Generalists



b) Capabilities that link processes. These are enabled by using call centres, and online track/trace capabilities.
c) Capabilities that extend fulfilment into the suppliers' and related providers' value chains.

Figure 3 shows the frequency distribution of the number of separate capabilities offered by each of the sample. It is clear from this that there are a minority of specialists, a large group of providers offering a half or more of the possible capabilities, and 30% of the sample offering *all* capabilities analysed.

Further analysis of these 48 organisations examined 'last mile' capabilities, warehousing space, size and stability, turnover and relationships to parent organisations (Punakivi, 2001, 2002; Barnett and Alexander, 2003; Schulz, 2003; Alexander and Burn, 2004). Though almost all e-fulfilment providers are derived from, or are in their own right, established logistics/warehouse/transport operators, 68% are able and willing to provide new services such as web development and hosting facilities. For established logistics providers, this is an interesting development. Not only have these companies implemented the online and web-based changes required to be a credible e-fulfilment provider, but they appear to be keen to offer these services to customers, a phenomenon also observed in the e-grocery environment (Koster, 2002). This data clearly indicates new business opportunities in the industry as a whole; an idea that will be developed in the next section.

GENERAL CHARACTERISTICS OF THE SAMPLE

These organisations all targeted online retailers, either primarily, or as a recognised sector of their market. Duffy et al., (2002) recognised 10 critical support processes required for success by such retailers, and e-commerce operators in general (Table 1). Of these 10, eight align with capabilities exhibited in our sample (the remaining two cannot be evaluated at this stage). Evidently, they provide some or all of the range of services e-tailers consider essential, and therefore provide most or all of the services in the model we presented. They all have tight end-to-end electronic systems to control their processes, and provide facilities call centres, payment systems and online components to integrate their services with those of the online retailers.

In most cases, this integration appears to be to the point of providing a single outsourced solution for online retailers' e-fulfilment needs, which in turn appears to result in offerings of diverse sets of services, rather than specialists in particular services. However, there is significant evidence of the e-fulfilment organisations themselves outsourcing certain of their functions to specialists; particularly noticeable with web site aspects of the businesses. When viewed as a whole; the online retailer, the e-fulfilment partner, and the specialist e-fulfilment service provider are all cooperating as a "virtual organisation". For instance, those with expertise and assets able to handle large-size products (eg. furniture) are becoming aligned with online retailers with that product range.

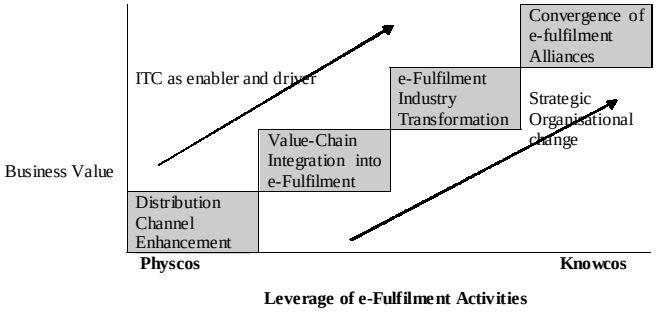
Based on the findings we can see a staged transformation taking place within the industry which can be related to a model of e-business change as identified by (Deise et al., 2000) – figure 4. This begins with the use of ICT within the parent company (typically transportation or warehousing) to enhance distribution channels through some form of e-commerce. This is followed by the application of ICT within and across value chains, and extending into e-fulfilment. This inevitably leads to industry transformation as networks of organisations are formed through extended e-business operations; for example, the move we observed within e-fulfilment companies towards website design activities. And finally there will be a convergence where many e-fulfilment companies and their offshoots come together and work within the same e-space in virtual environments.

