MANAGING APPLICATION DEVELOPMENT:

The manufacturing perspective

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About this report

Executive summary and key findings

Manufacturers are deep users of software. They use the cloud, rely on applications and employ advanced development approaches. And unlike many other industries, manufacturing is decidedly comfortable working with contractors, agencies and other outside application developers.

An in-depth review of the manufacturing industry's survey results uncovered the following insights:

- Manufacturers are in the cloud. Nearly all (96%) use cloud technology or plan to use it in the near future.

- Application development is important to manufacturers. Most (92%) say it is a key component of their growth strategy.

- Security is the top barrier to application development for nearly half (44%) of manufacturers. A problem shared in equal measure by the other industries we surveyed.

- Half of manufacturers (51%) give most of their application development to external developers—considerably higher than other industries.

- Advanced development techniques are prevalent among cloud adopters: nearly half use Agile (46%) and DevOps (49%).

- Key performance indicators (KPIs) are used by half of manufacturers (49%) to assess their app-dev efforts. More importantly, nearly nine in ten manufacturers say their organisation is successful at using KPIs to judge a project's success.

- Most manufacturers measure application success by application quality (cited by 62%), customer/stakeholder satisfaction (53%) and on-time/on-budget execution delivery (48%).

CHAPTER 1:
Rapid digitalisation

Manufacturers are big users of software applications. Their competitive advantage, and indeed their survival, depends on it. From supply-chain management to enterprise resource planning and customer-relationship management, manufacturers are also regular implementers of advanced industrial robots and 3D printing.

In fact, in 2018 nearly 30% of all worldwide spending on technology and services that enable digital transformation came from manufacturing industries, totalling US$333bn. The largest allocation of that was spending towards applications, connectivity services and IT services to build out their digital platforms.[1] And the industry's annual spending on applications is estimated to reach US$22bn by 2022, up from US$21.4bn in 2017.[2]

And according to our cross-industry survey of business executives, IT leaders and application developers, manufacturing is one of the top industry adopters of the cloud. Cloud technology is either used, or planned for use soon, by all but 5% of manufacturers. Specifically, over two-thirds of manufacturing respondents (70%) report using the cloud now, and a quarter (25%) plan to use it in the near future. Regarding current adoption of the cloud, manufacturers are second only to retailers and ahead of others including gaming/media, healthcare and the public sector.

Dublin-based Eaton is a cloud adopter. The company makes power-management products that include electrical, hydraulics, aerospace and vehicular products and systems. "We use cloud technology, as it makes sense from an ROI [return on investment] standpoint involving costs and speed," says James Lyle, Eaton's vice-president of application development, quality and support. "It really comes down to an economics decision."

Like all other industries surveyed, the biggest barriers to manufacturers' cloud adoption is security, cited by slightly more than half (52%) of respondents. Other top cloud barriers for manufacturers include a lack of alignment between IT and the business strategy (23%), an inflexible culture (22%) and a lack of funding (also 22%).

According to our cross-industry survey of business executives, IT leaders and application developers, manufacturing is one of the top industry adopters of the cloud.

Footnotes:

1. IDC, "Worldwide Spending on Digital Transformation Will Soar Past $1 Trillion in 2018", June 2018: https://www.idc.com/getdoc.jsp?containerId=prUS43979618

2. Apps Run the World, "Top 10 Manufacturing Software Vendors and Market Forecast", January 2018: https://www.appsruntheworld.com/top-10-manufacturing-software-vendors-and-market-forecast/
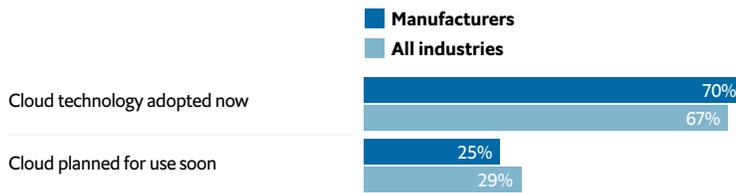
But for some developers, security is not so much of a barrier as it is a feature, and a competitive advantage. "In today's environment, security must be at the top of everyone's priority list," says Vince Manuppelli, director of application development at Eaton. "We bake in development standards that give us the best possible security stance, and as the landscape changes, we're continually evolving those."

