



Using ecosystems to accelerate
smart manufacturing
A regional analysis

Introduction

Even before COVID-19 began altering global business dynamics, the manufacturing industry was facing an inflection point. The rapid pace of technological innovation was sparking significant investment in digital transformation as companies struggled to improve flagging productivity and replace aging assets.¹ As the pandemic began its global spread, the imperative to transform only became more pressing. Faced with regional stoppages, supply chain disruptions, and production backlogs, manufacturers began to clearly see the advantages of accelerating smart manufacturing initiatives.

At the same time, however, it also became apparent that true change could not happen in isolation. Given the interdependencies of the global community, manufacturers would have to work together to manage industry-wide disruption. This recognition has sparked the formation of manufacturing consortia to ramp up production of personal protective equipment,² as well as the large-scale manufacture of new vaccines,³ in countries around the world.⁴

It was amid this environment that Deloitte and the Manufacturers Alliance for Productivity and Innovation (MAPI) jointly conducted a study to examine whether smart manufacturing ecosystems could help accelerate overall production (see sidebar). This article delves into the responses we received to compare the extent to which manufacturers in different countries are transitioning towards an ecosystem approach.

To understand what this means in practice, it's helpful to think of a "smart manufacturing ecosystem" as a collaborative network formed when different entities come together in meaningful ways to solve shared challenges and meet shared objectives.⁵ According to the study's results, 85% of global respondents agree that ecosystems are growing in importance, and 87% believe these broad ecosystems can help them stay competitive. To unlock these benefits, however, manufacturers will have to enhance their ecosystem maturity.

Research methodology



Deloitte and MAPI jointly launched a study in July 2020 to identify the ways in which smart manufacturing ecosystems can potentially accelerate smart factory initiatives. The study included an online survey of more than 850 executives at manufacturing companies across three key regions: North America, Europe, and Asia. It also included executive interviews with more than 30 leaders from manufacturing companies and ecosystem participants.

Regional responses can be broken down as follows:

- North America (US, Canada, Mexico): **476** responses
- Europe (Germany, Italy, France, Spain, UK): **227** responses
- Asia (China, Japan, India): **150** responses

Although a majority of manufacturers believe ecosystems will help them compete more effectively in a post-COVID-19 world, they should enhance their ecosystem maturity to unlock the promised benefits.

