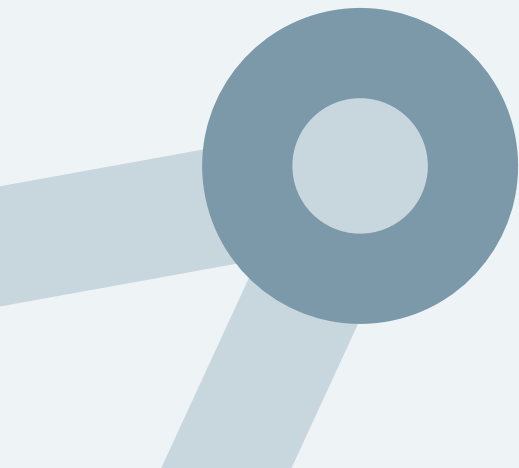


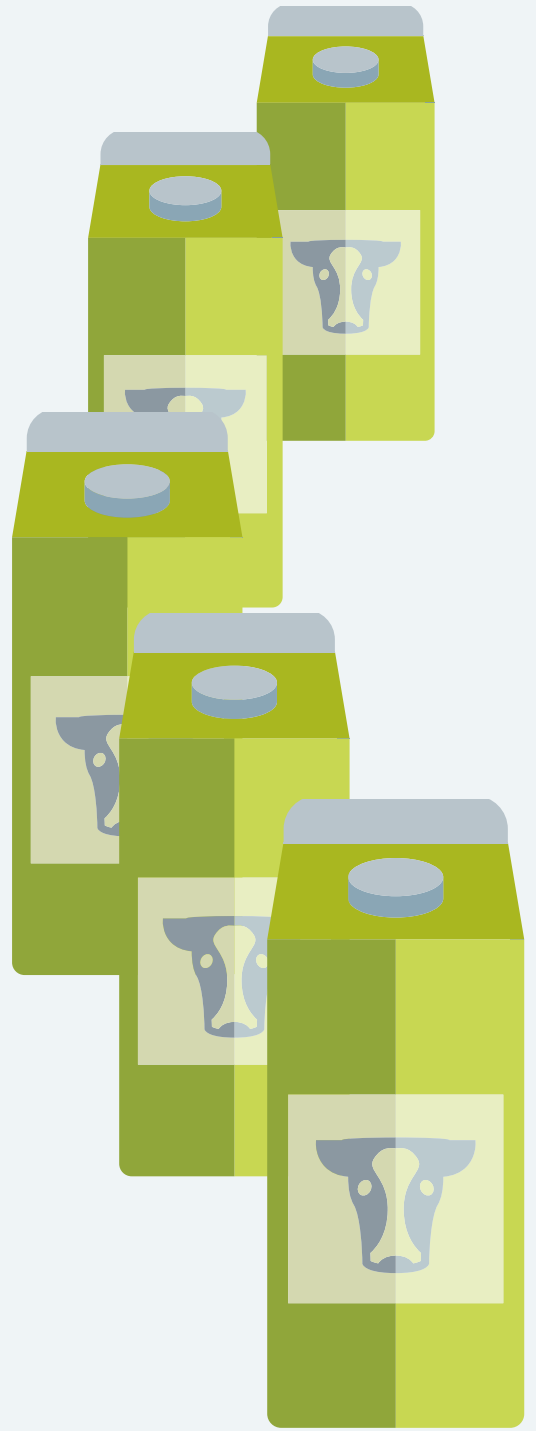
SIEMENS
Ingenuity for life



Connected food and beverage

Unlocking the benefits
of digitalization





Introduction

For Berner Food & Beverage, which makes **90%** of its products to order, keeping costs and inventory low is critical. Yet until last year, improving plant utilization and forecasting demand were time-consuming, labor-intensive tasks, fraught with complexity.