As e-fulfilment organisations move from left to right across the panorama painted by the Transformation Model (figure 4), they are likely to gain added value but also to encounter much greater risk. As they move through these stages, they will be looking to exploit means of revenue enhancement, cost reduction and relationship management. This transformation can be viewed as the transformation of a company reliant on physical assets to one which is solely dependent on knowledge assets. As companies collaborate along their value chains the nature of the industry begins to change as organisations decide to outsource some of their traditional functions and focus only on their core competencies. The term "going to market" will no longer be defined as the way a company enters the marketplace but rather it will characterise the way an integrated group of companies creates a set of cascading values to transform the marketplace into a network of value providers. At this

Table 1. Critical e-Commerce Success and e-Fulfilment Capabilities

e-Commerce critical success capability, from (Duffy and Dale 2002)	*e-Fulfilment Operator capabilities in the sample*
Order fulfilment	Yes
Revenue generation	No
Revenue collection	Last Mile capability
Financial control	No
IT/Web changes	Yes
Business processes	Significant integration
e-integration	Yes
Order generation	Integrated
Call centre integration	Yes
24/7 operation	Enabler
Consumer behaviour	Influences customer experience

Figure 4. e-Fulfilment Transformation Model (after Deise, Nowikow et al. 2000)



stage companies will make a conscious effort to orient their strategies toward becoming knowledge-based "Knowco" or physical goods-based "Physco" companies (Deise, Nowikow et al. 2000). This is not normally a complete transformation but rather an orientation towards one or the other. Knowcos will focus on building brands, capturing ownership of the customer-end market relationship, and investing in knowledge-based core competencies such as e-marketing and web services development. They may well expand into providing customer knowledge management services to other companies in their marketplace. Physcos will become hubs of processing expertise. Their success will be based on speed, quality and delivery.

THE STUDY-STAGE 2

We also surveyed a subset of 4 of the 48 UK target companies at some depth, with emphasis on the companies' perceptions of near-future e-fulfilment challenges and opportunities, whether they were developing Physco or Knowco capabilities, and how they were preparing for these. Appendix 1 shows the questions from this survey.

These results were summarised (Table 2). They suggest two relatively discrete approaches to future environment, depending on whether the companies are "General Outsourcers" (we call these GOs) representing 30% of e-fulfillers, those providing a full range of capabilities as defined by our e-fulfilment definition (above), or "Specialised Outsourcers" (SOs) targeting a more niche-market strategy and with typically fewer capabilities. Which ever category they might fall in, they appear to be comfortable in that approach, with no intentions to alter their customer or geographic focus.

The data indicate strong pressures to move to non-traditional capabilities in the GOs, with some, but much less perceived imperative in the SOs, who are more focused on relationships with customers in their sector. This behaviour in turn appears to drive the nature of development of the capabilities. The GOs are developing new customer-facing capabilities while the SOs are more intent on improving internal processes and infrastructure of existing capabilities.

Regardless of their degree of specialisation, they are using and recognise the importance of web facilities for their organisations, though it is the GOs who see online services as more significant. They are also more intent on increasing their expertise and developing these capabilities.

Though almost all e-fulfilment providers are derived from, or are in their own right, established logistics/warehouse/transport operators, 68% are able and willing to provide new services such as web development and hosting facilities. For established logistics providers, this is an interesting development. Not only have these companies implemented the online and web-based changes required to be a credible e-fulfilment provider, but they appear to be keen to offer these services to customers, a phenomenon also observed in the e-grocery environment (Koster 2002). This data clearly indicates a strong desire to develop Knowco capabilities..

Table 2. Future Intentions of Surveyed e-Fulfilment Organisations

	Item	Generalised Outsourcers (GO)	Specialised Outsourcers (SO)
1	**Changes in business focus**	None	
2	**Geographical ranges serviced (next 2 years)**	Incremental increases	
3	**Perception of industry expansion (next 2 years)**	Most respondents anticipate growth, with about half suggesting significant growth	
4	**development of capabilities**	Hi tech, flexibility, expertise across a range of capabilities, experience, expanding range of capabilities	Sector knowledge, value-add capabilities
5	**New capabilities (next 2 years)**	Customer-facing activities	Internal improvements (transport, etc)
6	**Online services being supplied**	Increased significantly in 2 years	Not increased much in the next 2 years
7	**Electronic integration with customers and customers' customers**	High and increasing over next 2 years	Moderate or not very important
8	**Web Site significance**	Websites and web site creation is seen as highly significant be almost all respondents	
9	**Web development outsourcing**	Most outsource	
10	**Intention to increase web expertise (next 2 years)**	Moderate to major increases	Minor levels only
11	**Biggest concerns (next 2 years)**	Competition from substituted services (ie. bricks & mortar), postal infrastructure issues, security & fraud	Postal infrastructure issues, security & fraud
12	**Main opportunities (next 2 years)**	Improved customer interfaces, improvements to delivery infrastructure, online processing	

Interestingly, despite the importance of these services, most organisations are comfortable in outsourcing them. While this is understandable in SOs, who do not appear to regard them as so central, it is unexpected, given the GOs' intended direction.

