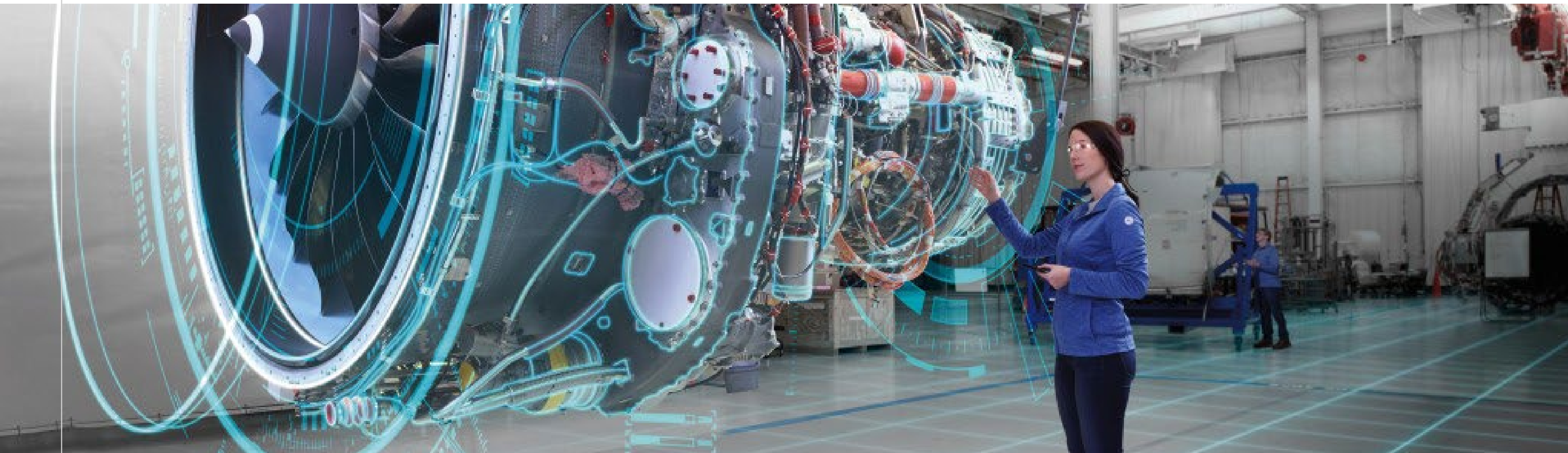




Digital Industrial Transformation Playbook: Capabilities Pillar



Introduction

In December 2016, GE Digital unveiled its playbook for digital industrial transformation. Based on our own transformation journey, the playbook outlines a set of principles and practices we employed to drive new outcomes in productivity, asset availability, and performance.

Industrial companies are entering a new period of explosive value creation, and the rapid spread of digital innovation will reboot industrial productivity growth. McKinsey & Co. reported that the Industrial Internet of Things (IIoT) would create as much as \$7.5 trillion in value by 2025.

One thing is clear: the Industrial Internet is not optional, and it is as important as the electrification of industry was to the last century. Early adopters are more likely to find lasting results. For those who lag behind, the future might not be as bright.

When it comes to successful transformations, the key is to focus on capabilities that will differentiate and drive competitive advantage. The first step for any transformation is to re-think the organizational capabilities needed to start, scale, and sustain your transformation.



GE's capabilities and operating model for becoming a digital industrial

Around 2010, GE made a strategic decision to move from a defensive market position—where we saw new IoT market entrants as threats to our service contracts—to an offensive, growth-oriented market position where focused on providing a rising tide that lifted all ecosystem participants.

Our path to realize our strategy is straightforward.

01 Use these new capabilities to drive internal productivity and cost improvements. We call this **GE for GE**.

02 Leverage the insights and capabilities born out of our internal productivity work to offer a complete set industrial applications. We call this **GE for customers**.

03 We made our Predix platform available to everyone for co-creation and innovation across virtually all industrial categories. We call this **GE for the world**.



