

LEADING TECHNOLOGICAL INNOVATION & PRODUCTIVITY IMPROVEMENT ACROSS THE SUPPLY CHAIN

AN EVALUATION OF THE ALC INTERMODAL VISIBILITY PILOT OF THE GS1
ELECTRONIC PRODUCT CODE INFORMATION SERVICE (EPCIS) STANDARD



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EXECUTIVE SUMMARY

This case report presents key findings of an evaluation of a pilot trial of the Electronic Product Code Information Service (EPCIS). The trial was initiated by the Australian Logistics Council (ALC) in collaboration with GS1 Australia. The evaluation was undertaken by Centre for Workplace Leadership at the University of Melbourne.

The EPCIS standard is an international standard for recording key events associated with the movement of goods or objects through a supply chain. As an international standard, EPCIS can be integrated into an existing database or “track and trace” platform as a means to share information and provide visibility throughout a supply chain. The EPCIS standard is one of only a few production standards globally, unprecedented in its ability to cover an open supply chain end-to-end.

This pilot trialled the EPCIS standard in three logistics supply chains operated by Nestlé Australia, OneSteel and The Reject Shop. The CWL research team followed each of the three pilot trials of EPCIS with the aim of identifying the benefits associated with improved supply chain visibility, and to assess the challenges associated with implementing a common standard across supply chain partners operating different information management systems and with varying degrees of complexity.

This evaluation demonstrated that, with careful planning, the implementation of EPCIS could provide a wide range of potential benefits to the business, their supply chain partners and customers. Participants also indicated they faced a range of challenges in planning and implementing the EPCIS standard. However, none of these challenges had proved debilitating. Even where EPCIS may involve significant investments to adapt and extend the capability of existing information management systems and online platforms that facilitate servicing customers, the potential benefits to the business were expected to outweigh these costs. Overall, all participants in the pilot trial of EPCIS anticipated the business would yield a significant return on their investment.

THE IMPERATIVE OF IMPROVING SUPPLY CHAIN VISIBILITY

Getting product to markets in an efficient and timely manner is critical to the ability of many businesses to compete. The imperative to manage supply chain and logistics arrangements has become even more important as supply chains have become increasingly globalised and complex. More effectively coordinating the flow of goods along a supply chain is not simply a matter of minimising costs of transporting good to market. Increasingly, better supply chain management plays a role in avoiding supply chain disruptions and maintaining customer satisfaction with logistics service provision.

The transport and logistics sector also indirectly affects the productivity of every other sector. The geographic size of the domestic Australian economy and the distance from international markets means that the efficient movement of goods and products is a key factor in shaping the competitiveness of Australian-based businesses.¹ This in turn implies that improvements in productivity and efficiency in logistics and supply chain operations can deliver a major boost to Australia's productivity and improve the competitiveness of Australian businesses, large and small.

A 1 PER CENT INCREASE IN TOTAL FACTOR PRODUCTIVITY IN THE LOGISTICS INDUSTRY WOULD YIELD A \$2 BILLION INCREASE IN NATIONAL GDP.

It is difficult to measure the economic value to the Australian economy of logistics and supply chain operations. The sector makes a significant contribution to the Australian economy. The sector includes both third parties providing logistics and supply chain services, as well as activity undertaken by firms on their own behalf. ACIL Allen Consulting estimate that the sector accounts for 8.6 percent of Australia's Gross Domestic Product (GDP), contributes around \$130 billion to the Australian economy, and is estimated to employ approximately 1.2 million people.² This report estimates that a 1 per cent increase in total factor productivity in the logistics industry would yield a \$2 billion increase in national GDP.

Making the most of new technologies and standards that facilitate coordination along a supply chain is a critical element in meeting this productivity challenge. Many logistics providers have invested in their own "track and trace" systems that enable them to improve supply chain visibility as a means to address these challenges. However, from the perspective of the customer and other supply chain partners, visibility over the entire supply chain flow is generally not assured by these systems. Goods and shipments "disappear" once they move downstream and beyond the reach of a single provider's tracking system. This invisibility impedes the effective tracking of shipments, co-ordination of logistics and transport services, and compromises the ability to manage customer expectations around delivery and delays in shipments.

