IBM and SAP in the Industrial Machinery and Components Industry

Harnessing the power of cognitive computing

Contents

Digitalization Is Disrupting Industries

Technology changes everything

Digitalization has reached almost every aspect of today's life and will embed itself further into our personal and business lives. For the industrial machinery and components (IM&C) industry, new and exciting opportunities are provided by advances in hyperconnectivity, automation, cloud computing, Big Data and analytics, computing on the edge, machine learning, augmented reality, artificial intelligence, the Internet of Things (IoT), and cybersecurity. At the same time, these advances open the playing field for companies that are not traditional manufacturers but come with expertise in these technologies from other industries.

In this situation, where the opportunity is huge but new market entrants are threatening, it is essential to focus on the right strategic priorities to drive digitalization across the business. In working with leading companies across the globe, we see the key as being investment in five strategic priorities.

Customer centricity – putting the end-customers' point of view at the center of every decision, not just in the sales department but also across the entire organization.

Serving the "segment of one" – extending mass customization in traditional engineer-to-order environments to all manufacturing areas.

Delivering smart products – using digital capabilities like self-awareness of technical health and operational status, or business system connectivity, to differentiate offerings

Creating smart supply chains and factories – connecting production and logistics intelligently with the rest of the business to respond rapidly to short-term demand and supply fluctuations or changes in customer orders that require different materials, parts, or machining operations

Adapting new service business models – moving from selling physical products to providing complete solutions that generate higher profit margins and greater customer loyalty

In this e-book, we look at how IM&C companies can embrace the opportunities provided by digital technologies to successfully reinvent themselves and answer three key questions with a resounding yes:

- Is my strategy ambitious enough?
- Can I execute fast enough?
- Will my people transform themselves and their capabilities?

An industry in transformation

Key trends that are reshaping the IM&C industry include:

- Reduction in plant and equipment size
- Localization of manufacturing
- Robotics and knowledge work automation
- 3D printing
- Predictive analytics
- Rapid product development and enhancement

64%

Of executives believe new business models will impact their industries more profoundly than ever

Source: “Global Digital Disruption Executive Study," IBM Institute for Business Value, 2015.

