

BUSINESS SWEDEN

SOUTHEAST ASIA'S BIG SHIFT

INDUSTRY 4.0 AND THE FORCES OF CHANGE
IN THE ASEAN BLOC

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FOREWORD

TIME TO REBOOT

Manufacturing is the beating heart of the economic bloc known as the Association of Southeast Asian Nations (ASEAN). The sector accounts for more than 20 per cent of the region's gross domestic product and is a major driver of growth and competitiveness.

Today, ASEAN is the world's seventh largest market and boasts the world's third largest labour force. The bloc's importance as a global manufacturing hub has strengthened from the ripple effects of the U.S.-China trade conflict. But change is sweeping the manufacturing landscape in more ways than one.

As the region looks ahead, managing the disruptive impact of the Fourth Industrial Revolution (IR 4.0) will be high on the agenda. Companies need to rethink and reboot their strategies in order to stay relevant. Emerging technologies are paving the way for new production techniques and business models that will fundamentally transform the way products are made and distributed.

While digital manufacturing is making its mark in the advanced Western economies, investments are ramping up in the burgeoning markets of Southeast Asia. The technology shift is helping companies unlock new pathways to competitiveness, innovation and growth and address challenges of rising operational cost and low workforce productivity.

This report presents a survey conducted by Business Sweden in six selected ASEAN countries. It shows that four out of five manufacturers are budgeting for IR 4.0 investments in the next three years. However, a few sticking points remain. Implementing industrial strategies that promote productivity and inclusive growth requires broad-based collaboration between governments, industry, academia and civil society.

Policy actions are slowly but surely being taken to close these gaps. Meanwhile, Swedish companies are well-positioned to tap into the vast opportunities currently unfolding in everything from smart production technology to implementation know-how for IR 4.0.

Southeast Asia is on the cusp of transformation. We hope the observations in this report provide useful insights that help you get on board.

Martin Glaumann
Market Area Director



MARTIN GLAUMANN
Market Area Director
Southeast Asia

OVERVIEW

THE ASIAN CENTURY BEGINS

REGEARING THE GROWTH ENGINE

The 21st century has been heralded by some observers as “The Asian Century”. Proponents of this view maintain that the political and economic pendulum is now swinging back towards the Asian continent after roughly three centuries of Western prominence. This shift, the argument goes, is changing the very foundations of the current world order and requires not only companies but nation states too, to reassess strategic alignments, partnerships, friends as well as foes.

Such grand statements are not uncontested of course. Unresolved geopolitical issues, critics point out, are causing tensions that threaten to stand in the way of Asia’s rise. Others question the ability of the Asian countries that have been responsible for the lion’s share of economic growth over the past 40 years to stay on course. Increasing income inequalities, weak

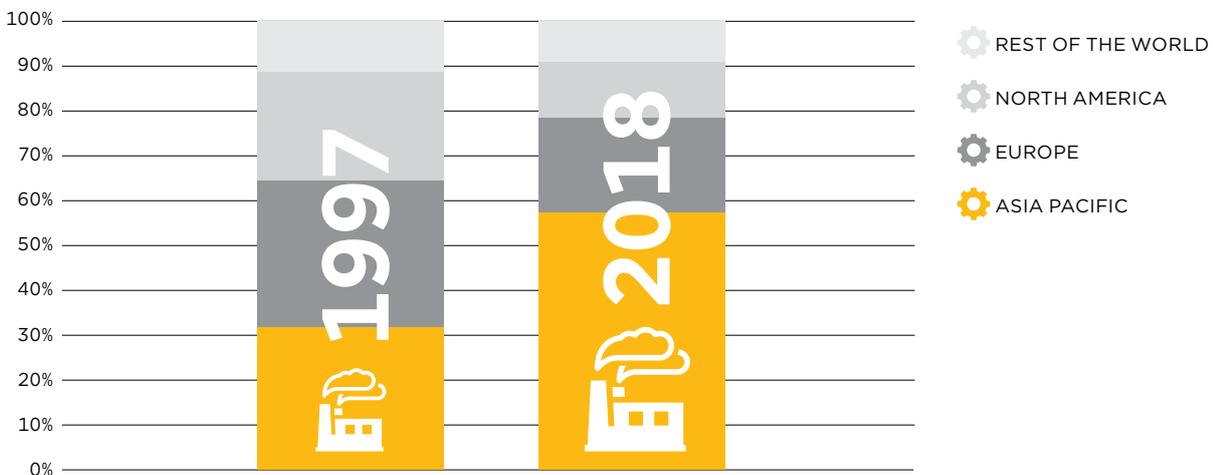
institutional frameworks and poor governance, they say, are fundamental challenges that many Asian countries have yet to overcome.

None of the concerns raised by critics are misplaced. But what the detractors of “The Asian Century-narrative” tend to overlook is the thrust and momentum of the changes taking place. As the Financial Times recently highlighted in an article titled “The Asian Century is set to begin”, over half of the world’s population already live in Asia – 21 of the 30 largest cities are found here, and, importantly, half of the world’s middle class will call Asia their home by 2020.

In addition to these striking facts, the Asian continent is projected to account for a whopping two thirds of total global growth next year. By then, according to UN data, the economies of Asia put together will be larger than the rest of the world combined. In this context, disregarding those who claim that the future indeed belongs to Asia is looking harder by the day.