Today, however, the firm is able to predict customer demand with **95%** accuracy – a feat which, according to Berner’s CIO Troy Grove, “frees up millions of dollars in inventory that we don’t need to have.” The firm has achieved this turnaround with a low-cost predictive analytics tool that combines data from across the enterprise, from the factory floor to the enterprise resource planning system. The new tool also enables managers to quickly identify bottlenecks and find the root cause of a faulty product – such as a can of aerosol cheese that won’t spray – within an hour of receiving the customer complaint.

We surveyed more than 40 US manufacturers in the food and beverage sector and found that many firms are likely to follow Berner’s lead and invest heavily in digital to drive new efficiency gains:

- Cloud computing, additive manufacturing (3D printing), and connected sensors in plant operations have each been adopted by **50%** or more of firms.
- Almost **60%** have used digitalization to add new revenue streams from the provision of services – for example using the Internet of Things to ‘track and trace’ ingredients through the supply chain and prove their provenance.
- Two-thirds (**67%**) are encouraging suppliers to provide them with data from their operations and production processes, improving supply chain visibility and creating new opportunities to drive efficiencies.

Yet despite their initial progress and enthusiasm, there are a number of areas where F&B firms have ample room for improvement. Chief among these is advanced data analytics:

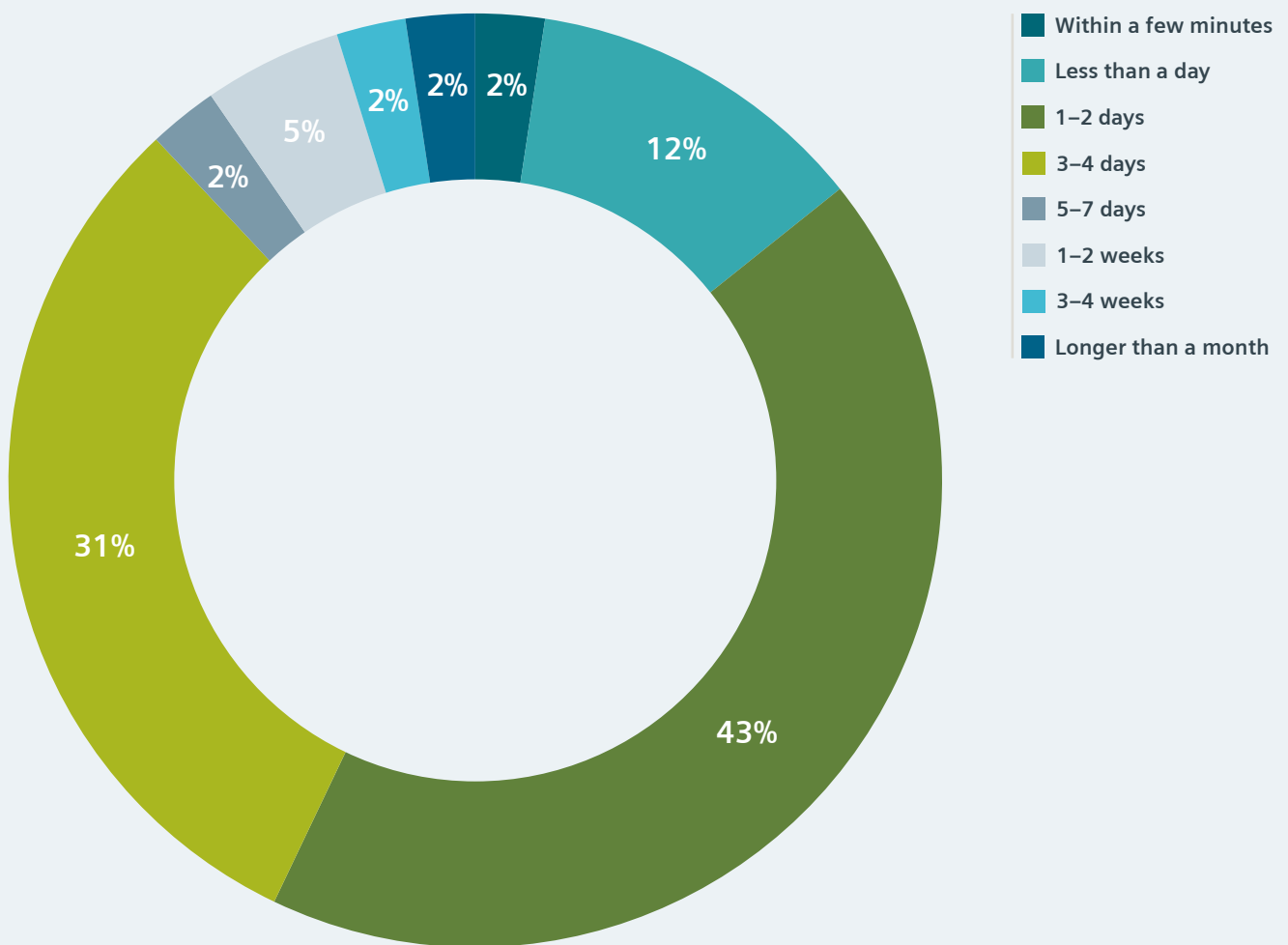
- Less than half (**48%**) of firms are using advanced data analytics tools like those adopted by Berner.
- About **85%** of firms have a lag of more than 24 hours between data collection and analysis, and the majority of firms collect less than **60%** of data from their production process.
- Over a quarter do not have a fully defined data management strategy.



