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The impact of a virtual forwarding environment

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The impact of a virtual forwarding environment

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1. Management Summary

Managing The Extended Supply Chain

Supply-chain management becomes the methods, systems and leadership that continuously improve an organisation's integrated processes for product and service design, purchasing, inventory management, planning and scheduling, logistics, distribution and customer satisfaction. In a modern sense, most of these factors are being accomplished in a collaborative manner across a network of linked business partners. The more advanced supply-chain management systems include extensive application of e-commerce features. (Source: *Council of Logistics Management*).

To achieve this lets start with what can be expected to come: E-marketplaces and even META-Markets (portfolio of integrated supply chains, example TradeMatrix.com). Logistics marketplaces can provide service to both horizontal- and vertical marketplaces. Can you imagine the complexity of such a META-Market? Think of the requirements in terms of data exchange and IT solutions necessary.
Let us take it a bit closer to the next step after freight exchanges, which will have an impact on logistics services, because of the integration needs to participate. Beside all the fears and hesitation of some logistics service provider, there are also potentials.

E-marketplaces will provide a platform for the marketing of logistics services to achieve process efficiency, supply chain integration and E-marketplaces will support the development of logistics buyers/supplier networks by creating synergy's for both, buyers and sellers and 4PL's.
However, to get most optimised results of collaboration, mutual trust is needed as well as standardisation. This is probably the most critical issue to be overcome.

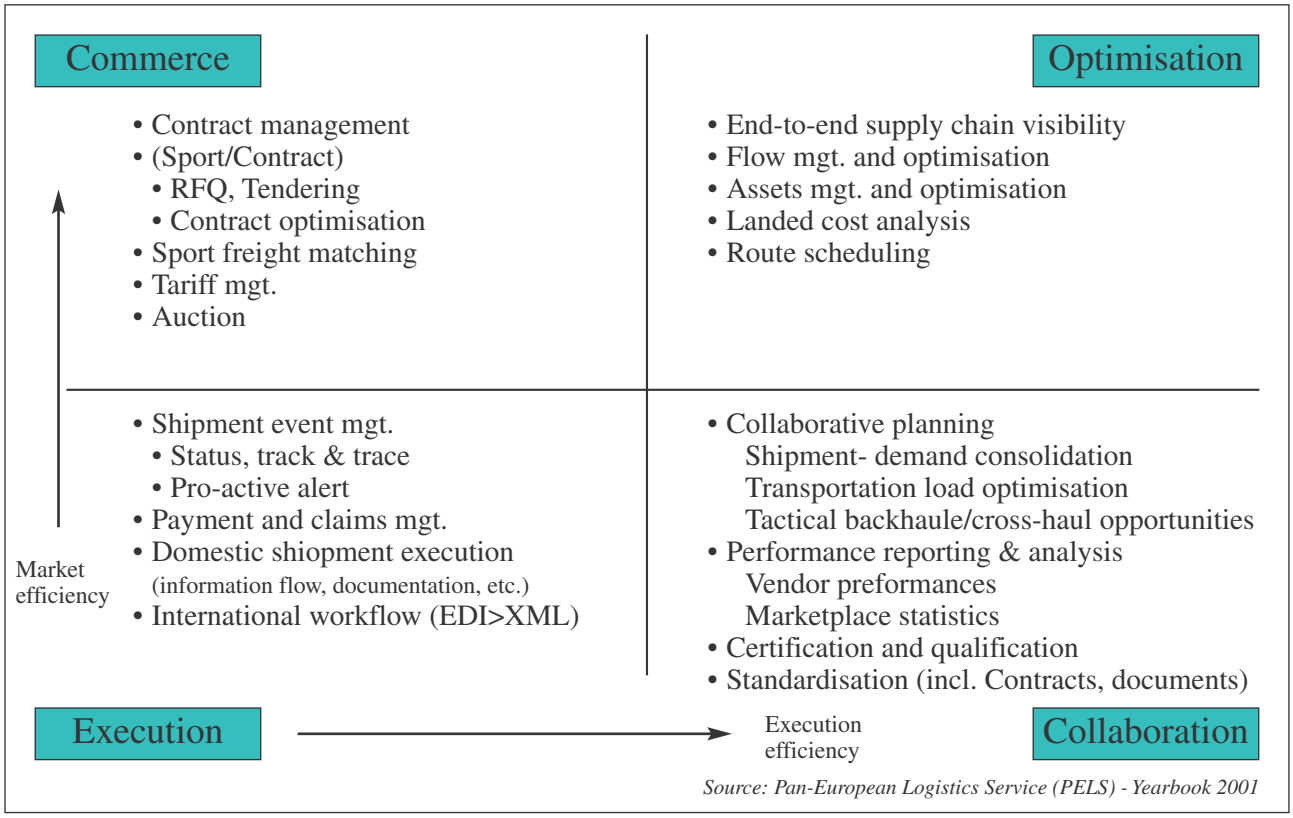


Figure 1.1: The efficiency model

Assuming that Virtual Forwarding Environment will be **the** approach of the future, the working group has asked members - in a virtual approach to fill in a questionnaire with the aim to understand needs and barriers and get your thoughts how you will perceive the usage of a virtual forwarding environment.

All following chapters have some references to the results and reflect your area of interest.

New Formation of Logistics Provider

With the development of 3PL's, 4PL's, E-Marketplaces caused by the increasing demand for more speed, transparency, transactional efficiency, information, economy of scale - IT systems and software to integrate that all is becoming vital. That has brought new partners to the logistics arena: Software vendors, especially the ones involved in

SCM software. Information service becomes a different meaning. Development, running, maintaining of such systems is costly. This is probably a major reason for success or failure in the virtual environment. To achieve critical mass is essential, only few will be able to do so.
One way to achieve critical mass is to build communities with service providers and shippers, and this will change the world of the logistics provider too.
The issue of who is best suited to own the process is also looked at in the report. Especially when it comes to lose control, supply chain optimisation over control will be put to the test.

Potential for Supply Chain optimisation

To establish a link between supply chain management in a virtual forwarding environment, complexity and reasons for slow progress in SCM are addressed. This might also serve as warnings in terms of expectation to reach for the optimum (integrated supply chain communities) too soon.

Types of Virtual Environments

This chapter focuses on different types available in the virtual environment.
Since e-markets incorporate the virtual environment, special attention will be given to this phenomenon. E-markets come in many different forms and variations, serving different goals and needs. To identify the various e-markets a number of classification systems have been developed.
This should help to understand the difference between various models and also what drives a virtual environment.

Virtual Environments and their users

Looking from a logistical point of view, all users of a virtual environment look for the same objectives - sharing information in order to optimise (their part of) the supply chain. As in the real environment in the virtual world we can categorise the following users:

- Operators of the virtual marketplace or environment
- Buyers of goods and products

- Suppliers/sellers of goods and products
- Companies with an advanced approach to systems and IT Technology and understanding supply chain (optimisation) principles

There are differences in expected benefits, but all are essential to utilise a virtual environment to the full potential. Different points of view are taken in this chapter.

NEEDS for using a virtual forwarding environment

Buyer's needs - expected benefits
To join a virtual environment - besides being forced to do so - added value has to be the motivator.
Some of the expected benefits are:

- Lower price and negotiation costs
- Expanded supplier access
- Lower processing costs
- Reduced inventory costs
- Reduced lead times
- Faster competitive response
- Economies of Scale
- Control of expenses
- Increase marketing/sales area
- Optimisation of (logistics) capacity
- Increase speed/accuracy of information
- Visibility/transparency

In the process of analysing web portals of logistics service provider, the offer is sheer frightening - because it is probably more than a new user of the virtual environment actually can. There are complex sites with all kind of services, e.g.: financial, reporting, routing & scheduling, order fulfilment. Not all of them deliver that what is promised, but some do and this is simple stunning and shows where the logistics world and its customer are heading to.

Supplier's needs

The supplier will only join the virtual environment, besides being forced by their customers/shippers, if there is anything of added value for them too. Being bashed for reducing rates in a transparent environment will make service providers careful.
But there are also benefits to be gained:

- Higher profile and volume
- Extended customer base
- Lower customer acquisition costs
- Lower processing costs
- Improved demand forecasting
- Improved, ongoing benchmarking
- Faster competitive response

But remember, probably most companies will not have a choice to participate or not, as it is stated at another place "Logistics follows Trade"!
Important will be to get your strategy right, even if it means not to use 'Virtual Forwarding Environment' at all.

E-marketplaces needs

The utmost need is to attract shippers and service providers, they will be vital for success or failure.
Listening to all the promises and expectations it sounds nearly to good to be achieved easily. And it will not be achieved that easy as some analysts already paint a bleak picture onto the walls.
However, E-Marketplaces will offer all the ingredients required to optimise supply chains beyond any experienced level yet through the opportunity of collaboration.

Barriers

The biggest barrier seem to be, that many things have to change first within a company itself, before the wide functionality of a Virtual Forwarding Environment can be used.

First barrier: Change, change of processes
Change of IT Systems
Change of customer/supplier relationship
Change of the approach by a mental shift
Out-sourcing but being integrated

Second barrier: Human Resources and development of skills and understanding.
Most of the companies returning the questionnaire stated this point as a main barrier, but qualification is growing fast.

Third barrier: Capital expenditure
The questions of finance or capital expenditure seem not to be crucial. Still companies will of course carefully check the Return On Investment.

Fourth barrier: Service capability
Service capability, quality, safety and commitment are the commonly most critical points, and were highly ranked in the questionnaire.

Contradicting are some expectations of users and requirements to deliver. This might also influence the hesitation to use a virtual forwarding environment.
And last but not least: a clear strategy is required to get everything lined up to participate successful in a chosen environment

Drivers for success and failures

To understand why marketplaces fail or succeed, we focus on some drivers for success and failures. This chapter covers subjects like Internet solutions, transparency and business rules.

ICT in Freight Transport - major problems and challenges

ICT is probably the most important factor to get supply chain optimisation really going. IT systems, technology and processes are featured in this chapter. Without the necessary system & IT support we could not talk about all the benefits outlined in this study.

On-line questionnaire

Results out of the replies were the backbone to the study. - Thanks to the participating companies. - Replies were in line with the public opinion but some were different and surprising.
Albeit not much time has passed since the survey, things have changed very rapidly. Asking the same questions again might bring already different answers, but the outcome remains interesting and valid.

Searching for the right virtual provider - an on-line guide to F&L members

Research has been done into the current offer of freight exchanges and logistics provider in the Internet.
Results are confirming occasional statements concerning rationalisation of exchanges, E-Marketplaces. Nearly 70% of investigated sites were not operational and some have closed down operation in the course of this study. Initial thoughts were to provide F&L members with a guide for easy selection, considering the pace of changes, the matrix developed has to be seen as a reference but with support for easy selection according to criteria needed.
The outcome of the research has grown into a reference guide in terms of definition, processes and background information to understand better how virtual forwarding environment works.

Conclusion

A virtual environment will be part for most of our businesses, it will be the key to all the outlined benefits achieved by collaboration. To which degree we can achieve it will be seen, it will not be easy as the process is complex and influenced by so many variables. Not at least by the human nature and us.
The working group hopes to have created a document that will be of help to you and your decision to join or stay away - THE IMPACT OF A VIRTUAL FORWARDING ENVIRONMENT!

2. General Introduction

LOGISTICS follows trade - The changing shape of European logistics - The e-logistics marketplaces as the challenge for logistics service providers - Facing the Forces of Change, Who's Who? Sorting out the e-logistics players!

These are the headlines currently featuring in the press, on-line and at seminars.
Two previous F&L working group themes were

Impact of SCM-(R)Evolution on Shippers and LSP's
The impact of electronic commerce

addressing the changes already evident which has lead to the third theme as final chapter to the Trilogy:

The impact of a Virtual Forwarding Environment

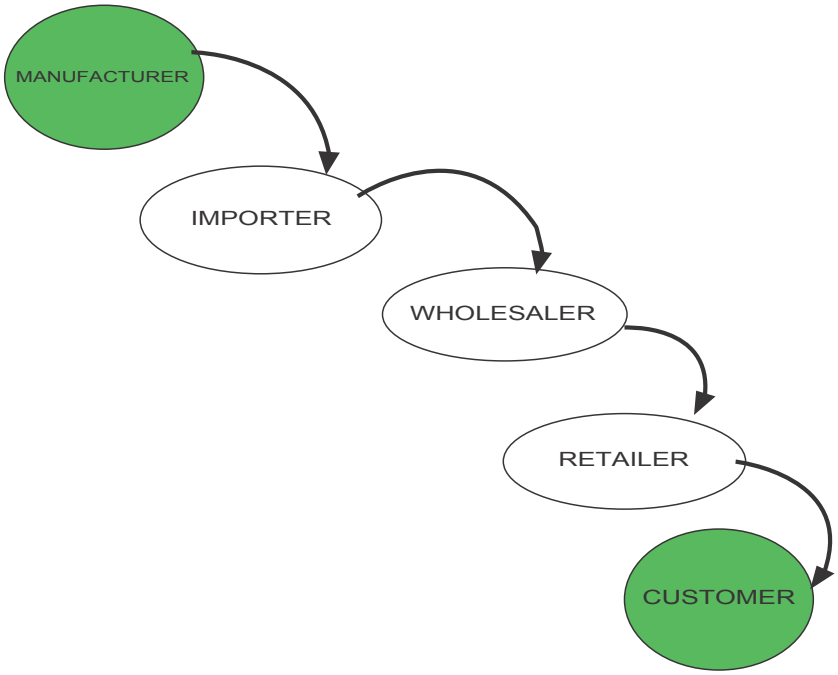
Visibility, speed, information, data exchange, order fulfilment via net are becoming standard features.
B2B has overtaken B2C and is by now the fastest development area as it gives supply chain optimisation new levels of opportunities. The magic word "Collaboration" is on every ones mind and in fact - theoretically - this will be the key to eliminate wastage on capacity, time and costs.
To release all these potentials, to create synergy, the usage of virtual environments will be a must for most of the business partners.
This study covers barriers and needs using virtual forwarding environment, IT requirements and developments, new formations of logistics service providers, freight exchanges, success and failures. Responses to the on-line questionnaire were an important contribution to the findings.
Because of the difficult task to sort out Who's Who for freight exchanges, a research was done on European offerings and....closings!
Because it is such a wide field linking to a virtual environment involving logistics issue, the study has had to be limited to major and generic issues but overall gives a good view about things to come and the need to be prepared.

