

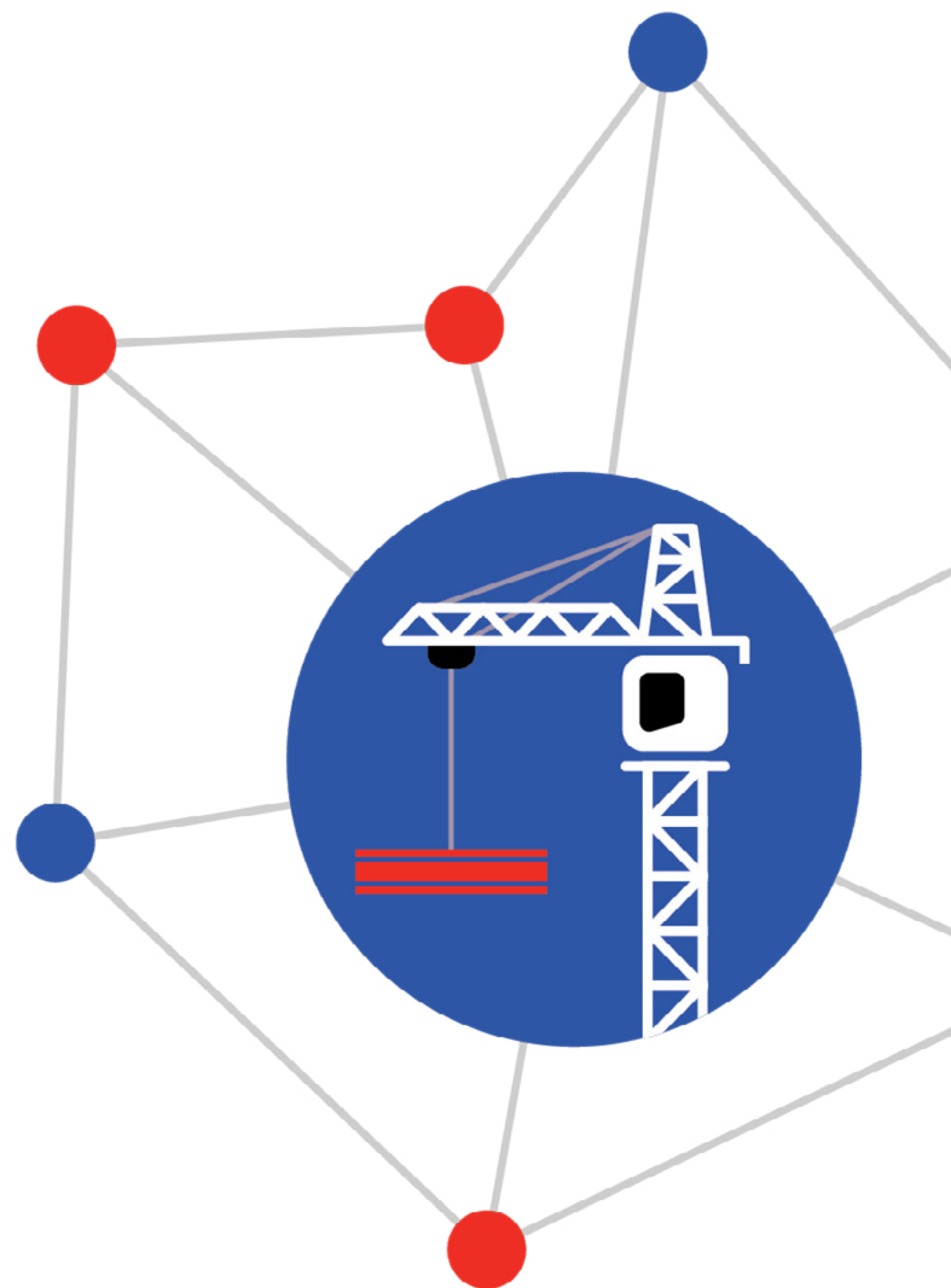


Ecosystem pathways for connected construction

A part of the Deloitte Insights report titled "Accelerating smart manufacturing: The value of an ecosystem approach"

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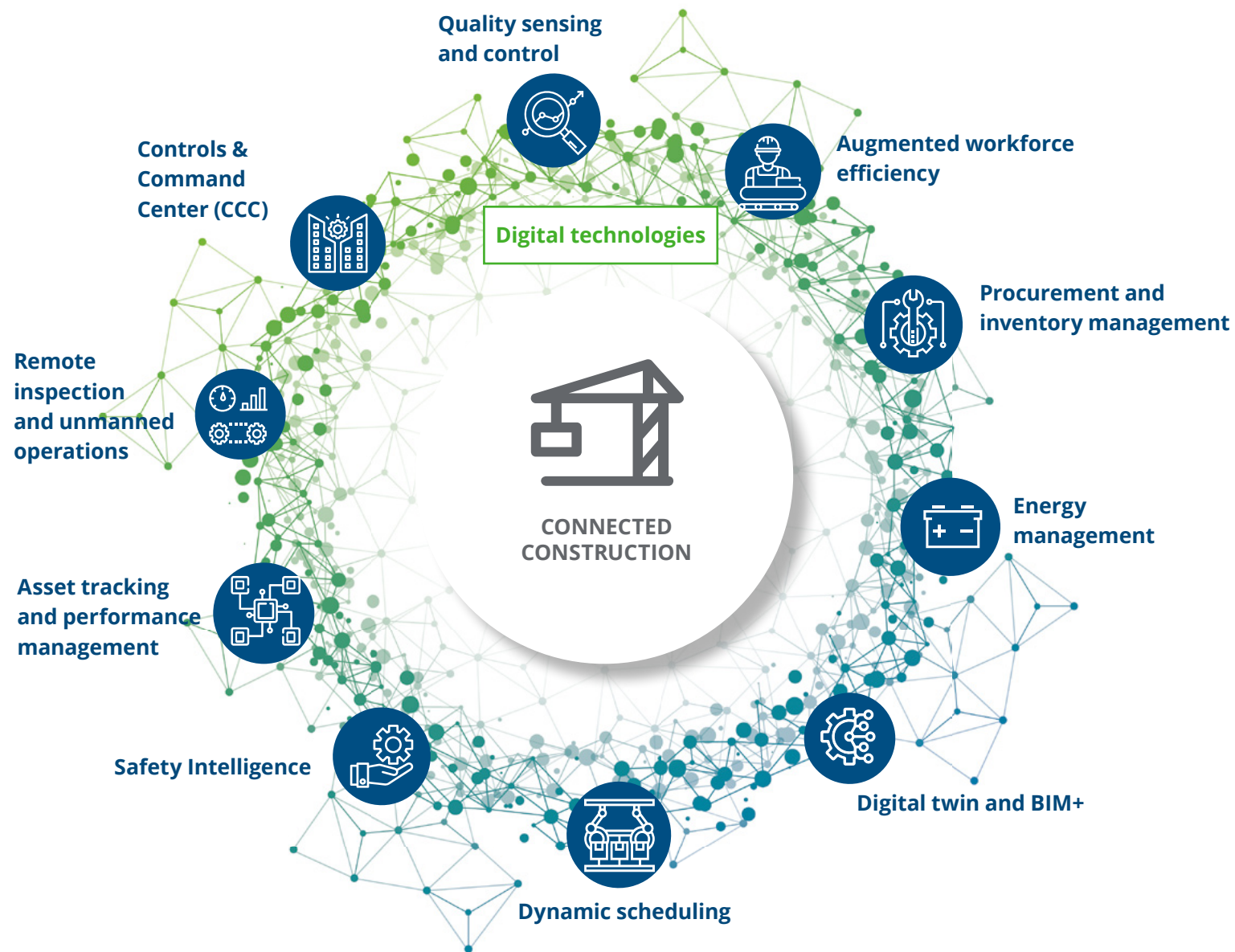


