

Building a more productive, smarter and safer workplace

Digital technologies can play a key role in driving vital improvements to both worker productivity and safety.





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Productivity is under pressure

The stark fact of modern business life is that productivity growth has slowed. United States Bureau of Labor Statistics productivity data since 1964 shows that productivity growth, at only 1.3%, is now at the lowest point since the 1970s (calculated as the gross domestic product per hour worked). And that’s despite all the innovations we’ve seen in how companies design, build and bring products to market.

Safety remains important

While there has been much work (not all of it successful) to address productivity in recent decades, a strong focus on worker safety has continued to be a major focus for enterprises. As most organizations know, a set of comprehensive safety practices and a reputation for being a safe workplace are important to:

- hiring and retaining good people
- meeting the company’s obligations to conform to statutory rules about employee safety
- reducing risk (to people and property) and possible litigation

Digital technologies can help

None of this is new. What is new, however, is the ability of all companies across every business sector to use digital “smart” technologies to help make their employees more productive and even safer.

The digital wave is more focused around enhanced customer experience, efficient supply chain operations, predictive maintenance and so on depending on the industry and readiness of companies.

Ensuring workers at site or plant are productive and safe has long been a key concern and it continues to be so – especially for mining, energy and utilities, chemicals and construction companies.

However, companies aren’t always investing in digital technologies for productivity and safety improvement at a rate that will do them the most good.

An under-investment in digital technology designed to improve productivity can lead to increased work hours, corresponding billing increases, increased operational expenses, schedule slippage and lost revenue.

Digital technologies can also drive safety improvements for companies – especially where third-party contractors and temporary workers form a significant portion of their workforce.

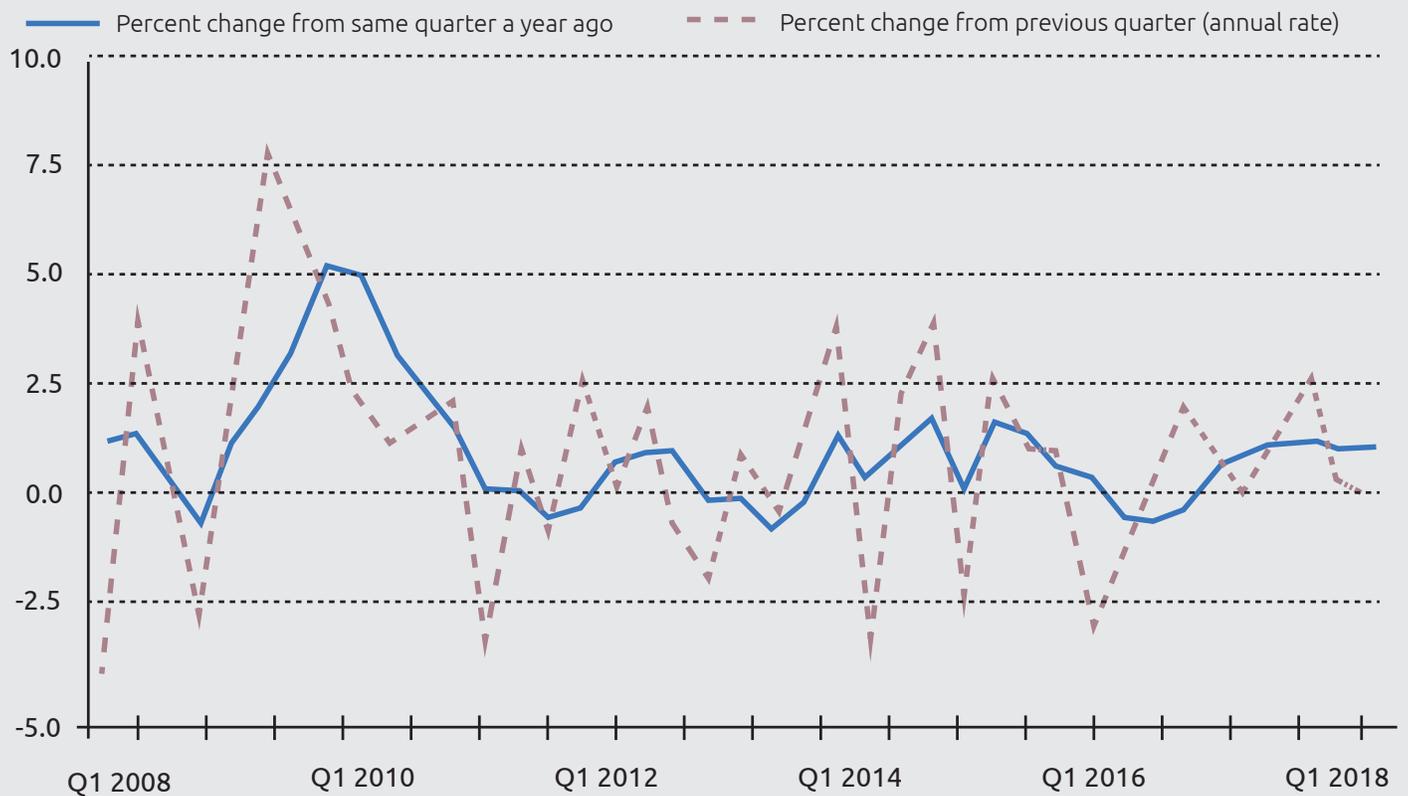
So there are great opportunities – worker productivity and safety improvements by gathering data from various sources, conducting analysis on it to generate insights and review best practices.