Mobilizing a coherent, enterprise-wide digitalization strategy is critical if firms are to realize their digital ambitions – but with almost half (43%) struggling with digital strategy, more needs to be done to engage and align senior stakeholders.

A bigger challenge, however, is overcoming budget constraints, with limited access to capital cited as a major hindrance by more than 70% of respondents.

Gap between data collection and analysis



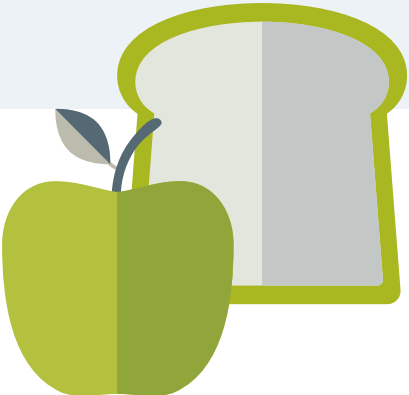
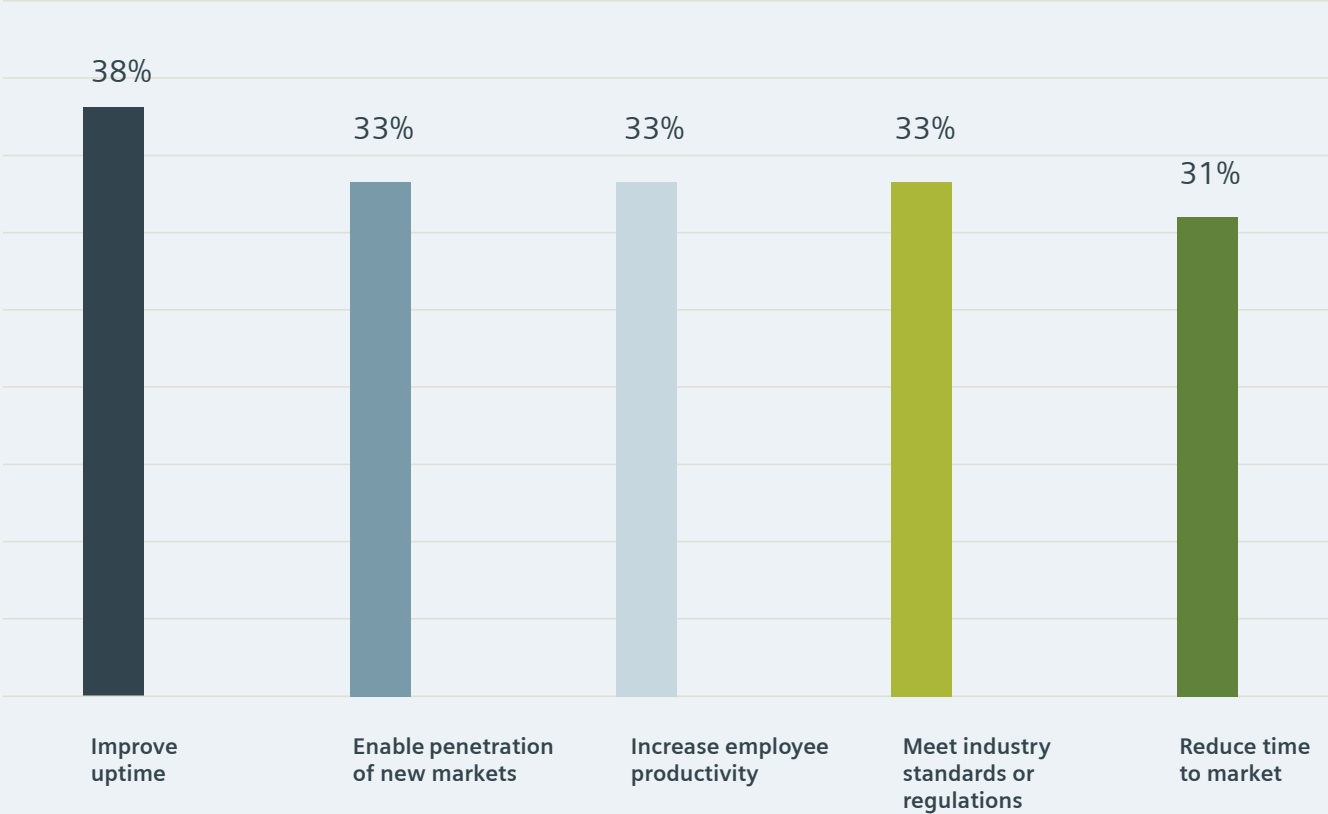
»About 85% of firms have a lag of more than 24 hours between data collection and analysis, and the majority of firms collect less than 60% of data from their production process.«



