

Materials Handling **TECHNOLOGY STUDY**

April 2019



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MATERIALS HANDLING



Introduction

- *Modern Materials Handling* magazine conducted its annual Materials Handling Technology Study to better understand the usage and adoption of technology applications being used and planned for use in materials handling environments. Where applicable, results are tracked back to prior studies to gauge any changes that may have occurred over time.
- Specific areas investigated include:
 - Company's adoption of technology
 - Impact of the current state of the economy on technology purchases
 - Annual spending on technology solutions and circumstances driving technology investments
 - Usage and plans to evaluate materials handling technology solutions
 - Reasons for implementing materials handling technology applications: What challenges looking to address
 - Types of materials handling software solutions currently in use/planned for purchase or upgrade:
 - Warehouse Management Software (WMS)
 - Transportation Management Software (TMS)
 - Supply chain management solutions
 - Adoption of cloud-based applications
 - Respondent Demographics



Methodology

Methodology:

- Field: March/April, 2019
- Method: Internet by email invitation
- Sample: Subscribers to *Modern Materials Handling* magazine
- Qualifications: Personally involved in using, evaluating, or purchasing software for their company's materials handling operations
- Incentive: Raffle for a \$100 amazon.com e-card
- Response: Response to waves 2015 through 2019 follows:

Field Dates	2019	2018	2017	2016	2015
# of completes	108	131	213	109	192
Margin of error at @ 95% confidence level	+/-9.7%	+/-9.0%	+/-6.9%	+/-9.7%	+/- 7.4 %

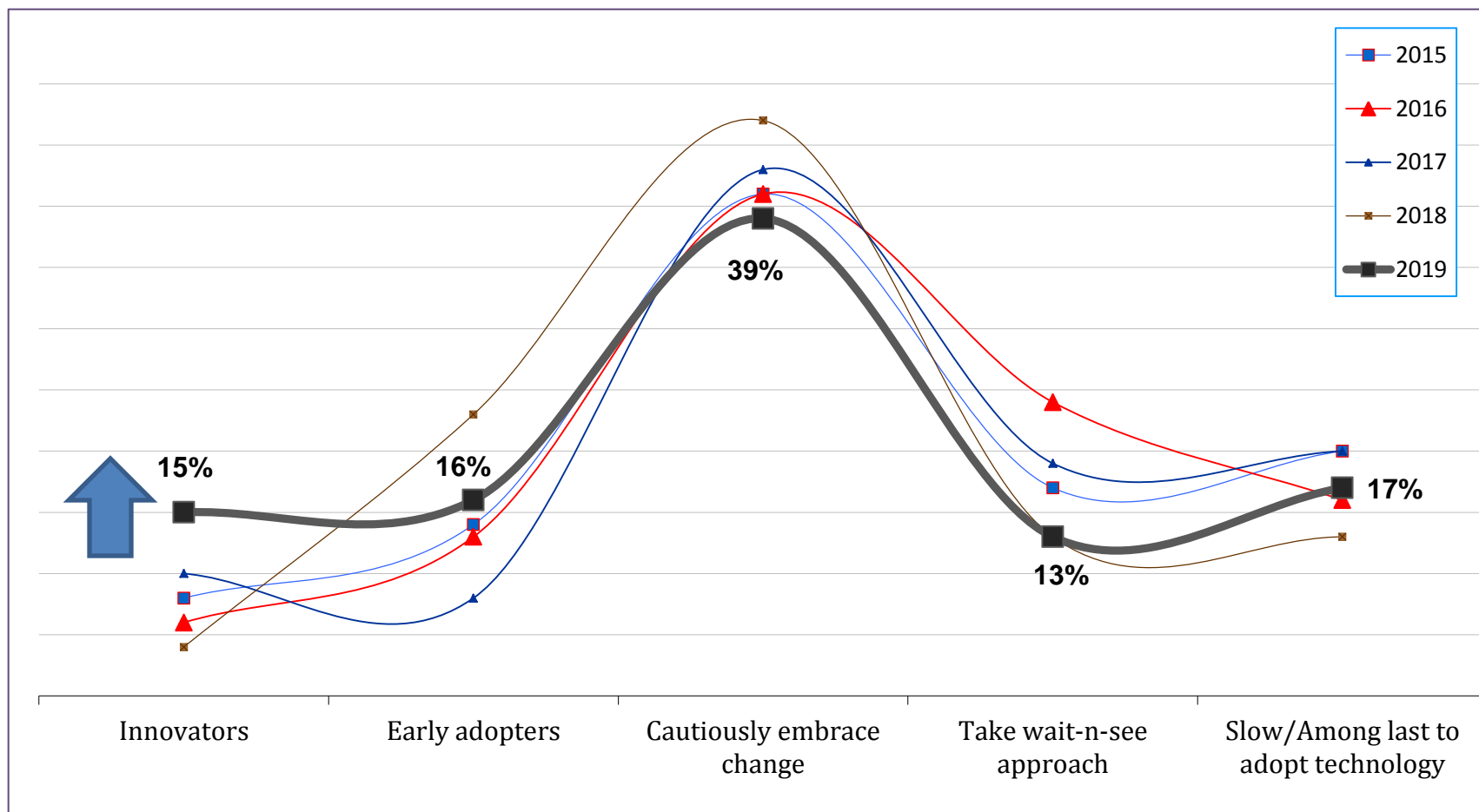


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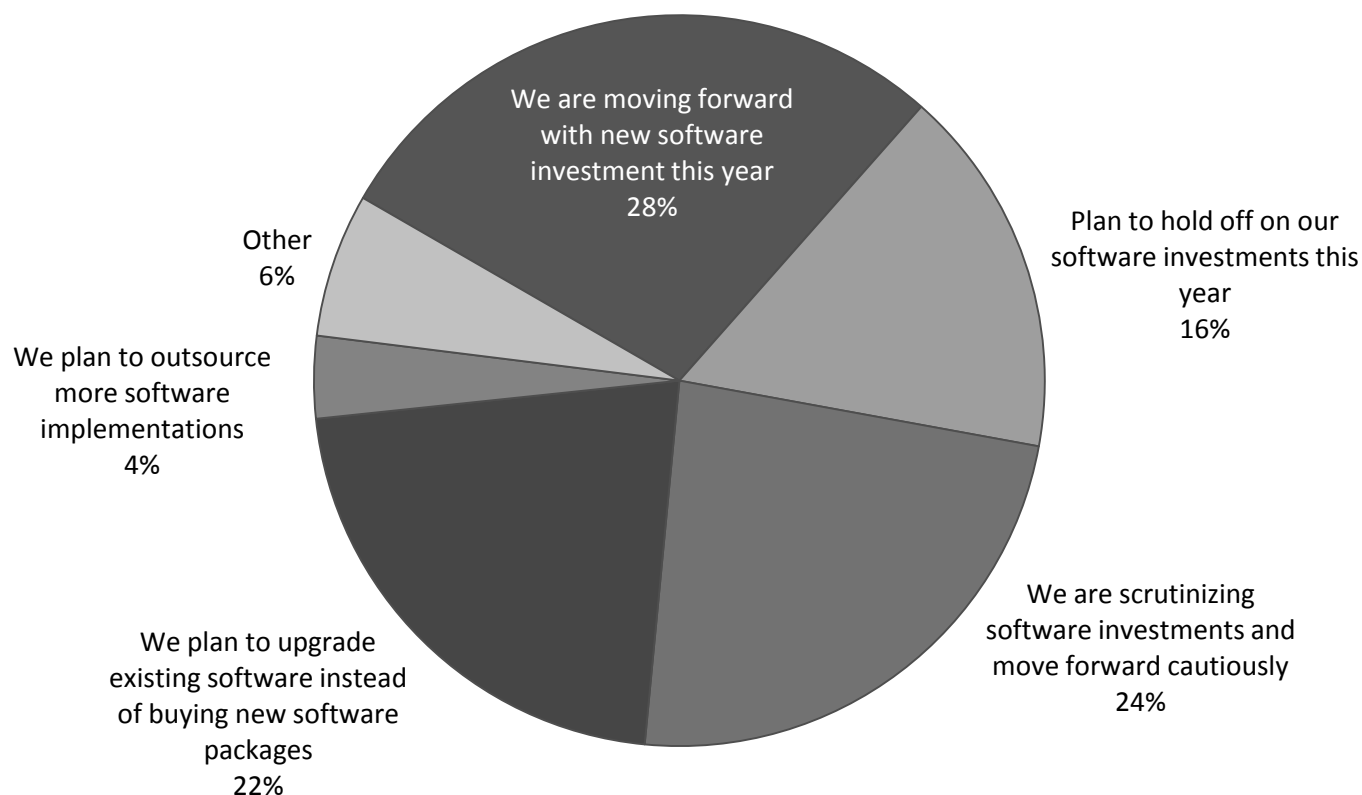
How would you best describe your company's adoption of technology for your materials handling procedures?



April 2019



How has the current economic climate changed your company's approach to adopting materials handling management software?





During the last two years what issue have you looked to solve through the implementation of a materials handling management software application in your warehouse or distribution operation?

Ability to more accurately and timely stage materials for upcoming assemblies - eliminate intermediate steps in consolidation procedures by identifying and separating incoming components that reduce the complexity of "staging" later on.

A computer system that fits logistics need, not just those of manufacturing

Addressing omni-channel in a legacy distribution center that was designed for retail/wholesale channel fulfillment.

Adjusting storage and handling to support hyper localization

Automation of kit building. Automation of weight checking products. Outbound scanning of packages. Print & Apply applications for outbound packages.

Barcode inventory identification. We rapidly want to move towards RFID.

Best cost management of portable RF units. Inventory Control via WMS/ERP Multi-Site Management via WMS lite

better service safety and programs for employees

Better throughput of product.

Compatibility with existing software

Conveyor controls update.

cost and performance

Dealing with high labor demand and high competition

Do more work in less time

Ecommerce picking Automation for put a ways

Efficient pick & pack systems and inventory management

Flexibility. observed, "There are going to be problems; count on it. Nobody involved can afford rigid positions. There must be give and take compromise. This can only be effective with joint and open work sessions. And all parties need to be ready to back away from their established positions, and rethink all viable alternatives. There is no substitute for having well-defined problem resolution processes.

Forecasting Resource allocation Production planning Flow and process management Inventory management and control Customer delivery After-sales support and service

implementation of a WMS

Integrating 3PL into core systems and process controls.

integration with ERP

inventory accuracy and reconciliation/Inventory management



During the last two years what issue have you looked to solve through the implementation of a materials handling management software application in your warehouse or distribution operation?

LED lighting

Out Of The Box platform was not complementary to our Business Model, many one-off enhancements and re-programming. Future upgrades to the platform are designed with the end in mind and more successful launches

Pallet content identification for ASN use

Reduce labor.

Robotics

Security because a majority of our business is cloud based now. And hack attacks have increased as our clients demand more access

Separated a product type into a separate room for storage, picking, and shipping. Includes a new conveyor belt, packing stations, and manifest area. The products are small, heavy pieces compared to the majority of our shipments, so it made sense to separate the special packing materials and small cartons into a specific area for improved efficiencies.

Shipping / receiving accuracy and performance

Storage utilization. We have purchased multiple VLM's and will be relaying out the warehouse with more use of carton flow racking systems to gain optimal efficiency, as well as invest in WMS.

Use of robotics and AI

Vehicle mounted scanner/pc.

Visibility

Well through our employees survey we have found that software issues need hour on hour updates to stay current with customer need and we have invested money in new and updated technology.