One important means to ensure greater visibility of products that move from partner to partner within a supply chain is the ability to share data between partners. This in turn requires data to be captured and recorded using a common set of rules and standards. The Electronic Product Code Information Service (EPCIS) standard, which forms part of the GS1 Australia system of open global supply chain standards, provides a standard set of protocols for capturing, exchanging and querying data, and recording events as goods move through a supply chain from business to customer.

¹ Bureau of Infrastructure, Transport and Regional Economics (2010) Road Freight Estimates and Forecasts in Australia: Interstate, Capital Cities and Rest of State. Research Report No. 121, Bureau of Infrastructure, Transport and Regional Economics, Canberra. Also see Bureau of Transport Economics (2001) Logistics in Australia. A Preliminary Analysis. Working Paper No. 49, Bureau of Transport Economics, Canberra.

² ACIL Allen Consulting (2014) The Economic Consequences of the Australian Logistics Industry. A Report prepared for the Australian Logistics Council, Canberra.

THE PILOT TRIAL OF EPCIS

In 2013, a working group convened by the Australian Logistics Council (ALC) identified end to end supply chain visibility as an industry-wide concern, with many logistics customers particularly concerned about gaps in the visibility of products as they move between supply chain partners. This working group identified GS1's EPCIS standard as a possible way of improving visibility by providing a standard approach to recording and representing events that occur as goods move through a supply chain.

In collaboration with the ALC and its member organisations, GS1 Australia undertook to facilitate a pilot trial of the EPCIS. Three supply chains were chosen to trial the EPCIS standard. The primary customers in these three pilot participants were:

- ▶ Nestlé Australia;
- ▶ OneSteel; and
- ▶ The Reject Shop

The trial covered a specific supply chain for each shipper, including supply chain movements travelling from the east coast of Australia to the west coast. The pilot trial therefore included participation of supply chain partners, including primary logistics and transport providers (road and rail) and third party transport companies contracted to move freight at particular parts of the journey.

In each case, the key events were defined for the particular supply chain and set up for capture to an EPCIS repository. The events were captured manually or by file upload, using a data capture approach best suited to the participants. The approach to implementing the pilot varied between supply chains involved. In two of the three participating supply chains, each supply chain partner entered real event data retrospectively, recording information about the agreed-upon events, such as the actual time of the goods reaching a particular location along the supply chain. In the third supply chain, there was a one day trial with all partners in the same room entering data in a simulation of real-time data.

EVALUATING THE PILOT TRIAL

The Centre for Workplace Leadership at the University of Melbourne agreed to evaluate the implementation of the EPCIS pilot, examining its operation, the potential of the EPCIS standard to shape supply chain operation and the role of leadership in the adoption of new technology standards. Given that the EPCIS pilot was a proof of concept rather than full implementation, a quantitative evaluation of the consequence of implementation for supply chain outcomes or cost savings was not possible. A qualitative analysis was therefore deemed as the most appropriate study design. A number of research questions guided this study:

1. How did the EPCIS pilot operate?
2. How can the EPCIS standard potentially shape supply chain management?
3. What are the key challenges likely to emerge in co-ordinating the implementation of EPCIS within and across supply chain partners?
4. What critical organisational and leadership capabilities are required to implement the EPCIS standard?
5. What can be learned from these pilot programs and applied in other supply chain settings?

To explore these issues semi-structured interviews were conducted with key informants from organisations that had participated in the pilot. GS1 Australia facilitated access to pilot participants, and provided documents with information on the pilot, as well as enabling access to an online discussion portal that participants used to confer and discuss issues during the pilot. Based on a review of prior research relating to challenges associated with supply chain integration, an Interview Protocol was developed. A draft version of the Interview Protocol was reviewed by the working group before field work commenced. In accordance with University of Melbourne requirements, the Interview Protocol was also submitted for approval to the University of Melbourne Ethics Committee as part of an Ethics Application prior to the commencement of fieldwork.

