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Distribution workflows improving by internet of things technologies

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The Internet of Things (IoT) is transforming the supply chain from static and unreliable information to more dynamic and actionable data thanks to commercial applications of advanced technologies found in sensors and radio frequency identification (RFID) tags and their lower costs to implement. The world’s largest fashion retailer by sales, Industria de Diseno Textil or Inditex is closely integrating logistics and customer service functions with all Zara stores worldwide by their RFID programs. A DHL and Cisco recent report indicates a potential value of $1.9 trillion to supply chain and logistics and their customers from connecting devices to the Internet across warehousing, freight transportation and last mile delivery.

A smart supply chain is when logistics and transportation equipment (containers, trucks, fork lifts, pallets), facilities (warehouse infrastructure) and the products they move from suppliers to customers have devices attached to these equipment (objects) or infrastructure that convey data to improve productivity and profitability. Factory machines to dockworkers to in store or on-line sales are involved in the Internet of Things revolution. The treasure trove of data collected are improving decision making by lowering costs from inventory counts to lowering energy bills to rapid replenishment in stores for customers demanding fast-fashion apparel.

Sensors and RFID tags with their hand-held reader devices enable pallets and their product loads (temperature sensors for perishables or pressure sensors for weight sensitive) to send more precise data for freight forwarders to improve arrival times and if necessary alert customers to any delays and potential loss of business. At present, static messages by advanced shipping notices (ASNs) are sent by electronic data interchange (EDI) and become stagnant information to users along the supply chain. Real-time visibility is taking on a new meaning by the Internet of Things technologies.

**IoT - The Customer Speaks for the Company**

The astounding success of fast-fashion retailer, Inditex based in Arteixo, Spain attributes its $22.1 billion 2015 sales to its motto: “*the company doesn’t speak; the customer speaks for the company.”* The voice of the customer is heard from one of hundreds of Zara stores worldwide or on-line because of a new RFID implementation.

A recent interview with Inditex in Spain by the *American Journal of Transportation* found that innovation is one of the “main engines” of the company. They invested over 1,000 million euros ($1 billion) in the last four years on technology. The needs of their customers require a more immediate response and part of their investments went to Zara. “Zara developed in the last few years a RFID technology that allows to identify individually the garments from the logistics platforms until their sale,” the Inditex spokesperson explained. The RFID system uses tags or labels attached to objects to be identified. These tags have two parts: an integrated circuit for storing and processing information and an antenna for receiving and sending the signal. The tag information is stored in a non-volatile memory and includes fixed or programmable logic for processing the transmission and the sensor data. The two-way radio transmitter-receiver is called an interrogator or reader to send encoded radio signals to the tag and records its response. The RFID tag receives the message and then responds with its identification and other information. Electronic Product Code (EPC) data is stored in a tag and written into the tag by a RFID printer. The tag has 96-bit string of data that includes: header, product identification, and unique serial number that can all be relayed over the Internet into a website database.

**RFID**

Inditex completed their RFID implementation in 2016 to Zara stores worldwide. Pablo Isa, CEO, “plans to begin implementation over the next few years for all eight brands, and start in 2017 with Massimo Dutti and Stradivarius,” said Inditex. Macy’s had a similar RFID deployment by asking suppliers to place small RFID tags in the packaging of items shipped to stores.

The Inditex operation starts with the coding process in the logistics centers (Zaragoza) located near their design and manufacturing in Spain. “The RFID chip is placed in the alarms of our clothes which are 100% reusable. The distribution platform workflow is improved since the RFID system gives Inditex real-time knowledge of where every item is at each moment of the distribution process. When shipments reach the stores twice weekly, the system immediately pinpoints which sizes and models need replenishing so that inventories are more efficient and 80% faster thanks to this technology,” said Inditex.

Widespread implementation of RFID as an Internet of Things solution is still in the early stages for retailers. Industry reports indicate only one-third of the U.S. retailers use RFID and most of those chains with over $1 billion in sales. Over the past few years, the cost of the tags dropped to about 9-25 cents each, inventory and order performance improved, and international standards are more stable around ultrahigh frequency (UHF) passive RFID driven by the EPCglobal Network, a joint venture between GS1 and GS1 US.

A passive tag collects energy from a nearby RFID reader’s radio waves up to 5 feet away, whereas active tags have a local power source of a battery and operate thousands of meters from the RFID reader, hence can cost $50 each. New technology now allows sensor monitoring with passive UHF RFID tags and with readers that are interfaced with software for the sensor data to be interpreted correctly. This is effective with temperature sensors for cold chain monitoring shipments of perishables and pharmaceuticals.

Impinj, a Seattle based company, is the technology (chips, readers, antennas) behind Temp TRIP UHF Gen2 RFID tags for Hy-Vee, a $9 billion regional supermarket chain. This allows connectivity for distribution centers and suppliers to record time and temperature readings throughout the shipping process. Similarly, DHL and Cisco stated that Union Pacific placed acoustic and temperature sensors on tracks to monitor wheel bearings to avoid derailments to save up to $40 million per incident.

Supply chains are benefiting from the Internet of Things revolution in real-time data collection and decision making from RFID systems and sensors. This enables companies to better serve their customers. “RFID technology increases our response ability and guarantees a precise control of the whole store and all this exclusively to our customer service’s advantage,” commented Inditex.

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