# DIGITAL TRANSFORMATION FOR MANUFACTURERS

## ASSESSMENT

Please answer all questions in all Digital Transformation for Manufacturers Assessment (DTMA) categories based on current conditions at your company. Each category appears on a separate online page.

(NOTE: Each question and category is designed to be applicable to most manufacturers. However, if a question or category is NOT applicable to your company’s operations, please skip it. Questions or categories left blank do NOT negatively impact your assessment score.)

As you complete a category, your responses will automatically be saved in the event you inadvertently exit the DMTA website or lose your internet connection.

Engagement with the Digital Transformation for Manufacturers program will help manufacturers to implement advanced technologies and achieve operational excellence and sustainable profitability by identifying significant opportunities within their companies.

After completing the Profile section of the Assessment, please proceed through questions addressing digital maturity in eight categories. At the beginning of each category, a description is provided of a digitally mature manufacturer. Questions in each category are scaled to reflect the level of digital maturity:

* Level 0 — No maturity.
* Level 1 — Awareness of digital technologies and processes and their applicability
* Level 2 — Trialing digital technologies and processes
* Level 3 — Some application of digital technologies and processes
* Level 4 — Substantial application of digital technologies and processes and achieving operational benefits
* Level 5 — Full maturity with widespread application of digital technologies and processes and achieving operational benefits and significant competitive advantage

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*If you are not here to complete an assessment*

*but want to review data from a past assessment, please go directly to*

*DTM Data Visualization*

Please provide an Email Address and Passcode. The Email Address and Passcode are required to review the data output of your assessment upon submission of this questionnaire.

Please remember/record the Email Address and Passcode, which are required to enter the data output site. When submitting assessments in the future for this company, please use the same Email Address and Passcode, which will then allow you to compare the results of your different assessments and track your progress.

Notes:

If this IS NOT your first assessment and you’ve forgotten your Passcode, please provide a new one and then you will be asked at the data output site to reset your Passcode in order to review your results alongside your past results.

If you are assisting different companies in completing assessments, you should use an Email Address of someone in the company involved in the assessments (not your own).

**Email:**

**Passcode  (8 characters consisting of letters and numbers or symbols):**

By submitting data to the Digital Transformation for Manufacturers Assessment questionnaire, you acknowledge and agree that Ohio MEP may use your data for the following purposes: (i) participants’ review and analysis of their own assessment responses; and (ii) participants’ and other parties’ review and analysis of aggregated assessment responses (your individual assessment responses remain confidential and available only to you and the firm managing this site, The MPI Group, Inc.).

DTMA PROFILE

**1. In what industries does your company primarily participate? (check all that apply)**

* Food manufacturing
* Beverage and tobacco product manufacturing
* Textile mills
* Textile product mills
* Apparel manufacturing
* Leather and allied product manufacturing
* Wood product manufacturing
* Paper manufacturing
* Printing and related support activities
* Petroleum and coal products manufacturing
* Chemical manufacturing
* Plastics and rubber products manufacturing
* Nonmetallic mineral product manufacturing
* Primary metal manufacturing
* Fabricated metal product manufacturing
* Machinery manufacturing
* Computer and electronic product manufacturing
* Electrical equipment, appliance, and component manufacturing
* Transportation equipment manufacturing
* Furniture and related product manufacturing
* Miscellaneous manufacturing/Other (please specify):

**2. In which state is your company headquartered?**

**3. What is the ownership structure of the company?**

* Public company
* Private company — family-owned or closely held
* Private company — equity-firm-owned
* Private company — employee stock option plan
* Other

**4. What are the approximate annual revenues of your company?**

* Less than $1 million
* $1 million to $5 million
* $6 million to $10 million
* $11 million to $15 million
* $16 million to $20 million
* $21 million to $25 million
* $26 million to $50 million
* $51 million to $75 million
* $76 million to $100 million
* $101 million to $250 million
* $251 million to $500 million
* $501 million to $1 billion
* More than $1 billion

**5. What are the approximate number of full-time employees in the company?**

* Less than 5 employees
* 5 to 10 employees
* 11 to 15 employees
* 16 to 20 employees
* 21 to 25 employees
* 26 to 50 employees
* 51 to 100 employees
* 101 to 150 employees
* 151 to 200 employees
* 201 to 250 employees
* 251 to 500 employees
* 501 to 1,000 employees
* More than 1,000 employees

**6. How many manufacturing facilities/plants does your company operate?**

* 0
* 1
* 2
* 3
* 4
* 5
* More than 5

**7. Please identify the following characteristics that best describe your company's manufacturing facility(ies):**

**Nature of production processes:**

* Discrete
* Process
* Both discrete and process

**Volume and mix of product:**

* High volume and high mix
* High volume and low mix
* Low volume and high mix
* Low volume and low mix

