

**Jonathan Asherson**  
 Regional Director, South-east Asia  
 Rolls-Royce

THE manufacturing sector has seen a gradual shift into more advanced high-value manufacturing (HVM), a move that has strong government support and commitment. It brings a positive ripple effect to the economy by enabling sustainable growth, knowledge transfer, enhanced skilled jobs, high value exports and longer term investment in R&D.

Industries like aerospace, offshore, semiconductor and electronics will continue to play an important role in strengthening Singapore's position as a regional hub for high-value manufacturing.

Rolls-Royce has introduced advanced high-value manufacturing technology in aerospace through establishing the Rolls-Royce Seletar Campus, and for us, access to the right talent with the right skill-sets is vital.

As other industry sectors move up the manufacturing value chain, there will be increasing pressure to grow the right talent pool here to support industry growth.

Success stories suggest that developing top-level education takes years of focused effort and must be an integral part of industrial policy. We welcome the government's approach in continuing to work with organisations in high-value industries to address this challenge.

**Jim Li Hui Hong**  
 CEO/Founder  
 JSB TECH Pte Ltd

THE electronic manufacturing sector in Singapore is still a relatively high value-added activity and a sizeable contributing factor to GDP.

Limiting labour supply, intended to speed up productivity improvement, could potentially drive this sector to become more relevant in this fast changing market structure. However, it could risk weakening this sector when significant shrinking of manufacturing scale and scope occurs.

It is important to keep a critical cluster size of production activity at home to maintain supply chain competitiveness and responsiveness in supporting local R&D activities, as well as be capable of mitigating any sudden fallout or temporary supply cutoff resulting from, say, a regional epidemic or political incidents.

For example, aggressive outsourcing by developed countries for over two decades resulted in unsustainable manufacturing job losses. These countries are currently in a "hard" swing of reversing outsourcing as part of a larger directive for rebalancing their economies.

Hence, some words of caution: pushing away manufacturing activities may be a "shortcut" in reacting to current pressing issues, but when we need to get them back in the future this would likely be a difficult task!

**Assoc Prof Annie Koh (PhD, Finance)**  
 Vice-President, Business Development  
 and External Relations  
 Office of President  
 Singapore Management University

I BELIEVE that it's a brave new world for manufacturing – because we need manufacturing to fortify Singapore's strength in our niche service areas.

Manufacturing is not asset light and requires an eco-system of both larger and smaller firms. So in the area of commodities, for example, where Singapore has a niche play, the next level of manufacturing is towards higher end hybrid products and a cleaner and more sustainable approach to getting the raw materials sourced, refined, produced and packaged for storage.

This in turn, could spawn a whole new area of food technology and food science, given Singapore's trusted brand in food security.

In the area of healthcare – as we build medical tourism – we are also building manufacturing support, towards bio-tech, medical-technology, pharma plays as well as IT medical systems to cater to Asia's medical service demand. This will spawn a whole new industry of healthcare-related manufacturing companies.

The transformation of our manufacturing sector to support the service sector implies that we are building greater stickiness and reinforcing our comparative advantage.

This integration of both service and manufacturing sectors will help us build higher barriers to entry and our education system has to develop the right level of human capital with skills straddling both sectors. That will be the ultimate barrier against rising competition and producing quality workers.

**Lothar Herrmann**  
 President & CEO  
 Siemens Pte Ltd

ONE of the key recommendations that the Economic Strategies Committee put forth in 2010 is to transform Singapore into a global base for complex manufacturing and manufacturing-related services, such as HQ activities, R&D, IP (intellectual property) management and product life cycle management (PLM).

This will enable Singapore to strengthen its position as a leading Global-Asia business hub, grow human knowledge capital, as well as create better jobs.

Today, manufacturing systems have become more complex and automated and it will be critical for SMEs in Singapore's engineering sector to adapt and upgrade their capabilities for product life cycle management and move to more efficient manufacturing technologies.

Siemens has established a PLM software regional headquarters in Singapore to support such manufacturing companies. Siemens has also evolved its hearing instruments manufacturing plant in Singapore in recent years.

We are doing a lot more R&D out of Singapore, for the Asian market. These new innovative products are tested and produced here.

