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Improving Port Customer Services through Logistics Information Management

Stuart Orr and Shannon Heffernan
Introduction

Transportation to and from Australian ports occurs through a variety of independent organisations and is highly reliant on accurate and timely communication (Bellino and Gordon 2001). Unfortunately, the systems that the industry uses to manage these very large volumes of information flow are cumbersome (Parkinson 1990). This paper presents a study of the information flow in a rail corridor servicing a major Australian port and identifies the type of developments that could be made to this system to improve logistical control.

There are various activities that could assist the rail corridor stakeholders with improving information flow. This includes the fact that although many stakeholders contribute to the information as items pass through their hands (such as transportation dates), eventually all of the information is required in a single document (Miles 2001). Also, port customers are demanding that more transactions be conducted by e-commerce (Walsh 1999).

As with any supply chain, a failure in information transferred reduces the effectiveness of the entire rail corridor (Mattingly 2001). Communication error is a common and expensive failure in transportation processors, such as rail doors (see, for example, Bellino and Gordon 2001). Many transporters are unaware of this because they do not monitor the effectiveness of their information systems (Noorlander 2001).

The port rail corridor would gain a competitive advantage from an effective information system under these conditions (Blanchard 2001).

At the industry level, switching from a fragmented to an integrated transportation system will also improve customer service (Ngui 2001) and reduce the overall supply chain transportation costs (Slater 2000). Port railway corridors stand to gain even more from integrating their services because port customers expect high levels of control and service (Ngui 2001). Unfortunately, the low return on capital investment normally experienced has made it difficult to justify investing in information management in this railway industry, where investment has focused on managing terminal and rail performance instead (Blanchard 2001). If a port is expected to be an integrated logistics centre in a seamless transport chain (Ngui 2001), railway operators will have to integrate their information systems.

Electronic data interchange would be particularly useful in helping rail corridor stakeholders improve their information management (Lim and Palvia 2001). Improved information management can be expected to contribute to the expansion of transportation services around ports (van Hoek 2002). At the time of the research, port customers were already requesting greater use of e-commerce in their transactions (Rosencrance 2000). Transportation companies in other areas were already finding that single information systems enable them to reduce costs, increase throughput, improve customer service and increase their customer base (Krizner 2002; Regan 2002). More recently, e-commerce has become extensively utilised in Australian ports (Prince 2004; Railway Gazette 2007).

The problems with information flow in the rail corridor servicing a major Australian port and the opportunities for improving this through better information management have been established. This paper will now present a detailed examination of the weaknesses of the current rail corridor information management system and suggest approaches for improving the information management of this rail corridor.

Method

A structured interview guide was constructed around the issues identified in the literature review. The interview guide asked the respondents to identify the type of information transferred between corridor...
stakeholders when transporting cargo, the process by which this information was transferred, its current performance and how the efficiency of the current information transfer process could be improved. A self-completion version of the interview guide was provided to participants unavailable for a personal interview. Rail corridor stakeholders were randomly contacted until a total of 12 stakeholders had agreed to participate. The interviews were conducted with the CEO or Logistics Manager of the operations. Secondary sources, including documentation and Websites, were also used to determine the information flow required for the transport of cargo along the rail corridor.

The analysis was based on both categorical and numerical data. A quantitative analysis of the interview data was conducted to identify:

- factors related to or influencing the current performance of information transfer along the corridor
- desirable features of a future "streamlined" information transfer process.

Table 1: Techniques for Using or Generating Information

<table>
<thead>
<tr>
<th>Release #</th>
<th>ERA*</th>
<th>Consignment #</th>
<th>Handover authorisation</th>
<th>Booking #</th>
<th>Timeslot</th>
<th>Invoice</th>
<th>Manifest</th>
</tr>
</thead>
<tbody>
<tr>
<td>87%</td>
<td>62%</td>
<td>37%</td>
<td>50%</td>
<td>62%</td>
<td>37%</td>
<td>100%</td>
<td>25%</td>
</tr>
</tbody>
</table>

* Export Receival Advice
The respondents did not integrate any of their systems with other rail corridor participants, which is an important finding. This supports Walsh's (1999), observations that there were opportunities for the respondents to use e-commerce systems to integrate with other rail corridor stakeholder's systems.

"Errors in data" was rated the most undesirable consequence of the current information management arrangements. Two causes of "errors in data" were the many different methods of information transfer used by the respondents and the fact that the respondents entered large amounts of information manually. This supports Bellino and Gordon's (2001), observations that manual and repetitive information transfer in this industry can lead to mistakes and loss of data.

In particular, many of the problems identified were considered to be due to the number of stakeholders in the rail corridor and the requirement for many of these stakeholders to have access to the same information. This requirement continually led to errors in data through duplication and the manual input of data into many different communication systems and formats. In addition, the respondents indicated that when it became necessary to change information due to variations in details, such as shipping or container numbers, it was difficult to define the ownership of the data. This introduced difficulties in accessing information and in determining which parties should have access to what information. On occasions where specific stakeholders did not have access to adequate cargo information, changes occurring to the information during transportation resulted in errors in cargo movements. For example, some cargo was transported to the wrong destination or to storage depots without any information identifying who should actually receive the cargo, or whom to contact.