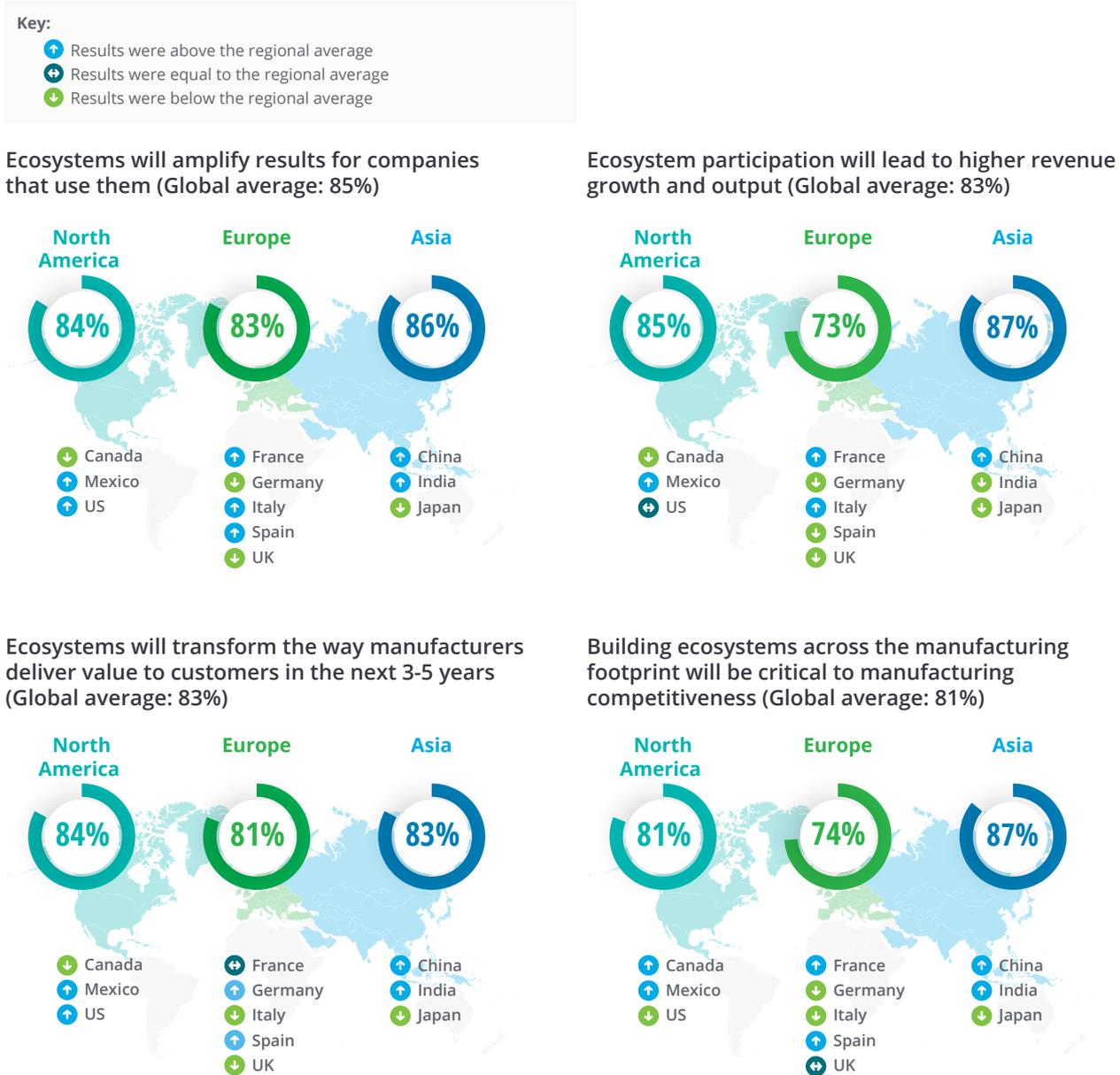
The value of an ecosystem approach

Globally, manufacturers indicate that they believe an ecosystem approach can help them unlock value and realize several benefits. Yet, the perceived utility of these ecosystems varies from country to country.

China, India, and Mexico, for instance, appear most bullish in their recognition of the potential of ecosystems, with a large majority of respondents in each country agreeing that ecosystems will amplify results for companies that use them and transform the way manufacturers deliver value to customers in the next three to five years.

A similarly high percentage of respondents in those three countries say ecosystem participation will lead to higher revenue growth and output, and that building ecosystems will be critical to manufacturing competitiveness (figure 1).

