

**Deloitte.**



**Digital supply networks in  
industrial products manufacturing**

Beyond the buzzwords: Getting  
started with digital transformation

# Introduction

Today's industrial products manufacturers face declining productivity growth, skilled labor shortages, and a shift toward protectionist trade policies coupled with emerging threats to protecting IP and trade secrets. Coping with these issues adds to an already challenging environment in which industrial product manufacturers are expected to find sustainable growth opportunities in today's increasingly global market.



---

The United States averaged

0.7%

annual labor productivity growth between 2007 and 2017, less than a quarter of the

4.3%

average annual labor productivity growth it sustained between 2000 and 2007.<sup>1</sup>

---

For the

7<sup>th</sup>

consecutive year, skilled trades vacancies are the hardest jobs to fill in the United States, and for the fifth consecutive year, they are the hardest to fill globally.<sup>2</sup>

---

The global annual percentage growth of the value added by the manufacturing sector in 2016 was nearly

1/3

its value in 2006.<sup>3</sup>

Understanding how to harness the power of advanced technologies is critical in enabling industrial products manufacturers to meet customers' demands and create new revenue streams. B2B customers are increasingly expecting products tailored to their preferences and swiftly delivered to their doorstep anywhere around the globe. The growth in spending on manufacturing e-commerce platforms<sup>4</sup> is an example of just how accustomed B2B customers have become to speed, personalization, flexibility, and transparency from the consumer market, and how they are now expecting the same capabilities from their industrial vendors.

Empowered by digital transformation, manufacturers are now turning to selling outcomes<sup>5</sup> for their customers. As a result, companies are driving an increasing share of value through services versus products themselves. These new revenue streams enable companies to rethink long-held business models and change the basis of competition. Such technology-enabled services include predictive maintenance and real-time product intelligence that equip companies to sell uptime and deliver OPEX reduction. This shifting paradigm can be seen both as a threat and an opportunity. New competitors, who often do not have the product manufacturing history, are increasingly playing this role by leveraging their ability to be agile and layer multiple technologies. These new entrants are reaping the benefits of what could be lucrative extended services provided by traditional industrial products manufacturers.

A defensive stance is not an option. Surviving—and thriving—as an industrial products manufacturer requires the digitalization of your supply network and the creation of a dynamic, data-sharing web connecting

customers, vendors, and partners. Some have already begun: At least 33 percent of manufacturers are currently investing in a range of technologies such as IoT platforms and advanced analytics to jump-start their own digitalization.<sup>6</sup> Those that wait risk losing growth opportunities and market share to those able to integrate the digital supply network (DSN) and provide net new value to customers with a continuous and seamless engagement model. In short, there is no time to stall—industrial products manufacturers must evolve now.

Supply chain digitalization can be daunting. Digital technologies have been held up as the answer, but for a variety of reasons there is no clear path forward, which results in frustration and “digital fatigue.” Twenty-seven percent of manufacturers believe there is ambiguity about the objectives of a company’s digital agenda and competing priorities between stakeholders, leading to individual biases on the best path forward.<sup>7</sup>

Justifying the business case for individual digital technologies is further complicated by project interdependencies requiring synchronization across siloed business units and a long-standing perception that technology implementation projects are prohibitively long and costly. Beyond the business case, the current pace of technological innovation inflates the fear of committing to the wrong technology or partnering with the wrong vendor—a decision that has the potential to damage a manufacturer’s performance.

Having said this, digital transformation does not have to happen across an organization, all at once. In fact, a series of small, targeted projects can lead to large-scale transformational change for clients and their supply networks over time.

**Deloitte has helped corporations navigate through this type of uncertainty thanks to a practical framework that we will outline in this paper:**