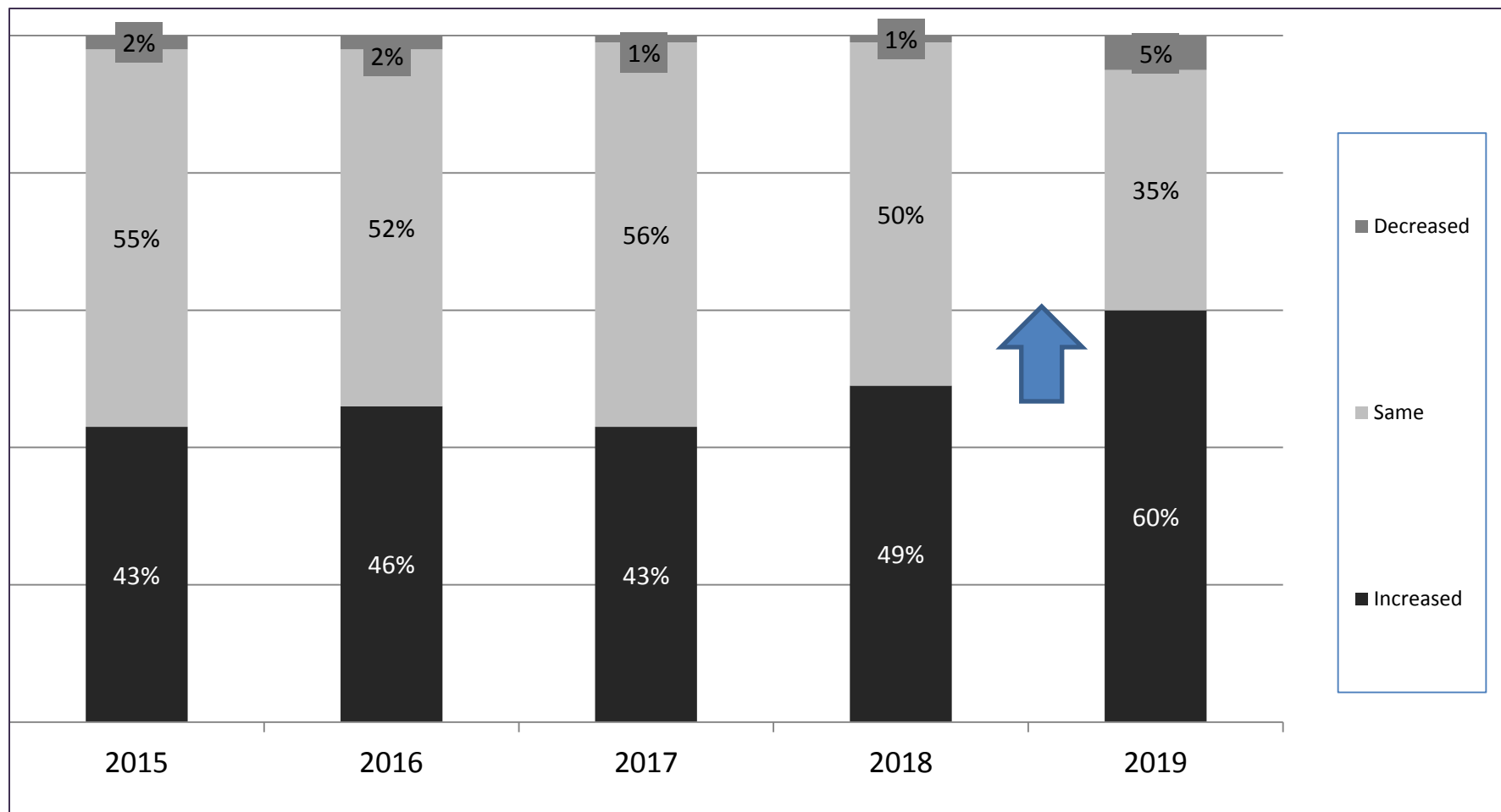


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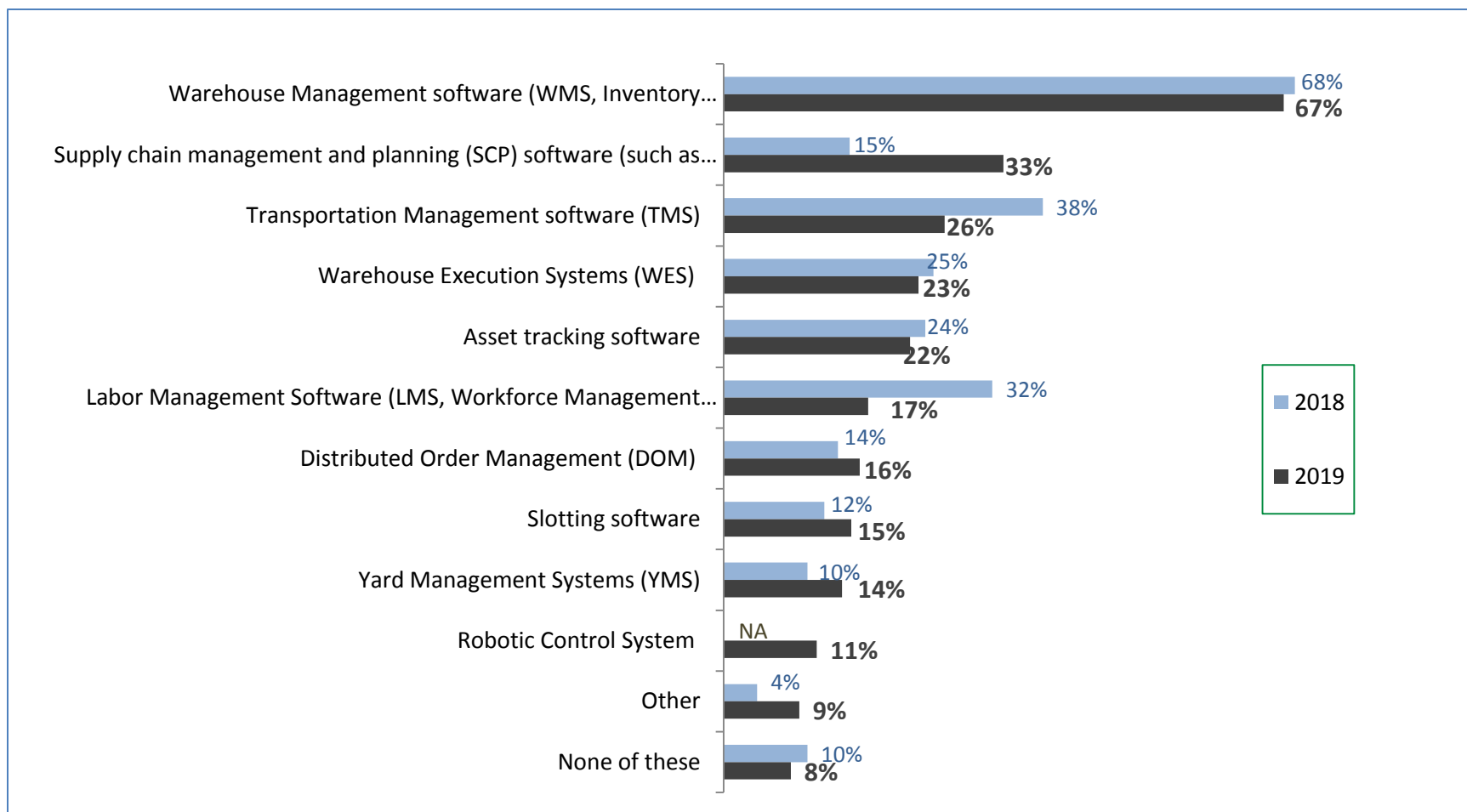
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How has your company's use of materials handling software changed over the past 2 years?



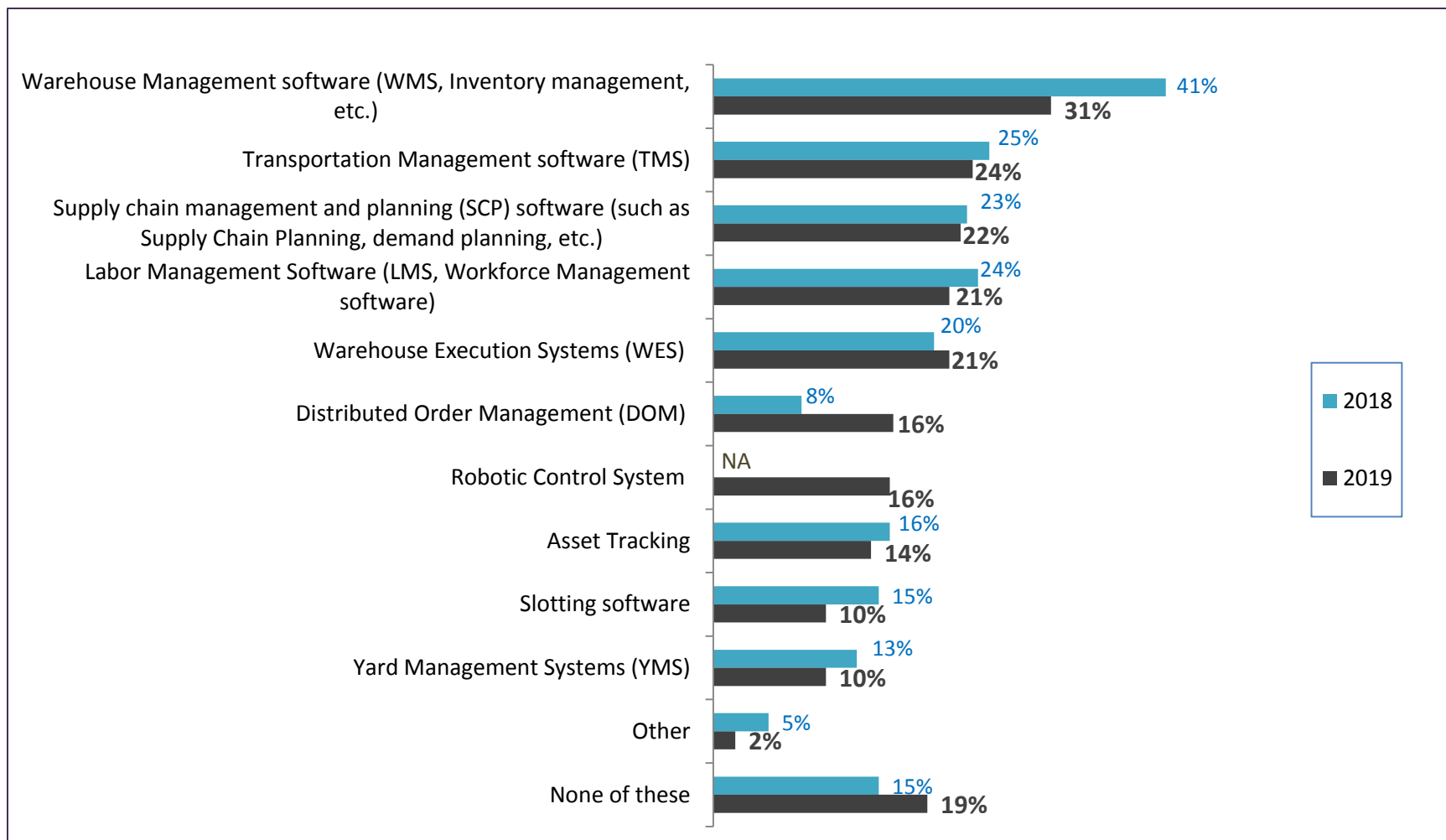


Which of the following software applications are currently in use in your warehousing and distribution environment?



