

# THE POTENTIAL FOR A REGIONAL ELECTRONIC LOGISTICS MARKETPLACE: THE CASE OF WALES

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## **Abstract**

An emerging business model, known as Electronic Logistics Marketplace (ELM), is increasingly being recognised for its potential to address the issue of poor vehicle utilisation. This research investigates the feasibility of setting up a neutral government-supported regional ELM which will fully exploit the potential of such a collaborative network across industries and achieve transport optimisation at a regional level. There has been a lack of studies in this particular field. A qualitative research method is deployed. The findings suggest that while many companies are positive towards the concept of a regional ELM, mixed feelings exist in different sectors, in particular in the haulage industry. We note that most concerns and barriers are commensurate with previous generic research on ELM, although such issues as anti-competitiveness are specific to a regional ELM..

**Keywords:** electronic logistics marketplace, freight transport, regional network

## **Introduction**

Whilst the efficiency of road freight logistics operations is improving due to the cost reduction pressures imposed by freight customers, there is strong evidence to show that many vehicles run empty or with part loads (DfT, 2007). An emerging business model, known as an Electronic Logistics Marketplace (ELM), has the potential to address the issue of poor vehicle utilisation. An ELM is coined by Wang et al. (2007), and can be defined as an electronic hub using web-based systems that link shippers and carriers together for the purpose of collaboration and/or trading (Wang et al., 2007).

An ELM may facilitate not only vertical collaboration between shippers and carriers, but also horizontal collaboration between shippers. Therefore synergies between shippers can be identified and network optimisation outside companies' own supply chains can be achieved. However previous studies have revealed many ELMs are led mostly by either by a dominant supply chain player, or by a consortia group within the same sector (Grieger 2003, Wang et al., 2007). Consequently these ELMs are limited in enabling network optimisation across one company's own supply chain. Many are biased towards just one party, in most cases shippers. This creates conflicts, asymmetry of cost/benefits, and restricts the inclusion of haulage SMEs.

Few research studies have explored the possibility of establishing a truly collaborative ELM network at a regional level across industries. Previous studies in the field of e-marketplaces, have looked at generic concepts of regional collaborations, but have not considered freight transport. Our research aims to investigate the feasibility of setting up a neutral government-supported regional ELM that will fully exploit the potential of such a collaborative network across industries and achieve transport optimisation at a regional level. This differs from previous research which has reviewed such ELMs after implementation.

## **Literature review**

Two types of ELM have emerged since the late 1990s: open and closed systems (Skjøtt-Larsen et al., 2003). Open ELMs allow shippers and carriers to use their services with no barriers to entry. A typical example is an online freight exchange for the spot trading of transport services. Early ELMs were open systems, such as [www.teleroute.com](http://www.teleroute.com), and mainly price driven (Gosain and Palmer, 2004). Despite the benefits of lower search and coordination costs from using open ELMs, there is an increasing need for companies, and particularly shippers, to retain their linkages with preferred business partners (Dai and Kauffman, 2002). This has resulted in the recent development of closed ELMs, aiming for long-term collaboration between shippers and carriers.

The operational scope provided by closed ELMs goes beyond basic load posting and matching services, and shifts to complex offerings that might encompass complete order fulfilment services. The use of closed ELMs is expected to lead to improved pipeline visibility and to the more efficient

planning, execution and responsiveness of all supply chain players (Crujissen et al., 2007). The closed ELM can be classified into three main types according to their e-business architectures (Wang et al. 2007): private, shared and collaborative. While the first two types of ELM are mainly used to facilitate vertical collaboration between shippers and carriers, it is the collaborative ELM which proactively seeks the benefits enabled by horizontal collaboration between shippers. Collaborative ELMs are normally established by a consortium of businesses, in most cases, shippers. Together, they look to identify synergies in the flows between their individual distribution networks. The marketplace is then used to control all of these networks through a central hub in order to optimise the network.

The collaborative ELM seems to have the most potential to facilitate network optimisation and bring both economic and environmental benefits, achieved by reduction of empty running and improvement in fleet utilisation. However, those marketplaces are rare in practice, due to the complexities of horizontal and vertical collaborative arrangements between shippers and between ship and carrier (Wang et al. 2007). Further, those ELMs are often initiated by a consortium group of shippers from the same sector. Hence they tend to neglect the potential collaboration opportunities with other shippers outside the alliance and across sectors.

One way of breaking the aforementioned limitation is to set up a regional ELM which can bring together both shippers and carriers from various sectors. More synergies are expected to be exploited, hence bring greater benefits to the participating companies as well as improving the competitiveness of the whole region.