Digital supply networks in action



DSN-enabled services



Getting started with DSNs



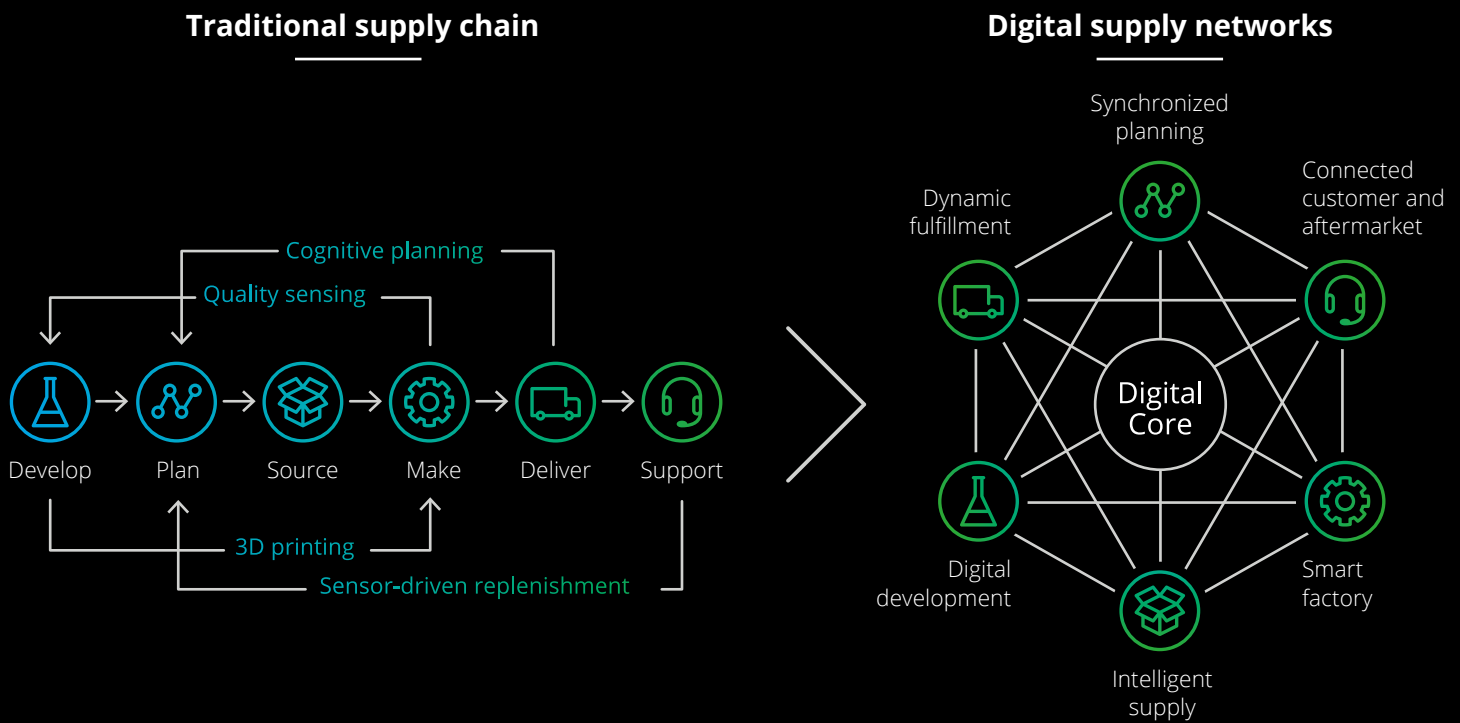
The most effective path toward DSN implementation



Case studies of DSN-driven value generation

# Digital supply networks in action

Figure 1. Evolving the supply chain to a digital supply network (DSN)



Source: Deloitte Analysis

A traditional supply chain resembles a relatively rigid and linear path that moves information along with raw materials and semi-finished goods from one end of the production system to the other. A digital supply network is a flexible, interconnected matrix that allows data and goods to move nonlinearly to maximize efficiency to meet changing consumer and market demands (see figure 1).

The DSN embeds digital functionality throughout the process, from development to delivery, to allow the physical world and digital world to communicate and collaborate. By translating physical events into digital information, companies generate data. Actionable insights from visualizing and analyzing this data are used to transform the physical world. These actions, in turn, yield benefits in terms of increased efficiency, quality, customer experience, and revenue growth.

## Case study

A Deloitte client had talent and operations distributed across three continents, which led to issues with their manufacturing incident resolution processes and resulted in severe delays during critical component assembly. Remote engineering experts found it difficult to utilize common collaboration tools to troubleshoot problems with on-site technicians.

Deloitte collaborated with the client's IT department to deploy a suite of industry-leading wearable technology so that engineers in the United States and EMEA countries could watch and collaborate remotely with technicians in Asia as they carried out repairs, as well as review and share targeted instructions in the technician's field of view.

