

The Future DC Associate

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Presented by:

Ed Williams

Chris Elliott

Will Automation Replace Distribution Workers?



Considering Automation?

- Dadzie and Johnson, writing in the Journal of Business Logistics on Businesses' future automation plans:

Majority (51% +) of executives surveyed where considering:

- High Speed Sortation
- Conveyors
- Picking Systems

Approximately 30% considering:

- Automated Storage and Retrieval
- Robotic Vehicles



Why?



Does this sound familiar?

“There has been a dramatic change in the overall business climate, including the rising cost of money and labor, fierce global competition, and rapid technological sophistication.”

Dadzie, K.Q. and Johnston,W.J., Innovative Automation Technology in Corporate Warehousing Logistics.
Journal of Business Logistics.



OK here is the full reference . . .

Dadzie, K. Q., Johnston, W., J., (1991) Innovative automation technology in corporate warehousing logistics. *Journal of business logistics*, vol: 12 No:1, **1991**. PP: 63-82.

Points to Ponder

- The challenges we face are similar to ones faced by the industry over 25 years ago.
- In 1991 we were talking about the role automation will play in automating distribution
- Then as today, we looked to new distribution hardware and software to improve operations

What is different today?



Speakers

Ed Williams is a Vice President and General Manager with Blue Horseshoe Solutions. Ed has over 30 years of experience in operations strategy and process improvement; working both as a client and a consultant. Having worked with nearly every major publisher during his career, Ed is one of the preeminent authorities on supply chain for the publishing industry. Previous projects have included strategy development, network design/optimization, operations improvement, ERP and SCM software justification and vendor selection, as well as the implementation of solutions in service operations, stores, distribution, and manufacturing. Ed earned a Bachelor of Science degree in Mechanical Engineering from Purdue University. He speaks frequently at regional and national conferences on operational leadership and continuous improvement.



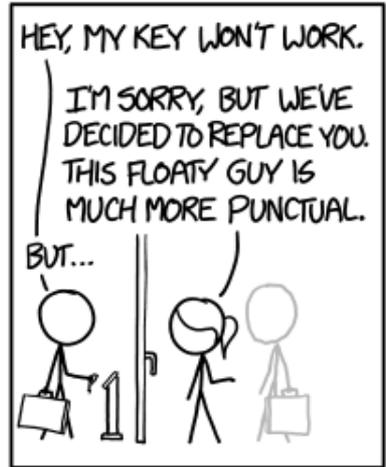
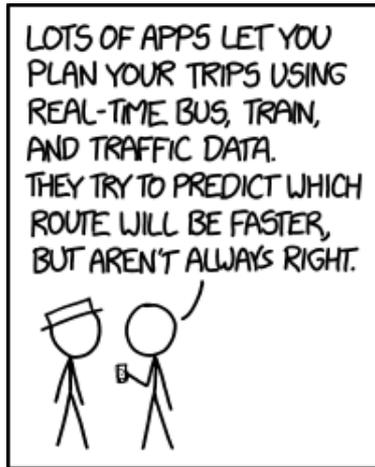
Chris Elliott is a Senior Strategy Consultant with Blue Horseshoe Solutions, TransTech Division. Chris has more than thirteen years of experience with supply chain software solutions, network design, inventory optimization, ERP/WMS implementation, project management, and supply chain technology implementations. As a consultant, he has provided solutions and strategies for mining, distribution, 3PL, manufacturing, fulfillment, publishing, and retail customers. Before entering into consulting in 2012, Chris held supervisory, analyst, and engineering positions with 3PL, chemical, and consumer packaged goods companies. Chris has also been an Adjunct Professor of Business at Ohio Christian University. His thought leadership has been published in CSCMP's Supply Chain Quarterly, DC Velocity, and has written content for McGraw Hill Education's Career Connections program. Chris holds a Master of Business Logistics Engineering and a Bachelor of Science in Materials Science and Engineering degrees from the Ohio State University.



Agenda

- Current Challenges to Automation
- The Future of the DC Associate
 - Augmentation of the DC
 - Retail Employees
 - Physical Augmentation
 - The Expanding Role of Automation
 - Semi-Autonomous
 - Fully Autonomous
 - Is the fully autonomous distribution possible?
 - What does the software of the future do?





Performance Algorithms

Comic attribution: [HTTP://XKCD.COM/1580/](http://xkcd.com/1580/)



Past Barriers to the Distribution Software of the Future

- Historically, paybacks harder to achieve in more software and hardware heavy projects . . .