Figure 1: Assessing the value of an ecosystem approach by regional average*



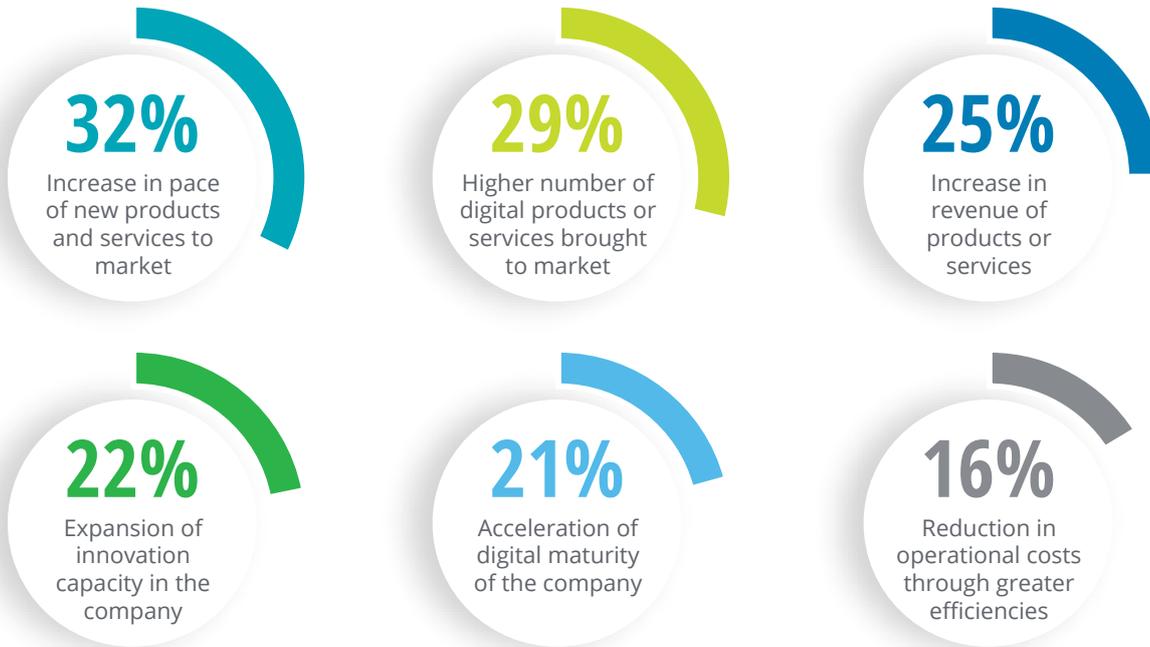
*As we have different sample size for all countries, simple average of regional numbers will not add up to the global average.

Source: Deloitte analysis

Although these results seem to show a relatively high belief in the aspirational value of ecosystems, the percentage of respondents that have experienced tangible benefits over the past two years is considerably lower. That said, benefits appear to be accruing across the board. Among the 69%

of global respondents that are developing production ecosystems—which are designed to make products that meet customer requirements, quality standards, and cost margins—the average benefits experienced in the last two years are shown in figure 2.

Figure 2: Average benefits organizations experienced in last two years from production ecosystems (Global)



Source: 2020 Deloitte and MAPI Smart manufacturing ecosystems study.

Here too, certain countries are outperformers. For instance, 58% of US manufacturers, and similarly manufacturers in Spain, brought more digital products or services to market as a result of ecosystems, compared to the 29% global average. Likewise, 53% of US companies said they increased their capacity for innovation compared to the 22% global average.

Interestingly, manufacturers in Japan also report outsized results, despite their comparatively low belief in the potential of ecosystems. For instance, many of Japan's manufacturers report accelerating their pace of digital maturity thanks to an ecosystem approach, and they report reduced operational costs compared to the global average.

Investment continues apace

In light of the benefits respondents reported experiencing through the adoption of an ecosystem approach, it likely makes sense that many manufacturers have continued to invest in the smart manufacturing initiatives that could help them unlock the value of their production ecosystems.

However, COVID-19 is taking a toll on the industry, driving roughly 40% of global respondents to pause all smart manufacturing investments. In the UK and France, a greater portion of respondents than the global average have paused their investments. For the UK, this could have been influenced by the uncertainty surrounding the Brexit deal. Among the global respondents that have halted investments, 31% said they expect to resume activity within the next three to six months from when they were surveyed, and an additional 45% say they will begin reinvesting within one year.

Again, however, regional variations exist. In China, for instance, only one in 10 manufacturers have paused all investments, and 100% of respondents expect to resume activity within one year—with 57% planning to reinvest within the next three to five months. Japan sits on the other end of the spectrum, with some respondents saying it will be at least one year before they pursue these initiatives. Given the pace of innovation in the world of technology and digital transformation, this regional disparity could see Chinese manufacturers pulling ahead of their Japanese peers if the latter wait too long to reinvest.

Among the approximate 60% of global respondents that are continuing to invest despite the pandemic, these companies are allocating 39% of their overall factory budgets towards smart manufacturing initiatives. Here too, Chinese manufacturers may be positioning themselves to pull ahead, with respondents allocating 54% of their budgets to these initiatives. Canada and Spain are tied for second place, with each country allocating almost half of their budgets.