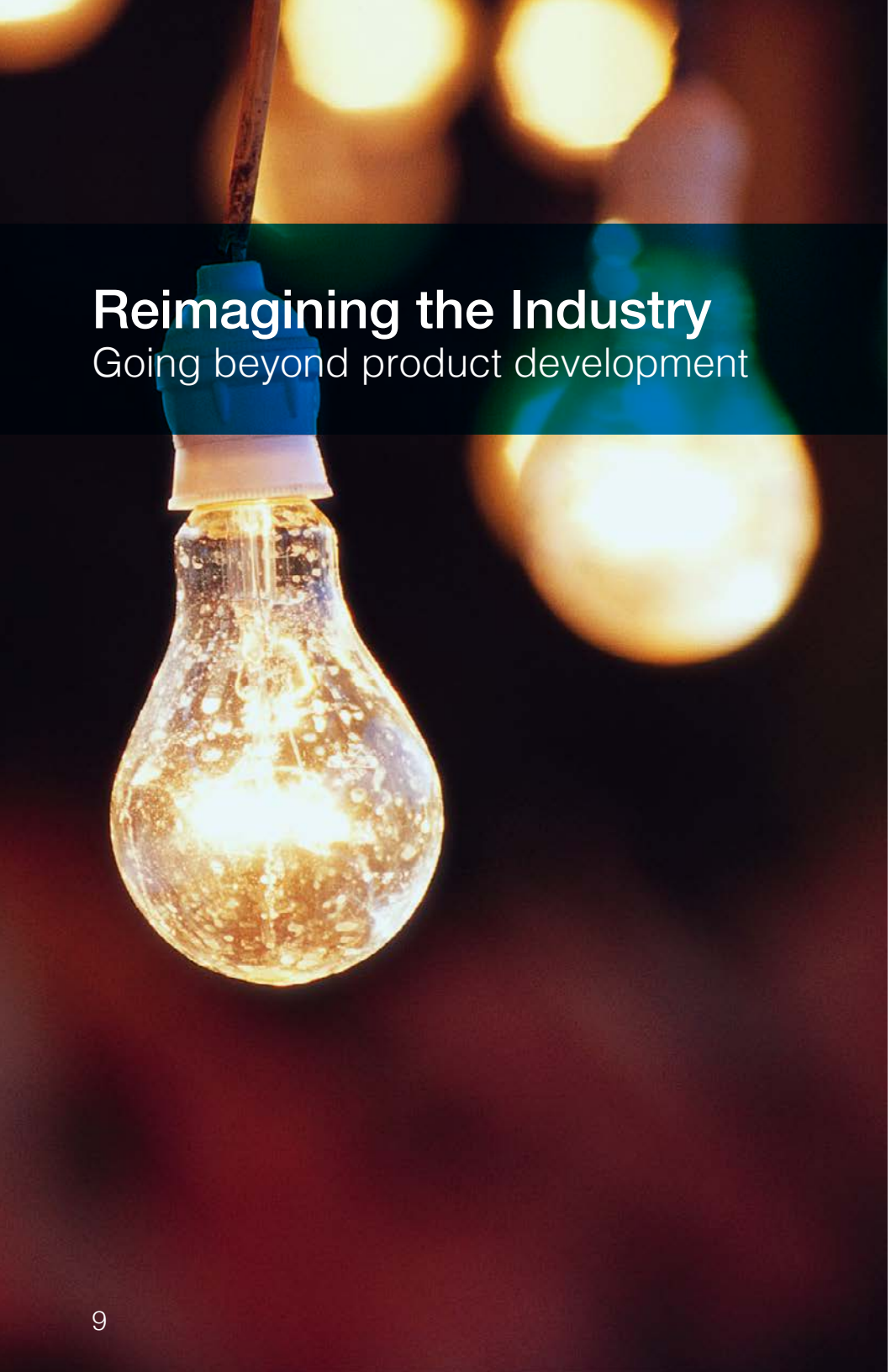
New business models

IM&C companies are reinventing their businesses from:

- Selling compressor systems to selling compressed air
- Manufacturing industrial trucks to driverless vehicles
- Automation technology to providing service level agreements for machinery uptime
- Elevator producer to people transportation
- Selling robots to providing welding points
- Selling equipment upgrades to selling software-enabled functionality

Industry definition

For the purposes of this e-book, the industrial machinery and components industry is defined as companies providing automation and control solutions and machinery and equipment for industrial manufacturing, energy, and infrastructure.



Reimagining the Industry

Going beyond product development

Reimagining products is clearly one area where new technology can help IM&C companies differentiate themselves from the competition, and we look at this in the next section.

However, this is not the only area where new technologies can make a disruptive difference. IM&C companies have the opportunity to reflect on how they can reimagine models and processes.

Reimagining service models

In the IM&C sector, the next wave of evolution is being driven by the fusion of digitally connected equipment, business data, and third-party information to provide new service models. Opportunities include equipment as a service, value-added software and mobile apps, on-demand consumption, and digital orchestration of the entire value network.

Reimagining business processes

In the digitalized world, business processes go beyond company boundaries. New, digitally enabled products sold through innovative business models offer companies the opportunity to reimagine fundamental processes.

R&D used to focus only on the product. Today it needs to collaborate with electronics, software, and mechanics departments, as well as engineers outside the company. Retooled product-design processes can also benefit from digital improvements.

Connected devices offer the opportunity to rethink the manufacturing process to make it seamless. The process needs to connect the lab to the shop floor, and the shop floor to the customer. Integrated and connected manufacturing ensures digital devices work in concert with R&D.

In addition, marketing can adopt a more-contextual approach to customer engagement. Sales can work more proactively to deliver the solutions customers require, rather than simply sell products. And after-sales service can build stronger, lifetime relationships with customers.

Reimagining work

New technologies offer IM&C companies the opportunity to create a more-productive and adaptive workforce. As the adoption of robotics and cognitive computing rises, factories will become more lights-out, allowing workers to focus on orchestration and exception management. Mobile workers can use simple and scalable apps that provide them with the right information when and where they need it.