Connected construction is important to unlock higher efficiencies

Most engineering and construction (E&C) firms have been slow in embracing digital technologies. While a number of firms are using digital as a tool to create new business opportunities and improve margins, many are missing out on innovative approaches to drive down costs and improve project execution.

To capture the full value of advanced digital technologies, firms should take a holistic approach toward integrating their internal and external value chains. **Deloitte and MAPI's 2020 Smart Manufacturing Ecosystem Study** has identified a path forward that can accelerate progress.

Use cases for connected construction

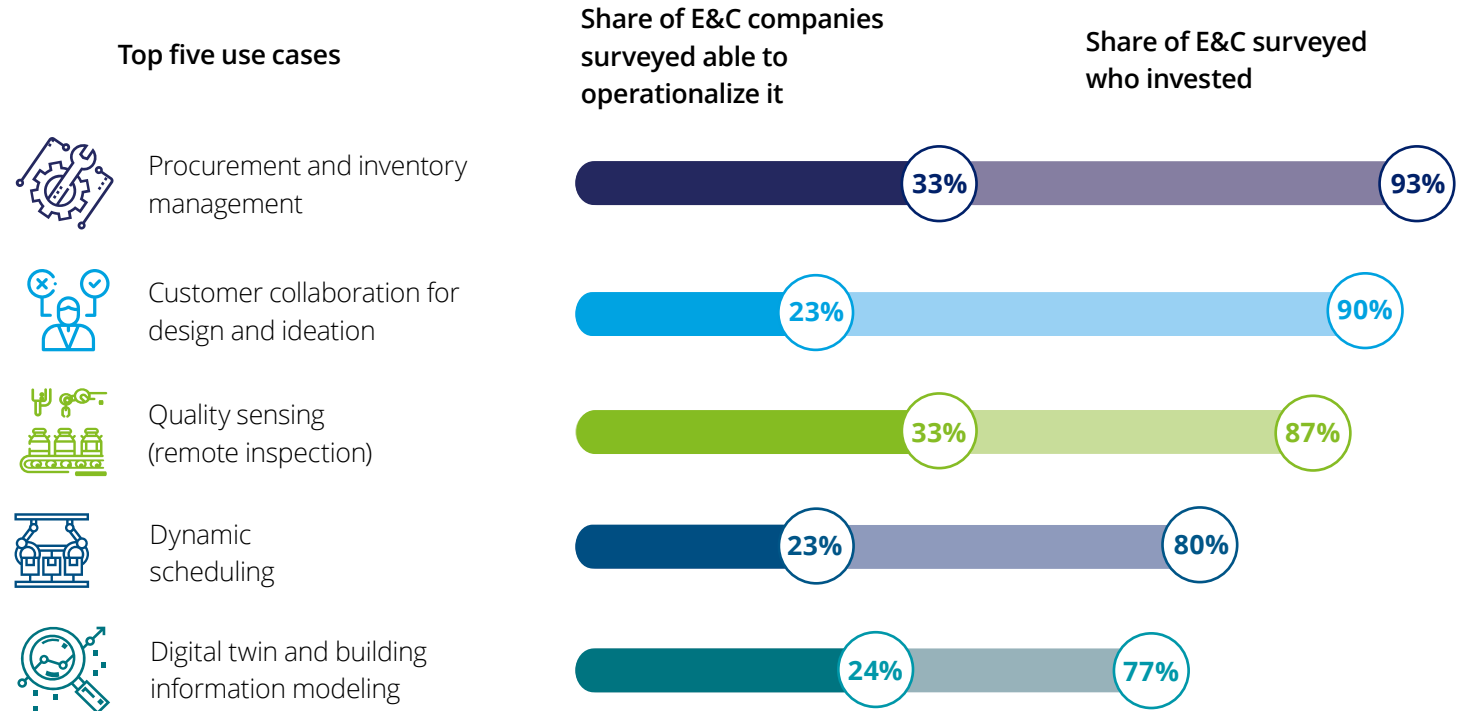


Many E&C companies are investing in digital, but not making much progress

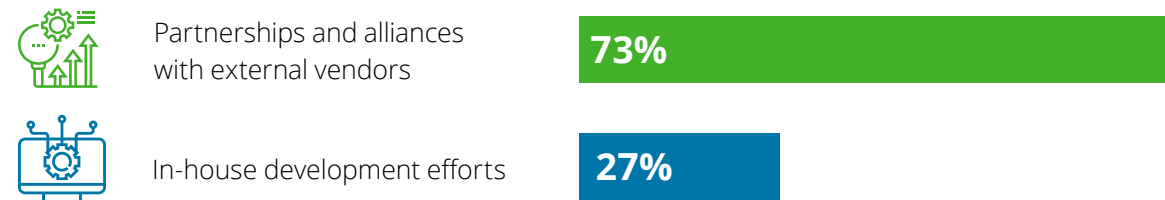
E&C companies surveyed are increasing their digital investments, allocating 39% of their overall operational budgets to digital initiatives, including an average of more than 10 smart construction use cases. However, few participants have these use cases operational at one or more location. How were certain E&C companies surveyed able to achieve faster progress and better returns on their investments?

In the study, while 73% of E&C companies surveyed indicated value from their external alliance partners, they may not be fully leveraging the power of the network to which they are connecting. This is where an ecosystem approach can help to move the needle and dial up results.