2.1 Background

In the last twenty years we have seen characteristic changes in the general business environment. The impact

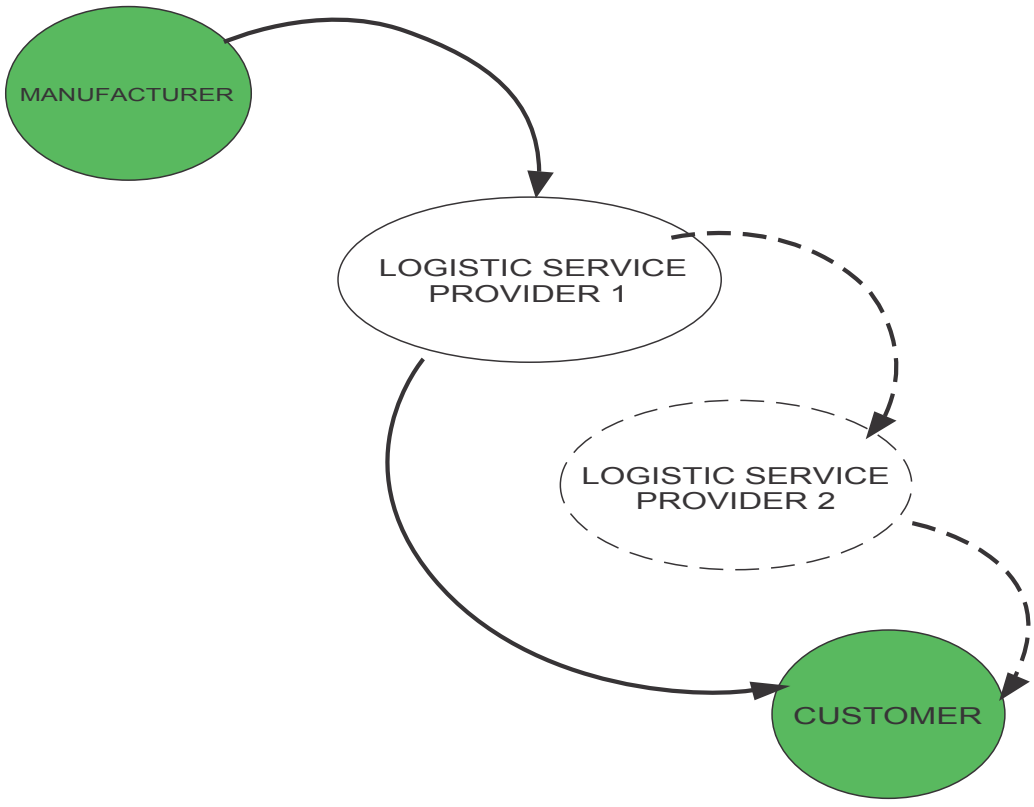
was clearly recognised on the business models of the key players on the market.
The corporate science and corporate advisory services were also focusing on changing areas of the company life. In the early 80`s the globalisation had not yet started and a high number of national production companies were operational. In this period a large variety of different products were available on the markets and the level of product standardisation was relatively low.
Corporate management have just started to think in Supply Chains but the structure of it was characterised as follows:

- The traditional supply chain was fragmented and several middlemen were involved in to the process.
- Several stock hubs and distribution centres were involved in the sales process.
- The form of SCM was highly working capital intensive.



In the 90s we were witness to a large number of M&A activities. These deals were driven mainly by the intention of investors to create larger economies of scale for their companies. These large corporations were able to operate

globally. The IT and ICT technologies had a key supportive role in this process. ERP systems as a standard frame become common at international companies. The SCM would not be efficient without IT enabling tools.
The SCM of today is much more different from the previous one. The method of "build to order", the optimised number of stocks and working capital could have been set as realistic targets for the companies. New businesses emerged from this scenario, the suppliers were positioned as tier 1and 2 and large companies were built on outsourced contract manufacturing. The 3PL service started to be an attractive core business area for the entrepreneurs. The end of this development is not yet in sight but it has to be said that the outcome was a sustainable growth of the market. Given the present world market situation some of the previous achievements might have to be put under reconsideration again.



2.2 Scope and Goal

To review management and execution of physical transportation in Europe, information/data exchange with the

use of @net and IT in the interest of shippers and service providers and provide help to better understand virtual requirements and potentials.

Deliverables:

- To help F&L Members to understand the internet "market place" for transport
- To detail the business process implications
- To provide case studies
- To provide a document for the F&L Club Members
- To provide an on-line selection support for members

Approach:

- Working group meetings
- Establishment of manager's job-allocation
- On-line questionnaire to F&L Members for initial input concerning barriers and needs, degree of a 'Virtual Forwarding Environment' usage, expectations for the future
- Research into European freight exchanges and logistics service provider
- Analysis of Internet publications on LSP and marketplace developments

List of Terms & Definitions 2.3

For convenience of the reader a list of terms and definitions has been inserted. You can find this list in the form of Appendix III on page ??.

3. New formation of logistics provider

3.1 Introduction

The picture below helps to understand the future supply chain, with regard to all involved parties.
In the traditional situation, each piece of the chain tries to add value by following each other's steps in chronological order. Nowadays organisations frequently use Enterprise Resource Planning (ERP) systems, which can increase supply chain reliability and responsiveness, through connectivity of systems. Connectivity and Internet can create the transparency needed for efficient and effective supply network execution. The transparency technology enables improved planning and scheduling of resources in the supply network.

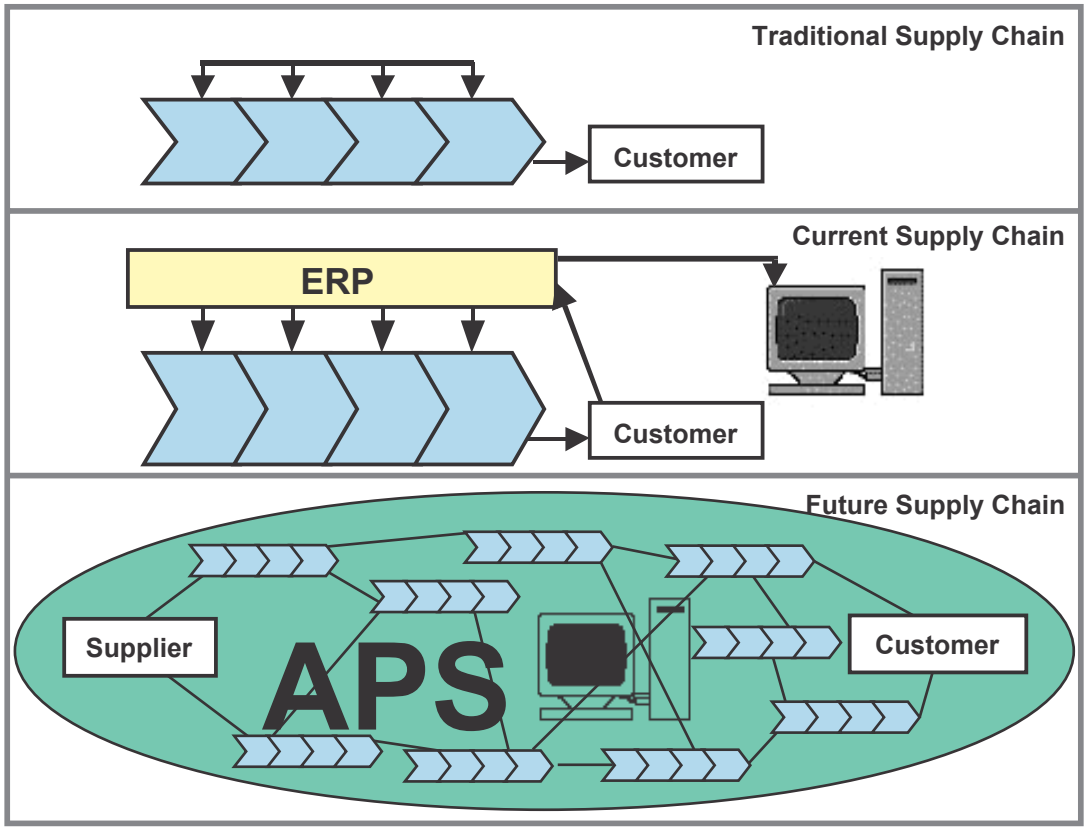


Figure 3.1

3.2 Collaboration

Already business leaders have acknowledged the needs and benefits of collaboration between business units along

entire supply chains and across marketplaces, ever since the 'just-in-time' revolution came around in the mid-1980s.[1] Concepts like lean manufacturing and total quality can only be achieved if there is tight synchronisation between all supply chain participants.
Collaboration can be structured or unstructured; When talking about structured collaboration, that means that a company has a rigid transaction-focus that allows supply chain partners to share inventory forecasts and pricing information. When the collaboration is unstructured, a company is streamlining supply chain communications and processes through next-generation workflow tools. Through new information and communication technology, parties are more easily connectable and will collaborate more and more.
The different parties, trying to focus on their core-business and outsource the rest, cause this collaboration. The keywords regarding the subject of collaboration are connectivity and transparency. Transparency will allow better planning, and to do so an Advanced Planning and Scheduling system (APS) can be of help. Ultimately collaboration is of course about more than just technology. While emerging tools can help companies share information and streamline processes, collaboration is a mindset that must be adopted by all members of a trading community before true benefits can be achieved.
The Internet and its supportive technologies are opening up a far broader range of collaboration to virtually anyone with a browser.
(Example: www.cargonow.com)

Optimisation 3.3

The most important opportunity regarding optimisation is to utilise the available capacity in a better way. Savings could be made easily, by giving thought to route planning and optimisation. Try to keep the truck loaded to the highest possible extent and keep an eye open for special holidays, transit costs involved with transport and other external factors (e.g. toll fares, ferries).

1 'Collaboration: Linking Partners Becomes Critical in Optimizing' by Philip Burgert, www.ecomworld.com, September 25, 2001

Another possibility is for a company to take a look at, and maybe re-improve, its service-levels. If a company can profile itself through better services, this will pay off eventually. Companies that provide more service and higher quality standards will see the customers coming to them. An accessible and transparent website can be of big help in the service section of optimisation.
When a company can make itself into an e-cargo hub for its own business area, it has found yet another way to optimise its logistics process. Through e-mail and other applications truck drivers and planners can have a minute-to-minute update on possible loads. This way the chances of an empty truck driving past a DC where a load has no truck will be diminished severely.
Keeping stocks as accurately as possible is also a way to optimise the supply chain process. E-logistics could be a convenient tool for this purpose. Up to date figures can help realise accurate planning, which in turn will cut losses on empty return rides.

However, fear for sharing internal data, which is still considered a competitive asset, frustrates the growth of these developments. Although sharing information seems to enhance overall supply chain efficiency this barrier will not be taken down easily.
Optimisation has a nice ring to it. It makes people start to think about what they can change. But do they really need to change? That's another question a manager should ask himself before getting started, because optimisation often is expensive to develop. An enterprise should look closely at what it is doing and if the results are to its liking. If there is any reason to change a process or use of equipment, this should be considered and reconsidered until an agreeable plan has come up. Never forget that optimisation often affects all layers of an organisation.

3.4 Information and reporting services

Companies have always been able to slice and dice internal data to view processes more clearly and identify areas for improvement. But in order to improve today's supply chains that utilise the Internet and XML, companies must be able to view one another's data to measure crucial

things like order fulfilment rates, channel inventory levels and transaction costs.[2] The Internet and XML give a possibility to capture and process data instantaneously, even from outside a company's four walls. Customers are asking for more and more information services.

Through connectivity and transparency, data becomes available to each connected party. Each party can filter its own information from the available data, which is placed in relational database systems. Information captured in a RDBMS gives unlimited opportunities for all kind of information services.
Through data mining software, business intelligence is heightened with extensive data analysis. Knowledge discovery through data mining identifies market segmentation, neural networks, and provides data visualisation for effective risk management and much more. Data mining software literally "mines" the truly useful information hidden in raw data that you already have.
Data mining software can be used to enhance your productivity by allowing you to upgrade data analysis capabilities, to educate users on best practices, and to deliver key business information, all from a central location. In order to make your supply chain more efficient, information availability becomes a very valuable part of logistics. While security and transaction integrity is important, one must face a more fundamental challenge in the supply chain marketplace, namely getting companies to entrust their data to a third party.

3.5 Who is best suited to manage the transportation process?

There is no straight answer to the question stated above. Sometimes a company will need the expertise of a 3PL, while in another case the overview capacities of a 4PL are required. A 3PL takes over a part of the companies supply chain while a 4PL is a person or company that takes care of all things logistic.
Consultants and 3PLs don't seem to agree on whether the term 4PL is really something new or just a meaningless

2 'Sharing Supply Chain Data Across the Internet' by Michael Garr, www.ecomworld.com, 12 September 2000

phrase. However, they do agree that there is a need for a "Supermanager" that runs a company's logistics, knowledge base and It-systems.
The job description would be: "Supervising the whole supply chain of a manufacturer or distributor and be a company's contact-point for all things logistic." In plain English, this comes down to the fact that a company appoints somebody to handle the companies that handle their logistics.

3.5.1 Who is best suited for the role of "Logistics Supermanager"?

If you ask a logistics manager, he will say that 3PL is not that much different from 4PL and it takes only a small shift in approach to make a 3PL into a 4PL. Consultants on the other hand say that they are best equipped to do so, because they have a lot of experience in guiding companies along the logistics path. The 3PLs as well as the consultants are both defending their share of the market. One has an interest in keeping everything as it was and the other has a lot to gain when the situation moves to 4PL integration. So both arguments have to be distrusted.
When 3PL was introduced everybody saw it as THE solution for logistic problems. It now turns out not to be all that. Companies indicate a need for information that the 3PLs apparently have not given them, so the consulting firms step in. Adding a new layer of cost to the supply chain, but to what end?
It is said that changes are taking place in supply chain practices. Logistic managers can place value on three competencies:

- Managing activities of multiple 3PLs on strategic as well as operational levels.
- Managing availability and utilisation of knowledge.
- Managing and integrating IT-systems.

These three are not the first things to pop up when 3PLs are discussed, so maybe there is indeed a vacuum for 4PLs to fill up. Time and information are the keywords in logistics management nowadays. Some say that information is sometimes more important than the physical logistic process.

In addition to what was said earlier about the conflicting interests of 3PLs and consulting firms, it's very likely that they will need each other in the future. One has the operational experience, the other has the managerial experience. For 3PLs and consultants to work together would not be out of the ordinary. If they keep fighting over a client they are likely to see someone else run of with it. If they give each other space and both focus on what they are good at, they will both make an agreeable profit.

3.5.2 What about the customer?

Most companies fear the possibility of handing over their logistics process to another company. They feel like they are putting themselves at the mercy of the 4PL and fear the possibility that they cannot get them out once they let them take over their customer relation programs. They give up the daily touch with their logistic partners and that makes them uncomfortable.

Customers will have future access to two logistic packages. One package will be an integrated package of services in IT and know how supplemented with a wide range of logistic services, while another will be a package for companies operating in highly focused niche markets like warehousing and transport.
As long as the users do not choose between 3 and 4PL they will be flooded with solutions to their problems from 3PLs as well as consultants trying to get the biggest possible market share available.

Rationalisation of @market places 3.6

For sure, the fever around e-commerce as a standalone initiative has wavered. A year or two ago it was: "How fast can you make it happen." Nowadays, the sentiment seems to be: "Show me the value.[3]

An e-marketplace should be a hub of collaboration by definition. A hub where buying and selling supply chains meet

3 'Collaboration: Linking Partners Becomes Critical In Optimizing' by Philip Burgert, www.ecomworld.com, September 25, 2001

to do more than just buy and sell products at the lowest price. E-marketplaces are learning that getting companies to sign up for an e-marketplace is the easy part. The hard part is getting them to actively participate.

Among other collaborative features, e-marketplaces should be able to support frictionless transactions from chart-of-account synchronisation, purchase orders, sales orders, inventory availability, price checks, online bill presentment and payment, returns, demand and material planning forecasts, logistics and order-tracking. The integration with back-end processes and systems is the most complex and time-consuming step.

Another thing e-marketplaces should clearly communicate are the benefits of participation. Examples of benefits include a major increase in the number of potential buyers of a supplier's product, the reduction of supply chain costs and the improvement of the supplier's overall capital position due to reduced inventory.
Do not mistake enrolment for participation. Being listed is completely different from being an active member. Being listed only looks good while being active can actually work to an advantage.

There are some articles available on the current state of e-marketplaces[4]. All of these articles stress the fact that caution is still the way to operate when thinking about stepping into the Internet.

Still, too often a marketplace is set up and left to wither away because it does not meet the demand of management within the timeframe they came up with. A good example of this is Cargoreservations.com that has been showing the same numbers for the last three months on its website:

> *With over **297,630,108 lbs** of Buyer Request and **$77,917,042** worth of Quotes todate, the Freight Exchange membership is increasing daily.*
> **The Cargo Reservation™ Freight Exchange has taken-off!**

4 Future of E-marketplaces August 1, 2000; Shake out looms for E-marketplaces May 1 2001.

A marketplace takes time, lots of time. In general, management tends to oversee this in their eagerness for a fast solution or fast profit. There is no guarantee for success in creating a marketplace, but taking the time to think over the different aspects of a marketplace surely is one of the things to make the start up easier.
The exchange business model requires liquidity to succeed. But to do that it must first provide value to buyers and suppliers based on their particular needs. The move towards collaboration and self-service will eventually push up product quality, because companies can learn from mistakes other companies made and then develop new or existing strong points.
For B2B e-commerce to be fully effective emerging systems must integrate with established technologies. E-marketplaces that thrive in the future will be those that integrate with a firm's 'back-end' systems.
The recent growth in e-marketplaces that operate within an industry sector raises issues such as interoperability between different electronic exchanges, so business can still be performed across sectors. Future development of open standards will be a vital component to interoperable electronic exchanges and in attracting supplier communities, especially small firms, to participate broadly in B2B e-commerce.
The main driver for e-commerce to reach its full potential will be collaborative enterprises that are developing whole-of-industry solutions and delivering shared benefits. To achieve this, companies will need to share their understanding of business information and workflow processes and agree on how they can best automate their interchanges for efficiency. This will then free business resources to concentrate more on competitive issues such as product quality and price.