In terms of future environments, e-Fulfilment organisations are anticipating new opportunities generated by new software applications, and by delivery infrastructure enhancements, often relating to the Postal Service.

When it comes to threats, while all respondents are concerned with security (more particularly, online security issues), GOs are also concerned with substitutable products, which aligns with earlier noted intentions to enhance customer-facing capabilities.

DISCUSSION

There appears to be a lack of interest in developing in-house capabilities, with outsourcing presumably filling the gaps. Thus, e-fulfilment companies will likely have two parallel plans running. A "current" one based on capabilities they currently have, and a "developmental" one based on capabilities they are developing. What's more, our assessment of the surveys indicates both of these plans are likely to be tactical; in response to perceived threats in the near future. In such an environment they will be developing new capabilities as fast as possible, and transforming their offerings as soon as the new capabilities come on line.

Further, it appears that organisations are expecting changes to their environment. They are moderately optimistic about the expansion of the sector as a whole, anticipating incremental expansion. As opportunities, the GOs look to last-mile delivery enhancements and new knowledge-based capabilities such as web and online services. The SOs look to greater efficiency and more integrated customer human and electronic interfaces to tighten their relationships with their markets.

Though some e-fulfilment companies have been operating for some years now, there is still a general perception in the industry that substituted services remain a major threat; that is, bricks and mortar retail outlets not requiring door-to-door delivery infrastructures. E-Fulfilment companies apparently expect such companies to react to the growing online retail market, not by adding online channels themselves, but by leveraging physical retail assets and participating in price-lead competition. Such a situation may indicate hard times for all retailers if it occurs. It must be said though, that this is a perception of the

respondents themselves, without any direct evidence gathered in this study.

Although almost all organisations recognise the importance of online tools in their future strategies, many have also chosen to keep this part of their business outsourced. Our study suggests outsourcing may have commenced in organisations as a rapid response to the need for online capabilities. Given its wide-spread incidence now, it is likely that these relationships are currently working well, with little short-term incentive to transfer expertise to in-house resources. However, outsourcing a function perceived in our surveys as central is a long-term strategy should not be entered into lightly. If it results in reduced control or understanding of the use of these capabilities, then it can provide a definite opportunity for competitors. We suggest that for GOs in particular, inhouse online expertise may yet serve as a future differentiator of successful firms.

From the perspective of physical delivery a universal limiter is seen as the Postal Service, which is logical as it provides the infrastructure for much of the delivery capability for most organisations. This need is highlighted across the sample and in different contexts. Most companies believe the capabilities, efficiency and costs of this service will underpin both positive and negative future impacts.

Conclusions and further research

Our study observes that e-fulfilment businesses are both successful and stable in the UK, where they have in many cases evolved from traditional fulfilment-logistics-transport businesses into enhanced e-fulfilment businesses showing many of the features we expected from the knowledge capabilities model proposed.

Many of these businesses have chosen to become generalists, offering the whole range of services classified under the heading of e-fulfilment. This is driven, at least for some businesses, by a perceived opportunity in outsourcing online retailers' fulfilment needs completely. Such a marketing strategy is logical when not only does the outsource provider have individual capabilities, but has developed systems and skills that link them closely together, enhancing efficiency and reducing problems.

There is also a place for specialists, who although fully embracing online and general capabilities, are very focused on meeting their customers' needs with respect to efficiency and services offered.

E-Fulfilment businesses are preparing for a market place they believe is incrementally expanding. They feel constrained by delivery infrastructure and threatened by a potential backlash from traditional retailers. But even though the market appears to be evolving steadily now, e-fulfilment organisations are transforming as a fast rate, acquiring knowledge-based capabilities that integrate them better with their customers. When those capabilities are integrated with online solutions such as customer web-integration, we note that many companies have chosen to outsource these capabilities. This may well have been a suitable response to rapidly acquiring skills not part of the traditional e-fulfilment businesses from which many e-fulfillers are descended, but if this has suppressed development of core online skills then strategic decision-making in the area may be affected. We believe having such core skills may become a differentiator for gaining competitive advantage in the future.

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