

STRATEGIES FOR THE MINIMIZATION OF LOGISTICS COSTS FOR THE NEW INTERNET-BASED BUSINESS MODELS

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FOR THE NEW INTERNET-BASED BUSINESS MODELS**

TRACK: INTERNET-ENABLED OPERATIONS

ABSTRACT: Many researchers have been dedicating their time and efforts to understand the ways traditional logistics can be adapted to the new requirements of the electronic commerce. Some advances can already be seen. Less attention has been paid by the researchers to the virtualization of products and services in order to avoid or reduce the need of traditional logistics. This paper focuses on that issue, discussing some possibilities, taking into account the characteristics of products and services being traded through the Internet, the production processes involved, as well as the supply chain structure and business models best suited for the virtualization effort.

KEYWORDS: e-commerce, virtualization, logistics

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INTRODUCTION

Internet has allowed companies and people to exchange information in a much more intensive way than ever in the past. In a short period of time, the Web turned itself into a promising channel for business to be carried out among companies (B2B) and among companies and the consumers of their products and services (B2C).

But a considerable share of the activities related to the business transactions carried out through the Internet and most of the business processes still happen in the physical world, in which some of the oldest stock management and materials moving problems become even more challengeable.

Traditional distribution systems are not suitable to perform the type of movement they are being requested. As a result of the adoption of the Internet as a business channel, orders are becoming more frequent and more time sensible. They are also involving smaller quantities to be transported to longer distances, as has been remarked by HINTLIAN AND MANN (2001).

Thus, the main competence for the success of Internet-based operations may, ironically, end up being the capability of updating the physical features of the company's supply chain, so that it is able to handle the high speed and high availability expectations, typical of the Internet world. That is the opinion of ANDERSON AND LEE (2000).

A lot of research has been carried out trying to find out the best ways to adapt traditional logistics concepts to the new requirements of electronic commerce, and some advances can already be noticed. GRAEML, GRAEML AND STEIL (2001b) reviewed the bibliography and have established a scenario of the logistics challenges involved in electronic commerce. Special emphasis has been given to the distribution of products directly to the consumers, without the role of middlemen. UEHARA (2001) proposed that electronic commerce players need to improve their performance with respect to the fulfillment of promised delivery times, after having analyzed a few Brazilian Internet-based operations. He found out that among several features being evaluated, including service, delivery time, number of damaged parts during transportation and the use of logistics operators for the delivery, the poorest results related to the compliance of delivery times with promised delivery times.

An issue that seems to be receiving less attention of the researchers than it should, despite some initiatives by the industry, is the possibility of virtualization of products and services or the processes used to obtain them, in order to avoid or reduce the need for traditional logistics. This paper focuses on that issue, discussing some possibilities, and taking into account the characteristics of products and services being traded through the Internet, the production processes involved, as well as the supply chain structure and business models best suited for the virtualization effort.

INFORMATION PRODUCTS AND SERVICES X PHYSICAL PRODUCTS AND SERVICES

GEOFFRION AND KRISHNAN (2001) make a distinction between physical products, such as cars and computers, and information products, such as magazines and music. They also separate physical services, such as transportation, from information services, such as news providers.

Information products and services

Information products and services are those that can be digitized, i.e., converted in bits and bytes. Typically, they involve very low production marginal costs because, after the first unit is generated, its reproduction doesn't require significant effort (SHAPIRO AND VARIAN, 1999). In many cases, it doesn't even require raw-materials to be incorporated to the product, which would increase the production costs. With the possibility of shipping such products and services through the Web, even the transportation costs have almost disappeared, as they can be transferred from the premises of the vendor to a place of convenience for the customer, electronically.¹

Thus, for this class of products and services, stocking and shipping materials and products is no longer an issue, except for the need of developing policies and strategies for storing and distributing information, in order to preserve its integrity and avoid malicious access to it.

