

## ***Disruptive Innovation – The new normal in warehouse management***

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*Editor's Note: It seems that change in our industry is moving at an accelerated pace. As we struggle to assimilate the latest technical terms, we recover by remembering author Alphonse Karr: "The more things change, the more they stay the same".*

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The phrase *disruptive innovation* was invented by Clayton M. Christensen, a professor at Harvard Business School. The term describes a new market and value network that eventually disrupts an existing market. Not every revolutionary invention starts out by being disruptive. When the first automobiles were developed in the late 19th century, the vehicles were costly and temperamental, so their market was limited to the very wealthy. However when Henry Ford started mass production of the Model T in 1908, this was a disruptive innovation because its low cost made cars available to the average consumer.

In this article, we will consider those disruptive innovations which have the potential to cause significant alterations in the art of warehousing. We understand the risk of predicting the future, and some of these innovations may end up being less disruptive than they seem to be today. Here are the innovations that will be reviewed:

- Additive manufacturing
- Crowdsourcing
- Internet of things
- Merger mania
- New ways of teaching and training
- Robotics
- Self driving vehicles

### ***Additive manufacturing***

Also known as 3-D printing, the technology has been around for several years. A machine roughly similar to a photocopier uses plastic or powdered metal to build a three-dimensional copy of an existing item by repeatedly adding small amounts of material. For most of its short life, additive manufacturing has been a demonstration or experiment. It has proven its ability to create reproductions of existing items. Only recently has the technology been suggested as a substitution for the procurement of conventional parts. At least one major logistics service provider has an experimental implementation of the technology within a distribution center.

Full implementation of additive manufacturing could have a drastic effect on warehousing. Imagine a distribution center for automobile parts, containing perhaps 20,000 different part numbers. If half of those parts could be reproduced with additive manufacturing, the size of the inventory in the warehouse should be dramatically reduced. When a client needs a particular part, it is literally made to order on the 3-D printer.

### ***Crowdsourcing***

The term was coined a decade ago. It refers to the process of obtaining services by soliciting contributions from a large number of people who are not traditional employees or suppliers. The crowd may consist of part-time workers, independent contractors or even volunteers. Crowdsourcing can be used in a wide range of activities.

In supply chain management, the best example is the cab services provided by Uber, Lyft and Sidecar. The disruption begins when Amazon and others promise that they will use the similar services for delivery of cargo. Sidecar's website already reveals a freight delivery operation. Disruption could be complete when a significant share of delivery services are handled by independent contractors similar to the crowd sourced cab services seen today.

The same concept is now used for the marketing of warehouse space. FLEXE is an Internet-based service that allows any warehouse operator with excess space to offer storage and handling services to any buyer who needs them. In effect, the concept allows every warehouse operator to become a logistics service provider. This disruptive innovation could reach its ultimate phase when a large percentage of warehousing services is offered by the crowd rather than the traditional public warehouse.

### ***Internet of things***

IoT is a network of physical objects or "things," embedded with electronics that enable these things to exchange data.

The earliest application was RFID (radio frequency identification), patented in 1983 and wildly promoted by a few chain retailers. The technology worked, but the promise that every box of cornflakes would contain an RFID tag has proved to be unrealistic. The best applications are used for the control of more costly items such as rental cars.

The research firm Gartner predicts that the number of wirelessly connected products will increase fourfold by the end of this decade. For warehouse operators, the security aspects of IoT could be useful. A recent article in *The Economist* describes Gooee, a lighting firm that gives its lamps the power to activate alarms in the event of a fire or a break in.

## ***Merger mania***

A certain amount of merger activity in the logistic service industry is normal and inevitable. The industry is fragmented, and a high percentage of firms in it are family-owned and family managed. When the family is not successful in succession planning, a merger is the usual next step.

However, the merger activity today is different. Brad Jacobs, CEO of XPO Logistics, acquired 8 major companies in five years, in addition to 10 smaller ones. Four of these were acquired this year.

In an interview, Mr. Jacobs said "Transportation and logistics is the last big industry that has not yet been consolidated, but it should be, and it will be." This is the first time in years that anyone has talked about consolidation of the logistics industries. We have never seen mergers of this size executed so close together. Merger professionals frequently discuss the challenge of integration. The landscape is littered with merger transactions that failed to achieve the anticipated results because integration did not proceed smoothly. We would not suggest that XPO will fail to integrate its businesses, but the size and complexity of the mergers completed in 2015 should be noted.

If merger activity continues at the same rate seen in the last year, the character of the logistics service business could be changed. Will future mergers stimulate a race for size and scale? Will some of them be Wall Street driven? Will they reduce competition? Though there are giant multinational companies in the logistics industry today, as a whole the business is still fragmented. Mr. Jacobs says it should be consolidated.

If the current state of fragmentation is so great that no single enterprise could influence the process of consolidation, then what if several giant logistic service providers all follow a strategy similar to that promised by Mr. Jacobs. Will this happen?

