Electronic Logistics Marketplaces Research Report

Cardiff University Innovative Manufacturing Research Centre

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- Descartes Systems
- Infor
- JDA Software Group
- Translogistica

Contents

1. Introduction

1.1 What are Electronic Logistics Marketplaces (ELM)

ELMs provide a low cost means to improve the flow of information between the three parties involved in a shipment – the shipper, the transport company and the customer – through the use of information and communication technology (ICT).

ELMs are one of a range of collaborative approaches to managing the movement of freight in a more efficient, and ultimately more sustainable, way. Broadly speaking these approaches concern either “hard structure” (logistics facilities that physically handle freight) or ICT based collaborations. Figure 1 illustrates one way of understanding how these different approaches relate to each other, and also distinguishes between “open” and “closed” approaches.

Open collaboration allows participants to freely collaborate without having formal entry requirements. A Consolidation Centre for example could accept shipments from any carrier before consolidating the goods and sending them on further down the logistics pipeline to various locations and clients. An example would be freight consolidation centres, often set up by local authorities, on the edge of a large retail centre.

In contrast a Regional Distribution Centres (RDC), a form of closed collaboration, might receive goods from many but only forward the goods on to a single client. The obvious example would be supermarket RDCs.

In the case of ICT platforms an open systems adopts “many-to-many” transactions and utilises either fixed or dynamic pricing. Any shipper or carrier can join and use the system as often as they like and a good example of this type of approach is found in the many online freight exchanges now in existence.

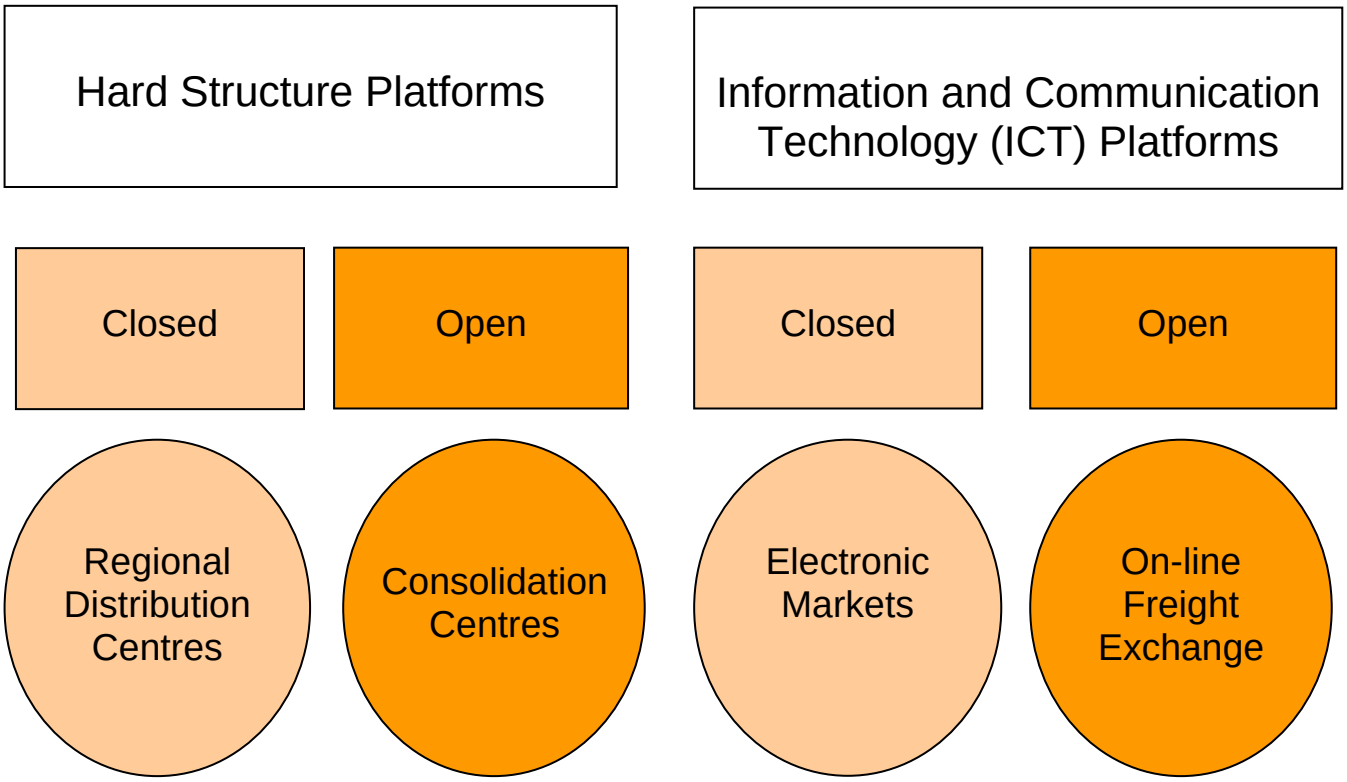
In a closed ICT platform – the Electronic Market Place (ELM) - membership is only available to those who are *invited* to collaborate. Often, this means that contracts already exist between the shipper and carrier and the customers are usually long-term and actively involved in the logistics process. By using ELMs it is possible to improve the efficiency of transport operations and levels of customer service while also reducing transport costs.

Rather than focusing on the selection and identification of potential partners for spot transactions, as in a freight exchange, ELMs focus more on “transport planning and execution” where transport rates are usually pre-defined through contracts. One of the partners will usually act as the “lead” partner in any ELM.

There are two different ways in which ELMs can be configured:

- In-house – the lead partner invests in both the server and database infrastructure, as well as in the software to support the ELM. This may then be highly customised to the specific needs of the leader.
- Hosted – the ELM is in effect managed by an outside party that retains control of the software and provides the infrastructure necessary for the operation. It usually only requires an internet connection for the shipper, carrier and customer to get access to the system.

Figure 1: Context of ELMs within Freight Management



1.2 Who should use this Report?

This Report will be of benefit to the following people who may be involved in establishing and operating an ELM:

- Transport managers
- Transport buyers
- Supply chain managers
- IT department staff wanting to understand collaborative working within the logistics sector
- Marketing and Sales staff looking to gain competitive advantage

Because the use of an ELM is not just limited to the transport operator, this guide is aimed at both users and providers of transport services. As the use of technology becomes more widespread, there is the opportunity to share increasing amounts of information along the supply chain. ELMs represent one way in which this can be achieved

1.3 Other sources of information

ELM is one of the many ICT applications in freight transport, and often links with other systems and technologies being used within the supply chain. For example, information on loads will often be obtained from Computerised Vehicle Routing and Scheduling (CVRS) systems, while vehicle telematics may be used to monitor the progress of deliveries. A number of complementary Best Practice Guides have been produced, and are available through the **Freight Best Practice** website or helpline.

