



DIGITAL TRANSFORMS PHYSICAL

Three Pillars of Success for Industrial Digital Transformation

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Executive Summary

At the heart of every industrial company lies its physical products. The ability to innovate in engineering, to manufacture efficiently, and to deliver top-notch customer service can spell the difference between success and failure for these companies. The adoption digital technologies across the physical product lifecycle is a strategy being used by forward-thinking companies to create competitive advantage – and is a real threat to those who are laggards.

A recent PTC survey reveals that most companies have invested at least 5% of their annual revenue on [Digital Transformation \(DX\)](#) projects in 2021. Each of the 500 companies surveyed also reported increased DX spend over the past three years. With the tremendous amount of money being invested, the DX strategies that companies are developing today will impact their ability to compete over the next decade.

But success is far from guaranteed. Of the 1,500 DX projects represented in this study nearly half have failed to show positive ROI. However, that is an improvement over a few years ago, a 2018 McKinsey study suggested less than 30% of digital transformation projects ultimately succeed.

Much has been learned in the years since that study and our research pinpoints some of the broader best practices that help to ensure a successful DX program. Our data represents a myriad of DX pursuits across manufacturing, engineering, and service functions. Despite the differences in goals and challenges across these initiatives, analysis points to three key pillars that are fundamental to success. The pillars are:

- Technology's role to facilitate information and collaboration across siloes
- Executive leadership's responsibility to redefine departmental and functional boundaries
- A culture-conscious approach to change that is driven by a mix of top-down and bottom-up initiative

In this paper we explore the implications of these three pillars and illustrate a real-world example of Celli Group, a company that engaged in true digital transformation.

Figure 1

SURVEY FIRMOGRAPHICS N = 500



Industries

- Aerospace & Defense
- Automotive
- Consumer Packaged Goods
- High Tech
- Industrial Machinery & Electrical Equipment
- Life Sciences
- Oil & Gas
- Retail (manufacturing)
- Utilities
- Medical Devices

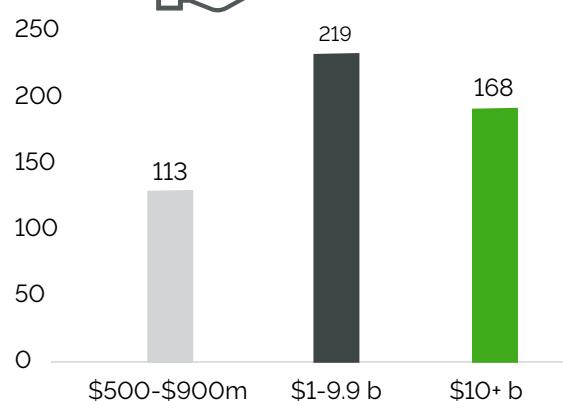


Countries

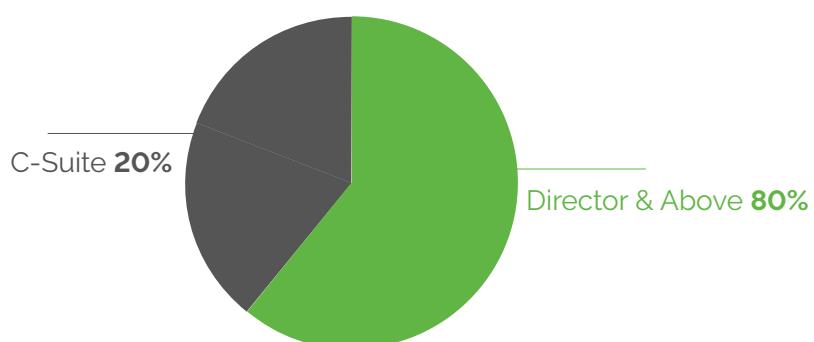
- Brazil
- China
- France
- Germany
- Italy
- Japan
- Mexico
- South Korea
- United Kingdom
- United States