Real-time, transparent access to data can keep everyone in the organization, from the top floor to the shop floor, better informed. While ad hoc collaboration and learning will help employees perform tasks in a more timely, efficient, and effective manner.

To sustain innovation and drive improvements in on-time delivery to clients, Kennametal worked with IBM Global Business Services to migrate the SAP® ERP application to a SAP HANA® in-memory database – enabling Kennametal to serve its customers better and view key performance indicators faster. An immediate boost in performance included 83% faster reporting of product delivery, 90% quicker open order checking, and making it 25% faster for Web users to search the online product catalog.

Read the case study

Connected Products

Delivering unprecedented business opportunities

Smart, connected products use technology to collect and share data. They anticipate problems, offer solutions, and open up new markets for companies.

Smart, connected products also provide manufacturers with a better understanding of how products can best be used and improved. Using this understanding, companies can deliver continuous service innovation and increase revenue. Instead of selling a product, companies can offer a suite of services.

Companies that digitalize their business can realize increased aftermarket profits. Machine-to-machine technology and Big Data modeling let businesses offer new services that are valuable to customers, such as predictive maintenance.

In addition, data from connected products can help reduce field service costs. Quick problem identification and first-time fixes save money and improve customer retention.

Smart, connected products that provide data and useful insights can fundamentally change relationships with customers, give rise to new business processes, and drive product improvements. As a result, customers see the company as a strategic partner rather than just a manufacturer.

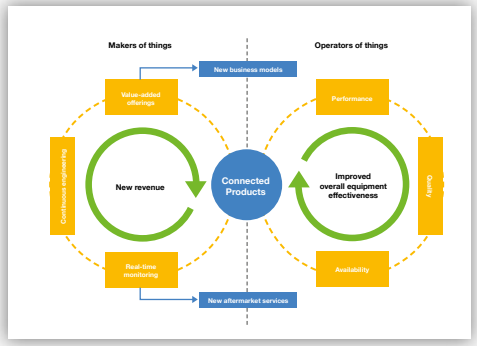


Figure1: Connected products – the bridge between makers and operators

Click to enlarge

New thinking

But smart, connected products also require new thinking about value creation and capture. There is a distinct difference between the traditional product mind-set and an IoT mind-set.

Figure 2: Changing the product mind-set

		TRADITIONAL PRODUCT MIND-SET	INTERNET-OF-THINGS MIND-SET
VALUE CREATION	**Customer needs**	Solve existing needs in a reactive manner	Address real-time and emergent needs in a predictive manner
	Offering	Standalone product designed for obsolescence	Constantly evolving product that adapts and can be refreshed as needed
	Role of data	Limited, point-in-time data that informs future product design and experience	Continuous flow of data to inform current and future product design and experience
VALUE CAPTURE	**Path to profit**	Sell the next product	Capture recurring revenue
	Control points	Commodity advantages, IP ownership, brand	Personalization and context, network effects between products
	Capability development	Leverage core competencies, existing resources, and processes	Understand how other ecosystem partners make money

Click to enlarge

Driving new value

Smart connected products offer new opportunities by:

- Improving operations and lowering costs
- Creating new solutions and business models
- Advancing environmental sustainability
- Scaling institutional expertise
- Delivering better customer engagement and experiences

Creating new businesses

- Physical equipment vendors are reimagining customer service by capturing millions of machine measurements a day in the field.
- Providers of industrial vehicles and logistics systems are prototyping driverless vehicles equipped with the latest sensor and scanning technology. The solutions connect to ERP and warehouse management systems, enabling new business models like logistics operations and transport as a service.
- Industrial automation companies are seamlessly and cost-effectively connecting sensor technology with SAP Leonardo solutions to truly become the eyes and ears of industrial machinery and equipment around the world.
- Other companies are connecting industrial assets to the cloud so customers can monitor and optimize their processes proactively. As a result, the companies are generating new revenue streams by selling services instead of products.