Previous research on ELMs has largely focused upon ELMs initiated by the private sector at firm or supply chain/industry level, with a large proportion of open ELMs. Only a few concentrate on the study of closed ELMs (Kale et al, 2007, Helo and Szekely 2005, Rudberg et al., 2002). Studies on regional e-marketplaces, both open and closed, are also rare, with exception of Nambisan (2000), Gengatharen et al. (2005), Gengatharen and Standing (2005) and Standing et al. (2006). Nambisan (2000) argues that there is a trend for internet-enabled supply chain management moving from firm-centric, via industry centric towards cross-industry management. He refers to the cross-industry supply chain management as 'an open environment where supply chain services can be traded among participating members belonging to multiple industries with little loss of efficiency'. From this definition, we can see that his discussion is mainly related to open systems. He also argues that such system should be driven by third party service agencies. Gengatharen et al. (2005) and Gengatharen and Standing (2005) investigated two regional e-marketplaces (Twintowns.com and RegWa.net) in Western Australia, and concluded that a staged approach should be adopted for the successful development and subsequent diffusion of a regional e-marketplace. Standing et al. (2006) also discussed the case example Twintowns.com, and pointed out that the main reason for its failure was due to lack of participants. Overall, of the limited literature discussed above, none of the work has examined the feasibility of setting up an e-marketplace from a logistics perspective at regional level, instead looking at systems already established. Our research attempts to fill this void through the investigation of whether a neutral government-supported ELM can help to exploit further the potentials of logistics synergies at regional level, focusing its application in Wales.

### **Context for the research**

This study focuses on Wales as the region for an ELM. In terms of the volume road freight, approximately 60 million tonnes has its origin and destination in Wales, with 30 million tonnes entering the country and another 30 million tonnes leaving the country (WAG, 2008). These volumes are dominated by food transport, with bulk products such as steel and building materials also important. Much of the volumes within Wales are focussed on corridors in the north and south of the country, with major imbalances from east to west on these corridors (WAG, 2007). In terms of flows to the rest of the UK, the majority of these go to local regions or towards major ports.

In terms of policy, the draft Wales Freight Strategy was launched in 2007 (WAG, 2007). Within this, one objective is to establish an electronic service to provide information to freight transport users. Although the concept is not clearly defined, it could develop into an ELM. A key feature of the Welsh economy is a high number of SMEs. These companies may not be able to develop their own ELMs individually. By using a government supported initiative involving many companies, they may be able to obtain some of the benefits. The research presented in this paper is funded through the Welsh Assembly Government, to link previous research conducted by the authors in the field of ELMs (for example, see Wang et al., 2007) to this policy context. The main research objective was to evaluate

the technical, managerial and attitudinal capabilities of shippers, carriers and customers, based on knowledge gained through previous research into ELMs. This will identify the potential for a regional ELM to be adopted.

### **Research method**

A qualitative data analysis approach has been adopted for the empirical evaluation of a pan-Wales ELM. Three focus group meetings were facilitated with participating companies from various sectors. The focus group usually took 2.5 hours. The first part (0.5 hr) was for the researchers to present the background information on the study. The remaining time was devoted to a discussion to evaluate the technical, managerial and attitudinal attributes of potential participating companies. A further two focus groups in the food and haulage industry were scheduled, but the geographical locations, and the availability of the participants meant that it was very difficult to arrange a meeting venue. Therefore we changed our approach and collected the participants' viewpoints by conducting individual, face to face interviews on site. These were similar to the focus groups, with the same information presented and questions asked. Overall the activities covered the key sectors in Wales: automotive, steel, timber, road haulage and food.

The focus group findings were complemented by three further detailed investigations of key cases with a specific purpose for including each;

- Case A: a piloting pan-industry ELM. The rationale behind this investigation was that through a study of a similar system, good and/or bad practices can be identified which will help to improve the 'learning curve' of setting up a pan-Wales ELM. Insights gained can also help to develop terms of references at a later stage.
- Case B: an unsuccessful regional ELM, which started operations in 1999 with government support but closed after 3 years. It was believed that learning from the mistakes of others' can lead to a better and deeper understanding of ELM system development. Therefore similar issues and problems can be avoided and chances for successes will be improved. This was the primary reason why we conducted a study of Case B.
- Case C: a physical, urban consolidation centre. Along the progress of focus group discussions and the literature review, one theme that emerged was that it could be appropriate to have physical consolidation in conjunction with a pan-Wales ELM. Therefore, we studied a case example to examine the interaction between physical and information flows.