Workplace complexity creates productivity and safety challenges

Workplaces today are becoming ever more complex – with an influx of advanced tools and equipment, changing job sites, external contract workers, evolving regulatory requirements and shortage of skilled labor. Due to these complexities, meeting the challenge of effectively using both labor and equipment and providing a safe work environment – remains a major area of focus for organizations.

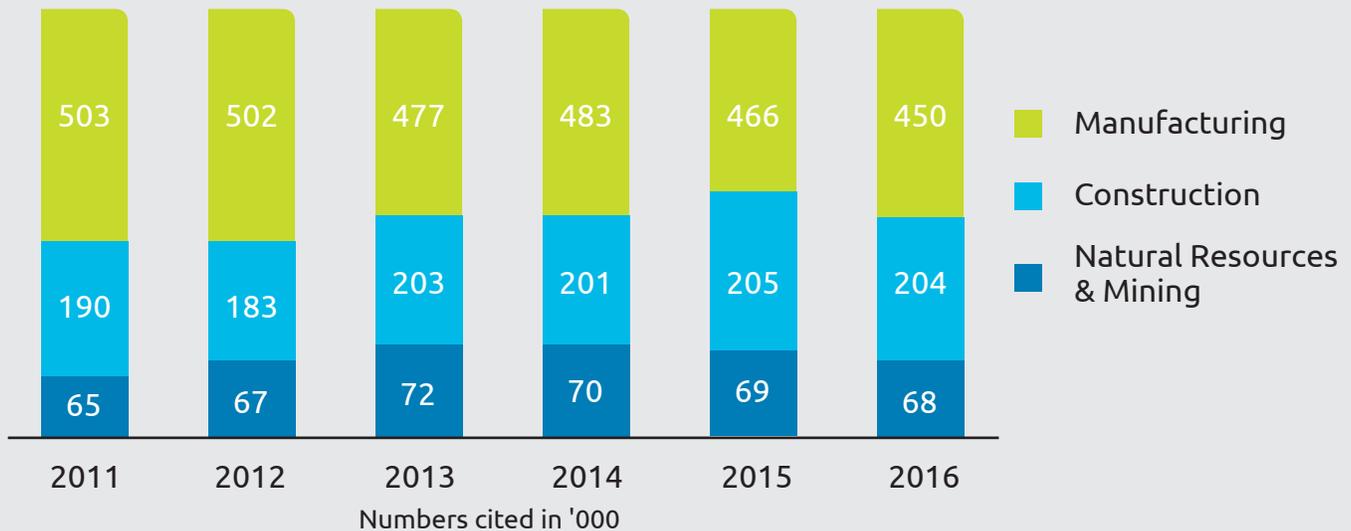
You can see the impact of this complexity in the numbers for productivity for the last 10 years from the US Bureau of Labor Statistics (Figure 1). The only time there has been a significant positive change in productivity since 2008 was in 2010, following the huge economic downturn in 2008 and 2009.