Leveraging the Ecosystem

Delivering end-to-end value creation

IM&C companies do not exist in isolation. They belong to an ecosystem that includes owners of the resources they use, the companies exploring those resources, and organizations that process the resources to create basic products. The question is how the participants in this ecosystem can increase competitiveness by sharing the risks and better aligning the supply chain with commodity market trends.

In any ecosystem, value can be captured in one of three ways: directly between partners by transactions within the ecosystem, by an orchestrator that deals directly with consumers, or by using a model that combines the two. The successful organizations will be those that are clear about their intentions, actions, and relationships.

Successful companies:

Change their organizational mind-set by identifying and exploiting pockets of potential value creation while leveraging capabilities and synergies across the ecosystem. Leading organizations stay ahead by continuously testing the possibilities of value creation in entirely different ways.

Build the right connections by understanding their capabilities and how to realize synergies with ecosystem partners. They find partners that can further their objectives, and they decide how they want to partner.

Make their organization more agile by evolving with their ecosystems and changing their roles as circumstances dictate. This requires new technology that empowers dynamic new business models, consumer interactions, and organizational flexibility.

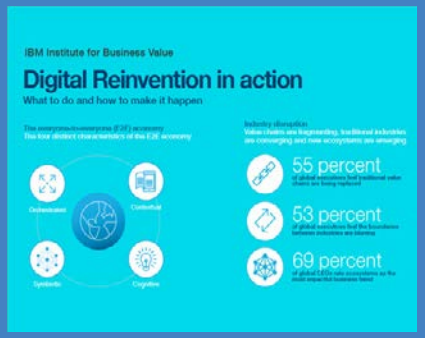
69%

Of global CEOs rate ecosystems as the most impactful business trend

Source: “Digital reinvention in action. What to do and how to make it happen," IBM Institute for Business Value, 2016.