A majority of E&C executives surveyed indicated their companies invested in 10+ smart use cases during the past two years ... but only a fraction were able to operationalize them.



Among those able to operationalize, the majority indicated value from external alliances as the top contributor.



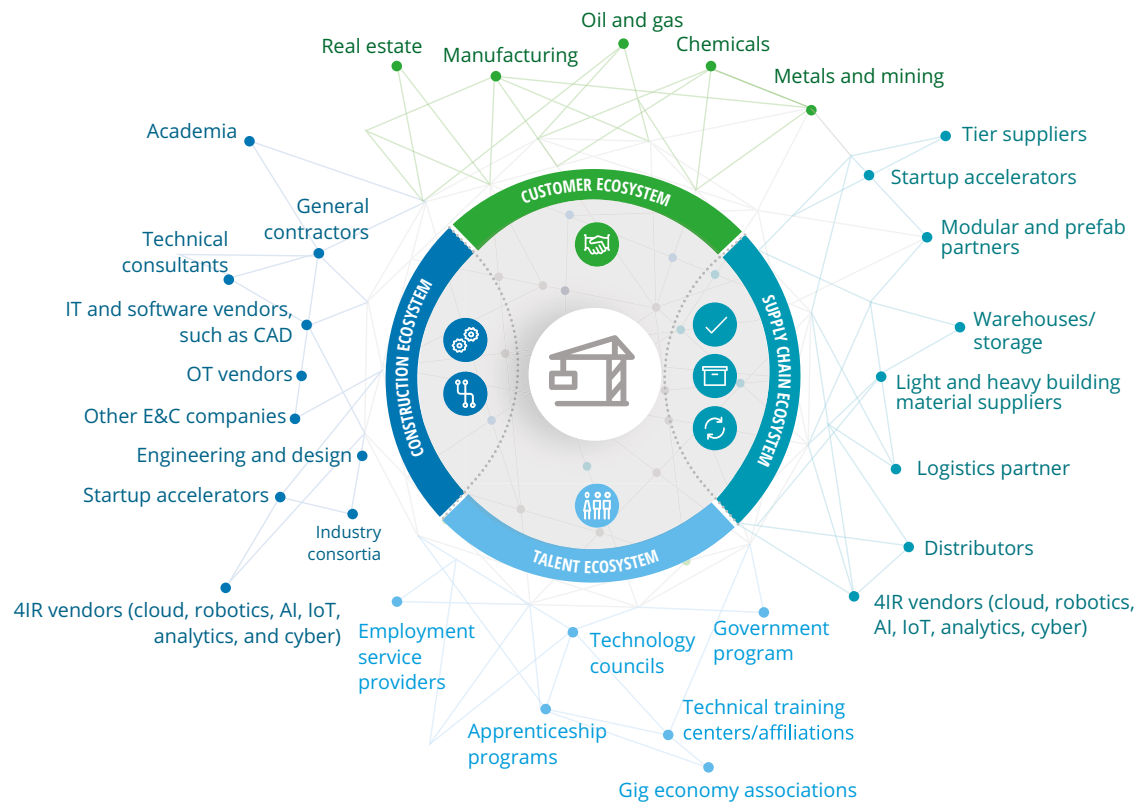


The ecosystem approach: Amplifying collective network strength

The ecosystem approach for engineering and construction brings several independent stakeholders onto a common platform. This enables higher collaboration, reduced project risks, more efficient portfolio management, and improved outcomes for all stakeholders.

An ecosystem approach can not only enable true interoperability throughout the supply chain, but also respond to disruptions better. Four primary types of ecosystems support connected construction initiatives: job site, supply chain, customer, and talent.

Foundations to becoming a viable, digital organization



Ecosystem capabilities:*

- Connected customer
- Dynamic fulfillment
- Intelligent supply
- Synchronized planning
- Talent access
- Smart production
- Digital development/innovation

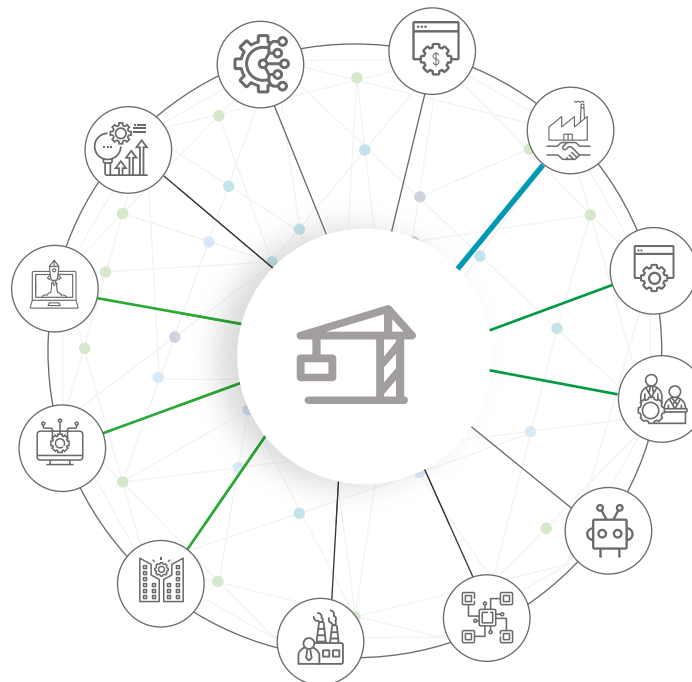
*Ecosystem capabilities are constantly developing and may not be limited to the ones mentioned above. Source: Deloitte analysis