Revenue



Seniority



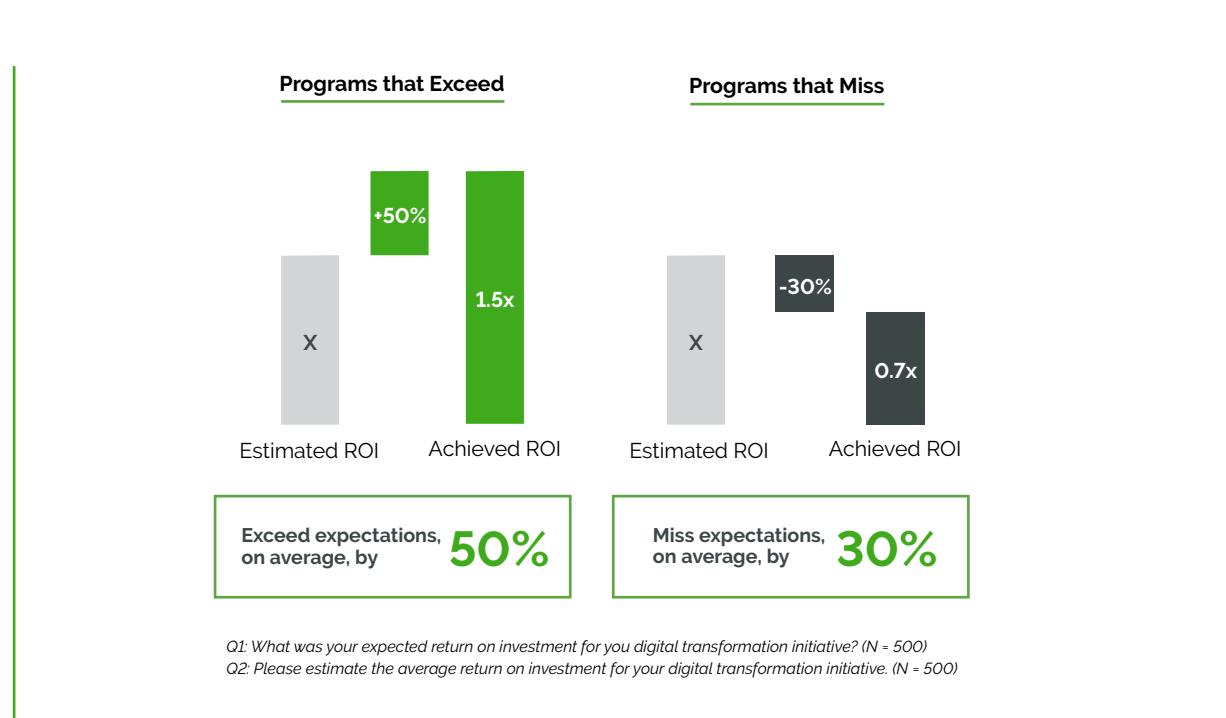
The Stark Difference Between DX Success and Failure

There is a striking disparity between the DX programs that exceed and those that fall short of financial expectations. On average, successful DX programs beat return-on-investment goals by 50%, while programs that miss ROI goals do so by 30%.

The takeaway: all else being equal, the company that beats its DX expectations will see more than twice the return on investment as the one that misses (Figure 2). With trillions of dollars being invested globally in DX over the next few years, swings of this magnitude will without question disrupt the competitive landscape of industries around the world.

Figure 2

ROI SUCCESS VS. FAILURE



Knowing the potential swing in results, how can companies pursuing DX mitigate risk of failure, improve their odds of exceeding expectations, and position themselves favorably against their competition now and well into the future? Our analysis of top-performing DX programs revealed three common themes underpinning their efforts. These pillars supported whatever shape DX took, and enabled greater outcomes. First, they establish early on that technology must play a role in facilitating new and more powerful forms of collaboration and ways to deliver value from data. Executive leaders acted as advocates for the necessary changes to interdepartmental and interorganizational dynamics, leveraging their authority to push through hurdles and redefine priorities. Finally, these initiatives addressed the culture component of digital transformation by taking steps to instill a sense of ownership at every level of the organization.

