TRANSFORMATION IN THIRD PARTY E-FULFILMENT: AN EFFECTIVE BENCHMARKING INDEX

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ABSTRACT

The Logistics industry is undergoing dramatic transformation as retail organisations focus on core competencies, outsource many of their logistics operations and explore online channels. Using a study of third party fulfillment providers in the UK over a 5 year period, this paper reports on quantitative changes in an *index of relative transformation* previously developed and published by the author, which indicates significant transformation from physical to knowledge based activities. These changes will have long-term impacts in the Logistics industry, and the index of relative transformation provides a useful means of modeling the transformation phenomenon and benchmarking logistics businesses' competitiveness in this environment.

Keywords: fulfilment; benchmarking; logistics; transformation

INTRODUCTION

The nature of the supply chain as it responds to e-business pressures and opportunities is clearly changing: from fulfilment consisting of warehousing, logistics and transport with a quantitative, efficiency focus to "e-fulfilment" with a relationship/collaboration-based approach reliant on new technology and resulting in complex supply network alliances.

Third party e-fulfilment outsourcing

Third party e-fulfilment (3PEF) has become important to e-business and its impact is increasing. For instance, in 2004 Ebay provided outsourced 3PEF solutions to over 254,000 e-commerce businesses [1]. By the beginning of 2006 this had risen by 39% [2]

This paper focuses on 3PEFs, not only because they represent an important channel for providing these services to a diverse group of e-businesses, but also because they are organisations focused specifically on providing these services, which are therefore treated as their core business. In short, investigating their e-fulfilment activities is more transparent, and because they are using those activities to directly compete, more likely to be an indicator of best practices.

E-business transformation responses

Rapid uptake of technology, particularly related to mobile and online commerce is fuelling rapid transformation, not just incremental change, in e-businesses [3]. E-business leverages the technology, which in turn enables transformation of business, industry, processes and organisational structure [4]. Customers are demanding better value solutions customised to their exact needs at less cost and as quickly as possible. Such pressures lead to transforming of both provider and receiver businesses [5]. This results in the development of new capabilities.

Deise et al [4], in considering this environment describe a model consisting of four chronological stages representing changes in businesses under pressure to transform.

Stage 1: Channel enhancement, in which both buy and sell-side channels are impacted by new technologies which change the value proposition, and redefine markets more as communities. Customer pressure in the form of new sales opportunities and resulting competitive pressures drives this transformation.

Stage 2: Value Chain Transformation, in which pressure to integrate, underpinned by the ability and commensurate advantages of supporting complex, widely distributed, information-rich relationships, causes transactions to evolve from a simple end-to-end sequential chain to a web of transactions and value-adds held together with internet technology.

Stage 3: Industry Transformation, in which innovative solutions that can meet new customer requirements drive industry change and pressures businesses with physical products and assets (*Physcos*) into a dependency on knowledge assets (*Knowcos*).

Stage 4: Convergence, in which pressures from customers, in considering their own core activities, favour outsourcers with solutions aligned and integrated to their needs. This generates forces for convergence in businesses servicing them.

Patterns of transformation

The models suggested by Deise et al [4], Raisinghangi [6] and others point to transformation pressures on 3PEFs being from traditional, physical activities such as warehousing, logistics and transport to portfolios of capabilities with far more knowledge content, such as consulting, call centre management, cash collection and many non-traditional activities.

Deise et al's (2000) definitions suggest a mechanism that considers an organisation as being at a single level of such transformation. However, viewing 3PEFs from a capabilities perspective, customers seek, not a single service but a suitable portfolio aligned with their needs.

Therefore to be useful, the Diese et al (2000) model must be extended to recognise this heterogeneous portfolio of capabilities, each with a potentially different level of transformation. In that context it is also clear that each capability contributes differently to a business's degree of overall transformation. Some capabilities support purely Physco characteristics such as delivery, while others (in the same organisation) such as retail-web-site and consulting services are Knowco capabilities. This paper outlines research that extends the original Deise model by recognising transformation at a capabilities level.