We have also shifted most of our basic labour-intensive manufacturing of hearing instruments out of Singapore in the last two years. In place of that, we have invested about \$510 million in an automated manufacturing facility that is able to produce much smaller hearing aids which cannot be assembled by human hands.

Not only that, this facility has reduced manpower by half while increasing output capacity by 75 per cent. We now employ people with higher qualification, and can also chart a much more attractive career path for the staff.

**Hansjoerg Wagner**  
 President  
 Polycorn, Asia-Pacific, China and Latin America

IN manufacturing, time is money. Companies must recognise that streamlining their business processes presents an immediate competitive advantage.

However, in order to achieve this and create new revenue streams, the need for manufacturers to



PHOTO: BLOOMBERG

**THIS WEEK'S TOPIC:**

How should Singapore's manufacturing sector evolve to remain a pillar of the economy, and what industries do you see playing a key role? How will an evolving manufacturing sector affect your area of business, and Singapore generally?

# The future of manufacturing

increase participation in the overall value chain is pertinent.

While globalisation has advanced manufacturing in multiple ways, it has also brought along the challenge of managing teams across borders.

A teleworking initiative, for one, enables teams to collaborate face-to-face wherever they are in the world and in whatever environment – be it on a factory floor, in an R&D lab or even on-the-go.

This on-demand collaboration culture not only promotes manufacturing innovation, but also streamlines both design and production processes.

We see a huge potential for Singapore's geographically-dispersed offshore manufacturers to lead the industry forward.

In this respect, video-conferencing plays a critical role as it enables companies to remotely monitor manufacturing activities for quality assurance across global sites, tap on remote expertise, enhance customer interactions, as well as reduce time-to-market and time-to-manufacture, making them ultimately more competitive.

**Karen Reddington**  
 Regional Vice-President, South Pacific  
 FedEx Express

TO look at how Singapore's manufacturing sector can remain relevant in a changing global economy and a pillar of Singapore's economy, we need to look at what the trends are and how Singapore's infrastructure can support those trends.

Manufacturing processes will become less labour-intensive and more information-technology intensive; developments in nanotechnology, robotics and additive manufacturing will impact the manufacturing processes; and the need for a mature services industry to support these developments in manufacturing will intensify.

Singapore's pro-business culture, great physical and regulatory infrastructure, and the government's push for a knowledge-centric and research-based economy will continue to position the country well at the frontiers of manufacturing.

We believe that the electronics and biomedical and pharmaceutical industries will continue to play an important role in the transformation of Singapore's manufacturing sectors.

From a supply chain perspective, air express is well-suited for the transportation of such high-value, time-sensitive and critical inventories.

At FedEx, we see a growing demand for a global distribution network with best-in-class technology and service as more and more manufacturers, especially pharmaceutical and biomedical, make the decision to outsource the fulfilment of their "critical" inventory.

To meet the growing demand, FedEx is powering up its portfolio of specialty services that include integrated solutions from temperature-controlled services with online tracking, to 24-hour monitoring and security and time-definite express services, to FedEx specialty packaging.

**Janet Ang**  
 Managing Director  
 IBM Singapore

THE manufacturing industry remains a key contributor to the economic growth of Singapore, steadily increasing its GDP contribution and generating more jobs.

Industries such as electronics, pharmaceuticals and construction are poised for growth and should look for market differentiation by leveraging on product and technology innovation.

Over the years, the manufacturing sector has evolved from a labour intensive to a digital and knowledge-based one.

As a case in point, the IBM manufacturing plant in Tampines has more than double the number of skilled professionals than operators to produce IBM Z series mainframes and high-end Power Unix servers for Asia-Pacific and Europe.

Our investment in this area serves to reaffirm Singapore's capabilities for complex, high-value manufacturing and global supply chain management.

More recently, IBM launched The IBM Supply Chain Analytics Center of Competency which is dedicated to developing analytics-based technologies in order to help organisations improve their supply chains.

With the explosion of big data, enterprises across all industries are looking for ways to gain greater, more accurate insight into their businesses.

IBM looks forward to developing innovative technologies to advance the supply chain industry, worldwide.

**Thomas Chua Kee Seng**  
 Chairman and Managing Director  
 Teckwah Industrial Corporation Ltd

WITH advances in technology, materials and even new sectors coming to the forefront of manufacturing, the face of Singapore's manufacturing industry has to change with more high value-added products and spin-off industries leading the way to ensure continued growth in this sector.