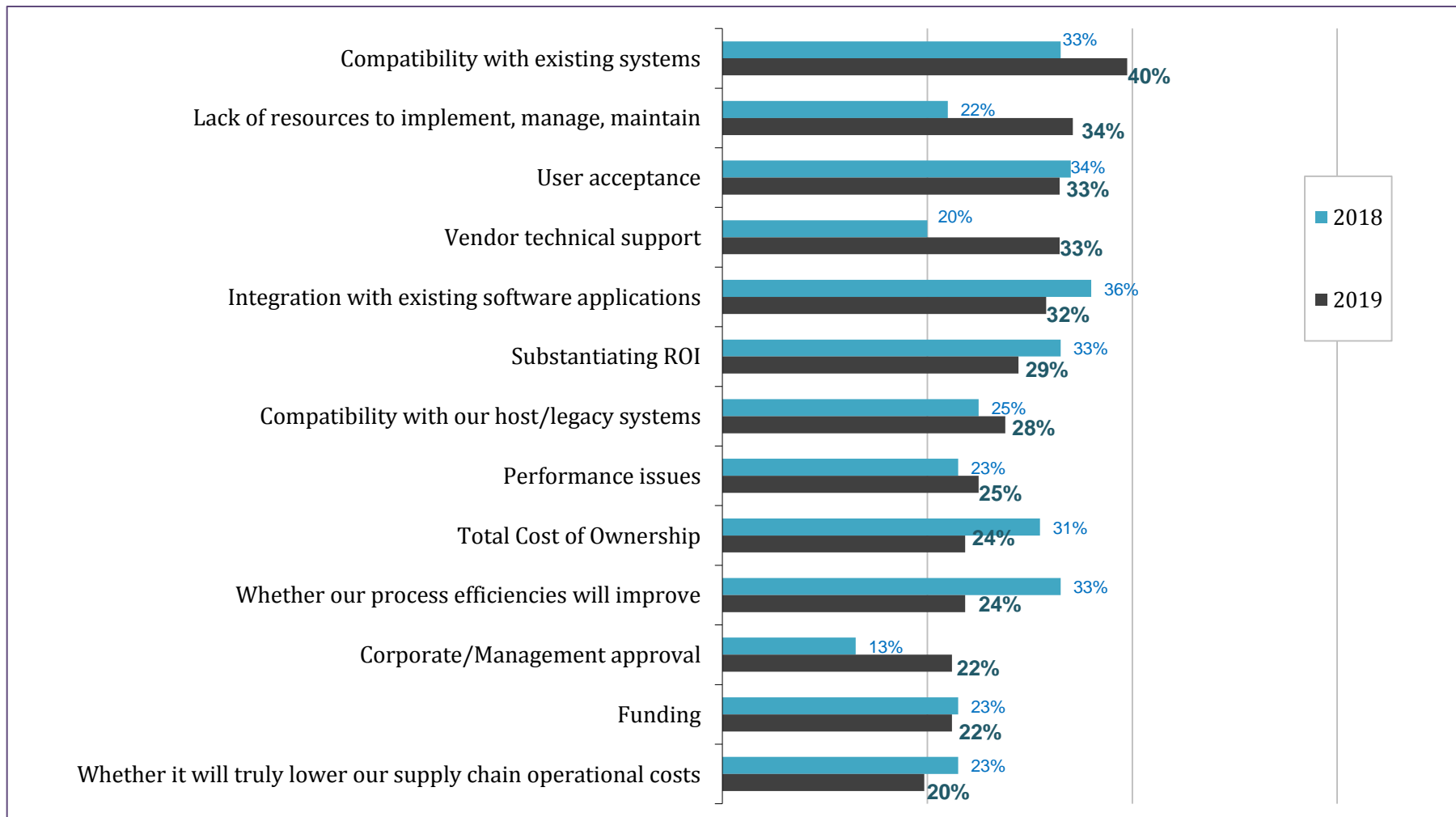


Which are you planning to evaluate, purchase or upgrade within the next 24 months?





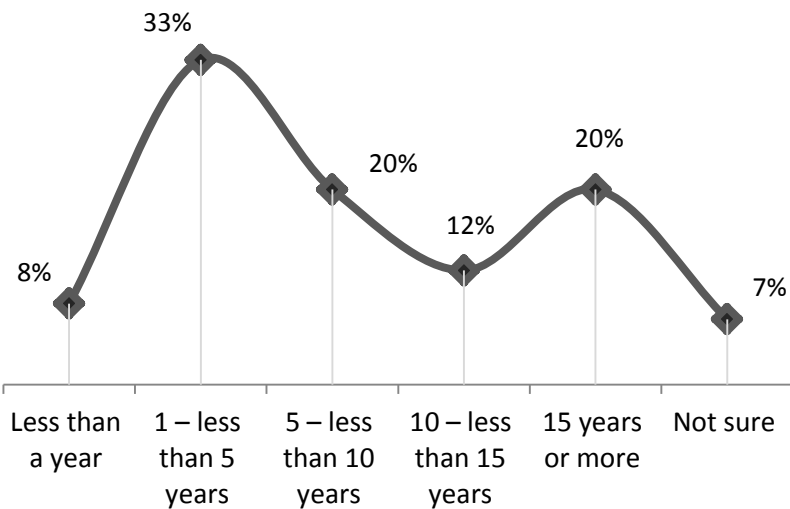
What challenges have you experienced or would you anticipate when adopting or implementing materials handling software applications?



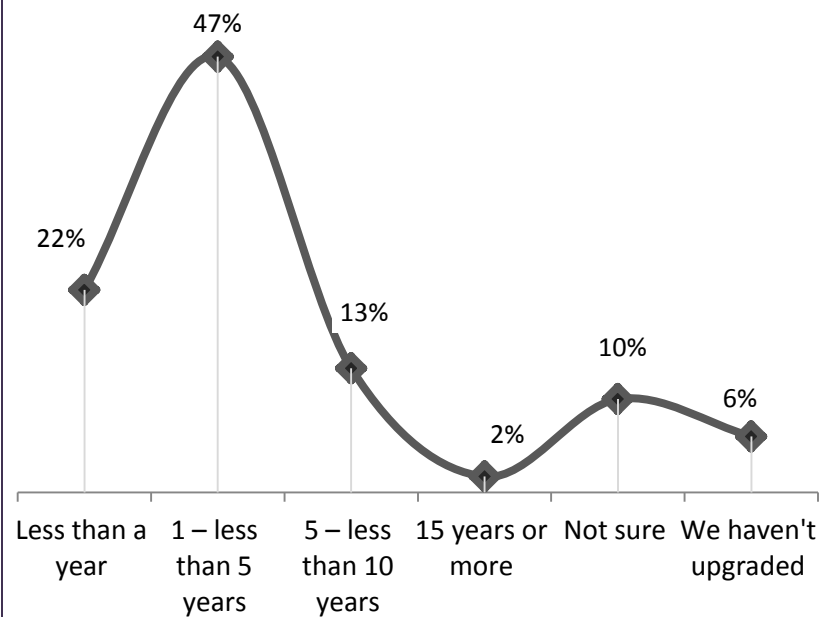


About organizations' WMS

How long have you had your current WMS application in place?

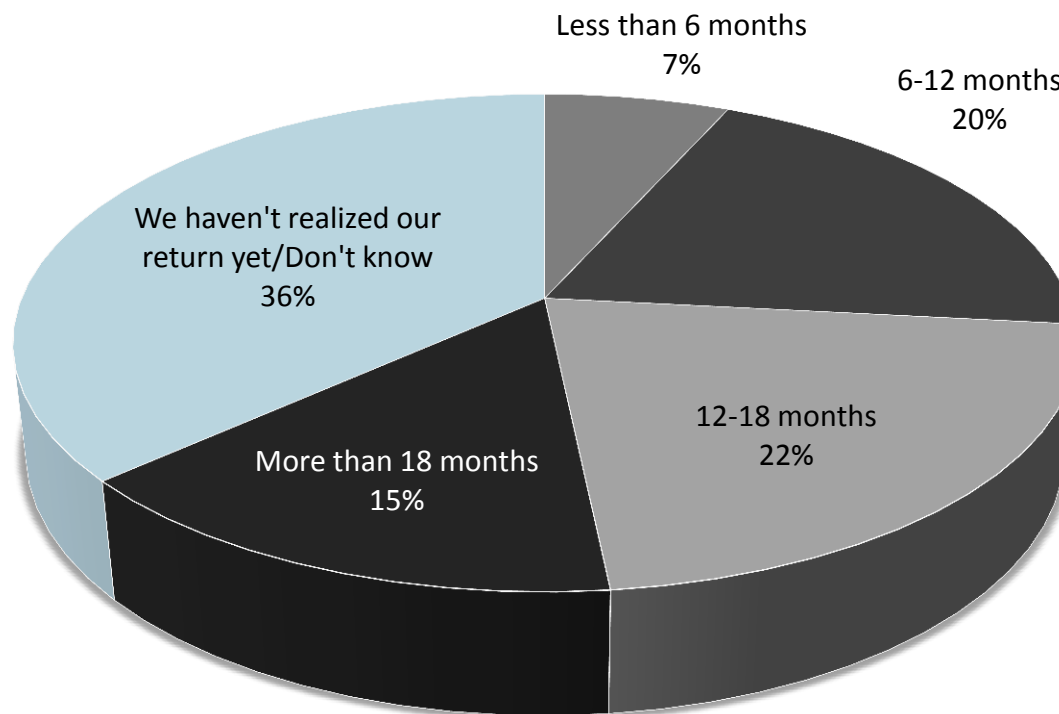


And, when did you last upgrade this application?



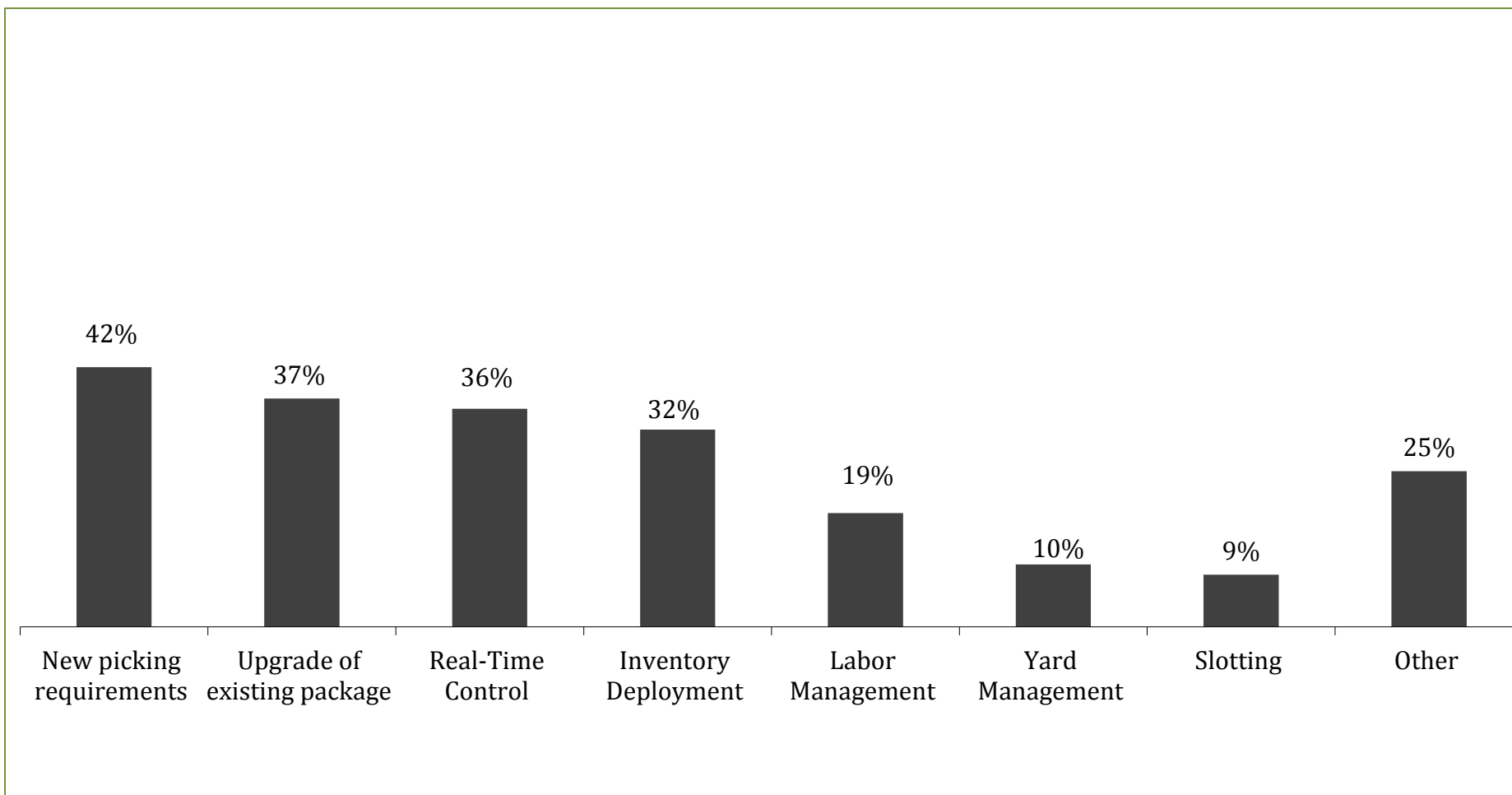


How long did it take for you to realize your return on your WMS investment?