Figure 1

Cloud adoption: manufacturing gets ahead

(% of respondents)

■ Manufacturers
■ All industries

Cloud technology adopted now
70%
67%

Cloud planned for use soon
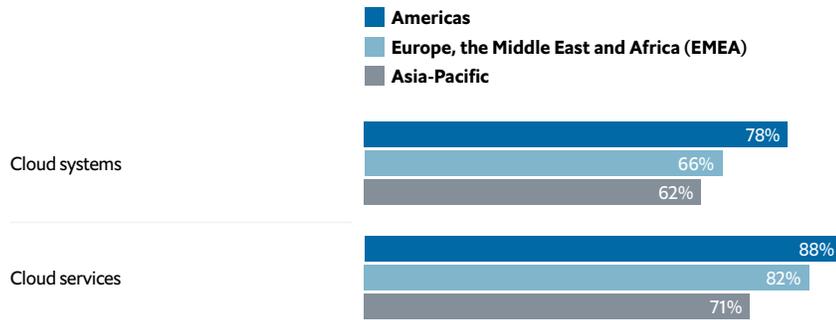25%
29%

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017

Figure 2

Cloud adoption by region

(% of respondents)

■ **Americas**
■ **Europe, the Middle East and Africa (EMEA)**
■ **Asia-Pacific**

Cloud systems
78%
66%
62%

Cloud services
88%
82%
71%

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017

CHAPTER 2:
The building blocks of development

In the light of heavy investment in app development and digital transformation, it is little surprise that most manufacturing respondents (92%) consider app development important to their organisation's growth strategy. They go on to identify their primary strategic objectives as entering new markets, acquiring new customers and deriving additional revenue from existing customers.

As for who is managing that spend and strategy, our survey finds that IT leaders —the chief information officer (CIO), chief technology officer (CTO), IT manager or other senior IT team member—are overwhelmingly taking the lead on app-development initiatives. This includes responsibility for proposing app-development strategies, final authority for which app to develop, and for managing development and allocating resources.

There's only one notable exception where another person has contending authority: roughly a third of respondents (32%) say final authority over which apps to develop comes from the CEO. But even for this task, more respondents (44%) point to the head of IT, and slightly over a third (38%) say it is approved by their CIO or CTO. (Respondents were permitted to select two primary authorities.)

Moving down the organisational structure towards development and implementation, the survey found that within the manufacturing industry, respondents say that their organisation's app-dev teams are most often organised by department (37%), business unit (33%), function (33%), operating system (32%), and type of application (28%). Respondents were able to select up to three choices, and most did so, indicating that app-dev teams are organised fluidly, depending on the specific and immediate need.

Advanced development techniques are used widely by manufacturers, too. Nearly half of respondents (46%) have adopted Agile. Similarly, DevOps has been adopted by about half (49%). Continuous integration of the application-code base presents a more mixed picture. In the Americas, this approach is used by nearly half of respondents (49%), but in Asia-Pacific by only a third (36%) and by even fewer (7%) in EMEA.

According to Mr Manuppelli, these internal factors—authority, team structure and development techniques—can affect employee retention, an important issue given today's tech-talent shortage. At Eaton, he says a mix of traditional and emerging technologies and team structures helps keep workers engaged.

"We encourage our developers to stretch themselves and cross over from one technology to another," Mr Manuppelli says. He adds that current Eaton employees have referred 40% of new developer hires. "This is a good indication that our atmosphere is something people want to be part of," he adds.

"We encourage our developers to stretch themselves and cross over from one technology to another."

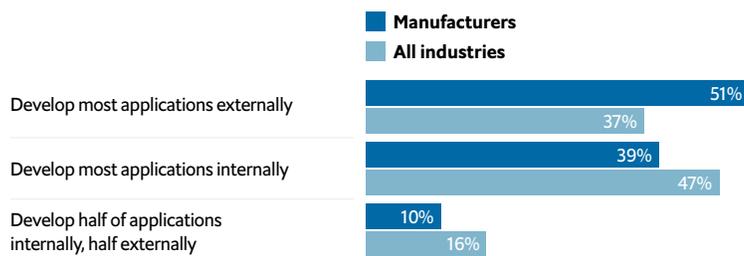*Vince Manuppelli, director and chief IT architect, Eaton*

CHAPTER 3:
High tech, high quality

One area where manufacturers stand out is their heavy use of external developers, which includes agencies and contractors. Across all industries, only about a third (37%) develops most apps externally, but among manufacturers that figure rises to half (51%). And only about four in ten (39%) develop a majority of applications internally. The remaining 10% of manufacturers split the work evenly.

