Freight Collaboration and AI in the Next Industrial Revolution: An Opportunity

04 March 2022

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The definition of insanity is to do something the same way repeatedly and expect a different outcome. As we move towards the next industrial revolution, it is becoming more apparent that current practices in a vast number of supply chain activities will not be working anymore. The just-in-time, globalisation model for supply chains, realised in industrial revolution 4.0, is infrequently a not-in-time model, with demand disruptions becoming a common occurrence. Supply chain has become no stranger to challenges created by man-made crises and natural disasters. The most recent in that array includes the global pandemic which is placing increasing constraints on current practises. It has been argued that the global pandemic is the driver for the next industrial revolution.

For many years, goods were made by hand at home or in small workshops. However, from the beginning of the 18th century until today, societies have witnessed four industrial revolutions transforming the conventional methods of production into the current smart factories. The first industrial revolution, known as 'Industry 1.0', represents the period between 1784 to 1870 when the power of steam was explored, and the first engine powered by steam was invented (Deane 1979). The steam engine eventually made the use of machines in the manufacturing process feasible which in turn facilitated manufacturing. The second industrial revolution, Industry 2.0, followed the discovery of electricity, and electrical engines were subsequently invented in the 1870s (Hawken, Lovins & Lovins 2013). With the aid of electrical engines, manufacturing time reduced, assembly lines were built, and factories opened. Industry 3.0 took place from the 1960s to 2000s when programmable logic controllers (PLC) were invented, and later introduced to the manufacturing industry (Stearns 2018). PLCs made manufacturing even easier and helped factories to become automated. According to the World Economic Forum, we are currently in the midst of IR 4.0. This means that factories are now becoming smart and cutting-edge technologies such as artificial intelligence, big data, and robotics, with minimal input from humans, are providing autonomy in manufacturing processes.

The fourth industrial revolution also coincided with the increased awareness of massive damage to the environment and society over the years. Depletion of natural primary resources, carbon emissions, landfill caused by end-of-life impacts of plastics, electronic goods and clothing waste are just a few examples from a tiresomely long list. Efforts have begun to try to recoup these catastrophic mistakes through circular practises, albeit at an imperceptible rate.

Industrial Revolution Future

The opportunities for the next industrial revolution seemingly lie in moving towards creating Society 5.0 where better human life, regardless of age, origin, sex or location, with minimal damage to the environment, will be the focus of attention. For Society 5.0 to be realized, an amalgam of physical space and cyber space must occur to create solutions that will resolve challenges through a new set of systems and values.

The value of Collaboration

The value of collaboration will come of age in the industrial revolution 5.0, albeit with the current boundaries challenged and broadened. Companies collaborate by working towards mutual goals, developing processes or products jointly, sharing the cost of investments, mitigating risk, or sharing information. Collaboration has predominantly focused within the supply chain and looked at internal opportunities working with other divisions to improve efficiencies. However, organisations have become much more aware that trying to achieve all this on their own is near impossible. Expansion to engage external organisations with similar needs that can capitalize on waste or end of life materials from another stream that can repurpose into its manufacturing process will be essential to meet future sustainability guidelines.

Although this practice is relatively new in adaptation, it has proven to be very beneficial for organisations to not only achieve sustainability goals, but financial benchmarks as well. With growing academic and industry focus, together with more legislative pressure expected to be applied to manufacturers regarding end-of-life producer responsibility for packaging, collaboration is imperative to organizational success in the Industry 5.0. Cross sector. Meso level collaborations leveraging internal supply chain strengths with external businesses needs will be crucial for organisations to successfully manage costs and increase revenue.

And how best can these opportunities be identified? In the IR 5.0, application of AI and BD (Big Data) in previously untouched applications will be the key. One example of this is Freight Collaboration. Some organisations have stronger relationships, infrastructure and pricing than others in areas such as container shipping, domestic transport and warehousing. Traditionally, these supply chains have been utilised exclusively with the host organisation as the customer, e.g., K-Mart.

What if the organisation was to expand the supply chain customer base to other retailers?

The host organisation can charge other companies more for the space in the container and unpack than the margin on its own product, improving container profitability. This also brings savings to the other companies. Furthermore, the revenue is realised sooner as non-trading income, without the need for the retail phase of the distribution to collect the margin. With space revenue optimisation becoming a focus, and applying the barbell effect, the risk is minimised by applying logic such as maintaining the core volume of the container as the host organisations stock whilst filling the rest of the container with the product with the best *GMROCS (Gross Margin Return on Container Space).* Inputting the data manually from one application to another would be unachievable, and time consuming. Here, applying AI to BD already in the container management and shipping platforms programs to calculate the best container profitability would be very progressive, and extremely valuable to any organisation.

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Andrew is a Business Improvement Analyst specializing in pooled asset risk mitigation through process design, implementation and administration. Currently undertaking research candidature in Supply Chain and Circular Economy synthesis, Andrew completed his MBA in 2017 with AIB. Passionate about sustainability and improving circular supply chain management principle application in the global market.

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