**Method to manufacture products:**

* Continuous flow
* Small batch and queue
* Large batch and queue

**8. Which stakeholders are represented on the DTMA team that is completing this evaluation? (check all that apply)**

* Company — senior leadership
* Company — information technology
* Company — manufacturing management
* Company — manufacturing/industrial/production engineering
* Company — maintenance
* Company — procurement
* Company — supply chain
* Company — sales and marketing
* Company — R&D/product development
* Company — human resources
* Company — other (please specify):
* Customers
* Suppliers — components and materials
* Suppliers — services, including consultants
* Other (please specify):

**9. How many DTMA evaluations have previously been conducted for this organization?**

* 0
* 1
* 2
* 3
* 4
* 5
* More than 5
* Don’t know

**10. What is the primary source of the information for this assessment? (choose one)**

* First-hand experience
* First-hand experience and second-hand information (from another person or information system)
* Second-hand information (from another person or information system)

### I. BUSINESS

Digitally mature business processes enable a company to leverage technologies to improve its operations and supply chain and consist of the development, communication, and execution of a strategy to digitally connect information from all corporate functions.

Examples of technologies that enable digitally mature business activities include:

* Enterprise resource planning (ERP) to integrate and manage business processes
* Business analytics to evaluate past performance and drive planning and decision-making (e.g., plant network optimization)
* Secure communications networks to facilitate automated capture, sharing, and leveraging of information

Digital best practices include cross-functional, tiered communications; and leadership, coaching, and mentoring that foster collaboration and continuous improvement.

Digitally enhanced outcomes include agility and proactive decision-making, enabling rapid responses to internal and external conditions.

**11. How important is digitization to your company's vision and goals?**

* No company vision or goals
* Not important to vision and goals
* Minimal importance to vision and goals
* Some importance to vision and goals
* Significant importance to vision and goals
* Focus of vision and goals
* Don’t know

**12. Describe your company's digital strategy for becoming a digitally-connected enterprise:**

* No digital strategy
* Digital strategy is in development
* Digital strategy developed but not yet implemented
* Digital strategy developed and partially implemented within the company
* Digital strategy developed and fully implemented within the company
* Digital strategy developed and fully implemented within the company and with suppliers and customers
* Don’t know

**13. To what extent is your company's digital strategy achieving objectives?**

* No digital strategy
* In the process of defining objectives for digital strategy
* Objectives defined for digital strategy
* Achieving some strategic objectives
* Achieving most strategic objectives
* Achieving all strategic objectives
* Don’t know

**14. How much has your company invested in implementing a digital strategy in the past year (as a percentage of sales)?**

* 0%
* 1-2%
* 3-5%
* 6-10%
* 11-15%
* More than 15%
* Don't know

**15. Describe the ability of your company's *network infrastructure* to support digital operations:**

* No plans to digitize
* Network overhaul required
* Significant upgrades required
* Some upgrades required
* Minimal upgrades required
* Fully capable
* Don't know

**16. Describe the ability of your company's *IT and OT hardware* to support digital operations:**

* No plans to digitize
* Hardware overhaul required
* Significant upgrades required
* Some upgrades required
* Minimal upgrades required
* Fully capable
* Don't know

**17. Describe the ability of your company's *IT and OT business systems and applications* to support digital operations:**

* No plans to digitize
* Business systems and applications overhaul required
* Significant upgrades required
* Some upgrades required
* Minimal upgrades required
* Fully capable
* Don't know

**18. What best describes the working relationship of the operations technology (OT) function with the information technology (IT) function in your company?**

* No collaborative interaction
* Minimal collaborative interaction, usually when major problems arise
* Some collaborative interaction on common issues and concerns (e.g., cybersecurity)
* Frequent collaborative interaction to review technology performances and address problems
* Ongoing collaboration interaction to address technology problems and pursue opportunities
* High-performance, integrated collaborative interaction, defined as neither OT nor IT
* Don’t know

**19. How confident are you in existing cyber-risk management policies, processes, and practices (e.g., risk assessment, monitoring, incident response planning/testing, business recovery) to prevent unauthorized access to technologies and support digitally enhanced operations?**

* No cyber risk management policies, processes, and practices
* Not confident in cyber risk management policies, processes, and practices
* Somewhat confident in cyber risk management policies, processes, and practices
* Somewhat confident in cyber risk management policies, processes, and practices; continuously improving/upgrading capabilities
* Very confident in cyber risk management policies, processes, and practices; continuously improving/upgrading capabilities
* Completely confident in in cyber risk management policies, processes, and practices; continuously improving/upgrading capabilities
* Don’t know

