



Adoption of **IoT** for **Ware**

Supply chain management is continuously improving, relying heavily on technology to improve work processes and efficiency. New use cases and ways in which businesses can improve their operations and enhance their efficiency are actively being tested as the industry is considering the move toward IoT-enabled solutions.

● BY Israel Gogol, Freelancer



house Management

Amazon Prime, the retail giant's delivery program which promises same-day or two-day delivery for an annual membership fee, is proving to be a big hit. Attracted by the convenience of shopping online and instant gratification, people everywhere are slowly but surely changing the way they shop. This is correspondingly shaping the future of retail and how the

supply chain is being managed.

This doesn't come as a surprise to Daniel Dombach, Director of Industry Solutions for EMEA at Zebra Technologies. "What we see these days, if we look at the warehouse landscape and the way client expectations are shaping, is the expectation to get goods faster – tomorrow or end of day delivery. For that, you need a higher proximity of goods to the consumer and if you want to be flexible and agile in your operations, you need very good visibility of your inventory and to be able to change things fast. This is where IoT comes in. It is about retrieving data from all the sensors and transforming it to business valuable information."



INTERNET OF THINGS

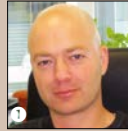


INVENTORY AND ASSET VISIBILITY

Stock visibility, or the ability to know where each item is, where it came from, and where it is intended to go, was quoted by all of the interviewees as the main demand from supply chain and warehouse managers.

“Our supply chain platform provides global visibility to track inventory from contract manufacturers all the way to customers. It is important for efficiency, as well as for redundancy and contingency planning. For example, if an earthquake hits a component supplier in Japan, the client can immediately know which parts they will have to get from somewhere else,” said John Bermudez, VP of Product Management at Infor.

Inventory tracking and scanning is not a new concept. The supply chain industry has been developing and improving technologies for this purpose for decades, starting from barcodes and then going all the way to RFID tags. So where does IoT come in and what benefits does it



- 1 **Asaf Adi**, Senior Manager, IoT and Wearables, IBM Research
- 2 **Douglas Bellin**, Global Lead, Manufacturing and Energy Industries, Cisco Systems
- 3 **John Bermudez**, VP, Product Management, Infor
- 4 **Daniel Dombach**, Director of Industry Solutions, EMEA, Zebra Technologies

deliver?

“We already track shipments from the time the pallet leaves the supplier to the last mile,” said Bermudez. He continued by talking about how IoT will enable continuous real-time visibility as to where everything is. “Tracking now depends on going through various scanners. We want to have active IoT to track shipments continuously and allow better reporting. There are a lot of ideas on how to use IoT in warehouse management, but the most important is to use it to make fast decisions. The goal is to get the right product to the right customer as fast as possible.”

“For example, by using active RFID tags or wireless battery operated tags on pallets, we can identify a whole order at one time, identify hot items on the pallet, and make sure we take them out first. This is especially true for components that are parts of a larger order, where delay in the delivery of specific components can get a whole project stuck,” added Bermudez.

The importance of visibility in supply chain management goes beyond mere inventory tracking. “We need to define the need as asset visibility, not just inventory visibility. Assets also include workers and equipment like forklifts in the warehouse. By knowing their location and condition and



Engaging Workers with

Apart from tracking inventory and assets around the warehouse, another benefit of IoT is the ability to improve the accuracy and performance of human operators. It is very common for warehouses to hire many temporary workers at peak seasons, such as holiday seasons or sales promotions, to answer the increased demand for shipments during this time. Finding an easy-to-use and accurate technology for these employees is highly important and wearable devices and augmented reality are some of the options currently being explored.

“In our innovation lab, we are looking into options like providing workers with wearable video cameras that can upload information to the warehouse management system or with smart glasses. This augmented reality solution will give the operator a visual confirmation on a small screen in front of his eye that he is picking the right thing,” described John Bermudez, VP of Product Management



“Greater stock visibility will benefit warehouse operators through increasing shrink prevention and worker safety.”

combining it with the inventory, we can make faster decisions and enhance efficiency. In the past, warehouses were a cost center. Now, with visibility and transparency, you can differentiate yourself from the competition and it's a growth opportunity," said Dombach.

POTENTIAL IOT APPLICATION

IoT-enabled warehouses and supply chains are still in its early stages. Therefore, the industry is still in the process of trying out different applications and approaches in an effort to figure out what makes the most sense.

By definition, IoT is a broad concept.

Various sensors can be deployed: cameras, active and passive RFID

tags, embedded scales in forklifts, and many others.

"We are seeing a multitude of sensor types being used



depending on the warehouse type and the products moving through. This could include cameras for security issues, but also for path management for forklifts and identification of empty pallets. Video cameras are able to track the location of the forklifts to see what routes are being used and then to optimize the path of the forklifts," detailed Douglas Bellin, Global Lead of Manufacturing and Energy Industries at Cisco Systems.