Figure 1: Labor productivity (output per hour), nonfarm business, percent change from same quarter and from previous quarter (annual rate), 1st quarter 2018



Note: Shaded area represents recession, as determined by the National Bureau of Economic Research
 Source: U.S Bureau of Labor Statistics

Figure 2: US Bureau of Labor Statistics: Occupational Injuries and Illnesses – 2011-2016



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Hand-in-hand with this slow productivity growth are occupational safety numbers from the US Bureau of Labor Statistics (Figure 2) that showed very little change between 2011 and 2016 with various types of occupational injuries and illness incidents slightly rising in some sectors (such as construction and natural resources/mining) while slightly falling in manufacturing.

The cost of an unproductive and unsafe workplace

Productivity loss at a workplace due to safety-related incidents leads to schedule slippage and revenue leakage, eventually having a measurable impact.

Just how costly are those incidents? The human toll is obviously significant – and so is the financial one.

The US Department of Labor estimates that organizations pay almost \$1 billion per week for direct workers' compensation costs alone. And according to 2017 Liberty Mutual Workplace Safety Index, serious workplace injuries cost US companies \$59.9 billion a year.

To provide even more detail, a study by Population Health Management (published by the National Center for Biotechnology Information, U.S. National Library of Medicine), reports that overall health-related work losses are estimated to cost US employers more than \$260 billion each year, and may cost some companies more than direct medical expenditures. They also impact labor costs and productivity.

To get a sense of the overall reasons for labor costs going up and productivity going down, consider the observations made in a February 2018 Reuters story about this trend. “Economists blame soft productivity on a shortage of workers, which could be an obstacle to faster economic growth,” Reuters reported. “Other economists also argue that low capital expenditures, which they say has resulted in a sharp drop in the capital-to-labor ratio, is holding down productivity.”

Impacts are felt by both employers and employees

Debbie Michel, general manager of Liberty Mutual's National Insurance Casualty operation, explains the impact.

"Workplace injuries impact both employees and employers. Injured employees face potential physical, emotional and financial harm," she says in the announcement of the index results. "Employers face the direct costs of workplace injuries – medical care related to the accident and some portion of an injured employee's pay – and the indirect costs, including hiring temporary employees, lost productivity and quality disruptions."

Making the workplace safer and more productive

The key to being productive and safe at a work site largely relies on having the right information at the right time for workers and supervisors. Real-time information availability helps in efficient planning and preventing major incidents at the work place. Access to the following can help organizations in having a positive impact on productivity and safety:

- Visibility of work place (Site or Plant)
- Visibility of work to be performed
- Real-time communication
- Adoption of technology

These factors become even more important when you look at the rise in number of temporary workers and third-party contractors needed to perform field service and maintenance activities at many sites and plants. This situation demands visibility of the site or plant layout to ensure safety and greater productivity.

How do you keep a workforce safe and productive?

Safety is ensured by making workers aware of restricted and hazardous zones in real-time and preventing them from entering such areas. Visibility of asset location and navigation assistance ensures workers reach the specified work location quickly, helping boost productivity at work.

Taking a more detailed look at each of the factors that go into creating a safer workplace provides insight into the actions that organizations will need to take.

Visibility of tasks and progress tracking in real-time

Often in maintenance activities, workers tend to receive paper-based task lists for the day. That works until an emergency work order or task is pushed – and then the information is not available to the workers until they receive the paperwork for it.

This leads to schedule slippage and may have significant impact on cost. Also, timely availability of work information and progress is key in accomplishing tasks quickly – particularly those which involve multi-skilled craftspeople.