The main data collection technique for the case studies was the semi-structured interview. In addition, background information on each company and the interviewees' role within the organisation was obtained. This enabled the identification of any external factors that might have affected their judgments. Interviews were transcribed and cross-checked with interviewees to ensure maximum objectivity. To complement the interviews, other techniques were employed and sufficient time was spent on accessing archival records and company websites, attendance at industrial seminars, site visits and use of existing business databases in the library. Therefore different sources of data thus provided triangulation of research results.

Issues from each focus group and case examples were identified, and mapped onto a force-field diagram as either enablers or barriers. Similar issues are further grouped into specific themes. Frequencies of occurrence of these themes are highlighted in order to demonstrate the significance of certain categories.

For the multiple case studies, as different cases serve a different purpose, our data analysis focuses on individual cases but cross-case analysis was also conducted when developing terms of references for the WAG.

### **Research findings**

#### **Focus group findings**

The research findings from the focus group activities have helped to identify a number of key learning points for the Pan-Wales ELM, which will determine its level of success, as indicated in Figure 1. Firstly, it is important that the ELM is more closely defined than it is currently. Participants were keen to understand the true nature of the value proposition the marketplace may create. In order to define this, the functionality and scope needs to be determined. Geographically, the marketplace must not be

constrained to flows just within Wales but offer a one stop shop for logistics services within the UK and Europe. From the carrier's perspective, it is also important that the nature of charges for using the ELM is clearly defined. Once the value proposition is clarified, it should be possible to determine the expected benefits more closely. This will then attract more members to participate. Aligned with the value proposition may be the inclusion of consolidation centres, although the use of these needs to be accurately evaluated to identify optimum locations.

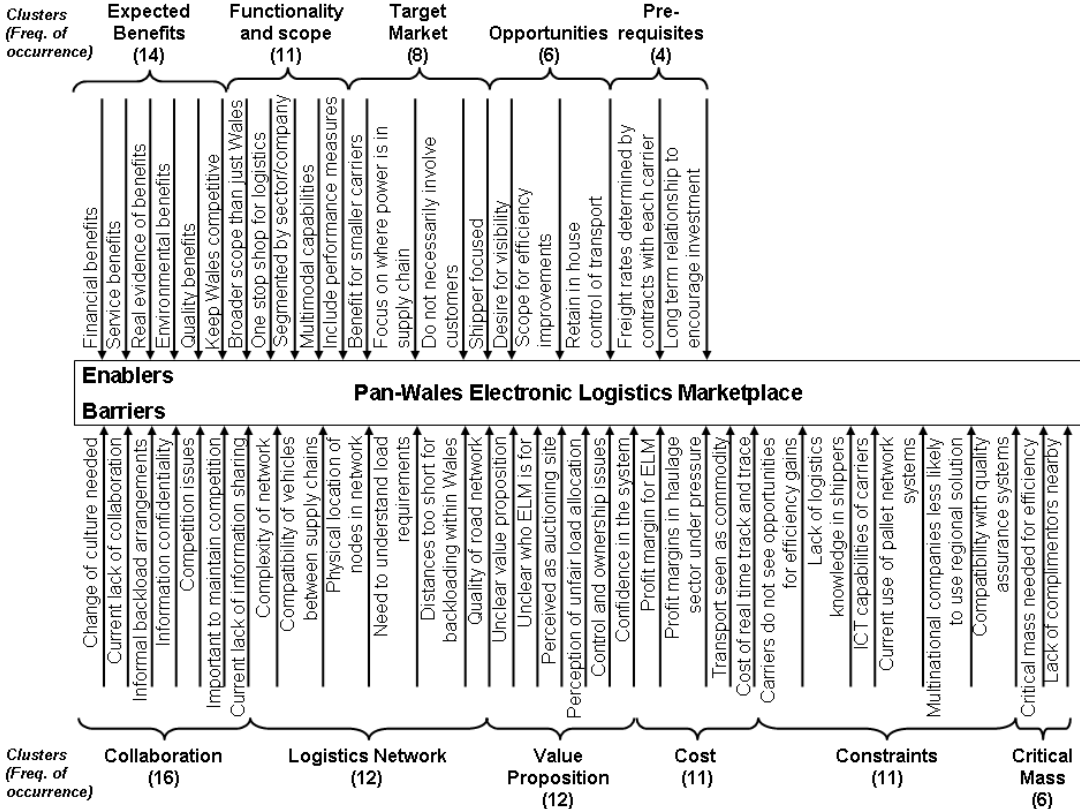


Figure 1: Force field analysis of focus group and interview (Source: Authors)

There are, however, some structural barriers that need to be overcome. The nature of the Welsh distribution network is such that it may be difficult to improve efficiency and/or increase the critical mass of users in particular geographical areas and sectors. The technological and knowledge capabilities of potential users are also a potential limitation. Finally, there is a need to challenge mindsets as to the opportunities that exist as differences of opinion exist between shippers and carriers.