**20. Which of the following best describes the predominant culture of your company?**

* Chaotic culture — no leaders and employees exhibit trust, respect, and daily pursuit of excellence; lack of structure limits performance and drives high employee turnover
* Adversarial/toxic culture — almost no leaders and employees exhibit trust, respect, and daily pursuit of excellence; mutual finger-pointing limits performance and drives high employee turnover
* Disconnected culture — a few leaders and employees exhibit trust, respect, and daily pursuit of excellence; significant communications breakdowns limit performance improvement and drives high employee turnover
* Follow-the-leader culture — some leaders and employees exhibit trust, respect, and daily pursuit of excellence; this minority drives somewhat improved performance and somewhat lower employee turnover
* Common culture — most leaders and employees exhibit trust, respect, and daily pursuit of excellence; shared mission significantly improves performance and significantly lowers employee turnover
* High-performing culture — all leaders and employees exhibit trust, respect, and daily pursuit of excellence; shared mission and rigorous continuous improvement drive dramatically improved performances and dramatically lower employee turnover
* Don’t know

**21. What best describes the nature of your lean/continuous-improvement (CI) practices?**

* No use of lean/continuous-improvement practices — management firefights problems
* Minimal use of lean/continuous-improvement practices — management or CI group directs employees to fix problems
* Some use of lean/continuous-improvement practices — some frontline employees identify and communicate problems to management and CI group
* Moderate use of lean/continuous-improvement practices — many frontline employees work alongside management and CI group to identify, diagnose, and solve problems
* Substantial use of lean/continuous-improvement practices — many frontline employees independently identify, diagnose, and permanently solve problems
* Lean/continuous improvement practices are a core part of company’s culture — systems in place for all employees to independently identify, diagnose, and permanently solve problems
* Don’t know

**22. Which of the following constraints impair or preclude your company's ability to become a digitally-connected enterprise? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**23. Please include comments/notes for the Business category that can help in planning digital improvements for your company.**

### II. PRODUCTION

Digitally mature production processes enable automation of operations and real-time management of manufacturing.

Examples of technologies that enable digitally mature production include:

* Smart devices embedded in equipment and processes to capture and share production data in real time (e.g., quality, productivity, stoppages, equipment wear)
* Robotics, automation, and advanced human-machine interfaces to automate dangerous tasks and lower variability for repetitive work
* Computerized maintenance management systems (CMMS) to manage and optimize assets
* Machine learning to reduce process variability
* Manufacturing execution systems (MES) to monitor data from embedded devices and sensors in real time and identify improvement opportunities

Digital best practices include empowered frontline staff; daily huddles; and visual management systems that enable production employees to respond in real-time and autonomously solve problems.

Digitally enhanced outcomes include world-class safety, quality, speed, productivity, energy-consumption, and environmental performances.

**24. What best describes the application of smart devices/embedded intelligence to production processes at your company?**

* No plans to apply smart devices/embedded intelligence
* Production processes evaluated for potential application of — and benefits from — smart devices/embedded intelligence
* Legacy devices and technologies replaced with smart devices/embedded intelligence for some production processes
* Legacy devices and technologies replaced with smart devices/embedded intelligence for most production processes
* Smart devices/embedded intelligence have been applied where necessary and local data-sharing and analytics (i.e., with plant systems) occur
* Smart devices/embedded intelligence have been applied where necessary and widespread data-sharing and analytics (i.e., with plant and business systems, suppliers, customers) occur
* Don't know

**25. What percentage of production equipment and processes incorporate smart devices/embedded intelligence?**

* 0%
* 1-10%
* 11-25%
* 26-50%
* 51-75%
* More than 75%
* Don't know

**26. Has the application of smart devices/embedded intelligence enhanced the capabilities of your company’s operations technologies (OT)?**

* No application of smart devices/embedded intelligence
* Planning to connect smart devices/embedded intelligence to operations technologies (OT)
* Connection of smart devices/embedded intelligence to applicable OT systems is underway
* Some applicable OT systems improved by the application of smart devices/embedded intelligence
* Most applicable OT systems improved by the application of smart devices/embedded intelligence
* All applicable OT systems improved by the application of smart devices/embedded intelligence
* Don’t know

**27. To what extent has the application of smart devices/embedded intelligence in plants helped to improve environmental, health, and safety (EHS) performances.**

* No smart devices/embedded intelligence
* No improvements yet to EHS performance
* Some improvements to EHS performance
* Many improvements to EHS performance
* Extensive improvements to EHS performance
* Extensive improvements to EHS — industry leader
* Don't know