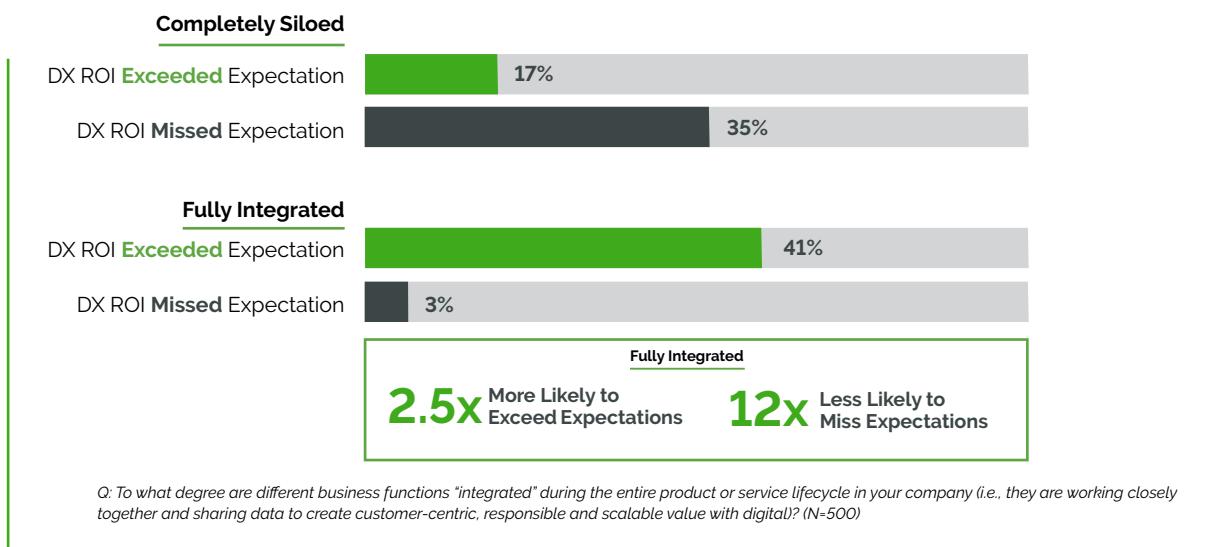
Pillar #1: Digital Technology Must Bridge the Gaps and Reduce Friction

Companies with a high degree of cross functional integration throughout their product lifecycles – namely across engineering, manufacturing, and service organizations – are far more likely to have exceeded DX expectations. Those who reported top marks in this category were more than twice as likely to have also exceeded their ROI goals compared to those who reported low scores here (Figure 3).

It makes sense; better collaboration across organization siloes provides greater ability to leverage the data generated by and for their initiatives. Furthermore, the utility of that data can be extended to empower more insightful decisions along the value-network.

Figure 3

INTEGRATION IMPACT ON ROI



Conversely, DX programs falter when they introduce troves of data without introducing better ways of sharing that data. As a result, the typical pain-points of siloed systems become barriers to transformation. The friction caused by multiple sources of truth, hidden or difficult to access data, and the manual duplication and transfer of data across siloes increases exponentially as more sources of information and collaborators are involved (Figure 4). If left unaddressed these and other pain points of siloed systems will compound to undermine the success of DX initiatives.

Figure 4

PAIN POINTS OF SILOED SYSTEMS



What is a Digital Thread?

A [digital thread](#) is a closed loop of digital processes and information that tethers the physical and digital world. With a digital thread, organizations can create seamless, uninterrupted digital connections across functions, assets, customers, production sites, workforces, and products, enabling multi-directional sharing of data, information, insight, and intelligence to improve the ways value gets created. With a digital thread approach the right information is available to the right person at the right time and in the context of where it is needed most across the value chain.

The rich collaboration and efficient exchange of information necessary to achieve the full potential of DX is only possible with a digital thread. For most companies this will require they either replace their outdated software or adopt platforms that wrap and extend their existing solutions. According to our survey, these two approaches are equally likely to succeed, at least in the short term. To better ensure long-term success, companies should consider [Software as a Service](#) options. SaaS solutions can scale up or down and continuously incorporate new features and functions to meet shifting and emerging needs without impacting operations.

When considering new technology in order to establish a strong digital thread foundation, look for solutions that, in addition to their functional benefits, are designed to manage, associate, orchestrate, and deliver data across your product lifecycle. These are often more flexible and adaptable to your shifting DX needs and opportunities. Avoid DIY if possible - out of the box functionality enables quick wins and time to value that can generate team buy-in and be leveraged for greater executive support. Work with vendors that offer a portfolio that spans the departments engaged in your project. Vendors that exhibit these qualities are more likely to have encountered the many hurdles and pitfalls that can undermine a DX initiative and have created tools and processes to address them.