All those complexities mentioned above require most sophisticated software. As this kind of software is expensive, development takes place in the direction of ASP (Application Systems Provider) and anyone acting in a more complex supply chain environment will need the support of such vendors. For 4PL's or marketplaces, software companies are already a significant partner e.g. MANUGISTICS and I2.

4. Potential for Supply Chain optimisation

Supply Chain Management in a virtual forwarding environment (VFE). Albeit this study will not cover in depth issues around SCM it is necessary to touch on possible influences in both directions: impact on SCM by VFE but also impact on the success of a virtual forwarding environment.

As it was and still is, interpretation of LOGISTICS is varying and the understanding of its meaning is very different. Supply Chain Management is the even more complex and abstract philosophy. Of course there are also some variations like Demand Chain Management and Customer Driven Supply Chain. And to make it even more sophisticated, we talk now eSupply Chain, eLogistics and eBusiness(es) with all kind of variations.

We like to attempt to keep it simple and concentrate on SCM and its overall meaning, which is in principle valid for all siblings touching the process delivering a product, beginning with the customer request, product development, quality, procurement, production, storage and delivery to the customer.

As SCM is a defined philosophy around for some time (20 years) and lived by some companies even before it was called SCM, the real push came with the ability to exchange data between the supplier and the customer in an easier and cheaper way than the more expensive original EDI solutions: eBusiness: THE WEB!

With this solution, it became suddenly possible to exchange real time information and data for smaller companies but also for top companies. Of course, logistics and its impact on a company's performance are not completely understood by some sales and marketing people.....and we have seen the results of this as we followed the hype of eBusiness development and failures.

However, it is beginning to be understood that B2B (business to business) and especially logistics and as part of it mainly transportation and warehousing and in future order fulfilment via 3PL's will be one of the largest segments in the eBusiness environment.

Let's recall the meaning of SCM in a simple way:

- Optimisation of the entire process from a customers request to fulfilment
- Sharing of information to enable optimisation at all levels (supplier, customer)

Of course it is not that simple, maybe the following will make it more understandable:

There are strategic objectives:

Profits	improve	Costs	reduce
Market Share	improve	Sales Volume	increase
Growth Rate	secure	Time to Market	reduce
Product Quality	improve	Customer Satisfaction	achieve

Main operational targets to achieve strategic objectives:

Cost reduction

- Manufacturing
- Material
- Transportation (Distribution)
- Processes

Sales improvement

- New/different service offerings
- Avoid stock out losses
- Improve service levels
- New sales channels

Capital employed reduction

- Inventories
- Accounts receivable
- Fixed assets
- Working capital

Despite trying to be simple, it begins to show why successful supply chain management is not that simple. All of the operational targets are interrelated by processes to a high degree and determine the degree of optimisation and therefore the profit improvement a company can achieve.

How does this fit to our subject of **Virtual Forwarding Environment**?

To achieve the highest level of optimisation, the process of Transport/Forwarding needs to be (seamless) integrated in parties involved, anything less than that will lead to additional steps and sub-optimisation of the supply chain.

Some examples: Non-integrated systems require additional manual data handling
Rejected transport requests placed via www.sites
Non-realistic planning assumptions leads to capacity loss

There will be business on a more spot term basis using VFE, but the real target should be to get the huge potential of B2B via VFE and get involved in the SCM process to contribute to optimisation. This would really release all the spare capacity to the benefit of shippers, transport/forwarding companies and also for the customer.

There are new words on the horizon:
Internet Fulfilment
Supply Chain Community

5. Who will be the user?

Introduction 5.1

User can be defined in many different ways. Following the goal of this report we define the users form a logistics service provider point of view. Before it can be determined who will be the users, we define in paragraph 5.1 what type of virtual environments can be used. In paragraph 5.2 we will define what is driving a virtual environment and consequently in paragraph 5.3 we define the users of these virtual environments.

Types of virtual environments 5.2

Since e-markets incorporate the virtual environment, special attention will be given to this phenomenon. E-markets come in many different forms and variations, serving different goals and needs. To identify the various e-markets a number of classification systems have been developed.
The first main classification is by means of process perspective[5]:

- *Horizontal markets*. These e-markets have a process focus and aim for supporting one specific business process for all companies in one specific industrial sector, e.g. purchasing of goods or services. To operate such a marketplace a great deal of process knowledge is required.
- *Vertical markets*. These e-markets have an industrial focus and there aim is to support the entire supply chain of a specific industrial chain from raw material supplier to end customer and return flow.

The second main classification is by means of `accessibility' of e-marketplaces[6]:

- *Private markets*. This type of e-market serves the exchange of information between a limited number of business partners. It can be either a horizontal or a vertical marketplace. The marketplace can only be accessed by the partners.

5 AMRResearch 2000, Gartner 2000
6 AMRResearch May 2000

- *Public markets*. This type of e-market can be accessed by everyone. It can be considered as a 'many-to-many' relationship. Normally these markets are free of charge or small fees apply when using it.

The third main classification is by means of market mechanism[7] that is supported by the e-market.

- *Auction model*. In this model price is the main driver. One party is offering goods or services for sale to the highest bidder. The transaction has to be settled within a fixed time frame. There are two basic subsystems:
  - *English auction*. The price is increasing per bidding round and finally the highest bid is accepted;
  - *Dutch auction*. The price is decreasing until the first party makes his bid. This principle is e.g. used at the flower markets.
- *Reversed auction model*. In this model one buying party issues a Request For Quotation (RFQ) to various suppliers of the required services. The buyer ensures himself of the lowest available price for that product/service.
- *Exchange model*. In this model there is a real-time exchange of offering and request. The marketplace operator acts as a broker between buyer and supplier. Prices are determined by market dynamics and the model is applicable to situations in which goods or products can are well specified.
- *Catalogue model*. In this model suppliers offer their products against fixed catalogue prices to there customers. Many examples can be found in the area of office supplies and home shopping concepts.

The first three models are so-called dynamic e-markets. The information and interaction between business partners using these models have a dynamic character. The catalogue model on the contrary has a static character with only limited to no interaction. The figure 5.1 shows the third classification.

7 AMRResearch May 2000, Cap Gemini Ernst & Young - Electronic marketplaces - 2001

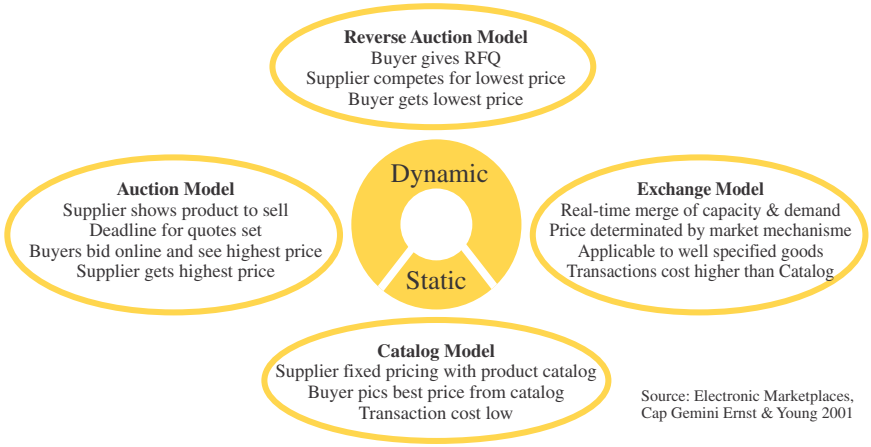


Figure 5.1

Nowadays e-markets show a mix of the classifications as explained above. The mixed and focus by the e-marketplace operator determines its success, ... or failure.

What is driving a virtual environment? 5.3

Only when one expects to benefit from a certain service he will start using this service. Where logistic suppliers are gearing up with e-commerce solutions, the catalyst is change in user needs[8]. Arguably, it is probably desirable that the motivation for change comes from the users of logistic services, as this will tend to keep the service providers in touch with logistics needs in perspective client markets.
The change in user needs, which are ideally covered by a virtual solution, lies in three fundamental problems:

- *Geographical reach*. Trade is fragmented by geographical limitations. A buyer only has limited choice when it comes to purchasing goods and/or services. Incorporate large groups of suppliers will lead to a complex and difficult to manage process.
- *Information management*. Complex and labour intensive exchange of data between business partners. In the traditional way of doing business data is exchanged in many different ways (e.g. telephone, fax, email, flat

8 TNO Reports 01-41 - E-commerce in the logistics sector - 6 august 2001

files, print-out, EDI, etc.) and in structure that is determined between the business partners. Some efforts has been made to define business rules that makes this exchange more efficient and enhance its logistics (e.g. Efficient Consumer Response concept).

- *Controlling your supply chain*. Often too many unnecessary (buffer) stocks in the supply chain. To deal with uncertainties throughout the supply chain (e.g. transport times, sales forecast, etc.) stock is build up in various places in the chain.

Summarizing these three fundamental problems the main driver, and therefore the main added value to logistics, is **transparency**. This transparency is created when information about the logistics market is made available to a wide group of logistics users, and these users adapt this transparency into their decisions.
Transparency however also calls for collaboration and, in many cases, leads to emotions. In the next chapters the needs, barriers, success and failure are further explained.
The availability of a universal and global ICT-infrastructure like Internet, hence easily creating the necessary connectivity between all logistic partners, is the basic reason for existence of the virtual logistic service provider.

5.4 Virtual markets and their users

Looking from a logistical point of view, all users of a virtual environment look for the same objectives - sharing information in order to optimize (their part of) the supply chain. As in the real environment in the virtual world we can categorize the users:

- *Operators* of the virtual marketplace or environment;
  This group can be compared with e.g. public or governmental organizations providing, maintaining and innovating infrastructure for their clients like Port of Rotterdam Authorities or the providers of software tools like e-marketplaces. They provide the technique and tools, but do noting with the actual use of their tools.
  From origin the operators of marketplaces come from the area of ICT, consultancy, education and government.

- *Buyers* of goods and products;
  This group of users tries to control their purchasing expenses by gaining access to a wider group of suppliers, or participating in a purchasing group. They use the tools provided by the operators.
- *Suppliers/sellers* of goods and products;
  One of the first commercial applications of the Internet was on-line sales. This gave the commerce the term 'e-commerce'. Where at first suppliers put their goods on-line via a catalogue-model 'marketplace', later on it became a truly interactive exchange.

6. What are their needs?

6.1 Introduction

Before we give some points of view what we believe are the most important needs that users of a virtual forwarding environment have, we would like to revert that question to yourselves;

What are your needs?
Why would you use a virtual forwarder?

And when these questions are too difficult to answer, simply reverse the question to;

Why will you not use a virtual forwarder?

With these questions in the back of our minds we will define some general needs or drivers of users of virtual forwarding environments.
In section 6.2 the needs from an operator point of view will be described. In paragraph 6.3 the buyer's needs are described and in paragraph 6.4 the supplier needs. In paragraph 6.5 finally a summary of the most import needs is given.

6.2 Marketplace operator needs

As explained earlier on most marketplace operators originate from the IT sector. They have learned from there years of experience with various logistical companies and developed very complex systems. Their goal is obvious - improving the efficiency of the entire supply chain. The best-known companies in this respect are i2 Technology, IBM and Ariba.
Since it is the tool that they are trying to sell, there main need is *content*. Attract as many users as possible and generate as much trade and transactions via their marketplaces. Beside the functionality to support the business processes, additional functionality was incorporated in the marketplace with the sole purpose of attracting as many customers as possible, e.g. by means of hyperlinks, market specific news, general information and additional services by service provider like finance, insurance, etc. Some operators originate directly from the logistics themselves. In some cases it was formed out of a group of cooperating companies, specialized in a particular mode of transport

and forming a new but independent partnership (e.g. transportation - National Transport Exchange NTE.com), or individuals within logistic companies starting their own marketplace.What all of these operators have in common is that they need the traditional logistic service providers for the execution of their services. The marketplace by itself has no value.

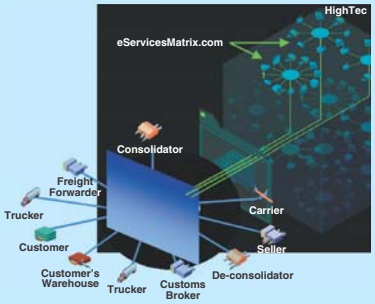
1.1 What is Freight Matrix

FreightMatrix is a logistics industry marketplace where buyers and sellers of logistics services can negotiate for services, transact shipments, and plan for their transportation needs. FreightMatrix provides logistics solutions to TradeMatrix industry vertical markets, as well as other non -TradeMatrix business-to-business marketplaces. It does this by providing user interfaces that integrate commerce activities into a logistics delivery service of FreightMatrix.

For example, FreightMatrix is available to a commercial purchaser of desktop computers subscribing to HightechMatrix™. As part of its purchasing and fulfillment services, subscribers can get transportation rate quotes from FreightMatrix and det ermine landed costs as part of the order - promising phase. In addition, he or she can use FreightMatrix to execute the delivery of product through logistics screens on HightechMatrix.

FreightMatrix is also a vertical market providing logistics services to carriers, third-party management providers, forwarders, and brokers. These providers can transact shipments with their customers, as well as manage internal workflows, control their financial management, improve customer service, and sell into companies pa rticipating in TradeMatrix. FreightMatrix planning services enable logistics providers to get the best utilization out of their equipment and operations.

TradeMatrix is an online marketplacemade up of trading communities for specific industries, such as high tech, retail, steel, replacement supplies, food services, and automotive. Its participants are leading companies, such as Hewlett Packard, Sun Microsystems, General Motors, IBM, Boise, and Alliant Foods. These companies use TradeMatrix to buy, sell, and collaborate with their trading partners. Once purchases have been completed online, participants can use FreightMatrix services through their own user interfaces. FreightMatrix is part of the TradeMatrix marketplace, so its subscribers also have access to direct and indirect materials purchases available from any of the TradeMatrix vertical marketplaces. Purchases can then be tracked from PO to POD.



FreightMatrix connects the fragmented transportation industry into a community through the Internet. FreightMatrix acts as a central hub and provides workflow tools and valuable services for transacting logistics business. FreightMatrix also provides an operating staff to assist in the management of shipment transactions and provide support for delayed or l ost shipments.

With FreightMatrix, many of the inefficiencies in the logistics process can be eliminated because there is information available to make proactive decisions. This additional control provides shippers with the information to make extended enterprise supply chain planning and integration effective.

Figure 6.1

Buyer's needs 6.3

Looking from this perspective the main goal is to do more efficient purchasing by using a virtual environment that supports the business rules.
Buyers in this respect can be e.g. a shipper buying transportation services from a logistic provider, or an airfreight forwarder buying capacity from carriers.
As a buyer of logistic services it is very common that only a few logistic providers are being used for the whole range of logistics for all your products. Since each product has it own logistic characteristics you would like to have the opportunity to chose from several providers that suit your

needs best. Depending on the scope and scale of your market doing this in a traditional way is too complex and time consuming. However using a virtual environment might help to create the transparency you need. Your driver then is finding the right provider against the best cost (not necessarily lowest cost).
As a buyer of capacity, again depending on the scope and scale of your operation, you already have established working relations with all the carriers you require. You main driver to use a virtual forwarding environment is to control the transactional cost and increase the speed of the process. Finding the right capacity against the right price might give you that advantage you need to win a logistical tender or maximize your profit.