**28. By approximately what percentage has the plant's energy usage (kilowatt-hours) per unit of output production changed over the past three years?**

* Increased
* Stayed the same
* Decreased 1-5%
* Decreased 6-10%
* Decreased 11-15%
* Decreased more than 15%
* Don't know

**29. What method best describes how quality problems are typically identified and resolved?**

* No method per se
* Quality control inspection at end of production
* Frontline associates alert management when they see a quality problem
* Frontline associates use process data to identify in-process poor quality and stop production (e.g., andon) until problem can be resolved
* Smart devices/embedded intelligence identify in-process poor quality and automatically stop production until problem can be resolved
* Smart devices/embedded intelligence identify in-process poor quality and digitally recalibrate process/equipment to prevent problem recurrence
* Don't know

**30. What is your company’s finished-product first-pass quality yield?**

* Less than 80%
* 80-84%
* 85-89%
* 90-94%
* 95-98%
* 99-100%
* Don't know

**31. How does maintenance typically respond to equipment problems?**

* No maintenance department per se
* Management contacts maintenance when equipment breaks down
* Frontline associates contact maintenance when equipment breaks down
* Frontline associates contact maintenance when equipment data indicates a potential problem
* Smart devices/embedded intelligence alert maintenance in real time to a potential problem
* Smart devices/embedded intelligence alert maintenance in real time to a potential problem as well as schedule preventive maintenance when equipment-performance variations exist
* Don't know

**32. What percentage of maintenance work is reactive?**

* More than 50%
* 31-50%
* 21-30%
* 11-20%
* 5-10%
* Less than 5%
* Don't know

**33. What is company-wide machine availability as a percentage of scheduled uptime?**

* Less than 75%
* 76-85%
* 86-90%
* 91-95%
* 96-99%
* 100%
* Don't know

**34. How are finished-goods inventory levels determined?**

* No process to establish inventory levels
* Management reacts to depleted inventories
* Manual counts establish inventory levels (periodically)
* Automated counts establish inventory levels (periodically)
* Automated counts combined with consumption data and forecasts establish inventory levels (periodically)
* Automated counts of inventory and dynamic consumption data and forecasts establish inventory levels (real time)
* Don’t know

**35. How has the total inventory turn rate (raw material, work-in-process, and finished goods) changed over the past three years?**

* Decreased
* Stayed the same
* Increase 1-5%
* Increased 6-10%
* Increased 11-15%
* Increased more than 15%
* Don't know

**36. What is the production output of your company's plants as a percentage of designed production capacity?**

* Less than 70%
* 71-80%
* 81-90%
* 91-95%
* 96-100%
* More than 100%
* Don't know

**37. Which of the following constraints impair or preclude your company's ability to digitize production processes? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**38. Please include comments/notes for the Production category that can help in planning digital improvements for your company.**

### III. WAREHOUSES/DISTRIBUTION CENTERS

Digitally mature warehouse/distribution processes enable automation of goods storage and real-time management of warehouse activities.

Examples of technologies that enable digitally mature warehouses and distribution centers include:

* Smart devices embedded in warehouse processes to capture and share inventory data in real time
* Warehouse management systems (WMS) to optimize resources and space in moving and storing materials and goods
* Robotics, automation, and advanced human-machine interfaces to automate dangerous tasks and lower variability for repetitive work
* Radio frequency identification (RFID) to track goods

Digital best practices include empowered frontline staff; daily huddles; and visual management systems that enable warehouse employees to respond in real-time and autonomously solve storage and warehouse problems.

Digitally enhanced outcomes include world-class warehouse metrics (e.g., pick times, inventory accuracy, backorder rates).

**39. What best describes the application of smart devices/embedded intelligence to warehouse/distribution-center processes at your company?**

* No plans to apply smart devices/embedded intelligence
* Warehouse processes evaluated for potential application of — and benefits from — smart devices/embedded intelligence
* Legacy devices and technologies replaced with smart devices/embedded intelligence for some warehouse processes
* Legacy devices and technologies replaced with smart devices/embedded intelligence for most warehouse processes
* Smart devices/embedded intelligence have been applied where necessary and local data-sharing and analytics (i.e., with warehouse systems) occur
* Smart devices/embedded intelligence have been applied where necessary and widespread data-sharing and analytics (i.e., with warehouse, plant, and business systems and with suppliers and customers) occur
* Don't know

**40. What percentage of warehouse equipment and processes incorporate smart devices/embedded intelligence?**

* 0%
* 1-10%
* 11-25%
* 26-50%
* 51-75%
* More than 75%
* Don't know

**41. To what extent have smart devices/embedded intelligence (e.g., sensors) been applied to monitor the conditions (e.g., temperature, moisture, movement) of goods?**

