Manufacturers wake to the potential of digital technology
The digital revolution is finally making incursions into the $10 trillion-plus global manufacturing sector, yet few manufacturers are maximising the opportunities available to them.

At the same time, digital technologies continue to evolve at pace. The innovation these technologies are generating is changing the nature of manufacturing itself, as heightened connectivity among consumers, product designers, suppliers, workers, C-suite executives, and all physical industrial assets continue to unlock large amounts of value.

This, in turn, is transforming every link in the manufacturing value chain, from research and development, design and production (including every link in the supply chain) to marketing, sales and ongoing service and support.

**Resistance to early adoption**

Manufacturing has been slow on the digital uptake. Rising workforce costs usually come with lower productivity, and technology investments are often forced to compete with operational requirements.

This means costly upfront changes – those required to support complex technology such as factory automation – may not seem like a priority for a manufacturer who already has huge overheads.

The Australia and New Zealand manufacturing industry, for example, is suffering from several challenges: high costs, ageing workforces, lack of skilled workers in some areas, and oversupplied markets due to increased competition and the low cost of some imports.

Bruce Sneddon, Lead Consultant for Manufacturing at DXC Technology, agrees that cost is the one thing stopping big manufacturers from adopting digital technology across their IT ecosystems.

“Traditional manufacturers that have done things the same way for a long time are loathe to make a big capital investment, especially one that requires an overhaul of most of their systems,” Sneddon says. “If they’re cash-strapped, they will continue to operate with manual processes.”

This resistance to investment has left many manufacturers with systems that restrict their ability to innovate and transform their processes.

**A 21st century reality**

For slow adopters, today’s consumers won’t wait for them to catch up. Historically, people had had little input into what was being made and sold to them. Nowadays, they can play a role in product design.

“Manufacturers need to re-evaluate every aspect of their business processes accordingly to provide for the demands of today’s consumer,” Sneddon says.

Tech-savvy customers expect much more in the digital age. They are more connected, with greater visibility and self-service ability across the purchase and delivery process. They also want personalised experiences tailored to their specifics.
Companies that can make products and services to order have a big competitive advantage, while those that enrich the post-purchase customer relationship can generate further revenue through repeat sales and support services.

“A lot of traditional manufacturers are still focused on making products and shipping them off, yet customer satisfaction is now paramount,” Sneddon says. “Creating great customer experiences using digital technology opens up whole new channels of marketing opportunities, especially through avenues such as social media.”

Transforming the supply and value chains

Today’s market landscape is forcing manufacturers to revise their core business models and supporting capabilities.

Andrew Mullin, CTO Manufacturing ANZ at DXC Technology agrees that the market forces impacting manufacturers are driving them to be more responsive than ever to maintain competitive advantage.

“Manufacturers that are serious about optimising their supply-chain and value-chain performance will have to re-engineer at least some of their production processes,” Mullin says.

Processes such as product design, sourcing raw materials, production, marketing and sales used to be independent of each other. However, digital technology allows all these functions to operate within the same IT ecosystem.

With digital supply-network management tools, factory managers have a clearer view of raw materials and equipment parts flowing through a network. This helps them schedule factory operations and product deliveries, while product managers simultaneously access customer experience data that helps them anticipate demand and design better products.

Collaboration, data sharing and engagement across the value chain will help to better address customer, partner and supplier requirements, transforming manufacturing operations to a demand-driven supply chain.

At the same time, market leaders are utilising the power of big data and analytics for a supply chain competitive advantage, while large manufacturers have a vast array of technologies to choose from to improve their operations. This includes automation...
and robotics, the industrial internet of things (IoT), data-driven simulation (Digital Twin), machine-driven learning and artificial intelligence, 3D printing, augmented reality (AR) and virtual reality (VR).

This is especially true for manufacturers of mass consumables, such as cars and mobile phones. Yet even manufacturers of heavy goods for industry can streamline their supply chains by using digital analytics, big data and the cloud, especially to optimise sourcing of raw materials.

Larger manufacturers that have moved their factories and production facilities offshore for cost reasons need to source raw products from a range of suppliers, and they also need to be able to track everything across what can sometimes be a highly complex supply chain.