So using a digital solution to capture the real-time location data of workers or contractors can help organizations significantly improve productivity and safety. Safety can be ensured by "geo-fencing" hazardous areas and triggering automated safety alerts to workers in case of breach.



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— Debbie Michel, general manager of Liberty Mutual's National Insurance Casualty operation

Various safety reports such as number of breaches by site or plant, number of breaches by workers, frequently breached zones or frequently breached work hours can provide organizations deep insights into the current operations and shall help them to formulate appropriate safety guidelines.

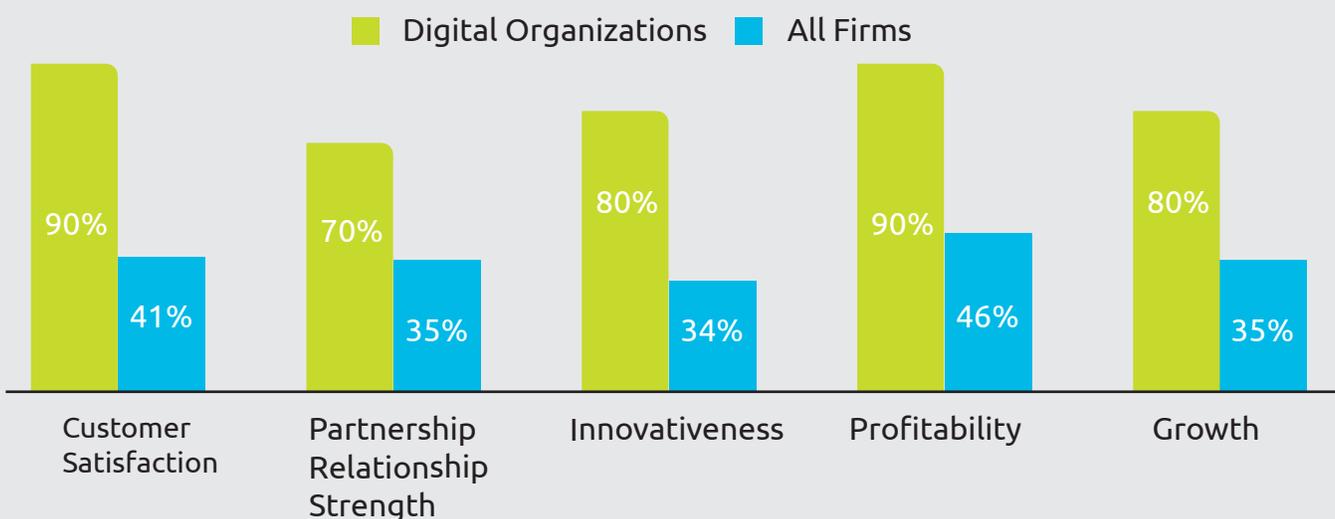
With the available location data, time and motion-like study can be used to perform worker movement analysis to provide insights on productive time spent, supervisor-crew productivity, identify inefficient work practices and so on. Also, by providing real-time visibility into the work orders for workers, it is feasible to track actual time spent against work orders, thereby eliminating any billing discrepancies along with productivity improvement.

Overall real-time communication

Real-time information and notifications on external factors (such as weather data) helps workers plan work and be safer. In the case of an emergency, the ability of workers to immediately reach out to safety personnel in real-time can make a huge difference to the outcome. Alerts to workers on their key health vitals – and the broadcasting of safety events to all workers at a site – are key real-time communications aspects to be considered around safety.

Capturing and communicating the environmental variables can help improve safety conditions at workplaces to great extent. Centralized warning systems can be established by capturing data from various sensors like temperature, humidity, toxic or hazardous gas and worker’s vitals too. By correlating this data, centralized and early warning mechanisms can reduce safety related incidents. Integrating weather information with the system helps companies to be prepared for any catastrophic incidents and provide early alerts to workers and supervisors.