6.4 Suppliers/Sellers needs

Where as a buyer would like to have sufficient choice so he can obtain the lowest price, the supplier wants to reach as much buyers as possible to sell his goods or services.
When focusing on the logistical product, suppliers can offer their services (e.g. warehouse capacity, transportation services, cargo space) to shippers, distributors or selling organizations, or to logistical parties horizontally or vertically in the chain (e.g. LCL-capacity to forwarders or truck capacity for return loads).

6.5 Summary of needs

The needs can be distillated from the drivers mentioned at section 5.3, geographical reach, information management and control over the supply chain.
Being just a user from one perspective is hardly ever the case. One can be buyer in one case, but supplier or seller in another. You can also be just the facilitator, without a buying or selling involvement. Another important issue to take in account when defining the needs is that some companies try to do it all. Whether this is the correct way of doing business, is a question that is answered later on in this document. The figure below shows the needs in a nutshell.

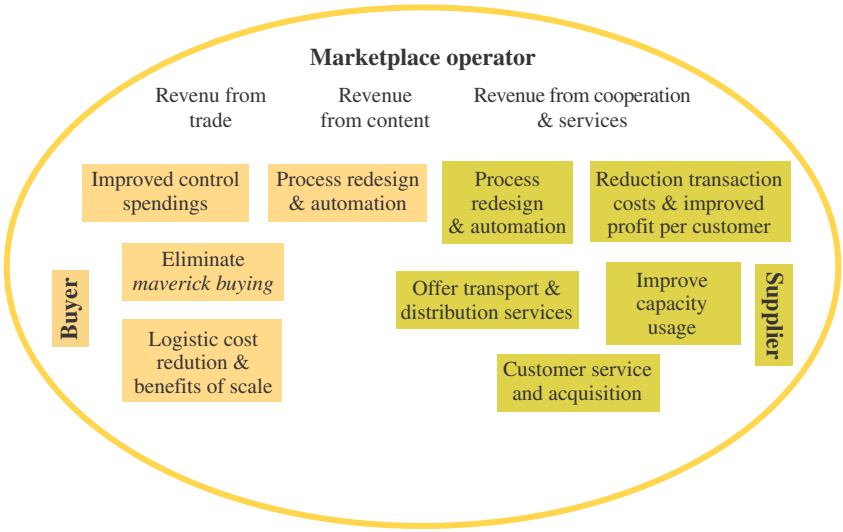


Figure 6.2: Source: modified from Cap Gemini Ernst & Young - Electronic Marketplaces - 2000

All of this will only be successful when you use a virtual forwarding environment that:

- has sufficient investors;
- supports your business processes in a professional way;
- has sufficient number of buyers of a reasonable size;
- has sufficient number of suppliers/seller of a reasonable size.

7. What are the barriers?

7.1 Why hesitation to go virtual?

The changing shape of European logistics, driven by new technologies brought high expectations for new, revolutionary solutions. But the predicted "information revolution" is yet to come. (See also chapter 8: Virtual forwarders - drivers for success or failures). There is no doubt, that new technologies will promote the development of logistic buyers/suppliers networks, because it might potentially benefit both buyers and sellers. There are potential areas to generate value with regard to:

Potential buyers benefit	Potential sellers benefit
Purchasing Power	
Lower price & Negotiation costs	Higher profits & Volumes
Expanded supplier access	Extended customer access
	Lower negotiation costs
Process Efficiency	
Lower search costs	Lower customer acquisition costs
Lower processing costs	Lower processing costs
Supply-Chain-Integration	
Reduced inventory costs	Improved inventory management
Reduce time to market	Improved demand forecasting
Aggregated Content & Community	
Improved ongoing benchmarking	Improved ongoing benchmarking
Cost-efficient research	Cost efficient, ongoing research
Faster competitive response	
Market Efficiency	
Price & Inventory Transparency	More customer reach
Reduced cost spot buying	Reduced cost of sales

Reality has shown that it was not possible to realise some of these potential benefits just by using "new technologies".

Maybe the expectations created by the "hype" were too high or did not always match with reality (business-processes in place, expected service level, other requirements etc.).

New technologies are commonly considered as a valuable, enabling tool, but without "real" companies behind the systems, committed to integrate these tools in their e-business strategy no substantial progress will be made. (See section: "Who is best suited to manage the transportation process?")

Business is still done by "real companies", which have been doing business successfully since many years, following still the same old, reliable and traditional business rules. More volumes - who cares? Does it really always bring a better price? Buyer Market or Seller Market - it was there already before the Internet. But it seems everything is now speeding up a little bit, calling for changes.

So what are the barriers for potential users? 7.2

The biggest barrier seem to be, that many things have to change first within a company itself, before the wide functionality of a Virtual Forwarding Environment can be used.

First barrier: **Change**

- Change of the Business Process

Figure 7.1

Logistic-Strategy must become an integrated part of the Supply-Chain-Strategy, which again must become an integrated part of the overall e-business strategy.

❖ Change of the IT-Systems

If we wish to share data, we have to have them available! Do we? And if so, do we have an appropriate interface to share our companies information openly with our present business partners and potential unknown business partners?

❖ Change of the traditional customer / supplier relationship

Transparency and Business Integration is a must.

❖ Change of the approach by a mental shift

This point seems to be the most difficult to overcome. LSP and the industry are aware, that it will no longer be possible to do "business as usual". To ignore new business processes, enabled by powerful @-tools. To ignore that both - manufacturers and LSP's are impacted directly by the "new economy focus", which brought many changes already.
The "New Economy Focus" requires de-integration instead of centralisation.
It requires transparency instead of "four walls mentality"- it requires a new, open approach.

Are all parties ready and well prepared for all these changes? If yes, it seems, that it will also be possible to overcome the other barriers stated below:

Second barrier: **Human Resources and development of skills and understanding**

Although most of the companies returning the questionnaire stated this point as a main barrier, it is most likely that this problem will fade shortly. There is already more IT-staff available, then a year ago. On top of that, even users that are not trained to higher levels get more and more familiar with new technologies. What remains is the difficulty to find the best system - and there are many to choose - for your own organisation.

Third barrier: **Capital Expenditure**

As it is most likely, that "new economy"-companies will be predominantly be the same companies we have seen in the "old economy", the question of finance or capital expenditure seems not to be crucial. Still companies will of course carefully check the Return On Investment.

Fourth barrier: **Service Capability**

Service capability, quality, safety and commitment are the commonly most critical points, and were highly ranked in the questionnaire. These fears are clearly focused on "new entrants", who have not proven themselves; many of them popped up and disappeared, most of them with no stable financial background. But supposed that mainly the players of the old economy will use the @- technologies of the "new economy" and form the "next economy" as predicted by scientists, it is most likely, that the same companies still will be doing business in the future. May be much quicker, more efficient, may be "many to many" instead of "one to one".

Try to make sure that you are not left behind!

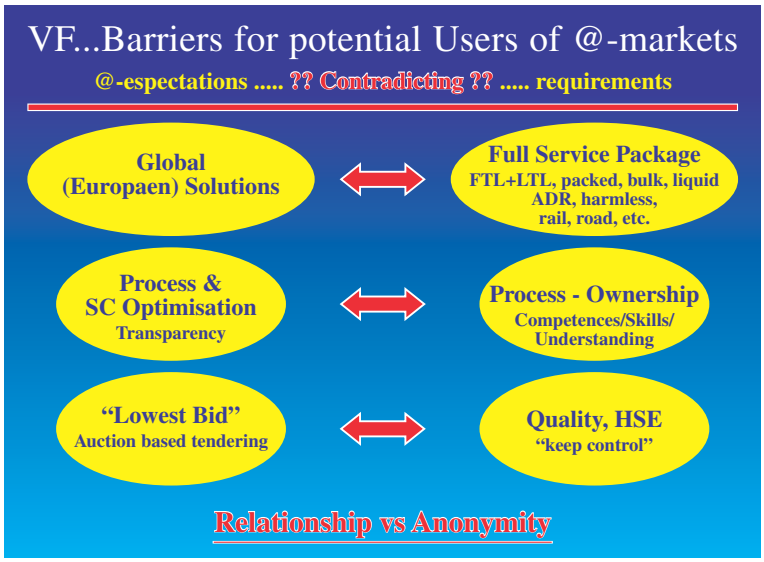


Figure 7.2

8. Virtual forwarders - drivers for success or failures

8.1 Introduction

With the previous chapters we hoped to clear the dynamics around e-marketplaces and virtual forwarding environments. We are well aware that it is more complex than described. Evaluating the past few years it is possible to identify some drivers for failure and success.

In the 80's and 90's many theories around Supply Chain Management were developed, but their concepts could only evolve partially. Main reason for this was that the necessary systems for the exchange of information and sharing processes were limited to mainframes and EDI-exchange. Internet would give a breakthrough.

Martin Christopher stated that the Internet provides a perfect vehicle for the establishment of the virtual supply chain. Not only does it enable vast global markets to be accessed at minimal cost and allow customers to reduce dramatically research time and transaction cost, but also enables different organisations to share information with each other in a highly cost-effective way[9].

With the internet-hype of 1999 and 2000 many ICT companies working on individual logistical improvement projects, saw the opportunity to combine the need for supply chain optimisation and Internet technology. They have build systems that promised the world to their users. The year 2000 became the booming year for e-markets, virtual forwarders and 4PL's. "If you do not start e-business now, you are out of business" was the slogan. The media was driving everybody crazy.

Although the ideas behind this innovation are right, the year 2001 is the year of the shakeout and opponents seem to be right. What went wrong and what went right?

8.2 Internet solutions implemented as response to a problem, rather then a solution

The first perception was that Internet was the answer to connectivity and co-operation. "Electronic interaction is a mean, not a goal; the goal is to enable close, effective relationships between people and their organisations that open new opportunities for mutual profit" stated Preiss,

9 Prof Martin Christopher - Logistics and Supply Chain Management - 2nd edition 1998

Goldman and Nagel[10]. Implementing or starting an e-marketplace does not automatically makes money. From a market study performed by TNO[11] few of the interviewed companies could quantify any effect of e-commerce, and none made the claim that e-commerce has increased revenues by increasing the customer base.

Freight exchanges were sold as a mean of creating price transparency for all buyers and sellers **8.3**

Although in principle the idea is right, the builders and operator of these marketplaces went passed one of the most fundamental business rules. Rates, cost and hence profit margins are never revealed to the public. From a shipper point of view you would like to have easy access to various rates to compare, as a provider point of view this is the utmost threat. All public e-marketplaces that embraced the idea of price transparency have either disappeared or are doomed to disappear.

Creating transparency is creating emotion

E-marketplaces that follow and support the business rules appear to be successful **8.4**

Following the business rules are found within partnerships between the larger companies with their suppliers or providers by means of private environment in which they exchange information, supporting only a specific part of the supply chain through a public environment.
This statement is best illustrated by some business cases. Teleroute.com is market leader in the area of on-line exchange of cargo and truck capacity. The services are accessible through the websites of Teleroute. More than 35.000 trucking companies and freight forwarders in 13 European companies daily place more than 40.000 (!) shipment orders. What makes this freight exchange so successful are determined by the following, most important factors:

10 Preiss, Goldman and Nagel - Cooperate to Compete - 1st edition 1996
11 TNO Reports 01-41 - E-commerce in the logistics sector - 6 august 200

- The exchange of information is based upon established business rules. The business partners can build upon a long lasting relationship. They are the investors in their own exchange;

- The business partners have the same mutual goal, efficient use of ground transport capacity. The partners bring in (part of) their volume and hence create the necessary content;

- The e-marketplace is limited to a part of the supply chain process, ground transportation;

- The exchange is used to manage the process and the first phase of the commercial process - establishing the contact. The actual commercial negotiation will be performed in the traditional way outside of the exchange. When business partners require they have the option to use Teleroute as well;

- The participants in the exchange are trucking companies and forwarders. Shippers have no access to the exchange.

These conditions appear to be the red line through successful public marketplaces.

The same type of conditions more or less apply to the private marketplaces. Eventually, the dominant parties define the business rules in the supply chain. In many cases the marketplaces are driven by shippers (e.g.: General Electric, Siemens).
They have a mutual goal, working together in an efficient way. In most cases the commercial aspect has already been established and the rates applicable can be obtained on-line.
One distinctive aspect however is that private marketplaces are more designed to manage the supply chain as a whole, then only a specific supply chain for a specific product or market.

9. ICT in freight transport - major problems and challenges

ICT development 9.1

Information and communication technologies (ICT) are crucial for improving the efficiency and quality of freight transport. Due to general economic trends such as just-in-time production, made-to-order manufacturing and a wide network of outsourcing relationships, tighter and ever more flexible planning schemes, which heavily rely on ICT systems, are implemented.

❖ Intelligent Transport/Traffic Systems (ITS)

An area of particular interest within ICT are Intelligent Transport Systems (ITS) that integrate data from a variety of sources such as onboard GPS tags, static roadside or track side tags, and various sources such as information on infrastructure maintenance, weather, unusual traffic patterns, accidents, etc. In the following, the more generic term ICT is meant to include ITS systems as well as other classes of transport-related IT systems.

❖ Reliable Estimated Time of Arrival (ETA)

Transport ICT systems can provide benefits both for the transport operator increasing service efficiency as well as for the customer / shipper. They can allow the tracking-and tracing of shipments at any time and the computing of a reliable estimated time of arrival (ETA). Customers can learn early about delays or unforeseen circumstances and take appropriate action such as re-scheduling or re-routing.

❖ Reduced Lead Times

ICT systems can also improve transport efficiency and speed and thereby reduce cycle time. Transport information can be tightly integrated into a company's in-house Enterprise Resource Planning (ERP), Supply Chain Management (SCM) or Inventory Control systems. Such integration can help automating or facilitating complex ordering and booking tasks, moving the necessary paper work online, speeding up the pre-transport phase. This in turn responds to demands for ever more flexible and speedy supply chain management and provides

the basis for the growth sector of e-fulfilment, the physical side of the booming e-business activity. E-fulfilment usually deals with small, high-value, and highly time-sensitive shipments, especially via air and road. Here, the timeliness, transparency and reliability harnessed by ICT systems are especially important.

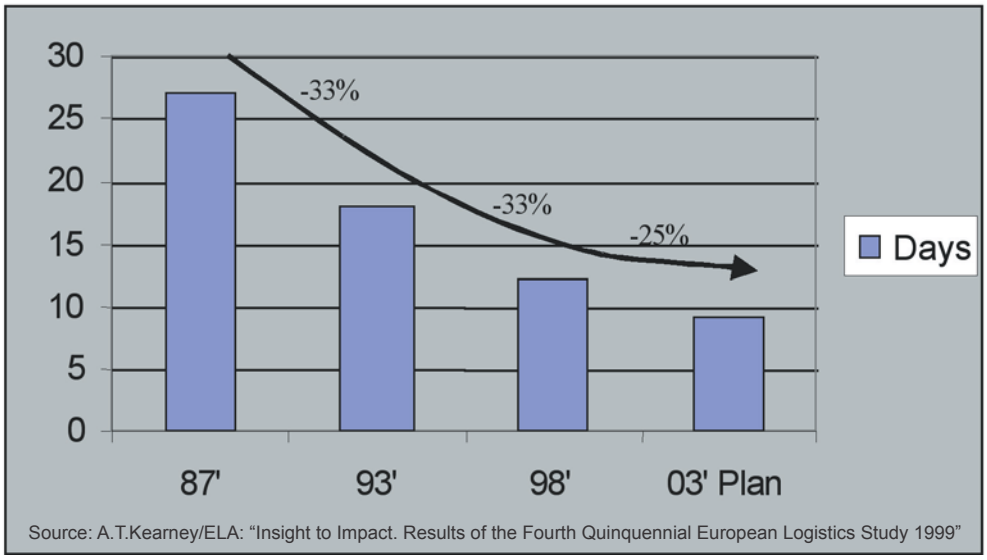


Figure 9.1: Lead reduction over time

❖ Increased efficiency

For the transport operators, ICT systems hold the promise of increased efficiency since they enable better planning, for example through more accurate and timely resource utilisation, optimised schedules and adaptive navigation and routing. For multi modal transport operators, ICT can facilitate the integration of diverse transport providers in the transport chain operating in different modes.