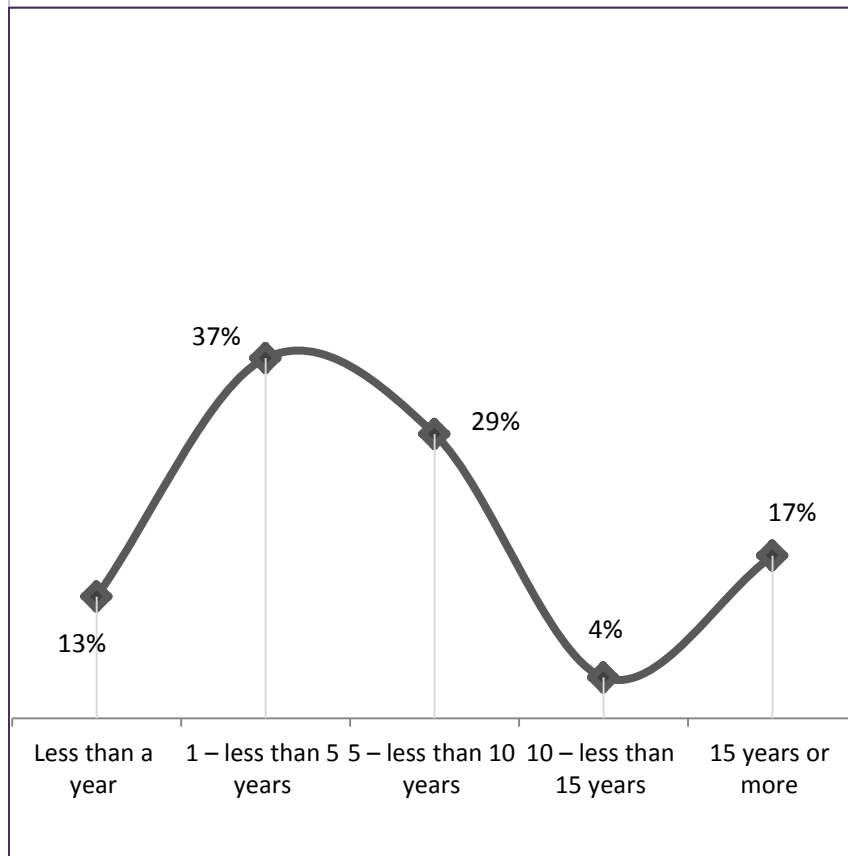
What are the main reasons your company is planning to consider or buy warehousing management software (WMS) during the next 2 years?



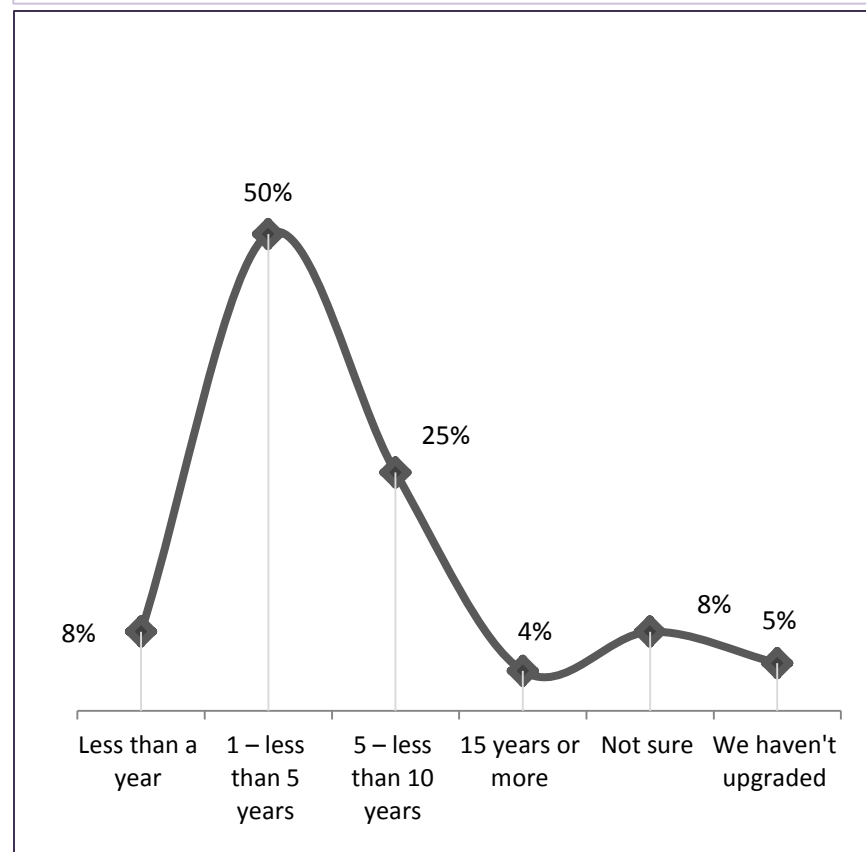


About organizations' TMS

How long have you had your current TMS application in place?

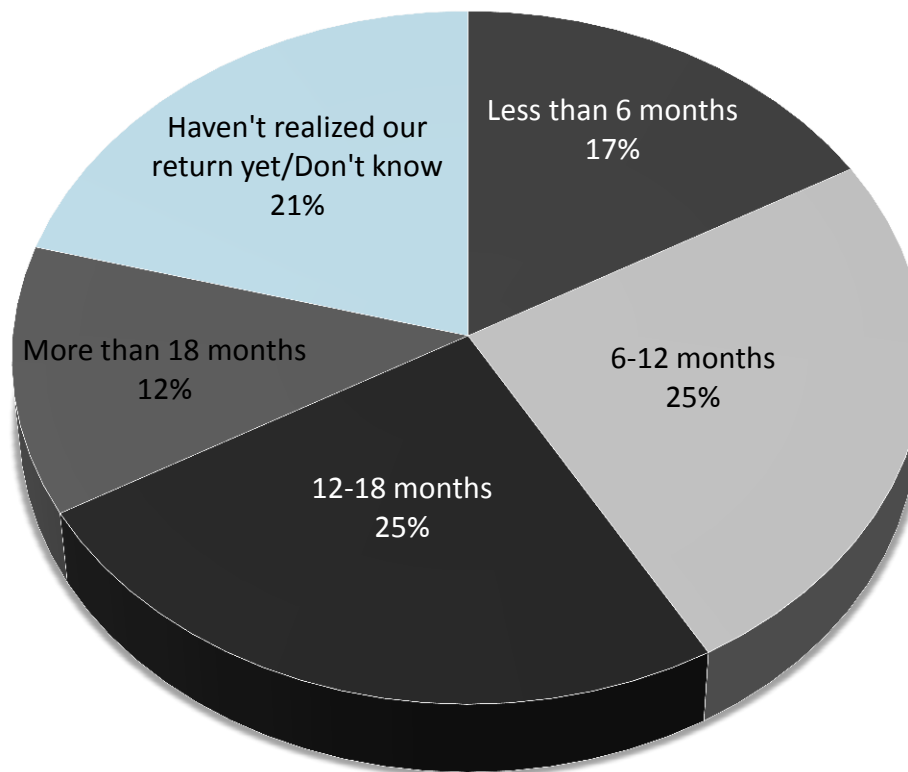


And, when did you last upgrade this application?





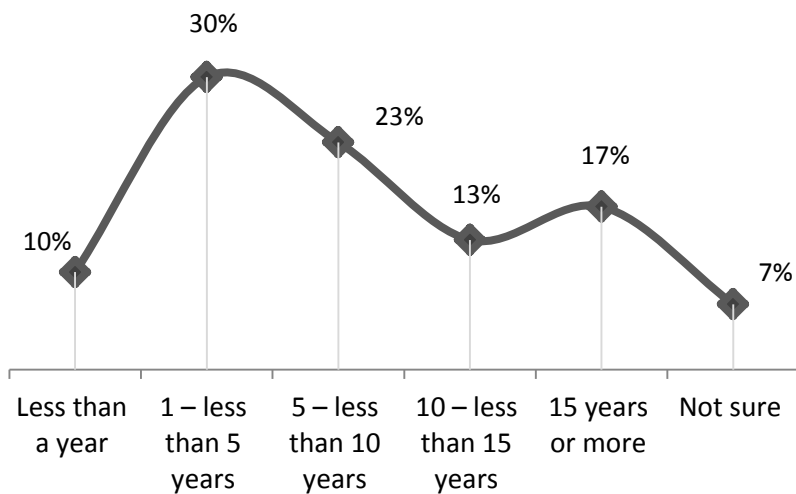
How long did it take for you to realize your return on your TMS investment?



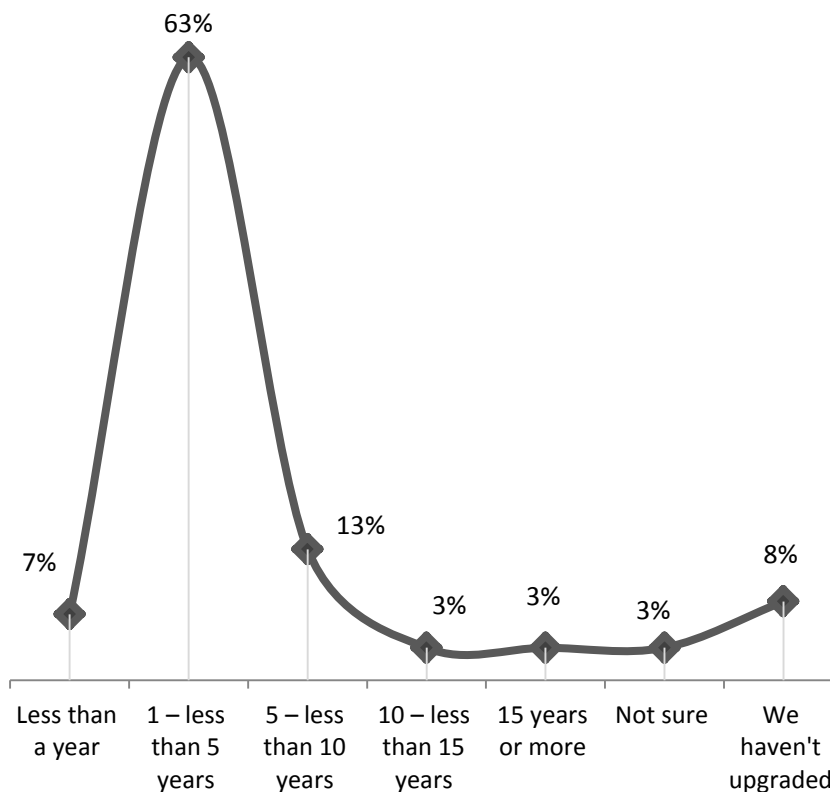


About organizations' supply chain management and planning solution

How long have you had your current supply chain management and planning application in place?

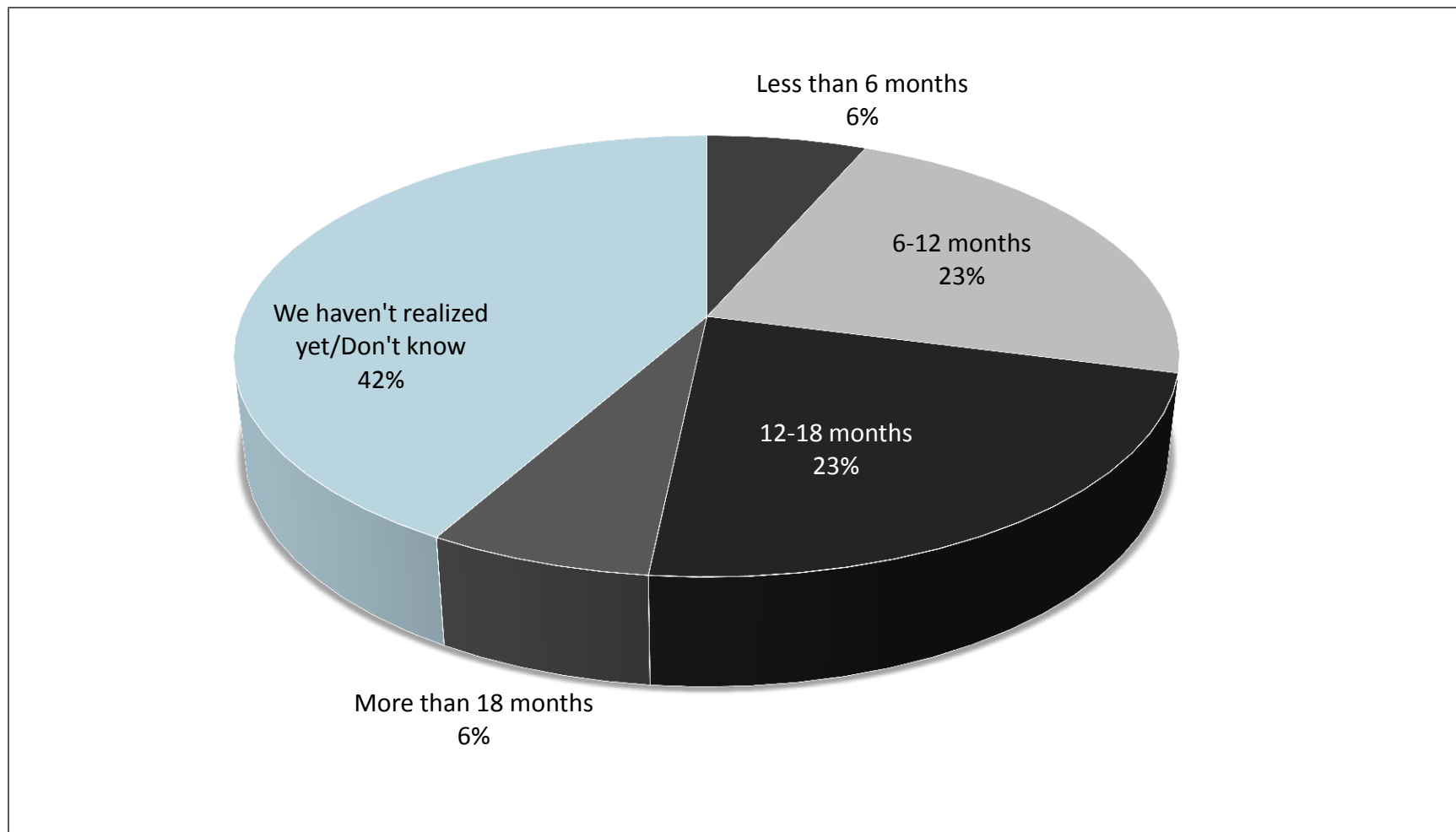


And, when did you last upgrade this application?