Value drawn from the ecosystem can increase exponentially as connections grow

Digital technologies enable many siloed networks to converge and form a large single network or ecosystem. This converged ecosystem is designed to be more secure and agile and can deliver value at a larger scale.

Ecosystems can thrive when they foster the interconnections of people, processes and equipment, and their virtual counterparts. The study shows firms investing and participating in ecosystems are likely to see higher strategic benefits.

Companies actively seeking ecosystem participation reported having connections with a higher number of participants when compared with those not thinking about it.



Top partners contributing the most value to surveyed E&C company's digital initiatives

- #1** Industry 4.0 technology providers
- #2** IT software vendors
- #3** Operations vendors
- #4** Physical automation and robotics vendors
- #5** Services firms and contractors

— Same number of connections

— 2x connections

— 3x connections



Industry consortia



Other E&C firms



Start-up accelerators



Operations vendors



Companies from other industry groups



National R&D labs



IT software vendors



Services firms and contractors



Prefab and modular suppliers



Automation, robotics, or drones vendors



Connected technology providers



Material suppliers

Pathways to an ecosystem approach

The ecosystem approach can work, but it's not easy. It requires a deliberate method and typically involves an executive commitment and the creation of a road map with important milestones.

Then, to support the road map, E&C companies often reach out to their ecosystem to build an enabling platform with an enterprise architecture. Firms need to identify the use cases and undertake a cost-benefit analysis. Companies can then accelerate their initiatives while determining which specific advanced capabilities to cultivate in-house.

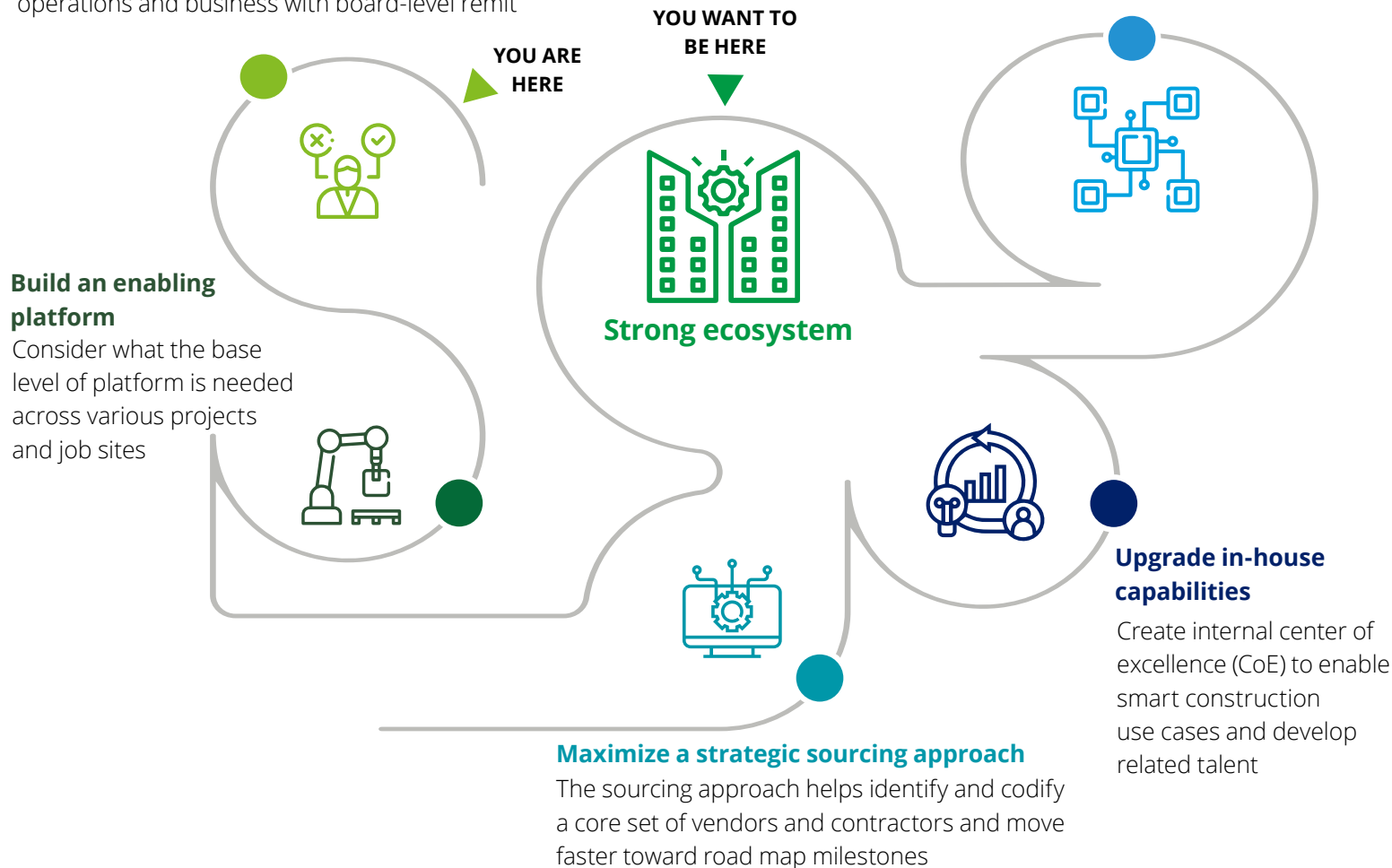
A framework to consider

Create an enterprise road map with milestones

The road map defines the core capabilities for the next three years and provides milestones for advancing maturity. Form executive leadership team that represents operations and business with board-level remit

Strengthen the enterprise architecture

Consider a framework that combines connected construction use cases, technology, and people together



Create an enterprise road map with milestones

Key questions that should be kept in mind while developing the road map:



What is your vision for the next three years for digital?