### **i This solution resulted in:**

**50%**

reduction in repair cycle time for defects and assembly failures

estimated savings of

**\$500,000**

for a single product line through reduced travel costs and downtime

Data insights that are generated either on a monthly cycle or as part of a stand-alone project in a traditional supply chain can be obtained instantaneously in a DSN. This ability eliminates the latency of communication between supply chain elements and the reaction time needed to either rightsize or optimize the manufacturing process. DSNs are dynamic, flexible, and predictive, thus enabling industrial products manufacturers to meet radically different demands from their customers: last-minute engineering changes, specification compliance and rework, low-tolerance quality checks, and so forth.

DSNs unlock new ways of value creation. In a linear, discrete, and sequential supply chain, each link is a handoff between the players, who take their turns to add value and then sell that value upstream to the next player in line. A DSN allows for new value creation opportunities within its technologies, data, processes, and products. This is likely to accelerate as new digital technologies generate more data, provide greater transparency, and enable enhanced connectivity.

# DSN-enabled services

Organizations that adopt evolving digital technologies are breeding grounds for new business models—manufacturers are shifting their attention from making products to enabling outcomes for their clients. Some companies have also recognized a critical opportunity to monetize the vast amounts of data being collected and transmitted by new sensors that have been integrated into a wide array of products. Below are some examples of how organizations are already adopting new opportunities to directly or indirectly provide customers (B2B and B2C) with these value-added services.

## Asset-as-a-service model:

GE Aviation has taken a completely new approach to the capital leasing model with its *TrueChoice™* Flight Hour power-by-the-hour service, where it sells its customers the service of using one of its engines<sup>8</sup>—an attractive proposition in a space where products cost millions of dollars. Beyond improving its sales, GE Aviation has aligned its goals with that of its customer: maximizing uptime to minimize its rapid-response maintenance deployments.



### DSNs can enhance such services using:

#### **Predictive maintenance.**

Smart devices sense any product's upcoming breakdowns and thus allow for resource allocation ahead of time.

#### **Design simulation.**

Data points from the connected products and events (e.g., maintenance) can better inform design simulations and help engineers build a more robust product, reducing the need for repairs in the long run.

## IoT services:

IOTA is a major blockchain platform offering a distributed ledger for data monetization using micropayments. Its solution has already garnered huge partnerships with Bosch,<sup>9</sup> Fujitsu,<sup>10</sup> and Volkswagen.<sup>11</sup> Bosch<sup>12</sup> plans to place sensors across its devices and collect data beyond the point-of-sale using the IOTA platform—a program enabling it to monetize data generated by domestic appliances while marketing remote maintenance capabilities.



### DSN-generated data can have multiple purposes with:

#### **Smart-connected products/real-time product intelligence.**

An “always on” capability that helps to ensure a robust IoT network where data can be collected, packaged, and distributed via online platforms.

#### **Predictive/sensor-driven replenishment.**

Event-triggered replenishment information for maintenance and non-maintenance purposes sent directly to the point-of-use. Add-on services, such as a technician's help, can also be offered on customer devices.

As the examples show, DSN can—and needs to—be used for efficiency, customer experience, and growth. The digital supply network looks different for every company, as it solves different issues and applies different technologies, but it has some key characteristics that apply across industries and sectors. No matter the application, the DSN provides benefits not only to the organization but also to the customer. Whether it is passing along cost savings, improving delivery, or staying connected throughout the product life cycle, the customer benefits (and will continue to benefit) from the increased insights and connectivity. One thing is certain, however: In all the decisions about where and how to play in this new environment, there is no master playbook—and no single path to success.

## Rapid-response manufacturing:

Zara, a subsidiary of Inditex, can now take a product from design to display to any of its more than 2,000 stores worldwide<sup>13</sup> in as little as two to three weeks<sup>14, 15</sup> (although two months on average). This is thanks, in part, to the information it collects from RFID microchips, which are tagged to every garment that leaves its warehouses. The use of this technology helps Zara make its stock takes (inventory checks) 80 percent faster<sup>16</sup> and almost instantly informs its 350 designers on what trends are most popular, influencing the products they create.<sup>17</sup> Today, Zara is able to sell three times more distinct items as compared to its competitors and only needs to design 25 percent ahead of a season.<sup>18</sup> As a result, it can now deploy 20 separate “seasons” per year as compared to the traditional three to four seasons other retailers usually deploy.<sup>19</sup>



## DSNs can enable faster and more efficient operations by offering the following capabilities:

### **Demand and supply sensing and synchronization.**

Digitally connecting suppliers, manufacturers, and customers ensures that an array of smart-event-based triggers allow for proper replenishment and sales, reducing lead times and intelligently predicting demand levels to help adjust fulfillment strategies.