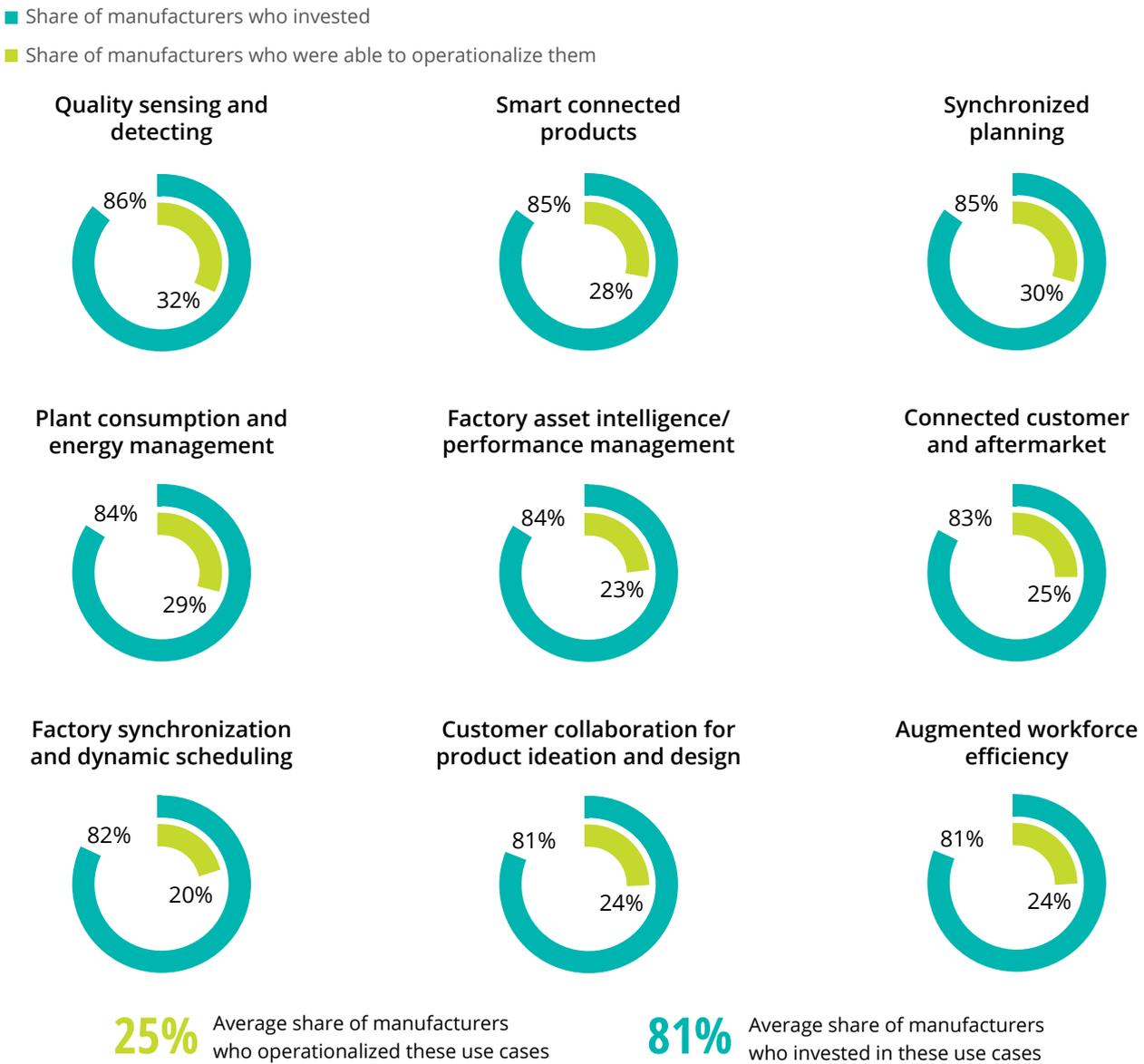
Case study: Enhancing supply chain visibility and resilience in the face of adversity

