Introduction

For decades Southeast Asian manufacturers have enjoyed competitive advantage based on low labour costs and fast productivity. But those traditional manufacturing differentiators now face six significant challenges in the fourth industrial revolution.

Our latest eBook explores those challenges and explains how smart factory solutions give Southeast Asian manufacturers a clear, lucrative opportunity to improve efficiencies and quality, speed time-to-market, manage cost and accelerate growth.
For nearly 80 years, Asia has experienced remarkable industrial growth. Manufacturing has blazed a trail driving that growth, despite being a sector that has endured through significant disruption. Historically, China has dominated the manufacturing sector but many eyes are now turning to the economic potential of the other countries in the region.

In 2018, the combined GDP of the Association of South East Asian Nations (ASEAN) member nations is estimated to have reached USD2.92 trillion. ASEAN makes up the world’s third-largest labour force, its fifth-largest manufacturing economy and its seventh-largest market. The region’s 4.4 per cent growth (CAGR) from 2012-2016 outperformed that of larger economies, including Germany and the United States.²

The Japan Center for Economic Research compiles an annual manufacturing production index comparing production volumes against a base period to indicate manufacturing activity. The 2018 index shows five key Southeast Asian countries grew at 6.2 per cent year over year, only slightly behind China’s growth of 6.9 per cent in the same period.

The five countries (Indonesia, Thailand, Malaysia, the Philippines and Singapore) form half of the 10 member countries of ASEAN. The same five countries have recorded aggregated growth every year since 2015, against China’s growth which has been declining annually since peaking at 15.7 per cent in 2010.

China’s slowing manufacturing growth, rising labour costs, and ongoing trade tensions with the United States all represent potential for other countries across the Southeast Asian region to absorb more manufacturing business.

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Core challenges faced by ASEAN manufacturers in maximising their potential

While ASEAN manufacturers have long enjoyed competitive advantage based on low labour costs and fast productivity, these differentiators face six significant challenges in the fourth industrial revolution.

1. Demographic changes

In emerging economies, the number of manufacturing workers aged 50 years and older is expected to double by 2035. There are two implications of the changing workforce demographics for manufacturers. Older workers tend to resist new ways of doing things and are reluctant to embrace changes from digital transformation. Older generations also tend to lack the attributes needed to perform more physically demanding manufacturing jobs and may not be sufficiently technically savvy to benefit from on-demand, computer-based training programs. Conversely, younger generations don’t want to work in organizations tied to time-consuming manual processes and push for digital processes to make their work more efficient, productive and safe. Manufacturers face significant challenges adapting to shifting workforce demographics over the next decade.

2. Cost pressures

Cost pressures are a hard reality for every manufacturing operation. Fluctuating global exchange rates, problematic supply chains, shifting workforce demographics, material shortages, incident management, waste management, asset repairs, maintenance, and working with inflexible infrastructure are just some of the forces that combine to create cost pressure. And, waiting at the end of the value chain of production, are customers with growing expectations for exceptional product quality delivered quickly and consistently. Many manufacturers wrestle with technology and operational systems which have limited potential to reduce and control costs.

3. Disruptive technologies

New, disruptive technologies are combining with traditional processes to revolutionize production systems, introducing levels of flexibility, agility, efficiency, safety, cost savings and transparency never seen before. Machine learning, Internet of Things (IoT), artificial intelligence (AI), connectivity, real-time data visualizations to drive decision-making, robotics, predictive analytics, and biometrics are just a few technologies which are already disrupting, and transforming, the manufacturing sector. ASEAN manufacturers who don’t embrace new technologies risk losing competitive advantage and market share to their regional neighbours, many of whom are already moving quickly to digitize operations. In just one example, India was recently ranked as the world’s second-fastest digitizing economy.¹

4. Higher product diversity in shorter product lifecycles

Remaining competitive on the global stage by reducing time to market with new or improved products to retain and attract customers presents another material challenge for manufacturers. Manufacturers need techniques to better understand what their individual customers really want, and to break down data silos and streamline collaboration between different parts of their supply chain to deliver what customers want. Delivering product diversity more efficiently also requires manufacturers to be able to efficiently manage product availability with minimum stock costs, reach new revenue areas, and be assured of delivering consistent quality standards.

5. Social and corporate governance

Increasingly, customer purchase decisions in the digital economy are influenced not only by a product or service’s features, price and associated customer experience, but also by whether a brand is practicing sustainability, treating sources fairly, and operating ethically. Manufacturers are challenged to provide a positive, dependable customer experience, transparency to operations and traceability across the supply chain. Along with satisfying community and social expectations for good citizenship, manufacturers are also required to meet a host of regulatory, legislative, governance, and compliance demands spanning industry and geographic boundaries.