Read the report

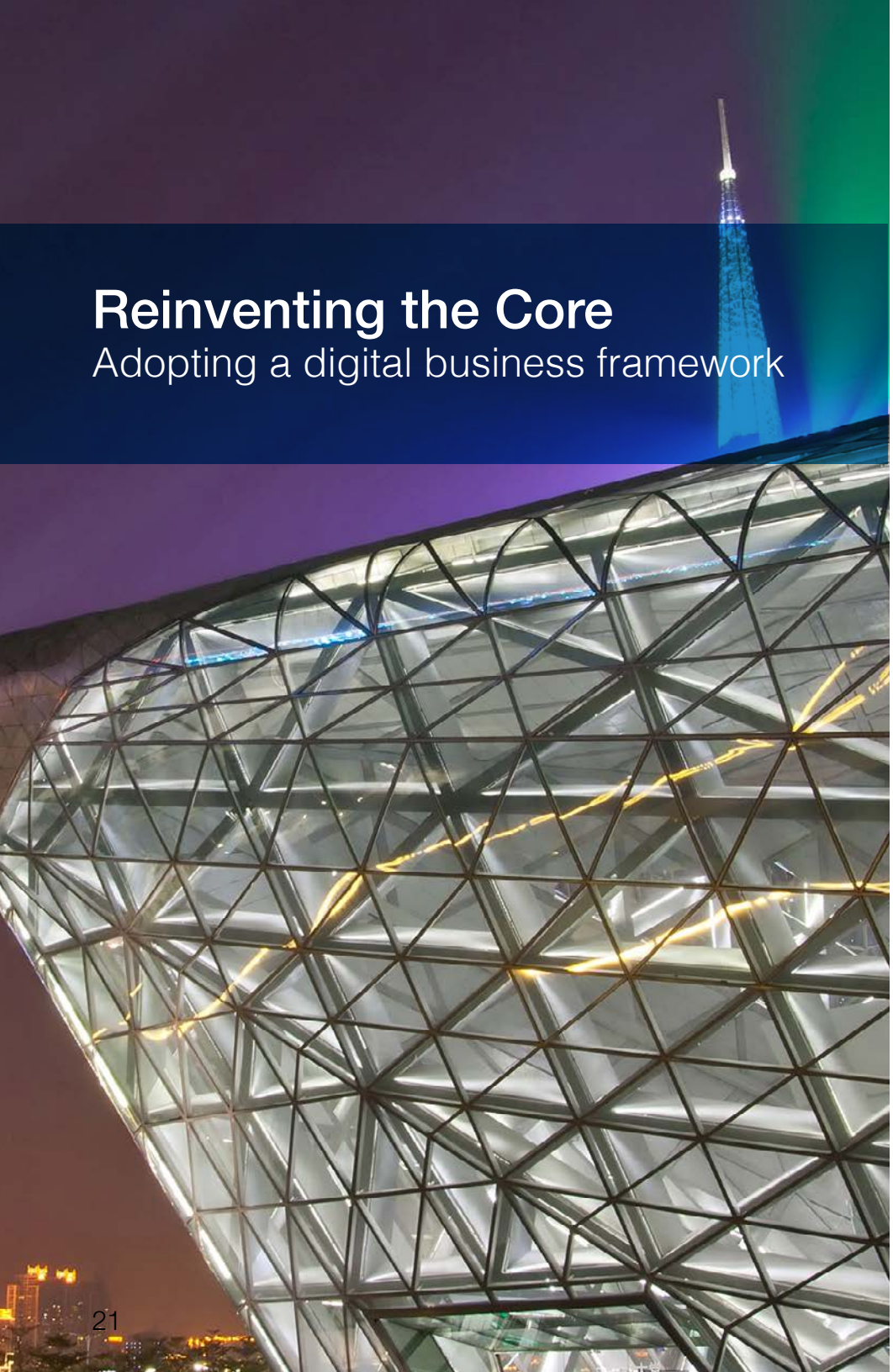
Learn more



Discover digital reinvention in action and how to make it happen in your organization.

Read the research

Ecosystems exist because participants can deliver more value acting together within the ecosystem than acting alone.



Reinventing the Core

Adopting a digital business framework

To successfully transform their businesses, IM&C companies need an IT architecture that provides both stability and long-term reliability for the core enterprise processes. At the same time, the architecture needs to provide the flexibility to change and include new functionality as the business environment evolves.

This concept, often referred to as “bi-modal IT,” is brought to life through a digital business framework that covers all the core processes of an industrial manufacturer.

The framework allows manufacturers to work smarter, faster, and simpler by connecting transactions with powerful cognitive analytics. Advanced in-memory computing allows companies to run the business live, in real time. It reduces total cost of ownership significantly, which frees up funds for additional infrastructure investments.

The digital business framework eliminates poorly integrated value chain systems operating on disparate data sets. Industrial manufacturers can now run more simply by leveraging one version of the truth across the entire company.

Accessing solutions to run core business processes has to be simple. With SAP solutions, industrial manufacturers can choose to deploy on premise, in the cloud, or a hybrid of the two. At the same time, the satisfying user experience the solutions deliver is key to accepting digital change, as it helps drive user adoption, engagement, and productivity.

SAP S/4HANA®

At the heart of SAP software solutions is SAP S/4HANA®, a next-generation business suite designed for the digital age. The software covers all industrial manufacturing business processes.

By adopting it, companies gain the benefits of:

- Real-time optimization of business-based changes that massively improve how they work, do business, and organize
- The power of prediction and simulation that enables every employee to use real-time business insights to drive better decisions, improve productivity, and increase profitability
- Integration with IBM's Watson, a cognitive platform, to optimize business models; better understand what is happening and what is likely to occur; and learn how to profit from this insight through informed decision making on what to do next