❖ Problem solving

There are many problems faced by freight transport customers that can be addressed by better ICT systems. Problems include, for example: The difficulty of comparing transport costs via different modes of transportation (including sunk costs), he frequent lack of full in-transit visibility of shipments across the entire transport chain, the frequency of delays in the delivery of freight, often partly due to lack of integration of actors' IT systems.

An ICT system typology for the freight transport sector ____ 9.2

In order to structure what is available in terms of ICT for freight transport, it might be useful to divide systems into a few broad categories. Overlaps between these categories are not only inevitable, they should be welcomed as a sign of improving integration of ICT within the sector.

- E-Business-oriented and customer-focused ICT systems

  E-Business-oriented and customer-focused ICT systems are the latest systems historically, and owe their existence to a large extent to the growing popularity and ubiquity of the Internet that has now taken over from EDI as the dominant platform for e-business. Internet-based transport exchanges implementing a variety of business modals (from mere brokerage to full transport responsibility) and sometimes including various interfaces (web/internet, mobile phone/handheld, roadside kiosks, etc) are examples of this trend.

  Customer-focused ICT systems help shippers find appropriate transports and modes, simplify transport-related tasks (such as getting quotes or comparing prices across diverse operators and modes), or, during transport, track bookings and shipments. Many of these functions are available through independent service providers. They are taking responsibility for shippers' transport needs under specific service level agreements. Many shippers are now outsourcing parts or all of their logistics operations to 3PL (third party logistics) providers.
  There are also service providers for a range of ancillary transport functions such as customs brokerage, insurance, financing or warehousing.

- Operational ICT systems (individual actors)

  These systems are the traditional logistics systems operating on the level of one large and usually globally operating forwarder or integrator. They can cover a wide range of functions such resource allocation / fleet management (load units, schedules, transport services), consolidation and sorting of shipments, positioning and navigation, automatic vehicle or load unit identification via RF tags, barcodes, or freight management functions

including re-routing and re-scheduling. Freight transport operators have their own proprietary logistics systems for the various transport functions, before, during and after transport, for example:

- Before transport (e.g., route planning, resource allocation, or documentation for customs clearance or dangerous goods information).
- During transport (tracking and tracing of shipments and bookings, delay and problems, notification of changes to ETA).
- After transport (proof of delivery, administration and financial clearing, benchmarking and statistics)

In general, such systems may be divided into onboard systems and home base systems. To the extent that these systems are integrated this distinction will get increasingly blurred.
Onboard ICT systems can fulfil functions as collecting information about the vehicle or the load, e.g. temperature of cargo or engine parameters, fuel consumption or safety-related aspects, relating the vehicle to the environment, linking the vehicle to the home base (see below).

❖ Fulfil the functions of a mobile office, e.g. send out quotes, confirm bookings or delivery, send electronic documents via EDIFACT or XML standards, communicate with shipper or other actors via voice, email, SMS etc.

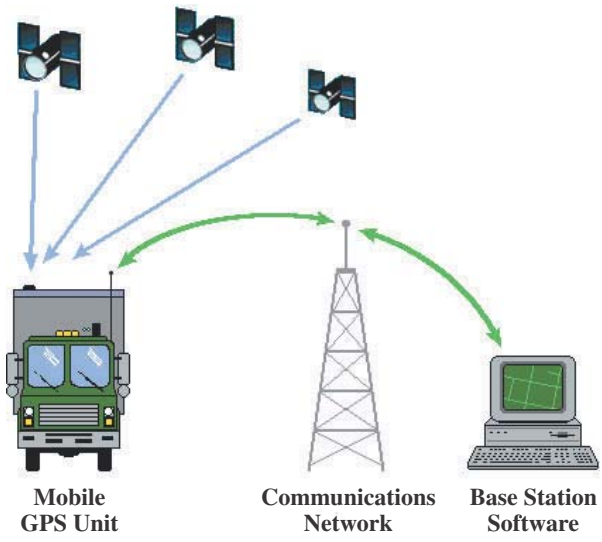


Figure 9.2: Position reporting of a vehicle

Home base systems can cover functions such as:

Route planning, possibly making use of traffic information

- Fleet management
- Communication to vehicles: send information regarding delays or changes, instructions for re-routing or additional transport tasks, or transmit electronic documents
- Communication from vehicle: receive vehicle parameters such as position, speed, load or vehicle status to be fed into the transport management system.

Home base systems can then use vehicle data to improve fleet utilisation, inform operational planning, or aggregate statistical data for strategic planning. They may also support the marketing of certain types of data, such as floating car data to Travel Information Centres or Navigation System Providers.

Operational systems spanning a variety of actors
One sector with particular information and therefore communication requirements is multimodal transport. Currently major efforts are undertaken to overcome the break of the information chain whenever the mode is changed, e.g. from road to rail. This also brings rail back into the picture with otherwise too specialised equipment in comparably small numbers.
Multimodal transport chain management systems (TCMS)[12] are one attempt to link together individual freight operators' logistic systems by using a standard data model and standard message exchange formats to integrate transport functions across various actors and modes in the transport chain.

Proprietary logistics systems that aim at integrating subcontractors and fulfil functions such as messaging and financial clearing may also belong here.
Also into this category belong systems run by transport network operators that employ roadside or railside tags to

12 See the INFOLOG project. http://www.tfk-hamburg.com/infolog or the commercialised version: http://www.logit-systems.com

measure traffic flows or provide vehicle or rolling stock positioning information. Although operated by network operator other actors can also use the data.

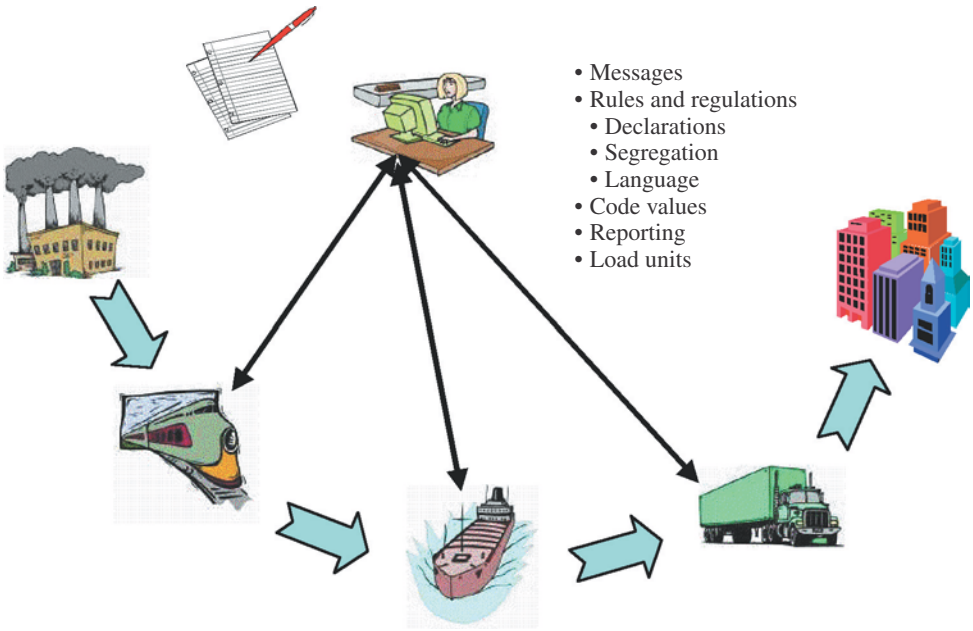


Figure 9.3: Issues related to multimodal transport

Site-specific ICT systems
Such systems will usually be operated at terminal gates, in distribution centres, or at borders.
Possible functions are automatic vehicle or driver identification, e.g. via barcodes, RF tags, or video-based pattern recognition systems. Some ports (Rotterdam) also use biometric techniques for driver identification. In warehouses, ICT systems can link freight scanning (usually barcodes) with other transport related tasks such as sorting, inventory systems, or invoicing and deduction.

Public or private infrastructure / administration systems
This includes systems that implement safety, security or revenue mechanisms and are run by public administrations such as customs or port authorities. They may also be outsourced to private operators or PPPs (Public-Private-Partnerships). Examples dangerous goods declaration or customs clearance systems, electronic fee collection systems for toll roads, or smart-card based functions such has the electronic tacho.

Some customs clearance systems are geared to interface with freight operators (such as Road Air at Schiphol Airport in The Netherlands). Traffic information services offered via public bodies or private public partnerships (such as the Verkehrsmanagementzentrale in Berlin) would also belong here to the extent that they contribute data that can be used by freight transport management.
In the aviation sector, the CDM (Collaborative Decision-Making) approach aims at pooling flight data and make them available also to air cargo operators as well as operators in other transport modes connecting to air transport.

From EDI to XML: Interoperability and standardisation _____ 9.3

EDI (Electronic Data Interchange) has been the technology that held the promise of better interoperability between trade- and transport-related ICT systems.
UN/EDIFACT (EDI for Administration, Commerce & Transport) is the only recognised multisectorial international EDI standard and is predominantly used in Western Europe. It describes a range of standard message formats, including those for documents related to transport (e.g. shipping contract, consignment, bill of lading, proof of delivery, etc.)

Although it is faster, more efficient and more accurate than paper documents systems the main problem associated with EDI and EDIFACT is that electronic documents raise authentication, integrity and confidentiality concerns. The use of digital signatures and digital certificates in fulfilling authentication and identification functions will make electronic documents as legally binding and enforceable as paper documents. Encryption can address confidentiality concerns, although there is still intense debate regarding the right of public authorities to access encrypted documents.

The use of the Internet for trade facilitation is likely to replace EDI in the medium term. An important facilitating role was played by the rapid rise of the XML (eXtensible Markup Language) standard as a means to encode semantic structures pertinent to a domain in a shape that is both machine-readable (well-formed) and human-readable (marked up with meaningful tags). XML has become

the most important data interchange format for e-business. An XML document can be displayed by software (for example, by a standard Internet browser) but it can also be processed by domain-specific applications in the same way as EDIFACT messages. There are now conversion tools such as XML-EDIFACT offers an open path for migration between XML and UN/EDIFACT, turning the complex EDIFACT messages into a human-readable format.

XML has become the basis for the definition of new protocols for platform-neutral interoperability as the widely supported SOAP (Simple Object Access Protocol) that allows remote procedure calls between applications in a distributed environment. Another originally competing standard, ebXML, which also supports more complex aspects such as digital signatures and no-repudiation, will integrate SOAP Into its Messaging Services Specification[13].

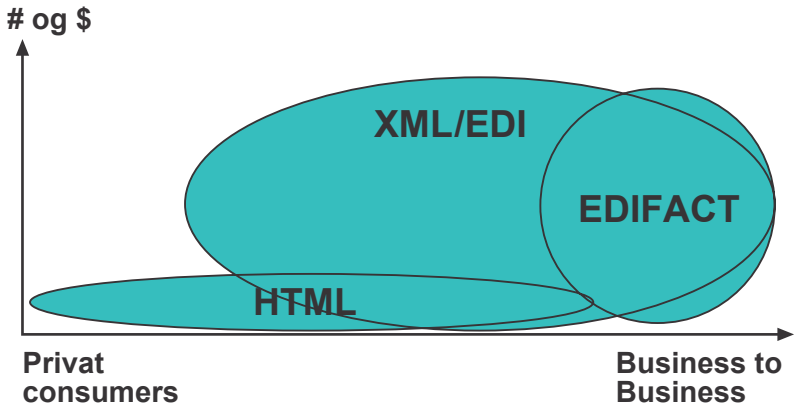


Figure 9.4: Syntax and area of utilisation (source: Per Myrseth/Norwegian Computing Center "introduksjon til xml/edi")

13 ebXML Integrates SOAP Into Messaging Services Specification (2001) http://www.ebxml.org/news/pr_20010222.htm

10. The online questionnaire from Members

Summary 10.1

The online questionnaire from Members revealed not only a range of views but also some consistency in certain aspects. This section will start with the main conclusions and then go into the different aspects in greater detail. All the comments and statistics quoted here reflect the views of those Members who completed the questionnaire.
The first point is the involvement in e-commerce: In general there was a low level of Business to Business (B2B) e-commerce activity. However, in contrast to this, there was a higher level of involvement in e-commerce for logistic activities than expected.
The second point is the factors in which e-commerce for logistics activities are important to businesses: the most important are those dealing with the supply chain and procurement. Least important are its use for contracts. Most interestingly, the cost benefit driver is less than expected.
The third point is that the biggest influence is service capability and the least influence is the capital expenditure.

Members Participating in the online questionnaire: 29 10.2

There was an excellent response to the questionnaire. The first response was within two hours of the e-mail going out to Members, the final responses were within a week of the presentation at Gothenburg (may 18th, 2001).
List of Members Participating:

Diakinisis SA Greece
DSM
Eka Chemicals AB
Exxon
Ewals Cargo Care
F&L
Finnish Railways
Geest North Sea Line
G A Autologistics
Hungarocamion
Imerys Minerals
Johnson & Johnson
LKW Walter
Lloyd Fraser Group
LogIT systems
Marks & Spencer Plc
Polimeri Europa SRL
Road Air
Rohm and Haas
SCA Transforest AB
Schenker AG
SJ Green Cargo AB
SNCB B-CARGO
SNCF Participations
Stora Enso
Transfesa
Veitsch Radex GmbH
Volkswagen Transport
Vos Silo Logistics Oss bv

10.3 Quotations

There was an interesting range of quotations expressing good points of views. Selected Comments from Members:

Comment on Virtual Forwarding

"For me it is a market place where exchange of demand and availability of transport resource become visible and where ordering and execution of transport takes place"

Contrasting Views

"Our company has defined and is developing pilot cases for reasons of learning. I personally foresee rapid deployment in 2-3 years from now".

"There is a lot of "hot air" in that kind of business... many markets have already failed; we are still checking the alternatives".

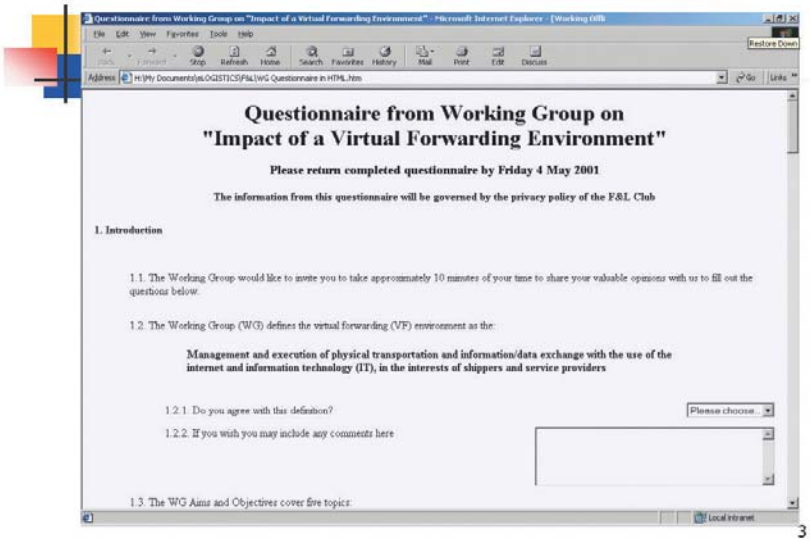
Core Driver

"Better service to the customer"

10.4 Questionnaire Format

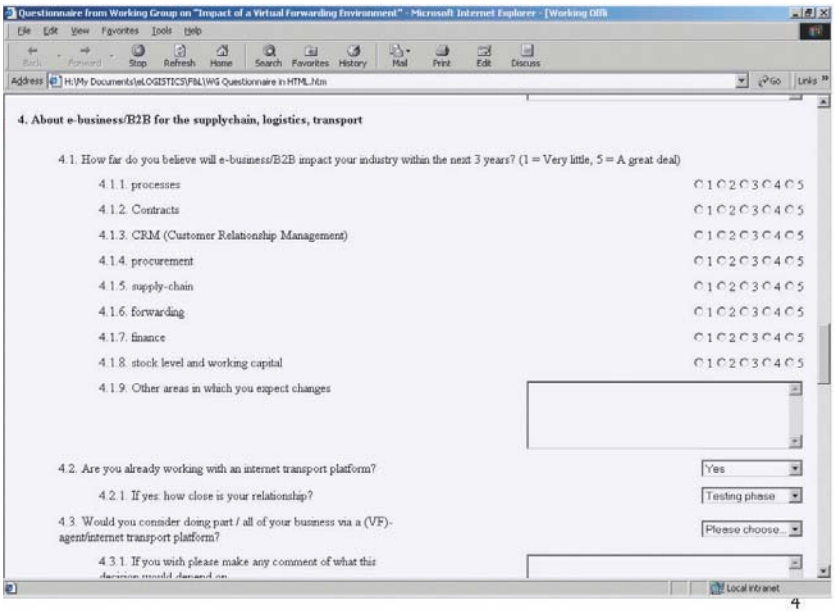
Members were able to access the questionnaire directly on the Internet by clicking on the link.

