



# Becoming A Future-Forward Enterprise

*How to disrupt your industry with confidence*

A Frost & Sullivan White Paper

In partnership with



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## HOW TO DISRUPT YOUR INDUSTRY WITH CONFIDENCE

Now more than ever, companies are finding themselves awash with data. From sensors across the manufacturing floor to gathering data and insights from the field to understanding supplier trends, needs, and conditions, companies are beginning to weave together the threads to create a powerful, data-driven ecosystem. Companies now also need to contend with revolutionary advances such as artificial intelligence and blockchain, which bring powerful potential, as well as complexity and apprehension, to data strategy.

The use of information and insights to gain a business advantage has been leveraged since the dawn of commerce. The term “knowledge is power,” credited to Francis Bacon’s writings from the late 16th century, is undoubtedly a significantly older realization. While the general benefit of having more information, insights, and knowledge has been with businesses for millennia, data’s rapid rise to being a critical company asset has taken less than a decade. The sheer volume of data now being generated is all but beyond comprehension; according to Frost & Sullivan analysis, 2.5 exabytes of data are being created globally on a daily basis. But, as Bacon may have understood, it is the use of data that makes it a make-or-break factor for having a thriving business.

Data is now so critical across all economic sectors that it has moved from being a tool to an asset—one that needs to be maintained, secured, and used as effectively as possible. As with any valuable asset, companies need to ensure they are getting the most productivity out of their data and the best ROI. They also need to understand how that asset can be applied across multiple parts of the business; reducing costs, improving customer experiences, and creating more efficient supply chains are only some of the broad categories that the leaders in any industry need to heed.

While data can be looked at as an asset in terms of ensuring it is highly leveraged, it is not a static asset, such as a building or piece of equipment. Data collection has evolved from rudimentary information on equipment status to helping plan and manage an entire business ecosystem. Data can now go well beyond improving internal and external business processes to actually being shared and used across the supply chain. As noted in the chart below, this process progresses along many steps.

**Equipment Level** At the equipment level, sensors help detect and report on equipment operations and failures. This information can alert an operator of any breakages and help plan maintenance. With enough data, time and analytics, it can also help an operator or data solution provider increase equipment performance, optimize energy usage, and create maintenance schedules that are more predictive than routine.

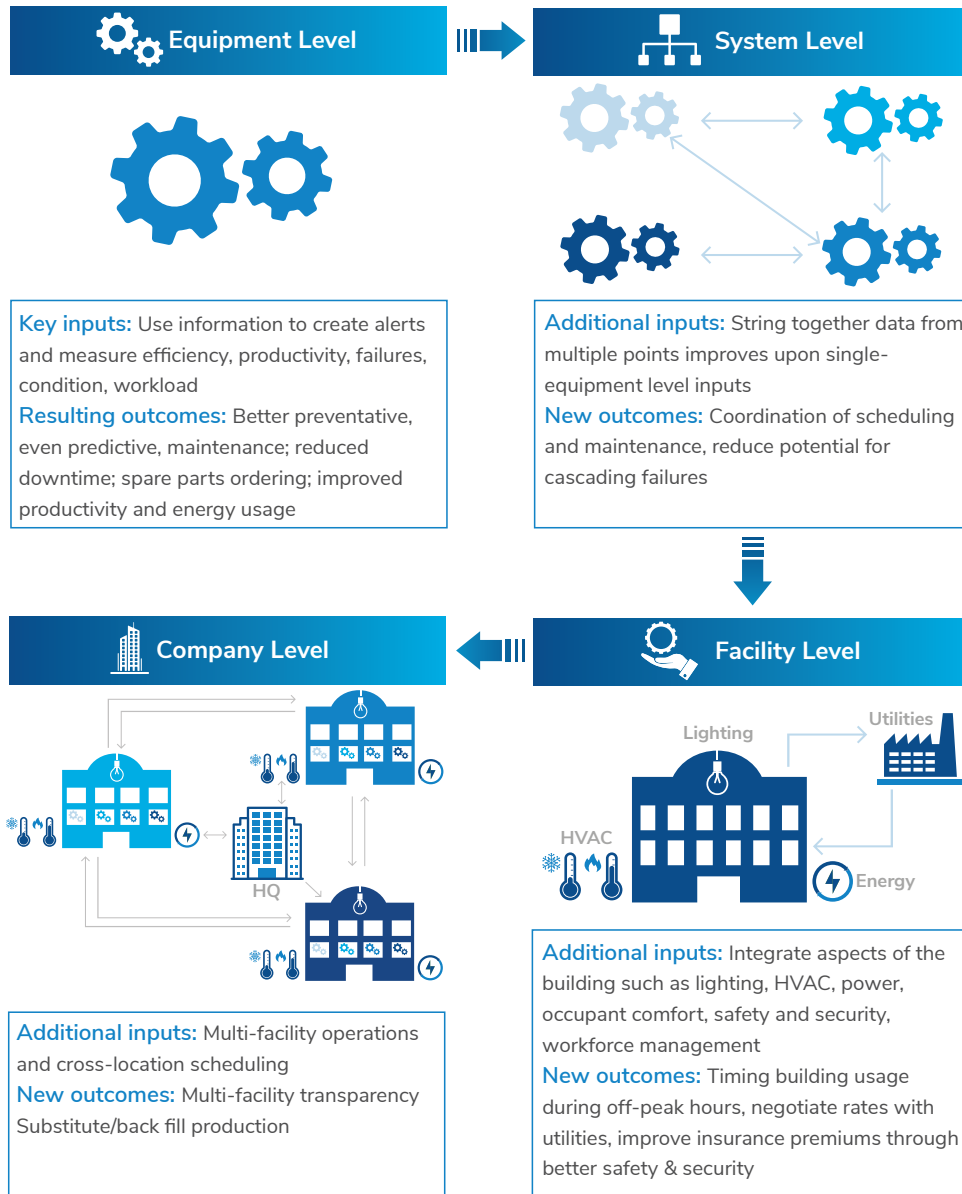
**System Level** By coordinating several pieces of equipment or a larger system, such as an assembly line within a manufacturing plant, the increase in data provided can greatly augment the maintenance and operation benefits seen on one piece of equipment. At a system level, it can also reduce bottlenecks and prevent cascading repercussions from equipment failure.