The connected factory

Our research shows that digitalization offers several key benefits for F&B manufacturers:

Top five reasons for digitalizing



① Uptime, at all times

The cost of downtime in an F&B plant can be hundreds of thousands of dollars a day, so it is no surprise that improved uptime is the sector's primary objective of digitalization. By using sensors to monitor machinery, managers gain access to real-time data on how each piece of machinery is working, allowing them to monitor performance, quality, and training needs.

Over half of respondents say they use predictive analytics to determine when to maintain equipment, so that they don't waste time and resources fixing equipment that is not broken and can minimize downtime by addressing problems before they affect production.

This approach has proved successful at Pinnacle Foods' plant in St Elmo, Illinois, which uses the Internet of Things to proactively manage equipment maintenance and reduce downtime.

"Our kitchens run 24/7. Because we're running continuously, we need to make sure our maintenance is ahead of packaging lines... Start-ups and shut-downs cost money," explains Plant Manager Thomas Perkins. Additionally, the plant has automated much of its production-line process, ensuring that exactly the right proportions of vinegar, sugar, and seasonings go into each of its salad dressings. This frees staff to focus on quality and compliance.

② Higher productivity, lower inventory

Boosting productivity is a primary concern for F&B executives, and is an area where data and analytics tools hold much promise. These technologies can be used to both anticipate and prevent expensive errors and equipment failures, and to predict customer demand more accurately. The latter application is pivotal for driving down inventory costs and freeing up cash flow.

At the operational level, analytics tools can help to cut waste across the production line. A major sausage roll manufacturer recently improved yields by 0.10% by implementing

a centralized data-capture and analytics system that tracks multiple points in the production line to eliminate weight variance in sausage production. Although only a fractional gain, this alone achieved savings of hundreds of thousands of dollars a year through reduced waste, as well as ensuring that each sausage roll contains the optimal amount of meat.¹

¹ www.industryweek.com

3 Satisfied regulators, safer customers

While the most cited reason for digitalizing is improving uptime (38%), meeting industry standards or regulations (33%), and improving safety (29%), also provide powerful motivation.