### **Additive manufacturing (AM).**

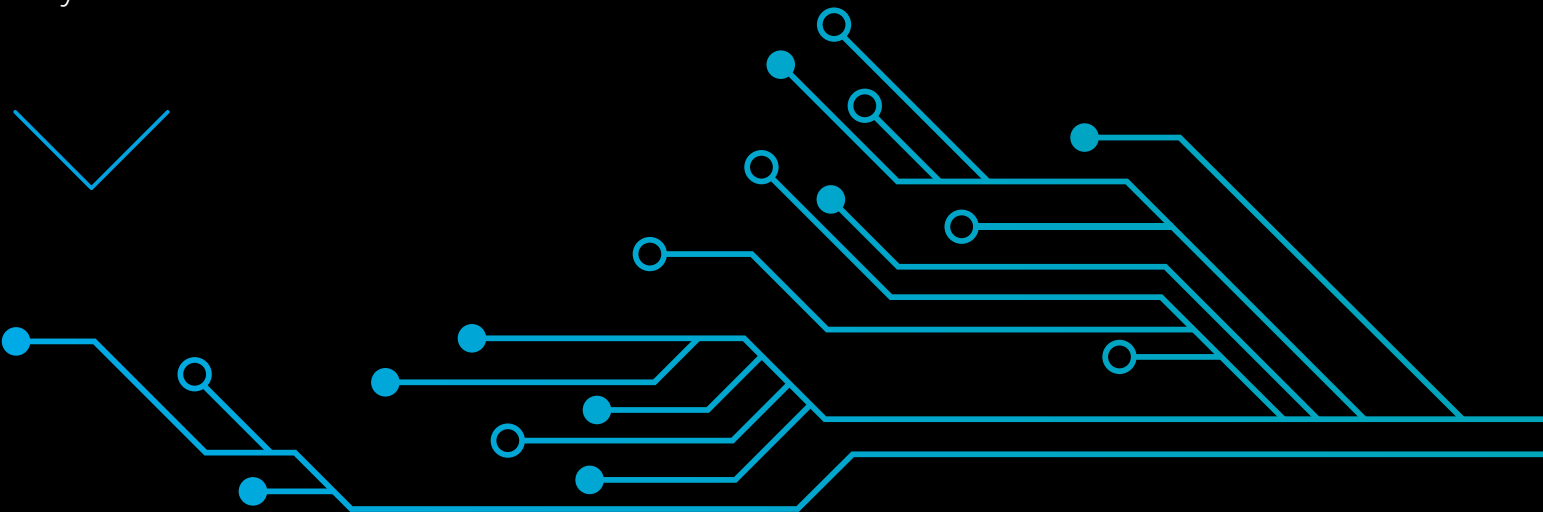
The ability to design and manufacture personalized products, while maintaining the same core product. AM also offers a way to manage inventory digitally only, and print small, complex parts with lower volumes locally or physically closer to the point-of-use.

### **Intelligent procurement operation management.**

Data-driven decision-making results in effective contract negotiation and procurement to reduce lag time, allowing companies to rapidly yet economically source products.

# Getting started with DSNs

Before starting any digital transformation, clients should understand and outline what they are solving for as a means to identify the guiding principles they will use to define success.



Once there is a goal in mind and clear measurement criteria, the next step is to understand the constraints. Companies should tailor their DSN journey and individual implementations to meet their own specific needs, based on their existing infrastructure, talent base, culture, and technological requirements.