* No use of sensors
* Evaluating sensor technologies and potential areas of application
* Trialing the application of sensors
* Sensors in use for some applicable goods
* Sensors in use for many applicable goods
* Sensors in use for all applicable goods
* Don’t know

**42. To what extent have smart devices/embedded intelligence (e.g., sensors) been applied to improve material handling (e.g., locating, picking, and moving goods)?**

* No use of sensors
* Evaluating sensor technologies and potential areas of application
* Trialing the application of sensors
* Sensors in use for some applicable goods
* Sensors in use for many applicable goods
* Sensors in use for all applicable goods
* Don’t know

**43. What is the inventory accuracy in your company's warehouses/distribution centers?**

* Less than 80%
* 80-85%
* 86-90%
* 91-95%
* 96-99%
* 100%
* Don't know

**44. Which of the following constraints impair or preclude your company's ability to digitize warehouse/distribution center processes? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**45. Please include comments/notes for the Warehouses/Distribution Centers category that can help in planning digital improvements for your company.**

### IV. SUPPLY CHAIN

Digitally mature supply-chain processes enable a company to digitally connect and coordinate its operations with suppliers.

Examples of technologies that enable digitally mature supply chains include:

* Smart devices throughout supply-chain processes to capture and share in real time information critical to supplier performances
* Supply-chain management (SCM) systems to integrate and manage the flow of goods and services across the supply chain
* Supplier-network optimization tools to improve efficiency and performance of the supply base while ensuring reliability of goods and services, and reducing supply-chain costs
* Predictive analytics to monitor, manage, and proactively react to changing supply-chain conditions

Digital best practices include digital sharing of real-time production data, schedules, and sales forecasts; and real-time monitoring of operations and shipments at primary suppliers.

Digitally enhanced outcomes include partner relationships with key suppliers (e.g., sharing of intellectual property and resources) and world-class supplier metrics (e.g., quality, timeliness, cost containment).

**46. What best describes the application of smart devices/embedded intelligence to the supply-chain processes at your company?**

* No plans to apply smart devices/embedded intelligence
* Supply-chain processes evaluated for potential application of — and benefits from — smart devices/embedded intelligence
* Legacy devices and technologies replaced with smart devices/embedded intelligence for some supply-chain processes
* Legacy devices and technologies replaced with smart devices/embedded intelligence for most supply-chain processes
* Smart devices/embedded intelligence have been applied where necessary and local data-sharing and analytics (i.e., with supplier systems) occur
* Smart devices/embedded intelligence have been applied where necessary and widespread data-sharing and analytics (i.e., with supplier systems and downstream plant and business systems) occur
* Don't know

**47. How well do primary suppliers' networks and systems communicate with those of your company?**

* No communications attempted
* No communication currently available
* Minimal communication available
* Some communication available
* Significant communication available
* All necessary networks and systems communicate seamlessly
* Don't know

**48. Does your company digitally track supplies and integrate that information into its enterprise systems such as ERP?**

* No digital tracking of supplies
* Planning to digitally track supplies and integrate information into enterprise systems
* Trialing tracking and integration of supplies information
* Tracking some supplies and integrating digital information into some applicable enterprise systems
* Tracking a majority of supplies and integrating information into many applicable enterprise systems
* Tracking most or all supplies and integrating information into all applicable enterprise systems
* Don’t know

**49. With what percentage of primary suppliers are your company's production schedules automatically shared?**

* 0%
* 1-25%
* 26-50%
* 51-75%
* 76-99%
* 100%
* Don’t know

**50. With what percentage of primary suppliers are your company's demand plans/sales forecasts automatically shared?**

* 0%
* 1-25%
* 26-50%
* 51-75%
* 76-99%
* 100%
* Don’t know

**51. For what percentage of primary suppliers is your company able to monitor their operations (e.g., goods in production, throughput, quality) in real time?**

* 0%
* 1-25%
* 26-50%
* 51-75%
* 76-99%
* 100%
* Don’t know

**52. What is your primary suppliers' on-time delivery performance to your company's operations?**

* Less than 80%
* 80-85%
* 86-90%
* 91-95%
* 96-99%
* 100%
* Don't know

**53. What is the defect rate on components and materials received from primary suppliers?**

* More than 15%
* 11-15%
* 6-10%
* 3-5%
* 1-2%
* 0%
* Don't know

**54. Which of the following constraints impair or preclude your company's ability to digitize supply-chain processes? (choose all** that apply)

* Human resources/talent
* Improvement-process knowledge
* Enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**55. Please include comments/notes for the Supply Chain category that can help  in planning digital improvements for your company.**

### V. LOGISTICS/TRANSPORTATION

Digitally mature logistics/transportation processes enable a company to digitally connect and coordinate its operations with transportation and logistics providers.