The Interview Protocol covered a number of themes, including:

- ▶ information about the role of interviewees in the management of logistics and supply chain operations;
- ▶ the nature of the challenges currently experienced in supply chain management and how these are being managed;
- ▶ experience with the trial of the EPCIS standard within their respective supply chain;
- ▶ the potential benefits and challenges likely to be associated with the implementation of the EPCIS standard; and
- ▶ the leadership capacity necessary to implement EPCIS standard in practice.

A total of ten interviews were conducted, each lasting between 1 and 2 hours. Eight participants were interviewed from five organisations across the three supply chains, including participants from transport customers, transport providers and third-party transport contractors. Two additional interviews were conducted with key informants from GS1 Australia. These persons were involved in the planning and implementation of the trial pilot of EPCIS.

KEY FINDINGS

A number of key themes emerged from the study. The potential gains from the adoption and use of the EPCIS standard may be very strong, addressing some current supply chain management concerns and having a far-reaching, positive impact across the logistics industry. Better planning, superior customer service and greater efficiency were identified by study participants as some of the most significant potential benefits that could result from the implementation of the EPCIS. These potential benefits may further lead to time savings, lower costs and increased levels of customer satisfaction. Additionally, implementation of the EPCIS was viewed as a means to potentially improve efficiency by reducing the need for supply chain partners to negotiate how to record the movement of goods along the supply chain and which information to share.

VISIBILITY AND THE PERFORMANCE OF LOGISTICS OPERATIONS

Effective management and co-ordination of logistics operations was identified as critical to both cost control and delivering to customer expectations. End to end supply chain visibility provides a critical mechanism for managing logistics operations and maintaining control. As one interviewee explained:

One of the key things about the transport industry is that when it all goes well, it's low cost but when things go wrong, costs escalate incredibly quickly... one of the key levers you've got to manage it is visibility. If you've got that, then you can keep costs under control.

Interviewees identified a number of ways that improved visibility could assist in the effective management and co-ordination of logistics operations, including:

- ▶ improved exceptions management;
- ▶ early notification of changes to logistics events and timetables;
- ▶ the ability to micro-manage particular deliveries; and
- ▶ the ability to identify emerging patterns in future logistics and supply chain needs.

These benefits were viewed as potentially making it easier for individual organisations to plan for future logistics and supply chain resourcing needs. These planning benefits could help organisations better understand the movement of goods along their logistics supply chain, analyse trends and reduce inefficiencies, making deliveries better planned and more efficient. The potential spill-over effects for the business and the supply chain associated with improved visibility were understood by interviewees:

EPCIS could help us understand variability around pick up times and demurrage. If you're getting good, robust data coming through in a timely and accurate fashion, then it could help for analysis down the track... If we can safely reduce time at each of those steps, then we can reduce costs and improve service to our customers. The more we can reduce variation, the more predictable we are, the more reliable we are.

We get an idea now, but it's a very vague idea of when they're coming to collect freight or when they're coming to drop off freight. That may be something we'd be able to work on, which would be of benefit because then we'd be able to work out our requirements for the terminal workforce. Are we having a busy period or is it going to be slow? The work flows of when they're going to come into the terminal, the ebbs and flows of how freight's delivered and picked up- that'd be the main benefit for us.

VISIBILITY AND CUSTOMER SERVICE

The implementation of EPCIS was also identified by interviewees as an important means to enhance customer service, not just for the primary customer whose goods are being shipped, but also for the wholesale and end customers. In particular, visibility was viewed as providing the necessary information to deliver improved customer service. As one of our interviewees observed:

In the end, it's all about the consumer. We focus on giving the best experience to the customer so when they walk into store, the stock is there.

Visibility also provides a means to reduce the costs associated with servicing customer inquiries. Without visibility, customer inquiries across the supply chain become a costly process involving a number of people:

We talk to our people, those people talk to their people and those people talk to their people and those people talk to their people. It's ridiculous. If you looked at it, you would kind of go, 'Huh? How have we got this far with all that?' That's what I mean, when we have to have a manual intervention, that's where the cost comes, there's just people everywhere.

More reliable, real-time information also provides organisations with the capability to ensure delivery schedules.