These findings confirm that there was a lack of integrated communication providing information on the status of cargo (as suggested by Webber 1986), a heavy dependence on information owned by other users (as suggested by Avin 1985), and a reliance on accurate information (as suggested by Miles 2001). This led to increased operation costs and delays in receiving payment.
Respondent needs

While each of the respondents claimed that they needed fast, efficient and reliable transfer of accurate information, none of the respondents had extensively investigated integrating their systems with other corridor stakeholder's systems. Most of the respondents utilised computer systems to manage their internal operational and financial systems. In most cases, however, the respondents manually transferred information from their systems into paper or email formats, before sending it to the next corridor stakeholder. The next stakeholder then manually entered the data into their own systems. It is surprising that the respondents had not already seriously investigated EDI. Table 2 shows the percentage of respondents who indicated that they would have a preference for incorporating the items listed along the top of Table 2 in future information transfer. This table indicates that most respondents would prefer to utilise just one reference number. Currently, many reference numbers are generated by different stakeholders for their own operational purposes.

Table 2: Desirability of Information Types

<table>
<thead>
<tr>
<th></th>
<th>One Reference Number</th>
<th>ERA*</th>
<th>Consignment #</th>
<th>Handover authorisation</th>
<th>Booking #</th>
<th>Timeslot</th>
<th>Invoice</th>
<th>Manifest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would require this information</td>
<td>86%</td>
<td>42%</td>
<td>14%</td>
<td>42%</td>
<td></td>
<td>1-4%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Would generate this information</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td></td>
<td>1-4%</td>
<td>100%</td>
<td>14%</td>
</tr>
<tr>
<td>Would not need this information</td>
<td>14%</td>
<td>29%</td>
<td>72%</td>
<td>44%</td>
<td>100%</td>
<td>72%</td>
<td>72%</td>
<td></td>
</tr>
</tbody>
</table>
One participant utilised an operations management information system to which its customers had access to make orders, view product details and determine the cost of transportation of these items. This participant also had the ability to receive orders and send financial documents via this system to its customers. Interestingly, this system was not used to transfer information electronically to this participant's transport provider (another corridor stakeholder). Instead, the information was taken from their system and manually entered on a form, which was then faxed to the transporter. This participant indicated that they would prefer to exchange electronic information with their transporter; however, incompatible systems, costs and limited discussion about the issue stopped them from achieving this.

This participant also indicated that it would have been preferable for their transporter to manage such a system as their contractual arrangements were based on “round trip” terms. Round trip terms means that this participant was responsible for arranging all aspects of the transportation process, rather than the transporter, and sometimes required them to negotiate with other corridor stakeholders utilising that transporter. This participant did not want to be involved in this aspect of the corridor’s activities.

Interestingly, the transporter also stated that they would prefer an information management system that all stakeholders could access and utilise. In particular, they wished to integrate with both the operational and financial systems used by the various rail corridor stakeholders. Notably, they had not considered transmitting information electronically directly from their own system. Although the transporter utilised a comprehensive system to track their trains and cargo, they preferred to enter data manually into their information system and transfer information manually via fax or email.

Whilst these two organisations indicated that it would be desirable to have an independent system that managed all of the information relating to the transportation of the cargo, neither had considered integrating this system with their own information system, even though they would prefer to electronically exchange information. Without integration into the internal information systems of the rail corridor participants, such an independent information system would have little real value. Much of the important information would still only be held in the individual community member’s systems. Furthermore, these organisations would forgo the benefits of increased accuracy and reduced operating costs if they continued to manually exchange the information that they held.
Possible solutions

The research indicates that incompatible systems, duplication, manual entry of data and multiple methods of information transfer lead to errors in data. This finding supports the previous research of Parkinson (1990), Webber (1986) and Avinco (1985). It was concluded that a central system in which information is provided by the supplier at the beginning of the trade transaction and can be used by all parties will increase the reliability and reduce the operating costs of the users.

This system could be combined with the individual corridor participant’s systems via a standard messaging format that would allow users to access original, accurate information. This would also facilitate planning, receiving, payments and other operations associated with cargo movement that require information. All of the respondents indicated that they desired a computer system that integrated with their own computer system and could be accessed by all stakeholders. This type of system would increase the ability to define ownership of the data through the identification of the original data source.

Of course, the data must still be initially entered into a centralised information management system, probably manually. As determined previously, the manual entry of data is one of the main factors that must be eliminated in order to streamline the information transfer process. For this reason, EDI could be used to provide automatic messaging as an alternative to a stand-alone, central information management system. In such a system, data generated by one corridor participant’s system would be sent directly to another participant’s system, which can eliminate (or minimise) the manual entry of data, increase the compatibility of the information management systems and save the cost of creating and maintaining a stand-alone information system.

Such a system would also allow the individual participants to add their own information as necessary and generate another message to send to other participants. This approach would ensure that all participants used the original information; however, the ownership of the data may become less defined, as participants downloaded the information directly into their systems and generated another message to pass on to others. All respondents agreed that the ownership of the information had to be easily identifiable if an integrated system was to be implemented.
Conclusion

This research has identified several opportunities to improve the information management between rail corridor stakeholders that would improve the operations of the port it services. In particular, various inefficiencies and weaknesses in the information flow for cargo being transported along this rail corridor could be eliminated. These were primarily due to participants in this corridor manually transferring data from their own electronic information management systems to other participants who then re-entered this data into their individual systems. This approach was found to be costly and greatly increased the likelihood of errors. The incompatibility of the data between the members' systems also created data transfer problems and a difficulty in identifying the original source of the data.

Two solutions were suggested:

- a stand-alone, centralised system with an Internet interface between the corridor participants
- an automatic messaging system that allowed participants' individual systems to automatically generate and send a message to other stakeholders' systems, from which the data could be automatically entered into their systems.

The latter approach was considered to offer more advantages for this group as it eliminated the need for the manual data entry required by the stand-alone system.
References