Online Questionnaire at:
http://www.fracht.org/questionnaire.htm



The questionnaire had a variety of sections. Multiple

choice options, yes / no options, score rating together with free text space for comments and observations.



4

Level of B2B activity: high for logistics _____ 10.5

This section of the questionnaire investigated the involvement of companies in e-commerce over a three-year period (1999 to 2001). In general there was a low level of Business to Business (B2B) e-commerce activity. However, in contrast to this, there was a higher level of involvement in e-commerce for logistic activities than expected. The table below shows that the involvement in logistics grows faster and to a higher level (5-10% in 2001) than for purchasing or sales (5% in 2001).

3: e-business & business to business (B2B)

3.1	Do you exchange operational / commercial information with partners / customers via EDI	Yes 25
3.1.1	What percentage of your total information flow	24%
3.2	Do you exchange operational / commercial information with partners / customrs via email	Yes 27
3.2.1	What percentage of your total information flow	33%
3.3	Do you run a part of your business today as "B2B" via Internet	Yes 18
3.4.1	Do you use "B2B" for Purchasing activities	Yes 10
3.4.2	. for Sales activities	Yes 9
3.4.3	for Logistics activities; (online booking, / track & trace)	Yes 17

8

10.6 Drivers for using e-commerce for logistics

The questionnaire examined the drivers that influenced why e-commerce for logistics activities are important to businesses: The most important are those dealing with the supply chain and procurement, with average scores of 4.0 and 3.8. The least important are its use for contracts, score 2.9. Most interestingly, the cost benefit driver is less than expected, score 3.6.

4.1. How much impact far will e-business /B2B in next 3 years?

		Av	1	2	3	4	5
4.1.1	Processes	3.6	0	4	9	10	5
4.1.2	Contracts	2.9	2	8	10	7	1
4.1.3	C R M	3.3	0	5	11	11	1
4.1.4	Procurement	3.8	1	4	6	10	7
4.1.5	Supply-chain	4.0	0	1	2	19	5
4.1.6	Forwarding	3.8	0	1	7	15	4
4.1.7	Finance	3.0	2	4	13	6	2
4.1.8	Working capital	3.2	2	4	10	7	4

Most important: supply-chain, procurement;
Least: use for contracts

10

4.4: Drivers for using a VF agent or internet transport platform

		Ave	1	2	3	4	5
4.4.1	Costs	3.6	0	1	12	9	5
4.4.2	Speed up information	4.0	0	1	2	20	4
4.4.3	Transparency	3.9	1	2	2	15	7

Cost benefit driver less than expected

12

Enablers for using e-commerce for logistics 10.7

The responses demonstrated that the biggest influence is service capability, (score 4.0) and the least influence is the capital expenditure of becoming involved in a logistics e-commerce activity, (score 2.6).

4.5: Barriers to using a VF agent or internet transport platform

		Ave	1	2	3	4	5
4.5.1	Systems	3.3	0	6	10	10	1
4.5.2	Safety	3.7	1	3	7	8	8
4.5.3	Quality	3.8	1	1	4	14	6
4.5.4	Service capability	4.0	0	2	5	9	10
4.5.5	Business complexity	3.9	0	3	6	10	8
4.5.6	Commitment	3.8	0	2	9	9	7
4.5.7	Lack of know how	3.6	0	4	7	11	4
4.5.8	Ebusiness strategy	3.3	2	4	10	5	4
4.5.9	Capital expenditure	2.6	4	10	7	5	1
4.5.10	Human resources	3.3	2	5	4	15	0

Biggest: Service capability; **Least: capital expenditure**

14

Statistical Analysis of those who responded to the questionnaire 10.8

The logistics data of those who completed the questionnaire covered a range of business sectors and a balance between shippers (12) and carriers (11). {Note: The twenty-two companies in the other category of item 5.1 were mostly third party contractors.

5. Company Logistics Data

5.1	Industrial Sector: Chemical; Steel; Electronics; Agriculture; Pharmaceutical; Other	5	0	1	0	0	22
5.2.1	Is your company a Shipper/ Carrier / Both		12	11	2		
	Average balance Shipper / Carrier		55	45			
5.3	Shipments pa: +1000; +1000;+50000; +100000		2	0	3	19	
5.4.	Percentage: Full Loads; LTL; Groupage;		78	12	10		
5.5	Modal Split: Road; Rail, Sea & Inland; Air		63	20	14	3	
5.6	Percentage outsourcing 0;10; 20;30;40;50	3	3	2	1	1	0
	Percentage outsourcing Ave;60; 70; 80; 90; 100	70	3	0	2	1	11
5.7	LSP %: Regional; Paneuropean; 4PL; Internet		54	45	0.1	0.5	

7

10.9 Learnings from using an online questionnaire

There were very good points of key learning from using an online questionnaire.

- It is easy to e-mail, access and return with a copy sent to the respondent.
- There is the flexibility to acquire quantitative data alongside comments and feedback.
- The comments were included in the report back to the members at Gothenburg.
- There was a general approval of the online method from the members and management.
- A high number of those who responded were also willing to take part in a telephone survey.

10.10 Potential for gathering future case studies, internal and external

The members and management recognized the potential for increasing the depth and widening the scope of companies completing the questionnaire, including those outside the F&L club. The willingness of member to take part in a telephone survey opens up the opportunity to gain a greater insight into their particular case studies. Members have contacts with other companies outside the F&L club whom they could recommend to participate in the questionnaire survey. However given the time and resource constraints of the working group these aspects could not be gathered and incorporated into this report. They remain an opportunity for the future.

10.11 Conclusions

The results of the questionnaire provided factual evidence for the working group. There was a good quality of consistency across the range of views and options.

11. Searching for the right virtual provider - an on-line guide to F&L members

11.1 Introduction

The developments in the sector of e-business are following rapidly, almost to fast to keep up with. Let's take some time to take a closer look at E-marketplaces and their usefulness for European logistic companies. In assignment of the Working Group "Impact Of A Virtual Forwarding Environment", a research project has been conducted to investigate the possibilities of freight exchanges for the members of the European Freight and Logistics Leaders Club.
The guidelines for this project were described in a number of main tasks[14]:

- Analyse and list logistic E-marketplaces by indicating usage, ownership, functionality, etc
- Categorise logistic E-marketplaces by a set of predetermined properties
- Describe the logistical process of a specific logistic E-marketplace.

Provide an online selection support guide for shippers that enables easy selection of best purpose suited Electronic Transport Platforms (E-marketplaces)

The first part offers an explanation to the F&L Matrix. The second and final part gives a conclusion on the investigation of the E-marketplace possibilities for shippers.
In chapter 5 a detailed explanation is given about the terms e-marketplace. The definitions in that chapter are used again to streamline the investigation of current operational freight exchanges.

11.2 Building the Matrix

- Finding information on the Internet

All the information used to build the F&L-Matrix has been taken from web pages.
To get lists of websites I've used search-engines as:

14 Tasks as described in the "Briefing for Student"

Altavista	Google	E-search Excite	Magellan	
DMOZ	Hotbot	Netsearch	Webcrawler	National Directory
Euroseek	Lycos	Searchalot	Yahoo	

The search engines mentioned above were selected because they are among the largest engines available on the Internet. Because of the enormous networks that they were built upon they are most likely to produce functional links. It would probably be too extensive to mention all the search-entries that were inserted into the search-engines to get the final list of websites, because practically all references have been tried. Furthermore, the F&L Matrix as it is now, gives only a limited view of what can be found when searching on the Internet.
A limited view, because this matrix was developed with a lot of fixed requirements. If you set no requirements the possible results of a search for a marketplace via a search engine will be more numerous. Nevertheless, extensive and thorough search efforts have been made to create a piece of documented information.

Only when you start to set requirements to narrow the search area the number of hits diminishes.
The enormously overflowing amount of information on the Internet could be an advantage as well as a problem. The large number of possibilities could be an advantage, because by using the Internet a user has the possibility to access a lot of potentially good e-marketplaces in a short period of time, when the user knows what he is looking for. On the other hand it could be difficult to make a distinction between the sites that meet the user's demand and the ones that do not, because a search-engine that gives only the specific requested information that a user desires has yet to be launched.

Selection Criteria

In accordance with the managers of the Virtual Forwarding Working Group the most relevant features for the F&L Matrix had to be determined. These criteria put together make up the interface of the F&L Matrix. These criteria will now be listed and discussed. Whenever you find a "Not mentioned" reference, this means that there was no data available at that time.

Most website links coming out of a search-engine search are practically just a name and a telephone number that get you nowhere eventually.
The difference between a company that is available on the Internet and a company that is available and accessible in a virtual way could not be clearer.
The first tells you something about the company and that is just what you get, some information on the company and a telephone number or an e-mail address.
The other possibility for every organisation is to do business in a transparent way, so that business will be easy and fast. Bringing in the virtual aspect enables an organisation to cut costs and reshape the business model for future development.

Website

All the websites mentioned in the Matrix are functional and ready for doing business. The websites are mentioned in blue hyperlinks in the Matrix. Using the hyperlinks will take you directly to the website.

Process

The basic processes of e-marketplaces have been explained in chapter 5. Up until now four options for market-process have been selected:

- Auction
- Catalogue
- Exchange
- Reverse Auction

Most commonly found in the Matrix is the private exchange. Although there are some Auctions mentioned, it seems that the transparent structure of the Exchange is being favoured, because the prices are believed to be lower for buyers and reasonable for forwarders.

Ownership

The ownership-column tells the user who, or what type of company, owns or maintains the website. Sometimes a

name is mentioned but mostly you see one of the options listed below.
Options given in this section of the Matrix:

❖ Bank	This website is funded/operated by a bank
❖ Business conglomerate	This website is owned by a group of companies
❖ Co-operation	This website is owned by a group of companies that do not operate within each others branch of business
❖ Foundation	This website is not a commercial enterprise
❖ Private company	This site is operated by 1 commercial company
❖ Other	All of the options not listed above

However, private companies seem to be most frequently mentioned. This is caused by the fact that most e-marketplaces were started up by privately owned IT-consulting companies with logistic backgrounds. Other cases of private companies occur when a company already in business starts up its own website. Yet another option is "Information site". Although these websites are not E-marketplaces, they provide a lot of valuable information on logistic subjects

Type of Load

In this section you can find the different kind of goods/loads the listed companies specialise in.
Abbreviations used in this section of the Matrix

TL	Truckload
LTL	Less than Truckload
CL	Container load
LCL	Less than Container load

Options given in this section of the Matrix:

All goods	Website trades all goods
Bulk	Website specialised in bulk transport
Chemicals	Website has specialised in chemical transport

FCL/LCL	Website trades a combination of both
FCL	Website trades Full Container Loads
LCL	Website trades Less than Container loads
Container 20ft	When a website specialises in handling 20ft containers
Container 40ft	Website specialised in 40ft containers
Container 40fthc	Website specialised in 40ft high cube containers
Hazardous goods	Website trades especially in hazardous goods
Heavy transport	Website specialises in heavy transport
Loose goods	Website specialises in loose goods
Pallets	Website specialises in handling pallet loads
Part load	Website specialises in consolidation
Reefer goods	Website specialises in refrigerated goods
Space/Freight	Website offering freight or space inter-mediation
Tank container	Website specialised in Tank containers
FTL/LTL	Website trades combination of both
FTL	Website that trades full truckloads
LTL	Website that trades less than truckloads

Mode of transport

A number of websites feature all modalities or more than one in an intermodal way of working. Naturally, this does not always have to be an advantage, because sometimes it may be better to focus on one modality and deliver peak performance, than spread your attention over two or more ways of transport and perform poorly. Road transport appears to be the best represented modality in the European transport market. Which is comprehensible when you look at statistics discussing the percentage of road-transport as a part of total transport per country.

Options given in this section of the Matrix:

All	Website has contacts for all modalities
Air	Website provides business for airfreight
Rail	Website provides business for rail-freight
Road	Website provides business for road-freight
Sea	Website provides business for sea-freight

Global Areas

Here you can find the different possibilities for the area a company can be active in.
Abbreviations used in this section:

EU	European Union
US	United States of America

Options given in this section of the Matrix:

EU	Website is strictly focused on Europe
EU/US	Website is strictly focused on Europe and United States
EU/ASIA	Website is strictly focused on Europe and Asia
EU/US/ASIA	Website is strictly focused on Europe, United States and Asia
World-wide	Website has no limitations to area
Not mentioned	Website does not specify area

Language

The more languages are available the more international a site can be deemed to be. Although we stated that a European marketplace should at least have English language as a possibility, there are some sites that are German only, but still worthwhile.
Abbreviations used in this section:

ENG	English
DEU	German
FRA	French

Options given in this section of the Matrix:

ENG only	Website does not support any language but English
German only	Website supports German only
ENG, DEU	Website supports English as well as German
ENG, DEU, FRA	Website supports English, German and French
ENG, FRA	Website supports English as well as French
ENG, others	Website supports English and any language not being French or German

Track & Trace

Although not all sites feature this option right now, I am sure that they will in the future, because it's starting to turn into one of the basic elements for each marketplace.

Options given in this section of the Matrix:

Yes	Website has Track & Trace capabilities
No	Website has no Track & Trace capabilities
Unknown	Track & trace is either not mentioned or not available (yet)

Fee

There are four general options available in the Matrix under Fee right now:
Fixed Percentage
Variable Percentage
Subscription
None

❖ Fixed Percentage
Some sites have chosen to make their money by charging 1-3 % of the total value traded. The fee one pays totally depends on the website owner. There can be a minimum or maximum charge per month or year. The minimum charge often occurs in the form of a monthly/annually subscription. The maximum charge is often related to a minimum amount. For example: After having spent 25,000 Euros on the same website you don't have to pay your subscription for the next year. There are a lot of other bonus opportunities, all depending on the personal liking of the website owner

❖ Variable Percentage
Websites that feature this way of payment work according to the following principle:
A shipper or carrier starts out at point 0, he pays the full price for everything. The more he trades, the more discount he receives, but the fee never gets reduced to zero. Another way for variable percentages to be charged is on basis of the nature of the goods. Percentages tend to be high for dangerous goods and lower for standard run of

the mill goods. This difference is not in the physical aspects of the goods, but in the availability of a carrier of shipper.

❖ Subscription
The word says it all. Companies subscribe for a certain amount and that buys them a certain range of services. Often there are multiple possibilities for the subscription fees. The higher the price, the higher the service-level. Worth mentioning is the fact that subscriptions often come in combination with fees per shipment. Websites that feature this method proclaim that their service levels are better.