While customer safety has always been of paramount concern for the F&B sector, the FDA's 2015 Food Safety Modernization Act (FSMA), which requires food manufacturers to create detailed action plans to prevent food-borne illness, has increased the importance of monitoring, traceability and data collection. Here, digitalization can be used to minimize labor costs while providing a high degree of assurance. Particularly useful are mobile monitoring technologies, in-package sensors, radio frequency identification (RFID) tags and connected devices, which can provide the real-time information required to ensure compliance with cold-chain requirements.²

Regulators are not the only source of external pressure, though: in a recent survey, 92% of consumers reported that it is somewhat or very important to know where their food is coming from.³ Using digital technologies to verify the source of ingredients could help to boost consumer confidence while also providing F&B firms with a major opportunity to market their services to makers of organic and locally grown products – rising trends in the food industry that generate higher prices.

»If you use the ROI model and think only short term with benefits, you're almost always going to choose not to invest.«

Cliff Waldman, Director of Economic Studies, MAPI Foundation



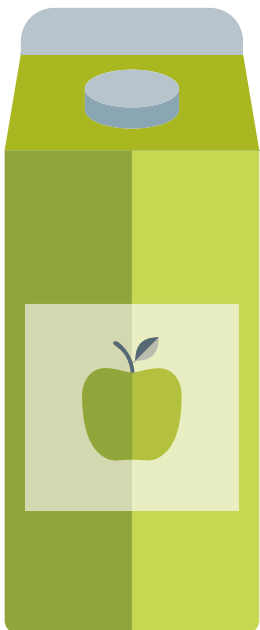
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- ³ <http://www.traceone.com/en/news/consumers-buy-private-brands-but-concerns-in-food-quality-and-safety-point-to-need-for-greater-transparency/>

Constrained capital and dormant data: barriers to progress

The commercial benefits outlined above show that digitalization is the only option for F&B firms. Yet our research also indicates that the sector must overcome a series of hurdles in order to increase adoption of digital technologies and realize the expected benefits.

According to more than **70%** of firms, a major challenge is increasing access to capital. Indeed, embedding new technologies can require significant investment from F&B firms, as well as the hiring of workers with new skills and the retraining of potentially hundreds of employees.

A key reason why firms are struggling to access capital for digitalization projects relates to difficulties in proving the related return on investment (ROI). "The regular ROI thinking that you use for capital investment doesn't completely translate in the case of new technology investment," says Cliff Waldman, Director of Economic Studies at the Manufacturers Alliance for Productivity and Innovation (MAPI) Foundation. "The 3D printer is very different from putting a new machine on a factory floor. It creates a different kind of supply chain, so your workforce is going to have to be re-oriented to it. Then there are stranded costs, as you're going to have to leave your old technologies behind. If you use the ROI model and think only short term with benefits, you're almost always going to choose not to invest."



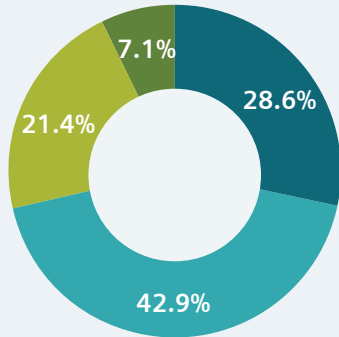
Unlocking the real value from data is a further challenge. While many F&B manufacturers are collecting data from across the production line, only a third are using this data to support most or all decisions. Fundamentally, this is a cultural problem, but it's exacerbated by a lack of integration between digital tools, which profoundly limits firms' ability to collect data at the scale required to influence major, strategic decisions – none of the firms surveyed has achieved full data integration across plants.