Transformation in any company is complex, and GE is no different. It requires change across people, process, and technology. In order to accomplish transformation at scale, we broke the challenge down into five key focus areas for digital industrial transformation:

- 01 We created a new business unit called GE Digital, as the organizational mechanism to drive change, providing us with the operating model and organizational capabilities to become a digital industrial.
- 02 We built Predix, a cloud-based operating system for the Industrial Internet, to enable GE and our customers to start at the innovation layer, rather than reinventing the IIoT wheel.
- 03 We created an open-innovation partner ecosystem that our customers leverage across industrial markets and industrial outcomes.
- 04 We systemically drove culture change. We needed to develop the necessary processes for rapid decision-making, iterative improvement loops, and an ongoing people management process to ensure that the culture doesn't reject the transformation.
- 05 We rethought how all of the above impacts the business models we offer our customers. And we created a Digital Transformation Blueprinting service that helps our customers leverage business model innovation within their own markets.

Digital transformation in the industrial world typically involves critical infrastructures, where safety is prioritized. GE recognized that the industrial world needed a distinct set of capabilities that reflects their place as the world's critical infrastructure providers.



Transformation: the long and winding road

Let's face it, transformation of any sort requires a clear understanding of your current limitations, a vision of what the future organization looks like, and a constellation of executive buy-in, financial support, new organization models, and a change management system that drives a new mentality to every employee. A holistic approach is vital to ensuring transformation is a long-term endeavor that delivers sustained results.

You have to ask and answer some tough questions:

- Where are you in your transformation journey?
- Is this an enterprise transformation, or more of an "innovation group-driven effort"?
- What conversations have you had with various product lines about how they would like to work on this transformation?
- What does success look like to you and your leadership?
- What's not working today?

Based on our experience, we urge aspiring digital industrial companies to organize around three fundamentals to success.

1. Make sure you can fund the journey. Start by identifying areas of quick wins that will demonstrate short-term value and results. Look for cost and revenue opportunities, and a simple organizational structure that is agile and can adjust quickly.
2. Plan for the medium term. Identify areas for growth, new business models, or target an operating model to improve.
3. Finally, organize the transformation initiative for sustained performance. This is a significant step toward becoming a digital industrial. Both short-term wins and medium-term innovations can help provide the needed credibility among leadership to advance the initiative forward.



What is a capability?

We define capability as the ability to do something well in a way that improves business performance and creates value. At the core of capabilities are activities, interactions, and decisions made by individuals who exemplify that capability.

Transformations always require re-wiring the way companies operate, including new business models, digitization, and fundamental changes to the roles of business units and functions. As a result, companies invariably need to build new capabilities.

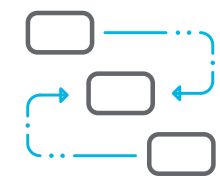
Knowing how to identify and develop these capabilities is pivotal to the success of any transformation.

Ultimately, transformations are about behavioral change. The leadership team must address key components of any capability.



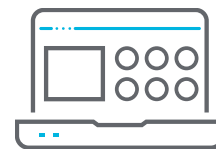
Competencies

Employee skills, knowledge, and beliefs



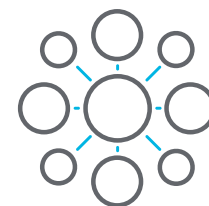
Processes

The activities and responsibilities that govern the way work is divided and done



Tools

IT, apps, systems, technology



Governance

KPIs, incentives, metrics, and decision-making/reporting structures

Collectively, these four key elements reinforce each other and lead to sustainable behavior change. They will also provide the agility to develop and deploy strategic capabilities that will position you for success as you execute your strategy.

Capabilities of a world-class digital industrial

With a definition in place, companies can turn attention to identifying and developing capabilities.

It starts with the development of a capability map across your value chain. For us, the question we had to answer was “what capabilities do we need to pivot to become a software-as-a-service business?”—something that we had never done before.

We looked at leading software companies as examples, and worked with industry experts to develop an end-to-end capability map, from product and design, to marketing, sales, operations, support, and services.

Some of these capabilities were completely new to GE, and hence needed ground-up work, requiring a major change in the way we operate.

A lot of time goes into making sure that the map has mutually exclusive but collectively exhaustive capabilities. The real work starts when you have to determine where you will begin.

If you’ve ever visited a major public destination, like a shopping mall or an amusement park, you are familiar with the many maps located throughout the location, indicating where things are. The most important message on that map is the dot that states, “You are here.” That’s what a capability map does. It helps you take a hard look at where you now, and then prioritize the critical capabilities that will deliver the greatest value, providing you with a map to get to where you want to go.