The following Freight Best Practice publications will inform this research report further:

Working together to improve Operational Efficiency of RDCs
Information Technology for Efficient Road Freight Operations
Freight Best Practice Telematics Guide
Make Backloading Work for You
Case Study: London Construction Consolidation Centre
Case Study: Consolidate and Save
Case Study: Profit through Partnership

1.4 Structure of the Report

The Report contains the following sections:

- Section 2 gives an introduction to ELMs and the different structures that exist.
- Section 3 considers why an ELM may be introduced into a supply chain, highlighting the benefits and drawbacks from using them.
- Section 4 considers the value of introducing an ELM, including some details on costs.
- Section 5 presents an implementation process that can be followed, along with a summary of the main requirements for introducing an effective ELM.
- Section 6 details case study applications of ELMs, considering both the system requirements and impact on the supply chains.
- Appendix A includes contact details for the main case studies presented in this guide

2 Electronic Logistics Marketplaces

2.1 Benefits

When used in supply chains, ELMs enable information flows to be simplified and automated, while also increasing the visibility of the shipment to the shipper, carrier and customer as it progresses through the supply chain. This can provide benefits including lower costs, greater productivity, increased security for shipments, shorter lead times and a reduction in disputes and litigation.

ELMs make extensive use of the Internet. As will be shown, this does not necessarily mean that transport companies need high levels of technological capabilities. Quite often, a desk-top computer with an Internet connection will be sufficient. Table 1 highlights the basic concepts and benefits of an ELM:

What are they and how do they work?		ELMs are ICT systems that link shippers, carriers and customers together for the purpose of information sharing and long term collaborative activities. Importantly they involve pre-defined contracts and rates. They can be in-house or hosted by an outside party.
What are the global benefits?		• Improves and simplifies the communication between both shippers, carriers and customers • Improves operational efficiency and customer service levels (a move from reactive to proactive) • Potential opportunities for horizontal collaboration opportunities between shippers, and carriers leading to network optimisation • Pre-defined contracts and rates lead to a more predictable operating environment
How much is it likely to cost?		Charges vary. The ELMs can be maintained in house or hosted by a third party. The former implies higher capital cost and lower variable cost; the latter vice versa. Most of the expenses are covered by the leader of the community (usually the shipper). Under certain conditions, it will be free of charge to carriers who act purely as system users.
Issues to consider		• Benefits might be distributed unevenly • Need to clearly define the role, responsibility and authority of each participant. • Need to have sufficient volume of transactions to justify the return on investment
Benefits to individual partners	Shippers	ELMs help shippers to gain better visibility of all consignments regardless of which carrier does the deliveries. It leads to more reliable delivery and an improved customer service level, as well as better management of carriers' performance.
	Carriers	ELMs help carriers to achieve better fleet and labour utilisation through better scheduling, and be more responsive to shippers' requests through improved visibility. Affordable ICT infrastructures have lowered the perceived entry barriers and smaller carriers can now compete successfully with larger ones.
	Customers	ELMs encourage "buy-in" to the logistics process and generate a better understanding of the inherent constraints and opportunities. Tracking and tracing functions also lead to greater confidence in both the Shipper and the Carrier.

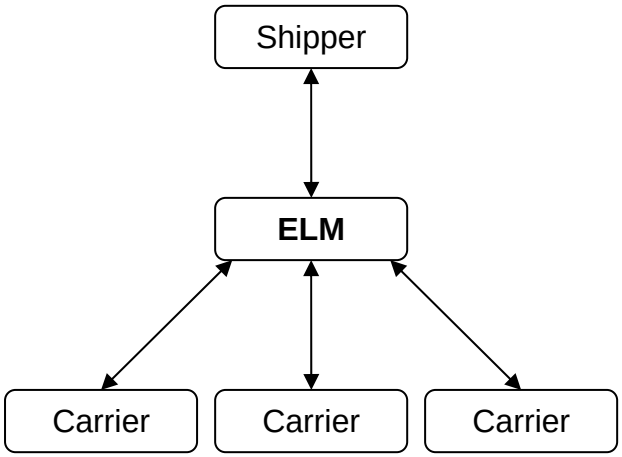
The development of the marketplace is usually led by one organisation (termed the “leader” in this guide) which is normally the shipper but could be the carrier, customer or technology provider. A wide range of functions can be incorporated into an ELM. These include:

- Transport planning – although this activity normally takes place outside of the ELM, this may not always be the case.
- Communication – passing information between the shipper, transport operator and customer. Information includes the allocation and acceptance of loads.
- Tracing and tracking - monitoring and controlling the progress of shipments once they have been despatched.
- Invoicing – by having data available on which loads were transported and by whom, it is possible to automate the invoicing process between the transport provider and shipper.
- Performance reporting – using the data captured within the ELM to generate a range of performance reports.

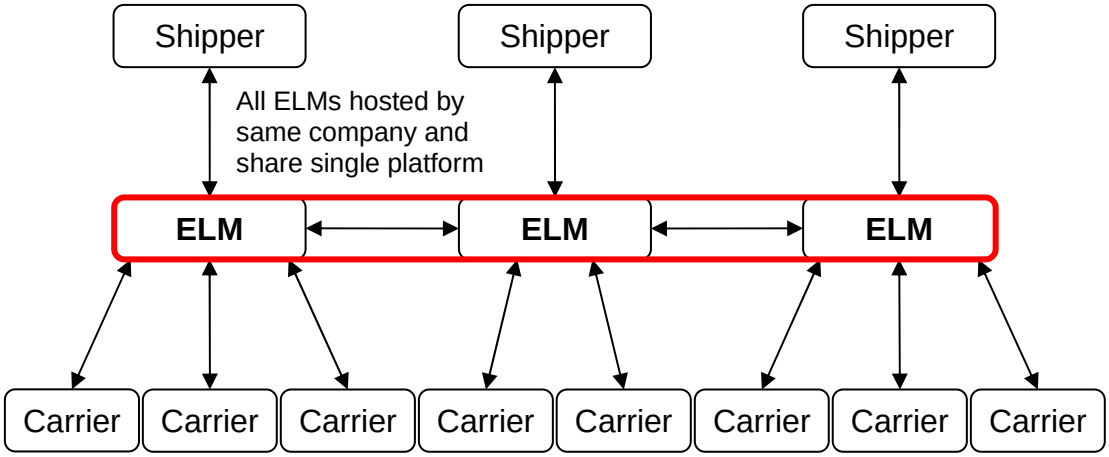
Figure 2 demonstrates in diagrammatic form the most common structures found in ELMs.