What use cases or business opportunities are you most interested in solving for or enabling?



How can you accommodate for varying levels of maturity across your footprint?

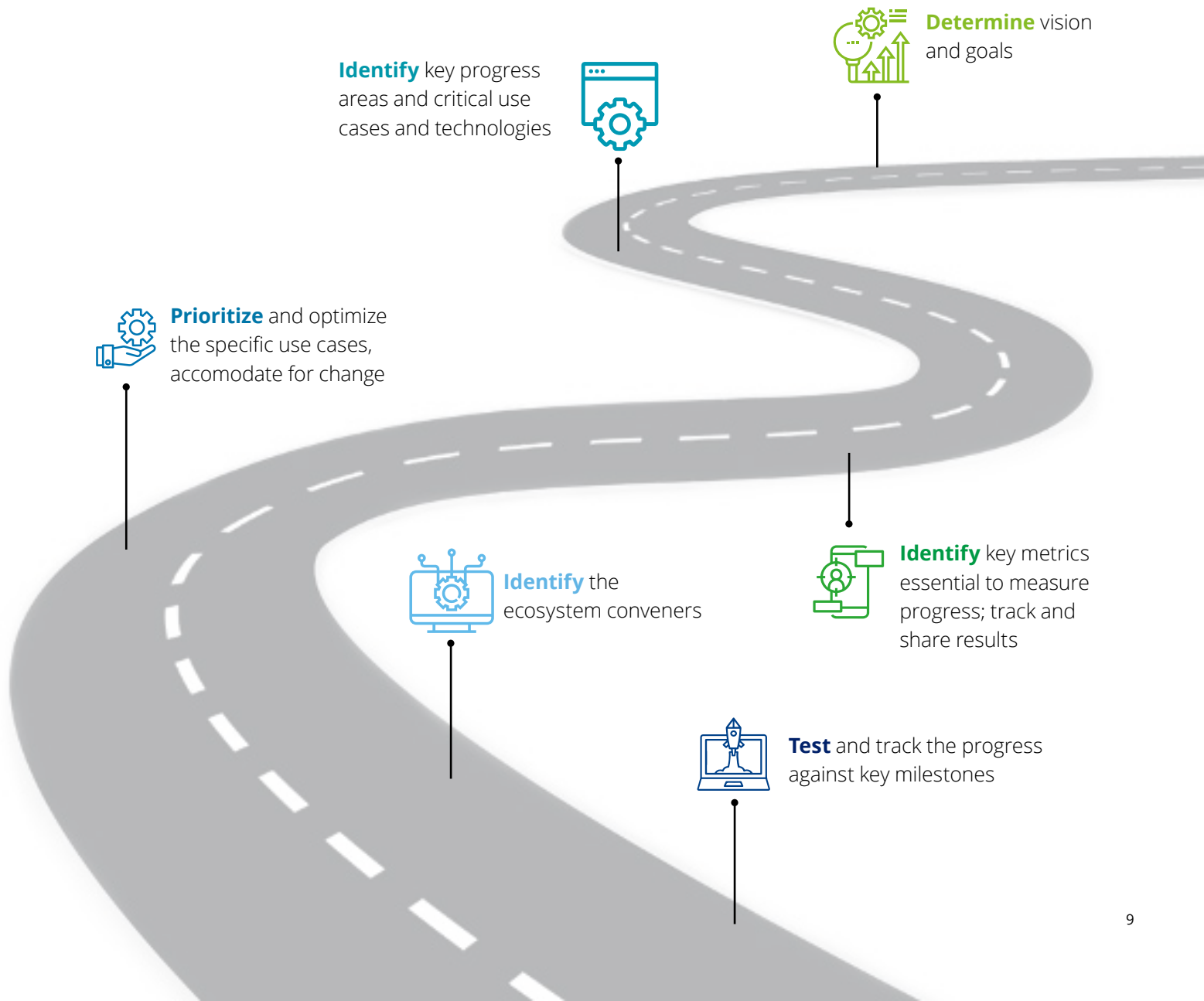


What do you need to do right now (capabilities) that will lead to bigger things in coming years?



How can you identify initiatives that positively affect margins and returns on investments (ROI)?

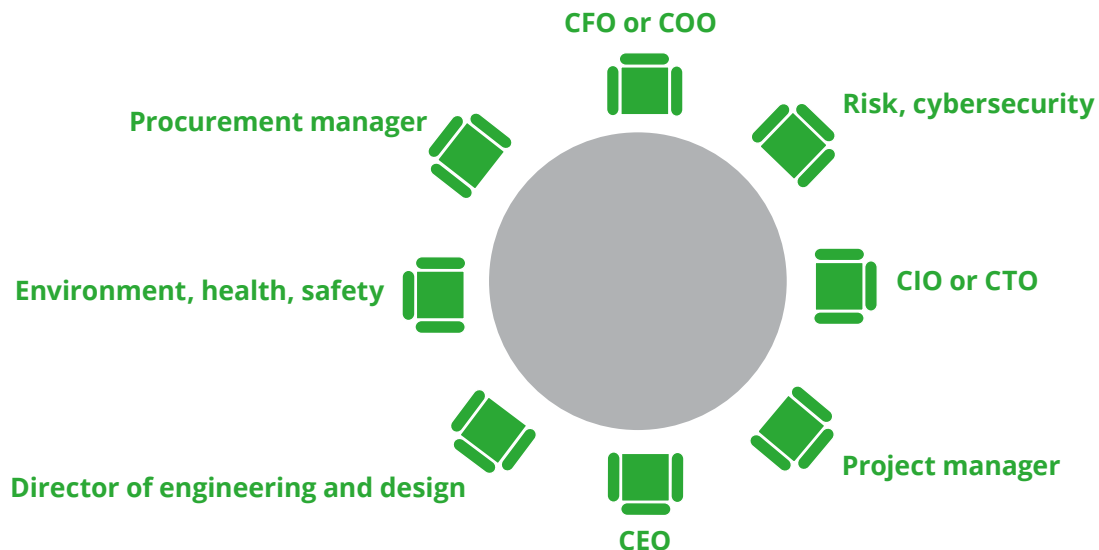
Create an enterprise road map with milestones