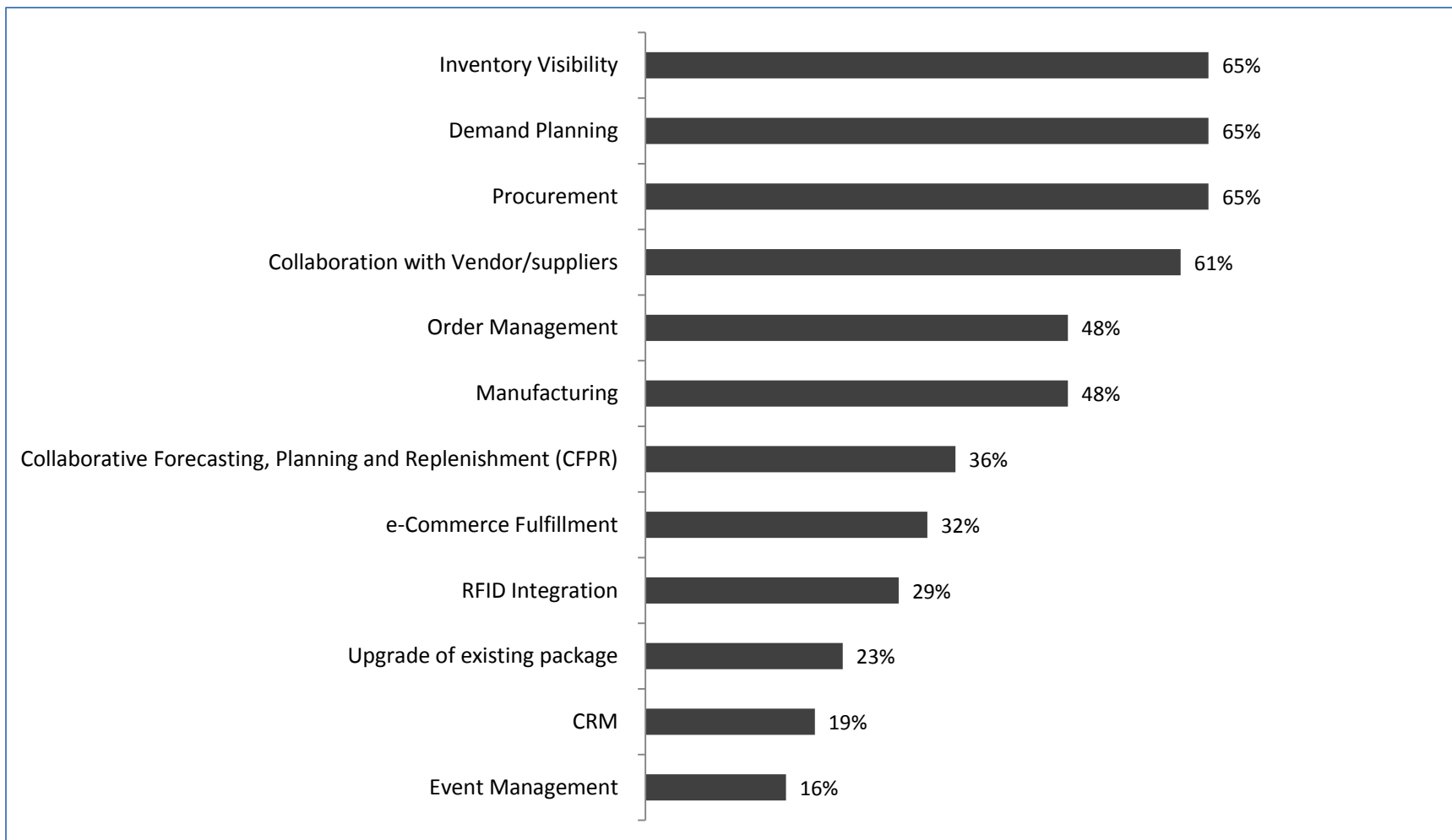


How long did it take for you to realize your return on your supply chain management and planning solution investment?



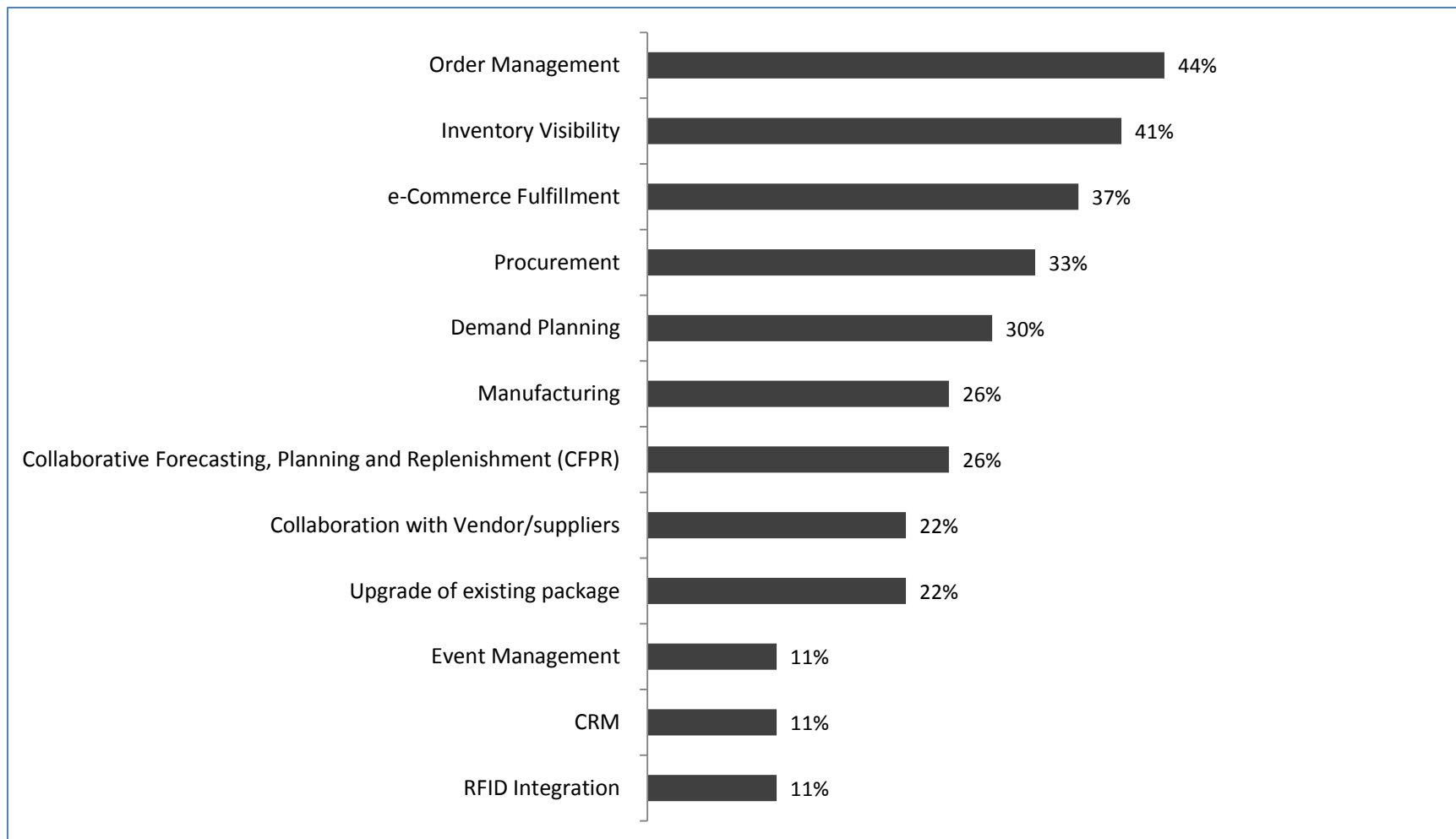


For which initiatives is your company using your supply chain management software application?



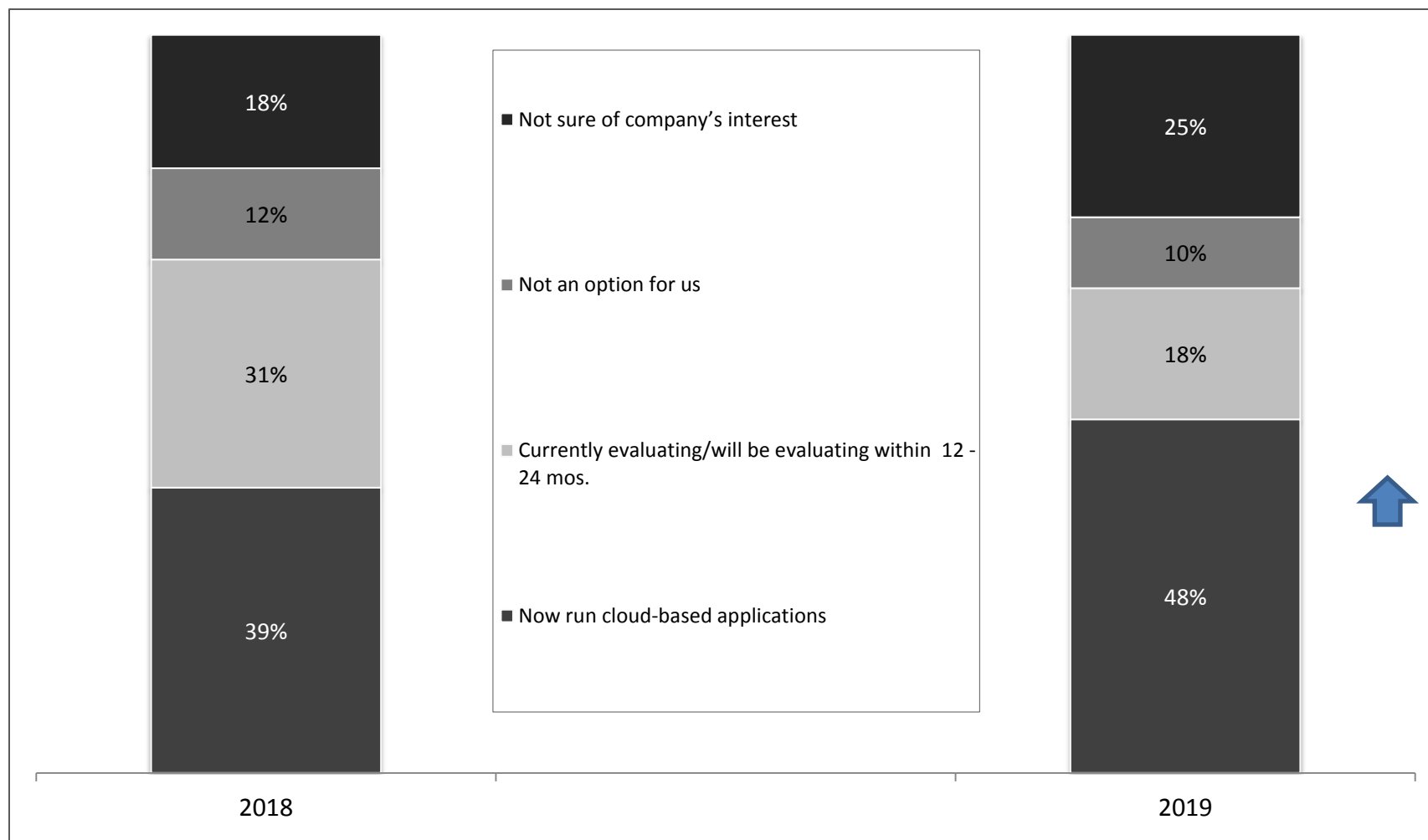


For which initiatives is your company planning to buy or upgrade your supply chain management software application?