Logistics Industry at a Glance

The logistics industry is expected to grow in the next few years mainly due to two factors: increased economic activity and outsourcing of business. New technologies and IoT will be increasingly incorporated to improve the efficiency of the supply chain, resulting in increased growth opportunities in the industry.



The **global logistics market** is forecast to grow at a **CAGR of 8.4%** over 2015-2019.

Source: Technavio

01



IoT is set to **boost supply and logistics operations** by **US\$1.9 trillion** over the next decade.

Source: DHL and Cisco Consulting Services

02



Asia Pacific is the **largest region** in terms of **outsourced logistics market size**.

Source: Apex Insight

03

Wearable Technology

at Infor.

"Wearable devices will add a new layer of visibility that does not exist now. It will work in route management, showing wearers where to go via the glasses, and pick and pack verification, where bar code scans or RFID readings in real time can be used to ensure correct pick and order management," added Douglas Bellin, Global Lead for Manufacturing and Energy Industries at Cisco Systems.

The information collected from wearable devices can also be used for employee safety. This is important because not only does it ensure the employees' wellbeing, but it also saves the company money, minimizing losses due to injured employees and lost productivity. The IBM Employee Wellness and Safety Solution gathers data from all kinds of wearable and environmental sensors and alerts workers and safety officers when danger is imminent.

"Our wearables platform serves as a real-time warning system. It

analyzes a vast amount of information gathered from wearable sensors embedded in personal protective equipment, such as smart safety helmets and protective vests, and in the workers' individual smartphones," said Asaf Adi, Senior Manager of IoT and Wearables at IBM Research. Information from the sensors and smart protective equipment feeds directly to the worker's smartphone, which can then immediately process and analyze the personal data. Some of the gathered information is stored in the cloud for further analysis to improve safety regulations and procedures.

These sensors can continuously monitor a worker's physical condition through his pulse rate, movement, body temperature, and hydration level. Other things the sensors can monitor include environmental factors such as noise level and the employees' location in relation to moving machinery like forklifts. The solution can also identify and report potential risks such as a worker who is very close to operating machinery or one who is without a required safety helmet. It can also send out injury reports in cases like when it detects a worker that has fallen or fainted in the warehouse and alert first responders. "It can even alert if a worker seems to be suffering from low concentration or fatigue," added Adi.



“We have also seen access control being used not just for the entry and exit points, but also to include access to crib areas or storage points for support products such as helmets or gloves to track what is being used by the employees. We have also seen the advent and inclusion of active RFID around location management to track what is happening in real time and allow workflow management in real time,” added Bellin.



“There is no 'one size fits all' IoT solution for warehouse management. Each company will have to find the right mix of sensors and information that can bring maximum benefits.”

BOTTLENECKS FOR ADOPTION

IoT-enabled warehouses are not yet common. To tap into the benefits of IoT, warehouses will need to have a proper, robust IT infrastructure and sufficient bandwidth, especially if video integration is concerned. But besides these technical hurdles, market education is an issue.

“A huge issue for implementation is around process management and people management. It is not about people tracking or process tracking, but around efficiency management and helping employees understand. This is a key issue. Many people do not understand what is available and how this can help their business moving forward, so basic education on the possibilities is a hindrance as well,” said Bellin.

UPCOMING SOLUTIONS

Adoption of new technologies relies heavily on return on investment (ROI). Among the solutions mentioned by the interviewees, dimensioning, or the process of measuring the size and weight of pallets and boxes, showed clear economic benefits.

This is because volume and weight are two major factors that influence

shipping costs and thus, supply chain managers need to keep close track of them. “We are using the video in the warehouse to scan the sizes and weights of different boxes and the data for more efficient pallet packing. We can use accurate data which saves us money on transportation. We pay for what we ship,” said Bermudez.

“With sensors like embedded scales in the forklift, we can also monitor the size of the object, the volume being shipped, unloaded, and loaded onto trucks. All these have economic benefits when a customer pays by weight or volume. Mobile volume measurement, which allows the measurement of an object while it is moving or using a mobile unit, is currently being developed and I believe we will see more of it in the next two years,” agreed Dombach.

There is no “one size fits all” IoT solution for warehouse management. Each company will have to find the right mix of sensors and information that can bring maximum benefits. “Part of the challenge of IoT in warehouse and supply chain management requires companies to figure out what they need. There will be a need to partner with providers that can supply the full solution. The jury is still out,” explained Bermudez.

IOT WILL ADD INTELLIGENCE TO SUPPLY CHAIN

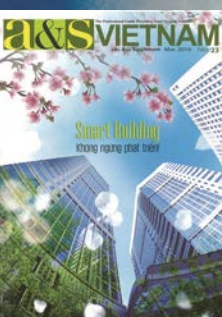
Greater stock visibility will benefit warehouse operators through increasing shrink prevention and worker safety. Knowledge of where each item is at any given time will minimize theft from warehouses and tracking of the movements made by both employees and machines throughout the warehouse might even prevent accidents from occurring. Even if the timeline for the full application of IoT in this setting is still unclear, the possibilities are numerous and its benefits are becoming more and more evident.

AVS





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