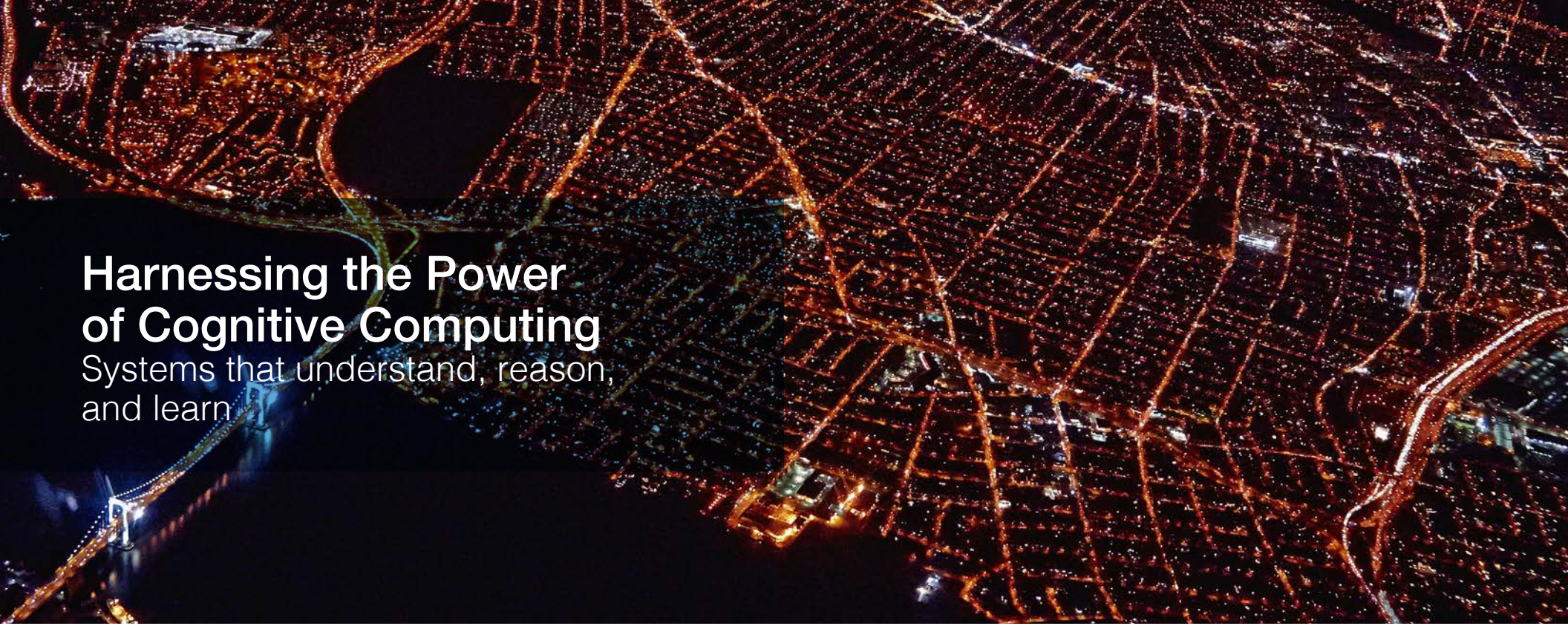
Cloud platform

In addition, SAP offers SAP Cloud Platform, which provides in-memory database and application services that enable companies to rapidly develop, extend, and run cloud business applications.

Learn more

Find out what IM&C companies need to do to win in the digital era.

Watch the video



Harnessing the Power of Cognitive Computing

Systems that understand, reason, and learn

For several decades, IBM and SAP have been digitalizing and building networks to connect the world around us. For example, the social networks have created an entirely new channel of information running in parallel to all other business data flows.

And with the Internet of Things, we're connecting devices, applying sensors and instruments to all of our applications, products, operations, and processes to create connected cars, satellites, supply chains, and factories.

These sensors and instruments are the elements of a supply chain that is driving cognitive businesses and generating the data that becomes information once analytics are applied. But we've reached an inflection point at which the sheer volume of information generated is so vast that we no longer have the ability to use it productively.

Cognitive systems change this dynamic. They present humans with the ability to extend their expertise and knowledge gleaned from that vast amount of information. As such, these systems help forge a new relationship between man and machine. And they have three capabilities that differentiate them from traditionally programmed computing systems.

Understanding

Cognitive systems have the ability to navigate the complexities of human speech, understanding the idiosyncrasies and colloquialisms and knowing the ways we express ourselves to one another. They can also put the content they receive into context.