ASIAN MANUFACTURING IN CONTEXT

PROGRESS, MADE IN ASIA (MFG. OUTPUT % OF GLOBAL TOTAL)



POWERHOUSE IN THE MAKING

The role played by manufacturing in the “Asian miracle” is hard to overstate. In East Asia, for example, the sector underpinned the region’s industrialisation journey through most of the second half of the 20th century. Backed up by policies to protect infant industries from foreign competition, the governments of East Asia managed to transform rural industries and put their manufacturing industries at the heart of global value chains.

Progress was spearheaded by Japan where living conditions of millions of citizens improved as large domestic businesses flourished. China and Korea followed suit and soon enough Asia transformed into the manufacturing powerhouse it is today. In the US, once the world leader in manufacturing, the sector in 2016 employed only 8 per cent of the total private workforce compared to over 25 per cent in the 1970’s.

By way of contrast, Asia now accounts for USD 27.2 trillion, or 57 per cent of total manufacturing output globally, and the sector’s annual growth from 1997 to 2018 averaged 8.4 per cent. The more modest 3.2 per cent for the rest of the world draws a bleak comparison. Moreover, Western companies’ share of Asia’s manufacturing output has steadily declined which signals that Asian companies are increasingly controlling the regional supply chain.

Another transition is now underway as Japanese, Korean and even Chinese firms are outsourcing operations to Southeast Asia.

ASIA IN NUMBERS

60%

of worldwide infrastructure spending

7

of the world’s ten largest cities
(by population)

60%

of the world’s population

50%

of the world’s automotive manufacturing

10

of the busiest ports in the world

75%

of global textile production

72%

of global electronic’s
manufacturing



TECHNOLOGY TRENDS

BRACING FOR DISRUPTION

INDUSTRY 4.0 ON THE HORIZON

Technological advances are changing the face of manufacturing once again. The First Industrial Revolution set in motion transformations and effects that are still being felt today. Machines moved into factories around Europe and the United States, powered by coal and steam engines, demonstrating that some tasks are better managed with minimal human input. The Second Industrial Revolution brought electrification and mass production to the world, further underscoring the limitations of human labour.

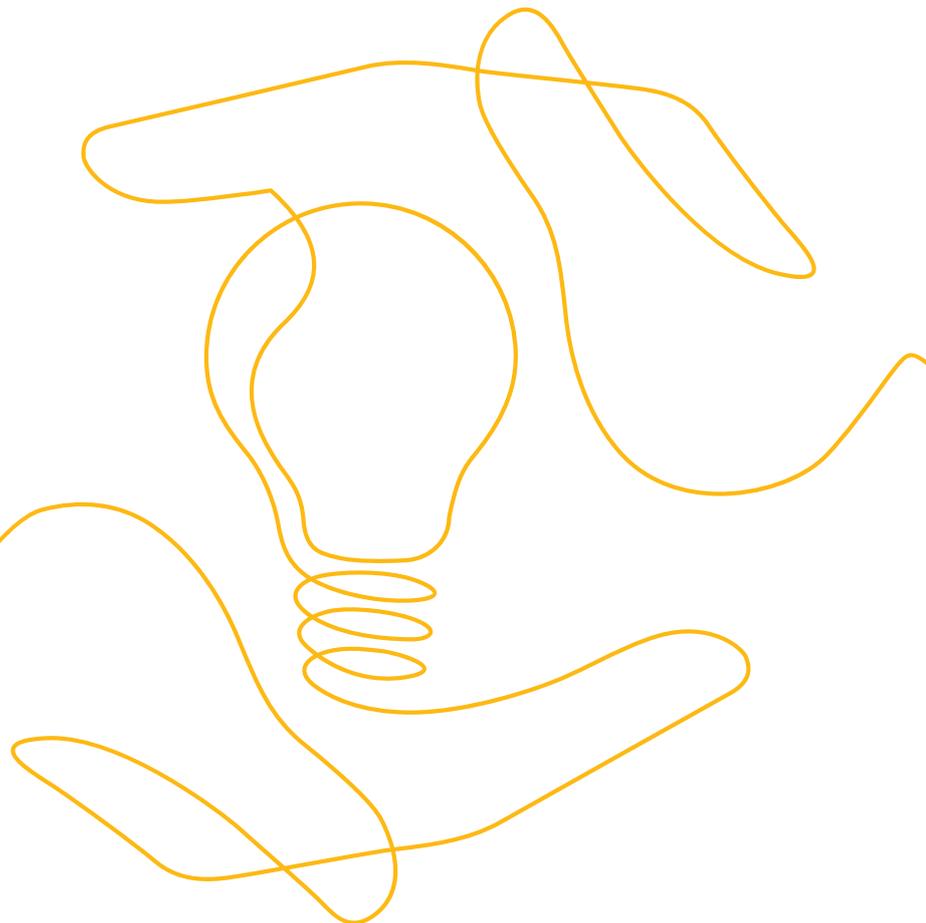
Then, in the late 1960s, technologies began to converge on factory floors. Mainframe computers ushered in a Third Revolution that paved the way for robotics and automation. The first programmable logic controllers (PLC systems) were now governing manufacturing processes. So, what happened next?

DATA REVOLUTION KICKS IN

The consensus is unmistakable. Industry experts, researchers, business leaders and politicians around the world are convinced that civilisation is on the cusp of a new, Fourth Industrial Revolution where data-driven production is the name of the game. This transformation carries with it the promise (or threat) of making human labour obsolete in areas of work previously thought to be insulated from technology. In many ways, the next revolution is a “smart revolution”.