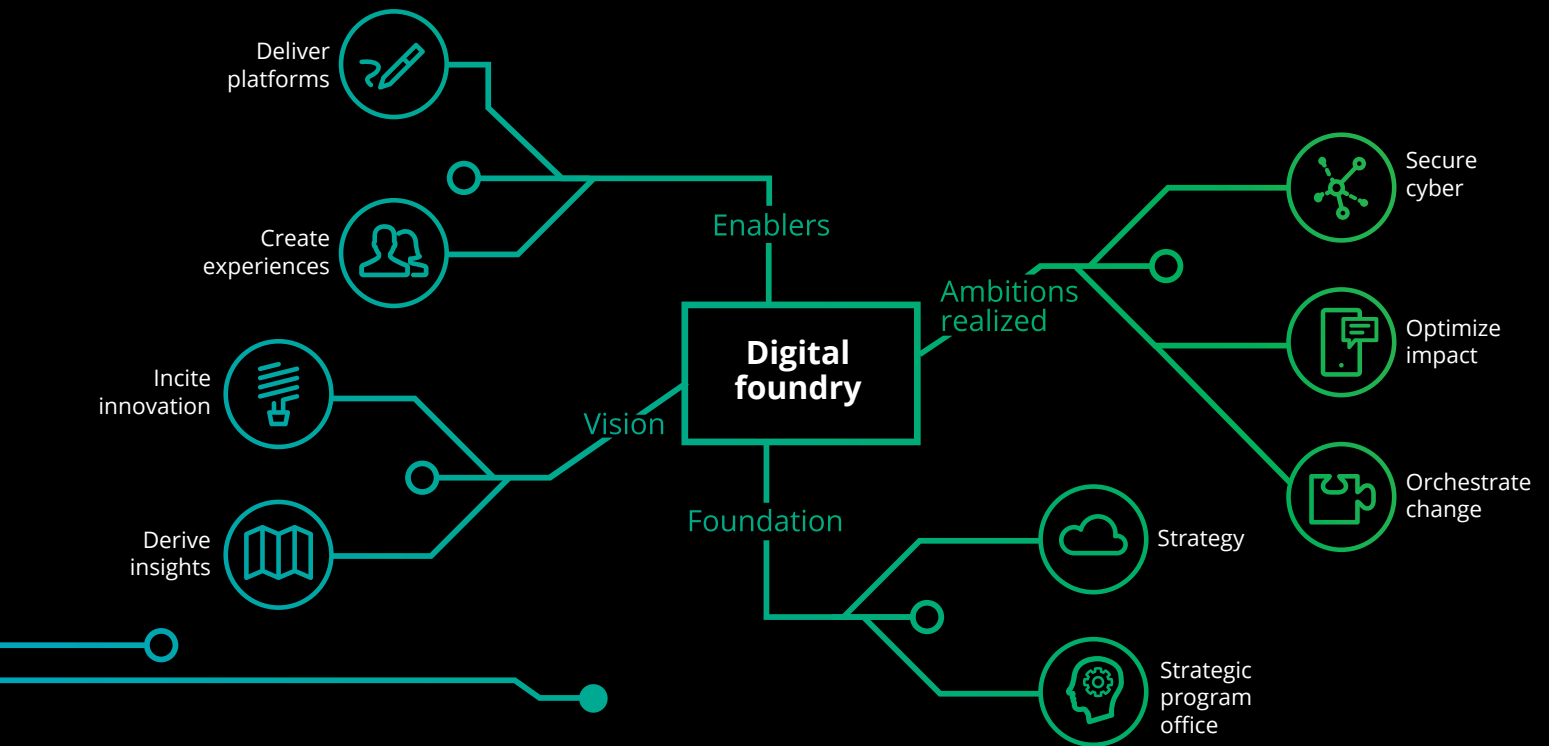
Larger organizations tend to be reluctant to abandon the “tried and true” in favor of new, disruptive technologies. To combat this “if it ain’t broke, don’t fix it” mentality, it can be particularly important for companies to start small and conduct discrete proof-of-value initiatives where they can pilot technologies and measure performance change in specific areas without affecting their full supply chains.

One of the most effective ways to get started is to use the adage “think big, start small, scale fast” to accelerate meaningful results to help move toward the path of digital transformation. This process enables clients to *think big* and develop a comprehensive strategy. The next step is narrowing the scope to *start small*. This enables clients to develop an approach that is strategic, agile, fast, affordable, adaptable, and repeatable. After establishing what works, it is time to scale fast. Applying those same tactics and principles, as well as the lessons from preceding projects, enables larger-scale transformation that no longer carries the same financial or organizational risks.