Example of High Speed Sortation vs.
Goods to Person Project Payback

	High Speed Sortation	Goods to Person
Savings (MM)	\$ 15.0	\$ 2.8
ROI	297%	151%
Payback (Years)	3.3	5.1
IRR	37%	6%

WHY?



Barriers to the Distribution Software of the Future

- Risks in Highly Automated (Goods to Person) Systems
 - Higher capital expense associated with hardware, software, and implementation
 - Order profiles can change, which affect the efficiency of a Goods to Person (GTP) system
 - Changes in distribution patterns.
 - Harder to move a GTP system versus rack and conveyor.
 - Customer preference can change.
 - Downtime



What will drive change in the next three to five years . . .

- Lower cost and improved capabilities of 3D Printing / Additive Manufacturing
- Software that can integrate sensors, systems, and facilities
- Base wage rates rising
- Lower costs of systems?
- Increased consumer demand to have products delivered faster (same day deliveries)
- Lack of full time and temporary labor

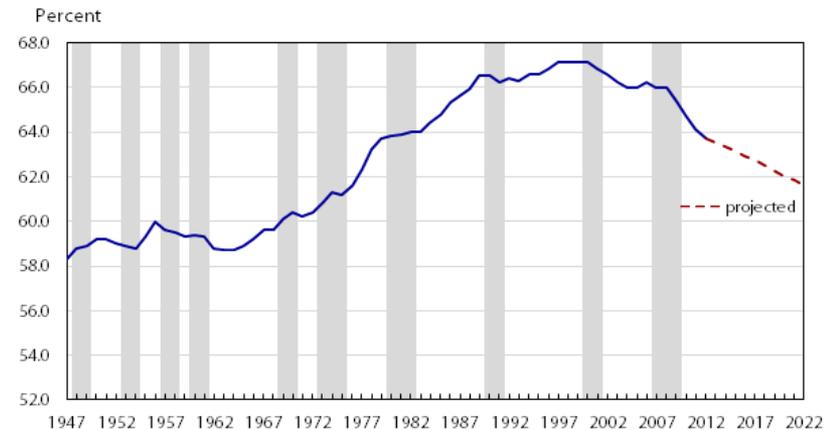


Bureau of Labor Statistics Data to Consider . . .

- Base total wages for warehousing have risen 32.7% since 2005.
 - Outpacing CPI Inflation rate
- Labor participation is dropping:

Youths not seeking employment one of the drivers in the drop in labor participation

Figure 1. Labor force participation rate, 1947–2012 and projected 2022



Note: Shaded regions represent recessions as designated by the National Bureau of Economic Research. Turning points are quarterly.

Source: U.S. Bureau of Labor Statistics.



Distribution Associate of the Future

- What does the distribution associate of the future today look like?
 - Omni-channel enablers of same and next day delivery from retail stores



Retail Augmentation

- The next generation of Omni-Channel
 - Retail stores are continuing to become extensions of the distribution center.
 - Services like Google Express will bring same day delivery out of the warehouse and e-commerce facilities and into the stores
 - Retail workers are responsible for picking, packing, and shipping product to customers.

REQUIRES: Having access to channel inventory from source to checkouts.



Device Augmentation

- Vision picking at Ricoh



Next Generation of Augmentation

- Combining Vision, Voice, and Wearables
 - Vision
 - Visual task assignment
 - Voice
 - Respond with voice / receive additional guidance
 - Wearables
 - RFID Scanners / Tags to improve labor management

RFID already being used by NFL
to get instant performance data



Augmentation

- In the near future (now to five years)
 - Augmentation of warehouse workers will:
 - Increase labor productivity
 - Reduce delivery time to customers
 - Increase labor management data



But there is more

WHAT COMES NEXT



Automation

Background

- High speed sortation, conveyance, and picking technologies have been around and in place for over 25 years
- Automated picking systems have been around for a generation
- Adoption of automation has been slower than we would have predicted 25 years ago



What does the warehouse worker of the future look like?

- Moving from manual picking to semi-autonomous



Companies are creating systems utilizing automatically guided vehicles with an autonomous picking arm.



What do semi-autonomous systems look like?

Combination of:

- Augmented workers
- Autonomous vehicles
 - Flexible AS/RS Systems
 - Automated Guided Vehicles (AGV)
 - Automated Picking Systems
- Automated pallet building and conveyance



What does the future hold . . .