**Facility/Building Level** Integrating building systems with the activities within a building, whether manufacturing, office, retail, warehousing or another application, is much more complex but the benefits often outweigh the coordination of such systems. For example, businesses can be incentivized to match their activities to save energy, such as shifting production to off-peak hours or scheduling meetings in clusters of rooms that can utilize the same HVAC and lighting systems, leaving less-used areas of a building essentially dormant. Safety and security systems can also be tied into occupancy levels, as can overall worker productivity be related to occupant comfort.

**Company Level** When looking at an entire company, many additional functions and benefits can be recognized through increased data points and analysis. Automated cross-location scheduling can help improve product lead times by bringing products closer to distribution and customers more accurately. Delays in shipping or manufacturing bottlenecks can be alleviated more quickly. At a corporate level, better insurance premiums can be negotiated if a company can show how its production and safety risks have decreased thanks to enterprise-wide data systems and platforms.

**Ecosystem Level** The most complex system to envision, much less implement, is one that goes beyond the company to incorporate information from the value chain. Vendors can help alert a company to material shortages. Transportation partners can provide faster and more accurate details on component deliveries upstream or product distribution downstream. Customer information can help improve product specs from real-time metrics of equipment in the field, enable automatic re-ordering, and help create new revenue streams such as service options. Even more tangential information such as weather, geopolitical issues, and social media can be captured and integrated into relevant areas such as estimates on shipping times or changes to sales and marketing approaches.

The chart below introduces key ways that data can be collected, shared, and utilized:



Many companies are now realizing the value of data utilization and, in particular, how they are connected through the Internet of Things (IoT). Frost & Sullivan research calculates that the market for big data analytics will grow from \$8.7 billion in 2017 to over \$40 billion by 2023.

It is of little surprise that this shift is affecting markets as diverse as entertainment, government, telecommunications, healthcare, heavy industry and tech. What is interesting, however, is that despite broad global agreement on the value of IoT and data, some markets are struggling to fulfill their data destiny. For example, manufacturing only accounted for 6.2% of the market in 2017, despite the sector being over 15% of the global economy. This highlights an opportunity for industry to build innovation in processes inside and outside of factories. Industries can use