According to Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, the Fourth Industrial Revolution is propelling megatrends that are “physical”, “digital” and “biological”. These subsets cover innovations such as additive manufacturing (3-D printing), autonomous vehicles, advanced robotics, IoT (Internet of Things), blockchain, AI and CRISPR-Cas9 (gene editing).

While the idea of “hacking” the human DNA is mindboggling, this report will concentrate on the disruptive technologies in the physical and digital realm, and their impact on Southeast Asia. In this endeavour we have identified six technologies (opposite page) that are already impacting the way manufacturers in Southeast Asia are planning their investments over the next three years.



6 TRANSFORMATIVE TECH TRENDS



ADDITIVE MANUFACTURING

Better known as 3D printing, additive manufacturing has probably had a bigger impact than any other technology of late. By “printing” metal parts layer by layer, manufacturers can create complex designs that were previously impossible to achieve. In addition, small batches of products can be produced that otherwise would be too costly. A third benefit is that additive techniques allow for point-of-sale production enabling shorter lead times, reduced logistics costs and cuts to CO₂ emissions from transportation.



BIG DATA

Data analysis and predictability is a foundation stone of Industry 4.0. Big data refers to the vast collection of data generated by factory machines and robots, sensor-equipped products, operators and end-users. Manufacturers have only just begun to harness the potential of today’s abundance of data. Studies have already shown that big data analytics can reduce unscheduled downtime by 26 per cent. With downtime costing automotive manufacturers some USD 22,000 per minute, huge savings are made possible.



SMART MACHINES & ROBOTS

Some jobs are already being rendered obsolete as intelligent machines and robots enter the stage. Industry robots are now more advanced and cheaper than ever. Similarly, robotic expertise in Southeast Asia is rapidly moving forward. The next generation “co-bots” can analyse data, collaborate with each other and adjust tasks in real time. With the looming AI revolution, manufacturing is set to enter an era where robots play an even greater role.



VIRTUAL MODELLING

With virtual modelling, companies can put new component and product designs to the test in a virtual environment. This simulation technique ensures that quality standards are met and eliminates the costs of conventional trial-and-error in product development and testing. Simulation programmes allow companies to avoid typical hick-ups and to validate that the many stages of production are interlinked and performing well – which is already giving productivity a considerable boost.



AR/VR

Augmented reality (AR) and virtual reality (VR) have ushered in new ways of working in several Southeast Asian factories. By visualising instructions for operators and staff, both AR and VR are helping to speed up lead times and improve efficiency. Downtime for unplanned maintenance is reduced and technicians are also leveraging the technology alongside automation to improve workplace safety.



E-LEARNING

Focusing on human capital and upskilling is crucial in the era of Industry 4.0. With a generational shift from baby boomers to millennials, manufacturers are using e-learning to engage and attract the next generation of professionals. E-learning unlocks major cost savings and is fast becoming a key element of training programmes alongside classroom and on-the-job training schemes.



DRIVERS AND BARRIERS

MOVING TOWARDS MATURITY

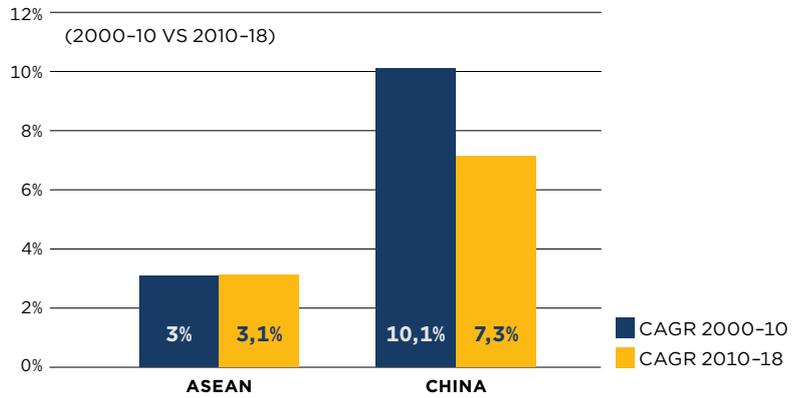
UPBEAT TIMES... BUT READY TO GO?

Is Southeast Asia ready to jump on the bandwagon of smart manufacturing? As demonstrated in this report, there is no shortage of forward thinking as well as real-world examples of how digitalisation is redefining industrial practices. At the same time, government-driven innovation often lags behind in the region.

To get a snapshot of Southeast Asia's readiness level for Industry 4.0 we have identified five areas where drivers and barriers converge, all of which should be considered in order to fully capture the opportunities of the new manufacturing era.

Industry 4.0 is right around the corner in other regions too. The ASEAN countries need to keep pace by facilitating change across supply chains, and that is easier said than done. Outdated regulations, lack of skills and insufficient infrastructure are all potential pitfalls.

PRODUCTIVITY GROWTH



Stepping up the productivity game: disruptive technologies will be needed to boost competitiveness in Southeast Asia.



INSTITUTIONAL FRAMEWORK



Perhaps more than anything else, so called “boundary conditions” can truly influence private sector behaviour. Regulatory certainty has been an advantage for Singapore, but other governments in the region will need to double down on progressive reforms that facilitate the technology shift in manufacturing. The outlook is promising as several governments have taken steps to remove bureaucratic obstacles and develop Industry 4.0 roadmaps – but more needs to be done.