A prioritization framework

As you can see in Figure 1, not all capabilities contribute equally to achieving the goal of the transformation, and hence need the highest attention of the transformation executives.

About 20% of the capabilities are must-win, or the ones that give you a strategic advantage. However, only 10% of the capabilities are truly innovative—things that will set you apart. Often, these are also the hardest to set up, and require significant time, energy, resources, and commitment from the leadership. They are often built by creating teams dedicated to constructing these capabilities as part of the transformation program.

70% of the capabilities are foundational. These typically drive efficiency, and most of the time, these are the easiest to implement, and need less direct oversight.

In addition to determining the capabilities that are strategic to the transformation, you also have to assess where you are in the maturity of those capabilities. You don't have to be best in class in everything that is important.

For GE's own transformation to a digital Industrial company, the priorities were clear.

Figure 1: Successful transformations focus on capabilities that will differentiate the business and drive competitive advantage

Best in class

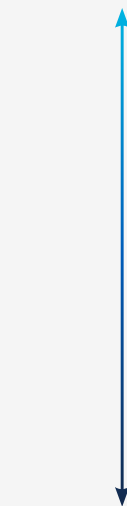


Table stakes



Not all capabilities contribute equally to achieving the goals of the transformation

- **Innovative:** 10 % (Innovative processes that set you apart)
- **Competitive:** 20% (More complex capabilities that lead to strategic advantage when fully optimized)
- **Foundational:** 70% (Must have capabilities contributing to greater efficiency)

For us to drive customer outcomes, we invested a lot of energy, talent, and resources into developing a leading-edge product management capability. This led to the development of the Predix platform, and killer applications such as asset performance management.

We had the sales and marketing capabilities that, when fully optimized, could lead to a very strong strategic advantage, and were also a key priority. For sales, we had to move from selling

product features to selling outcomes. For marketing, the journey included making a leap from awareness and lead generation to data-driven segmentation and closed loop ROI.

Finally, every software-as-a-service company has to have the capability to monitor and measure what their customers are consuming, invoice their customers, and recognize revenue. These functions do not give you a competitive advantage, but are foundational to running the new business.

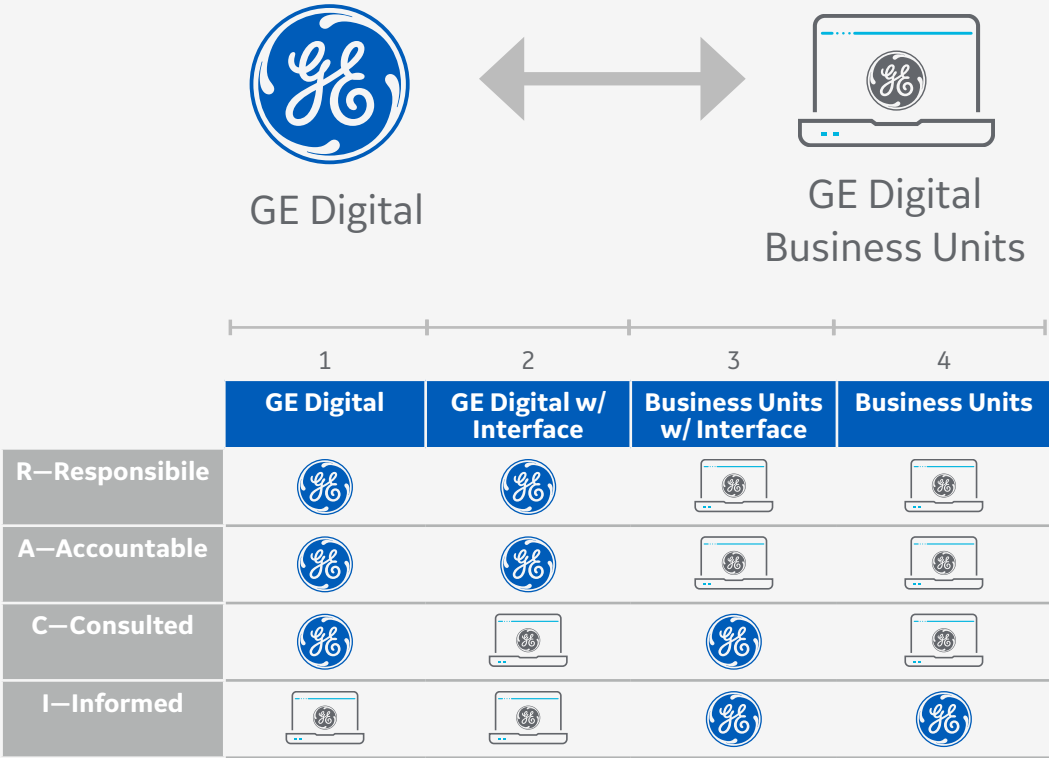
Figure 2: GE Digital Operating Development