Examples of technologies that enable digitally mature logistics include:

* Smart devices and radio frequency identification (RFID) within logistics/transportation processes for tracking shipments en route in real time
* Transportation management systems (TMS) to monitor and manage carriers, optimize routes, deliver alerts, reduce costs, and improve customer satisfaction
* Automated carrier invoicing and payment processes

Digital best practices include consolidated shipments; “milk runs;” and real-time monitoring and alerts for abnormal driver and vehicle conditions.

Digitally enhanced outcomes include world-class logistics and transportation metrics, including delivery times and delays, damaged/missing shipments, transportation costs, fuel efficiency, and accuracy of freight payments.

**56. For what percentage of inbound shipments can your company identify the approximate location in real time?**

* 0%
* 1-50%
* 51-75%
* 76-90%
* 91-99%
* 100%
* Don’t know

**57. For what percentage of outbound shipments can your company identify the approximate location in real time?**

* 0%
* 1-50%
* 51-75%
* 76-90%
* 91-99%
* 100%
* Don’t know

**58. To what extent can your company monitor in real time the conditions of inbound shipments?**

* No plans to monitor shipment conditions
* Evaluating the use of shipment monitoring
* Trialing the monitoring of applicable shipments
* Monitoring some applicable shipments
* Monitoring many applicable shipments
* Monitoring all applicable shipments
* Don’t know

**59. To what extent can your company monitor in real time the conditions of outbound shipments?**

* No plans to monitor shipment conditions
* Evaluating the use of shipment monitoring
* Trialing the monitoring of applicable shipments
* Monitoring some applicable shipments
* Monitoring many applicable shipments
* Monitoring all applicable shipments
* Don’t know

**60. How are optimum (e.g., lowest costs, timeliness) routes and modes of transportation determined for inbound shipments?**

* Shippers/providers determine routes and modes
* Suppliers determine routes and modes based on past history
* Suppliers determine routes and modes based on recent market information
* Our company and suppliers collectively determine routes and modes based on shared market information
* Optimum routes and modes automatically set on a daily basis based on market information
* Optimum routes and modes set dynamically in real time
* Don’t know

**61. How are optimum (e.g., lowest costs, timeliness)  routes and modes of transportation determined for outbound shipments?**

* Shippers/providers determine routes and modes
* Our company determines routes and modes based on past history
* Our company determines routes and modes based on recent market information
* Our company and customers collectively determine routes and modes based on shared market information
* Optimum routes and modes automatically set on a daily basis based on market information
* Optimum routes and modes set dynamically in real time
* Don’t know

**62. What percentage of inbound shipments are damaged or lost in transit?**

* More than 5%
* 4-5%
* 3-4%
* 2-3%
* 1-2%
* Less than 1%
* Don’t know

**63. What percentage of outbound shipments are damaged or lost in transit?**

* More than 5%
* 4-5%
* 3-4%
* 2-3%
* 1-2%
* Less than 1%
* Don’t know

**64. Which of the following constraints impair or preclude your company's ability to digitize logistics/transportation processes? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**65. Please include comments/notes for the Logistics/Transportation category that can help  in planning digital improvements for your company.**

### VI. CUSTOMERS

Digitally mature customer-focused processes enable a company to better understand customer needs and improve the customer experience.

Examples of technologies that enable digitally mature customer processes include:

* Online portals that allow customers to pull and share customized information when required, from orders and billing data to after-sales support and services
* Customer relationship management systems (CRM) to analyze customer interactions and data throughout the customer lifecycle
* Electronic data interchange systems (EDI) to efficiently manage transactions and product deliveries

Digital best practices include capturing and leveraging customer information (buying habits and patterns, complaints, product queries, product-usage data) for customized marketing and sales communications (e.g., online, email, social media).

Digitally enhanced outcomes include world-class customer metrics, including retention rate, satisfaction scores, and sales growth per customer.