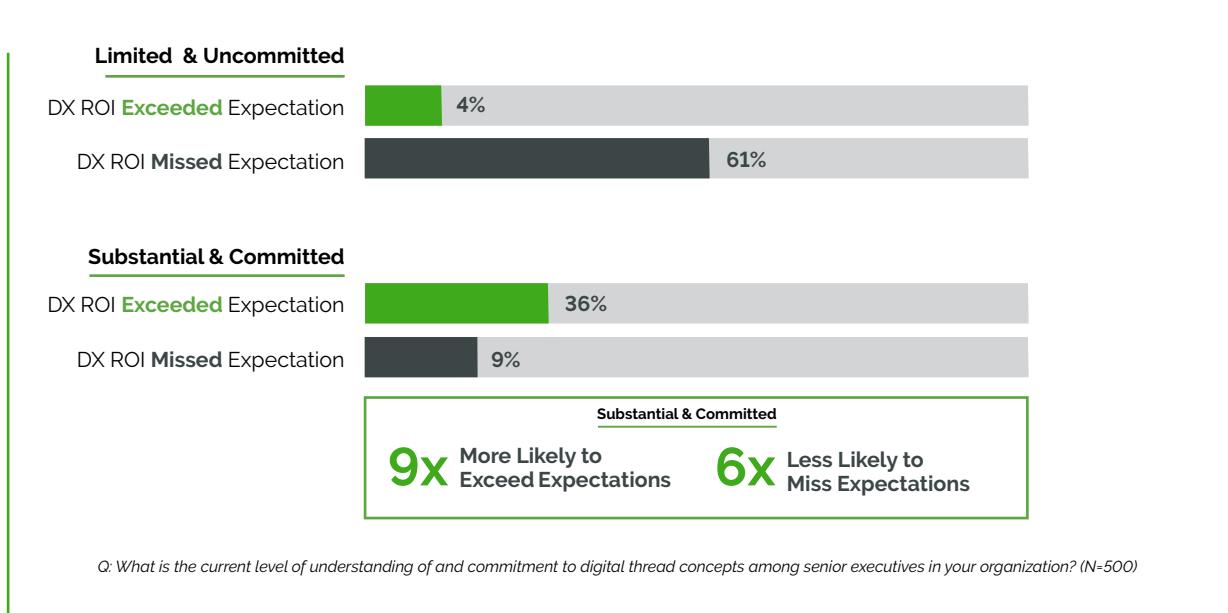
Pillar #2: Leadership Must Redefine Boundaries

DX initiatives must have leadership that is willing to drive fundamental changes to the way work gets done. Technology alone is only an enabler and without process changes true transformation cannot take place. This requires executive leaders to have a rich understanding of the opportunities afforded by greater cross-functional collaboration and to take a committed role ensuring necessary changes to departmental and functional boundaries are made.

Amazingly, organizations with executive leadership that possess these qualities are nine times more likely to uncover more value in their DX journey and beat financial expectations compared to those that don't (Figure 5). On the other hand, when executive leadership has a limited understanding and little commitment to these concepts, DX initiatives are more likely to fail than they are to succeed. In such cases, chances of missing ROI expectations skyrocket to 61%.

Figure 5

LEADERSHIP IMPACT ON ROI



Strong executive leadership is necessary because the opportunities that offer the greatest potential value are often those where information and collaboration span organizational siloes. For example, using quality data generated by a field service organization to inform design decisions in product development. But bridging siloes with new workflows will invariably result in an intersection of distinct priorities, expectations, and hurdles. Every new opportunity challenges the status quo of these interdepartmental dynamics. Executive leaders are responsible for recalibrating these relationships by defining a new set of shared priorities and expectations, redefining the boundaries of siloed systems by either blurring them, redrawing them, or eliminating them.

In this way, executive champions promote cross-organization communication so that information generated by one department can be leveraged by all. They are key advocates for new workstreams that defy typical organization boundaries and uncover more opportunities to maximize the value of data. This commitment from leadership is essential for cross-departmental projects, where it can be very or extremely difficult to drive collaboration, measure overall success, or even identify valid success criteria. Conversely, without these leaders, siloed DX initiatives lack the necessary political power to address interdepartmental hurdles. As a result, DX programs might lag far beyond initial timelines, consuming more resources and delaying ROI.