An executive team can drive the digital strategy road map

- Set up an executive team to drive the ecosystem approach, which should include people from key business areas and operations.
- Focus on unlocking the benefits of ecosystem—that is, easier and faster access to capabilities to help mitigate the inevitable disruption.
- Allow for flexibility to help cater to division- or location-specific nuances. For instance, the cloud provider or data platform can be decided at the corporate level, but the committee can allow for flexibility at the geography or division level for different equipment—depending on the need.

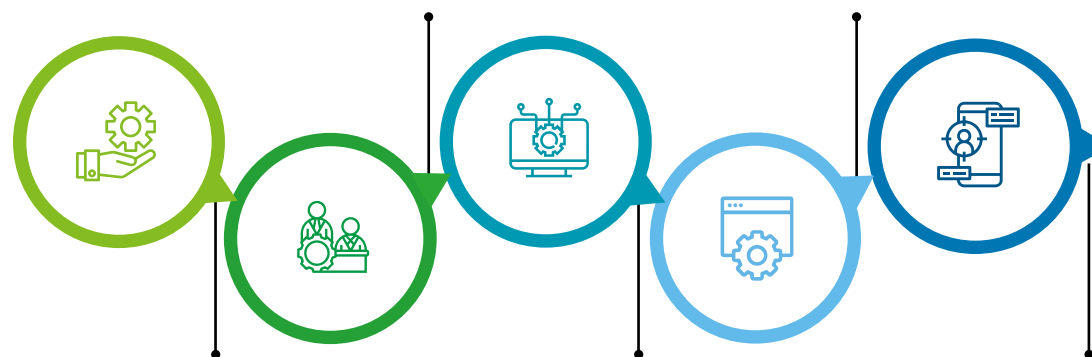
The executive team should represent different business areas...



...and allow multiple avenues to influence the road map

Leverage strategic sourcing organization to facilitate identifying new partners

Establish digital innovation committee that identifies potential new vendors or contractors



Listen to the internal team for development, data analytics, and UX/UI design

Connect with existing technology and equipment vendors to identify possible partners within ecosystems

Listen to the primary stakeholder of the use case or initiative to identify potential partners

Build the platform and the enterprise architecture to support the road map

Building a digital platform in line with an enterprise architecture for smart construction can be critical to support strategic goals.

The strategies should include necessary core capabilities, but also reflect the use cases and the corresponding technologies that drive them.

The approach here is driven by a layered method to use cases, wherein the underlying technology platform remains consistent, thereby helping E&C companies expand beyond current or include new use cases in future.

Connected construction platform

1. IDENTIFY BUSINESS ISSUES



Reduce equipment breakdowns



Manual document workflows



Insights into real-time asset and project intelligence



Enhance worker safety



Minimize rework



Reduce construction costs



Improve design processes

2. DETERMINE USE CASES TO SOLVE THE BUSINESS ISSUES



Quality sensing and control



Augmented workforce efficiency



Procurement and inventory management



Energy management



Controls & Command Center (CCC)



Remote inspection and unmanned operations



Dynamic scheduling



Safety intelligence

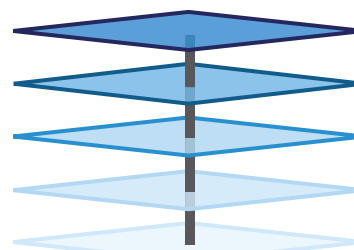


Asset tracking and performance management



Digital twin and BIM+

3. BUILD CONNECTED CONSTRUCTION TECHNOLOGY STACK



Level 4 Applications (e.g. ERP and PLM)

Level 3 Data science and analytics (e.g., WMS, RPA, and IA)

Level 2 IIoT data and ops pipeline (e.g., AR/VR and SCADA)

Level 1 IIoT edge and connectivity (e.g., PLC and edge gateways)