The biomedical and pharmaceutical sectors have already been identified as key areas of growth although there are others which harness the latest developments in technology.

Companies must invest in technologies, processes and human capital expertise to stay relevant to the evolving manufacturing sector. Raising productivity alone is not sufficient. Industries must be willing to align their entire operations and even core businesses with the demands of the marketplace.

We are experiencing this in one of our own core industries – print. As traditional print media faces challenges, with changing technology and newer modes of communication rendering former ones obsolete, we will have to innovate and harness these changes to come up with different means of communication, branding, advertising and packaging to serve our customers.

Singapore should also tap on surrounding areas of

manufacturing growth to allocate resources to maximise operations. Inasmuch as we see the challenges in the future, we should also see the opportunities. After all, through the years, evolution has always led to the betterment of society and progress in civilisation.

**Joost Geginat**  
 Managing Partner, South-east Asia  
 Roland Berger

SINGAPORE'S excellent infrastructure, pro-business policies, highly qualified workforce and high quality services certainly are alluring to manufacturers, albeit with a higher cost base.

And, if policies that augment business and innovation continue to adjust to external factors, local chemicals and electronics manufacturing – key manufacturing industries in Singapore – will no doubt prevail, as manufacturers capture a bigger slice of global demand.

Roland Berger research shows that 43 per cent of the chemical industry's global market volume, worth 2 trillion euros, is in Asia; by 2030, it will be more than 50 per cent.

Manufacturers internally should also evaluate and carefully hone their competitive advantages by carving out their niches, so that they can develop their portfolios and capabilities accordingly.

**Haider Rashid**  
 Country President Singapore  
 & Region President South Asia  
 ABB

EVEN with the onset of the digital age, people will always consume, but ever more discerningly. For Singapore, the opportunity lies not in low-cost mass production, but in pioneering ways that bridge the cost-quality divide to meet the needs of sophisticated consumers.

For example, robotics can boost productivity, in some cases by up to 200 per cent, without compromising on quality or customisation. At ABB, we help manufacturers manufacture, so in fact, we help to shape its evolution.

One priority which will put Singapore on the map is having an innovative approach to industrial energy efficiency. It's no longer just what you make, but how you make it, addressing the challenges of energy costs, environmental concerns and having the right people in place.

Furthermore, the convergence of power and automation may seem an abstract concept but it is one that will revolutionise the industrial landscape.

The "Made in Singapore" label is an important asset that goes beyond manufacturing, and reflects quality, creativity and entrepreneurship. It would be a shame to let it wither. To exploit its full potential, Singapore's passion and ambition needs to be backed up by real investments in people and businesses.

**David Hope**  
 Regional Managing Director, Asia-Pacific South  
 Infor

THE dynamics in the manufacturing sector globally and, in particular, the Asia-Pacific theatre, have shifted from a low-value production food chain to one which requires knowledge and information which is relevant, on demand, and at a speed which should only benefit the growth of the company.

Making better and faster decisions from the large volumes of data available within the organisation continues to be a key issue for all C level executives.

With the use of big data analytics, Infor's manufacturing clients in Singapore and the rest of Asean are able to harness this data with speed and context to make effective and efficient business decisions, develop a better understanding of their customers, improve cultivation of customer data and implement more focused customer outreach that has helped in increased sales.

It's all about better decision making, which reduces pain, time and cost to our clients' organisations.

**John Keung**  
 CEO  
 Building and Construction Authority

WITH the global trend in green growth and green industry, we can expect various industries to continually improve their environmental performance and use resources efficiently.

In Singapore and its surrounding region, the increasing emphasis on greening buildings will stimulate a greater demand for green building products.

Furthermore, our focus in Singapore goes beyond just greening new and existing buildings. We are also looking from the consumer's perspective to green office interiors and restaurants, retail shops and data centres.

With greater awareness on the need to be energy efficient and save energy cost, more consumers and business owners are expected to demand these green building technologies, products and solutions.

Singapore's built environment sector has a headstart in developing green buildings in Singapore and firms in the sector are sought after in this region due to the knowledge and experience gained.

