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UPDATE

Reconsidering e-business strategy and the impact on supply chains

Raffaella Cagliano, Federico Caniato and Gianluca Spina
*Department of Management, Economics and Industrial Engineering,
Politecnico di Milano, Milano, Italy*

Abstract

Purpose – Seeks to review the results of a paper originally published in 2003 and to evaluate what can be considered still valid and what needs to be revisited.

Design/methodology/approach – The approach is a general review and observations about the earlier work.

Findings – The focus of the earlier paper was on integration and collaboration tools, while internet B2B tools can be used also for the opposite purpose. E-sourcing and e-procurement tools are aimed at increasing purchasing efficiency, rather than integrating inter-firm business processes. In general, statistics and predictions such as those discussed focus on the value of exchanges, not on the purpose of internet applications.

Originality/value – The paper provides relevance at the present stage of B2B internet applications.

Keywords Internet, Operations and production management, Supply chain management

Paper type General review

Timing research against the hype cycle of the Internet technologies

It was 2001 when we addressed the issue of internet-based supply chains using a global database of manufacturing companies (*The International Manufacturing Strategy Survey-III edition*). Our purpose was to investigate how manufacturers started using the internet to integrate processes across their supply chain. In particular, we aimed at linking the level of collaboration with customers and suppliers to the use of various internet applications to the supply chain processes.

It is important to consider the timing of the research process in relation to the dynamics of adoption of the internet tools. As often happens with information technologies, the well-known Gartner's (www.gartner.com) hype cycle represents the typical pattern of adoption. Initially, interest surges dramatically to reach a peak (peak of inflated expectations), which is followed by a similarly dramatic fall (trough of disillusionment). Subsequently a slower but steady catch up effect (slope of enlightenment) starts. When data were collected (2001), we were probably at the peak of the expectations. The adoption rate was still low, despite the fact that most companies declared their intention to invest heavily. Immediately afterwards, the world experienced the crisis of the new economy, and the hype of e-business suddenly



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stopped. However, a few real implementation programs survived while others were started all the same. Today we observe the first, measurable, large-scale results of e-business adoption, just positioning on the catch-up stage of the curve. Emphasis in the media is now certainly lower, but investments are growing and results are appearing.

In the "slope of enlightenment", the implementation of technology is often re-shaped and the strategies might differ substantially from those of the initial euphoric stage. How much of the research results and conclusions we drew four years ago are still valid? We reviewed the OM literature of the last five years: some papers investigated similar issues, but focused on specific internet-based tools (auctions, catalogues, e-commerce, e-ticketing, etc.) in specific contexts, often business-to-consumer, while only a very few considered business-to-business applications in a comprehensive framework (Croom, 2005). Therefore, to answer the above question it would be necessary to replicate a global survey. Unfortunately, the *IMSS survey-IV edition* is still in progress and data will be available only in 2006. However, some preliminary reflections are possible based on secondary data.

Let us review the results of our paper and evaluate what can be considered still valid and what needs to be revisited or, at least, further explored. Table I summarises major results of our investigation in 2001.

Inter-firm integration mechanisms: a cumulative two-stage model

A first preliminary result concerned inter-firm integration mechanisms along the supply chain. It might be referred to as a cumulative two-stage model in which the interaction of a manufacturer with its customers and suppliers starts with mere information exchanges about inventory levels, production plans and deliveries. This level of integration is solely about visibility on the counterpart's status and does not entail any particular collaboration. A second level – which implies the first one – includes different practices such as plant co-location, use of Kanban systems and vendor managed inventories. At this level, a tighter coupling between the systems of the counterparts is achieved and a closer collaboration with joint decision-making is necessary. We used this two-stage model instrumentally, but interestingly it now emerges as a solid side-result, which has been confirmed by other research, as well as by case histories. Integration along the supply chain starts with visibility and proceeds with system coupling.

Inter-firm integration mechanisms	Internet B2B applications – clusters of companies			
	Traditionals	E-sellers e-commerce	E-purchasers e-procurement	E-integrators e-procurement e-operations e-commerce
Upstream information sharing		+	+	++
Downstream information sharing	+	+	+	+
Upstream system coupling				++
Downstream system coupling				++

Notes: + = fair use but not discriminant when compared to other groups; ++ = high use and discriminant when compared to other groups

Table I.
Internet B2B applications
and use of inter-firm
integration mechanisms

The paper then focused on three domains of adoption of internet tools to integrate business processes along the value chain: upstream (e-procurement), downstream (e-commerce) and internal (e-operations). Looking at practical applications as well as industry outlooks (Bertelè *et al.*, 2005) this classification now seems redundant. In fact e-operations does not appear as a stand-alone construct. It is reported to be always linked to interface applications either downstream-e-commerce or upstream-e-procurement. This was also suggested by our results. Clustering companies on the basis of these three factors, we found four groups, those in the headings of the table columns: traditionals – non or very poor adopters of internet tools; e-sellers – adopters of e-commerce tools only; e-purchasers – adopters of e-procurement tools only; and e-integrators – simultaneous adopters of e-procurement, e-commerce and, e-operations. Applications of e-operations were not implemented alone. Therefore, further analyses and models should focus on interface applications only, both upstream and downstream.