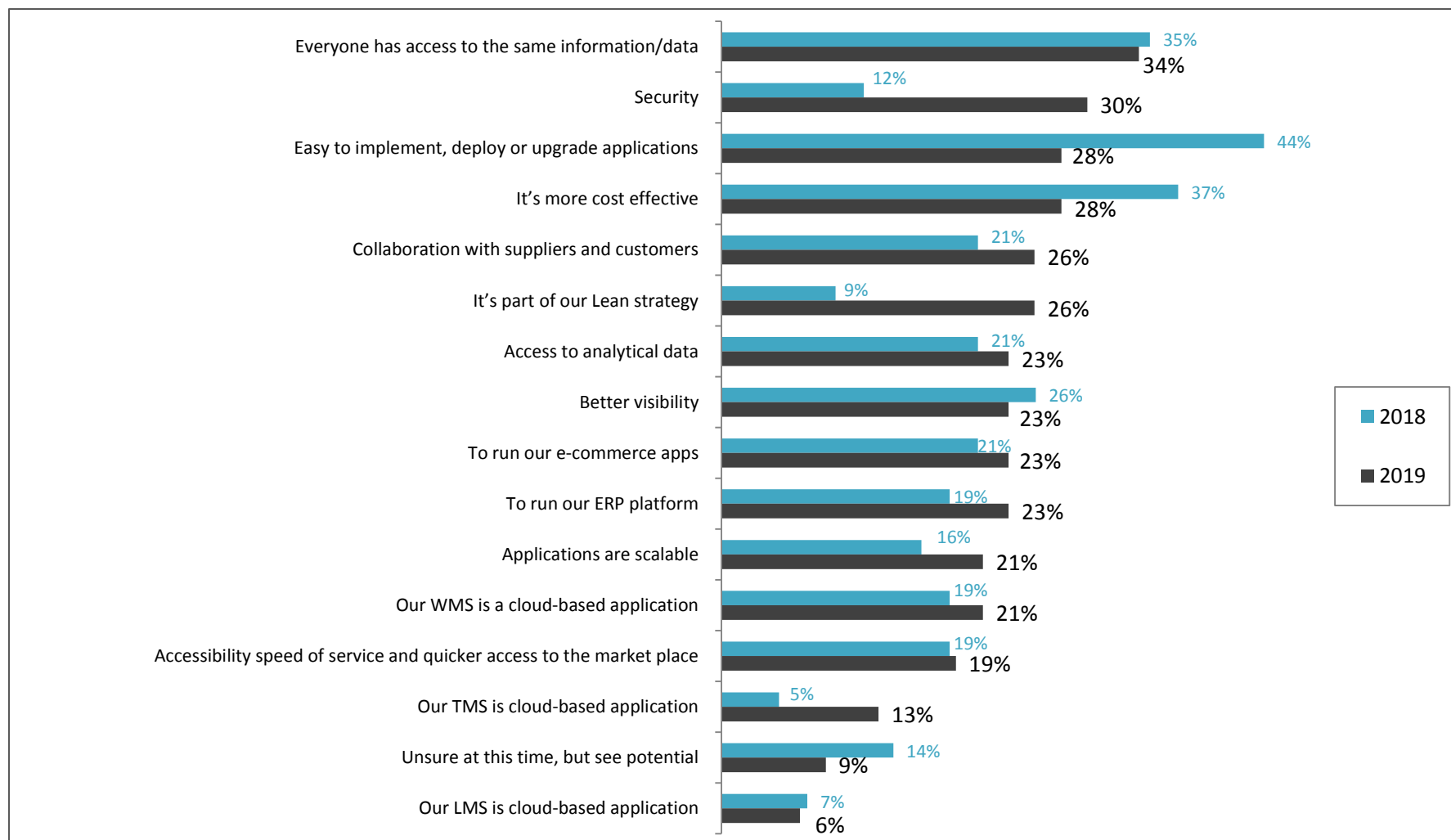


What is your company's status regarding the adoption of cloud computing?



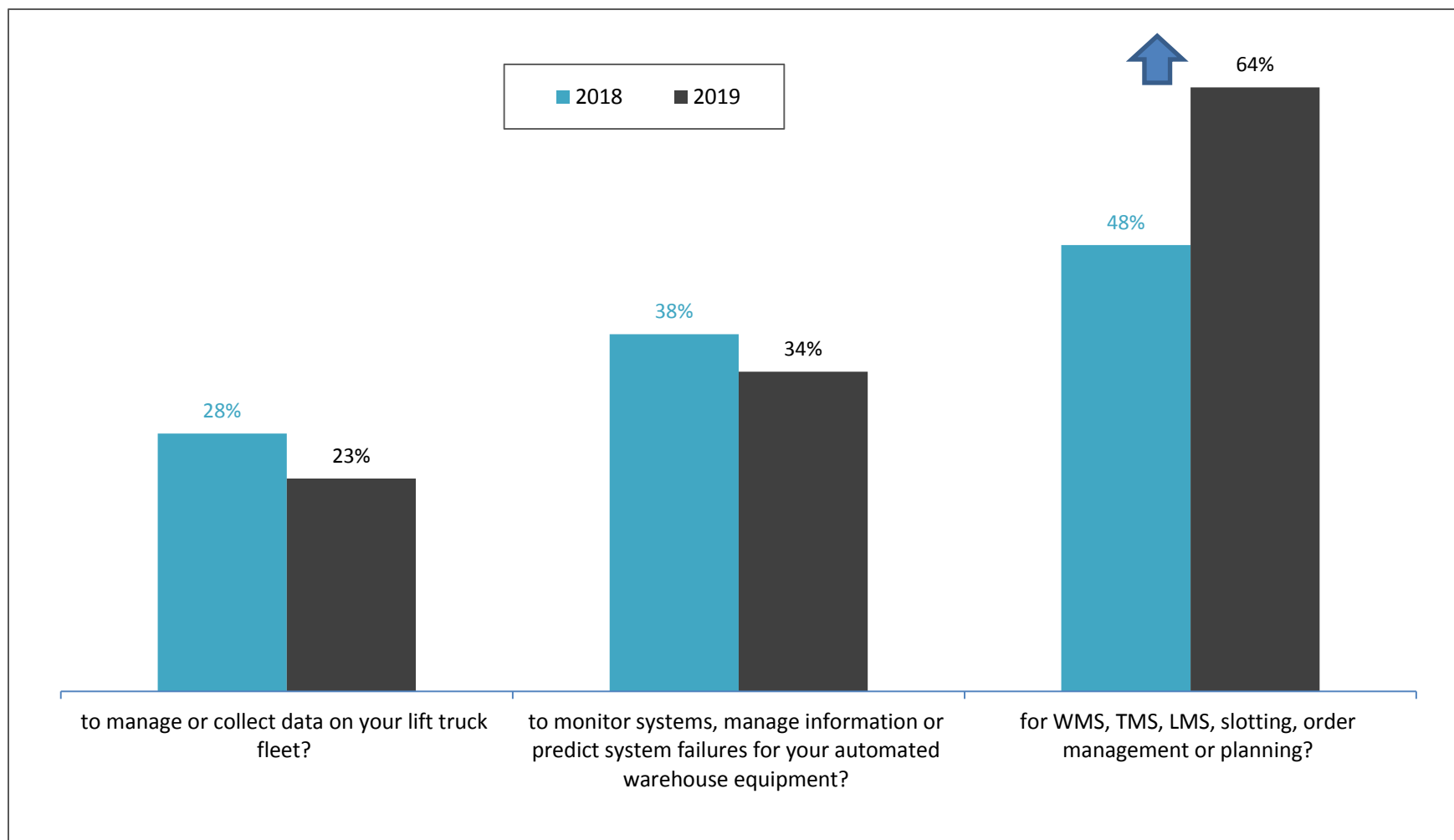


Why are you or will you be using cloud-based applications? What do you see as the benefits?



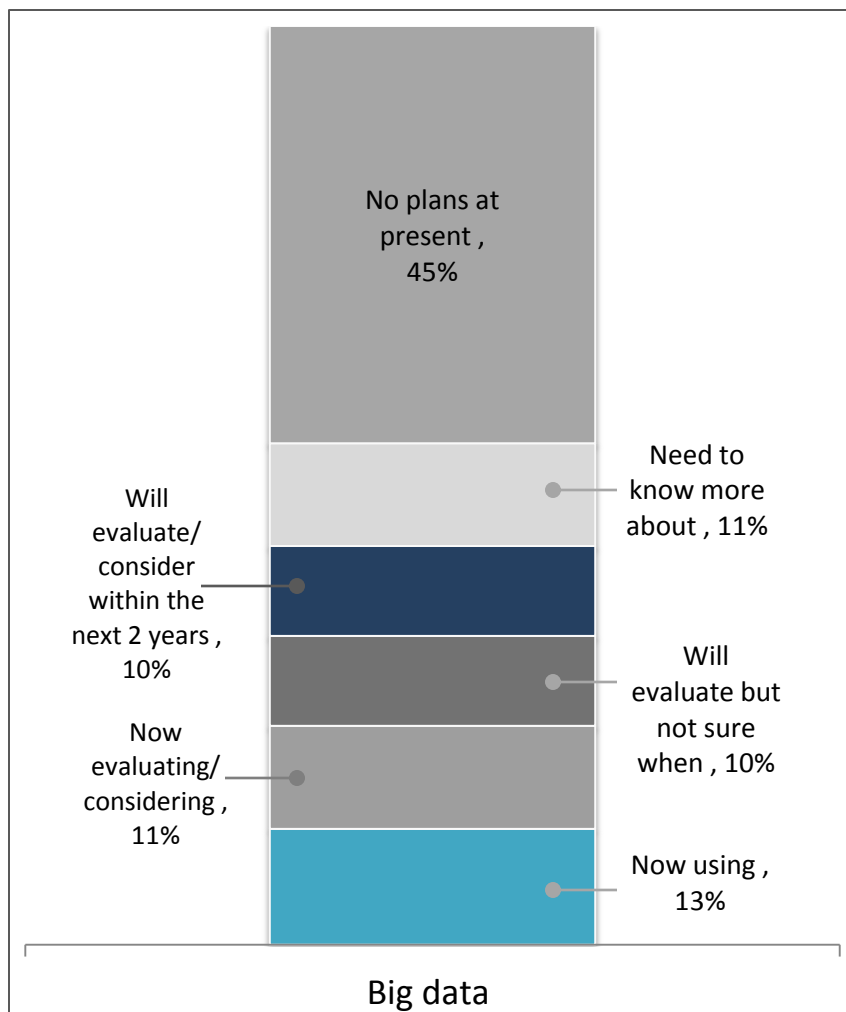


Are you using or planning to evaluate cloud-based applications . . .





Which best describes your adoption of Big Data?