6. The rise of Industry 4.0 and the smart factory

Throughout the years, manufacturers have always sought new techniques to improve the performance, efficiency, and safety of their operations. Many of those techniques have yielded results for long periods of time. But few have been able to endure the disruption brought by the accelerating technological advancements of the last decade. More than ever, Southeast Asian manufacturing firms are at risk of disruption from new technologies and new competitors.

Industry 4.0 or the fourth industrial revolution that’s impacting global manufacturing represents the most fundamental disruption the industry has experienced in the last 50 years. Industry 4.0 combines virtualization, decentralization, real-time capabilities, service orientation and modularity to deliver the next wave of digitalization to manufacturing.

At the core of Industry 4.0 is the concept of the smart factory. The smart factory represents a giant leap forward from traditional automation and is a highly digitized, fully connected production facility in which technology monitors all processes, analyses a constant stream of data on a wide range of metrics, and incorporates automation to support decision-making and improve operational control.

Deploying smart factory principles gives Southeast Asian manufacturing companies a clear and lucrative opportunity to improve efficiencies, control quality, speed time-to-market, manage cost and accelerate growth to leapfrog their competitors to success.
Implementing the smart factory

The cornerstone of the smart factory is the convergence of operational technology (OT) and information technology (IT). In moving to embrace smart factory solutions, the reality is that many manufacturers are confronted by legacy IT systems and obsolete shop floor technology. These older technologies are unable to transform to support modern manufacturing practices or integrate with newer, more powerful technologies.

Disconnected data spread across multiple systems and manual processes to extract and share information hinders the ability to create real-time, data-based visualizations to drive better-informed decision-making. Hardware dependencies absorb valuable financial and team resources, mobility is lacking, and security is left vulnerable. All too often, the existing infrastructure of many manufacturing operations is simply unable to solve current business challenges.

Southeast Asian manufacturers have a golden opportunity to cement their place in the future of global manufacturing by deploying smart factory solutions. Smart factory solutions deliver real-time data-driven insights to manufacturers to optimize operations and improve the customer experience, along with efficiencies and cost savings to offset rising labour costs and competition from other markets.

Three core features distinguish a smart factory from a traditional factory:

1. **Intelligent infrastructure.** Infrastructure in a smart factory is capable of real-time analysis, fast correlation to historical data and strategic business outcomes and predictive analytics to help improve efficiency, optimize operations and manage cost.

2. **Real-time information.** Within a smart factory, information about an event or process is available within milliseconds after it occurs. This access to near real-time information lets manufacturers make better-informed decisions, and identify problems and opportunities as soon as they appear.

3. **Hyper-connected facilities.** Smart factories are horizontally and vertically integrated to facilitate the real-time flow of intelligent data between people, processes, technology and physical and virtual assets.

Smart factory solutions are modular and span production lines, operational control centres, warehousing, security and technology and platforms. Solutions can be deployed holistically or in a phased approach.
By deploying intelligent, connected infrastructure able to operate in real-time, manufacturers can revolutionize incident management and system availability. Unplanned downtime and maintenance costs are reduced through predictive maintenance, alerts of likely equipment failures and automated corrective actions. Unplanned downtime is every manufacturer’s nightmare because of the costs associated with paused production. Those costs can bring tangible financial impact but also intangible losses which are harder to measure, including eroded customer responsiveness and slowed innovation.

Smart factory solutions improve uptime, efficiency and productivity with real-time access to data which can help target areas of impaired performance from production losses or over-ages, bottlenecks, equipment outages, waste management and more. With smart factory solutions, manufacturers can expect fewer production line disruptions and improved uptime, resulting in higher output and less waste. Resources and development can be proactively planned instead of being managed reactively as unexpected, expensive surprises.

Smart factory solutions improve worker safety with the ability to predict hazards through wearable technology, sensors placed throughout the plant and predictive alerts designed for early detection of maintenance or faulty equipment.

Quality assurance is reinvented inside a smart factory. The ability to fine-tune quality management can save manufacturers expensive, time consuming re-work. Pre-programmed processes and automated inspection seamlessly test products at designated points in the production line. Flaws are rapidly identified and routed out of the main process flow for repair or further inspection. Access to real-time data can reveal systematic flaws in a production line and save manufacturers the time and expense of conducting manual, visual inspections.

Smart factory solutions deliver flexible, agile infrastructure, helping Southeast Asian manufacturers maximize performance efficiency, exceptional quality assurance, proactive incident management, easily adaptive production processes, smooth integration with suppliers and customers, and outstanding safety and system uptime.
Fujitsu’s smart factory approach

Fujitsu has more than 50 years’ experience as a manufacturer in its own right with deep expertise in designing and implementing smart factory solutions for our own operations and for customer operations across the world. As a manufacturing organization, Fujitsu knows how highly attuned the manufacturing sector is to the transformation challenges and opportunities inherent with Industry 4.0.