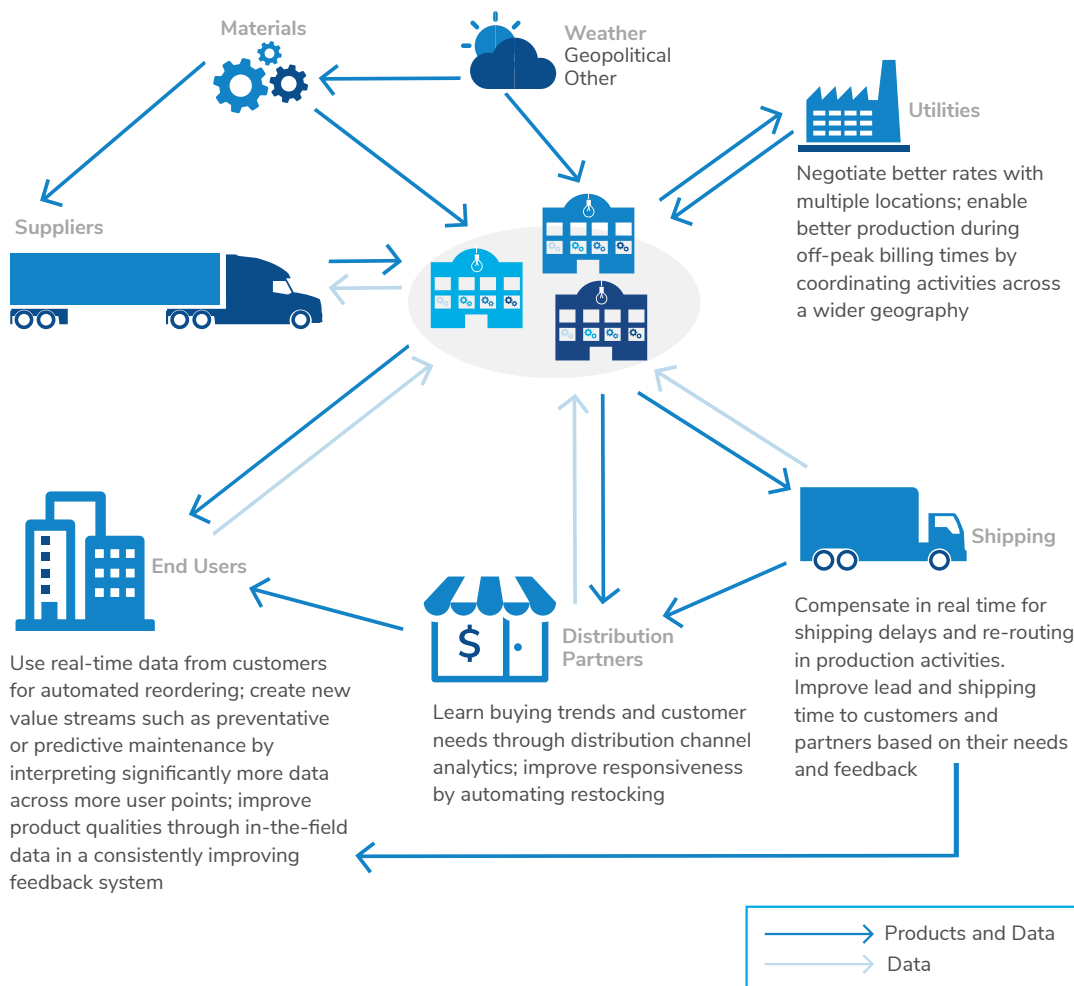
these innovations to become more efficient and create new value-added revenue streams. We are now seeing an inflection point for companies across industries—whether in automotive, electronics, manufacturing, oil and gas or aerospace sectors—to become “future-forward” innovators in their space, while the rest of the industry lags behind.

A future-forward enterprise can develop new ways of doing business, even creating new markets, well in advance of the rest of the industry. A future-forward enterprise will find new value propositions and business models in places where they had previously sought cost savings. A future-forward enterprise can provide a higher level of service to its customers, which can be more customized, appropriate, and effective, while still delivering better margins to the supplier. A future-forward enterprise can realize this beneficial cycle of higher value for the customer and better profitability for itself to build momentum that will continue to propel it beyond the competition. In this regard, moving a business along the IoT journey can become a self-funding process rather than a long-term expense.

This can seem somewhat esoteric, and it helps to look at real-world examples of how data across the value chain had a direct and tangible benefit on the supplier and its ecosystem, as noted in the example below.

### FULL ECOSYSTEM LEVEL WITH FEEDBACK LOOPS

Incorporate third-party information—cost of materials, weather delays, political disruption, social media feedback—into shipping, production, expectations on components and materials, features and functions, reducing bottlenecks and lead times, even creating new services.



## CONNECTING ACROSS THE VALUE CHAIN IN THE OIL & GAS INDUSTRY

A global oil and gas company wanted to better utilize its data and related analytics to address a key challenge—it needed to boost its razor-thin profit margins. This could be done by connecting with the final end users of their products.

It looked at one of its divisions that extracted and processed oil, gas and diesel, which was then sold to a distributor. However, the distributor was not the final end user, and the O&G company wanted to connect directly with the end user to help expand margins. The O&G company needed tools and expertise to connect these dots and create a cohesive, actionable plan to improve its business across these broad areas.

The O&G company engaged IBM on both the strategy and implementation of a data-centric solution. A key client of the O&G company, a global container shipping company, outfitted its vessels' engines with sensors to monitor performance at a highly sophisticated level. This information was gathered, analyzed and interpreted through a customized data platform. The O&G company bought the data from this client and was able to use it to understand how its lubricants affected the performance of the ships' engines, which then was fed back to improve the lubricants and overall process.

The shipping company now recognizes a new revenue stream by selling the data back to the oil & gas company and is developing a partnership with a vendor that helps ensure continuous improvement in lubricants that can help extend the life and improve the efficiency of its engines.

The O&G company gained the desired insights from the distributor's customers—the final end users. These insights will help improve products and solutions, create better margins for the O&G company, and deliver more value to the final end user.

This example highlights how a **major industrial market participant can take a product and distribution system that has changed little in the last century and quickly and easily modernize it, leapfrogging the competition.** The industrial space, in particular, is well positioned to catch up to other industries as it already has an immense amount of data being tracked and stored but is well behind in analysis and action. All industrial sector companies should be targeting equipment- and system-level solutions for IoT improvements and many have. But those that will gain exponential advantages in the market will be companies that leverage these advances for company, and even ecosystem-wide, IoT solutions.