TECHNOLOGY & INNOVATION



Connectivity is the lifeblood of the Fourth Industrial Revolution. Making the leap to smart manufacturing depends heavily on each country’s ICT capabilities. Internet speed will dictate whether IoT projects are successful. Similarly, cybersecurity and data privacy need to be in line with international standards. While ASEAN countries such as Vietnam lag behind, the government here has launched a programme to expand broadband nationwide and bring 5G connectivity to high-tech industries by 2020. In Malaysia, the government has put in place grants and incentives to encourage private sector R&D.

HUMAN CAPITAL



With all the buzz surrounding automation, you would be forgiven for thinking that human labour is an outdated concept. In actual fact, people skills will be crucial in Southeast Asia’s industrial transition. In 2019, all the ASEAN countries came together at a symposium in Bangkok to explore strategies for upskilling the region’s workforce and making it fit for Industry 4.0. The EdTech revolution is expected to have a significant impact in terms of bringing competences up to speed.

DEMAND ENVIRONMENT



Consumers in Southeast Asia are becoming more sophisticated and digital savvy by the day. A growing middle class is expanding from major capitals to Tier 2 cities which is opening up new market opportunities for high-end products. Companies in ASEAN are now adapting to a new consumer base, albeit at a slower rate than needed. Environmental awareness among millennials is also putting pressure on sustainability goals in the region’s production system and supply chains.

GLOBAL TRADE & INVESTMENT



Governments need to boost inward and domestic investments and improve access to large markets, while allowing financial institutions to operate in a framework that is robust and reasonably predictable. This is crucial in order to transform production systems and build the necessary Industry 4.0 infrastructure that meets global supply chain standards. Indonesia is one of the countries addressing the issue of investments and trade with its “Making Indonesia 4.0” roadmap.

REGIONAL OUTLOOK

TIGER CUBS SPRING AHEAD

UNCOVERING THE PULL FACTORS

The fact that Southeast Asia with its population of 640 million has emerged as an increasingly promising region for manufacturing should come as no surprise. Wages in China have climbed at an average rate of 15 per cent per year, prompting companies to rethink their approach and turn their attention to the ASEAN bloc.

The region has several important pullfactors beyond more affordable labour. Large markets, a booming middle-class and available Free Trade Agreements are three additional facts making Southeast Asia a particularly strong destination for manufacturers. Expertise and complex supply chains built up over decades will not be easy to replicate, so a full-blown exodus from China is not likely to occur anytime soon.

That said, ASEAN is certainly appealing to companies looking to diversify their supply chains and hedge their bets amid the U.S.-China trade tensions. When it comes to the rate of industrial growth, the group of countries sometimes known as the ASEAN 5 (Indonesia, Malaysia, Thailand, The Philippines and Vietnam) are, in fact, on par with China.

These “tiger cubs” and their fellow members of ASEAN appear to rival, and even surpass China when it comes to attracting FDI in the manufacturing sector, with companies from both the East and the West injecting USD 150 billion per year into the region. Some Western manufacturers have already made solid commitments and established both facilities and R&D centres to reduce their reliance on Chinese supply chains.

Establishing a presence closer to the new fast-growing consumer base in ASEAN provides a powerful rationale for change. Take Dyson for example – the company famous for its vacuum cleaners. When founder James Dyson announced an expansion his motivation was unmistakably clear. He was ramping up in a region that “continues to exhibit solid growth”. With hundreds of millions of new consumers emerging in Indonesia, the Philippines, Thailand and Vietnam, who could blame him?

Vietnam is perhaps the country in Southeast Asia that has benefited the most from the wave of restructured supply chains. Recent media headlines have declared Vietnam a “winner” in the trade conflict, to which there is a measure of truth. The Asian Development Bank reported that while Chinese exports to the U.S. fell by 12 per cent during the first half of 2019, Vietnam’s exports surged by 33 per cent. Extensive economic and political reforms undertaken over the past 30 years have undoubtedly played a major role. Investment interest and exports are looking promising in the other tiger cubs too, and lawmakers have not been slow to act.

Thailand recently announced a new incentives package to attract more manufacturing investments – a scheme that would give eligible companies a 50 per cent tax cut if they commit to investing at least USD 33 million by 2021. This programme aims to engage large tech companies and it comes at a timely moment. Apple has reportedly asked its suppliers in China to consider shifting as much as 30 per cent of production to Southeast Asia. Digital chipmaker Western Digital has taken similar steps to probe new opportunities in Asia.

INDUSTRY VOICES

WHAT'S ON THE MINDS OF MANUFACTURERS IN SOUTHEAST ASIA?

How do Southeast Asian manufacturers view the transformation journey that lies ahead? Do they consider disruptive technologies to be altogether positive and beneficial, or are they seen as major threats to competitiveness? What is their readiness level – do they have roadmaps and investment plans for the near future?

To uncover these answers Business Sweden conducted a survey among 300 manufacturers and industry experts in the ASEAN bloc. Their perspectives and views shed light on how the region is progressing and how manufacturers are preparing for change. In addition, the survey reveals ASEAN manufacturer's response to shifting supply chains and their maturity for taking an even greater role in Asia's future production landscape.

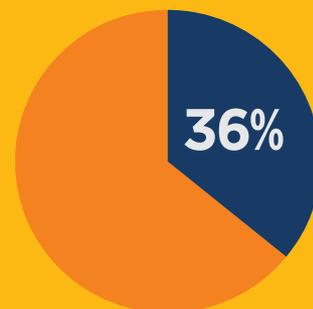
KEY TAKEAWAYS

The findings show that manufacturers in the region have overwhelmingly recognised the power and potential of Industry 4.0 technologies. The impact of smart machines and robotics, big data analytics and virtual modelling, to name a few examples, is being carefully assessed. And in most manufacturers' minds there are no questions that these enabling technologies will revolutionise planning and execution, processing, assembly and quality control.

