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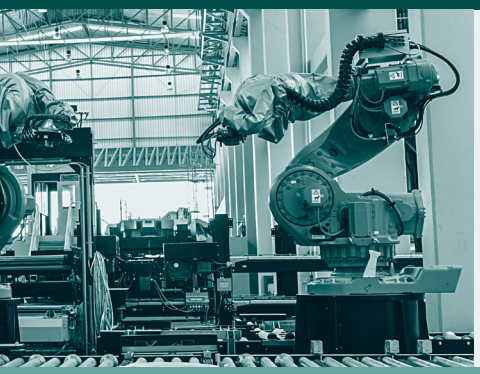
INDUSTRIAL



The industrial sector is facing a sea change because of new technology developments that can provide answers to some very challenging issues: How can we have better visibility into tracking and monitoring the product from inception to delivery? How can manufacturers have a smoother transition to Industry 4.0, which is already making use of IoT and cyber systems to improve operations and management in industrial settings? When and how should collaborative robots, aka cobots, be incorporated? What wireless connectivity options should be investigated? But just how quickly and cost-effectively can these technologies scale?

ABI has 8 main research services that cater to the needs of industrial companies with specific strategies to solve important challenges

- AI & MACHINE LEARNING
- AR & MIXED REALITY
- BLOCKCHAIN & DISTRIBUTED LEDGER TECHNOLOGIES
- DIGITAL SECURITY
- INTELLIGENT TRANSPORTATION & eFREIGHT
- M2M, IoT & IOE
- ROBOTICS, AUTOMATION & INTELLIGENT SYSTEMS
- SMART MANUFACTURING

AI & MACHINE LEARNING

What are the emerging use cases your business should address first? Should you create your own AI frameworks, license the technology from a third party, or subscribe to existing AI cloud services? This domain is all about efficiencies and streamlining processes. The focus is on foundational technologies so the factories can work more efficiently and the employees more effectively. How quickly do employees know that the machine is not working properly? Manufacturing industries are dealing with mission-critical tasks that need real-time actions (e.g., predictive/proscriptive maintenance, chain switch in case of chain overload, operation flexibility). It is crucial to have an understanding of the factory floor's end-to-end process: knowing what materials are coming in the door as well as when and how many products are going out the door. The development of AI is now extending from the cloud-centric approach to edge computing frameworks and AI embedded on devices. This trend is likely to change market dynamics within the value chain and will likely enable the device supply chain to play a key role in shaping the AI market looking forward.

AR & MIXED REALITY

How are you dealing with some of the major obstacles to AR adoption, such as security, content creation, optimization, distribution, and device cost? How can you train a workforce with minimal time yet emphasize worker safety? AR glass headsets and visual picks and packs enable employees to learn about maintenance, including important details of cleaning machinery, as well fixing them. And this can be done without employees reading cumbersome and complex manuals. Lists can be created and read directly into the AR glasses, which can even help expedite production lines. Previously aggressive smart glasses predictions will now be split between glasses and mobile with mobile devices delivering more functionality than previously expected. Additionally, light field displays can solve fatigue and lack of visual immersion, with lowering fatigue especially being critical to the growth of AR glasses.

BLOCKCHAIN & DISTRIBUTED LEDGER TECHNOLOGIES

From a management perspective, blockchain can provide a more dynamic registry for inventory and enable asset tracking. Blockchain also can solve issues in logistics, notably around lack of visibility, as the supply chain can get very crowded. Blockchain 2.0 and smart contracts have a place in the industrial sector because there is synergy with Industry 4.0, and it could sufficiently address a number of pain points: added transparency, automation, optimization and reducing friction. Additionally, streamlining the smart contracts process ensures transparency. Because there is an audit trail, it can help prevent IP theft and counterfeit production. If anything changes in the process, everyone understands why that change is needed and at what stage. Because everything is interlinked, there is a clear record of the changes, which can cover information about origin, parts, identity, ownership, certification, and maintenance. This information can be useful to all participants from manufacturer to the end user. In addition, smart contracts leverage automation and AI to administer prognostic health management, remote diagnostics, and predictive machinery for industrial machinery, thus, cutting out time-consuming human resources that would be otherwise be required. Smart contracts could also trigger the manufacturer of a spare part or a new product, execute the creation, payment, and delivery, based on the coded terms.