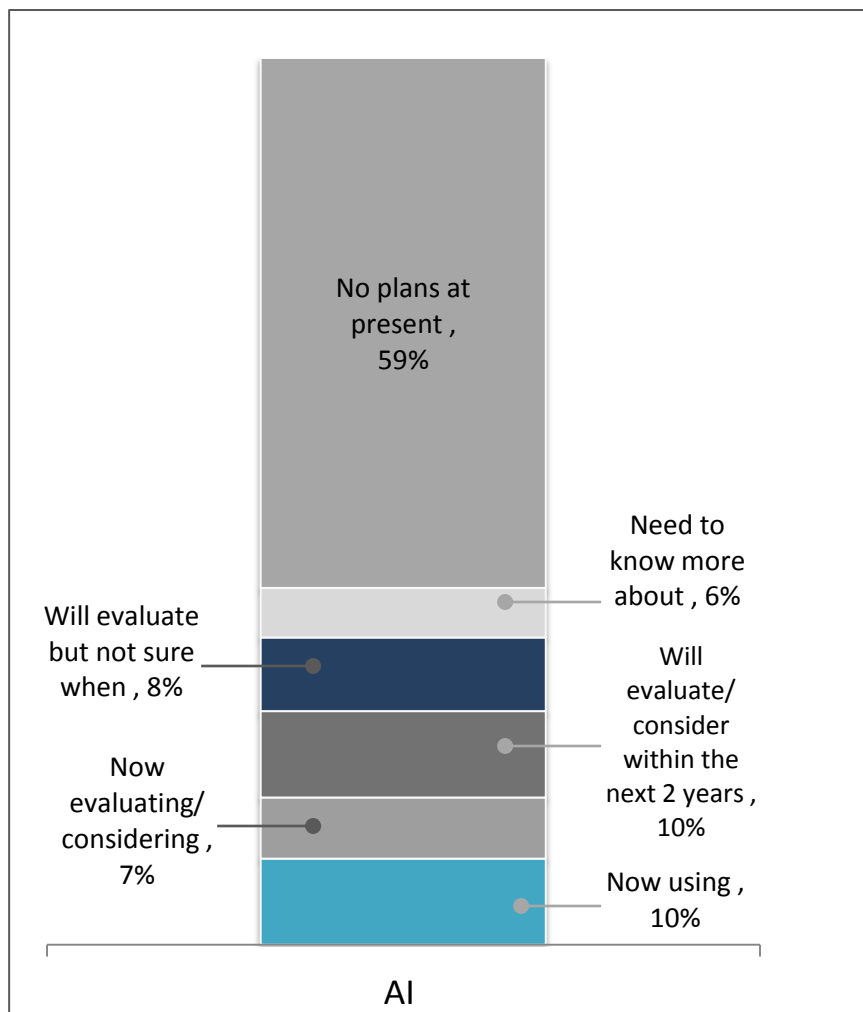


How are you using/applying or planning to use Big Data?

- Better forecasting & demand planning in an S&OP sense.
- Customer service
- Data analytics relative to current operations and customer demand/order profile
- In analyzing inventory and sales to help with localization efforts
- Inventory and demand planning
- Purchasing / Order forecasting
- Reaching buyers for clients
- Reporting to find repeated areas of concern that can be addressed in a timely manner.
- Traffic control, route planning, intelligent transport systems, congestion management.
- We have tons of data currently, but not a good way to categorize and summarize data easily.
- We use Big Data to help us learn about our clients and their needs



Which best describes your adoption of AI?

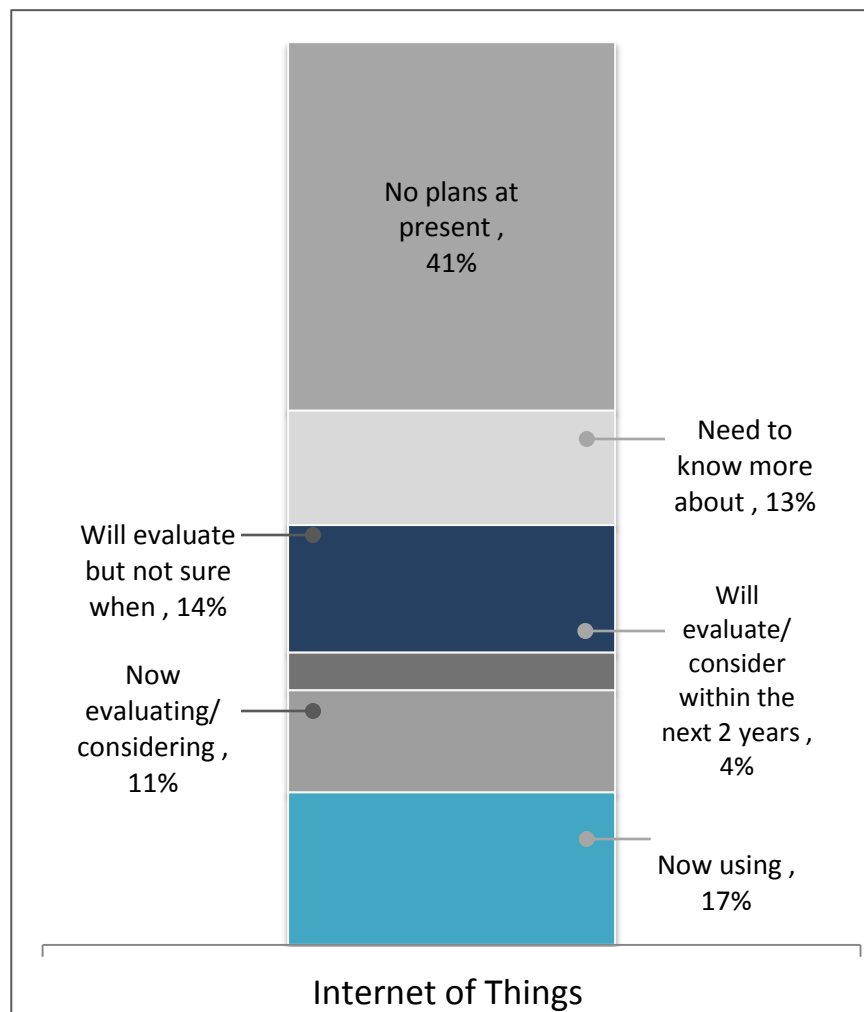


How are you using/applying or planning to use AI?

- AI planning, is a branch of artificial intelligence that concerns the realization of strategies or action sequences, typically for execution by intelligent agents, autonomous robots and unmanned vehicles.
- better service
- In analyzing inventory and sales to help with localization efforts
- Lowering make ready costs of repetitive processes
- Order models
- We use AI to help our clients enjoy the venues in real time



Which best describes your adoption of the Internet of Things?

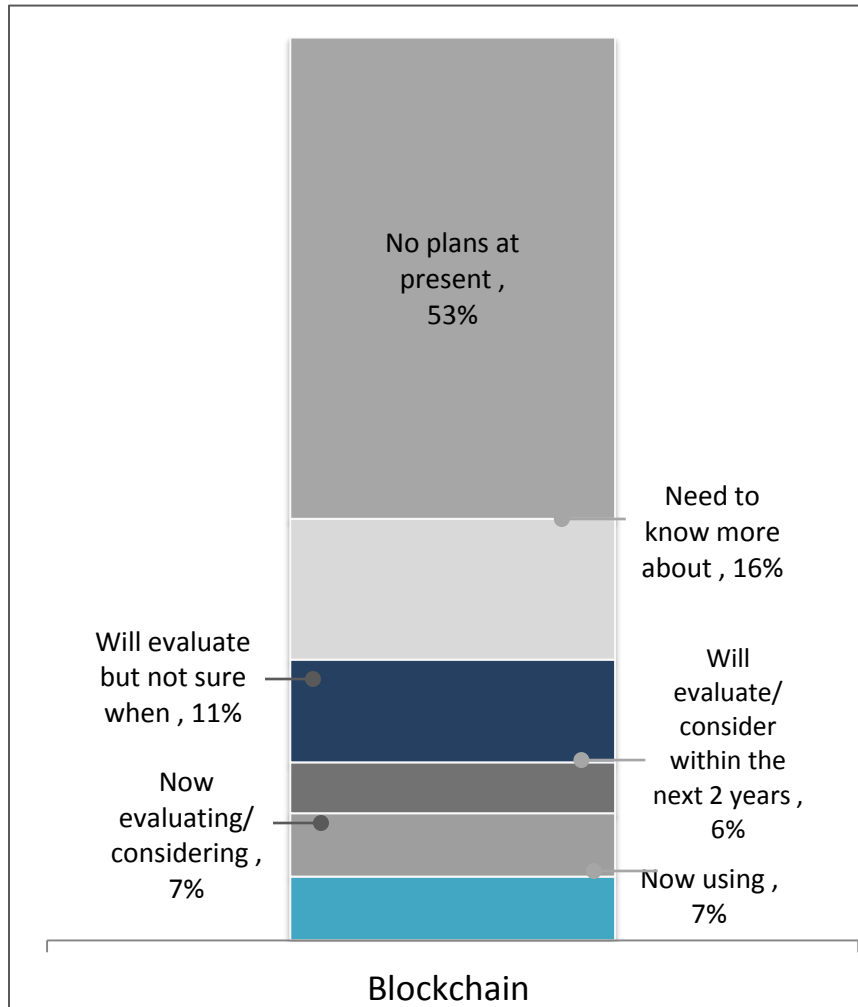


How are you using/applying or planning to use the Internet of Things?

- Device management
- Faster service
- IoT is used to help us modernized processes
- Mainly used for devices that wouldn't usually be generally expected to have an internet connection, and that can communicate with the network independently of human action.
- Maintenance and digital twin implementation
- Reduction of energy costs
- We use it on the floor to track production of individual components. We are also working on getting a system ready for tracking within the warehouses.



Which best describes your adoption of Blockchain?

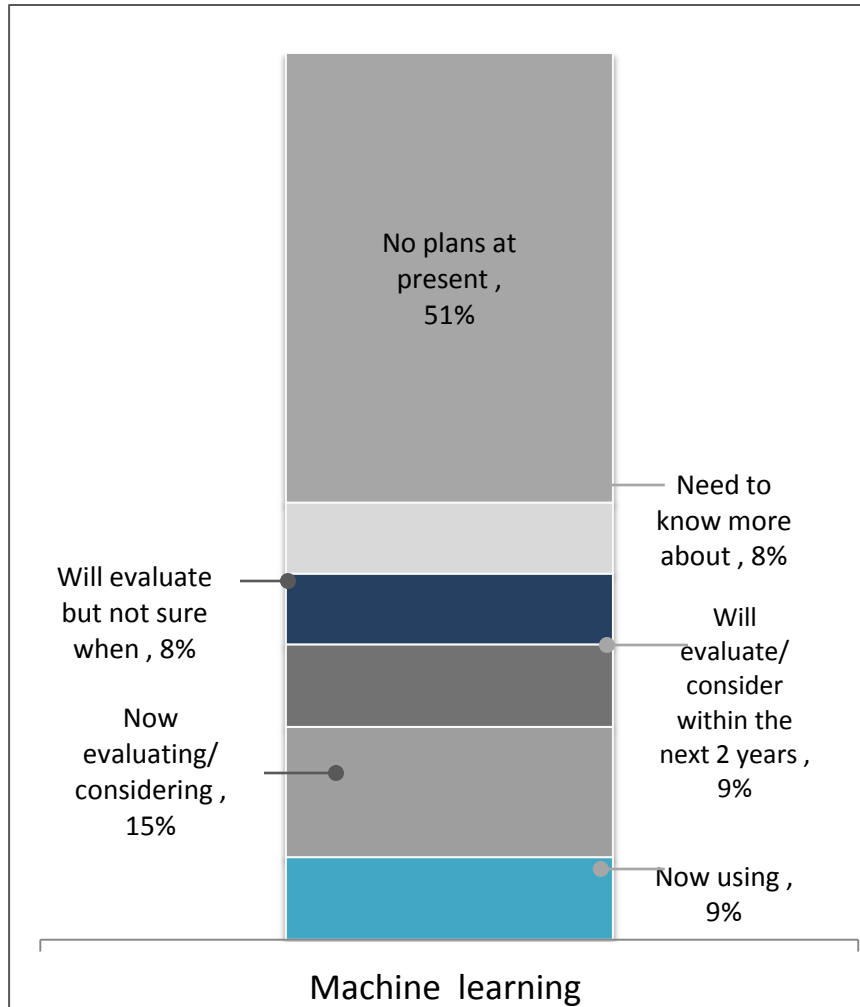


How are you using/applying or planning to use Blockchain?

- Better service
- Blockchain is an electronically distributed ledger or list of entries -- much like a stock ledger -- that various participants maintain via a network of computers. Blockchains use cryptography to process and verify transactions on the ledger. Encryption and coding improve transparency, efficiency and trust in information-sharing.
- Material tracking
- Perfect working software
- To help secure our enterprise
- Tracking of replacement of renewable resources



Which best describes your adoption of the Machine Learning?