## CRITICALITY OF ADVANCED TECHNOLOGIES FOR THE CONNECTED EXPERIENCE

For a business to be a leader in its industry, its customers need a tangible way to differentiate it from the competition. This differentiation needs to go beyond better product specifications or more appealing prices: regardless of industry, people still sell to people. And people today want solutions that are relevant, transportable, and available on demand. They want service that keeps them connected and is customized to their needs. Almost every business today needs to sell the customer experience as part of its product and service, and that experience needs to be a connected experience.

Today's connected experience goes beyond an abstract sense of relationship to one that has a very real backbone tied to data and automation. Using information from the Internet of Things (IoT) intelligently means utilizing the most advanced ways to make data meaningful to the user and situation. Companies can use insights from IoT and help them learn and evolve through artificial intelligence (AI). In fact, in an advanced and prosperous system, AI becomes the guiding beacon under which other important solutions, such as blockchain, drive and support activities to the desired outcomes. Put another way, AI is the umbrella solution, within which necessary IoT data can be secured, transferred, stored and monetized by blockchain-related applications.

For example, companies can create advanced connected experiences such as the following:

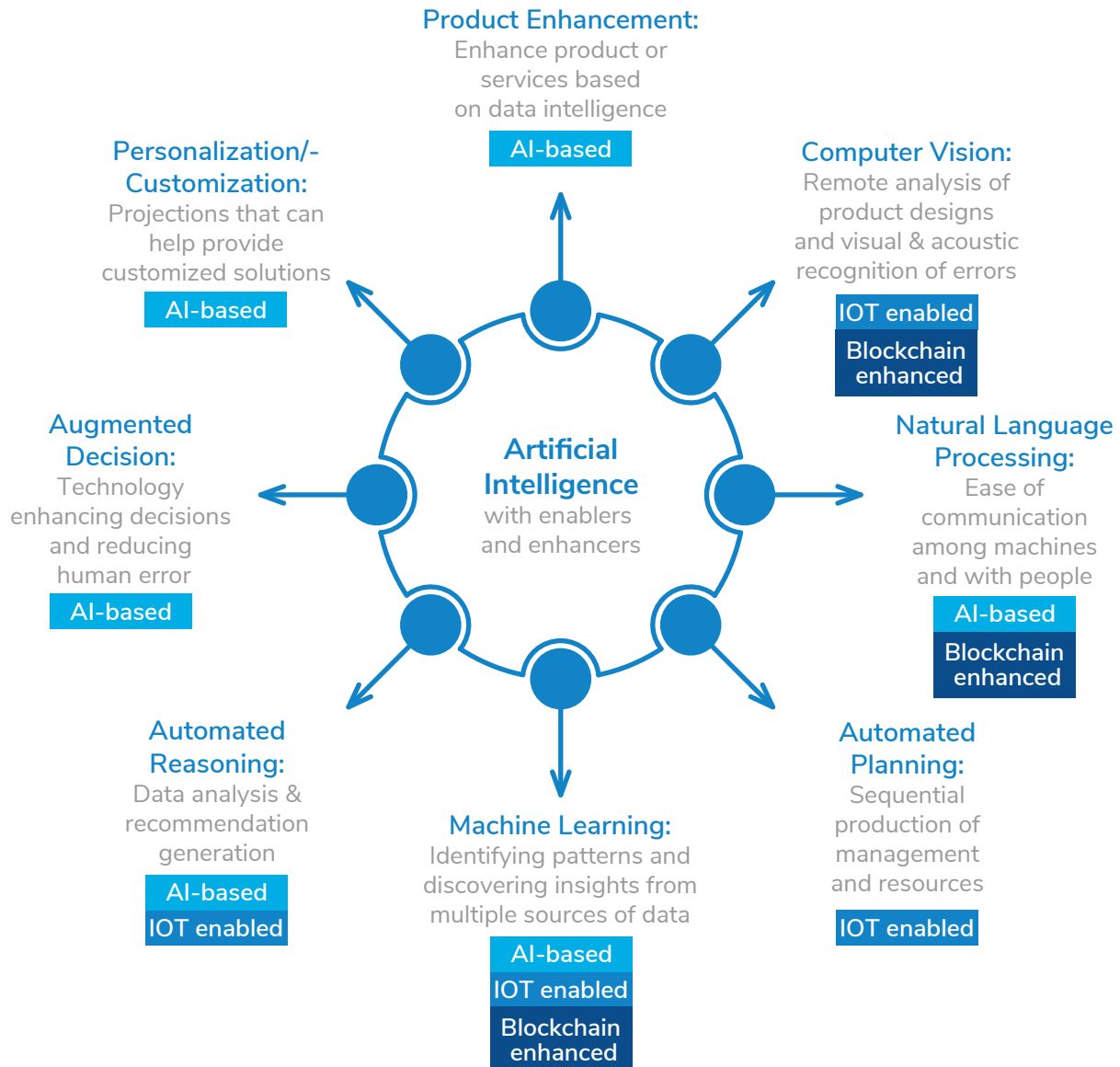
Operation Efficiency	Design industry leading alert systems and dashboards that evolve to operator needs for manufacturing or building operations
	Increase manufacturing efficiency with IoT-based insights for tracking materials, production line equipment health and operations, and integrating field data into product design improvements
Customer Service	Train service personnel and customers more quickly by using systems that learn the habits of the user, and engage experiential ways of learning
	Shorten the sales cycle by enabling more intuitive ways to present and communicate the value proposition to the customer through compelling formats of content
New Revenue Streams	Develop new revenue streams, including the following examples: leveraging IoT-based data to create preventative maintenance service solutions for customer equipment, using blockchain to help track outcomes for performance contracting, or integrating AI into self-healing edge systems



## AI TRANSFORMING INDUSTRY

AI has immense potential that is only beginning to be leveraged. Unlike the realms of high tech or healthcare, traditional industrial markets—aerospace, oil & gas, and manufacturing of electronics, automotive, and other industrial products—lag far behind. However, as noted in Chart 1, AI has a role across the industrial sphere.