Reasoning

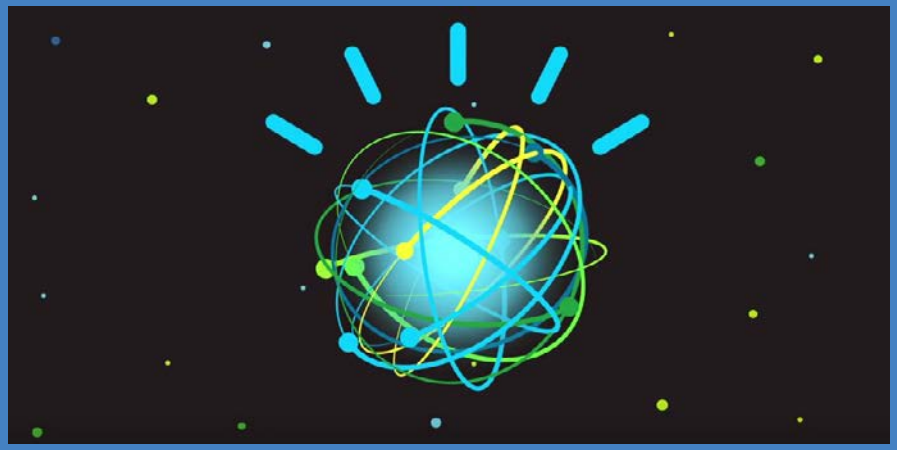
There are very few times where we, as humans, are presented with useful information without having to infer from the data what we need to meet our objectives. In doing so, we are reasoning with a purpose – often generating a hypothesis and then proving the theory. This is something cognitive systems can also do.

Learning

Cognitive systems are fundamentally different from traditional computational computers, which are hard-coded with rules and logic, following a decision-tree format. Cognitive systems get progressively smarter with each outcome, action, iteration, and new piece of information.

Together, these three capabilities allow cognitive systems to understand data – structured and unstructured, text-based, or sensory – in context and meaning, at astonishing speeds and volumes. Cognitive systems enable us to view the world differently and make better decisions.

Learn more



Discover how cognitive systems can be developed that have similar thought processes to a human.

Watch the video

Find out how cognitive computing and connected manufacturing help companies on their transformation journey.

View the video

Use Cases and Solutions

Cognitive computing for the IM&C industry

The combination of IBM cognitive computing and SAP technology provides IM&C companies with a huge opportunity to reimagine how their business operates and to develop an agile organization and IT environment that can adapt to changing business conditions. Here are just some of the applications that are available.

IoT for Uptime

Analyzes sensor data throughout a plant and performs trade-off analytics to determine the best course of action.

Learn more

Smart Materials Planning

Leverages machine learning algorithms to correct errors in master data before they have an impact on the bottom line.