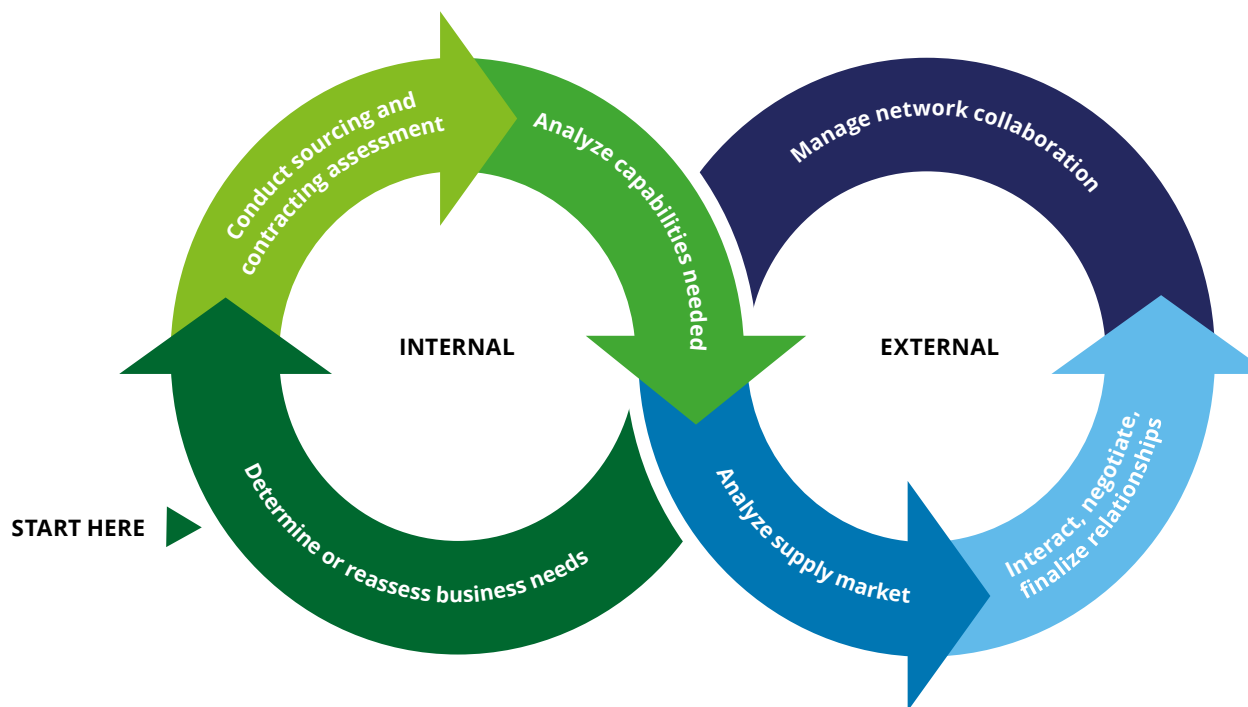
Level 0 Site and field (e.g., AGV and robotics)

Adopt and maximize a strategic approach for ecosystem participants

E&C companies should consider applying the philosophy of strategic sourcing for their ecosystem approach, but frontload the approach with strong relationship development. Other aspects to consider:

- Collaborate and form relationships with partners that share your values and passion.
- Focus on forming bidirectional relationships where you are bringing your challenge or opportunity to them, but they also bring things to you—making sure there's a give-take dynamic.
- Agree how value will be measured from these relationships.

Ecosystems strategic sourcing methodology



Other sourcing considerations

Surveyed E&C companies' top preferences to measure value from partners:

- Productivity or efficiency related metrics: **63%**
- Direct revenue-related metrics: **57%**
- Number of additional capabilities they bring: **50%**



Surveyed E&C companies' top preferences to identify partners:

- Regional players or entities with networks that enhance the strength of the regional ecosystem: **37%**
- Player or entity with global presence and experience: **37%**
- Any player or entity with the required expertise of value, irrespective of their location: **23%**

Start your journey

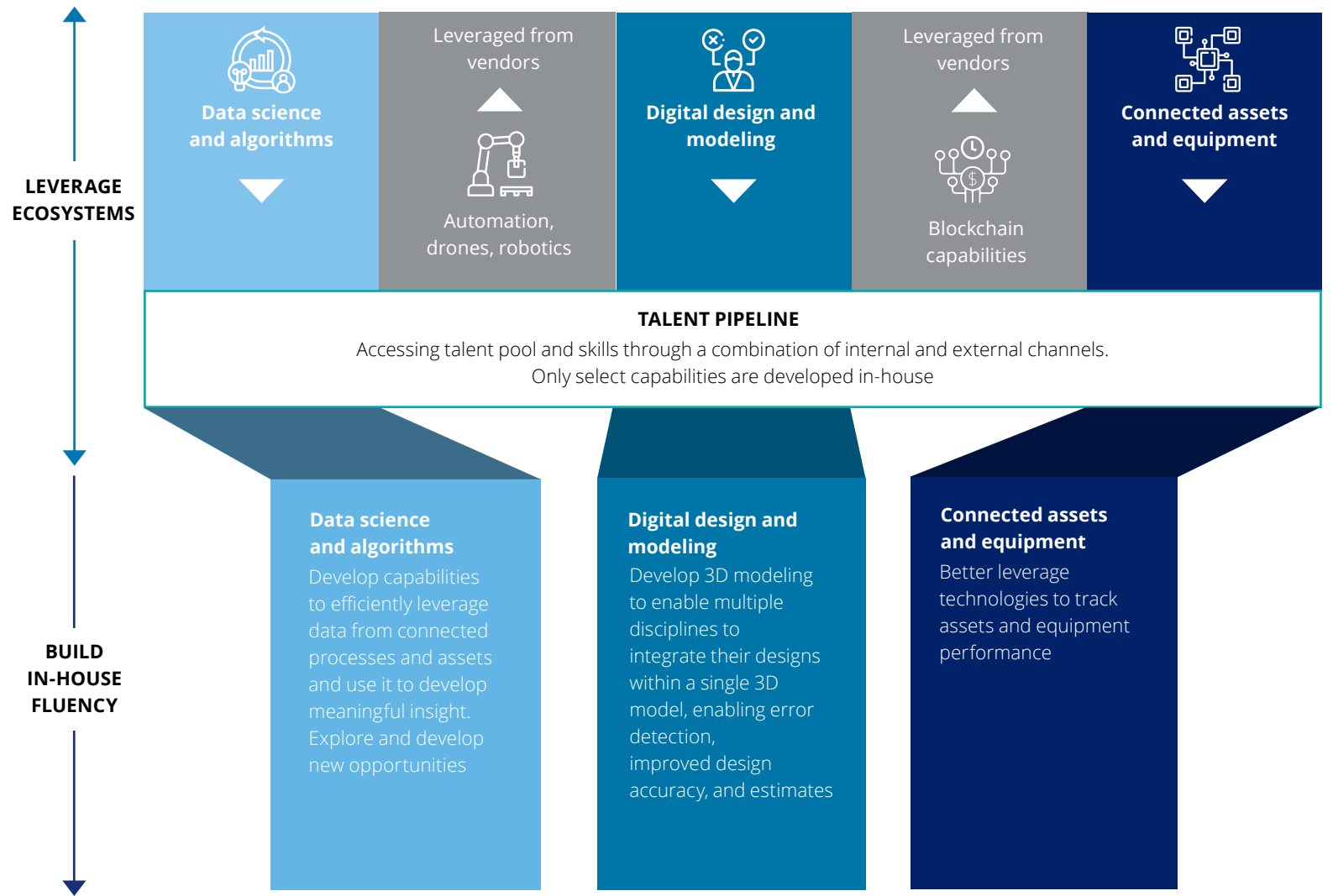
Determine what capabilities should be cultivated in-house

While external partners can provide faster access to smart use cases and technologies, upgrading select in-house talent and capabilities can likely help engineering and construction firms to scale those benefits.