By failing to integrate data and use it to underpin decision-making, firms are missing a huge opportunity to drive efficiencies, boost productivity, and better understand customer behavior. Manufacturers need to treat data as a strategic asset. Coca-Cola, for example, now imports 250 data sets from its bottlers around the world into a common system, and then uses it to review past progress and make future forecasts.⁴

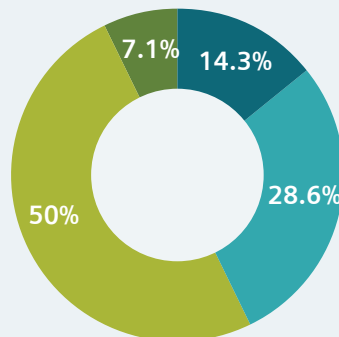
Progress will require both a maturing digital business strategy and a significant culture shift. This shift could be facilitated, at least in part, by the introduction of industry-wide standards for key technologies, the lack of which is hindering the digitalization efforts of two-thirds (**67%**) of firms surveyed.

⁴ <http://sloanreview.mit.edu/article/coca-colas-unique-challenge-turning-250-datasets-into-one/>

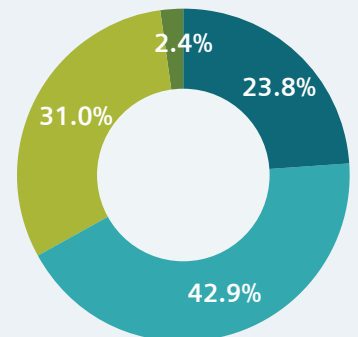
Barriers to digitalization



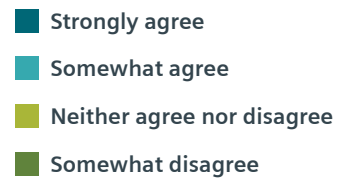
Limited access to capital is a major inhibitor of our implementation of advanced digital technologies



My company is struggling to implement a coherent digitalization strategy across the whole enterprise



Our digitalization progress is hindered by an absence of industry-wide standards for key technologies



Where next? Investing in digital to unleash competitive advantage

Our research shows that F&B manufacturers are forging ahead enthusiastically with their digitalization strategies: from Hillshire Brands, whose production facilities currently log up to 2,000 data points, to 172-year-old beer-maker, Pabst, which is using predictive analytics to forecast volumes by package type and customer.

Yet there are still plentiful opportunities to build on such success – in particular by using data and analytics to drive performance and decision-making. To make real progress, firms must avoid the trap of indiscriminate data collection; instead, they must create a robust data-driven strategy that identifies the insight they really need to get ahead of their competitors.

Before this can happen, CEOs must raise digitalization to the top of the corporate agenda and free up more capital to invest in digital technologies. Happily, there is strong evidence to support greater investment: over a third of respondents say they have significantly increased the cost efficiency

of their production since they started implementing digitalization, and the majority have used digitalization to add new revenue streams to their businesses through the provision of services. These can take a variety of forms – from using 3D printing to create bespoke products on demand, to introducing ‘smart packaging’ that indicates if food has gone bad.

As the pace of digitalization continues to increase across the sector, procrastination simply isn’t an option: companies that fail to adapt are certain to lose business to bolder competitors.

These findings are based on a survey of 42 senior executives from US food and beverage manufacturers. The survey was conducted by Longitude Research on behalf of Siemens in May and June 2016.

The respondents were primarily CFOs, COOs and CTOs and Directors (over 40% C-suite), and the majority of firms surveyed report annual revenues of more than \$1 billion.

Connected food and beverage: Unlocking the benefits of digitalization



This proprietary study from Siemens, conducted in the summer of 2016, measures progress of five key US manufacturing sectors according to their degree of digital intensity, as mapped out above.