Learn more

Find and Fix

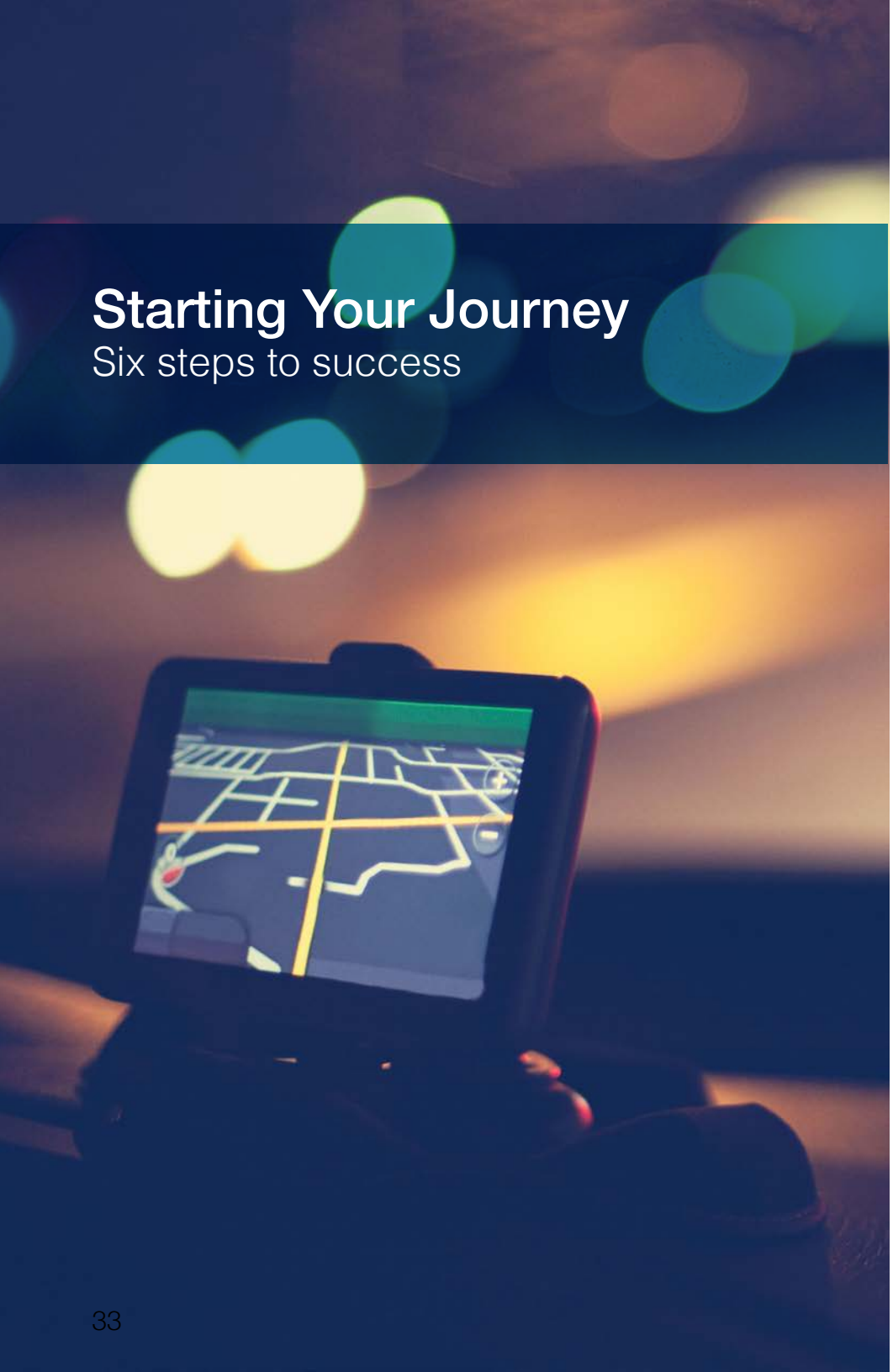
Allows technicians to use mobile devices to select jobs by priority and proximity and easily find the resources they need to complete them.

Learn more

Heads Up Weather

Generates automated, proactive notifications to customers and employees based on incoming weather data.

Learn more



Starting Your Journey

Six steps to success

How can your business begin the digital cognitive journey? Here are six steps you can take to unleash the power of SAP solutions and IBM's cognitive technologies.

Use design thinking with "customer first" in mind

Strategies and designs need to be structured around the customer first, not the technology or the software's capabilities. Design thinking focuses on building experiences that customers embrace.

Develop a digital cognitive strategy

Look at your products, services, processes, and operations, and determine which should be digital and cognitive.

Extend cognitive computing with analytics

Understanding is key in the cognitive era. Make sure you can collect and curate the right data – structured and unstructured – to support your vision.

Move to a cognitive cloud

Make sure your business can get everything possible out of your cloud services, your data, and your cognitive applications.

Build a cognitive infrastructure

Your cognitive-enabled business needs an IT infrastructure designed for cognitive workloads. Your infrastructure must be able to handle the data and analytics required by cognitive solutions.

Adopt security for a cognitive business

When everything is connected, everything is vulnerable. Make sure everything you do, every bit of data, and every transaction is secure.

Contact Us

For additional information about how we can help you, please visit:

IBM Consulting Services
SAP Cloud Platform
Digital Transformation with IBM and SAP

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"Digital Manufacturing – Powering the Fourth Industrial Revolution"

"Transform Industrial Machinery and Components with SAP S/4HANA"

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