Categorising transformed capabilities

Categories of knowledge content in 3PEF activities, an assessment of non-traditional, non-physical services, forms the basis for development of a knowledge transformation model reported previously [7]. A weighting from 0 to 3 is associated with each category (table 1). Zero assesses an activity as completely traditional while 3 assesses it as completely knowledge based. Although arbitrary, and without assuming linearity, these ratings can be applied objectively and uniformly, therefore providing a comparative indicator of the degree of transformation of a portfolio of capabilities for each organisation in a sample.

Table 1: Transformation based on knowledge rating for 3PEF capabilities (degree of "knowco-ness")

Rating	Assessment guideline used in this study	Examples of capabilities
0	Falls into the traditional fulfilment supply chain	Warehousing, transport, track and trace systems
1	fulfilment-related extension of the chain into the business processes of either end-customer or online retailer	Managing transaction finance, returns management, call centre, data entry, mail order management, designing multi-channel logistics solutions, decoupled replenishment
2	major extension into online-retail or end-customer business, including outsourcing a complete non-fulfilment function	Transaction bureaus, call centres, campaign management, web enabled mail order, point-of-sale
3	completely non-fulfilment business functions performed for end-customers or online-retailers	Customer Relationship Management systems, database cleansing, management of complete e-commerce solutions, web and site development, printing, product enhancements services, web content provision and hosting, catalogue production

Aggregating and standardising capability transformation

In this extended model a set of capabilities is aggregated for a whole organisation by adding the transformation rating of each of the measured capabilities considered core to 3PEFs.

The overall degree of capability transformation is standardised by measuring an organisation's *relative* transformation, represented as an index value scaled from the maximum observed for all organisations in the year surveyed, which is given a value of 100. This approach allows companies to be measured comparatively within each year. This is termed in this study, the Relative Transformation Index (RTI).

Measuring RTI across the supply chain

The standardised, rated assessment described above is made in two dimensions. Relative transformation associated with the 3PEF's customer, which is termed the "A" dimension, and that associated with the customer's customer, also referred to as the "end-customer" – the "B" dimension.

Such a measurement recognises that 3PEFs are acting as supply chain intermediaries between end-customers and retailers and it is at the two ends of the supply chain that interaction occurs. It is likely that different levels of knowledge can be seen at the two ends of supply chain activity and this approach helps identify them.

It should be noted that the relative transformations being examined in this study are limited to specific capabilities, not organisational change and other non-capability transformations. So it is valid to talk about highly transformed capabilities while making no judgement about the other characteristics of the organisation.

Aggregating RTIs for the 3PEF industry

For an individual business, the RTI is aggregated from the transformation of each individual capability. This results in a single aggregated RTI for that business. Similarly, looking at the changes in distribution of RTIs for the same businesses over several years can provide a measure of changes in overall transformation across that sample and may be an indicator of changes in the 3PEF industry as a whole.

Limitations of the methodology

While recognising an evolutionary connection between traditional Physco and non-traditional Knowco capabilities, and the 0 to 100 index this generates, the RTI does not imply a linear relationship between different degrees of capability transformation, but only a comparison. Thus, an organisation with an RTI of 50 is not "twice as transformed" or has "twice the knowledge content" as that with an index of 25.

Additionally, since the RTI aggregates transformation occurring in many capabilities into one measure, it may mask counterbalancing values within. For instance a stable RTI may not necessarily indicate stable capability transformation, but instead could suggest transformation in some capabilities is increasing while that in others is reducing in knowledge content. Similarly, two organisations with the same RTI may actually have quite different knowledge content indices at the capabilities level.

Comparisons between organisations over time, and general statements about the 3PEF industry as a whole must therefore accept both these constraints, though this is mitigated because their impact is neutralised when an analysis over time on the same source organisations is considered.