Figure 2 – ELM Structures

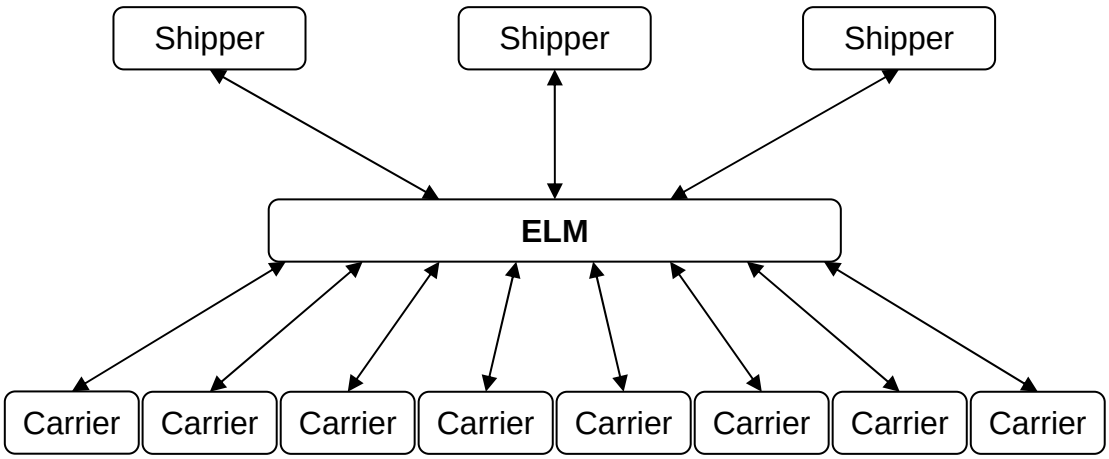
Private ELMs



Shared ELMs



Collaborative ELMs



2.2 Private ELMs

Under this structure, the leader develops the ELM and invites other parties to join. The leader is responsible for its operation and the information flows through it. The ELM usually connects only one shipper to a range of carriers and works in isolation from any other ELM. Consequently, this ELM can only help to optimise one company's network.

With this structure, there are clear lines of communication with a central point of control. Such a simple structure also makes it easier to add extra businesses to the ELM but among the potential disadvantages are the setup costs, particularly in terms of creating an interface between each participating company's system and the ELM.

Case Studies:

A private in house system by 3T – page 23
A private in house marketplace with JDA Software – page 25

2.3 Shared ELMs

This structure is similar to the private marketplace. However, information can also be communicated between the different ELMs. This happens because all of the ELMs are hosted by a single organisation and share the same platform. This provides a high degree of process coordination and enables easier transactions between parties. The connectivity between different ELMs only requires limited technical modifications from the private marketplace, which can be carried out by the hosting company.

A major advantage of this system is the ability to identify synergies between the distribution networks of different supply chains, and/or facilitate occasional spot trading of transport services due to fluctuations when existing partners could not fulfil the need. Disadvantages include the lack of an agent mediating the common interests/conflicts of participants, concerns with sharing commercially sensitive data, and data security. Therefore, it is important that access is carefully controlled.

Case Studies:

Strategic hosted collaboration with Translogistica – page 26
A shared hosted system with Descartes – page 26
A shared hosted system from Infor – page 28

2.4 Collaborative ELMs

Here, the leader of the ELM is not one organisation, but several in a consortium who are aligned through common interests. Together they try to

identify and encourage synergies within product flows and the capacity of carriers. Because multiple supply chains are involved there is a requirement for a high level of integration between shipper and carrier, which in turn implies a high degree of "open book" collaboration. (This sharing of information has to be clearly defined, especially for commercially sensitive data.)

A Collaborative ELM can be highly customised to the needs of the community, and it is worth emphasising that 'collaborative' in this type of marketplace means horizontal collaboration between shippers (or sometimes between carriers) as well as the usual vertical collaboration between shipper and carriers as in all three types of ELM.

By having a common system across supply chains, the complexity of the marketplace software is reduced. Equally, this software is often quite adaptable, making it easier to introduce extra members. A further advantage is that, by providing extensive visibility of freight movements across multiple supply chains, it may be possible to optimise these flows to minimise the distance vehicles cover.

One of the disadvantages is the investment required in ECT infrastructure to enable the marketplace to work efficiently, especially when specific functions like real time tracing and tracking is deployed. There is also the risk that, despite having the opportunity to optimise across supply chains, most improvements will be for individual supply chains.

Case Studies:

A collaborative hosted approach to ELMs – page 29
Challenges with hosted collaborative marketplaces – page 30

3 Why use an ELM?

There are many reasons why companies may choose to use an ELM. This section focuses first on the motivations for companies to become involved before highlighting the functions, benefits and drawbacks.

3.1 Motivations

The use of an ELM is largely driven by the business needs and company strategy. However, there are also external factors that can drive companies to adopt ELM technology:

- Political factors: pan-European and global trading lengthening supply chains
- Environmental factors: CO_2 emissions and congestion leading to pressure to reduce transport
- Societal factors: local delivery constraints affecting efficiency

- Technological factors: growth in Web and wireless technologies, as well as the software as service concept making it easier to share information
- Economic factors: reduction of empty running, efficient fleet management, visibility of delivery information for quick and proactive decision making, and improved customer service

Generally shippers are the main drivers for the development of an ELM. However, there are some motivations for carriers (particularly those with large fleets). The main motives are identified and summarised in Table 2.

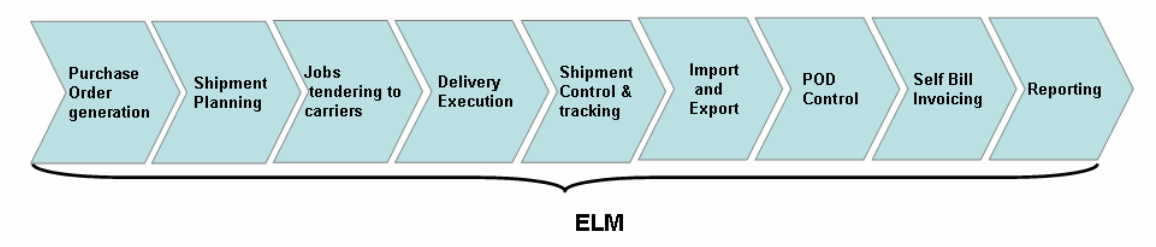
Table2: motivations for shippers and carriers

Motivation factors	Shippers	Carriers
Economic motives		
a) Productivity improvement through process automation and quick information exchange	√	√
b) Cost saving through effective scheduling (labour and fleet), critical mass gained cross company collaboration	√	√
Relational motives		
a). Shippers exert influence to 'lock in' carriers, or vice versa;	√	
b). Desire to coordinate and collaborate in exchanging information and conducting transactions;	√	√
c). Reduce uncertainties in the supply chain.	√	√
Service motives		
a). Increasing pressures on delivery performance from retailers or other customers to shippers;	√	
b). Uniform visibility of pipeline information to manage and monitor each consignment;	√	
c). Reliability and responsiveness.	√	√
Community motives		
a). Desire to impact an industry sector as a whole;	√	
b). Try to promote the development of policy and industry standards.	√	

3.2 Functions available

The functions are usually determined by whoever initiates the ELM or by the independent ELM provider who designed and developed specific functions for targeted customers. These range from basic load bidding services to complex offerings that encompass not only transport transactions but complete order fulfilment services. This then affects the underlying structure, and defines the boundaries and responsibilities of participants. The full range of functions that may be found in an ELM are detailed in Figure 3.

