

The Internet of Things Has Finally Arrived

(Unfortunately, Most Manufacturers Aren't Ready)

Executive Summary
MPI Internet of Things Study



The MPI Group
People. Purpose. Profits.

Introduction

The *MPI Internet of Things Study* was designed to evaluate the readiness of U.S. manufacturers to incorporate smart devices and embedded intelligence within their plants and processes. We're particularly interested in executives' plans to improve business performance via the Internet of Things (IoT) — and for developing and selling products with embedded intelligence. The study looks deeply into how manufacturers will leverage IoT capabilities, along with the challenges they face.

The *MPI Internet of Things Study* was conducted by The MPI Group, and sponsored by Rockwell Automation, QAD, and BDO. In August and September 2015, 350 manufacturers participated in the study.

This Executive Summary highlights:

- *IoT Awareness and Expectations (page 2)*: Manufacturers rate their companies' awareness of the IoT and the expectations they have for the IoT to impact business and their companies.

- *Intelligent Plants and Processes (page 3)*: Manufacturers detail the extent to which smart devices and embedded intelligence are incorporated into their operations.
- *Intelligent Products (page 5)*: Manufacturers discuss plans to develop IoT-enabled products.
- *Study Participants (page 7)*: Manufacturer participants are described by type and age of company, revenues, industry, markets, location of facilities, and progress toward world-class manufacturing status.

The IoT era is here — even if many manufacturers aren't ready. Find out if your company is ready by reading on.



John R. Brandt
CEO
The MPI Group

IoT Awareness and Expectations

Most manufacturing companies have limited understanding of the IoT or how to apply it to their businesses (Figure 1). That's unfortunate, because using the IoT wisely is a key strategic initiative for most manufacturing executives:

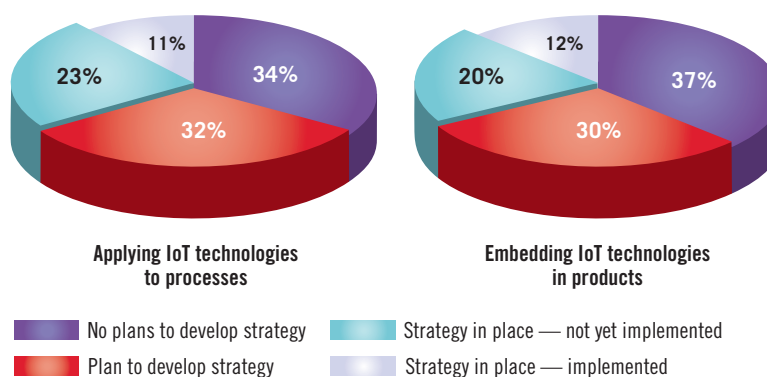
- 71% of study participants say the IoT will have a significant impact (24%) or some impact (47%) on business in general over the next five years.
- 64% of study participants believe the IoT will have a significant impact (17%) or some impact (46%) on *their businesses* over the next five years.¹

Alas, only a few manufacturers have a strategy to apply IoT technologies within their businesses. More than one-third of manufacturers have no plans (really?) to develop an IoT strategy for processes or products (Figure 2).

Figure 1. Company's understanding of IoT and how to apply it to the business (% of manufacturers)

Significant companywide understanding of IoT	5%
Some companywide understanding of IoT	28%
Limited companywide understanding of IoT	43%
No companywide understanding of IoT	24%

Figure 2. IoT process and product strategies (% of manufacturers)



Most manufacturing companies have limited understanding of the IoT or how to apply it to their businesses.

¹ Percentages in the Executive Summary may not sum due to rounding of decimals.

Intelligent Plants and Processes



Manufacturers have incorporated smart devices or embedded intelligence in 25% (median) of their production equipment and processes as well as non-production processes (e.g., back office). Yet 76% will increase the use of smart devices or embedded intelligence in production processes in the next two years; 66% will increase non-production IoT applications.

Shipping, warehousing, and document management are the best opportunities to leverage the IoT in operations (*Figure 3*).

The top five objectives for incorporating smart devices or embedded intelligence are to:

- Improve product quality (58%)
- Increase speed of operations (57%)
- Decrease manufacturing costs (57%)
- Improve maintenance/uptime (47%)
- Improve information for business analytics (42%).

The top five IoT capabilities that present the biggest challenges are:

- Identifying opportunities/benefits of the IoT (44%)
- Network capabilities to handle the IoT (38%)
- Budget/resources to develop or expand the IoT (37%)
- Incorporating smart devices or embedded intelligence (37%)
- Adapting existing technologies (36%).

Only 30% of study participants think that security is an IoT challenge. Roughly half have implemented, developed, or are considering a BYOD (bring your own device) policy for non-corporate devices (e.g., smartphones) in plants.

Figure 3. Processes that represent best opportunities to leverage the IoT (% of manufacturers)

	Excellent Opportunity	Good Opportunity	Fair Opportunity	No Opportunity
Shipping/logistics/transportation	27%	36%	22%	15%
Warehousing	22%	36%	21%	20%
Document management	22%	41%	22%	15%
Assembly	18%	28%	27%	26%
Packaging	18%	29%	27%	27%
Additive manufacturing	9%	21%	23%	48%
Fabrication/stamping	7%	24%	20%	49%
Welding	6%	14%	24%	56%
Heat-treating	6%	13%	20%	62%
Plating or painting	4%	16%	19%	61%
Other	5%	9%	8%	78%

Only a few manufacturers have the network infrastructure to accommodate IoT machine-to-machine (e.g., sensors in one machine trigger actions of another machine) or machine-to-enterprise communications (i.e., machine sensors send data to corporate business systems). Many manufacturers will require major upgrades or overhauls for either (Figure 4).