❖ None
Although some sites state that they are for free, this is often not the case. The list does not contain any foundations or non-profit organisations and therefore you must expect to pay a certain amount to use the marketplace. Some sites are listed as 'none' in the matrix. That does not automatically mean that they are free of charge, but mostly that they do not mention cost in any way.
However, there is a tendency going on in the US were companies indeed step off fees for the marketplace. These companies charge their members for value added services that can be provided by the same company that provides the marketplace.

❖ Founded
The year of creation gives you an indication of when a site was set up. There are a lot of conclusions you could draw from the year of founding; every one of them as good or as bad as the other. It completely depends on the perspective of the reader what is a good year of construction and what is not. Most articles on E-marketplaces draw the safety line at 1997, but again, safety lies in the eye of the beholder.

11.3 Result of findings - the on-line guideline

The web search's results are illustrated in Appendices I and II.

Sorry. We said worldwide.

www.danzas.com

Logistics. Worldwide.

DANZAS

F&L list for Transport & Freight sites

Website	Process	Ownership	Type Load	Modality	Region	Language	Track & trace	Fee	Founded
www.cargo4you.com	exchange	private company	All Goods	Air	EU	German only	Yes	Subscription+fee	2000
www.cargoreservations.com	exchange	private company	Space / freight	Air	Worldwide	Eng only	Yes	Fixed percentage	1998
www.gf-x.com	exchange	private company	FTL/LTL	Air	EU/USA/Asia	Eng only	Yes	Not available	1999
www.freightgate.com	exchange	private company	All Goods	Air / Sea	EU	Eng only	Yes	Not available	2001
www.aircargoworld.com	xxxxxxxxx	informationsite	All Goods	All	Worldwide	Eng only	Unknown	None	2000
www.cargex.de	exchange	Metis GmbH	FTL/LTL	All	EU	Eng, others	Yes	Subscription	Not available
www.cargoclix.com	exchange	Oskar Schunk KG	All Goods	All	EU	Eng, others	Unknown	Not available	Not available
www.cargohub.com	xxxxxxxxx	informationsite	All Goods	All	EU	Eng, others	Unknown	None	1997
www.cargonow.com	exchange	LSXS	All Goods	All	Worldwide	Eng, others	Yes	Subscription	1995
www.cargoweb.nl	xxxxxxxxx	informationsite	All Goods	All	EU	Eng, others	Unknown	None	2001
www.contingate.de	xxxxxxxxx	Under construction	All Goods	All	EU	Eng, others	Unknown	None	2000
www.demotrans.com	exchange	Loginet	All Goods	All	EU	Eng only	Yes	Not available	2000
www.elogisticsglobal.com	auction	private company	Space / freight	All	EU	Eng only	Unknown	Not available	2000
www.frachnetz.com	exchange	private company	Space / freight	All	EU	German only	Unknown	Not available	1997
www.freightmarket.com	exchange	private company	All Goods	All	EU/USA/Asia	Eng only	Yes	Not available	1999
www.freightstats.com	exchange	private company	All Goods	All	EU	Eng only	Yes	Not available	2000
www.freight-traders.com	auction	private company	All Goods	All	EU	Eng only	Unknown	Variable percentage	2000
www.logistikmarkt-online.de	informationsite	private company	All Goods	All	EU	German only	Unknown	Not available	1999
www.shipahead.com	xxxxxxxxx	informationsite	All Goods	All	Worldwide	Eng only	No	Subscription	2000
www.transp.ro	auction	private company	Space / freight	All	EU	Eng only	Yes	Subscription	2000
www.cargosphere.com	exchange	private company	Space / freight	R/S/A	EU/USA	Eng only	Unknown	Fixed % / amount	1999
www.3t-cargo.com	exchange	GHP GmbH	FCL	Road	EU	Eng, others	No	Not available	2001
www.aktuell3000.de	exchange	Johan Hackl	All Goods	Road	EU	German only	Unknown	Not available	2001
www.benelog.com	exchange	Daimler Chrysler a.o.	All Goods	Road	EU	Eng only	Unknown	Fixed percentage	2001
www.bestrado.de	auction	private company	Pallets	Road	EU	German only	Unknown	Variable percentage	2000
www.blotec.com	exchange	private company	FTL/LTL	Road	EU	German only	Unknown	Subscription	2000
www.box24.de	exchange	private company	FTL/LTL	Road	EU	Eng, others	No	Not available	2000

Website	Process	Ownership	Type Load	Modality	Region	Language	Track & trace	Fee	Founded
www.cargo4u.com	exchange	private company	FTL/LTL	Road	EU	German only	Unknown	Subscription	2000
www.cargodirect.de	exchange	private company	Space / freight	Road	EU	Eng, german	Yes	Subscription	Not available
www.cargomaster.de	exchange	private company	FTL/LTL	Road	EU	Eng, german	Unknown	Subscription	2001
www.cargomile.com	exchange	private company	Space / freight	Road	EU	Eng only	Yes	Subscription	2000
www.cargopool.de	exchange	Karl Fixemer gmbh	FTL/LTL	Road	EU	German only	Yes	Variable percentage	2001
www.cargorent.de	exchange	SALT AG	FTL/LTL	Road	EU	Eng, others	Yes	Not available	2001
www.delego.com	exchange	private company	Space / freight	Road	EU	Eng, others	Yes	Variable percentage	2000
www.digitalfreight.com	exchange	private company	FTL/LTL	Road	EU	Eng only	Yes	Not available	2001
www.drive.to/frachtboerse	exchange	other	FTL/LTL	Road	EU	German only	No	Not available	2000
www.eurodat-services.com	exchange	private company	FTL/LTL	Road	EU	Eng, others	Yes	Not available	2001
www.eurotrans.com	exchange	Fiscalc Inc.	FTL/LTL	Road	EU	Eng, others	Yes	Not available	1996
www.frachtmarkt.de	exchange	private company	FTL/LTL	Road	EU	German only	Yes	Fixed percentage	Not available
www.freecargo.com	exchange	Loginet	All Goods	Road	Worldwide	Eng only	Yes	Fixed percentage	1997
www.freight-online.com	exchange	private company	FTL/LTL	Road	EU	Eng, others	Unknown	Not available	Not available
www.haulage-links.ie	exchange	private company	FTL/LTL	Road	EU	Eng, others	Unknown	Not available	1998
www.interspeed.de	exchange	Dienstleistungsbörse	FTL/LTL	Road	EU	German only	Unknown	None	1998
www.leertour.de	exchange	private company	All Goods	Road	EU	German only	No	Not available	2000
www.lkwonline.de	exchange	private company	FTL/LTL	Road	EU	Eng, others	No	Not available	1998
www.spedi.de	exchange	private company	FTL/LTL	Road	EU	Eng only	No	Variable pricing	2000
www.svg-frachten.de	exchange	private company	FTL/LTL	Road	EU	German only	No	Not available	2001
www.teleroute.com	exchange	private company	FTL/LTL	Road	EU	Eng only	Unknown	Subscription	2000
www.timocom.de	exchange	Wolters Kluwer	All Goods	Road	EU	Eng, others	Yes	Not available	1998
www.auctioncargo.com	auction	private company	All Goods	Sea	EU/Asia	Eng, others	Unknown	Not available	1999
www.cyvoyage.com	exchange	private company	Not available	Sea	Not mentioned	Eng, others	Unknown	Not available	1999
www.freight-on-line.nl	exchange	ShortSea shipping	FCL	Sea	EU	Eng, others	Yes	Not available	Not available
www.glomap.com	exchange	private company	FCL	Sea	Worldwide	Eng, others	Yes	Not available	2000
www.levelseas.com	exchange	private company	Bulk	Sea	Worldwide	Eng only	Unknown	Not available	2000
www.netshipbrokers.com	exchange	P. Nomikos & Co	All Goods	Sea	Worldwide	Eng only	Yes	Subscription	1997
www.shipbestway.com	exchange	private company	All Goods	Sea	Worldwide	Eng only	Yes	Subscription	1999
www.ql-net.com	exchange	Mediaway	FCL	Air / Sea	Worldwide	Eng, others	No	Not available	2001
www.nedcargo.com	exchange	private company	Bulk	Air / Sea	EU/Asia	Eng, others	Yes	Fixed percentage	2000
www.onlinecargo.co	exchange	private company	All Goods	Air / Sea	Worldwide	Eng only	No	Fixed percentage	2000
www.ogenet.com	exchange	private company	FCL	Road / Sea	Worldwide	Eng only	Unknown	Not available	2000

Appendix II Not Suitable Logistic Websites

Not Suitable Logistic Websites

List of websites that are not marketplaces	
3PF.COM / ComAlliance	Not a marketplace
Agfreight.com	Not a marketplace
Air Menzies International	Not a marketplace
Airbill.com	Not a marketplace
Airfreight Quotes - Online	Not a marketplace
Arnold Logistics	Not a marketplace
ASD Systems (ASDS, news, profile)	Not a marketplace
Auction Broker	Not a marketplace
Bender Warehouse Company	Not a marketplace
Cargosave	Not a marketplace
Celarix	Not a marketplace
Cyber Freight	Not a marketplace
Cyntric	Not a marketplace
Debra-Hughes	Not a marketplace
Ditan Company	Not a marketplace
DSC Logistics	Not a marketplace
dVault.net	Not a marketplace
eFr8 Freight Matching Service	Not a marketplace
ElbeeNet	Not a marketplace
e-NITED Business Solutions	Not a marketplace
eTrac.net	Not a marketplace
Freight Dynamics Inc.	Not a marketplace
Freight Manager	Not a marketplace
Freight Savers Express	Not a marketplace
FreightDesk.com	Not a marketplace
FreightGate	Not a marketplace
FreightMatrix.com	Not a marketplace
freightPro.com	Not a marketplace
Freightquote, LLC	Not a marketplace
Freight Vision	Not a marketplace
From2.com	Not a marketplace
Intermail Same Day Shipping	Not a marketplace
Last Minute Air	Not a marketplace
LOG.NET	Not a marketplace
NowDocs	Not a marketplace
Quoteship.com	Not a marketplace
Roadrunner	Not a marketplace
Romanian Logistics Stock Market	Not a marketplace
sealink globle logistics net	Not a marketplace
Ship Net	Not a marketplace

Ships for Sale	Not a marketplace
Ship-search.com	Not a marketplace
The Web-Editors freight page Webex	Not a marketplace
Transportation Management	Not a marketplace
Transportation Services and Logistics Consulting	Not a marketplace
Transportation.com	Not a marketplace
TranspoWap Free Freight Exchange	Not a marketplace
USF Worldwide Logistics	Not a marketplace
Webfreight	Not a marketplace
WebShipper	Not a marketplace
www.cargo-agent.com	Not a marketplace
www.delego.com	Not a marketplace
www.loginet.nl/freecargo	Not a marketplace
www.logisped.com	Not a marketplace
www.logistikinfo.de	Not a marketplace
www.logistiksoft.com	Not a marketplace
www.lv-sachsen.de	Not a marketplace
www.nolis.com	Not a marketplace
www.nordtrans.com	Not a marketplace
www.pkaimex.de	Not a marketplace
www.removal.com	Not a marketplace
www.spedition.de	Not a marketplace
www.stoffstrom.de	Not a marketplace
www.trans-net.de/cargoroute	Not a marketplace

List of Non-European websites	
American Airlines Priority Parcel Service	Non-European area
American Delivery Service	Non-European area
Bid Freight	Non-European area
Carriers' Co-Op	Non-European area
Copera	Non-European area
Direct Freight	Non-European area
Directsite Corporation	Non-European area
DownRiver Logistics Group	Non-European area
eDigital.com	Non-European area
e-fulfillment.com	Non-European area
Expedite Loads.com	Non-European area
Freight Search Australia	Non-European area
FreightLand.com	Non-European area
Freight-Online	Non-European area
Freight-Search (Australia)	Non-European area
Hub Group Inc.	Non-European area
Internet Truckstop	Non-European area
Pacific Coast Tariff Bureau	Non-European area
PostOnce.Net	Non-European area
Shipping-Auction.com	Non-European area
ShippingFinder	Non-European area
ShippingFreight.com	Non-European area
Teamsters Trucking	Non-European area
Trans Modal Inc.	Non-European area
Ubidfreight.com	Non-European area
UQuote Freight.com	Non-European area
UrgentFreight	Non-European area
US Transportation Services	Non-European area

List of websites that are no longer available	
Action Transport Inc.	Website no longer available
AFC Shipping Company	Website no longer available
AFC Trucking & Freight Services	Website no longer available
Brennan International Transport	Website no longer available
Mercer Available Freight	Website no longer available
NeoModal.com (NeoModal)	Website no longer available
European Freight Exchange	Website no longer available
Free Translog	Website no longer available
Routes Transport	Website no longer available
Tarros	Website no longer available
www.drive.to/Frachtboerse	Website no longer available
www.fracht-24.de	Website no longer available
www.wevegotfreight.com	Website no longer available

List of Non-English websites	
www.aktuell300.de	Non-English website
www.bwv.de	Non-English website
www.computerfrachtenboerse.de	Non-English website
www.dbstv.de	Non-English website
www.eulox.net	Non-English website
www.eurofracht.com	Non-English website
www.frachtboerse.de	Non-English website
www.frachten.com	Non-English website
www.frachten24.de	Non-English website
www.intercargoline.de	Non-English website
www.intercourier.de	Non-English website
www.interspeed.de	Non-English website
www.kaufgasse.de	Non-English website
www.kurier.com	Non-English website
www.ladex.de	Non-English website
www.transp.ro	Non-English website
www.transport2010.de	Non-English website
www.transportbetz.de	Non-English website
www.transport-logistik.com	Non-English website

List of websites that are out of business/can't be opened	
BidToShip.net Inc	Out of business
Connextions.net	Out of business
2000Logistics	Unable to open
3Plex.com	Unable to open
Cargo4less.com	Unable to open
CargoNet.com	Unable to open
Electronic Freight Exchange	Unable to open
eShip.com	Unable to open
Geotrans (also in Russian and Rumanian)	Unable to open
iLink Global	Unable to open
Lone Star Freight	Unable to open
Online_Freight	Unable to open
Sea Freight Auction	Unable to open
Trans-Logistic	Unable to open
www.cargoservice.sk	Unable to open
www.cargoswitch.nl	Unable to open
www.fas-web.de	Unable to open
www.stutensee.com/rwr	Unable to open

Appendix III Terms and Definitions

Terms and definitions are partially adopted from the document "*The impact of electronic commerce on managing the supply chain*" of the F&L working group.
The working group "The Impact of Virtual Forwarding" has taken a closer look at the marketplace environment and re-defined some of the definitions concerning this area. Others remain unchanged.
To have general understanding of the concepts used in this report, this list will state the definitions of these concepts in alphabetic order:

3PL	Third party Logistics - Logistic Service provider for one or multiple tasks in the logistic chain.
4PL	Fourth Party Logistics - Service Provider that integrates all logistic processes.
APS	Application Systems Provider - manages and distributes software-based services and solutions to customers across a wide area network from a central data center.
C-Commerce	Collaborative Commerce - Software that aggregates fragmented buyers and/or sellers to increase a market's efficiencies beyond the exchange of goods.
CDM	Collaborative Decision Making - initiative aimed at improving traffic management through increased information exchange among the various parties in a community and improved automated decision support tools.
CRM	Customer Relation Management.- Business model that places the customer at the center of all corporate initiatives. The adoption of CRM necessitates the re-engineering of systems, data and processes to ensure all customer information is being used to the customer's best advantage.
E-Business	Electronic Business - Sharing business information, maintaining business relations and conducting business transactions electronically.