Having begun its digitalization journey many years ago, Schneider Electric had already developed a smart shop-floor management system and an in-house global vendor portal well before the start of the COVID-19 crisis. When the pandemic hit, leaders saw an opportunity to accelerate those efforts, rather than retrench. As part of its smart manufacturing strategy, one of the company's divisions in China will extend its vendor portal to encompass Tier 2 and Tier 3 suppliers—improving its supply chain visibility at a critical time. To build further resilience into its global supply chain, the division also invested in localization, ultimately cutting its single-source suppliers in half. As a result, it was able to expand its flexible capacity and shorten lead times despite pandemic-fueled disruptions. Currently, they are also working with regional 5G and artificial intelligence (AI) companies to develop practical applications for these nascent digital solutions.⁶

Yet, despite their ongoing investments, most manufacturers are still struggling to operationalize their smart manufacturing use cases. To understand which technologies manufacturers plan to adopt as they roll out their production ecosystems, we identified a set of use

cases for smart manufacturing (figure 3). As these results show, while a global average of 81% of manufacturers invested in these use cases, only 25% have successfully operationalized them.

Figure 3: Share of manufacturers investing and operationalizing use cases in the past two years



Source: 2020 Deloitte and MAPI Smart manufacturing ecosystems study.

Which countries are pulling ahead when it comes to operationalization? The results seem to indicate that it depends on the use cases (figure 4).

Overall, a higher number of manufacturers in India appear to be operationalizing across the board, closely followed by those in Italy, Spain, and Mexico.

Figure 4: Top three regional operationalization rates for each use case (compared to global rate)

		Top #1	Top #2	Top #3
Quality sensing and detecting	Global rate: : 32%	Italy	India	Mexico
Smart connected products	Global rate: : 28%	Italy	Spain	India
Synchronized planning	Global rate: : 30%	Mexico	France	India
Plant consumption and energy management	Global rate: : 29%	US	India	Mexico
Factory asset intelligence / performance management	Global rate: : 23%	India	Italy	Spain
Connected customer and aftermarket	Global rate: : 25%	India	Mexico	Spain
Factory synchronization and dynamic scheduling	Global rate: : 20%	Canada	US	UK
Customer collaboration for product ideation and design	Global rate: : 24%	Canada	US	Mexico
Augmented workforce efficiency	Global rate: : 24%	France	Italy	Spain