Key digitalization struggles



cite struggles in accessing capital

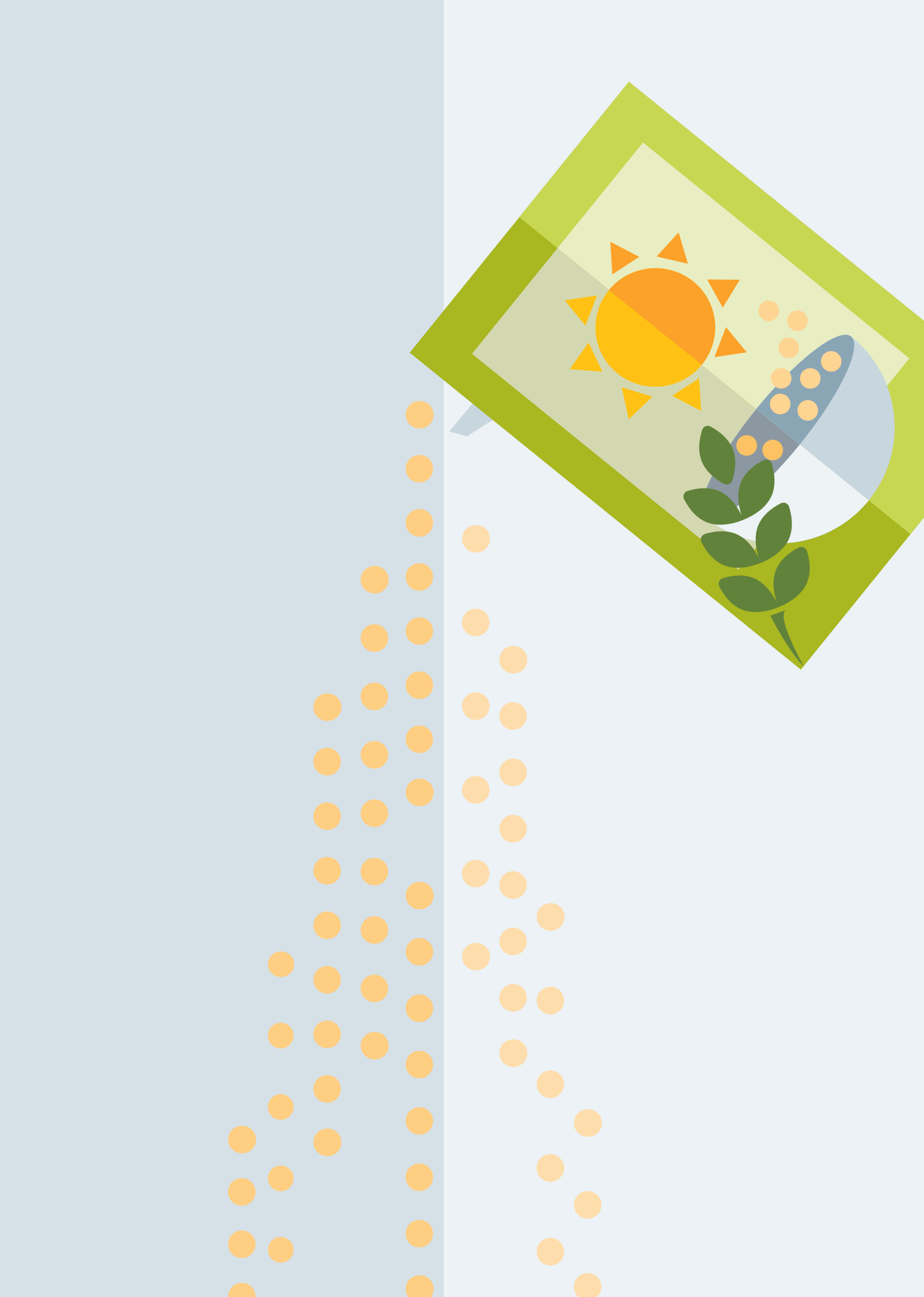


About one in four make no use of data analytics in their decision-making



Less than half of firms are using advanced data analytics tools

Try out our digitalization benchmark to see how your manufacturing business stacks up against your peers. Visit www.usa.siemens.com/digitalbenchmark to learn more.



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