### AI ACROSS THE ENTERPRISE



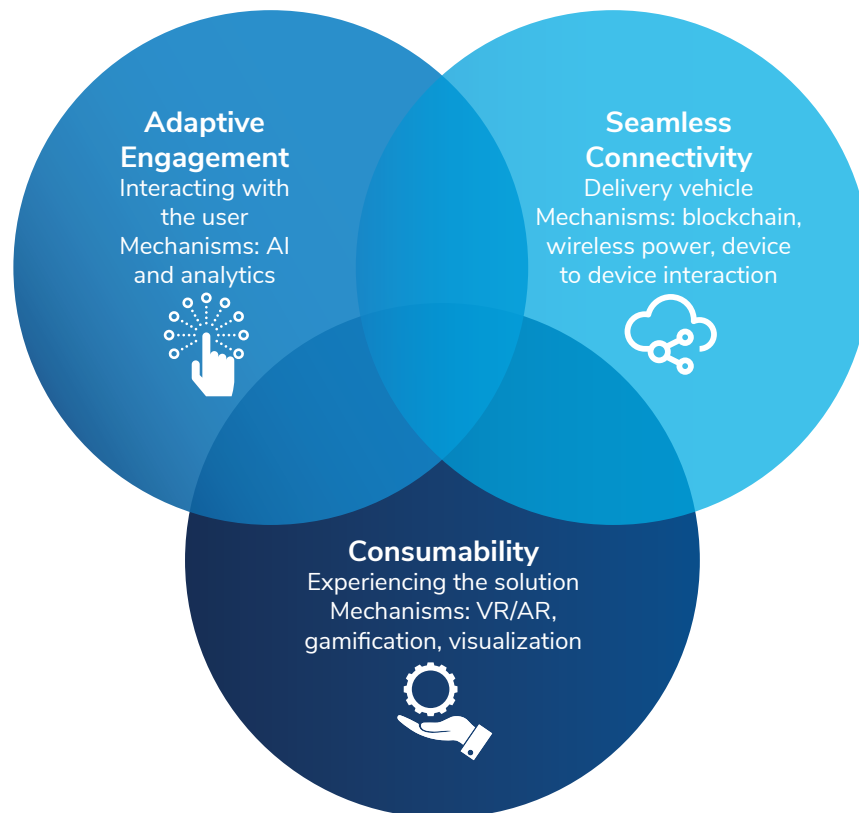
## LEVERAGING AI FOR THE CONNECTED EXPERIENCE

The connected experience is now critical to propel a business into being a market leader, a future-forward enterprise; likewise, AI is critical for delivering the dynamic interactivity of a truly connected experience. This experience has three main components: consumability, active engagement, and seamless connectivity.

**Consumability:** Consumability refers to the experiential consumption of insights and information in a manner that is engaging, often collaborative, and “sticky.” To make goods and services easily consumable, employ immersive technologies such as augmented or virtual reality, gamification, visualization and voice cognition technologies.

**Adaptive Engagement:** Adaptive engagement is the facet of the solution in which the system learns and adapts with the user, driven by intelligent platforms running highly sophisticated analytics. AI is critical in this step as it drives the evolutionary and dynamic aspect of the connected experience: adaptive engagement is what makes consumable goods and services fresh and engaging.

**Seamless Connectivity:** Seamless connectivity is the delivery vehicle through which the connected experience is provided. It refers to capturing the information that feeds into the system, through next-generation sensing and edge computing, as well as the mechanism employed to deliver the experience, which could include blockchain and wireless power. Technologies that can provide both levels of interaction, such as device-to-device communications, are also captured in this category.



## TAKING THE CONNECTED EXPERIENCE INTO THE ECOSYSTEM

Companies can utilize the connected experience to elevate it into a keystone ecosystem builder. An ecosystem builder stretches the advantages of IoT beyond the boundaries of its own enterprise and even beyond its industry. Industry leaders have often found inspiration and influence beyond their direct markets. Solutions such as blockchain and AI can give companies even more leverage in becoming the keystone of their ecosystem. These smart, secure solutions make it easier for enterprises to collaborate, and companies that want to be a keystone for their industry will help bring together myriad partners. Value chain participants, data providers, suppliers, manufacturers, and other partners can work together on customer-centric value propositions that would previously be too complex to execute.