## ***Teaching and training***

The shortage of talent is a major concern in the logistics industries today. While the spotlight is on truck drivers, there is a similar scarcity in other occupations. AWH is a software development company in Dublin Ohio. The company is constantly training a group of individuals to build a career in computer technology. The best candidates are individuals who have never tried to be programmers before. Why couldn't the same methods be used to develop other logistics skills?

## ***Robotics in the warehouse***

The *robot* was first used by Czech playwright Karel Capek in 1921. Experimental robots were demonstrated in private industry in the 1930s. In warehousing, one of

the earliest applications of robotics was the development of automatic guided vehicles (AGVs) in the 1970s. These mobile robots move about the warehouse floor, guided by a variety of navigation systems. Application of AGVs has steadily increased in the past several decades.

The earliest use of robots in materials handling was execution of repetitive tasks such as building and stripping of palletized case goods. Robots have also been used for packaging at the shipping dock. The move toward disruption may have begun when Amazon bought robotics manufacturer KIVA. As the applications have multiplied, the cost of robots has come down steadily. Disruptive Innovation may reach its peak when robots begin to replace many people in order picking, receiving, and other warehouse jobs.

## ***Self driving vehicles***

Not surprisingly, the concept of automated vehicles began with off-the-road applications such as farm equipment and robotic lift trucks. In such cases, the risk of accidents is minimized. Self driving motor trucks are legally deployed today in the state of Nevada. At least one major truck manufacturer, Freightliner, has made a major commitment to their development.

Another concept in advanced development is a "platooning" system that allows one or more driverless trucks to follow close behind a lead semi that has a driver. Volvo, Navistar and Freightliner have all made an investment in platooning technology. Platooning could allow a train-like row of trucks to move down a highway, just a few feet apart. The lead driver will cause the driverless trucks to automatically brake and accelerate as a unit. Since autonomous self driving trucks may be delayed by safety concerns, the platoon concept is likely to be the first application of driverless freight vehicles. In addition to reducing the number of drivers, the platoon saves fuel by reducing air resistance for the following vehicles. Ultimately, self driving trucks could greatly ease the driver shortage that exists today.

## ***Concluding thoughts about disruptive innovation***

Two decades after Professor Christensen published his career making theory of disruptive innovation in *Harvard Business Review*, it was inevitable that the original idea would come under attack. Even the author points out that the term "disruption" has been used so much that its meaning is diluted.

In Christensen's narrative, the innovators are usually newcomers. Yet at least three established firms, Amazon, Apple and Google, have caused as much disruption as any company. While most of the disruptors we described are not in the logistics service business, quite a few notable ones are.

If the logistics service industries are radically changed by 2020, which of the seven disruptors described here seems most likely to alter the face of warehousing? Your opinion is welcomed!

# ***KEN'S COMMENTS***

## ***Will the 3-D printer change warehousing***



Wikipedia may have destroyed the traditional encyclopedia business. Many have noted the ways in which Uber threatens the taxicab industry. Airbnb offers a similar challenge to the hotel and apartment business. Therefore it is natural to suggest that the technology called additive manufacturing or 3-D printing could eventually eliminate the need for warehousing of spare parts, and perhaps even some finished products. If a replacement part can be stamped out in a machine, then the parts depot needs only one unit of each. The impact on space planning could be severe. We have not heard of a situation where the 3-D printer has replaced a spare parts depot, but we should never assume that it will not happen.

## ***Technology versus commoditization***

A survey of 400 executives conducted by Eye for Transport (EFT) reveals that users of logistics services are looking for providers who are experienced in the latest technology. It follows that the service provider who wants to be distinguished from competitors should be at least a pilot user of robotics, 3-D printing, drones, or some other type of advanced technology. Being an early

adopter is one way to demonstrate that management is innovative and forward-looking.

## ***The danger of automating just because you can***

At a time when the cost of robotics is coming down and the availability of obsolescent handling equipment is great, a few warehousing organizations have jumped into a mechanized program just because it seemed to be a bargain. The important thing about automation is to consider it strategically. In other words, why are you doing it, and what are the options? A few years have passed since a warehouse service provider invested tens of millions of dollars in conveying equipment and then went out of business. There is a very thin market for used conveying equipment, and in this case most of the gear was sold as scrap metal. In another case, a company that grew by merger ended up with some mechanized equipment that was part of an acquisition. Just because this equipment is “free”, that does not mean that it would be wise to use it. If you are considering automation, the most important strategic question is: why?

## ***The difference between customers and fans***

Customers are price driven, and fans are driven by a positive experience. Customers want you to sell them, and fans are seeking personalized solutions. Customers will drop you if they are disappointed, and fans will tell you about the disappointment and want you to fix it. The challenge for every service company is to convert customers into fans.

# ***WAREHOUSING TIPS***

## ***Borrowing from Uber to improve truckload brokerage***

Freight broker Transfix uses smart phones and computer technology to find the closest available driver to handle a pickup. Drivers sign up for the service and use the phone to publish their location and availability. The system improves visibility and reduces inefficiency. Everything is tendered through the phone and tracked through the phone. Furthermore, accidents that might delay a driver are discovered and transmitted so that delays can be anticipated and/or minimized.