Absolute statements such as "this is a transformed capability" cannot be made using this index as it is a comparative measure derived for the sample only. Instead, it is only possible, though still useful, to make the assessment "how much is a capability transformed compared to other businesses in the sample?" It is for this reason the measure used for this study is of r*elative* capability transformation and a maximum RTI value (100) is established for each specific year and sample.

METHODOLOGY, INSTRUMENTS AND DATA

Publicly available annual reports by E.logistics Magazine and known as the "E-fulfilment Index" [8-12] provides the survey information on a sample of 3PEF providers for this study, which uses data from 2003 to 2007 inclusive. Respondents were selected from mailing lists of "all UK third party e-fulfilment businesses", and this approach selected for a population of UK companies defining *themselves* as such.

Businesses in this sample are largely local to the UK, though some organisations offer or even concentrate on international deliveries. Approximately 70 organisations were considered across five years, though actual participants varied each year as new companies entered and others exited the survey, and in most cases the

industry. The sample represented a significant proportion, around 7% of the UK population of approximately 970 e-fulfilment organisations [13].

Each of the 3PEFs sampled was surveyed to determine its fulfilment capabilities and each capability assessed for its knowledge content. Survey questions were uniform across the sample and over each of the years conducted. As all members of the sample attached their identities to the information they provided, it was possible to track changes in each respondent and analyse these for the whole sample.

As the data is secondary in nature, contact was made with the publishers of the E-Fulfilment Index to address all potential negatives and to ensure it was current and aligned to the year represented. The surveys were relatively objective, and based on have/have-not questions about capabilities, and so were less open to bias. A web scan of 20 non-surveyed e-fulfilment organisations confirmed that the sample was *prima facie* likely to be representative of the UK population.

RESULTS

Changes in transformation at industry level

Changes of RTI were examined across the five years of the study (Figure 1a and b). The graphs represent percentages of the sample grouped into 3 categories of RTI; 0 to 33, representing relatively untransformed (traditional fulfilment) businesses; 34-66 representing significantly transformed businesses; and 67-100 representing relatively extreme transformations (for example, consulting services and hosting web sites).

From 2003 to 2005 companies appeared to be exploring the potential for new knowledge capabilities, and were doing so across the supply chain. While some companies were happy to transform only at the customer-facing end of the supply chain, others did so at the end-customer end of the chain. Less were transforming at both ends of the chain. They had decided to concentrate on moderate transformation at least, either for their customers, or end-customers.

From 2006 through to the end of the survey, 3PEF customers indicate that moderate transformation has become the norm, with a reduction in low, and even more reduction in extreme transformation. End customers show a peak of relatively large transformations in 2005, with moderate and low transformations collectively attaining a dominant representation by 2007.

The appearance of relatively high end-customer transformations peaking in 2005, may be leading indicators of similar trends in the following year for customer transformations.