### KEystone OF THEIR ECOSYSTEM



For example, IBM and a global leader in connected products and solutions is partnering to create voice-enabled AI rooms that deliver more natural and intuitive connected experiences for customers. These spaces combine IBM's technology with the company's soundbars to create interactive rooms that allow people to control their in-room subsystems and discover businesses near their location with natural language

interactions. The technology is being piloted by hospital patients, who are able to interact with the company's in-room speakers that are connected to the IBM Watson IoT Platform. This allows them to operate lights and temperature settings, and ask questions about the hospital facilities or background information on physicians.

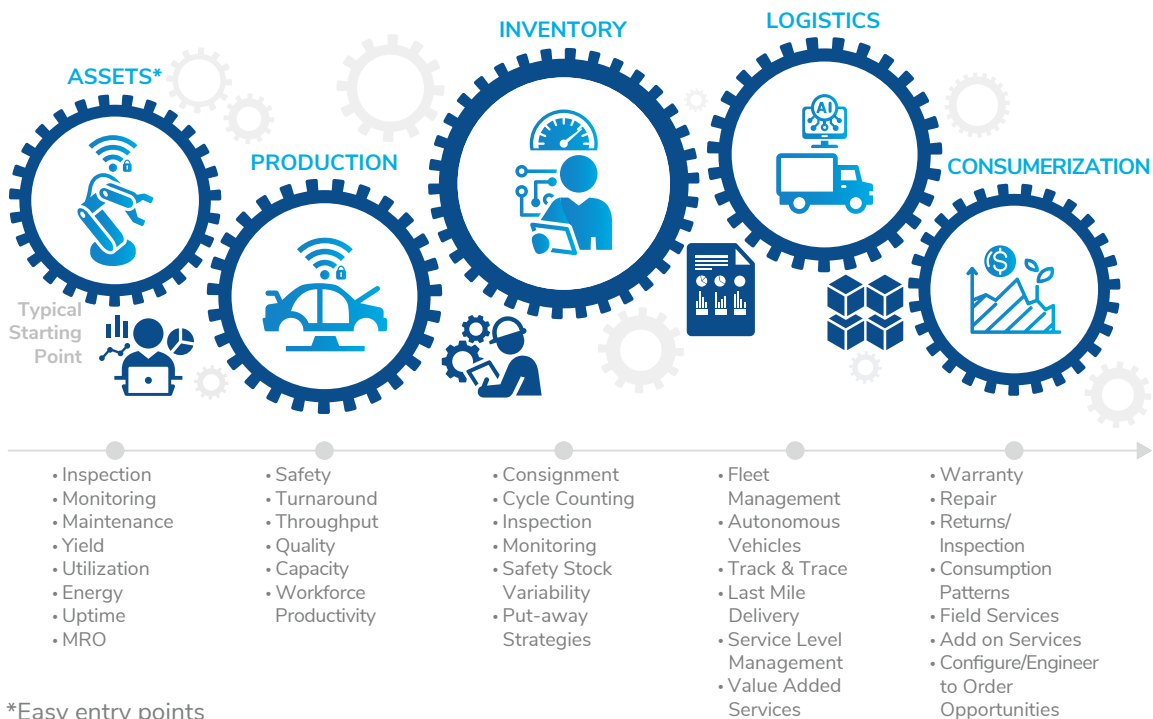


For the vast majority of companies, it will be impossible to develop these connected experiences on their own. However, with the right partner, companies can transition from smart solutions to truly connected, industry-leading ones that provide a significant advantage. Providing customers, partners, and even tangential markets with connected experience-driven solutions can help elevate a company from being merely IoT proficient to being a future-forward enterprise.

## SELF-FUNDING A FUTURE-FORWARD ENTERPRISE

No enterprise can afford to miss the opportunity to become a future-forward enterprise. However, the fear of a costly misstep can be paralyzing. Businesses can mitigate these challenges by leveraging a long-term, self-funding model that helps them recoup return on investment (ROI) along the way. This enables businesses to build upon their advances over time with considerably less risk.

### A SELF-FUNDING PROCESS FOR A FUTURE-FORWARD ENTERPRISE



Examples of self funding models from industry:



Leading global offshore drilling company aligned 5 year O&M strategy with a complete integrated offering

- 17 disparate systems became one cloud-based enterprise asset management system managing remote, disconnected assets
- Leading IoT platform and analytics dashboard enabled data from disconnected, remote environments to coalesce into clear KPI's from drilling systems on ships
- Annual benefits achieved equaled over \$28 million in asset management and \$12 million in operations.



Major global aluminum manufacturer reduced MRO inventory by \$23M in one year, avoided \$5 million in repairable costs. Savings went to innovations and projects for additional after market repair services and safety



A US energy laboratory reduced 10+ disparate service and asset management systems to one, unified platform to manage 40,000 assets plus related processes and policies

- Provides visibility to assets usage and condition
- Resulted in retiring a dozen point solutions and deferred new system purchases, better use of existing resources, and accurately forecast future demand



US-based multinational energy company reduced MRO working capital 10% in 6 months at one site, and also lowered yearly inventory levels 10%+, 3 years in a row. Savings at one site funded further such programs globally saving 10s of millions.