This new green growth may well boost our manufacturing sector too, if it can venture into delivering green building construction materials, technologies and solutions for this region and beyond.

**V R Srivatsan**  
 Managing Director of Asean  
 Autodesk

IN Singapore we see the consumer products, industrial machinery and automotive/transportation segments playing key roles in the manufacturing industry. Manufacturers strive to produce higher quality output faster, with fewer resources. They need to more easily predict, optimise and validate the performance of what they make. Increasingly, manufacturers are relying on digital tools for design, data management, prototyping and simulation.

Pent-up demand for affordable simulation technology led us to launch Autodesk Simulation 360 this year. It's a cloud-based, pay-as-you-go toolset that

**Teo Lay Lim**  
 Managing Director –  
 Singapore and Asean  
 Accenture

AS growth returns across the world, manufacturers must prepare themselves to take advantage of new and emerging opportunities. This requires an operating model that is dynamic, flexible and responsive.

Decentralising operations may allow manufacturers to deal more effectively with cross-border challenges, taxation differences, geographic obstacles, technological variations and labour discrepancies.

Adopting customised technological solutions such as cloud solutions, portable devices and customised applications to address local needs is important.

Lastly, as labour is a significant component of any manufacturer's cost structure, creating a leaner, more highly skilled and flexible workforce can help maintain consistency with demand and revenue.

To that end, today's era of permanent volatility requires flexibility and agility in operating models and operations.

An adaptable, cost efficient manufacturing network not only improves competitiveness, but can also enhance customer satisfaction that provides a strong foundation for growth.



lets any company make simulation part of their processes. "First-time-right design" is the goal, cutting production costs and reducing material waste.

**David Low**  
 CEO  
 Futuristic Store Fixtures Pte Ltd

SCARCITY of resources has always been the major challenge on this island, yet it forms the impetus to drive the economy through value-added and knowledge intensive industries.

The manufacturing sector is not spared from this direction. The notion of manufacturing being a low value mass production model cannot thrive in Singapore where land and labour are limited especially with new foreign labour controls.

To keep the sector robust, growth has to be vertical and knowledge centric to drive value and innovations into manufacturing. With a good reputation for IP rights enforcement, it is a pull for value creation manufacturing industries to continue their development and growth in Singapore.

I see biomedical sciences, oil & gas upstream and

semiconductor industries leading the path. Government agencies have been very supportive of promoting value creation business models with measures to manage human capital investment, and it is important for SMEs to tap into relevant aids to evolve in alignment in order to stay healthy in the new business environment.

As the country strikes a balance between limited home grown talent and over-crowding societal issues with foreign worker imports, businesses will have to make calculated strategic moves in ensuring sustainability in the long run. Such moves may see partial migration of certain manufacturing industries or forging of partnerships with neighbouring countries to complete the vertical integrated value chain.

**Lynne Ng**  
 Regional Director, Adecco SEA  
 Adecco Personnel Pte Ltd

THE manufacturing industry in Singapore has evolved over the decades. The current trend particularly in the areas of Oil & Gas, has seen key players move their production to locations where labour costs are lower such as China, India and the Philippines.

However, the development and strategic designs are still coming out of Singapore. Some of the world's largest rig builders such as Keppel and Sembcorp Marine are based in Singapore and this certainly provides essential manufacturing and engineering activities in the production of key components.

Singapore's reputation as a clean and established economic powerhouse also provides a safe and secure base for global key players.

**Joshua Yim**  
 CEO  
 Achieve Group

MANUFACTURING will continue to be an important pillar in Singapore's economy but the question is how it will evolve, as competing on price is no longer viable because the cost of labour in Singapore is rising.

The clampdown on the hiring of cheap labour in the form of foreign workers has worsened the situation and it is quite natural that some companies may choose to leave Singapore and relocate their operations to countries with a lower cost of labour. Generally, labour intensive activities will move out of Singapore to other countries in East Asia.

The industry on the whole will need to move from mass production to high value adding activities that incorporate a higher degree of research and development. How will this affect our recruitment business?

As our manufacturing customers start hiring more specialised staff instead of the type of workers required for mass production, we will move up the value chain together with them as we help them recruit these higher skilled talent. Therefore, I believe that our business will do just as well, if not even better than before.

For the complete list of views  
 from CEOs, go to  
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