# The most effective path toward DSN implementation

Figure 2. The core elements of a digital foundry



The most effective way to introduce DSN is to adopt a “digital foundry” approach, where ideas that have breakthrough potential in terms of business impact are generated and screened before being prototyped and piloted in a sequence of sprints (see figure 2). Successful ideas where tangible benefits can be demonstrated are then launched and scaled throughout the organization. In this way, companies can reduce the barriers to DSN implementation and effectively manage their exposure to risk by validating ideas in a controlled environment.

At its core, the digital foundry methodology is an aggregation of services that blends strategic expertise, governance, agile delivery methods, and innovative thinking with enabling technologies. The goal of the digital foundry is to enhance decision-making, inject energy into converting ideas into actionable plans, increase efficiency, and deliver measurable value.

# Case studies of DSN-driven value generation

Below are two examples of how the “think big, start small, scale fast” framework has been brought to life.

## Optimization of production processes:

A large manufacturer and distributor of food packaging and food service products that supplies packers, processors, supermarkets, and restaurants across North America engaged Deloitte to unlock additional capacity across its supply chain. Working with a cross-functional team, we created a minimum viable product (MVP) to identify “dark assets” in one of the company’s largest plants. The insights from this MVP led to a business case for unlocking capacity across 18 production lines.

A modest improvement in OEE at the one plant will likely generate an estimated

**\$50M**

in incremental value and more than

**\$20M**

in CapEx avoidance for the company.

**Starting with an MVP enabled the company to get to its end goal faster with less rework.**

## Analytics-driven sourcing:

An industrial products client that uses a commodity as a key component in its products engaged Deloitte to help optimize its forecasting and efficiency. The client lacked a methodology that linked its forecasting to its pricing and product optimization. By using the digital foundry methodology, we brought together the right resources and technology to develop a linear optimization model that computed the optimal supply mix, ordering policy, inventory control, and correct usage of interchangeable commodity types to yield the minimum cost scenario. The model was developed in just a few weeks using an agile approach and open-source technology. The earliest version of the model started small and used highly constrained inputs, but it was able to provide insights that demonstrated significant opportunities.

Additional development yielded a model that demonstrated more than

**6% roughly \$8M**

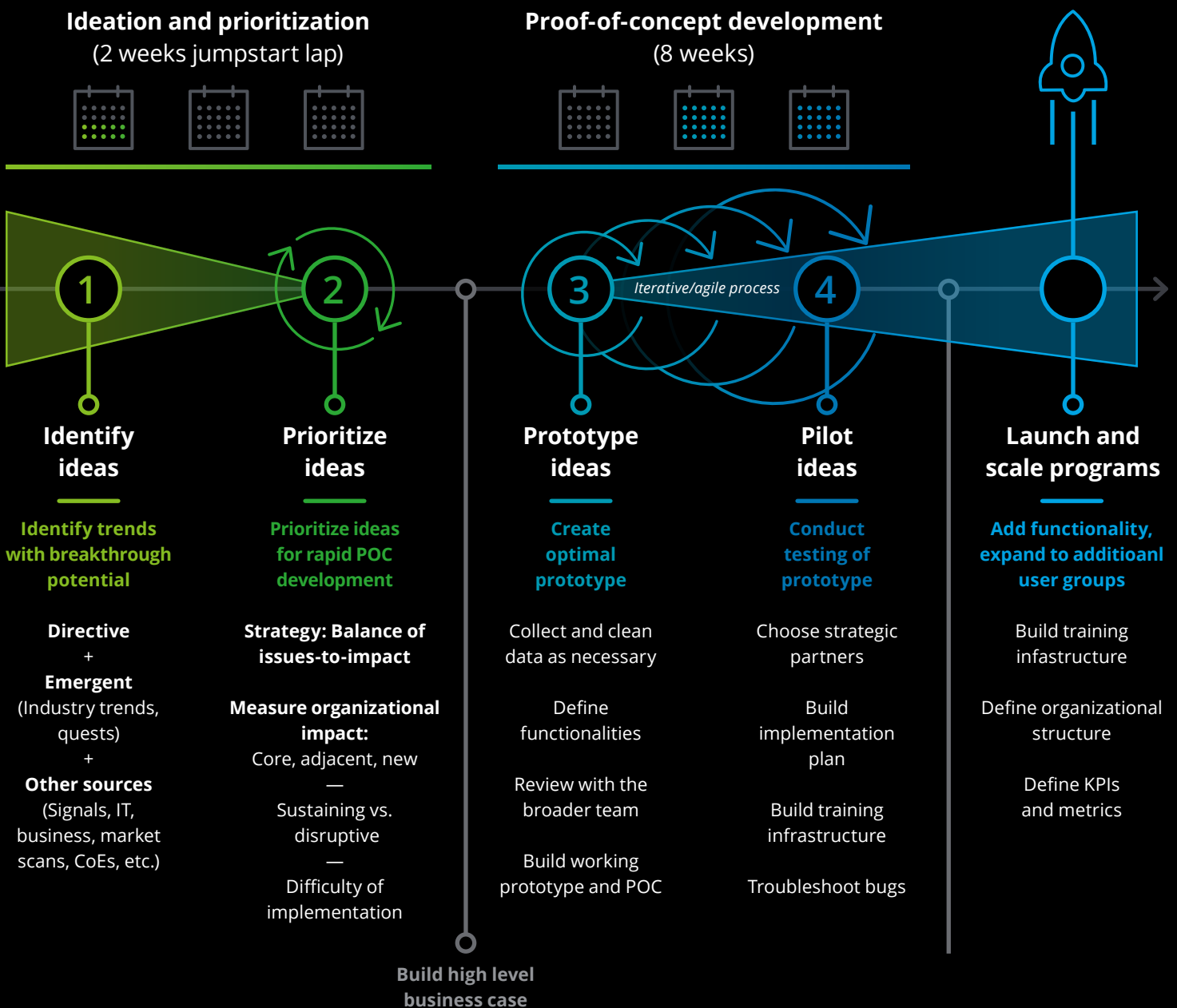
in annual savings for just one type of commodity in even the most pessimistic scenario.