At the same time, a number of challenges and potential stumbling blocks have been identified across the six markets in the survey. High initial investment costs, lack of technical skills and know-how as well as lagging infrastructure are all barriers that need to be addressed. Despite this, four out of five manufacturers in ASEAN plan to invest in the technology shift in the next three years. This opens up a spectrum of opportunities for suppliers.

Strong willingness, high ambitions and strategies are in place to improve conditions across the ASEAN value chain – from upgrading connectivity to government initiatives aimed at facilitating investments. Last but not least, there are clear signs that workforce upskilling will come high on the list of priorities. Again, this presents important opportunities in e-learning and other tried and tested solutions to address the IR 4.0 skills gap.

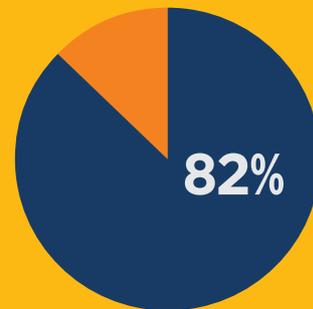
Industry 4.0 roadmap in place?



1 out of 3 have adopted IR 4.0 strategies

■ Yes
■ No

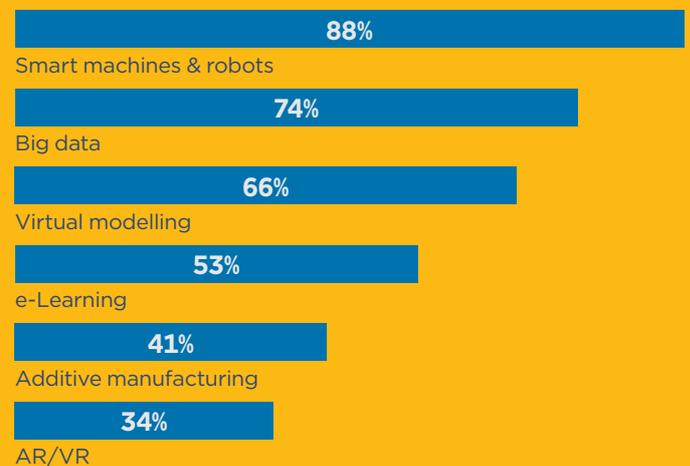
Planning to invest in the next 3 years?



4 out of 5 planning IR 4.0 investments

■ Yes
■ No

Budgeted investments until 2023



POWERING UP INDUSTRY 4.0 IN SOUTHEAST ASIA

The ASEAN countries set new course to harness the potential of smart manufacturing

470 BUSD
Mfg output 2018

5.5%
CAGR 97-18

16%
Share of labor in mfg

82%
Mfg products share of total exports

THAILAND

- ASEAN's second largest manufacturing economy
- Number one automotive hub in the region
- In October 2018 Thailand launched National IR 4.0 roadmap, called "Thailand 4.0"

VIETNAM

- Manufacturing accounts for 16% of Vietnam's GDP
- Electronics, textiles and food & beverage account for 72% of total exports
- In August 2019 Vietnam's government announced its national strategy on Industry 4.0

288 BUSD
Mfg output 2018

14.1%
CAGR 97-18

15%
Share of labor in mfg

84%
Mfg products share of total exports

346 BUSD
Mfg output 2018

6.6%
CAGR 97-18

32%
Share of labor in mfg

73%
Mfg products share of total exports

MALAYSIA

- Manufactured goods account for 22% of GDP and 73% of exports
- Major hub for electrical components - 20% of total regional output
- In November 2018 Malaysia launched National IR 4.0 roadmap, called "Industry4WRD"

248 BUSD
Mfg output 2018

6.1%
CAGR 97-18

14%
Share of labor in mfg

79%
Mfg products share of total exports

SINGAPORE

- World's 4th largest exporter of high-tech products
- One of Asia's largest hubs for aerospace and chemicals manufacturing
- In terms of Industry 4.0 policies Singapore is way ahead its neighbours, with being first globally to introduce Smart Industry Readiness Index

SELECTED INVESTMENTS IN ASEAN



TRANSPORT EQUIPMENT

VINFAST: New facility and set-up of automotive value chain in Vietnam

PROTON: Factory modernisation and expansion of capacity in Malaysia



ELECTRONICS

SAMSUNG: Relocation of Tier 1 supplier to Vietnam

RICOH: Relocation of printers factory to Thailand



FOOD & BEVERAGE

AAK: New customisation plant in the Philippines

CHINA MENGNIU DAIRY COMPANY: New liquid yogurt factory in Indonesia

THE PHILIPPINES

- Among world's top 10 fastest growing economies
- 73% of manufacturing sector total output generated by food & beverage and electronics
- The Philippines is the only country in the region lacking a national strategy for Industry 4.0

272 BUSD

Mfg output 2018

7.3%

CAGR 97-18

10%

Share of labor in mfg

88%

Mfg products share of total exports

INDONESIA

- World's 10th largest manufacturing nation
- 44% of manufacturing sector total output generated by food & beverage and electronics
- In April 2018 Indonesia launched National IR 4.0 roadmap, called "Making Indonesia 4.0"

570 BUSD

Mfg output 2018

6.6%

CAGR 97-18

15%

Share of labor in mfg

10%

Mfg products share of total exports

INDONESIA

Too big to fail

Indonesia recently became the world's 10th largest manufacturing nation. The country's Industry 4.0 roadmap is firmly in place and unveils a number of promising opportunities for smart tech providers.