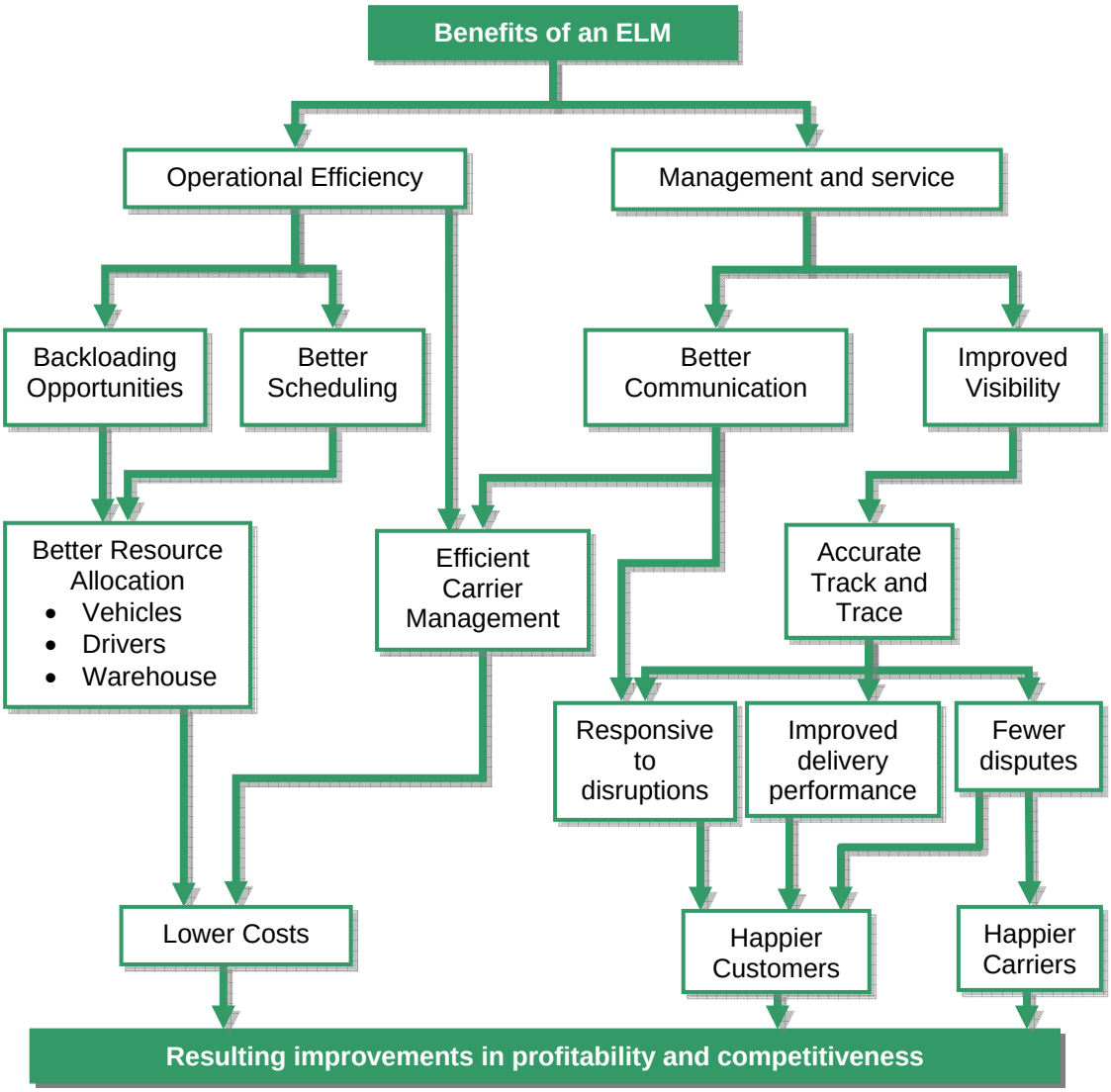
Figure 3: Functionality available to ELMs



3.3 Benefits

The benefits of using an ELM may not always be shared equally. It largely depends on who is the leader of the ELM, the operational scope of an ELM, and the collaborative agreement between a shipper and carrier. Figure 4 summarises how the benefits can lead to reliable and efficient deliveries with a reduction in transport costs.

Figure 4. The benefits of using an ELM



Improvements to operational efficiency result from doing the same work with fewer resources or doing more with the same resources. The key elements are backloading, better scheduling and efficient carrier management. All of these contribute to a lower cost per load.

Backloading and better scheduling enables companies to make better use of their resources. Efficient carrier management makes it quicker to transmit information to and from carriers. In summary the benefits of an ELM are:

- Easier to identify backloading opportunities as visibility of a wider distribution network. This reduces empty running and can increase revenues for the carrier
- Better routing and scheduling resulting from examination of the whole distribution network and vehicle capacity
- Carriers can obtain better fleet utilisation from improved scheduling. There may also be an increased volume of loads as closed ELMs are only available to invited members
- Scheduling can also smooth demand at warehouses to improve resource allocation
- Improved communication and transaction efficiency due to increased automation of processes
- Better management of all contracted transport providers via a single interface, saving administration work

Management and service enhancement is less easy to quantify, but still important. Many benefits enhance the operation and generally contribute to improvements in the overall service level, although they may not directly improve the operational efficiency of the transport fleet. An ELM provides better communication as shippers and carriers are connected through a single system. Improved visibility enables operations to be closely controlled and any problems can be identified early on. In summary|:

- Improved visibility for each party of each shipment through tracking and tracing. This provides better visibility of inventory as it is known where deliveries are. Delivery performance can also be improved through this visibility.
- Proactive approach to manage deliveries because delays are known earlier, as opposed to a fire-fighting reaction when problems occur.
- Reduced delivery errors and disputes through improved information accuracy. This can also eliminate errors in payments to transport providers as details on loads are more accurate.
- Customers see an improvement in service as disruptions can be managed more effectively and deliveries occur as planned.
- Improved information accuracy can also improve the relationship between carriers and shippers as there are fewer disputes.