Effective use of the IoT requires more than just technology: operations technology (OT) staff need to collaborate with information technology (IT) staff. Yet most OT and IT departments don't currently get along (Figure 5).

Operations leadership is most likely to lead an IoT strategy (26%), followed by a cross-functional leadership structure (19%) or IT leadership (17%).

About two-thirds of manufacturers have invested 2% or less of sales in implementing the IoT. Yet 77% of manufacturers expect to increase investments in the next two years.



Figure 4. Current capability of network infrastructure (% of manufacturers)

	Machine-to-machine communications	Machines-to-enterprise communications
Currently capable	10%	13%
Some upgrades required	41%	38%
Significant upgrades required	32%	35%
Network overhaul required	18%	14%

Roughly two-thirds of manufacturing executives believe that the application of the IoT to plants and processes will increase profitability over the next five years.

Figure 5. Information technology staff and operations technology staff collaboration (% of manufacturers)

Resolving technical operations issues	53%
Network security	50%
Upgrading legacy operations systems	45%
Upgrading legacy enterprise systems	45%
Linking operations data and with business analytics	45%
Resolving technical enterprise issues	37%
Other	1%
No collaboration	8%

Roughly two-third of manufacturing executives believe that the IoT will increase profitability over the next five years.

Intelligent Products

Most manufacturers have plans to embed smart devices within their products (Figure 6).

Figure 6. Company effort to embed smart devices and/or intelligence in products (% of manufacturers)

Significant focus of our product innovation plans	14%
Some plans to embed smart devices in products	26%
Limited plans to embed smart devices in products	30%
No plans to embed smart devices in products	30%

Manufacturing executives hope that embedding smart devices or intelligence will:

- Increase revenue from new products (39%)
- Increase market share (39%)
- Access data from products or services in the field (34%)
- Increase profit margins per product (34%)
- Improve branding/market awareness (27%)
- Access new markets/sectors (26%).

The top five challenges faced by companies pursuing IoT-enabled products are:

- Identifying opportunities/benefits of IoT-enabled products (44%)
- Clear understanding of customer needs/value (36%)
- Technologies needed to embed smart devices into products (35%)
- Budget/resources to develop IoT-enabled products (32%)
- Where/how to get started with IoT-enabled products (29%).

A majority of manufacturers see finished goods as the best opportunities to create IoT-enabled products (Figure 7).

Figure 7. Types of products that represent the best IoT opportunities (% of manufacturers)

	Excellent Opportunity	Good Opportunity	Fair Opportunity	No Opportunity
Our company's finished products	28%	31%	20%	21%
Technologies for other manufacturers' products	10%	19%	25%	47%
Devices for other manufacturers' products	9%	20%	23%	48%
Software for other manufacturers' products	8%	18%	21%	53%
Materials for other manufacturers' products	4%	19%	23%	53%
Fluids/substances for other manufacturers' products	2%	13%	22%	63%
Other	2%	8%	8%	82%

Profile of IoT Study Participants



Some 60% of manufacturers participating in the MPI Internet of Things Study are private companies. A large majority (84%) have been in business for more than 20 years.

Participants represent a range of annual revenues: 35% have revenues of \$50 million or less, while another 36% have revenues that exceed \$1 billion.

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The top five industries in the study are:

- Machinery manufacturing (21%)
- Food manufacturing (14%)
- Fabricated metal product manufacturing (12%)
- Chemical manufacturing (11%)
- Electrical equipment, appliance, and component manufacturing (11%).

The top five markets for study participants are:

- Manufacturing (54%)
- Retail (27%)
- Wholesale (26%)
- Defense industries (24%)
- Food services (24%).

Almost all participants had facilities in the United States (96%), and more than one-quarter had facilities in Europe (43%); Asia, not including China (32%); China (31%); Mexico (30%); and Canada (28%).

Roughly one-half of participants have made significant progress toward (39%) or fully achieved (12%) world-class manufacturing status; 7% have made no progress.

Customer satisfaction, productivity, and quality improvements are most likely to impact profitability at participant companies (*Figure 8*).

Figure 8. Type of improvement and impact on profitability

	Significant impact	Some impact	Limited impact	No impact
Customer satisfaction	76%	21%	3%	0%
Productivity	75%	22%	2%	0%
Quality	72%	26%	3%	0%
Speed/on-time delivery	59%	35%	5%	0%
Machine reliability/uptime	55%	33%	9%	2%
Product/service innovation	54%	37%	8%	1%
Cost controls and reductions	53%	39%	8%	0%
Safety	41%	42%	15%	2%
Green/sustainability	16%	36%	38%	10%

The MPI Group

The MPI Group (MPI) serves leaders with research, advice, and performance-targeted solutions that provide a competitive advantage in today's fierce marketplace. MPI combines the disciplines of research, strategic advice, knowledge development, and hands-on leadership to create a difference — in performance, in profits, and in the people who make them possible.

In addition to the *MPI Internet of Things Study*, MPI has conducted the MPI Manufacturing Study for more than a decade — benchmarking research focused on manufacturing plant performances and best practices. MPI also conducts the Next Generation Manufacturing Study, an assessment of companywide capabilities to compete in the next decade, as well as myriad studies for clients on varied topics within numerous industries.

In early 2016 MPI will release a full report on the *MPI Internet of Things Study*. The in-depth report will examine all study findings in greater detail, including key cross-tabulations (e.g., comparisons of small-revenue companies vs. large revenue companies), as well as ways in which the IoT will impact business going forward.

MPI CEO John Brandt offers presentations on the IoT study data, via webinars and in-person events. To learn more about the *MPI Internet of Things Study* Report, schedule an IoT presentation, or to find out more about other research conducted by MPI, contact:

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