Below is our approach for configuring capabilities for a best in class Digital company

1 Prioritize capabilities for Day 1

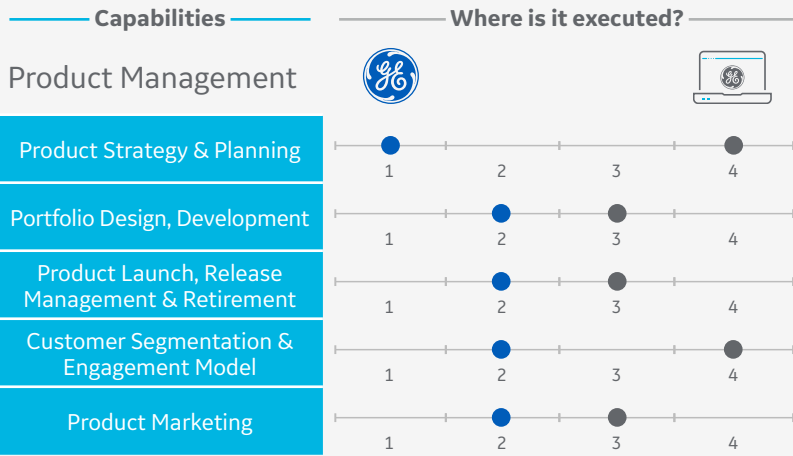
Digital Core Business Capabilities													
Product management	Pricing & packaging	Product engineering	Design	Marketing	Sales	Channels & alliances	CFO execution	Order & subscription	Licensing & entitlement	Service operations	Invoicing & payment	Revenue management	Customer support
Product strategy & roadmap	Pricing & packaging strategy	Product development	Design thinking	Marketing strategy & planning	Sales & business planning	Channel enablement	Product/service configuration	Order creation, validation & processing	Licensing model definition	Service provisioning	Invoice management	Revenue recognition & allocation rules	Customer service management
Product innovation	Regulatory & transfer pricing	Product quality engineering	Product design	Product marketing	Account planning & management	Alliance management	Price & discount management	Order orchestration	Account & hierarchy management	Service assurance	Tax management	Revenue forecasting & planning	Technical support
Product information management	Price optimization & analytics	Release execution	Service design	Brand management	Opportunity management	Partner program management	Quoted proposal generation & approval	Order status tracking & communication	Entitlement management	Resource/capacity planning	Consolidated billing	Partner support	Customer management
Portfolio design, development	Knowledge transfer	Product operations	Customer experience design	Marketing communications	Account segmentation/coverage	Partner incentives	Partner transaction management	Order cancellations/terminations	Entitlement tracking & compliance	Service orchestration	Collections & disputes management	Knowledge management	Sales integration
Product ecosystem management		Knowledge transfer	Usability testing	Campaign & promotion management	Pre-sales solution engineering			Credit management		Consumption metering	Royalty management	Customer retention & loyalty	Training
Product launch, release management & retirement			User insights	Lead generation, qualification & nurturing	Sales enablement			Contract management		Mediation & arbitration		Customer & partner self-service	
Customer segmentation & engagement model			Event management	Customer information management	Customer information management			Renewals management		Service APIs management		Customer 360 view & analytics	
			Channel marketing	Sales incentive compensation	Sales channel management			Trail contracting & Management		Service analytics & reporting		Customer experience design	
			Field marketing	Guided selling	Sales orchestration			Subscriptions management		Electronic software delivery			
			Marketing intelligence & analytics					Transaction data & analytics		3rd party provider fulfillment			

2 Determine where and how prioritized capabilities are executed across product lines (e.g., BO, OO, Predix, APM, etc.)



3 Differentiate where capabilities are executed based on horizontal and vertical archetypes

	Predix	APM	BO	OO	Cyber	Controls
Horizontal	✓	✓			✓	
Vertical			✓	✓		✓



Putting the pieces together

Now that you have clear prioritization and a completed gap analysis of the organizational capabilities required for your new normal, you need to determine how these will fit together—where and how capabilities are executed. As a concept, that is called the “Target Operating Model.”