3.4 Barriers

Industry often cites technological barriers to using an ELM. In reality, the barriers are largely influenced by the objectives of the marketplace, culture, business strategy and e-business capability. For example, real time tracking and tracking is more difficult to incorporate than an event based system. Nonetheless all new systems require a certain level of in-house training but technological barriers to using ELMs are overplayed.

On the carriers' side, especially for hosted solutions, an internet connection and a browser are all that is required to access the system. Big carriers can also afford to build automatic linkages with the ELM while smaller carriers can use manual inputs generated from telephone or Internet based information.

From the shippers' perspective, while large shippers have enough skills and resources for sophisticated functions small shippers tend to use fewer and simpler functions.

Even though a win-win solution is not possible in all circumstances, the leaders of the community, especially those from shippers, should be aware that an ELM cannot be sustained in the long term if the cost and benefit allocation is significantly skewed towards one party. Incentives should be introduced therefore to encourage participation from all parties, with benefits being shared proportionally.

4 Is an ELM right for me?

4.1 Suitability

Introducing an ELM into the supply chain requires careful consideration and represents a major project. Even though a successful introduction is likely to reduce supply chain costs and improve both customer service levels and productivity, there will be an impact on staff throughout participating organisations which will require effective management in both the development and implementation of the ELM.

The purpose of this section is to consider some of the key questions to ask, including the issue of cost, before implementing an ELM. The following questions are designed to provide a useful starting point for organisations to decide whether an ELM is appropriate for their operations:

- Are there a large number of deliveries per day?
- Are a range of transport providers used?
- Do customers have a range of individual delivery requirements such as delivery windows, vehicle types, lead times?
- Is it important to know the progress of loads in real time?
- Does the accuracy of information on loads need improving?

- Is it important to share information through the supply chain?
- Are a range of incompatible information systems used by members of the supply chain?
- Are there concerns with the accuracy of payments to transport providers?

If the answer to any of these questions is yes, then it may be that an ELM is appropriate for your supply chain. What structure it takes will depend on many factors and the examples provided in this guide will help you define this. (See section 2.2, 2.3 and 2.4)

4.2 How much will the ELM cost?

Identifying the costs of purchasing, installing and running an ELM is difficult as they can be affected by many factors including:

- The structure of the marketplace
- Whether it is operated in house or hosted
- The functionality that is required (see section 3.2)
- The number of organisations participating
- The number of users

To obtain accurate cost information, contact should be made with suppliers of ELMs. Contact details of several suppliers can be found in Appendix B. Nonetheless, it is possible to provide a guide as to the likely costs involved in setting up an ELM.

Shipper/Leader costs:

As noted in section 1.1, marketplaces may be provided either in house within the leading organisation (quite often the shipper) or hosted by the marketplace provider. Consequently, there are significant differences in the nature of the costs.

- For an in-house system, there is the need to invest in system infrastructure e.g. a computer server to process all the necessary data. Such capacity may already be available but, if not, this can represent a significant expense. The other initial fixed cost is for the software and an annual licence fee to pay. An in-house system is therefore often best suited to situations where there are a high volume of shipments to deliver economies of scale.

- Hosted systems charge in one of two ways. Some charge a fixed annual fee based on the predictable usage. However, the more popular approach is to operate on a ‘Pay As You Go’ basis. Here, a fee is paid for each shipment, be it a container, a full vehicle load or some other quantity. The advantage of this approach is that the cost of

using the ELM is directly linked to the volume shipped. Typically, the cost of a shipment varies between £0.60 and £2 per load (figures relating to 2007).

Carrier costs:

For a carrier, the costs of becoming involved in an ELM have two elements.

Firstly, there is the cost of acquiring the technology required to communicate with the ELM. This is a fixed setup cost. This cost depends upon the functions within the ELM and the means of communication that are required to transmit information. Equipment that can be used includes:

- Mobile telephone or Smartphone – this generally needs to be able to send data, either through text messaging or across the Internet.

- Telematics equipment – with this, it is possible to locate the vehicle and pass information either in real time or when certain events occur.

- Computer with Internet connection – ELMs can be accessed through the Internet, and much of the information can be inputted through forms found there. A basic home computer represents the minimum level of investment required.

The above highlights some of the basic requirements for interacting with an ELM. For transport companies that already make use of IT systems (such as a computerised vehicle routing and scheduling system), many marketplaces can be connected to them either through data transfer across the Internet or through a custom made interface.

The second element of cost is the variable costs. These relate to the volume and frequency of data transmitted to and from an ELM. Table 2 summarises some of the different interaction methods with an ELM.

Table 2. Methods of communicating with ELMs

	Impact on visibility	***Set-up cost***	***Set-up time***	***Running cost***
EDI or EAI*	High	High	Long	Medium
Webform **	Medium	Medium	Short	Medium
Email-based input	Medium	Low	Short	Low***
Fax/manual	Low	Medium	Short	Low***

* Electronic data exchange (EDI) or Enterprise Application Integration (EAI)
** Webform on a web page allows a user to enter data that is, typically, sent to a server for processing and to mimic the usage of paper forms.
*** Though the setup cost is usually low, note that the manpower costs of manipulating the information transferred by email or fax can be relatively high if the processing volume is high. Manual inputs can increase data errors as well.

The above summary considers the setup costs of an ELM and the day-to-day running costs. However, in developing the business case for an ELM, other costs need to be taken into account, including:

- Creating interfaces with existing systems
- Customising the ELM to reflect a particular supply chain's operations
- Training of personnel throughout all businesses involved
- Liaising with shippers, customers and carriers to get their buy-in.