First, the business needs to identify its overall goals in creating its strategic plan toward a future-forward enterprise. In prioritizing these steps, businesses will typically look to those that can start recognizing cost savings or new revenue streams as soon as possible. Doing this successfully enables a business to apply those savings and/or revenues toward the costs of modernization and help fund subsequent investments.

While many businesses will understand the value of this, its actual realization is difficult: which steps will perform better than others? Which actions, even with a high ROI, might be dependent upon other activities first? How does a company balance being an innovative leader with the risk of an un-tested solution?

In heavy industry, which has lagged behind much of the economy in the implementation of digital strategies, it is critical to either be a first adopter or a fast follower. A first adopter's ability to bring new solutions to market before the competition allows it to capitalize on a new idea and be viewed as an innovator in the space. However, this position is not without risk, especially in industrial markets that tend to be more conservative than, for example, high tech or retail. Fast followers can avoid the missteps of the first adopters while still gaining the benefits and status of a modern market leader.

Creating new revenue streams and/or cutting costs can help fund an enterprises' progression to being a future-forward business. For example:

- Creating a new value proposition, such as a new service based on more accurate data collection and improved analytics. A future-forward enterprise may develop a solution driven by artificial intelligence (AI) and secured with blockchain;
- Leveraging value chains and distribution networks to reduce costs of materials and components, reduce lead times, improve transportation times and costs, and create premier (higher cost/better value) offerings to customers; and
- Finding cost savings in production, manufacturing, sales and marketing, and most any other major aspects of the enterprise through IoT enabled improvements.

Finding ROI along the journey to digitization may seem like a difficult proposition, but industry is starting to see beacons of change by early adopters and fast followers.

### LOGISTICS PROVIDER SAVES COSTS AND IMPROVES EFFICIENCY FOR THE AUTOMOTIVE INDUSTRY

The automotive industry is encountering growing challenges across the market. The industry generally enjoys comfortable sales and operating margins; however, the ROI on capital investment is below average compared to other industries. The automotive industry is also in a state of flux: emerging competitors,

the growth of electric and autonomous vehicles, and changing ownership trends driven by new business models such as car- and ride-sharing, are all putting downward pressure on capital investments. Further compounding the issue is an antiquated, paper-based process in the downstream supply chain from when a vehicle leaves the factory until it reaches the end user.

A European logistics provider, in collaboration with IBM, was able to develop a future-forward solution that modernizes and streamlines the downstream supply chain. Because it is blockchain-based, the system is secure and also transparent to all parties along the supply chain, such as the factory, shipping provider, over-ground transport supplier, dealer and the OEM's own organization. The solution leveraged the existing and internationally recognized vehicle identification number (VIN) system, so implementation was relatively rapid as well. The logistics business's customer, a major automotive OEM, was able to recognize double-digit savings in a relatively short time frame.

Thanks to the fast implementation and cost savings, the solution can help OEMs fund further investments in technological advances, modernization, and increased production. Along with reducing inefficient and potentially inaccurate paperwork—which by itself brings considerable savings—the blockchain-based solution improves supply chain visibility, reduces fraud, and can even help accelerate the process from factory to driver.

The benefits are clear for the OEM, as are the drawbacks of lagging in modernizing one's supply chain. Given the choice, it is unlikely that any company would want to continue an inefficient and imprecise paper-based system across companies and continents. Other drawbacks of not moving toward a future-forward state include:

- Being too late to market with new, more competitive solutions;
- Likewise, being less responsive to customer feedback and interactions when compared to competitors;
- Having higher costs that reduce margins and keep prices higher than the competition; and
- Exposing the enterprise, value chains and even customers to data security breaches and concerns.

Becoming a future-forward enterprise can be a daunting proposition for any company. Finding a way to fund the process through early wins in new revenues or lower costs creates a much smoother process and an easier sell to both shareholders and key stakeholders within the enterprise. Having a strong partner with industry experience can help pave this road by identifying solutions that already show promise in an industry while helping the solution provider retain their position as an innovator.

## SIX COMPETENCIES TO BEING A FUTURE-FORWARD ENTERPRISE

As many businesses in the industrial space are still trying to find their way toward becoming a future-forward enterprise, being a leader or fast follower will be critical to avert obsolescence.

Being a future-forward enterprise means moving beyond a typical IoT journey and becoming a business that not only prepares for the future but helps write it. Businesses becoming a future-forward enterprise need to build new competencies to obtain the best results and returns from their actions. There are six key competencies that are necessary to create a well-rounded, progressive industry leader:



### ONE: EXPERIENCING THE CONSUMER EXPERIENCE

Bring together people, companies, technologies and products to establish a strong feedback loop with customers and partners to continuously optimize the customer experience. For example, help establish consortia of companies or events for similar disciplines across different vertical industries. Or connect different equipment and systems from aggregated customer experiences in the field and use that intelligence to modify and update the design and manufacturing process.