You need to determine whether you need to differentiate where capabilities are executed based on horizontal and vertical archetypes. For example, do you need horizontal product lines, or capabilities that span across multiple industry business verticals? Do you need industry, or product-line specific capabilities?

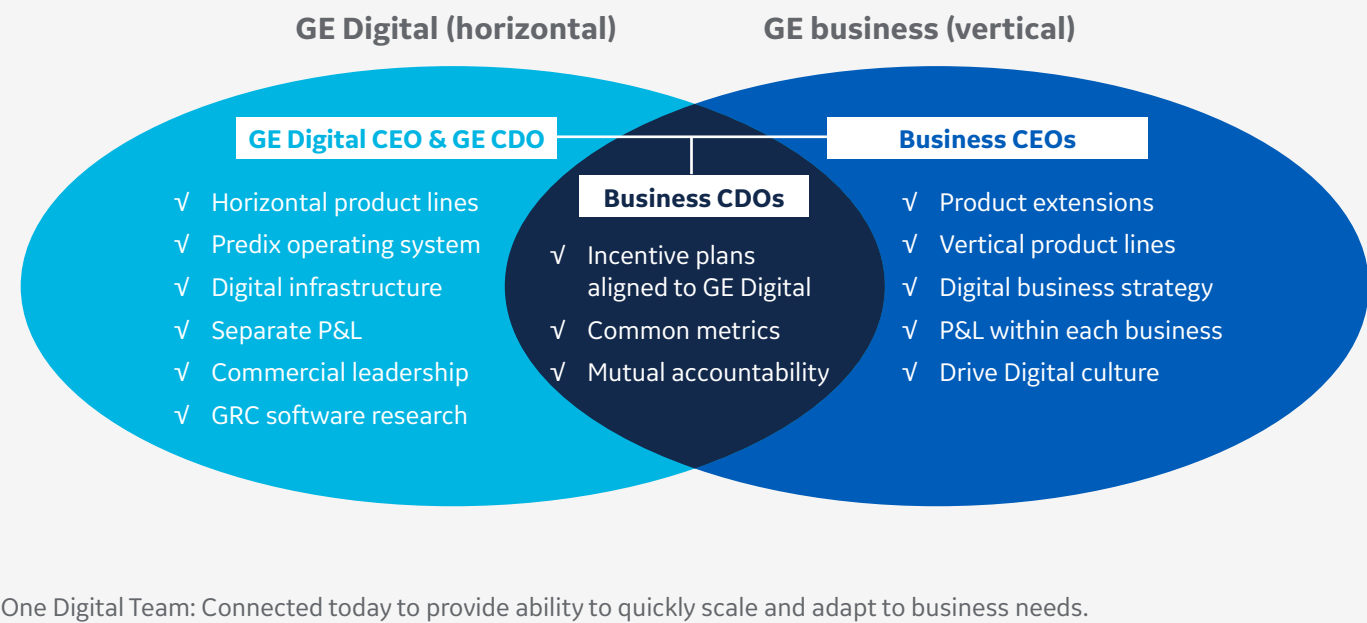
At GE, we needed both horizontal and vertical approaches. We determined which capabilities were horizontal—in our case it was around our core cross-GE product portfolio for Asset Performance Management & Brilliant Manufacturing capabilities, and our Predix platform. These horizontal capabilities are owned by GE Digital, and made available to the other GE businesses as a service.

We also have vertical product lines that are industry-specific, and therefore owned and developed in that specific business. Examples include Digital Power Plant from GE Power, or Flight Efficiency software from GE Aviation.

Once we understood which capabilities were horizontal versus vertical, we could create the organizational structure required to succeed. In our case, it centered on creating the role of a Chief Digital Officer in each business, who is accountable for driving productivity internally and leading digital growth externally in that vertical.