We may have committed to providing an article on sale on promotion, but if the article and promotion are tied up somewhere, can't get through somewhere, we would be at risk of saying something to our customers that we would not be able to deliver on... [Using EPCIS] would allow us to deliver on our promises. Where we say things are going to happen or be in stock, they can be.

In providing more accurate information to customers, the enhanced visibility associated with EPCIS was also recognised as potentially improving customer satisfaction and, ultimately, customer retention. As one interviewee noted:

The fact that we've got information as the event happens, not hours, days or more after the event occurs, gives you the ability to talk to a customer in a really informed way.

VISIBILITY AND THE WHOLE OF SUPPLY CHAIN PERFORMANCE

Most interviewees recognised that visibility across the supply chain provides benefits to their supply chain partners, as well as their own operations. The potential benefits associated with visibility provided by EPCIS were manifold. Importantly, visibility provides transport customers and providers the capacity to easily access real time information as goods move from supply chain partner to partner.

The value of visibility is different to each person and each role. Throughout the supply chain, most people work in silos and talk to the people on their left and the right. There's obviously some coordination across the whole lot but often the people on the ground doing the fleet controlling don't have the visibility of what's happening upstream. Say if the volumes were increasing by 20% next week because it's coming up to Christmas, they may not have that exposure. That's where visibility potentially might help people to plan their world based on events elsewhere in the supply chain. The value [of EPCIS] is about the ease of access to information to make decisions around delivery of shipments... If that comes about then the whole industry benefits from that efficiency in terms of deliveries on time and in full and having a common denomination around metrics and being supplied with that information in an efficient manner. That's a big win for everyone.

Gaps in visibility in the movement of goods are often time consuming to track through third party systems, which interviewees identified as the consequence of inconsistent and different ways of recording supply chain events.

One of the things that is never the same is the latent or legacy systems that all of the individual participants use for getting information in real time... For example our supply chain in far North Queensland uses at least four alternate providers so there's four sets of data that need to be updated from most likely four ERPs [Enterprise Resource Planning business management software programs] so that's where the complexity comes in, so it's not about the system, it's about getting real and right data into it.

For transport operators, the benefit of access to real-time information extended to the ability to make better informed decisions.

It makes it easier for us to transfer data, hence we are more likely to be able to get a greater volume of better quality data about what's happening in our supply chain. The standard itself doesn't improve [performance] but the things that we are able to build using the standard can provide better information to all of the players in the supply chain.

Moving beyond the benefits to individual organisations, greater visibility across the whole of the supply chain was reported to build understanding of the needs and challenges faced by supply chain partners, both “up-stream” and “down-stream”. In doing so, the EPCIS standard could improve efficiency across the supply chain by facilitating collaboration among partners and an awareness of their interconnection. Bonnie Ryan, the Industry Manager of Trade and Transport at GS1 Australia emphasised:

It's not just what do I do in this supply chain but really how do I affect this supply chain... unless you understand what's happening downstream and upstream in your supply chain you could be thinking that you're doing a really good job but actually really causing an adverse action for someone else in the supply chain.

In creating a common approach to recording supply chain events, the EPCIS standard was viewed as potentially providing significant cost reductions and increased efficiency. The visibility gained from the implementation of EPCIS was identified by the study participants as potentially having significant impact on the overall performance and productivity of the logistics industry, by enhancing supply chain management processes and increasing productivity. Visibility across the logistics supply chain may aid planning, facilitating the capture of data from different sources in a more efficient and accessible way to save time and lower administration costs. By providing more timely delivery information, these improvements in planning and more up-to-date data may in turn improve customer satisfaction and retention.

BARRIERS TO IMPLEMENTATION

Co-ordination across Supply Chain Partners

Although all interviewees were able to identify the broad range of benefits, many also stressed the need for a “whole of logistics” approach to implementation of EPCIS and a level of collaboration and co-ordination among supply chain partners to realise these potential gains. As one interviewee noted:

Transport providers and transport users in Australia face the problem that there aren't existing standards. So if we want to interact with any of our transport provider partners, we have to go through a number of steps, including agreeing on transactional protocol standards, as well as defining the events that make sense and the data that we want to have recorded against those standards. The idea of being able to have a largely pre-agreed, common standard across a large slab of the Australian transport market is attractive to us.