**66. How does your company create a demand plan/sales forecast?**

* No demand plan is produced (“let’s see what we’ve got”)
* Demand plan is based on the previous-year plan
* Demand plan is based on quarterly consumption patterns
* Demand plan is automatically set and based on monthly customer information (consumption patterns, forecasts)
* Demand plan is automatically set and based on monthly customer information and market variables
* Demand plan is dynamically set and based on real-time customer information and market variables
* Don’t know

**67. Does your company digitally track its product from plant to customer site, and integrate that information into enterprise systems such as ERP or a customer EDI?**

* No digital tracking of product
* Planning to digitally track product and integrate information into enterprise systems
* Trialing tracking and integration of product information
* Tracking some products and integrating digital information into some applicable enterprise systems
* Tracking a majority of products and integrating information into many applicable enterprise systems
* Tracking most or all products and integrating information into all applicable enterprise systems
* Don’t know

**68. To what extent are digital technologies used to monitor and analyze customer behaviors and needs?**

* No plans to monitor customer behaviors and needs
* Evaluating the applicability of digital technologies to monitor and analyze customer behaviors and needs
* Trialing digital technologies to monitor and analyze customer behaviors and needs
* Monitoring and analyzing behaviors and needs of some applicable customers
* Monitoring and analyzing behaviors and needs of many applicable customers
* Monitoring and analyzing behaviors and needs of all applicable customers
* Don’t know

**69. To what extent are digital technologies used to customize communications with customers?**

* No plans to customize communications
* Evaluating the applicability of digital technologies for customized communications
* Trialing digital technologies for customized communications
* Digital technologies used to customize communications with some applicable customers
* Digital technologies used to customize communications with many applicable customers
* Digital technologies used to customize communications with all applicable customers
* Don’t know

**70. To what extent do customers have access to an online customer portal for support, technical information, best practices with products, product communities, etc.?**

* No customer portal
* Evaluating customer portal options
* Trialing a customer portal
* Some customers have access to the customer portal
* Many customers have access to the customer portal
* All customers have access to the customer portal
* Don’t know

**71. To what extent are digital technologies used to improve customers' experiences with your company's products?**

* No plans to improve customer experiences with digital technologies
* Evaluating the applicability of digital technologies to improve customer experiences
* Trialing digital technologies to improve customer experiences
* Using digital technologies to improve the experiences of some applicable customers
* Using digital technologies to improve the experiences of many applicable customers
* Using digital technologies to improve the experiences of all applicable customers
* Don’t know

**72. What is your company's customer retention rate (percentage of customers retained from previous year)?**

* Less than 50%
* 51-60%
* 61-70%
* 71-80%
* 81-90%
* 91-100%
* Don't know

**73. What percentage of customers are digitally and automatically connected to your company and can send and receive sales, shipment, and order information in real time?**

* 0%
* 1-10%
* 11-30%
* 31-50%
* 51-80%
* 81-100%
* Don't know

**74. Which of the following constraints impair or preclude your company's ability to digitize customer-focused processes? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**75. Please include comments/notes for the Customers category that can help in planning digital improvements for your company.**

### VII. SUPPORT FUNCTIONS

Digitally mature support functions leverage operations and supply-chain data to improve the capabilities and performance of the organization.

Examples of technologies that enable digitally mature customer processes include:

* Secure network infrastructures that enable companywide access to real-time information (from production, warehouse, suppliers, logistics, and customers) for decision-making based on up-to-date internal and external conditions
* Big-data capabilities to analyze data in formats specific to functional roles

Digital best practices include cross-functional support; collaboration; and problem-solving to continuously improve customer value streams.

Digitally enhanced outcomes include functions aligned with corporate strategies, goals, and objectives.

**76. How have operations and supply-chain data been leveraged to improve procurement processes at your company?**

* No operations and supply-chain data digitally shared with procurement
* Infrequent/ad hoc use of digitally shared operations and supply-chain data by procurement
* Occasional review and analysis (quarterly) of digitally shared operations and supply-chain data by procurement
* Periodic review and analysis (monthly) of digitally shared operations and supply-chain data by procurement
* Frequent review and analysis (weekly) of digitally shared operations and supply-chain data by procurement
* Ongoing, dynamic review (real time) of digitally shared operations and supply-chain data in procurement
* Don’t know

**77. How have operations and supply-chain data been leveraged to improve finance/accounting processes at your company?**

* No operations and supply-chain data digitally shared with finance/accounting
* Infrequent/ad hoc use of digitally shared operations and supply-chain data by finance/accounting
* Occasional review and analysis (quarterly) of digitally shared operations and supply-chain data by finance/accounting
* Periodic review and analysis (monthly) of digitally shared operations and supply-chain data by finance/accounting
* Frequent review and analysis (weekly) of digitally shared operations and supply-chain data by finance/accounting
* Ongoing, dynamic review (real time) of digitally shared operations and supply-chain data by finance/accounting
* Don’t know

**78. How have operations and supply-chain data been leveraged to improve sales and marketing processes at your company?**