Determine which capabilities differentiate your business and support your long-term vision. Consider sensing and responding to them through the ecosystem. Identify who are the best vendors to provide the support.

Be deliberate about which capabilities make more sense to continue to source through the ecosystem's partnerships.

Leverage ecosystems and build in-house fluency



Start your connected construction ecosystem

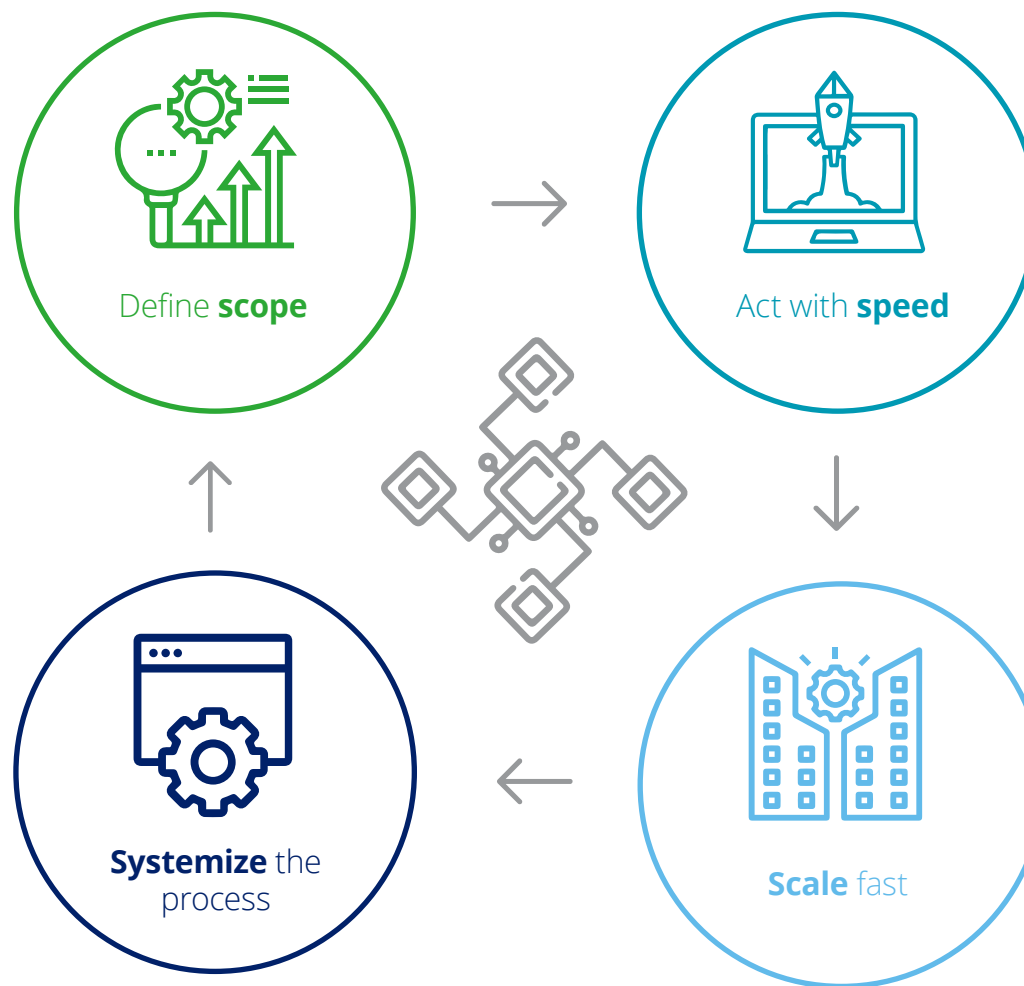
Define scope: Don't build capabilities you don't need. If you understand the nature of the business issue, the scope of the solution becomes easier to understand.

Act with speed: Speed is one of the key benefits of tapping into an ecosystem.

Scale fast: It's easy to do a proof of concept in an unscalable way. The ecosystem is ready to scale your test case. It brings scalable capabilities that are ready to respond.

Systemize the process: Create repeatable steps so that as you continue to activate new business use cases, you can tap into the ecosystem more readily.

The ecosystem-led digital innovation ecosystem



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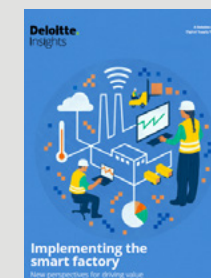
Acknowledgements

The authors would like to thank the team that helped us tremendously in developing this series of reports, including **Ankit Mittal, Kruttika Dwivedi, Sahitya Bhushan**, and **Siddhant Mehra** of Deloitte Support Services India Pvt. Ltd.; **Aijaz Hussain, Steve Shepley, Sami Alami, Steve Scott**, and **Samarth Shah**, who provided feedback for the playbooks; and **Kim Buchanan, Whitney Laine Garcia, Jessi Rayhill, Rachele Spina**, and **Marguerite Courtemanche**, who drove the creation of these assets to bring the story to life.

About the study

Deloitte and MAPI jointly launched the study in June 2020 to identify the ways in which smart manufacturing and connected construction ecosystems can potentially accelerate digital initiatives. The study included an online survey of more than 1,000 executives at manufacturing and E&C companies across three key regions globally: North America, Europe, and Asia. It also included executive interviews with more than 30 leaders from manufacturing companies and ecosystem participants.

See the full report for more insights from the survey and explore other reports on smart factory



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