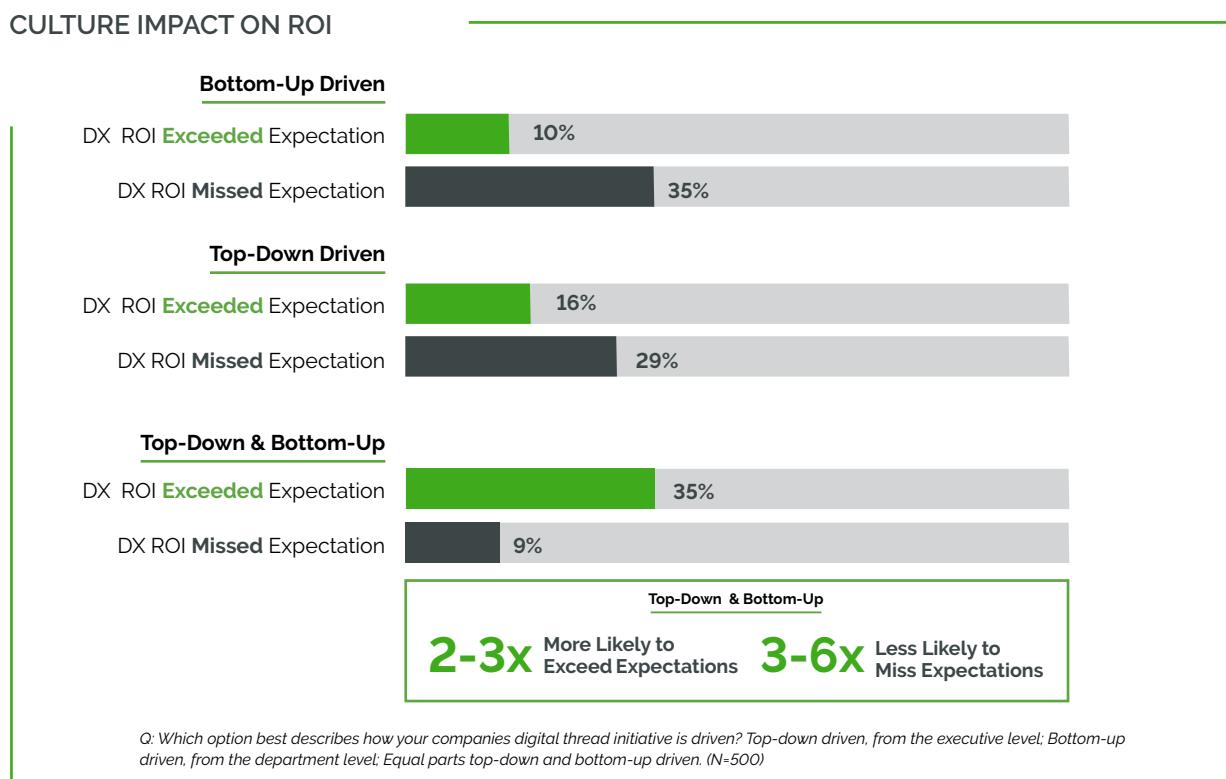
The first hurdle for leaders in this endeavor is to understand the status quo. That may sound trivial, but research suggests most people overestimate the cross-functional and cross-department integration of their company. Eight out of 10 surveyed report that their organization is very or extremely effective at facilitating an accurate, up-to-date flow of information across department boundaries. But just one in 10 say their organization operates at a high level of collaboration, with insights from one team impacting the strategy or work efforts of another. These results paint a conflicting picture and leaders need to understand the true state of collaboration within their organization in order to address challenges and achieve the highest value. Leaders with a false perception of their organizations ability to collaborate may overestimate capabilities and underestimate technology and cultural challenges for DX programs. While leaders who don't recognize the significance of extending data and collaboration across functions are leaving value on the table in the long run.

Pillar #3: Culture Change Must be Driven from Top and Bottom

Even with sound leadership and best-in-class technology, a DX project will not succeed if it is not embraced by company culture. Anecdotally, the organizations that we see tackling the culture challenge with the most success are those that inspire a sense of project ownership at every level in their organization through a top-down and bottom-up driven approach. The research reflects this trend as well: Companies that take a combined top-down and bottom-up approach to their cross-functional initiatives are two to three times more likely to beat their financial expectations and three to six times less likely to miss those expectations compared to companies that take either a top-down or a bottom-up approach (Figure 6).

Figure 6

CULTURE IMPACT ON ROI



When it comes to projects that span multiple departments with distinct cultures it is imperative to have alignment between the leadership's vision and employee empowerment and commitment to execute on that vision. Fostering this type of commitment is often the most challenging aspect of these projects because it relies on people's willingness to change. Changing the way things are done can instill feelings of doubt, fear, resentment and ultimately resistance if mismanaged. A balance between driving decisions from the executive level and the functional level can assuage these concerns and generate employee buy-in, while still achieving high-level business impact.

A **top-down approach** is executive-led and focuses on strategy, aligning the transformation initiatives with long-term company strategy and executive goals. This component is necessary for evaluating achievements against the long-term needs of the company. Without it, DX initiatives can miss the forest for the trees by measuring success in a way that is relevant to individual stakeholders but not indicative of the overall benefit to the broader business.