Fujitsu understands that factories can’t afford to stop operations to make changes without losing millions of dollars in revenue, and that return on investment (ROI) on technology investments needs to be clear and realized as quickly as possible. Manufacturers who invest in strategic smart factory solutions will accelerate their growth while improving their competitive advantage, customer experience, and profitability.

From the outset of an engagement, Fujitsu works in close partnership with its customers to fully understand the outcomes they’re seeking to achieve and the unique context around their business. Fujitsu’s approach to designing and implementing smart factory solutions includes:

1. Assessing the customer’s business objectives, current state processes and KPIs, integration needs and pain points.
2. Performing gap analysis to understand what customers require across technology, people and processes.
3. Developing a roadmap and business case addressing product lifecycle management, production line integration, plant maintenance and quality management needs.

In designing smart factory solutions, Fujitsu draws on its expertise to apply new technologies including IoT, AI, machine learning, robotic process automation (RPA) and cloud services to traditional manufacturing environments.

An initial step to simplifying manufacturing processes and improving data-based insights and connectivity is moving to the cloud. Fujitsu’s range of trusted cloud-based solutions helps manufacturers move to the cloud smoothly and cost-effectively.

Spanning sourcing, procurement, processing and manufacturing, distribution, warehousing, customer service, and sales, Fujitsu’s smart factory solutions let manufacturers improve efficiency, increase throughput, reduce inventory, gain visibility to processes, and action bottlenecks in real-time.
Benefits of Fujitsu smart factory solutions

With a proven track record in delivering digital solutions that improve efficiency, increase throughput and reduce inventory, Fujitsu’s smart factory solutions deliver robust benefits to manufacturing operations including:

**Planning and design.**
Improve the layout and design of factory facilities through the entire asset lifecycle.

**Maintenance.**
Achieve proactive and predictive maintenance to maximize the lifespan and productivity of equipment with real-time insights to equipment utilization and abnormal thresholds.

**Production and quality.**
Increased productivity lets a firm achieve greater production and yield without increasing costs. Real-time analysis of inspection results and acceptance rates helps improve quality standards.

**Warehousing and logistics.**
Reduce errors in order fulfillment processes, efficiently manage damaged products, promptly address customer complaints, trace deliveries to ensure on-time arrival, and customer satisfaction.

**Contractor management and digital safety.**
Fujitsu supports better workforce safety through digitized walk-by inspections, real-time monitoring and incident management, biometric data applications, sensor data, remote support, instant visibility into worker locations and contractor profiles and permits.

**Machine learning and predictive analysis.**
The Fujitsu Cloud, IoT Cloud platform, pervasive network and big data combine to enable powerful machine learning and predictive analytics to anticipate issues and maintenance requirements, detect anomalies, forecast demand and more across a smart factory environment.

**Machinery and facilities management.**
Real-time insights to overall equipment efficiency, individual machine status and meter reading help optimize smart factory management.

**Inventory management and control.**
Monitor stock quantities and storage bin status at-a-glance to improve inventory management and save costs.

**Order production.**
Streamline and improve order production with data-driven context on completion rates and time required for production.

**Energy management.**
Track energy consumption across a production line end-to-end and monitor key statistics influencing production cost and success, including temperature and humidity.

**Remote operation centre and IT/OT integration.**
BI driven analytics and intuitive data visualizations enable remote monitoring, control and security management.

**World-class security.**
As an expert in protecting systems, processes and customer data, Fujitsu partners with world-leading security vendors to protect smart factory environments.

**Connectivity.**
Fujitsu Smart Workplace solutions securely connect people, data, applications, processes and devices to deliver an agile, efficient, connected workforce.

**Operational optimization.**
Combining AI, network solutions, digital technologies and the power of IoT, Fujitsu delivers a 360-degree view of operational performance to better automate processes, anticipate issues to increase uptime and design better products.
Getting started

Fujitsu smart factory solutions let manufacturers proactively understand and plan their operations and deliver output at mass manufacturing speed and prices while meeting the individual preferences of end customers.

We have a proven track record working with companies across different sectors in the Asia-Pacific region.

Please see some of our customer success stories:

• Siam Cement (Digital Cement Factory: real time location tracking system to monitor engineers on-site for safety reasons)
• Tsubame City (COLMINA, visualization of manufacturing processes, connection with other companies)
• Shimadzu (VizuaLine for SMT production line)
• Yokohama Rubber (Intelligent Dashboard to monitor overseas factories)
• Siemens Gamesa (FAIR)
• Toray Industries (Digital Annealer)
• INESA Display Materials Company (Intelligent Dashboard and big data analysis platform to monitor production, operations and energy consumption)

For more information on how we can help you on your smart factory, please visit our website or contact us.