Adoption of internet tools and inter-firm integration mechanisms

The key result of our analyses in 2001 was the assessment of the linkage between the domains of adoption of internet tools – described by the four clusters – and the inter-firm integration mechanisms (Table I). It was empirically found that companies that used internet B2B applications more intensively and extensively (e-integrators) were those that integrated more – up to system coupling – both upstream and downstream. On the contrary, partial adopters (e-purchasers and e-sellers) and even traditionals integrate partially – to the level of information sharing only – while no system coupling is put in place.

Finally, our results showed also that the adoption of internet B2B applications was not homogeneous across different industries. The IMSS sample is focused on assembly manufacturing only, but significant differences emerged also among sub-sectors. In particular, e-integrators were strongly concentrated in the electronic machines industry (ISIC 383). On the other hand, the transport equipment industry (ISIC 384) has a higher percentage of traditionals compared to the overall sample. These results are confirmed also by other sources (Bertelè *et al.*, 2005). There is a clear explanation beneath them. Industries such as automotive, grocery, pharmaceutical, and household appliances had already heavily invested in EDI or other proprietary infrastructures before the advent of the internet. Consequently, they are still relying on the existing communication tools and are only slowly moving to internet applications, generally in the hybrid form of Web-EDI, in order to integrate new and old solutions. Other industries instead, such as electronics and textiles, have a higher degree of penetration of internet B2B applications, due to both the lack of existing infrastructures and the higher fit of the web with their characteristics (higher fragmentation of the supply chain and/or lower company size).

One distinctive feature of this research is that it focussed on the domains of adoption rather than on specific tools – e.g. e-catalogues, e-track and trace, e-auctions, e-forums/community – which, of course, misses details and specific implementation issues, but in turn allows a more comprehensive and strategic view of the phenomenon.

Level of adoption

Another relevant issue discussed in the paper was the magnitude and the dynamics of the phenomenon. Our data refers to qualitative measures, ranging

from no use to high use. Instead, they did not allow quantification in monetary terms of the extent of B2B transactions over the internet. This is not, however, a simple task. There is a lack of official statistics in Europe. Only aggregate data for e-commerce are available from Eurostat (<http://europa.eu.int/comm/eurostat/>), including both B2B (excluding EDI transactions) and B2C. In 2004, e-commerce represented 2.1 per cent of total sales in the 25 EU countries (2.2 per cent in EU 15, with a 100 per cent increase compared to 2003). These data show how the impact of internet applications is still very limited in absolute terms, although the growth rate is significant in the last few years. Private sector estimates (e.g. Gartner, Forrester, etc.) provide information on the value of B2B transactions. However, these data also have several limitations: first of all, they are often predictions, rather than statistics; second, they generally differ very significantly from each other; third, they are not consistent, e.g. sometimes they consider both internet and EDI transactions, thus showing much higher values. The common factor of all these predictions is the forecast of an exponential growth in the value of B2B transactions; however, statistics so far show a slower pace. The latest data in Italy (Bertelè *et al.*, 2005), for example, show that about 5 per cent of total B2B exchanges in 2004 have been made electronically, including those made on traditional platforms such as EDI, for a value of 94bn€. In 2003, this figure was 80bn€, which was already 5 per cent of total transactions.

E-collaboration vs e-competition

A final remark concerns the focus of our paper, which was on integration and collaboration tools, while internet B2B tools can be used also for the opposite purpose, i.e. accessing broader markets, fostering competition among suppliers, and automating the process, thus reducing purchasing costs. Indeed, e-sourcing and e-procurement tools, such as e-auctions, RFX applications, e-catalogues, etc. are aimed at increasing purchasing efficiency, rather than integrating inter-firm business processes. In general, statistics and predictions such as those discussed above focus on the value of exchanges, not on the purpose of internet applications, i.e. they do not differentiate between collaborative and competitive use of B2B, while the underlying strategy is completely different.

This distinction is particularly relevant at the present stage of B2B internet applications. Going back once more to the Gartner's hype cycle, after the initial euphoric adoption by a few leading companies, during the "trough of disillusionment", firms seem to have focused their attention on tools that could provide quick and measurable benefits, at a low cost. E-sourcing and e-procurement applications respond to these requirements, and have been preferred to the more complex, expensive, and long-term oriented integration and collaboration tools. Today, instead, we are going through the "slope of enlightenment", and companies are starting to realize that only the adoption of a composite portfolio of applications can maximise the benefits, thus they might also consider again integration and collaboration tools.

In conclusion, the actual evolution of e-business applications along the Gartner's cycle, especially differentiating the purpose of adoption and the level of integration of the supply chain, seems to be the most promising area of research about how companies today are reshaping their supply chain through the internet.

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