Perhaps the biggest challenge of all for the pan-Wales ELM will be achieving collaboration within industry. It is clearly perceived that there is a need for this to ensure the success of the marketplace but current business practice tends not to embrace the idea. Where collaboration does exist, it tends to be at an informal level between carriers, in order to arrange backloads.

**Case study findings**

Case A provides valuable insights in terms of the readiness and capability of the forest industry in setting up a regional ELM. The designed functions, and roles and responsibilities of various consortium members seem to be effective under current circumstances.

The biggest benefit at the industry level is to bring together a number of disparate trading entities which normally work at site level and generally in isolation to each other, and improve the whole industry's competitiveness through improved profitability achieved from network optimisation. Shippers can benefit from economies of scale through aggregating transport demand between them, and also through economies of scope from the pooling of various carriers. Carriers can benefit via access to potential new shippers, and also have a longer contract guaranteed by Case A if they are deemed

competent. Although the system is still at an early stage, these benefits are perception based and whether they can be realised in practice is not yet known.

The capabilities of participating in such a system varies among shippers and carriers. Technical capability is not a barrier for shippers. As shippers outsourced their major activity of transport to Case A, consequently they do not need to have sophisticated scheduling or transport management systems in-house to manage their distribution. For small carriers, the lack of knowledge and experience in using an Internet-based system to communicate could be one potential barrier. As many carriers tend to use telephone or fax to do business with their customers. Training needs to be provided by the technology provider. Developing the system for the technology provider does not seem to be a challenge, as the company has well-established expertise in this field.

In terms of managerial capabilities, the lack of similar cases in the practice means there is no best practice for Case A to learn. Managing the system may largely follow a 'trial-and-error' route. The lack of experience in managing such innovative business model suggests a higher risk of failure.

Attitudinal issues such as scepticism and reluctance arise mainly from carriers. Both shippers and carriers also need to change their mind-set as the new business model requires they change the way they operate. This is observed as one of the big challenges faced by Case A. Strong leadership and effective marketing is required in order for such a system to be accepted by private sectors.

Case B suggests that for a regional ELM initiative to work, it has to be developed at the right time, to the right customers, and with the right functions. Both the and public opinion largely determines the success of an ELM. The complex functions are expensive and time consuming to deploy. This leads to companies being less willing to participate. As with Case A, the need for cultural and mind-set changes also poses a challenge to the success of an ELM.

Case C confirms that a strong public sector involvement is critical in encouraging the use of a consolidation centre by private organisations. Strong leadership and sufficient funding is also required to get such an initiative started. Case C reveals that tangible environmental benefits can be achieved by using a physical consolidation centre, however it remains a challenge whether such a consolidation centre can self-sustain in the long term. It is also felt that it is more likely for urban consolidation centre to succeed if independent and smaller businesses located in an environment where there are particular constraints on delivery operations, for example limited access conditions.

Overall it is felt that that an ELM should not be in conjunction with an urban consolidation centre at its early development stage. This is to avoid added unnecessary complexities, and extra cost burden. An UCC can be developed at later stage if the system reveals the potential of congested traffic flows in certain urban areas.

### **Conclusion**

This study has found that there are mixed perceptions towards a pan-Wales ELM. The overall results favour the initiative of setting up a pan-Wales ELM. Economic and environmental benefits are the driving forces behind such an initiative. Inefficiencies in supply chains motivate the private sector to seek ways for improveing logistics operations. The potential to reduce carbon footprints is also an incentive for the logistics sector. In general, shippers are more positive than the carriers.

Our study also reveals a number of barriers, of which the biggest is related to collaboration, such as fear of information sharing and conflicts of interests. Technological and knowledge capabilities of potential users are also a potential limitation.

Our findings indicate that future developments should focus on establishing a freight logistics community in Wales, creating opportunities for promoting and sharing advanced logistics initiatives and best practices, and transferring knowledge to the logistics sector, particularly related to information and communication technologies (ICT) including ELM. The lack of knowledge and expertise on freight logistics management in Wales inhibits the nation's competitiveness in the global market.

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