Implementation could, however, be challenging for a number of reasons. First, most interviewees saw their own capacity to change the behaviour of other supply chain partners as limited. This was largely dependent on their capacity to influence direct supply chain relationships as a client:

We really only have leverage on the next [supply chain partner] down, on the one who directly trades with us.

The absence of any flow-on effects where such innovations were introduced was expressed by one participant:

I never want to see a supply chain participant doing something for us in a proprietary way that they're not doing for everyone else. Everyone should be using...one approach... Innovators have a responsibility to create standards and drive those operational changes through the use of their own systems to reduce cost across the board.

Competition among Supply Chain Partners

Full implementation of a standard such as EPCIS requires a degree of collaboration among non-trading partners. The concern that supply chain partners may be unwilling to change their systems to achieve this outcome, however, was echoed throughout the interviews, as these representative quotes indicate:

Everyone wants an integrated system as long as it's theirs... all the major transport companies have their own systems that they want to use so getting a standard would be difficult.

In the past we've understood that the transport providers have, to some extent, seen their specialist capability to do whatever their customer asks as one of the ways they can, to some extent, lock customers in to them.

A number of interviewees also observed that implementation of an integrated system providing visibility would require co-operation among organisations that often compete in the same markets:

Within the transport industry, it's a very competitive industry with tight [profit] margins... When companies are trying to attract customers, it's the things that differentiate you from other carriers that will win you the work, such as the visibility aspect.

Both these factors highlighted concerns that a common standard could impinge on proprietorial systems that contribute to competitive advantage. However, many interviewees saw that the EPCIS standard provided mechanisms to enable the co-existence of a universal standard for recording supply chain events and enabling individual organisations to continue to employ their own tracking systems and customer management systems to deliver superior service.

The hardest one to do is the first one, where you actually take the standard and translate the standard to what it means to you in your business. Once you've done the first one, if everyone else is working to the standard, you've done the hard work. That means the cost of doing business is a lot easier.

Having standards compliant systems across the industry would also enable transport operators to attract new customers and integrate with them more easily. Some interviewees emphasised the potential benefits that the adoption of an international standard such as EPCIS should outweigh any concerns regarding competitive advantage gained by using closed proprietorial systems to service customers. As one interviewee explained:

These businesses are often built around proprietary information flows. Some of the people who work there get it and others see it as a risk to their business. That creates a challenge. Fundamentally, I think they do see standards like EPCIS... as enabling them to take on new customers rapidly and to have those information flows been done at low cost. The challenge is that they've been providing that information to their customers for a long time in a proprietary way and if they head down a non-proprietary way they see that as something that might put their business at risk... In our view, businesses that have been doing this have been doing it because they're customer focused, so if they remain customer-focused, there shouldn't be any risk to their business.

Similarly, it was noted that the deployment of the EPCIS standard should yield improved customer service at increasingly lower costs as more supply chain partners adopted the standard.

Being a standard, once you've developed [systems using EPCIS] once, we can offer that to our next customer as a value add with minimal additional effort.

Data Security

A significant challenge identified by some interviewees concerned the security of event information data and how this could be maintained across supply chain partners.

Because there's so many different partners involved in the supply chain and a lot of companies will be involved in more than one supply chain... there needs to be a security layer involved with EPCIS so when we put an event up we don't want our competitors to see what our trucks are doing and what sort of volumes we're doing, which they could potentially infer by the events that we put up, but also one customer may not want another customer to know what we've moved for them.

Generally, data security was not seen to be an insurmountable issue, with interviewees who raised this concern indicating that data security had become an increasingly important issue more generally for the integrity of data management systems. Implementation of the EPCIS standard therefore would involve a systematic review of data security arrangements and provisions embedded within data management systems in any case.