MARKET OVERVIEW

With 270 million citizens, Indonesia is a country that is too big to fail. Although manufactured goods account for just 10 per cent of all exports, some 14 million people are employed in the sector contributing 20 per cent of GDP.

Electronics, automotive, food & beverage and chemicals are all important sectors, with the latter two being the largest. Food & beverage alone accounts for one-third of Indonesia's manufacturing. Production is centred on the island of Java where global brands such as Toshiba, LG, Sony, Toyota, Honda and Mitsubishi all have manufacturing facilities. Investments in the electronics industry hit a record high of around USD 1 billion in 2018 – a 50 per cent increase on the previous year. As much as 90 per cent of goods are destined for the domestic market.

FUTURE OUTLOOK

Manufacturing is becoming the engine of Indonesia's economy. The sector is on a strong growth trajectory in terms of value added (MVA% of GDP), fuelled by growing domestic demand. As Southeast Asia's most populated country, with a rapidly expanding middle class, it stands well-prepared to move further up the value chain.

The Indonesian government has undertaken a number of reforms to boost manufacturing and growth. Reduced bureaucracy, the introduction of industrial zones and financial incentives are just a few recent steps. The government's Industry 4.0 roadmap is firmly in place and aims to empower SMEs, increase investments, upgrade digital infrastructure and support upskilling of workers. More reforms are needed to improve education and upgrade skills.

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INDONESIA IS WELL- PREPARED TO MOVE FURTHER UP THE VALUE CHAIN

6.3

Indonesia
MVA CAGR
1997–2018

INSIGHT ON INDONESIA 2023

Indonesia recently became the world's 10th largest manufacturing nation. The country's Industry 4.0 roadmap is firmly in place and unveils a number of promising opportunities for smart tech providers.

TYPES OF IR 4.0 INVESTMENTS

Smart machines and robots: **85%**

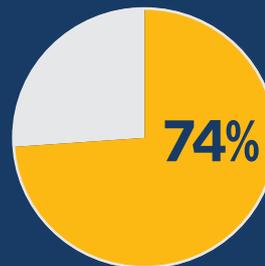
Virtual modelling: **40%**

E-learning: **35%**

Additive manufacturing: **25%**

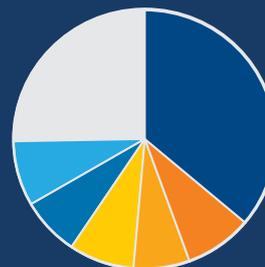
AR/VR: **25%**

Big data **65%**



SURVEY: INDUSTRY VOICES

74 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 36%
- Electronics 8%
- Chemicals 7%
- Transport equipment 8%
- Metal 7%
- Textile 8%
- Other 25%

*Manufacturing output 2018

MALAYSIA

Geared up for transformation

Malaysia's diverse manufacturing sector is the backbone of the economy and accounts for 22 per cent of GDP. Companies large and small are ramping up their focus on smart technologies to boost productivity.

MARKET OVERVIEW

No fewer than 5 million people (32% of total workforce) are employed in Malaysia's manufacturing sector which has led the country's growth since the 1980s. The economy is predominantly export-driven and the key segments are electronics, food & beverage and chemicals, which together make up 63 per cent of manufacturing turnover.

Malaysia is a major hub in ASEAN for electric components manufacturing. The electronics sector is particularly well-developed and is concentrated in the northern Penang region. Here, companies such as Intel, Dell and Texas Instruments all have operations. The chemicals industry accounts for the second largest share of exports in a sector dominated by SMEs and multinationals such as Petronas, BASF and Eastman.

FUTURE OUTLOOK

Malaysia has a well-educated workforce and an infrastructure that is often superior to that of its neighbours. The country has ambitious plans for transforming the industrial base and shifting focus to high-value products. Innovation, automation and increased productivity are strategic goals in Malaysia's national roadmap "Industry4WRD", launched in November 2018.

Penang is considered by many to be the "Silicon Valley of Southeast Asia". Productivity and talent retention are two key challenges. Manufacturers are opening up to smart tech as an important enabler for training and increased efficiency, with a young generation of professionals eager to take the reins and push through Industry 4.0 investments.

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**A YOUNG
GENERATION
OF PROFES-
SIONALS ARE
EAGER TO
TAKE THE REINS**

#12

Ease of Doing
Business Index,
World Bank
(Sweden #10)

INSIGHT ON MALAYSIA 2023

More than 50 per cent of respondents in Malaysia confirm they have already invested in disruptive technologies. High cost and lack of technical skills were cited as typical barriers. As such, the field is wide open for tech providers offering scalable solutions. 83 per cent of companies plan to invest in IR 4.0 technologies, and 31 per cent have adopted an Industry 4.0 roadmap.