A **bottom-up approach** is functional-led and provides operational benefits, identifying valuable use cases at the department level. The bottom-up approach delivers results inside the different functions of a company by improving the KPIs that matter the most to those functions. It's this responsibility that instills ownership at the function level, with each individual department given agency to capitalize on digital transformation as best they can.

One way that companies have formalized their top-down and bottom-up approach is by establishing a digital transformation governance body. This is a collection of stakeholders across the company who are responsible for ensuring project execution and ongoing success. A governance body can provide a continued sense of project ownership across functions, ensure that each group is operating within the guidelines and best practices of the broader business, and identify new opportunities for collaboration across stakeholders.

Case Study: Celli Group

For many beverage companies, the “last mile” of the supply chain journey at the point of sale is a mystery. Critical information—like what factors impact beverage quality and which drinks are in demand—is lost. Without visibility into the health of their equipment, beverage companies don’t know how or when their dispensers break or if they’re not operating at peak performance. As a result, many beverage companies struggle to control the quality of their drinks, ensure equipment uptime, and manage inventory efficiently.

Celli Group is a global company based in Italy that manufactures and services equipment for distributing soft drinks, water, and beer. Leveraging IoT, Celli Group set out to develop smart fountains, pumps, and taps, allowing for a dramatic shift in its go-to-market strategy: leasing their equipment to beverage companies instead of selling them. With these connected products, Celli Group could collect data on the equipment and beverages at the point of sale. This data would then fuel Celli Group’s value-added service offering, IntelliDraught, and unlock powerful insights for their customers to optimize inventory management, improve quality control, and more.

Using IntelliDraught to monitor factors like sanitation, product shelf life, and draught temperature, Celli Group’s customers improved draught quality by 27%. These predictive and preventative maintenance solutions enabled Celli Group’s customers to reduce service costs by 10%—a significant number on a global scale. By reducing equipment downtime, Celli Group’s customers increase the amount of product they dispense and generate more profit.

Beverage companies can also access powerful marketing data analytics, including information about consumption habits by time, geography, point of sale, and brands. These analytics help optimize forecasting and production planning to drive critical decision-making processes and prevent out of stock conditions. Customers experienced 14% more sell through of their product portfolio with increased engagement and a better understanding of purchases and churn. With the IoT data they collected on their equipment, Celli Group was able to enhance its product design and production process, leading to a 13% reduction in equipment failures. These enhanced service offerings have led to more market share with global accounts.

Celli Group's Technology, Leadership, and Culture

Technology: Celli Group uses a suite of PTC software – Creo, Windchill, and ThingWorx – for its CAD, PLM, and IoT solutions respectively, simplifying and streamlining processes from product ideation to market and back again. PTC products offer unmatched digital thread capabilities and out-of-the-box functionality. This technology approach ensured quicker time to value and empowered Celli Group to collaborate across engineering, manufacturing, service, and with their customers.

Leadership: Celli Group changed its value proposition. Thus, it required a far more customer centric mindset. Executive leadership recognized that organizational change was necessary to institute that shift in mindset and take advantage of the company's new capabilities. So, Celli Group created a new asset management division where they do service and digital solution combined. The new group was created with digital thread in mind, as a hub between information from customers and products in the field and the rest of the internal workflows in the company.

Culture: Having established a new, disruptive source of value – point-of-sale equipment and beverage data – Celli Group empowered its functions across engineering, manufacturing, and service to identify and pursue the opportunities that arose. For example, the engineering department bought-in because they were now able to make design decisions that were directly informed by field data. Similarly, manufacturing bought-in because they could eliminate customer quality concerns more quickly and accurately by correlating customer data to their own. What started as an IoT-enabled service opportunity was able to grow into a company-wide digital transformation initiative.

Conclusion

Given the tremendous investments being made and the massive financial swing between success and failure, DX initiatives will have an enormous effect on competition over the next few decades. As companies transform so too will industries. The companies that approach DX as just another technology adoption project will find themselves struggling to keep pace with evolving customer expectations and industry best practices. The companies defining those expectations and best practices understand that technology is not the end goal but the facilitator, that transformation requires bold leadership willing to drive systemic change, and that it is imperative to foster a culture dedicated to that change.

For additional information on Digital Transformation opportunities and insights read more [here](#) or contact us [here](#).



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