Information products and services can be reproduced and moved almost instantaneously and with very little limitation, as mentioned by GEOFFRION AND KRISHNAN (2001). In such cases, Internet represents a complete business solution. Vendors can use the Web to develop their products and services, they can advertise their products to potential buyers, take orders, replicate and deliver them to customers, receive payment, get feedback from consumers and provide after-sales support. All of that, electronically, through the Web.

The physical supply chain for information products and services is probably going to become each time less relevant, as physical processes and logistics tend to be gradually replaced by a virtual model, based on the Internet, with cost advantages, as well as more flexibility and diligence.

Physical products and services

Companies that have their operations based on pure physical products and services, on the other hand, can only use the Internet as a new channel for part of their activities. The delivery of physical goods or services cannot be performed through the Web. Physical transportation is still required from some point along the company's supply chain, where products are manufactured or stored, to the place where the customer needs them. GEOFFRION AND KRISHNAN (2001) remark that "physical products and services do not enjoy the magical qualities" [*sic*] that make information products and services so well fit to the Internet.

Even though, the company's Web site may represent a good window for displaying the company's physical products or services², it can be used to carry out the transaction, to receive payment, to establish a communications channel with customers and as the means to develop after-sales activities. Therefore, it shouldn't be left aside.

The next section is an attempt to show that not only companies that deal with information

¹ SHAPIRO AND VARIAN (1999) concerned themselves with the low marginal cost of information products and services, arguing that special commercialization strategies may be applied to take advantage of the low cost of replication, distinct of those normally used for physical products and services.

² ALBERTIN (1999) says that displaying products and services is one of the first efforts of companies that decide on using the Internet for business, in a stage they haven't yet figured out or are still not prepared to develop the full potential of the new business channel. At that stage, according to GRAEML, GRAEML AND STEIL (2000), Web sites work more often as "display windows" than as "cash registers".

products or services - with “magical qualities” – are able to simplify their logistics operations, reducing the need for physical interaction, by intensifying the use of the Web in their operations. Companies that manufacture or trade physical products or services can also benefit from the connectivity provided by the Internet, once they review their processes and, eventually, their business models, in order to better adjust them to the Internet’s potential for business activities.

POSSIBLE LEVEL OF VIRTUALIZATION FOR VALUE-ADDING ACTIVITIES

Companies carry out the following activities in their direct effort to add value for their customers, among others:

- ❑ product and/or service design;
- ❑ materials ordering (procurement);
- ❑ product and/or service production;
- ❑ creation of goodwill concerning their brands and the company, itself;
- ❑ product and/or service advertisement to potential customers;
- ❑ order taking;
- ❑ delivery of product and/or service to the customer;
- ❑ collection of payment for the product and/or service delivered to the customer;
- ❑ reception of feedback from customers, to be used in improvement efforts; and
- ❑ provision of after-sales support.

Businesses that are solely based on pure information products or services, completely digitizable in order to flow through the Web, can have practically all of the above mentioned activities virtualized.

On the other hand, businesses that are solely based on pure physical products or services will still require traditional stocking and transportation activities to be carried out. Sometimes, even in a more complex way than in the past.

Between the two extremes, represented by businesses that rely on pure information products and those that are completely physical, there is a wide range of intermediate situations for which hybrid strategies can be successfully carried out.

The table below summarizes the value-adding activities that can be virtualized, depending on specific features of the product or service, the processes used to produce them, the degree of verticalization of the supply chain and the business model being adopted.

Business activities that can be virtualized:

	product and/or service design	product and/or service production	materials ordering (procurement)	goodwill building and product advertisement	customer order taking	delivery of product or service to customer	collection of payment for the product	reception of feedback from customer	provision of after-sales support
pure information product or service	Y	?	Y	Y	Y	Y	Y	Y	Y
hybrid product or service	?	?	Y	Y	Y	?	Y	Y	?
pure physical product or service	?	N	Y	Y	Y	N	Y	Y	?