TYPES OF IR 4.0 INVESTMENTS

Smart machines and robots: **89%**

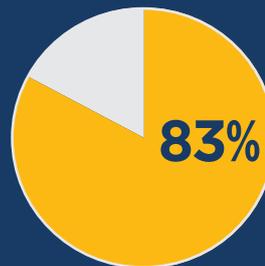
Virtual modelling: **80%**

E-learning: **66%**

Additive manufacturing: **46%**

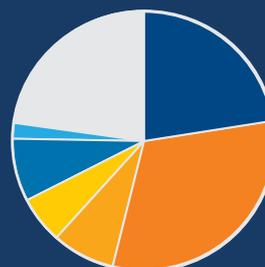
AR/VR: **34%**

Big data: **80%**



SURVEY: INDUSTRY VOICES

83 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 23%
- Electronics 32%
- Chemicals 8%
- Transport equipment 6%
- Metal 8%
- Textile 2%
- Other 23%

*Manufacturing output 2018

THE PHILIPPINES

Connecting the dots

The Philippines is one of the world's ten fastest-growing economies and has a large untapped talent pool with an international mindset. Manufacturing is central to the economy with a food & beverage sector leading the way in ASEAN.

MARKET OVERVIEW

The Philippine manufacturing sector contributes 23 per cent to GDP and employs 10 per cent of the labour force with the government vowing to increase this number to 15 per cent by 2025. While manufacturing has not lived up to its full potential, food & beverage and electronics are buoying the sector as a whole, with the former accounting for more than half of all manufacturing and the latter making up 55 per cent of all exported goods.

Philippine manufactured goods are globally competitive and represented as much as 88 per cent of the country's exports in 2018. The landscape is dominated by conglomerates such as JG Summit, San Miguel and Ayala Group. The local supply chain is relatively immature and infrastructure investments are sorely needed to spur growth across the archipelago and engage the large untapped talent pool.

FUTURE OUTLOOK

The long-term view of manufacturing is optimistic with some projections pointing to 5 per cent growth in the coming years. The Philippines is home to the second largest population in ASEAN, totalling almost 110 million people, and it has a young, tech-savvy demographic with an expanding middle class driving domestic demand.

While food & beverage is the largest segment, chemicals has been the fastest growing segment in terms of MVA (manufacturing value add) for the past eight years. The government's massive infrastructure programme "Build, build, build", aims to improve connectivity among the nation's islands. The 12-pillar initiative, the Manufacturing Resurgence Program (MVP), aims to revitalise automotive manufacturing and create hubs in electronics, machinery, garments and food.

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THE FOOD &
BEVERAGE
SECTOR
LEADS THE
WAY IN ASEAN

6.2%

Philippines
spending on
infrastructure
(as % of GDP)

INSIGHT ON THE PHILIPPINES 2023

Despite flawed infrastructure and institutional frameworks, Philippine manufacturers are progressing toward Industry 4.0 at pace. One in four respondents have a roadmap in place and 65 per cent report that they plan to invest in disruptive technologies in the next three years.

TYPES OF IR 4.0 INVESTMENTS

Smart machines and robots: **93%**

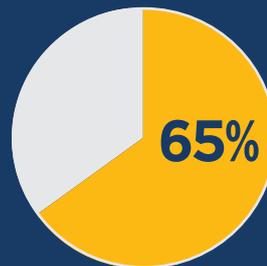
Virtual modelling: **47%**

E-learning: **33%**

Additive manufacturing: **20%**

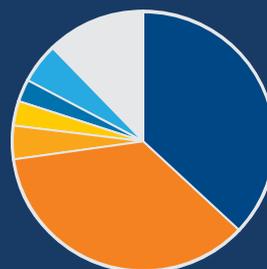
AR/VR: **20%**

Big data: **73%**



SURVEY: INDUSTRY VOICES

65 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 37%
- Electronics 36%
- Chemicals 4%
- Transport equipment 3%
- Metal 3%
- Textile 5%
- Other 12%

*Manufacturing output 2018

SINGAPORE

Well ahead of the game

As the world's fourth largest exporter of high-tech products, Singapore is well ahead of the game. Digitised factories are already bustling with activity and further investments are on the horizon.

MARKET OVERVIEW

The powerful tiger economy of Singapore is characterised by excellent finances and a high degree of openness. It has made knowledge and human capital its primary strength. The country is also known as a hub for high-value products. Some of the world's biggest semiconductor companies have fabrication plants here including Micron, NEC and Siltronic, supported by a rich ecosystem of sub-suppliers.

Manufacturing accounts for a fifth of Singapore's economy at a value of USD 73 billion. Electronics, petrochemicals and transport equipment dominate the manufacturing landscape. It has one of the largest and most diverse concentrations of aerospace companies in Asia with over 130 market players. Singapore boasts the largest pharmaceuticals sector in ASEAN with accelerating growth in med-tech manufacturing.

FUTURE OUTLOOK

Productivity in manufacturing soared by 14 per cent in 2017 making it the strongest performing sector of the year. This performance has continued and further investments in smart energy, robotics, automation systems and Big Data are expected to reinforce competitiveness in the face of growing competition. Singapore's fast-growing start-up scene is likely to present many opportunities.

The Singapore government has committed to invest USD 2.5 billion in R&D in advanced manufacturing and engineering. With its roadmap the "Smart Industry Readiness Index", testbed initiatives and other tools, the government is taking steps to enhance cross-border collaboration and build a powerful platform for innovation. In 2019 Singapore overtook the US as the world's most competitive economy.

”
A FAST-GROWING START-UP SCENE PRESENTS MANY OPPORTUNITIES

135.8
USD labour productivity per worker (US: 121)

INSIGHT ON SINGAPORE 2023

Singapore is the ASEAN leader in the race toward Industry 4.0. No more than 52% of companies have adopted an IR 4.0 roadmap, indicating strong reliance on government-driven programmes. Nonetheless, Business Sweden's survey shows that as many as 91% of companies have scheduled investments in smart manufacturing technologies in the next three years.