**We scaled fast and implemented a digital solution for an ongoing commodity purchasing process through rapid ideation, prototyping, and proof of concept.**

Any organizational change requires research, planning, and a degree of risk-taking. By *thinking big*, organizations can create a vision for the future and outline goals for the end state. *Starting small* enables clients to take small steps toward achieving a larger goal—moving from strategy to prototyping as quickly as possible—and *scaling fast* helps them learn quickly and achieve rapid results. This cycle of

continuous rapid ideation, reprioritization, and agile implementation of digital tactics can provide meaningful insights and show time-to-value measured in minutes, hours, and days—not months and years. By *starting small*, the financial implications are typically minimal, and when results are achieved, these digital projects can become self-funding, allowing clients to transition into *scaling fast*.

Figure 3. Executing the digital foundry



# Conclusion

Manufacturing organizations should take heed of the evolving competitive landscape of their operating environment. Given today's unpredictable economic and regulatory climate, B2B customers expect a more connected, responsive, and proactive supply chain where a sale goes beyond the product and enables better outcomes for both them and their own customers. DSNs offer industrial products manufacturers the ability to meet these evolving needs in a variety of ways, all while unlocking the potential for additional revenue streams. Those that are not able to sift through a barrage of technology solutions and build a comprehensive digital strategy for their supply networks potentially risk falling behind, at the very least.

Ultimately, a series of small wins can create large-scale, meaningful, and lasting digital transformation for clients' supply networks, allowing them to not only compete but also lead. Digital transformation creates significant value, but it requires practice and a targeted approach. By leveraging the "think big, start small, scale fast" approach, as well as various Deloitte tools such as the digital foundry, clients can start driving impact quickly. In the exponentially evolving digital world we live in, it is critical to act now.