The aerospace industry has adopted digital tools to integrate its enormously complex supply network, where a modern jet engine has hundreds of individual parts that are often sourced from dozens of different vendors. The complexity of sourcing can multiply quickly, since making one design modification can affect the manufacturing of many other components.

“In complex areas of manufacturing such as aerospace and defence, product lifecycle management (PLM) cloud and analytics technologies are increasingly underpinning everything, from sourcing parts to product simulation to production, marketing and sales across every aspect of their supply and value chains,” Mullin says.

**An array of benefits**

Companies embracing smart manufacturing are already seeing a big difference in every area of their business: operational cost, speed to market, product quality and tailoring, customer experiences across product and service life cycles, employee productivity and safety.

At the same time, advanced encryption technologies are transforming data security across IT and operational technology (OT) ecosystems, while simultaneously ensuring greater compliance across supplier and partner networks – anything from government import and export regulatory compliance to controlling the movement of assets, services and information from unauthorised users.
A remotely connected workforce using mobility, as well as VR and AR technologies, can provide a huge boost to productivity as connected workers access data across the enterprise or talk to experts in real-time to help them perform repairs and maintenance to physical assets.

Data-driven enterprise insights

Transforming into a digitally savvy manufacturer will turn shopfloor data into business-critical information, where analytics provides a far greater understanding of customer trends and influences product design and marketing.

Manufacturing generates vast amounts of data. However, harnessing this data for valuable customer, supply chain and marketing insights has become essential to remain competitive. The pace of change is accelerating and next-generation analytics, artificial intelligence and product simulation are already producing new data-derived enterprise insights from initiatives such as industrial machine learning and automation.

Insights from real-time process and product data, including location monitoring, sensors and diagnostics information, are already changing the face of manufacturing as large manufacturers use the information to optimise factory operations and improve equipment efficiency and product quality.

Big data and cloud computing solutions allow suppliers to collaborate much faster and more efficiently than they ever did before. For example, vehicle manufacturers can share three-dimensional models of their engines and bodies with all suppliers, who can then share information about the availability of parts, delivery times and pricing. This greatly reduces the time and labour required to make design changes using older and less-sophisticated solutions.

Boeing developed its two most recent airframes, for the 777 and 787 models, using all-virtual designs. The company said this reduced its time-to-market by more than 50 per cent.
The future is all digital

The ways people and businesses use information has shifted dramatically. Data storage is cheap and flexible, and advanced analytics and machine learning provide unprecedented insights from huge amounts of data.

Advances in virtual and augmented reality, next-level interfaces, advanced robotics and artificial intelligence will continue to drive digital disruption across all manufacturers – large and small. This will create a seamless flow of data linking every phase of the product life cycle, from design, sourcing, testing and production to distribution, point-of-sale and ongoing service.

More and more practical uses will be developed for AR and VR platforms, which will further streamline product maintenance and supply chains, and considerably shorten the time required to train staff, anywhere at any time.

Cognitive machine learning will also continue apace, as will machine connectivity through technology such as the internet of things. As machines become increasingly more intuitive, cognitive learning will also come to the fore.
The digital revolution is still in a formative stage, but early adopters are gaining a big competitive advantage by maximising the capabilities of their supply chains, accelerating the pace of innovation, lowering production and maintenance costs, and getting far greater bang for their marketing buck.

“Understanding customers will be even more essential in the future, and manufacturers in the digital age will need to clearly understand what technologies they need and how they will directly benefit their operations,” Sneddon says. “Once they define their business strategy, the next step will involve defining a digital strategy that will deliver new outcomes to their business.”

About DXC Technology

As a trusted partner for many organizations in the industrial sectors, DXC specializes in providing a broad spectrum of support for IIoT infrastructures. We offer expert advisory services, including data discovery workshops, security assessments and IIoT-specific planning.

DXC provides extensive transformational services, including application development and integration, analytics and data management, and network, edge and data transformational support. We also offer long-term management support, including security, applications support, and management of traditional and hybrid IT environments.

As the largest pure-play integrator, DXC has forged the partnerships needed in the digital future. We work with customers and solution providers to decide which functionality is available for a site, region, enterprise or external marketplace. Our domain expertise and ability to introduce new capabilities are key to the client’s success.

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