- The fully autonomous warehouse
 - Raw materials unloaded and put-away by AGV
 - Components printed by 3D printers
 - Assembly by robotics
 - Packing and shipping automated
 - Delivery to end customer by drone



Is this the warehouse worker of the future?



Software Enablers of the Distribution Associate of the Future

True IoT

- Current IoT platforms are great at generating analytics
 - “I can see where the truck is and when it will be here”
- Doesn't have semi-autonomous command and control functionality

Scenario: System sees greater demand at Ohio facility, so it is able to take product in transit to St. Louis and redirect to the Ohio facility.

True IoT will be able to look up and down channel and balance planned purchases, production, inventory, and delivery automatically.



Software Enablers of the Distribution Associate of the Future

Requirements of True IoT

- Increase usage of sensors and devices to track inventory, manufacturing, inventory, and demand
- Improved usage of algorithms to predict demand
 - Agent based modeling
 - Predictive analytics
 - Machine learning
- Collaboration among partners to share channel data
 - Sales
 - Inventory
 - Stock outs
 - Promotions
 - Material costs



Software Enablers of the Distribution Associate of the Future

Advanced LMS

- Utilize RFID to provide real time labor productivity
- Combined with augmented reality, can improve the picking of the right product at the right place at the right time, with the right labor.

Requirements

- Possible today with current RFID technology.
- Software needs to be able to handle increased data inputs from RFID sensors.
- Capital expense is high



Software Enablers of the Distribution Associate of the Future

Augmented Retail

- Utilize apps to provide customer choice in how products will be delivered
- Takes omni-channel to the next level with an immersive sales experience.

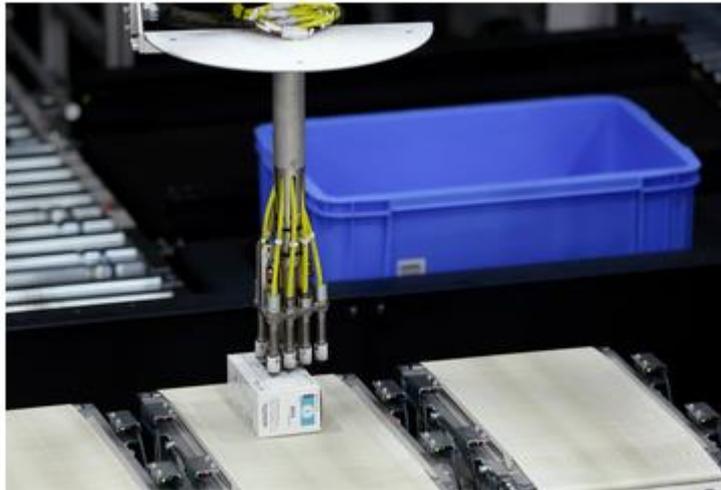
Requirements

- User adoption of augmented reality
- Adaptations to the retail store to handle augmented layers
- Cross-platform hardware support (Glass, hololens, ???)



Almost there . . .

- Japanese company Toho Holdings Co just opened a 10 Billion Yen facility that automates 65% of product picks



Individual employee productivity increased by 75%

System Challenges

System Challenges

- Must be able to integrate legacy systems with automated systems
- Be able to handle directing work to autonomous systems
- Must be able to adapt to demand and communicate what is happening across the distribution channels
- Move beyond just analytics



Hardware Challenges

- Cost and flexibility of 3D printing
- Reduced cost of robotics
- Changing role of warehouse workers
 - Task oriented to troubleshooting
 - More maintenance focused
 - Higher level of analytical / technical skills required
 - Comfort with technology



Industry Challenges

- Capital Cost to replace Legacy systems
- Fear of “Black Box” system controlling distribution system
- Finding partners with:
 - Automation experience
 - Global footprint
 - Deep understanding of the systems and integrations required
 - One provider that can provide total solution



It's coming . . .

About Amazon - “Step into the world of giant robotic arms working in factories and tiny machines lifting more than multiple humans combined.” – Dallas Sun Times, August 14th, 2015

“The World's First Self-Driving Semi-Truck Hits the Road,”
- Wired, May 5th, 2015

“In Japan, the Rise of Machines Solves Labor Shortage”
- Bloomberg News, September 13th, 2015

Are you ready?



For More Information:

Ed Williams email: ewilliams@bhsolutions.com

Website: www.bhsolutions.com

Chris Elliott email: celliott@bhsolutions.com

website: www.bhsolutions.com

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