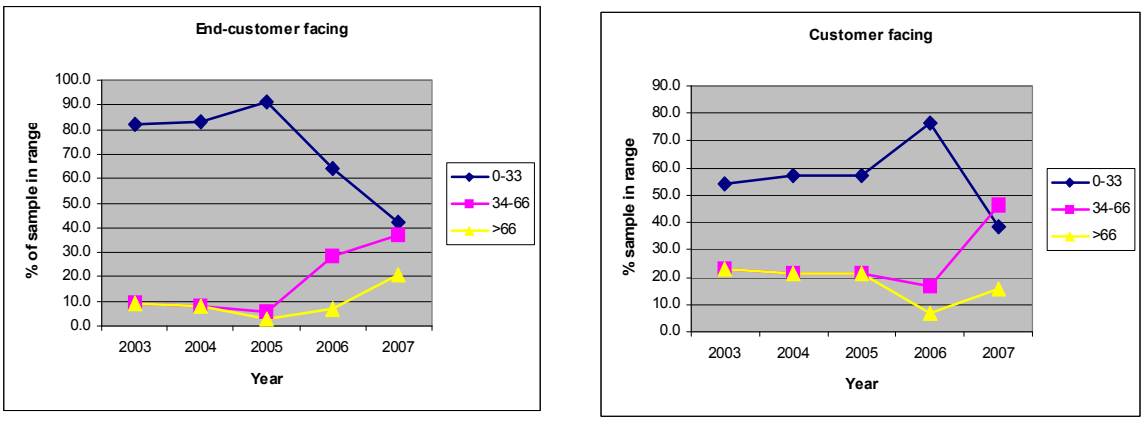

Figure: 1 a) and b) Changes in degrees of transformation, customer and end-customer

Maximum Changes

The change in the maximum observed transformation was measured at each end of the 3PEF supply chain; that is, the absolute aggregated rating of knowledge content (see table 1), scaled to equal 100 and against which all other businesses in the sample for that year were measured. It is shown in Figure 2a and b, for 3PEFs' customers

and end-customers. 2003 Aggregated maximum indices where used as a baseline. Two different trends are apparent.

The 3PEF's direct customers, those receiving outsourced e-fulfilment services, show a general increase in transformation of 50% over the survey period, with a pronounced spike around 2005. End-customers show a peak transformation in 2005, retreating by 2007 to only 58% of that originally observed in 2003.

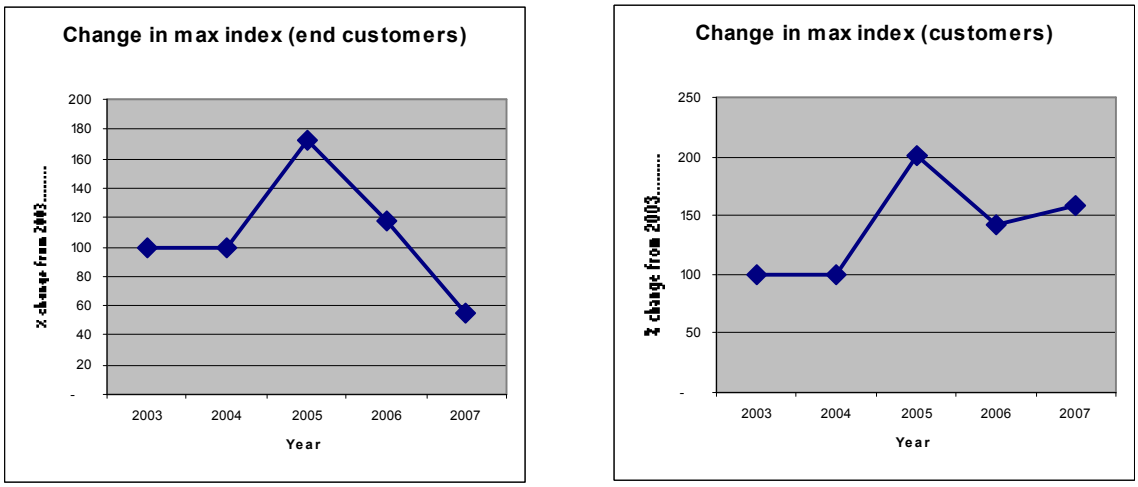

Figure 2 a) and b) Changes in RTI over years, for customer and end-customer

DISCUSSION

Industry Transformation trends

3PEF capabilities and knowledge content

The RTI quantitatively measures 3PEFs' moves to acquiring the knowledge-based capabilities that define them as Knowcos.

In 2003, the first year of the study, it was clear that knowledge capabilities were being adopted by the majority of the players in the industry. They were offering distinctly non-traditional services such as web development, web site hosting and supplier management, which are almost completely knowledge-based, and definitely novel for fulfilment businesses.