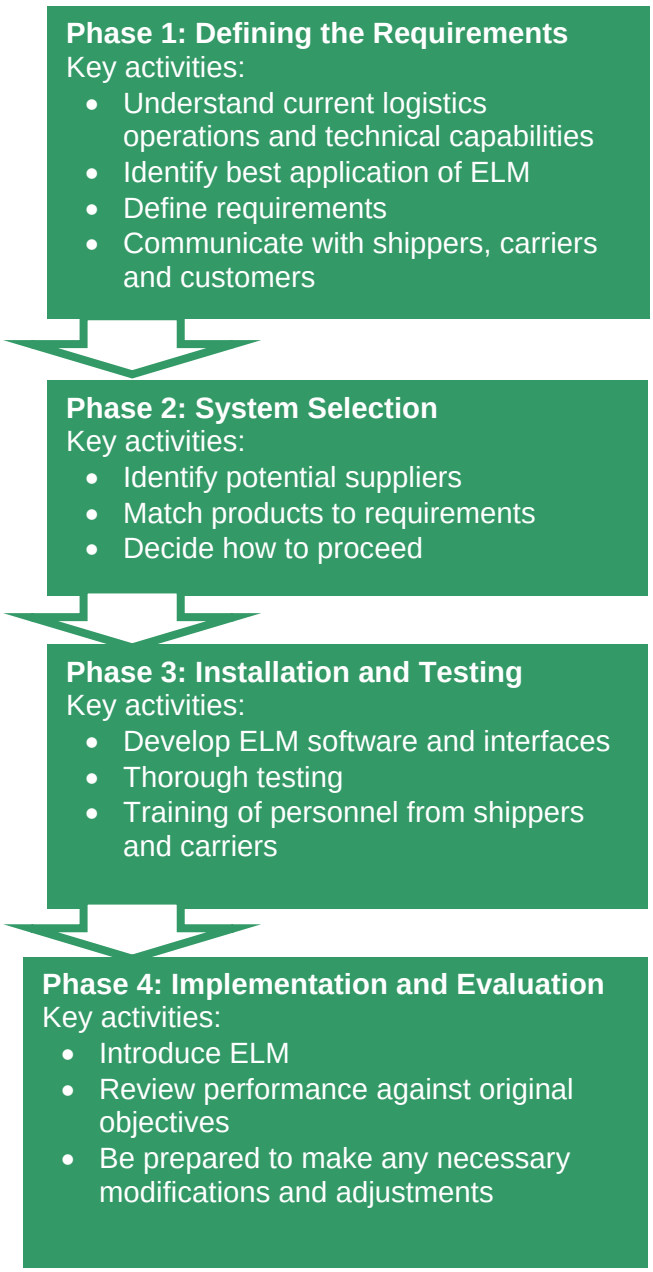
5 Implementation

The suitability and choice of an ELM will depend on how it is operated, your working practices and your organisation's circumstances. ELM systems can be tailor-made to each organisation's specific requirements but this can increase the cost.

5.1 How to initiate and implement an ELM

Once the decision has been taken to evaluate the use of an ELM, the following process is suggested as a guide to follow. There are four main stages to follow as illustrated in figure 5:

Figure 5: Implementing an ELM



Phase 1: Defining the requirements

This stage needs to be completed early on in the process, as it will help to define the appropriate ELM to use but do not assume that the system must mimic the current logistics operations. It is important to understand the current business processes, any problem areas or constraints that exist and gain an understanding of the current technical capabilities of the shippers and carriers involved. Attention should also be paid to wider business objectives as these may impact on future logistics operations.

Once a full understanding of the current logistics process is obtained, it is then possible to define the structure, scope and collaborative arrangements of an ELM. Note that in many cases, organisations may need to look at what ELM products are already available in the market first (as in Phase 2), and then define the desired functionality with reference to their own business requirements.

An essential aspect throughout this phase is communicating with all potential users of the ELM. This includes shippers, carriers and potentially customers. Through communication, it will be possible to further refine the scope of the marketplace and any scepticism or concerns about the ELM can be addressed. Communication should be at all levels, from senior management through to operational staff at junior levels. A key message should be that an ELM is not created to make people work harder or reduce transport rates. It is about helping to remove inefficiencies in the logistics network to bring benefits to all.

Phase 2: System selection

Having defined the scope of the ELM, it is then possible to identify potential suppliers of the technology. Key decisions at this stage include whether the ELM should be built in-house or an off-the-shelf solution. If an off-the-shelf solution is chosen, there is an option of choosing between in-house deployment or hosted solution by the technology provider. These will have an impact on the operational costs and therefore viability of the marketplace.

It is important to arrange for system demonstrations as these will give you a better idea as to whether the technology matches the requirements of the marketplace. Again, communication with stakeholders is important throughout this phase because of the potential financial impact on operational costs.

By the end of this phase, you should have a clear idea of both the setup and running costs of deploying an ELM, and will be in a position to decide how to proceed with the introduction of an ELM.

Phase 3: Installation and testing

Having identified the way forward, work can proceed to install and test the solution. It is important to identify any hardware requirements that may need to be bought so that delivery lead times can be incorporated into the project plan. Potential interfaces with other systems also need to be identified and steps taken to ensure that data can easily pass between them.

In testing the product, it is important that disruption to current operations is minimised. Therefore, it may be appropriate to use historic data initially, or to run the ELM in parallel with current logistics operations.

This phase will also require the training of the people who will regularly use the ELM. This affects not only the leader but all stakeholders, and it is essential that the total training costs are considered when evaluating the ELM. There may also be benefit in holding joint training sessions involving shippers and carriers together.

Phase 4: Implementation and evaluation

The final stage is to implement the ELM. Depending upon the scale of the implementation and the size of the logistics network, it may be appropriate to do this in one go or as a phased process. Adopting a phased approach reduces the risk of disruption to deliveries should anything go wrong with the ELM.

After the roll-out of the system, a systematic review and evaluation should be done to see whether the ELM has met its objectives. If necessary, make modifications, which may require a repeat of the above process.

5.2 Technical requirements

The advance of internet technology has made connecting businesses relatively easy, more flexible and at a lower cost. An ELM is usually run on a secure central server and can be accessed via web browsers. They are designed for participants to share a single system. If using a hosted ELM, neither shippers nor carriers need to install the ELM software. Therefore, ELMs can now enable large logistics firms as well as small and medium sized enterprises (SMEs) to use the service. It is flexible to access an ELM as well; it is possible to use a PC, Personal Digital Assistant (PDA) or even a mobile phone.

If participating companies need to automatically feed data into an ELM from in-house systems, such as a transport management system (TMS) or enterprise resource planning (ERP) systems, integration can be achieved via building the link between an ELM and proprietary systems. Generally, the technology provider for the ELM will facilitate such integration.

If data is being transmitted from the vehicle, then this usually involves the use of on-board telematics kit. The technological requirements and operational costs will be influenced by whether tracking is carried out in real time (with updates at regular intervals) or is based on events (such as arrival at a delivery point) occurring. As there are rapid developments in wireless communication technology, organisations are suggested to have a careful assessment of available techniques in the market.

Overall there are many different ways to access ELM technology, and the ELM can be configured based on users' needs and capabilities. Nonetheless the more functions that are incorporated, the more complex the ELM solution

becomes. The careful examination of cost and benefits of each method, and discussions with technology providers, should take place before final decisions are made.

This refers to the functions the ELM provides. As discussed in Section 2, the exact functions of an ELM are driven by the 'leader' of the community's needs and strategy, and determined by the solutions developed. No matter what kinds of functions are included, an ELM has to have sufficient transaction volume (i.e. so called 'critical mass') in order to justify the investment cost.