Figure 3: Digital Organizations Outperform their Peers



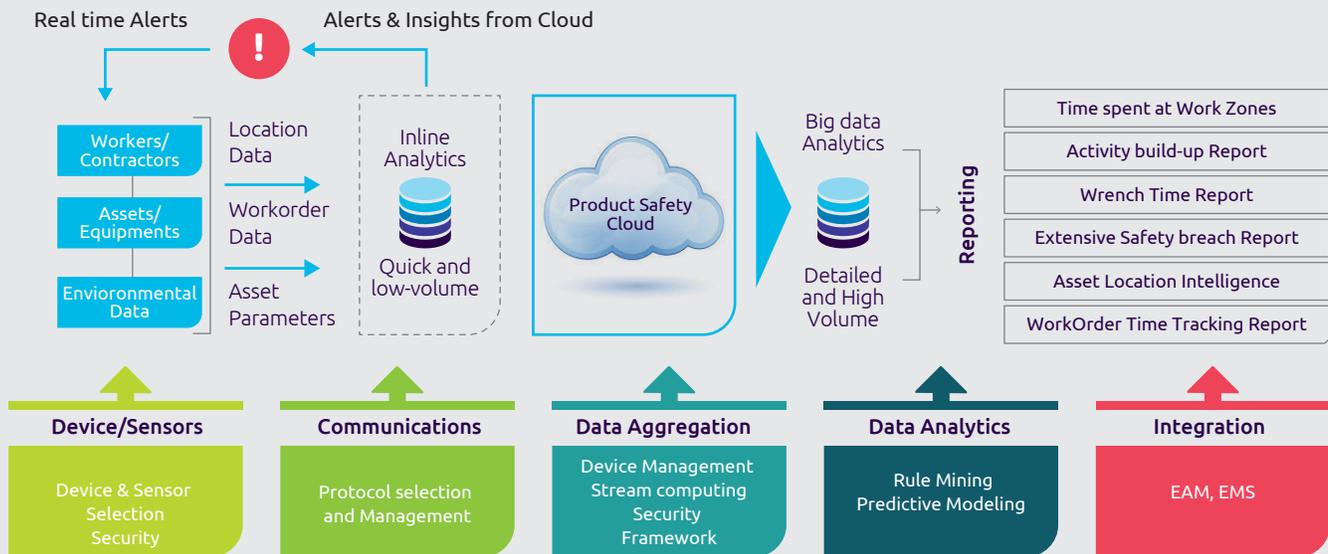
Source: Organizing for Digital: Why Digital Dexterity Matters Report, Capgemini Consulting, 2015

Adoption of technology

Capgemini, in collaboration with MIT center for Digital Business conducted an in-depth research study to gain insights on the capabilities and qualities of digital organizations. The research shows that digital organizations outperform competitors on key performance indicators (Figure 3).

Workers should have access to the latest technologies such as wearables and sensors that can help improve productivity and ensure the greater safety of their workplaces. Companies where operations are diverse across geographies must leverage latest digital technologies to gain visibility into operations in real-time to take timely actions (Figure 4).

Figure 4: Productivity & Safety meet Digital Technologies



Cost effective sensors are available that can track location, capture atmospheric gas level and transmit it to a central data repository. Data from these sources can provide real-time visibility to supervisors and workers – offering insights such as safety zone breaches, alerts on health vitals and notification on new work orders assigned. Here’s how it might work:

Once the data from all sources reaches the cloud, alerts can be triggered to the device or edge after minimal data processing at the cloud. This involves analyzing a combination of data and pattern matching to provide alerts and insights to the workers and supervisors.

This can include analyzing the speed and direction of the worker and provide an early warning on the hazardous zones nearby, navigation assistance to the asset or equipment depending on the work order assigned, centralized warning mechanism in case of hazardous gases exceeding the threshold and emergency work order being pushed.



Digital organizations outperform competitors on key performance indicators.”

Driving adoption of Productivity & Safety digitization

For an organization to start digitizing its productivity and safety operations, a Proof of Value and scale up approach makes the most sense.