Manufacturers may differ in part because over a quarter (28%) cite a lack of technical knowledge and skills as a top barrier to their app development. Hiring specialised external developers is a quick and effective way to fill an organisation's skill gaps.

Figure 3

Manufacturers comfortable with external developers

(% of respondents)

■ **Manufacturers**
■ **All industries**

Develop most applications externally — 51% / 37%

Develop most applications internally — 39% / 47%

Develop half of applications internally, half externally — 10% / 16%

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017

Eaton is among those mixing-and-matching its approach to application sourcing. "Our strategy, after trying to reuse solutions, is to purchase off-the-shelf software, but we also develop a significant amount of code for interfaces and where we believe it provides us competitive advantage," explains Mr Lyle. "The end goal, regardless of buy versus build, is to ensure robust and cohesive business processes and provide a productive end-user experience."

The quality of applications can be equally important. A low-quality app does no one any good. Manufacturers, attuned to the importance of quality across their supply chains, are similarly concerned with the quality of their software. One way this plays out is in the use of KPIs. Across all industries, over a third of respondents (39%) report using app-development KPIs. But among manufacturers, the figure is closer to half (49%). A majority of manufacturers (88%) also find their use of KPIs for app developers to be very successful.

Similarly, when it comes to metrics for app-development success, manufacturers say their top metric is quality (62%). It's followed by customer/stakeholder satisfaction (53%), on-time/on-budget delivery (48%), achieving the expected ROI (44%) and contributing to strategic goals (42%).
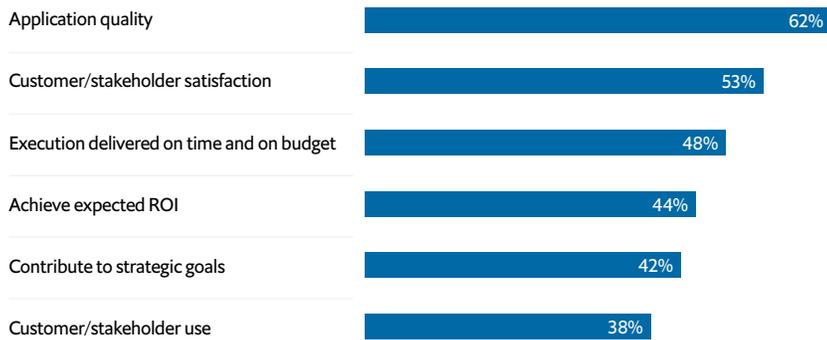
Figure 4

KPIs keep manufacturers developing

(% of respondents)

KPIs currently used for application development

Manufacturers	49%
All industries	39%

Manufacturers' top metrics for app-dev success

Application quality	62%
Customer/stakeholder satisfaction	53%
Execution delivered on time and on budget	48%
Achieve expected ROI	44%
Contribute to strategic goals	42%
Customer/stakeholder use	38%

Note: Multiple responses were permitted

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017

The way ahead

Manufacturing is moving into digital technology even as it maintains a presence in the physical world of products, materials and brick-and-mortar factories. Manufacturers won't stop making material goods anytime soon, but they will increasingly use software applications to better design, plan, make, sell and transport these things.

Here are some of the areas where manufacturers will next focus their application development efforts:

Agile for business: some manufacturers are expanding Agile tactics to business management. For example, one Agile tactic, known as a sprint, involves delivering software in quick increments (even as short as one week), then making changes based on early user feedback. That's in contrast to the "waterfall" approach of working for months (even years) to create a perfect piece of final software before letting users try it. Some manufacturers are now experimenting with sprints for product development, allowing teams to release what Agile practitioners call an MVP—short for minimally viable product—then collect user comments for future modifications.

Training: like many industries, manufacturers must cope with fast-changing technology, yet find themselves hamstrung by a severe shortage of skilled technologists. Data scientists and other IT specialists have become difficult to find and expensive to hire. One alternative is more training for existing staff. To this end, some manufacturers are adopting what's known as a 70/20/10 model, in which 70% of learning occurs on the job; 20% comes from "stretch" assignments and attending workshops; and the remaining 10% comes from conventional training.

Business alignment: in some industries (such as finance), IT not only supports the business, it is the business. That's not entirely the case for manufacturing, yet the industry is moving in that direction. As a result, manufacturing IT and business groups must become even more closely aligned. Some manufacturers are moving IT staff into the business units as a way to ensure alignment. At the same time, manufacturing CEOs, chief financial officers and other senior business executives can be expected to increase their involvement with defining, approving and funding business-critical applications.

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