Differential organisational capabilities among supply chain partners

A major concern with existing tracking systems concerned the requirements such systems might impose on smaller transport providers, particularly where they operate across different supply chains that rely upon different data management and tracking systems. A number of interviewees highlighted the potential benefits of the industry-wide deployment of a common standard for recording supply chain events. Indeed, interviewees suggested that doing so would enable smaller operators to provide customers with greater visibility than is currently available. One interviewee, for example, noted that:

Even the very large transport and logistics providers in Australia are dependent on the small owner-operator in many areas of transport. The large providers, even though they go to many locations, don't serve the whole of Australia. So, EPCIS provides them direct benefits with those small transport providers because they can integrate with them.

Nonetheless, smaller operators present ongoing problems for diffusing a standardised system for data capture and tracking given many still relied upon 'low-tech' systems for managing their own operations. As one interviewee noted:

Even though our major customers would use [existing online tracking systems], there's still a lot of small companies that sometimes don't even have a computer... one man operations that ring up or fax in... if it is off track, we'll communicate verbally with either a phone call or fax.

LEADERSHIP AND THE MANAGEMENT OF INNOVATION IN SUPPLY CHAIN OPERATIONS

The interview evidence and the learning experiences drawn from the pilot program demonstrate what has more broadly been shown in operations research on the associated returns of greater integration of supply chain operations across supply chain partners. This line of research has generally shown that the performance of a supply chain will be driven in particular by the extent to which technology and supply chain systems across partners are integrated.³ The introduction of an international standard such as EPCIS to improve visibility in the flow of goods between supply chain partners is one such means by which this integration can drive better performance.⁴ Yet, these barriers and challenges associated with implementing the EPCIS standard indicate that there are many factors likely to work against supply chain partners effectively realising the benefits associated with integration.

As the discussion so far as indicated, interviewees were also cognizant of this likely tension between identifying the benefits associated with visibility and achieving this potential through effective implementation. As one interviewee noted:

... it's a win for all ... everyone needs to come together to achieve the outcome- we can't do it ourselves and neither can our carriers...

A number of interviewees also suggested that particular organisations have the capacity to take a leadership role in diffusing new supply chain management practices:

A lot of these new systems are driven by the person who's holding the cheque book, because we're doing it at the request of [our customer], it would largely depend on them.

In particular, a number of interviewees also identified the critical role of senior individuals within organisations in driving this diffusion process:

Senior people in leading industry firms have to [take a leadership role] because they're the ones that can enable it in their systems, in their businesses.

Other interviewees also highlighted the critical role of industry-level stakeholders:

Firstly, it's at industry level, ensuring the successful outcomes of the pilots from the three supply chains involved and making that visible across the industry, with the strength that GS1 Australia and ALC have... all that working together would allow everyone to be coming to that implementation.

The critical role of leadership in driving supply chain performance has been recently highlighted by international research conducted by Deloitte consulting group.⁵ Drawing on findings from a global survey of businesses, they find strong support for the proposition that supply chain innovation is an important driver of supply chain performance. Moreover, the data suggest that a key determinant of supply chain innovation is recognition of logistics and supply chain management as a key strategic capability within the organisation. This in turn is shown to be related to presence of deeper talent pools in logistics and supply chain management at an operational level. Whilst this study does not test these relationships, the experiences with supply chain management more generally reported by interviewees, and their experiences with pilot program, support these conclusions.

³ See, for Example: Markham T. Frohlich And Roy Westbrook 2001. Arcs Of Integration: An International Study Of Supply Chain Strategies. Journal Of Operations Management, 199(2): 185-200.

⁴ See, for example, Paul A. Bartlett, Denyse M. Juijen, and Tim S. Baines. 2007. Improving supply chain performance through improved visibility. The International Journal of Logistics Management, 18(2): 294-313.

⁵ Deloitte Consulting Group. 2014. Supply chain leadership: Distinctive approaches to innovation, collaboration, and talent alignment. Available at: <<http://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-cons-supply-chain-leadership-report-040914.pdf>>.

ENHANCING VISIBILITY THROUGH INNOVATION – KEY LESSONS

In an increasingly competitive environment, ensuring that investments in new technology and organisational systems yield a return on investment is a critical concern for industry. Where the return on investment in new systems is dependent on how others across your supply chain take up such practices, making the business case can present a major challenge.