# Endnotes

1. Bureau of Labor and Statistics, "Productivity change in the manufacturing sector", 1987–2017, May 3, 2018.
2. ManpowerGroup, "2016/2017 Talent Shortage Survey", <https://www.manpowergroup.us/campaigns/talent-shortage/assets/pdf/2016-Global-Talent-Shortage-Infographic.pdf>.
3. World Bank and Organisation for Economic Co-operation and Development (OECD), National accounts data files for manufacturing, value added (annual percentage growth) <https://data.worldbank.org/indicator/NV.IND.MANF.KD.ZG>.
4. Forester, "US B2B eCommerce Will Hit \$1.2 Trillion By 2021", June 5, 2017, <https://www.forrester.com/report/US+B2B+eCommerce+Will+Hit+1.2+Trillion+By+2021/-/E-RES136173#>.
5. *Harvard Business Review*, "Manufacturing Companies Need to Sell Outcomes, Not Products", June 02, 2016, <https://hbr.org/2016/06/manufacturing-companies-need-to-sell-outcomes-not-products>.
6. Deloitte Insights, "Embracing a digital future: How manufacturers can unlock the transformative benefits of digital supply networks", 2018, [https://www2.deloitte.com/content/dam/insights/us/articles/4181\\_embracing-a-digital-future/embracing-a-digital-future.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/4181_embracing-a-digital-future/embracing-a-digital-future.pdf).
7. Ibid.
8. GE Aviation, TrueChoice™ Flight Hour web page, <https://www.geaviation.com/commercial/truechoice-commercial-services/truechoice-flight-hour>.
9. *The Economist*, "Exchange value: New ways to trade data: Securing data networks" (Science and Technology section of print edition), March 28, 2018.
10. CCN, "IOTA price spikes 21 percent after partnership with Japanese giant Fujitsu, August 27, 2018, <https://www.ccn.com/iota-price-spikes-21-percent-after-partnership-with-japanese-giant-fujitsu/>.
11. Paddy Baker, "First VW IOTA product will be released early next year," DeCentral Media, LLC and Crypto Briefing, last updated August 25, 2018, <https://cryptobriefing.com/vw-iota-product-released/>.
12. *The Economist*, "Exchange value: New ways to trade data: Securing data networks" (Science and Technology section of print edition), March 28, 2018.
13. Inditex, 2017 Inditex Annual Report, <https://www.inditex.com/documents/10279/563475/2017+Inditex+Annual+Report.pdf/f5bebf4-edd2-ed6d-248a-8afb85c731d0>.
14. Afzalul Aftab, Qin Yuanjian, Nadia Kabir, and Zapan Barua, "Super responsive supply chain: The case of Spanish fast fashion retailer Inditex-Zara", *International Journal of Business and Management* 13 no. 5 (2018), published online April 22, 2018. DOI:10.5539/ijbm.v13n5p212.
15. Kasra Ferdows, Michael A. Lewis, and Jose A. D. Machuca, "Rapid-fire fulfillment," *Harvard Business Review*, November 2004, <https://hbr.org/2004/11/rapid-fire-fulfillment>.
16. Ravneet Uberoi, "ZARA: Achieving the 'fast' in fast fashion through analytics," Harvard Business School Digital Initiative (blog), last modified April 5, 2017, <https://digit.hbs.org/submission/zara-achieving-the-fast-in-fast-fashion-through-analytics/>.
17. Ibid.
18. Ibid.
19. Afzalul Aftab, Qin Yuanjian, Nadia Kabir, and Zapan Barua, "Super responsive supply chain: The case of Spanish fast fashion retailer Inditex-Zara", *International Journal of Business and Management* 13 no. 5 (2018), published online April 22, 2018. DOI:10.5539/ijbm.v13n5p212.

# Contact us

## **Tom Walsh**

### **Principal**

Deloitte Consulting LLP  
tomwalsh@deloitte.com

## **Adam Mussomeli**

### **Principal**

Deloitte Consulting LLP  
amussomeli@deloitte.com

## **Brian Umbenhauer**

### **Principal**

Deloitte Consulting LLP  
bumbenhauer@deloitte.com

## **Jason Clark**

### **Senior Manager**

Deloitte Consulting LLP  
chaclark@deloitte.com

# Acknowledgements

The authors would like to thank Alessandro Garinois, Maddie Wasser, and Kunal Kumar of Deloitte Consulting LLP for their valuable input, insights, and efforts in the preparation of this perspective.



As used in this document, "Deloitte" means Deloitte Consulting LLP, a subsidiary of Deloitte LLP. Please see [www.deloitte.com/us/about](http://www.deloitte.com/us/about) for a detailed description of our legal structure. Certain services may not be available to attest clients under the rules and regulations of public accounting.

This publication contains general information only and Deloitte is not, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor. Deloitte shall not be responsible for any loss sustained by any person who relies on this publication.