## ***Vertical conveying — A neglected handling option***

The conventional wisdom is that freight elevators are the only practical way to handle merchandise in a multi-floor building. While multifloor warehousing is rare in most of the US today, it is still found in urban areas

and in many places overseas. Freight elevators are costly and slow. Furthermore they are governed by inspection and safety rules to prevent accidents. In contrast, vertical conveyors handle only freight, and therefore they are exempt from safety regulations in most states. They can be installed outside the building, thus eliminating the need to construct elevator shafts.

## ***Dealing with a capacity crunch in trucking***

The worst mistake that you as a shipper can make is to remain passive. The scarcity is no joke, and there is every sign that it will get worse before it gets better. When trucking is scarce, carriers become more selective about the shippers they choose to serve. Have you considered what you can do to make your warehouse more attractive to carriers?

Use of a private fleet may be an attractive option for portions of your transportation. In other cases, a change to intermodal may have some appeal. Never stop searching for new options. Trucking remains a fragmented industry, and you may find a carrier who is better able to serve you.

## The top 10 myths of supply chain talent development

By S. Scott, C. Autry, M. Burnett, P. Dittman & T. Stank, CSCMP Supply Chain Quarterly Q3, pg. 30.

The top 10 myths outlined in this article by four members of the logistics staff at University of Tennessee really apply to the entire business community, not just supply chain. Here they are:

- ① *Talent management is the responsibility of the human resources department.* Perhaps the most significant of the 10, this turns the spotlight on a discipline that has not adapted to the realities of 2015.
- ② *Talent development returns cannot be measured.* This myth is perpetuated by the people who have not done the measuring, and then claim that it cannot be done.
- ③ *Talent development costs too much.* The same people who say the cost cannot be measured then say they can't afford to invest in it. Sounds like an excuse!
- ④ *Talent development is about teaching supply chain content.* A rationale for those who think that skills are more important than attitude.
- ⑤ *You can solve the problem with a one-size-fits-all training solution.* Will the same training used for truck drivers will work for customer service representatives? Ridiculous!
- ⑥ *Internal resources are better.* This is one way to teach people what they already know.
- ⑦ *Talent development primarily happens in the classroom.* This is clearly an outgrowth of the "one-size-fits-all" approach.
- ⑧ *Talent development will happen informally and naturally.* Just look at the people turnover at the companies that have this attitude.
- ⑨ *Talent development is less important than current issues.* Is this just another excuse to sweep the problem under the rug?
- ⑩ *It is too late to start.* This is another excuse for doing nothing.

## Leadership

*Inbound logistics*, October 2015, pg. 14.

This unsigned article is a profile of Bradley Jacobs, CEO of X PO Logistics. No executive in the recent history of logistics has moved as far and fast in acquiring service providers. In a relatively short time, X PO has acquired eight major companies, including the second largest LTL carrier. Asked why he did it, Jacobs said that logistics is the last big industry that has not yet been consolidated. He described a goal of being either the number one or number two provider of every key supply-chain service. Asked about disruptive innovations, Jacobs mentioned artificial intelligence. Its practical application is closer than most people realize.

## M & A activity on the rise — is bigger better?

By John Haber, *Parcel*, September/October, 2015, pg. 12.

The author is a management consultant specializing in global transportation spend management. Before the end of summer, merger activity dollars among logistics companies had already surpassed the total for 2014. Those making the acquisitions include FedEx, UPS, XPO Logistics, and Geodis. Not every merger is a success, and the acquisition of Airborne by DHL in 2003 is highlighted as a catastrophic failure, costing the buyer nearly \$10 billion. No clear answer is given to the question in the title. The market is consolidating, which means that there will be a smaller number of competitors. In his closing argument, the author says "bigger is not necessarily better."

## A focus on mobility

By Rosabeth Moss Kanter, *DC Velocity*, October 2015, pg. 24.

The author is director of the advanced leadership initiative at Harvard Business School. She is the author of a new book, *Move: Putting America's Infrastructure Back in the Lead*. The author's goal is to increase awareness of the immediate need to repair not only highways, but water pipes, sewers and energy infrastructure. She hopes that the result of this discussion will be the emergence of a leader with a compelling plan to present to improve mobility.

## Besting the dim rate dilemma

By J. Bond, *Logistics Management*, November 2015, pg. 50.

A feature story in this newsletter last year described the potential disruption caused by dimensional pricing introduced by the two major parcel carriers. As predicted, LTL carriers are following the lead of parcel firms. Now that this program has been in for nearly a year, what are users are doing to react. Some are shocked to see 30% increases in shipping costs. Others who planned ahead had much smaller impact. The new pricing was designed to protect carriers from the cost of handling a large carton containing a small unit. Some shippers who sought to simplify by using a smaller variety of box sizes are now increasing the number of sizes in order to control freight costs. Dimensioning devices that measure product cube, such as CubiScan, are selling rapidly. Some switched from cartons to poly bags. Others find that their conveyors are not compatible with the bags. While the concern today is increases in freight costs, in the future improved dim technology may be used to decrease costs.