The evidence from this pilot program indicates that investing in systems that improve visibility throughout a supply chain offer large potential benefits for supply chain partners. However, to realise these benefits requires supply chain partners to carefully plan for implementation. Our interviews suggest that we can synthesise the key elements required to do so into a number of actionable lessons.

1 Know your own business case for investing in improved visibility

- ▶ Clearly define your own business objectives for improving visibility across the supply chain, which may be any mix of a number of benefits: reducing supply chain management costs; reducing wastage/spoilage; improving co-ordination, planning and resource utilisation; removing inefficient systems for managing customer inquiries; improving customer responsiveness and satisfaction.
- ▶ Understand the likely costs that your business will incur as part of planning and implementing EPCIS.
- ▶ Identify the strategic value of building B2B relationships through supply chain visibility and performance.

2 Create your own capabilities to manage change

- ▶ Understand the technical landscape of your supply chain, particularly the existing building blocks such as barcoding, scanning, electronic message exchange, and enterprise systems.
- ▶ Develop your capability to innovate through planning, piloting and measuring the impact of enhanced visibility on supply chain performance and areas for future improvement.
- ▶ Be prepared to invest in the skills and know-how of your supply chain team.

3 Understand your supply chain partners – downstream and upstream

- ▶ The benefits of enhanced visibility will vary greatly among your supply chain partners and may not always be so obvious. Be prepared to work with them to identify how improved visibility can help their own organisational and strategic goals.
- ▶ Leveraging the benefits of enhanced visibility requires organisations to take this approach beyond their immediate upstream and downstream supply chain relationships. Aim to achieve value for all stakeholders.
- ▶ Look to ways in which you can separate the inevitable incentive to compete with the benefits of collaboration.
- ▶ Understand the readiness/willingness of supply chain partners to collaborate and barriers to embracing innovation and change.

4 Don't ignore the invisible 'arc of integration'

- ▶ The benefits of enhanced visibility are not simply achieved through implementing better technology or the EPCIS standard. Just as important is the ability to more effectively manage across organisational boundaries to ensure connectivity and information flows.
- ▶ Encourage cross-functional collaboration within and between organisations. Encourage teamwork between customer service, sales, IT and logistics to facilitate the capture of data and share the benefits of the events information throughout the organisation, as well as between supply chain partners.

5 The importance of leadership

- ▶ Empower strategic supply chain leadership by securing senior executive sponsorship and support for the value of improved connectivity and information flows through visibility to the organisation.
- ▶ Be prepared to take a whole of supply change perspective to enable support for change and champion innovation.

CONCLUSION

In increasingly complex and globalised supply chains, maintaining visibility is the key to avoiding disruptions, minimising costs and ensuring customer satisfaction. Leaders across the transport and logistics industry are seeking innovative and strategic ways to position themselves for the future by building their interconnectivity across the end to end logistics supply chain.

This study followed the operation of a proof of concept of the EPCIS standard, a newly-introduced standard that is one of only a few production standards globally, unprecedented in its coverage of an end-to-end open supply chain. The pilot demonstrated the potential strengths of having a common standard for events reporting among supply chain partners, including improved efficiency, planning and customer service. At the same time, the pilot highlighted the need for a whole of industry approach to adoption in order to address the challenges of cooperation among trading and non-trading partners, different technological capabilities across the logistics industry, and industry concerns about data security. To some, the EPCIS standard represents a potentially disruptive technology development for the transport and logistics industry. Through piloting and championing this standard, organisations are able to build their innovative capability and keep pace with the demands of efficient supply chain management.

APPENDIX

List of Interviewees

Organisation	Title	Name
GS1 Australia	Industry Manager - Trade & Transport	Bonnie Ryan
	Project Lead- Trade & Transport	Ian Veysie
Nestle	B2B and Supply Chain Technology Manager	Mandeep Sodhi
OneSteel	National Freight and Logistics Manager	David Kelly
	eCommerce Manager	David McNeil
	IT Business Partner	Ronald Elsley
The Reject Shop	Chief Information Officer	Darren O'Connor
	IT Commercial Manager	Nick Busy
K&S Freighters	Business Analyst	Rob Simpson
Pacific National	Business Systems Coordinator	Geoffrey McAnulty

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