* No operations and supply-chain data digitally shared with sales and marketing
* Infrequent/ad hoc use of digitally shared operations and supply-chain data in sales and marketing
* Occasional review and analysis (quarterly) of digitally shared operations and supply-chain data by sales and marketing
* Periodic review and analysis (monthly) of digitally shared operations and supply-chain data by sales and marketing
* Frequent review and analysis (weekly) of digitally shared operations and supply-chain data by sales and marketing
* Ongoing, dynamic review (real time) of digitally shared operations and supply-chain data by sales and marketing
* Don’t know

**79. How have operations and supply-chain data been leveraged to improve R&D/product development processes at your company?**

* No operations and supply-chain data digitally shared with R&D/product development
* Infrequent/ad hoc use of digitally shared operations and supply-chain data by R&D/product development
* Occasional review and analysis (quarterly) of digitally shared operations and supply-chain data by R&D/product development
* Periodic review and analysis (monthly) of digitally shared operations and supply-chain data by R&D/product development
* Frequent review and analysis (weekly) of digitally shared operations and supply-chain data by R&D/product development
* Ongoing, dynamic review (real time) of digitally shared operations and supply-chain data by R&D/product development
* Don’t know

**80. How have operations and supply-chain data been leveraged to improve customer service and support processes at your company?**

* No operations and supply-chain data digitally shared with customer service and support
* Infrequent/ad hoc use of digitally shared operations and supply-chain data by customer service and support
* Occasional review and analysis (quarterly) of digitally shared operations and supply-chain data by customer service and support
* Periodic review and analysis (monthly) of digitally shared operations and supply-chain data by customer service and support
* Frequent review and analysis (weekly) of digitally shared operations and supply-chain data by customer service and support
* Ongoing, dynamic review (real time) of digitally shared operations and supply-chain data by customer service and support
* Don’t know

**81. Which of the following constraints impair or preclude your company's ability to digitize support-function processes? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**82. Please include comments/notes for the Support Functions category that can help in planning digital improvements for your company.**

### VIII. SMART PRODUCTS

Digitally mature R&D/product-development processes incorporate smart devices/embedded intelligence into products to enhance customer value and drive growth.

Examples of technologies that enable smart products include:

* Smart devices and embedded intelligence in products and/or packaging and labeling to capture real-time information from customers (e.g., delivery, usage, problems).
* Product lifecycle management systems (PLM) to aggregate and share product information and automate product development processes
* Robust wireless communication protocols that support the capture and sharing of information from smart products.

Digital best practices include the application of product data in the development, sales, and marketing of new products and services; standardized product development processes; and collaboration with customers and suppliers to develop smart products.

Digitally enhanced outcomes include improving sales metrics, including revenues, profit margins, and market share.

**83. Has your company developed smart products (i.e., products that incorporate smart devices/embedded intelligence and/or ship with smart packaging or labeling)?**

* No plans to develop smart products
* Considering smart products
* Trialing smart products with one product line
* Smart products developed for a few applicable product lines
* Smart products developed for a majority of applicable product lines
* Smart products developed for most applicable product lines
* Not applicable
* Don’t know

**84. What percentage of all company products incorporate smart devices/embedded intelligence and/or smart packaging or labeling?**

* 0%
* 1-10%
* 11-25%
* 26-50%
* 51-75%
* More than 75%
* Not applicable
* Don’t know

**85. Does data from products in the field inform next-generation product development?**

* No data from products in the field
* Planning to capture data from products in the field
* Trialing capture of data from products in the field
* Some product data occasionally used by product development
* Substantial product data regularly used by product development
* Substantial real-time product data regularly used by product development
* Not applicable
* Don’t know

**86. How much has your company invested in the development of smart products (as a percentage of annual revenue)?**

* 0%
* 1-2%
* 3-4%
* 5-10%
* 11-15%
* More than 15%
* Not applicable
* Don’t know

**87. Which of the following constraints impair or preclude your company's ability to develop smart products? (choose all that apply)**

* Human resources/talent
* Improvement-process knowledge
* Access to enabling technologies
* Leadership/guidance
* Funding
* Infrastructure
* Lack of external support (e.g., system integrators)
* Other (please specify):
* No constraints
* Don’t know

**88. Please include comments/notes for the Smart Products category that can help in planning digital improvements for your company.**

**When you submit your assessment, you will be given an opportunity to review your answers and save a copy of your responses:**

* **Click on “Submit your assessment” below. You will then be presented with your entire questionnaire as a single, scrollable page. At the top of the page is a “Download PDF” option.**

**Review your answers:**

* ***If you are satisfied with your answers:* Scroll to the bottom of the page and click on “Submit your assessment” AGAIN. You will automatically access the data visualization website and your assessment results.**
* ***If you are not satisfied with your answers:* Click on “Previous category” and revise your answers as necessary. When you are finished, proceed to the end of the assessment questionnaire and repeat the submission process.**