Y = can be virtualized; N = cannot be virtualized; ? = sometimes can be virtualized.

CONCLUSION

The Web allows companies to provide their customers with products in a fast and convenient way. In some cases, it also contributes for better adjusted products to specific customer requirements. But, the greater the quality of service expected, the greater should be the attempt to concentrate in supporting local/regional customers, in the case of physical products and services, due to the difficulties involved in physical distribution.

Customers are becoming less tolerant while waiting for products ordered through the Internet for several reasons. In part, that is the result of the fact that there are a few companies that developed operations difficult to benchmark with, having made huge investments in new technologies and new business models for the Web. Most operations do not have (and will probably never have) economies of scale capable of justifying such expenditure. But, inevitably, all other e-businesses will be compared to those world class e-ventures, regardless of them being global operations or sites created to support local demands. Another important factor for the existence of high expectations with respect to the timeliness, reliability and diligence of the delivery service is that, being so easy to buy products and services through the Web – products are just a click away – it is difficult for the consumer to understand that the logistics involved in taking the product to him isn't also that simple. That has been observed in a survey conducted by GRAEML, GRAEML AND STEIL (2001a) in which people were asked to give their impressions of there visit and purchase experience in a virtual supermarket.

Therefore, any effort carried out by companies in order to better fulfill their delivery promises will probably remain unnoticed, at the best. If the best of the possible scenarios is not to be noticed, , at all, neither have the effort recognized by the customer, due to the high level of expectation, less favorable scenarios can be devastating, in practice: customers get really upset when they do not receive their orders as expected.

Many companies have been able to reduce delivery cycle time, mainly by adopting information systems to support more agile distribution procedures and by improving their processes in order to make them more suitable to the Web. But the pressure for fast delivery has been making companies promise even shorter delivery times, something they are not being able to fulfill, as observed by UEHARA (2001).

Companies will keep improving their delivery cycles, as electronic commerce gains scale that justifies the adoption of specific logistics strategies for the new sales channel. Changes in current processes, even when they do not include the virtualization of any activity, may contribute to shorter delivery times. The integration of sales systems (front-end) with the inventory and order handling systems (back-office) besides making the delivery more agile, will reduce the inconvenience generated by items being sold, without physically existing in the inventory to be delivered to the customer, as reminded by REYNOLDS (2000). If the company, besides trading the products, is also responsible for manufacturing them, integration can include the interaction with sales data available in databases, that can be reached through the Web, and the interaction between inventory systems and production planning systems, triggering production and purchase orders, as soon as they are required, to replenish stock or to fulfill a customer's order. Integration may happen among companies, improving the information flow along the supply chain, improving demand forecast and planning the availability of goods. Systems that allow for the authentication of buyer, credit verification and approval or debit to a bank account additionally contribute to the reduction of the elapsed time from the moment an order is placed until the moment delivery to the customer's site is achieved.

Some of these initiatives represent, themselves, the virtualization of business processes (or parts of them) or can be complemented by the virtualization of such processes, in order to allow for improvement in the delivery cycle time.

This paper didn't intend to discuss the possibilities of virtualization in depth, as a broader study is being carried out by the authors with that purpose, which will be ready in a few months. The purpose here was just to call the attention of academic researchers to the possibility of improving cycle times in electronic commerce operations by virtualizing processes that needed to be physical in the past and are being kept physical, in some cases, just because that is the way things have been done. E-commerce represents a paradigm shift in many ways and it is not different with the logistics involved. Current processes have to be reevaluated in order to make them better suited to benefit from the potential of the Internet as a new business means.

The virtualization of business processes has appeared more often in industry practice than in theoretical studies developed by researchers in the field. Academy has to wake up for the potential of the new business channel represented by the Internet, in a more thorough way. New models have to be developed to help practitioners replace traditional processes, establishing a new rhythm for the interaction between customers and suppliers in B2B and B2C relationships.

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