



SELF-THINKING SUPPLY CHAINS

THE ROLE OF PORTS

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Many supply chains are now quicker and nimbler than ever before. Technology is truly transforming supply chain capabilities. What we have labelled the ‘self-thinking supply chain’ is helping companies as diverse as Amazon and Zume Pizza to engage in ‘anticipatory shipping’ where product is moved closer to likely customer demand. Yet today's supply chains are also becoming increasingly complex due to the many interdependencies among supply chain partners. Many too are stretched over long distances connecting suppliers, producers and consumers across multiple geographies. These capabilities though bring challenges. In our connected world problems in one region can quickly spread downstream and hit customer supplies many thousands of miles away. The collapse of the South Korean shipping line Hanjin in late 2016 for example quickly led to shortages in retail stock for companies such as Nike right across the US – unfortunately coinciding with the annual Thanksgiving retail rush. Hurricanes in Puerto Rico in 2017 caused devastating

damage – and led to fears of drug shortages in the US as some pharmaceutical companies have offshore factories there. Other supply chain challenges include the need to trace products – and check the condition that they are in – as they flow along the supply chain.

A NEW ROLE FOR THE ‘HUMBLE HERO’

In this context, the relationship between supply chains and ports is significantly changing. The ‘humble hero’ is now a key actor for supply chains to achieve efficient, accurate, fast and simultaneously orchestrated responses that can improve supply chain performance in an increasingly complex and uncertain world. The Fourth Industrial Revolution – and its promise of a world of connected, autonomous and digital technologies – brings with it the ability to achieve the visibility and the collaboration needed to coordinate the management of supply chain and port operations to counter the challenges mentioned before. When we think of developments in port technologies the first things that usually come to mind

are applications to improve of shore-to-ship performance such as autonomous vessels, automated cranes, and drones for vessel inspections. There are however many other developments in Internet of Things (IoT), artificial intelligence (AI) and software applications which are finally allowing ports to become a true supply chain partner. Examples abound: shipping companies piloting blockchain technologies to increase traceability along the maritime leg of supply chains; IoT to switch on previously ‘dark assets’ such as containers and chassis to improve turnaround time at port yards and thus optimize the utilization of logistics assets; crowdsourced data through transport apps to manage congestion at port gates; and port communities systems as a one-stop-shop for information sharing and coordination of maritime supply chain operations.

A LAND OF (SUPPLY CHAIN) OPPORTUNITY

In our work on Latin America and the Caribbean (LAC), we have discussed the benefits that these technologies could bring



not only to ports but also to a wide variety of supply chain stakeholders. For example, the implementation of IoT at the port of Veracruz (Mexico) could help streamline port-hinterland operations and provide performance gains in terms of container cycle time, utilization rates, and total throughput. In Argentina, the use of a trucking appointment system at grain terminals is reducing waiting time for transport companies and long queues on main roads, which in turn improves road safety. In Valparaiso (Chile), the development of a port community system has reduced turnaround times by 70%, increased yard productivity by 160% and reduced CO2 emissions by 84%. However, looking into the future, maritime supply chain actors in LAC countries will need a bigger push for technology adoption if they aim to integrate to the self-thinking supply chains that will soon emerge globally.

These supply chains will have a high degree of connectivity between cyber systems and physical objects through the use of IoT. Huge amounts of data will be generated, stored and analysed through IoT and AI in real time, enabling continuous monitoring of supply chain performance and early identification and management of potential risks. Increased connectivity among supply chain partners aided by IoT, together with AI, will allow for more accurate demand forecasting, predictive maintenance and continuous optimization. With AI, decision-making will be machine-generated and processes will be automated. Objects will be able to sense the environment and respond to it according to AI-made decisions. The fact that some terminals in the region already present some degree of automation – e. g. Manzanillo International Terminal in Panama – will facilitate the integration of port operations to these self-thinking supply chains.

... AND PITFALLS

Along with the potential benefits of this new scenario, we have also identified four pitfalls that ports and supply chains need to be aware of while embracing self-thinking supply chain capabilities:

1. As both ports and supply chains become more reliant on digital they are also more exposed to cyber-attacks: the giant container shipping line Maersk – which carries a significant share of the world's higher value trade – estimates the cost of a cyber-attack on its operations in 2017 at \$300m.
2. Before supply chain actors – ports included – start to think of investing in new technologies they need to first check to see if they are harnessing the full capabilities of their existing supply chain technologies. For example, in our work across logistics systems in LAC we have seen trucking companies use advanced routing technologies not to optimise their transport flows but mainly to ensure that their cargo hasn't been stolen.
3. The technologies are only as useful as the business capabilities that complement them. Key here is to ensure that supply chain actors have the management information, decision support systems and human capital in place to fully harness the power that resides in the self-thinking supply chain. Otherwise they are not leveraging the value of their investment in these powerful technologies: our work across LAC countries has shown that the lack of adequate management and technological skills at all levels of the supply chain workforce is a key deterrent for technology adoption.
4. Finally, supply chain actors need to reengineer any cumbersome processes before digitizing them. This is particularly important when developing a port community system for example. Streamlining customs and trade control procedures is as important as digitizing them.

Avoiding these pitfalls and embracing what the self-thinking supply chain has to offer – especially around lowering operational costs, adding visibility, increasing predictability and allowing greater agility in a complex world – can be a real win-win for both ports and supply chains as we propel through the Fourth Industrial Revolution.

ABOUT THE AUTHORS

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