Deciding where the capabilities get executed is often challenging, and can be dangerous if done subjectively. Start with a few design principles that become the true north. For example, say you are going to optimize for efficiency.

Figure 3: GE Digital top level organization structure



In figure 3, each GE Business Chief Digital Officer has a dual direct reporting line, one to their business unit CEO, and the other to the Chief Digital Officer for all of GE, and GE Digital’s CEO, Bill Ruh.

Collectively, our CDOs work across the company as one team to lead their part of the execution of our digital growth strategy to be a \$15B software company by 2020. They formulate end-to-end digital business strategy and vision for their industry, leveraging the core to build product extensions and vertical-specific product lines.

All digital resources across the company are aligned and on the same incentive compensation structure, so that collectively, we’re all leveraging the horizontal or shared value across one GE.

These CDOs also play a vital role in leading digital transformation in their business. They’re the digital role models leading this cultural transformation, and overseeing the development of innovative products using agile practices.

Avoiding pitfalls

One of the key learnings from our internal digital transformation was that it is critical to formalize your vision. Now is the time to think BIG. Identify and pick up your quick wins. Then, scale those quick wins through a digital transformation office to sustain momentum. Finally, assess and build capabilities from Day 1 across business units and P&L centers.

Here are some additional key learnings from our journey that can help lay the groundwork for success along your digital industrial journey.

1. Recognize the importance of target capabilities, and think about systematically incorporating them in transformation.
2. Emphasize cross-functional and business unit coordination. Developing robust capabilities involves new talent (supported by HR), new tools (IT), new processes (operations), and new governance (leadership).
3. New capabilities might represent a huge shift into the unknown.
4. New capabilities call for fundamental change in behavior.

Riding the maturity curve

Remember, capabilities are one key aspect of the transformation. Let's focus back on the 30,000 foot view of the outcomes driven by the transformation, and the increasing maturity and impact of the transformation. We encourage all customers to start with the same early focus: driving productivity in existing operations.

By focusing on delivering tangible ROI today through productivity improvements, you get three things:

- You are able to self-fund the next step in your transformation journey—such as new product introductions.
- You begin to build out the operational agility needed to innovate at the business model level.
- You are able to build early internal champions, and the momentum needed to drive more radical transformation.

Building credibility is the key to any successful transformation. Internal productivity is much easier to achieve than being “the next big thing” outside of the four walls of your company.

With the data, insights, and improvements from these internal wins, you're now in a credible position to take those same productivity improvements to your customers, in the form of best-practice sharing, or even as new products and services. This is what we have done, and it's part of GE for customers.

Once established, and you have a repeatable line of sight in to the outcomes you're able to achieve, you are in a position to start the dialogue around new business models that leverage this data and connected infrastructure. These lead to marketplace concepts like application economies around your offerings.

The different maturity levels of your digital industrial transformation will involve a sustained focus on capability development to take the successes and scale them.

The capabilities that will be foundational, competitive, and innovative at each level of maturity are different. Organizations striving for differentiation should continue to keep a capability focus, and effectively manage change to build those muscles.

Finally, traditionally organic development, and investment or acquisitions have been strategic levers for organizations to pull to enhance capabilities. In today's world where open innovation has come of age, take a closer look at building key partnerships that can help you close your capability gaps faster!

Your next step

Digital industrial transformation is a process, with significant rewards for those who stay the course, and significant risks for those who execute poorly. GE has been on this journey for the better part of 10 years, and we have learned a lot in the process. We've seen what works, and perhaps even more critical, we've seen what doesn't. A holistic approach is vital to ensuring transformation is a long-term endeavor that delivers sustained results.

You need to take stock of the direction you want to go, the capabilities you'll need to get there, and the short-, mid- and long-term steps needed to make the vision a reality are absolutely essential.

At GE Digital, we have some exciting ways we can help you along your digital industrial journey. From services to help you map out a digital industrial blueprint, to our GE Digital Foundries around the globe, designed to bring teams together to define outcomes using capabilities such as design thinking, data science, and a team of engineers and GE domain experts. We look forward to assisting you throughout your digital transformation!

Download the entire
GE Digital Industrial
Transformation Playbook

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About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive, and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure, and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology, and scale, GE delivers better outcomes for customers by speaking the language of industry.

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