5.3 Collaborative arrangements

Generally the leader of the community drives the development of such arrangements. The leader needs to define the process, information sharing and collaborative planning between different partners. Three main forms exist for the role of community leader:

- Core firm as leader, where the dominant player in the community acts as the leading company and is responsible for the operation of partnership activities;
- A consortia group, where the partnership features multiple leadership, and it is managed by a committee consisting of a few members; and
- The technology provider, where a neutral individual company prepares a platform of competitive and complementary web members, and creates a cooperative environment based on mutual trust.

The degree to which partners share infrastructure, facilities, technology, human resources, information, assets and risks depends on their needs and the rules established jointly by participating members. The participating companies of an ELM should jointly develop performance objectives and measures to guide their relationship, otherwise disputes can not be resolved early and the ELM model cannot be sustained.

6 Case studies of ELMs

In this section, there are a range of examples of different ELMs. They have been grouped according to the types of marketplace outlined in Section 2.

6.1 A private in house system by 3T

Positioned as a fourth party logistics provider (4PL) 3T manages all freight activity for its customers by managing volumes across its customer base and utilising the available capacity of sub-contracted third party logistics providers (3PL). For carriers, 3T can guarantee volumes and improve vehicle utilisation. For shippers, 3T can ensure higher service levels.

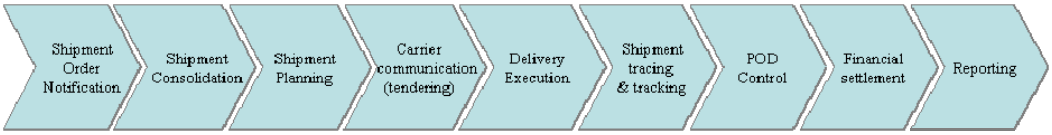
3T's ELM, called Global Carrier Manager (GCM), is a traditional client-server system but with web-based functions to facilitate communication with carriers

and shippers. Orders can be entered manually via the web or via EDI file transfer – FTP / XML. The system can interface with a wide range of ERP systems or standalone warehouse management systems. Shippers can log into the system and have the whole visibility of all their deliveries including proof of delivery (POD), performance reports and financial settlement. Carriers can log into the system, accept or reject load tendering, and update consignment status or report exceptions. The system can receive tracking data from individual carrier systems as well.

The following gives an example of the process flow for a manufacturer:

- Orders are fed into the system from shippers either via Electronic Data Interface (EDI) or input manually. Once checked for compliance, the orders are consolidated together and then released to the planning team.
- The scheduled orders are then available on the web for selected carriers who are informed by email alerts.
- Once the schedule is confirmed from the carrier, the system will generate an automatic notification to the shippers' warehouse system for loading preparation.
- During transport execution, 3T's operation team will keep tracking the delivery status until carriers confirm the delivery or advise problems at the point of delivery.
- Once a POD is obtained, self billing follows. Tailored reports are generated and sent to both carriers and shippers for financial settlement.
- The system supports delivery performance analysis and KPI reports based on different shippers or carriers' request.

Figure 6: GCM functions



Though greater horizontal collaboration between shippers or between carriers could lead to greater efficiency, many companies do not do so in reality because of the constraints involved. These include conflicts between shippers, lack of resources and competition between carriers. However, 3T acts as an agent and can mediate between partners with potentially conflicting interests. By so doing the whole ELM community benefits from both economies of scope and scale. GCM helps to manage the ELM community by capturing all transport data in one place, creating optimised delivery schedules, providing tracking and tracing and maintaining a dynamic cost model.

By belonging to this community shippers and carriers have achieved a transport cost reductions of up to 20%.

6.2 A private in house marketplace with JDA Software

JDA Software offers an alternative form of private marketplace. The leader is the shipper of the goods and the transport management system (TMS) operates independently from the marketplace and away from the Internet. However, the marketplace can communicate with the transport management system before loads are scheduled. In particular, information can be provided on the available capacity of a transport provider and their preferred destinations. Therefore, scheduling can become more dynamic and take into account available resources, reducing the risk of a delivery failing to take place. Typically, communication is through a website, although some applications have used a call centre. A summary of the main functions can be found in Figure 9.

Figure 7: Main Functions of JDAs Transportation Execution Solution

The typical process is:

- Carriers use the website to tell the shipper their availability in terms of vehicles and routes. This should be done on a daily basis, and the information is passed to the TMS.
- The shipper's TMS (external to the marketplace) plans loads based on available capacity. These are then passed electronically back into the marketplace.
- The carrier is then notified of the available loads. Delivery notes are generated on the website for carriers. Once accepted, the carrier can use the website to keep shippers updated of any incidents or delays, and details of when the delivery was made.
- The system records the cost and details of each journey and generates a self-billing report at the end of each month.

The system has been applied to a range of national and European distribution networks. Amongst the benefits delivered include:

- Transport cost reductions
- Simplified rate structures
- Improved efficiency
- Easy for carriers to use
- Accurate performance reporting
- Service improvements

6.3 Strategic hosted collaboration with Translogistica

Translogistica acts as a broker helping companies to find long term collaborative opportunities in transport and warehousing either internally or across supply chains. Unlike other cases in this guide, the ELM provides a strategic view, focused on identifying complementary flows in distribution networks. Translogistica brokers the introduction, protecting identities and data is kept anonymous until the owners are ready to share. The companies can agree on certain activities such as shared transport and backhaul opportunities. Translogistica will also help to implement the project if required by the participating companies.

The collaboration process takes the following route:

- Companies input their traffic flow data, including origins, destinations and volumes, and only they can see their own data in detail. They then run a search to identify partners, after which, companies can look at whether it is practical to collaborate more closely. For example, whether the shared or backhaul deliveries are compatible in terms of products and vehicle type.
- 'What-if' simulation allows users to model the effect of moving a distribution centre on the possibility of an improved shared network.
- Decisions can be made on with regards to collaborative tendering, joint operations or other agreed activities.

The anonymous handling of data between companies is a major advantage of this system, as in reality many companies find it difficult to collaborate because of a number of barriers such as lack of resources, data sensitivity, anti-competitive pressures and uncertain savings. Using an agent like Translogistica could help to expose opportunities which are currently unknown and also protect commercially sensitive data.

Benefits through the use of such system include

- Potential opportunities to reduce costs through shared carriage, backhaul and triangulation.
- Get better value from assets through better utilisation
- Reduced the carbon emissions and congestion
- Reduces the risk of searching for potential trading partners

6.4 A shared hosted system with Descartes

Visibility is a key benefit of using an ELM and the Global Logistics Network (GLN) developed by Descartes is a multimodal network of transport providers and their shippers that facilitates the exchange of logistics information. In total, around 5,000 carriers worldwide are connected to this network. These carriers have joined as a result of the supply chain(s) they work in developing an ELM through the GLN. An overview of the main functions of the GLN can be found in Figure 8.