E-commerce	Electronic Commerce - The application of advanced information technologies to improve efficiency and effectiveness within the business process.
EDI	Electronic Data Interchange - System that enables inter-organisational, computer-to-computer exchange of large amounts of sensitive information in a secured environment.
EDIFACT	Electronic Data Interchange for Administration, Commerce & Transport - A system that could enable the paperless office
E-markets	Electronic marketplaces - Online intermediaries that bring together several buying and selling parties and facilitate the transactions of goods and services between those parties.
E-marketplace	See e-markets.
E-Procurement	Electronic Procurement - Used to exchange information, to automate transactions and to link information systems. It allows every employee to directly participate in the purchasing process.
ERP	Enterprise Resource Planning - System that allows large companies to manage inventory and integrate back-end processes.
ETA	Estimated Time of Arrival.
Freight exchange	Marketplace strictly used for trading freight.
GPS	Global Positioning System.
ICT	Information & Communication Technology.
IT	Information Technology.
ITCMS	Intermodal Transport Chain Management System.
ITS	Intelligent Transport System.
LSP	Logistics Service Provider.
M-Commerce	Mobile commerce - The next frontier for B2B. Building the tools and infrastructure to stay in touch constantly with customers and employees through wireless

	devices such as cell-phones and personal digital assistants.
Portal	Web ports that serve as front ends by creating, installing and hosting personalised applications for customers or employees and aggregating links to relevant content and websites. A classic example is Yahoo!.
PPP	Public-Private Partnership.
PRM	Partner Relation Management.
RDBMS	Relational Database Management System
RFQ	Request For Quotation.
RF tags	Radio Frequency tags - wireless communication devices that have exceptionally long range, vary in size, and can be designed to identify and locate or monitor items for inventory and asset tracking.
SCM	Supply Chain Management - System that effectively co-ordinates and manages supply chain processes, as quickly as possible and at the lowest costs without deteriorating product quality or customer satisfaction.
SMS	Short Message Service - Service provide by telephone companies.
SOAP	Short Object Access Protocol.
TNO	Research bureau in the Netherlands.
WAP	Wireless Application Protocol.
XML	eXtensible Markup Language - a metalanguage that allows businesses to talk to each other over the web. The most important factor in XML's success is that it includes standards that allow backend systems integration.

Appendix IV Article on 4PLs

Just What Is a 4PL Anyway?
By Kurt C. Hoffman - August, 2000, Global Logistics & Supply Chain Strategies

Consultants and 3PLs differ on whether the trademarked term is a distinction without a difference, but they agree that there is a real need for a "supermanager" to run a company's logistics, knowledge base and IT systems.

You will get no argument that the increasing complexity of logistics management coupled with the explosion of information technology has created fertile ground for a "supermanager" of sorts for intricate supply chains. Moreover, academicians, consultants and third-party logistics providers, not to mention customers, say that the need for such an entity is growing all the time. Its job: to supervise all aspects of the supply chain of a manufacturer or distributor and to be the sole point of contact between that company and its array of logistics and information service providers.

What gets the hairs bristling on the necks of the 3PLs and consultants is when you start to narrow down who is more perfectly suited for the supermanager's role. And there are sensitivities at work here. For example, using the term "4PL" - for fourth-party logistics provider - instead of the more palatable handles of "logistics integrator" and "lead logistics provider" rankles the 3PLs to no end. That is particularly so when the 4PL concept is presented as a product from, and the holy ground of, the consulting firms. It certainly derives from that community; 4PL was coined and trademarked by Andersen Consulting. On the other hand, consultants take umbrage to the charge that they have attempted to manufacture a market by coining, trademarking, and then relentlessly flogging the future of the 4PL. An old-fashioned turf battle is brewing. And you don't have to scratch too far below the surface to get a reaction, particularly from the 3PLs that have invested in technology, human resources and alliances in order to present a single point of contact for operation of a customer's supply chain. Those leading firms include Menlo Logistics, Ryder System, Federal Express, UPS Logistics, GATX Logistics, Exel and Schneider Logistics.

But first, here's the deal from the Andersen side of the equation, according to James W. Moore, an associate partner with Andersen Consulting.

"The pace of change has been accelerating, the complexity has been accelerating, and our sensation - and we're not alone in this - is that there's a role emerging for a complexity manager," says Moore. This complexity manager - call it a 4PL or logistics integrator or lead logistics provider or supermanager - would be, in Moore's words, an "on-purpose entity with shared risk/reward and would have multi-function management responsibility, including supply-chain planning, some information technology capabilities, the more traditional transportation and distribution disciplines, and a multi-provider management function."

That's what Andersen is doing in the United Kingdom, Moore says, where it is serving as a 4PL for Thames Water. "That's a cooperative venture where we perform their supply-chain operations for them. They are the largest water utility in the U.K."

Expanding into the 4PL role constitutes an interesting shift for Andersen, as the consultancy's general position has been on the front end of a logistics solution: The troops typically go in to a customer location, collect information, perform due diligence and provide a white paper solution. A logistics firm usually then manages the business.

The leading 3PLs have a different take on the 4PL phenomenon. "The 4PL to me is nothing more than the lead logistics provider, and that name has been around for quite some time," says Rodger Mullen, vice president and general manager of Schneider Logistics.

The root of the issue, says Mullen, is that whenever service providers go into a logistics outsourcing project, the customer these days essentially wants one company and one point of contact to do it all. "However, given the way logistics organizations exist today, there isn't really one company that has all the core competencies to do everything that a truly global customer wants to do. In order to get to that total end-to-end solution, the lead logistics provider or

4PL in essence contracts with different providers, assembles those end-to-end solutions, manages them and serves as the single point of contact to the shipper." Schneider has been providing that comprehensive, single-point-of-contact service for GM's Service Parts Division and has several other irons in the fire, Mullen says.

"There's a lot of talk about how the concept of the 4PL developed, but one theory is that the consulting firms really wanted to figure out a way to create an ongoing revenue stream to supplement their project work, and therefore they coined the phrase 4PL, which basically meant that they were going to manage the 3PLs on a continuous basis for a client such as a manufacturer or distributing company," offers Todd Carter of GATX. "That's maybe the more cynical theory. The more optimistic theory is that because of the growing criticality of information in managing the supply chain, it was a natural progression."

Jim Fields, director of business development for Menlo Logistics, sees it this way. "The 4PL terminology has grown out of the consulting industry in what I think was really an attempt to create a market and position the company as the logical party between customer and the 3PLs," says Fields. As that go-between, the 4PL would be in position to manage what many consider is the most important aspect of the operation - the customer relationship.
On the practical front, however, Fields questions the need for an additional player here. "I don't think the 4PL role references anything more than what 3PLs and some of the largest integrators have been doing - being the single point of integration of information flow and operational responsibility for an entire enterprise or a defined portion of that enterprise," he says. Menlo provides re-engineering services, performs systems integration and subcontracts with and manages third- party service providers for a number of customers, he says. "And if the scope of your outsourcing contract is such that you will be acting as the sole conduit or the sole responsible party for the outsourcing of this scope of work and are the sole point of responsibility back to the customer ... well, if you want to call that 4PL or 5PL or systems integrator, the principle is the same, the responsibility is the same, and the operation is the same."

Bringing another company into the mix as a "superman-ager" of sorts raises the cost-versus-value question, says Fields. "This puts another layer of cost into the supply chain, and the challenge is to understand what kind of value is created by having this other group aside from the 3PLs. Does this company bring enough value to justify itself? I don't think it does."

Emerging Competencies

Prof. John H. Langley, Dove Distinguished Professor of Logistics at the University of Tennessee, understands the friction between the 3PLs and consultants, but he sees a new demand developing in the logistics arena as changes in supply-chain practices cause supply-chain managers to place value on three emerging competencies. One competency is in managing the activities of more than one third-party logistics provider, and there are both operational and strategic elements to this, he says.

A second competency is managing the availability and utilization of knowledge. "The natural reaction of most people is to say, `I can be responsible for my own knowledge, thank you,' but I think, given how quickly things are changing today, that it's not unreasonable to actually hire an expert to manage the knowledge - to process information, utilize it and make it available - in the same way you might have legal counsel to make you aware of the latest developments of a legal nature that impact your business."
The third competency focuses on information technology. "Things are changing so quickly today in the IT sector that you really have to have not only a capable party but one that has core competency in knowing what systems are available and how to utilize and integrate those systems with other capabilities."

These three competencies clearly exceed what might normally be expected from a 3PL, the professor explains. "That in my mind would justify the business case for a fourth-party provider," says Langley. "The question that comes up is - and it's a valid question from a customer firm or a 3PL - am I suggesting they cannot do these things themselves? I'm

not suggesting that, but I'm suggesting that certain competencies are needed. If you are a 3PL and you have them, great, you should be going full speed ahead." He adds that no reason exists why a 3PL could not bring these competencies into its service portfolio by subcontracting. Andersen clearly hopes to see a fruitful market for consultancies in the 4PL arena - at least for their consultancy - but backs off from confrontational language and talk about a turf war.

"I don't see it as a struggle between the consultants and the 3PLs, and we certainly don't view ourselves as competitors to 3PLs," says Moore. "With a new role like the 4PL, a role that is mostly global, information technology rich, asset-free ..... I don't think that puts us in conflict with 3PLs. We're consultants."

The key thing that is happening in the supply chain is that time now is often more important than geography, he explains. "The management of time and the associated optimization of the use of time throughout a supply chain is oftentimes a skill set provided by information technology people and consultants, more so than the third-party logistics firms have in past," he points out. "Certainly the 3PLs are catching up, but the primary role we see for the 4PL is the management of complexity and time."

"We all agree in this business that information has become as important and sometimes more important than the actual physical movement of the product," says Todd Carter of GATX. "Information on orders, on inbound material, on shipment accuracy, inventory control ... all of this is highly critical information. And as that information becomes even more critical, the reliance on information itself and the systems to manage it has become increasingly more important, which has really led to this role of a logistics integrator."

Carter acknowledges that a 4PL/logistics integrator could be either a consultant or the lead logistics provider, depending on the customer's most pressing needs. "The role of the lead logistics provider is knitting together for a manufacturer or distributing company the services of various transportation and warehousing companies and third-

party service providers," he says. "The first question we have to ask is whether there is potential value in a company acting in the role of a lead logistics provider or 4PL."

If one thinks that the answer to that question is yes, as Carter does, the next consideration is who might be best positioned to be of value to particular manufacturers and distributors. "Certainly 3PLs bring the advantage of operating experience: We've lifted the boxes and kicked the tires, we know how things are supposed to operate and we know what to do if operations break down. But, typically, compared to the consulting firms we may be weak on management talent, organizational talent or process re-engineering. So depending on what you're after from a 4PL, you might look one way or the other."

Clearly the first and foremost mission of a 4PL would be to integrate the information and operations, he says. "Whether the second mission is to provide some management organizational talent or really hit on productivity and quality within the operation probably would drive who would do a better job as a 4PL, the former being a management consultancy, the latter being one of the top 3PLs that is entering the 4PL market."

Menlo's Fields responds to suggestions that the consultancies are better positioned to handle the information flow and to oversee system re-engineering by pointing out that his company and the leading 3PLs have brought new talent into the equation through hiring and via alliances. "We have some of the best consultants in the world ... engineers and Ph.D.s and MBAs ... and these people are just like the people who work for the consulting firms. And consulting firms have engineers who are very competent people," says Fields. "The difference between us and a big consulting company is that whenever we are asked to consult, we generally are asked to operate. And that's a key differentiation. I'm not out there arguing that we should be hired ahead of consulting companies, because we work directly with consulting companies. I will say that we have this added advantage: When we consult for our customers, we also have to operate and manage the solutions, so our solutions have to be very credible."

Schneider also has brought more consulting talent in-house, according to Mullen. "We've really beefed up ourr engineering staff, so when we get a proposal, we are able to go to the possible customer's site and collect data and information and really come up with what we call our own solution and one that we feel has integrity on the operation front," he says. "And we've grown our engineering staff to be consultative in nature, not only on the front end. As you start managing the business, there are other opportunities as well."
Langley doesn't foresee a single provider type emerging as the only or even the best kind of provider of 4PL/logistics integrator services. It will be a mix of 3PL-type firms and consulting firms, he says, and he would not rule out the technology sector itself as becoming the provider of 4PL services. "Think about it: When you have the Ernst & Youngs, the Andersens and the Deloittes positioning themselves as potential 4PLs alongside the operating companies like Ryder and Exel, there's no reason why you couldn't have Manugistics or i2 Technologies emerge in a 4PL role," he says. "We also have some of the e-commerce type of companies that are bordering on providing those kinds of services as well. The leadership could come from a number of directions, and probably over the long term, we will see the direction established by multiple types of providers."

Fields agrees. "This is a huge market, and the projects are going to take all different kinds of shapes and forms and structures," he says.

Moore indirectly acknowledges that the movement from designing solutions to managing programs constitutes a significant shift within Andersen. "The lines between a lot of providers are blurring, and I think many consultants are trying to take a longer operating role in the supply chain," says Moore. However, he points out that the leading 3PLs haven't exactly been passive in the current logistics environment when it comes to forging new alliances and business relationships and might well be qualified for the 4PL role in certain logistics operations.

"In logistics today there are a lot of relationships among competitors where they have come together in alliances to

work for a particular customer," says Moore. "You end up partnering with a variety of people in this space now. The supply-chain space with the addition of the e-economy is getting very complex, so you have a classic cohabitation."

Logistics outsourcing is becoming analogous to the information technology sector of the economy, he explains. Alliances and joint ventures are more prevalent in the IT sector, but as the supply-chain sector becomes more information-rich and thus more akin to the IT world, it's natural to expect a progression of alliances and joint efforts, says Moore. And while alliances often are difficult to work with (and ownership of client relationships remains an issue), he says, they are a necessary evil, a faster way to get capability on board an enterprise.

"In IT outsourcing, there's a concept that has been developed over the past 10 years related to best of breed," says Moore. "Depending on the supply-chain situation and the weight and importance of the discipline you bring to the party, the overall manager serving the role of the 4PL in a best-of-breed contract could be a consultancy or it could be an asset-free associate of a 3PL. Some of the very large 3PLs are developing some pretty strong capabilities."
The most successful high-tech firms are rich with alliance relationships that include companies that often are direct competitors with each other, Moore points out. "And if you look at the 3PL landscape, they are developing a large suite of alliance relationships as well. There's an increasing maturity in the entire industry."

Several of the leading 3PL firms have achieved 4PL/logistics integrator relationships with a select customer or two, but the concept remains largely theoretical in nature.

"It's a tough sale," admits GATX's Carter. "One of the things that a 4PL's client gives up when they enlist the services of a 4PL is the day-to-day touching of providers, so it's really a leap of faith for somebody to go to a systems integrator and basically relinquish control and contact with the logistics service providers - the transportation companies, warehouse companies, freight payment service firms, packaging specialists - that make the supply chain work. In

a true systems integrator environment, that contact goes away and is managed through the integrator/4PL."

From the more candid customers, 3PLs hear about other considerations. "The natural business argument from the manufacturer's perspective is that the 4PL scenario can create tremendous exit barriers," Carter says. "These customers ask, 'How can you get rid of an integrator or 4PL when they basically own the commercial relationship with the service providers?' There are some important decisions involved here."
Looking into the future, Langley sees two things happening. "We will see the emergence of some relatively comprehensive providers that have the ability to provide the needed information technology and knowledge as well as access to a wide range of logistics services, and these comprehensive providers will give customers truly integrated packages.

"There also will be a continued market for highly focused niche kinds of operations of all types, particularly in transportation and warehousing. If you look at the marketplace in one respect you might think that if the larger companies have their way, there won't be room for anyone else. But I think just the opposite will be true. As the large companies improve their capabilities, that will actually do two things: improve the market position of those companies, and create a lot of identifiable niches where more specialized services are needed."

This might develop along the lines of the tier system in the automotive industry, he suggests. "You might find some of the Tier II and III companies providing valuable services to the 3PLs directly and may have customer bases of their own."

The logistics business is ripe for change, Langley adds. "Five or 10 years ago, we thought there were some identifiable directions for the logistics business. But right now the logistics arena is such an exciting environment, and there are so many different types of opportunities. If you look at the extent of the investment capital being ploughed into some of the large firms - Federal Express, Ryder, UPS, Menlo, Exel - a lot of companies are trying to take a huge position in the marketplace."

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