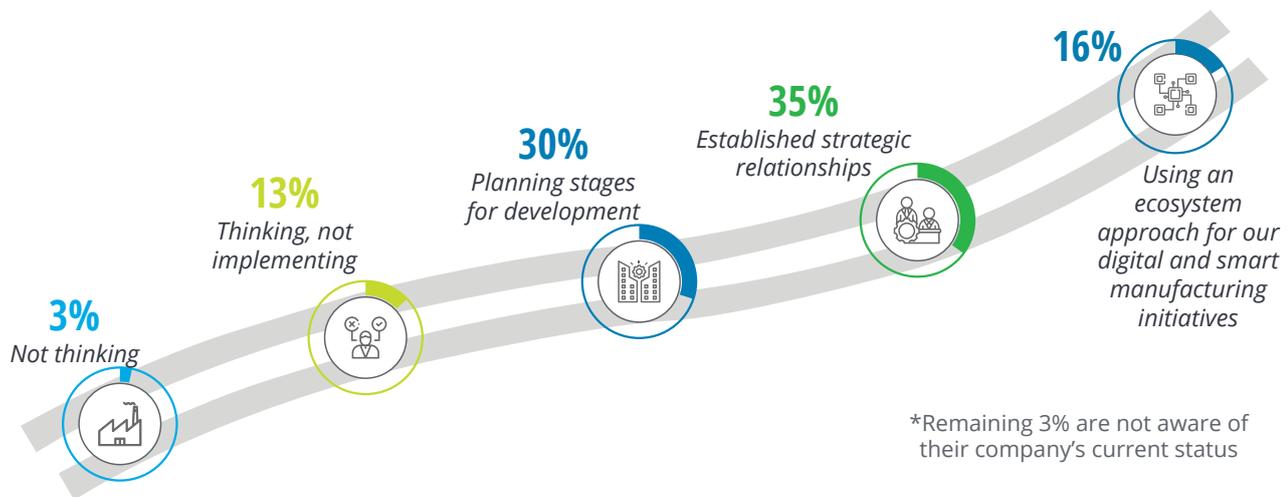
Source: Deloitte analysis

Is (a lack of) ecosystem maturity hampering success?

Given the level of investment being made in smart manufacturing use cases, manufacturers could be excused for wondering why operationalization continues to lag. Part of the reason for this gap may be due to current levels of ecosystem maturity.

Globally, only 16% of manufacturers use an ecosystem approach for their smart manufacturing initiatives (figure 5), and manufacturers in some countries lag even further behind—notably those in Canada and Italy. In two countries, Canada and Germany, a small number of manufacturers say they aren't even thinking of implementing these kinds of initiatives—a blind spot that could place these manufacturers at a competitive disadvantage on the global stage.

Figure 5: Percentage of manufacturers currently using an ecosystem approach for smart manufacturing initiatives



Source: 2020 Deloitte and MAPI Smart manufacturing ecosystems study.

In many ways, COVID-19 put that theory to the test by enabling manufacturers that were already building ecosystems with other companies, vendors, organizations, or associations to respond more rapidly to the crisis. One US manufacturer, for instance, noted that its ability to tap into an existing ecosystem of solution providers allowed

it to add collaborative robots (or “cobots”) to keep its line running even with fewer workers on the floor.⁷ At least in part due to results like these, 70% of global manufacturers say they are developing ecosystems in more than one business area.

In particular, four types of ecosystems are supporting the rollout of smart manufacturing initiatives:

- Production ecosystems—to make products that meet customer requirements, quality standards, and cost margins (the primary focus of this article).
- Supply chain ecosystems—to source raw materials, calibrate supply to demand, and facilitate storage and distribution of finished products to customers.
- Talent ecosystems—to create pipelines for skills and roles that are needed to support smart manufacturing.
- Customer ecosystems—to connect and engage with customers, enable customers to order products, and maintain and service products.

While reliance on these various types of ecosystems varies internationally, production ecosystems have gained

traction among a high percentage of manufacturers in Italy, China and India; supply chain ecosystems have high traction among manufacturers in Spain and China; talent ecosystems are most prevalent in China and India; and customer ecosystems are mostly being embraced in India, China, and the US.

In selecting partners to participate in these ecosystems, global manufacturers seem to prefer players or entities with a global presence and experience (figure 6). However, that preference does not hold true across all regions. In Spain, for instance, a significant portion of manufacturers indicate they would be willing to work with any players or entities with the required expertise, regardless of location. Conversely, several Canadian manufacturers would prefer to work with regional players or entities—an approach that is both supportive of local business and potentially overly-insular.

Figure 6: Manufacturers' preference when selecting partners or alliances to be part of their organization's ecosystem



Source: 2020 Deloitte and MAPI Smart manufacturing ecosystems study.

Overcoming the obstacles

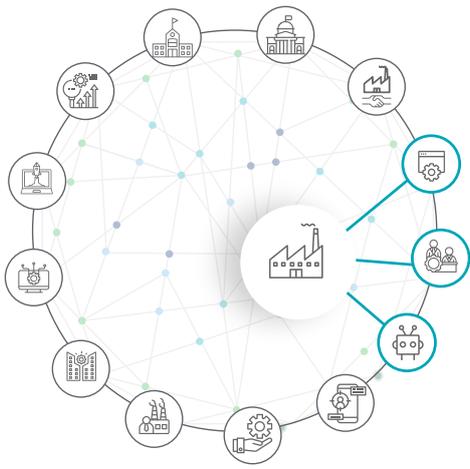
As the study shows, an ecosystem approach appears to amplify the impact of smart manufacturing initiatives. In comparing companies that prioritize in-house efforts to

advance their smart manufacturing initiatives to those that prioritize reaching out to external partners, the study found that the external-oriented respondents went further faster⁸ (figure 7).