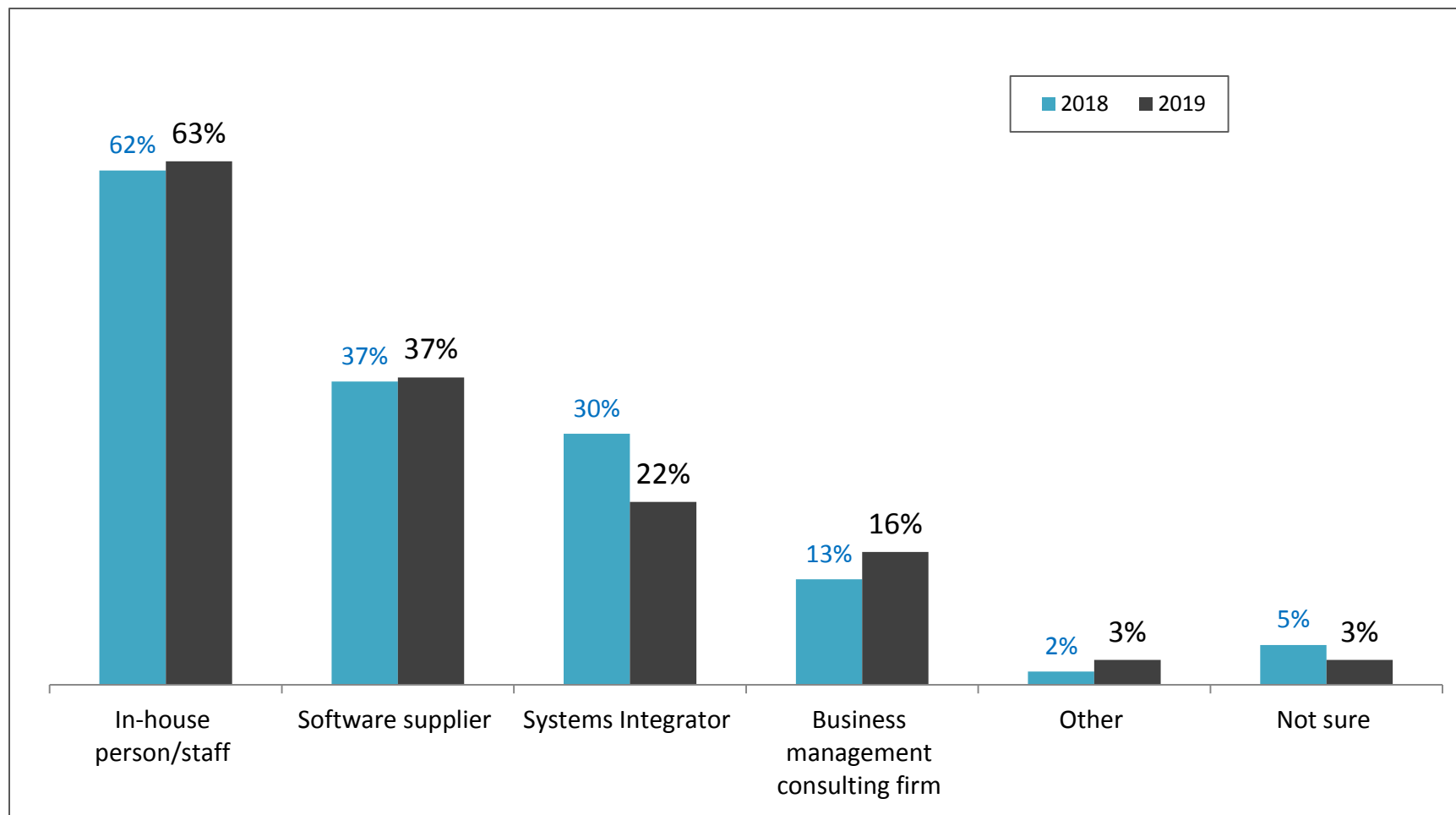


How are you using/applying or planning to use Machine Learning?

- Better software operation
- Increasing lean processing
- Less down time
- Machinists
- Not easily applicable.
- Not sure
- Planning and action is zero. Zero months, zero days, zero hours." Think of it as connected planning on steroids. The steroids are machine learning and artificial intelligence. AI and machine learning were conspicuously absent from any mention at a recent conference, where the focus was on a "customer first" and community-oriented strategy
- Slotting improvements
- To help with training

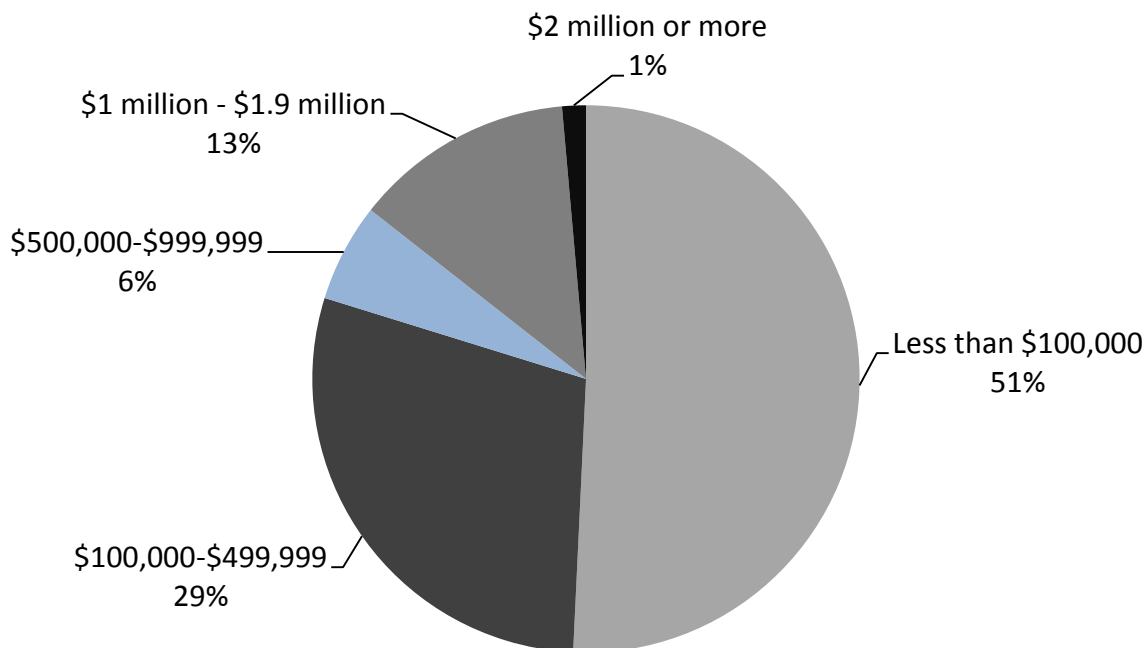


When your company purchases software, who do you typically use to integrate the software installation?





Approximately, how much will your company spend on supply chain software for your operation including license, integration and training in the next 12 months?



	2015	2016	2017	2018	2019
Average \$\$ plan to spend	\$679,220	\$472,900	\$504,630	\$473,770	\$431,160
Median \$\$ plan to spend	\$144,444	\$88,680	\$91,010	\$128,570	\$100,000



What is driving your decision to invest in new materials handling or supply chain software?

Application process, personnel qualification
Ability to interface to an ancient ERP system
Adding lots of small items to inventory and looking for better ways to stock & pick.
Always looking for a easier and better way
Automated pick and place, integrated robotic handlers
Best practices to become world class
Better use of space
Business growth.
Competition
Core to business strategy
Cost savings and handling larger volumes of inventory
Current methods in place do not work
Decrease man-hours per shipment
Efficiency within our work place. To help increase our throughput and manage our inventory better.
Ever-changing Business Mode
Forecasting Resource allocation Production planning Flow and process management Inventory management and control Customer delivery
After-sales support and service
Funding
Growth/expansion
Higher labor costs.
Improve efficiency and lower cost of operations
Improve operation efficiency
Information Hosting -- Must stay with us.
Inventory control
Lower payroll hours and increase productivity.
Mostly customer driven. We're not building to woo new customers, it seems, but rather to keep existing customers happy...especially those enamored with technology.
Needed to make core changes to operational flow and associated systems to support high growth channels
Optimized state of operational excellence
Outdated system.
Seeking improvements in warehouse performance and overall optimization
Traceability



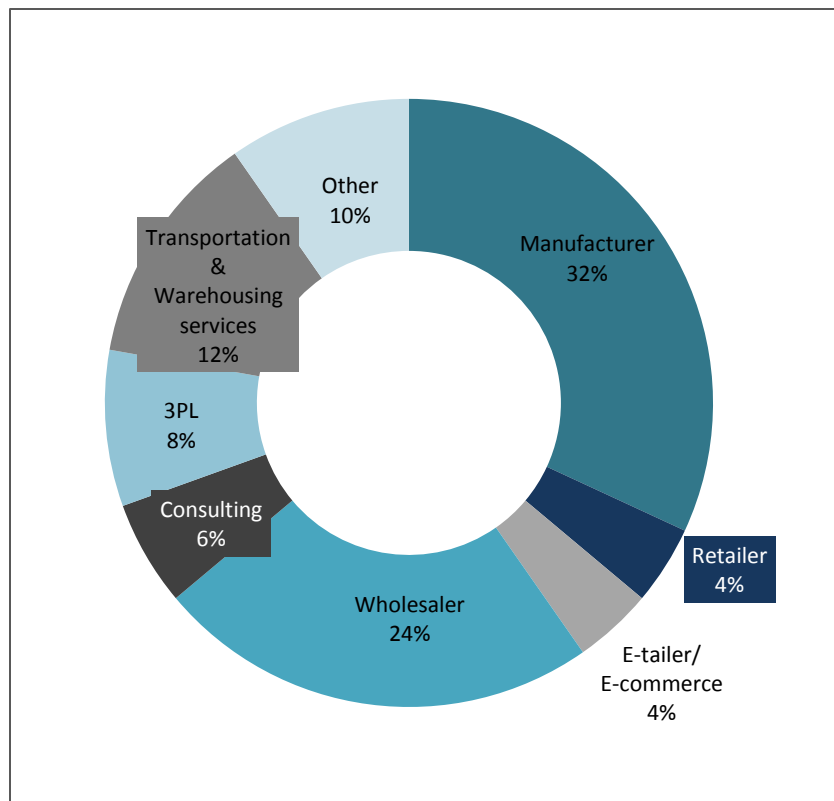
If you had the opportunity to implement one software solution or application that would improve any aspect of your materials handling operation, what would it be?

AGV's
AI
Bar coding that integrates into our ERP system
E-mail packing list system.
Embedded analytics tools
Energy monitoring and control
ERP system
GPS in trucks
Hand held devices
Heat mapping
Identification systems
Inventory management/control
Labor Management System
Material Tracking from dock to production
Mobile bar coding
More robust Inbound Dock Appointment Scheduling
Productivity improvement
Raw material management
Replenishment (we pick by each unit, not pallets or cartons)
SAP
SCP software
Shuttle system for storage density
Slack and Shipedge
Sortation of work orders
Visibility
Warehouse Execution System

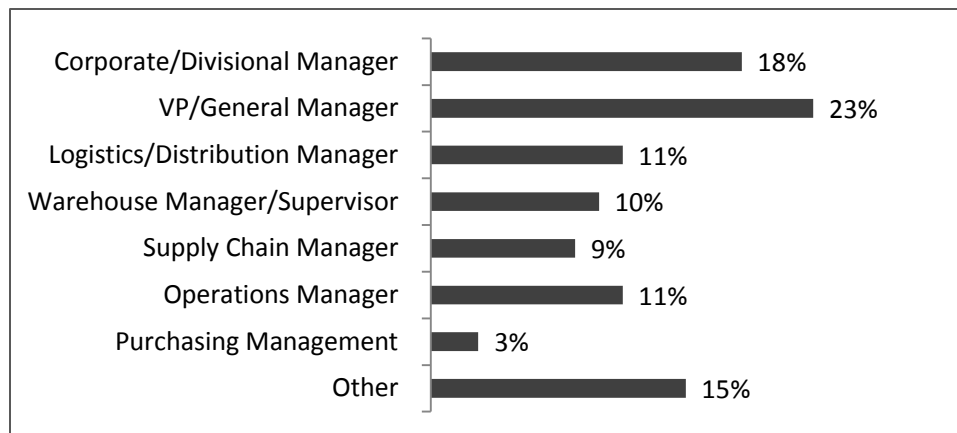


Respondent Demographics

Industry



Job function



Company size – 2019 Revenues

Under \$10 million	22%
\$10 million to \$49.9 million	19%
\$50 million to \$99.9 million	21%
\$100 million - \$249,999 million	13%
\$250 million - \$499,999 million	10%
\$500 million - \$999,999 million	3%
\$1 billion - \$2.49 billion	6%
\$2.5 billion or more	6%

	Average revenues	Median revenues
2018	\$335M	\$66.7M
2019	\$315M	\$70.0M