These businesses had varied capabilities with markedly different levels of transformation. A heterogeneous environment like this can be due to competitors seeking advantage by innovating and extending their capabilities to include new knowledge based offerings. Thus, while some organisations showed high RTI for their aggregate of capabilities, others maintained highly traditional logistics, transport and storage capabilities. The approach to the latter may be due more to a desire to maintain ongoing relationships with strong customers influencing the businesses' capabilities development, rather than an inability to innovate. This possibility was suggested in the previous research by the author [14-16].

The rapid adoption of new capabilities can provide niche advantages in a transforming marketplace and it is evident that many organisations are doing just this. Companies may be experimenting with transformed capabilities to gain competitive advantage, either to attract new customers or retain existing ones.

Evolution of Capabilities

During the period of the study organisations have been rationalising the capabilities they offer, and the knowledge content of those offerings. They are aligning them with others in the industry to more directly compete on the basis of quality and cost in each of these capabilities.

This is shown by a significant reduction of high RTI (from 20% of the sample in 2003-5, to around 10% of the sample in 2006-7) and indicates a change in the nature of competition in the industry. In 2003, offering new

capabilities would have provided niche advantages in the transforming e-commerce influenced marketplace. That marketplace is now maturing. With increased customer understanding of the specific capabilities they require, providers must now consider not just a capability's level of transformation, but also its cost-efficiency and quality, since these characteristics are now likely to be of a higher concern to customers than transformation alone.

The reduced penetration of extremely transformed capabilities, the reduced maximum RTI each year evident from 2005, and the reduction in variation of the RTIs indicate there is a new "standard" set of capabilities emerging to replace traditional ones offered by the logistics industry (from which most of these 3PEFs are derived). In other words, organisations are at the same time reducing the number and variability of the capabilities they offer, specialising in a smaller set of capabilities, capabilities that *may* be more transformed depending on their perception of customer demands.

What underpins this trend? In 2003 companies were clearly experimenting with new capabilities, driven to offer them by apparent competitive advantage due to transformation. This peaked in 2005, and since then the market has demonstrated preferences for particular capabilities while it is less enthusiastic about others. Likewise, in its quest for profitability and competitiveness each 3PEF will have developed capabilities for best delivery in terms of cost-effectiveness, saleability and quality that maximises its business objectives.

Changes in maximum RTI

When the maximum RTI is compared for the years of the survey, differences in transformation can be seen for customers and end-customers of 3PEFs.

End-customer transformations (the B-dimension) show a decline in the relative extremity of the transformation (from traditional fulfilment capabilities), starting in 2005 to the end of the survey. 3PEF customers (the A-Dimension) also experienced a peak in 2005 but maximum transformation increased steadily from that time. In other words, direct customers of 3PEFs are demanding ever more transformation while end customers are not as focused on transformed products as they were at the start of the research period. This is an indicator that end-customers are more focused on lower costs of core services in a more mature fulfilment market. Direct 3PEF customers still value transformation however, probably as a means to gaining competitive advantage.

The RTI as a benchmarking tool

The development and use of the RTI has considerable potential as an aid to assessing knowledge content in capabilities, and as a measure of the transformation of those capabilities. Though its non-linearity precludes plotting mathematical trends, and arbitrary ratings make it suitable only for comparative purposes, it still offers distinct benefits.

The RTI is suitable for a benchmarking tool, calculating indices for a specific business and comparing them to the indices for the whole sample, an organisation in a transformation continuum of other 3PEFs, and observing changes over time and in different situations.

A new model for 3PEF transformation

This study amalgamates Deise et al's [4] view of staged transformation, and extends it to relate transformation of 3PEFs and the emergence of new capabilities, and to provide a measure of transformation based on knowledge content (Knowco-ness) and an extension of pre-existing organisational models of transformation.

The observations in this study provide clear statements for 3PEFs. Overall, there is a general increase in the RTI over the years of the study; that is, transformation from Physco to Knowco capabilities. The data also indicate that 3PEFs are making a conscious effort to orientate their capabilities toward becoming mature knowledge-based Knowcos focusing on building brands as comprehensive outsourcers, capturing ownership of the end-customer market relationship, and investing in knowledge-based core competencies.