Figure 7: Ecosystems afford manufacturers faster access to new participants and use cases

- Potential access path to partners through a direct approach
- Potential access path to the alliances via the ecosystem approach

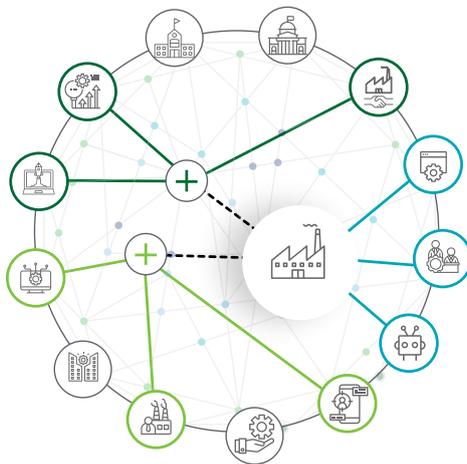
Current state: A manufacturing company with 3 existing connections



Desired state through a direct approach



Desired state through an ecosystem approach



Different alliances driven by an ecosystem convener/sponsor

- + unlocks **cloud and cognitive computing use cases** along with access to new user interface solutions. The ecosystem also includes companies from the technology domain.
- + unlocks **augmented workforce efficiency and digital twin use cases** with many new nascent applications developed by the start-up in collaboration with national R&D labs.

Industry consortia	Other manufacturers	National R&D provider
IT software vendors	Companies from other industry groups	Academia
Operation technologies vendors	Professional services	Government organizations
Physical automation/robotics vendors	Industry 4.0 technology providers	
UX/UI design providers	Start-up accelerators	

Source: 2020 Deloitte and MAPI Smart manufacturing ecosystems study.

For manufacturers to realize these benefits, however, they must close their ecosystem maturity gaps. This starts first by recognizing that having vendor relationships for smart manufacturing is not the same as an ecosystem approach. An ecosystem approach requires deliberate coordination, shared business objectives, measurable impacts/results, and a “convener” capable of aligning the efforts of multiple vendors.⁹

One of the key challenges identified to adopting an ecosystem approach is the difficulty associated with achieving this level of coordination. Globally, 30% of manufacturers say they lack experience on how to build an ecosystem. And this is just the first of several barriers. An even larger inhibitor to implementation is concern around cybersecurity. While roughly 60% of manufacturers around the world highlighted cyber concerns as a limiting factor for ongoing initiatives, that percentage is higher in Mexico, India, China, and Spain.

Other challenges include:

- Concern about exposing their intellectual property or smart manufacturing plans (29% of global respondents).
- Insufficient funding and/or resources (29% of global respondents).
- External factors, such as trade/tariff uncertainty or government policy (a concern of the majority of respondents in India and Mexico).
- Lack of a compelling business case (Japan and Italy) or lack of buy-in from senior executives (Germany and the UK).

Fulfilling the ecosystem promise

Given the variable maturity among different regions, manufacturers are bound to face some significant hurdles in implementing a comprehensive ecosystem strategy. That’s particularly the case in the current economic climate, where COVID-19 disruptions still remain a top concern.

In navigating the headwinds of the pandemic, however, many companies have begun to acknowledge the need to maintain momentum in rolling out their smart manufacturing initiatives. As this study shows, companies serious about operationalizing those initiatives can likely accelerate their value by exploring the power of ecosystems.

Challenges unquestionably remain, but the ultimate benefit seems worth the effort—particularly as manufacturers gain greater capacity to solve common problems through co-innovation. The countries that embrace this opportunity and accelerate adoption will likely be poised to outperform in the next normal.

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Endnotes

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