Figure 8: The main functions of the GLN

As a hosted system GLN represents a neutral platform. This means that there is no intention to favour a particular member of the supply chain. Such a philosophy has been applied throughout the development of the GLN over the past 10 years. Consequently, there is a large degree of flexibility in terms of how connections can be made to the network.

At a basic level, a mobile telephone or web-form can be used. This approach is particularly suitable for small carriers (up to 10 vehicles) due to the volume of loads they handle and the low setup costs involved in connecting to the GLN. For medium sized carriers, the GLN website represents a more appropriate means to obtain information. A report can be run to obtain an overview of loads for which they are responsible. This can then either be viewed on screen or downloaded as a separate file (for instance, in spreadsheet format). The downloaded file can then be edited to incorporate required information, before being uploaded back through the GLN website to update the members of the marketplace. For large carriers, connections through EDI between the marketplace and carrier's transport management software can be made.

This flexibility is enhanced in other ways too. Firstly, The GLN is based on standard business documents (such as despatch notes), with a common format within the system. Therefore, if a transport provider operates in a number of supply chains using the GLN, they still only need one interface with the network. Secondly, solution and GLN is charged on a 'Pay As You Go' basis, with the shipper bearing the cost. Where GLN delivers particular benefits is through being able to integrate different systems. In the case above, the manufacturer has over 10 distribution centres, yet GLN provides uniform visibility across all of them.

Through the use of consistent reference numbers, it is possible for the GLN to match information and provide full visibility. The following gives an example of the process flow for a manufacturer:

- Purchase orders are sent via EDI to the GLN, which then transmits them to suppliers.
- The GLN holds details of the purchase order in a database.
- Delivery orders are optimised in GLN to determine the best way of shipment. The created orders are then tendered to the different carriers, resulting in a Transport Booking to the carriers. The transport booking could contain the expected freight rate.

- Meantime, suppliers prepare and send a manifest or delivery note to the GLN.
- GLN then matches the purchase order and delivery note to provide a trace for the consignment.
- Carriers will then receive a message that the load is ready for collection. The freight rate is predetermined.
- Carriers update the status of the delivery as it progresses (e.g. when is the load delivered, any issues). Through the Visibility solution, there are a number of checks including the location of goods and arrival times.
- Performance data is recorded by GLN and generated for management use.

6.5 A shared hosted system from Infor

Infor Transportation Execution is a hosted solution that supports transport, global trade and event management. It is possible to set up an online community to collaborate with their suppliers, carriers and customers. To maintain security, the leader defines the privileges of each participant, for example, to restrict access to carrier contracts, or access tracking information, alerts and reports about shipments.

One distinct feature of this solution is that it supports global logistics. An 'import and export' function is built in and the system also provides global trade compliance checks and customs clearance assistance. Figure 9 outlines the core functionalities provided.

Figure 9: The main functions provided by Infor

Taking an example of an international shipment, the process can be summarised as follows:

- The purchaser logs into the system and generates a Purchase Order, which passes automatically to the shipper. They accept or amend this and create a shipment note. The shipper can also run a trade compliance check and generate export documents.
- The shipment order is sent automatically to carriers, who accept or reject the job, and can create Bill of Lading as well.
- During execution, any exceptional events can be posted by carriers and are then available to selected participants.
- When the delivery is finished, the system provides the total landed cost for invoicing, as well as tailored performance reports for different.

Benefits from creating an online community through Infor include a reduction in transport costs between of 5% and 19%, improved supply chain visibility, better planning, greater collaboration and improved information accuracy.

6.6 A collaborative hosted approach to ELMs

An ELM has been created by a group of leading shippers in the grocery industry, aiming for real time visibility of all consignments regardless of carriers. The group's motivations include increasing pressures from customers on delivery performance and rigid delivery restrictions at customers' warehouses.

Although it can be integrated with other enterprise systems, this ELM focuses primarily on providing real time visibility of shipments to both carriers and shippers. Other functions like transport scheduling and freight settlement are conducted by other existing systems. It is a web-based solution, and hosted by an independent technology provider. The shippers are charged based on transaction volume i.e. number of jobs transacted whereas the carriers do not pay transaction fees. They do however have to invest in hardware, such as telematics for vehicles, and pay to download data.

Currently this ELM provides real time tracking and tracing, alerts and performance reporting. Each shipper and carrier only has visibility of their own consignments but in the future functions like joint scheduling and delivery can be added in if required.

The process flow is as follows:

- Carriers upload their scheduled jobs onto the website
- The system captures GPS position data of each consignment and monitors the location, movements and status of fleet of vehicles.
- The position data is returned by telematics kit via mobile communication networks for use through the web-based software. The real location of a consignment can be displayed visually by computerised mapping software.
- Exceptional events will be highlighted, e.g. whether a delivery starts or finishes late.
- Performance reports are generated for management use at the end of each operational period e.g. daily, weekly or monthly.

With the greater level of collaboration between shippers, they do not only share the technical infrastructure. They often share the same carriers and deliver to the same customers in some circumstances. Therefore there is a great scope for potential joint deliveries and backloading. The benefits derived by the grocers have so far included:

- Reducing delivery disputes with customers
- Improving on time delivery performance
- Switching from traditional reactive to proactive transport management
- Facilitating the potential collaboration between shippers, and between carriers for better vehicle utilisation and route optimisation
- Promoting the development of policy and standards at industry level

6.7 Challenges with hosted collaborative marketplaces

A European consortium including a technology provider and manufacturer identified the potential opportunities that existed from coordinating the networks of a number of major shippers. They set up a hosted ELM to share information and improve transport efficiency.

After two to three years of operating as a collaborative marketplace, the decision was taken to evolve towards a private in house marketplace for each user. This was despite the improved visibility that the solution offered as well as achieving a 4% reduction in transport costs through improved information accuracy.

This example particularly highlights a number of issues with collaborative marketplaces that can affect their success:

- There is significant investment in hardware. With a 'Pay As You Go' approach, it is essential that large volumes are attracted to help recover this cost.
- Ensure that the products moved have similar transport requirements. In this ELM, the shippers were from a diverse range of industries. Therefore, while opportunities existed to optimise the network of each shipper individually it was not possible to identify flows between networks that complemented each other.
- Many members were reluctant to share confidential information as a high degree of trust was needed between all shippers and carriers
- The hardware needs to have a high capacity as otherwise, at peak times, the speed of transactions may slow significantly.
- In this ELM, each shipper requested a customised data for ease of integration with other ICT systems. This increased costs which could not be easily recovered through the 'Pay as you Go' pricing approach.

Appendix A: Contact details on ELMs

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