This process starts by identifying a specific use case for a pilot site for a closed group of workers. It involves device selection based on the use case, site selection and the desired reporting ability. It is designed to provide immediate value for organizations by understanding the existing work practices and identifying key areas for improvement. Upon successful value realization, the scale up plan can be created with use case extension and rolling out to a larger workforce across work sites or plants (Figure 5).

The key for successful Proof of Value implementation and scaling up is selecting the appropriate sensor or wearable from a wide range of available technologies.

Figure 5: The Value of Digitizing Productivity & Safety

	Description	Benefits
Operational Benefits	<ul style="list-style-type: none"> • Reduced contractor billing leakages by improving time spent on site • Improve wrench time <ul style="list-style-type: none"> • Work Order visibility • Asset location visibility • Improved worker discipline • Reduce time taken by contractors to clock in (in lieu of manual clock in) • Improved planning and schedule compliance thru time and motion data 	<ul style="list-style-type: none"> • Reduction in contractor billing leakage by 6% • Improvement in Wrench time by 10% • Improved Schedule compliance by 3-4%
Benefits from Safety	<ul style="list-style-type: none"> • Reduction in incidents • Reduced impact of incidents thru real time communication • Improved productivity during site wide disruptions • People reconciliation in Muster Area • Improving safety behavior and root causing of incidents 	<p>Improved Worker Safety & Reduced costs on Safety Incidents</p> <p>*Prevention of a fatal incident will save up to \$900,000</p>

Capgemini's Digital Productivity and Safety Solution

Capgemini's Digital Worker and Equipment Management solution is a wearable and cloud-based offering aimed to promote safe and productive workplace for Chemicals, Mining, Construction, Energy & Utilities and Manufacturing organizations. The solution enables real-time tracking of workers and equipment in plant facilities, captures and tracks time spent on work orders, provides proximity alerts and notifications and comprehensive productivity and safety reporting.

Capgemini maintains a comprehensive repository of sensors and has developed a sensor selection framework to assist companies in identifying the most appropriate one based on the requirement for Proof of Value and larger roll-outs.

Case Study

Capgemini implemented the solution for a leading producer of fuels and chemicals in North America. The client intended to identify contractor productivity and efficiency improvement opportunities, thereby modifying work practices to profitably execute regular and turnaround maintenance at the site.

The major concern area for the client was schedule slippage and revenue leakage during turnaround projects. Capgemini rolled out the Digital Productivity and Safety solution by provisioning Android-based “smart watches” for contractors across sites to enable tracking, log in and log out work time. Various productivity reports were developed to identify time spent by contractors in various zones and identify ramp-up and ramp-down time. Based on the insights provided by the solution, the client was able to identify major improvement areas and act on them.

- Improvement in worker’s time spent in productive or work zones: up from 40% to 60%
- Improved ramp-up time to work: 80% of workers at work zones within 60 mins of log-in from 60% of workers at work zones after 90 mins to 120 mins of log-in

Conclusion

Digital technologies can make a huge difference in addressing the significant, pressing and urgent needs of organizations to become safer, increase their productivity and reduce costs.

Implementation of these technologies requires a keen understanding of the overall problems you are trying to solve in your organization, as well as how each of the technologies you are proposing to apply will help address those problems.

That’s why it’s important to start small with the suggested Proof of Value implementation, take learnings from that – and then use those to inform broader rollouts. And, along the way, make maximum use of the data and insights you generate. They will guide you in the continued productivity and safety evolution of your organization.



About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 40 countries. The Group reported 2017 global revenues of EUR 12.8 billion (about \$14.4 billion USD at 2017 average rate).

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Authors

Mike Dennis

Solutions Leader

Energy, Utilities, Chemicals and Services

mike.dennis@capgemini.com

Chiranth Ramaswamy

Solutions Director

Energy, Utilities, Chemicals and Services

chiranth.ramaswamy@capgemini.com

Arvind Subramanian

Solutions Manager

Energy, Utilities, Chemicals and Services

arvind.subramanian@capgemini.com

People matter, results count.