DIGITAL SECURITY

Digitization and connectivity make operational technologies (OT) vulnerable to existing cyberthreats and create new threats within an organization. Cybersecurity strategies must consider extending protection to OT systems, in a similar fashion to those deployed for IT. This is especially true in smart factories that are increasingly making use of cyber-physical systems to improve manufacturing processes. When there are connected machines, they are vulnerable to attacks. It is imperative to not only protect the corporate assets but also the data that comes off the proprietary machinery. Who owns this data and is securing it? Lack of security can have serious repercussions in post-market: easy cloning, device subversion for cyberattacks, loss of functional safety, device failure and data loss that can lead to liability and non-compliance with potential safety regulations.

INTELLIGENT TRANSPORTATION & eFREIGHT

How will your solutions align with and leverage rapidly growing driver, vehicle and cargo big data and analytics including sources such as gateways, biometrics and machine learning? How are you planning to address data ownership? Do you understand the benefits and challenges of open APIs and app marketplaces versus closed solutions? Besides the major push to move from paper to digital, there is now the rise of online freight exchanges and markets. Additionally, the mode of delivery is changing so the product is delivered to the end customer more quickly and efficiently. Drones have been designed for a range of new mobility and freight applications. Delivery drones are being tested for parcel delivery and offer the promise of delivering items purchased online in a faster, environmentally friendly, and cheaper way, with cost per mile as low was a few pennies. Drones are also being considered for heavy freight transport. However, the main barriers remain the same: regulation and legislation, in terms of guaranteeing safe operation of UAVs (unmanned aerial vehicles) within existing, manned aviation environments. Freight-as-a-Service allows freight to be ordered seamlessly on the fly in open marketplaces, addressing an estimated 20% of capacity underutilization, and enables private and for-hire fleets to absorb unexpected demand and level seasonal fluctuations.

M2M, IoT & IoE

When manufacturers are digitally connecting physical assets, such as sensors, what do you do with data? Is it stored in the cloud or the edge? While edge computing can help improve operations at individual plants, cloud computing helps set longer-term global strategies for larger corporations. Consolidating data and computing in the cloud can find more underlying trends in the long term and help coordinate operations across geographies and job functions. But what other services are needed to extract and clean the data? Are you focused on the right IoT application segments for your product? Do you need to expand your product set into new parts of the value chain and what is the opportunity? Central to these questions are the data and analytics. It is the data that companies seek from their connected machines and devices to improve business processes, create new business models, build new products and create new revenue streams. This part of the IoT value chain will experience the highest growth, most supplier expansion as IoT hardware suppliers counter commoditization through greater use of edge analytics.

ROBOTICS, AUTOMATION & INTELLIGENT SYSTEMS

In the face of rapid, continuous technological and business changes, how can suppliers and users of robotics and intelligent systems technologies discover and comprehend the larger, repeating patterns of technological and business significance that provides for optimal business opportunity and growth? The key is digitalization. Industrial and collaborative robots, along with mobile systems, are becoming seamlessly linked and synchronized with other devices and equipment -- often in support of Industry 4.0 initiatives -- legacy manufacturing and logistics automation systems, as well as with their upstream and downstream supply chain partners. As such, the focus is on creating a more efficient workspace by partnering humans with robots, ultimately driving more efficiencies into the market. For the manufacturer yet to adopt robotics automation, it may be that a collaborative robot, aka cobot, is an ideal first step toward automated processes, given the slightly lower price point. Manufacturers are increasingly demanding robotics technologies that support agile manufacturing, production processes that make assumptions to volume levels or even types of products being manufactured. Cobots can provide this flexibility through high modularity and the ability to perform multiple tasks with new end-effectors.

SMART MANUFACTURING

How are you supporting your customers, partners, and prospects during – and after – the move from product- to service-led models? How much data is being generated vs. transmitted vs. captured? What data is truly disposable? Perishable? Who owns it? Today and in the future, it's all about proprietary data rather than proprietary technology. The confluence of connectivity, application development, data management, and cloud storage capabilities is driving greenfield technology decisions in a brownfield world. But the factors driving smart manufacturing strategy decisions are complex; companies want to standardize on their service of choice to scale their connected endpoint infrastructure yet lack a common set of tools to operationalize the intended efficiency improvements. Additionally, enabling HMI (human machine interface) technologies, such as AR, serve as an infrastructure amplification engine. In this case to provide a hands-free heads-up platform for access to information at the time and place work is performed. Digital twins can be used as an input to minimize downtime, extend the useful life of equipment, and help manufacturers meet new regulations.