### TWO: FORTIFYING BRAND EQUITY

Brand equity begins before the design process by engaging in an open and collaborative process with customers, partners, employees and industry thought leaders. In designing the brand itself, thought should be given to its ability to effectively communicate the value proposition as much as how attractive and memorable it is. Post-creation, brand equity then expands into using the brand to help foster customer loyalty and community.



### THREE: ESTABLISHING A DYNAMIC RESPONSE TEAM

One critical component of a digital transformation strategy is the potential value it brings to the workforce. A holistic approach that incorporates company culture helps move a company from a good strategy to a truly future-forward enterprise. For example, explore new business models by infusing machine learning throughout execution and decision making or commit to new operating procedures by establishing work teams with diverse backgrounds. This category requires an agile mindset and team culture to drive new ways of working.





## FOUR: ASSIMILATING AUTOMATION

Assimilating automation goes beyond embracing and leveraging it. It means cultivating a mindset where automation is the default state. Not everything can be automated but starting with the presumption that automation should be front and center helps ensure the rest of the process runs smoothly and efficiently. Understanding how to define automation is critical as well. Pattern recognition, facial and voice recognition, AI and machine-to-machine interaction are just a few of the ways that automation becomes ubiquitous and highly valuable.



## FIVE: COLLABORATING AND INTERACTING WITH TECHNOLOGY

At a broader level than assimilating automation comes an entire cultural shift in how an enterprise views technology. This step revolves largely around seizing the opportunity for new technologies and seeing opportunities for discoveries beyond the lab. It continuously strives to find technical solutions that can address challenges around efficiency, safety, accuracy or other human-centric issues.



## SIX: RESHAPING THE COMPETITIVE LANDSCAPE

Competition today is about disrupting markets and fending off disruption. Big data and AI can play a critical role in keeping a business's edge and can aid in everything from keeping up with market trends to guarding against security breaches. Strong and secure cloud functions can give a business better access to customer insights and connections, further strengthening its foundation against the competition.

### Experiencing the consumer experience

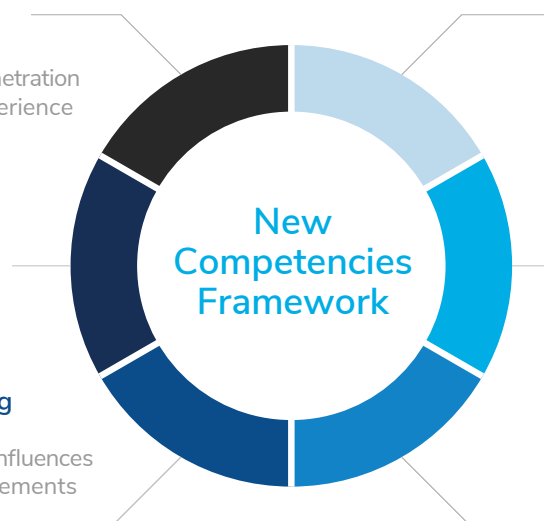
- Relate to diverse consumers
- Assimilate insights from consumerization & market penetration
- Advance user/customer experience

### Reshaping competitive landscapes

- Understand and respond to the disruption of industries & markets
- Secure environments/ foresee threats

### Collaborating & Interacting with technology

- Incorporate new technology influences
- Promote technology advancements
- Adopt scientific thinking & discovery culture
- Embrace human to machine interaction



### Fortifying brand equity

- Foster an open environment
- Know what's core to the business
- Design as a brand
- Design as a culture

### Establishing a dynamic response team

- Explore new operating models
- Commit to new operating procedures
- Integrate partners & embrace the sharing economy
- Evolve to a lot size of one

### Assimilating automation

- Employ machine to machine interaction
- Link architecture with Operations Research
- Collect & optimize data
- Derive data insights
- Apply pattern recognition

### A COMPANY THAT EXEMPLIFIES THE SIX COMPETENCIES OF A FUTURE-FORWARD ENTERPRISE

In collaboration with the IBM Garage, Volkswagen (VW) is using its customer data to refine products and services and increase customer engagement. These improvements have developed a new value proposition and an additional revenue stream for VW: the WE Experience app. This app helps predict user (driver) needs and then addresses them through a combination of geolocation and a partner ecosystem, allowing a driver or passenger to receive real-time and geographically accurate offers and information, such as parking availability or retail incentives. This system is built on advanced analytics and AI to ensure the messages are secure, relevant and attention-grabbing without being too obtrusive. Aside from creating a value-added service that benefits both customer and supplier, the IBM partnership also helps VW with internal considerations. In becoming a future-forward enterprise, VW has used IBM solutions to help secure assets, protect production, modernize inventory systems and optimize logistics. This results in better productivity and, when combined with customer insights, creates the ability to continuously refine designs and solutions. The savings from the combination of better productivity and revenue from new product lines also means that the journey to being a future-forward enterprise for VW is becoming a self-funding one: by recognizing early wins on the bottom line, VW can continue to invest in its digital transformation and thereby continue to stay ahead of a competitive vertical industry.

Are you ready to propel your business ahead of the competition, innovate and exceed your customers' demands, and start your journey toward becoming a future-forward enterprise? Explore the possibilities and schedule your IBM Garage session. <http://ibm.biz/servicesgarage>

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