Some businesses will not transform their capabilities and will be focusing on physical efficiencies in distribution and logistics, doing business with those that value those efficiencies and proficiencies. Other businesses will adopt increased amounts of Knowco-ness to provide value chain integration with their customers.

Such changes must affect the whole industry by inducing a cyclic enhancement of overall capability coupled to increased customer expectations. 3PEF suppliers offering enhanced value chain capability for customers will

improve customers' overall (industry) capabilities. In order to compete, other 3PEFs appear to be responding with more innovation, more Knowco-ness. These new services can then be offered to customers, who in turn create more transformation through their increased expectations (Figure 3).

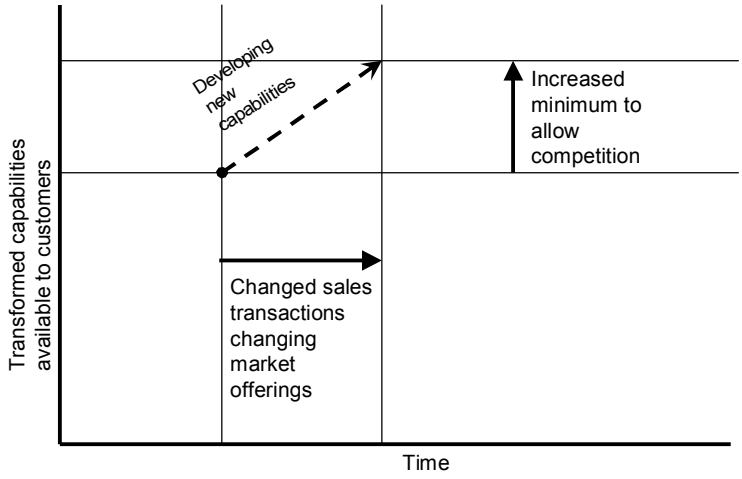

Figure 3: Industry-level transformation process for 3PEFs

CONCLUDING REMARKS

The ongoing analysis of 3PEFs has tracked an industry metamorphosing from traditional physical functions to more knowledge-based ones. In so doing a new industry appears to be forming, defined and driven by a portfolio of distinct capabilities. The RTI provides a tool to track the changes in this industry and to help 3PEFs make strategic decisions about the capabilities they develop and the services they can most successfully offer.

At industry level there is evidence of an iterative interaction between customers and suppliers of 3PEF services. That is, in constantly seeking competitive advantage customers demand new capabilities from their suppliers. These demands spread throughout the industry and eventually become the standard. To continue to achieve competitive advantage the customers demand more new services, or existing services at industry-lowest costs. Such behaviour prompts the presentation of an industry level transformation model that explains behaviour of both customers and providers in the e-fulfilment space.

The reducing extremes of RTI also indicate a coalescence of capabilities, suggesting that capabilities transformation at an industry level is occurring in a step-wise fashion in which an old order traditional fulfilment rapidly evolves into a new and relatively stable form. Customers are still seeking competitive advantage but are now focusing more on service cost rather than new services. This may well explain why authors in the last ten years have had so much difficulty in defining the nature of e-fulfilment. They were looking at an industry in the midst of experimenting with transformation to gain advantage in a new market. Now they are seeing 3PEFs responding to keep the advantage (and the customers) they have gained through capability transformation alone.

Depending on how a 3PEF is positioned in the market, its degree of transformation is an important early indicator of its potential to outperform its competitors. Innovation will likely continue and provide fertile opportunities to create new capabilities by leveraging existing traditional ones, but there is also evidence that this pace will relax. Those new capabilities will become absorbed into the business, and a new portfolio of capabilities will emerge as the norm. The focus will then move to improving efficiency, and more long term plans to drive acquisition, consolidations and capital projects.

The short innovation window for tactical benefit will close locking in a new form of industry, and it is important that companies be well placed for competitive advantage when is does.

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