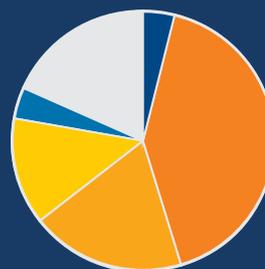
TYPES OF IR 4.0 INVESTMENTS

- Smart machines and robots: **90%**
- Virtual modelling: **67%**
- E-learning: **62%**
- Additive manufacturing: **48%**
- AR/VR: **33%**
- Big data: **71%**



SURVEY: INDUSTRY VOICES

91 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 4%
- Electronics 41%
- Chemicals 19%
- Transport equipment 13%
- Metal 4%
- Textile 0%
- Other 18%

*Manufacturing output 2018

THAILAND

On a roll

Thailand is the second largest manufacturing nation in ASEAN, trailing only Indonesia. A transformation mindset is gaining momentum as 90 per cent of surveyed companies prepare to go digital.

MARKET OVERVIEW

Thailand's manufacturing sector makes up 27 per cent of national GDP and employs 16 per cent of the labour force. The country leads the ASEAN pack when it comes to automotive manufacturing. BMW, GM and Ford all have a strong footprint here. Thailand also has more than 10,000 food & beverage processing factories including large-scale plants operated by multinationals such as Nestlé.

Electronics accounted for 33 per cent of export revenues in 2018 and there are hundreds of factories around Thailand operated by giants such as Sony, Hitachi, Schneider Electric and others. According to official data, 45 per cent of the country's 38 million strong labour force is currently unskilled with 400,000 skilled positions currently waiting to be filled.

FUTURE OUTLOOK

Thailand and Vietnam have become close rivals when it comes to attracting companies considering relocation in Asia. The Thai government has stepped up efforts to lure investments, now offering a 50 per cent tax cut for all investments made by the end of 2020 at a minimum level of USD 33 million.

Similarly, the government has committed to stimulate growth in high-value production by investing billions in infrastructure projects and centres dedicated to robotics innovation, in direct response to mounting challenges of an ageing population. In October 2018, the national roadmap "Thailand 4.0" was launched laying a strong foundation for manufacturers looking to embrace automation and smart tech.

”
A TRANSFORMATION MINDSET IS GAINING MOMENTUM

73%

of total ASEAN automotive sector export in 2018

INSIGHT ON THAILAND 2023

New technologies, say respondents in Thailand, will play a significant role in workforce upskilling to address critical labour shortages. The government's Industry 4.0 strategy is often considered to lack clarity, which may explain why just 40% of surveyed companies have roadmaps of their own. However, a mindset shift appears to be in full swing – 85 per cent of respondents plan to invest in smart technologies.

TYPES OF IR 4.0 INVESTMENTS

Smart machines and robots: **83%**

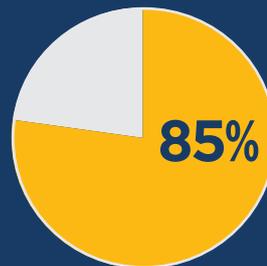
Virtual modelling: **67%**

E-learning: **56%**

Additive manufacturing: **56%**

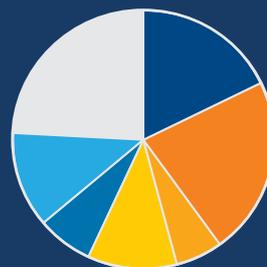
AR/VR: **39%**

Big data: **72%**



SURVEY: INDUSTRY VOICES

85 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 18%
- Electronics 22%
- Chemicals 6%
- Transport equipment 11%
- Metal 7%
- Textile 12%
- Other 24%

*Manufacturing output 2018

VIETNAM

Riding the trade train

Business is booming in Vietnam and high-value manufacturing is rapidly entering the spotlight. Suppliers of smart tech solutions are perfectly poised for success.

MARKET OVERVIEW

Vietnam is the fastest growing economy in ASEAN and consistently makes the top 10 list of the most promising emerging markets. The country has attracted record foreign direct investment (USD 16.74 billion in 2019), with the majority of inflow going to manufacturing – where 16 million people are employed.

Vietnam has grown into a major manufacturing hub that accounts for 16 per cent of GDP. The country's hallmark is its openness to foreign businesses, investments and free trade. Samsung has invested in eight new factories and an R&D centre, making Vietnam the company's largest production base for smartphones. Electronics and textiles account for 72 per cent of manufactured goods exports. A highly productive and affordable workforce has attracted major retailers including Adidas, Nike, H&M and Uniqlo.

FUTURE OUTLOOK

Is Vietnam's trajectory unstoppable? It certainly seems so. With a 9 per cent increase in FDI last year alone, the electronics and textiles sectors have a bright future. More recently, Vietnam has been cashing in on the U.S.–China trade conflict and attracted multinationals. In August 2019, the government announced a national Industry 4.0 strategy and connectivity is now at the forefront of people's minds.

Vietnam's young and technology savvy population is expected to be a strong catalyst for change. The government's roadmap for manufacturing aims to facilitate tech transfer, help minimise costs and strengthen the local value chain. Global brands are likely to drive digitalisation efforts which means that a broad spectrum of opportunities await. Exports are booming thanks to new FTA:s and reduced tariffs.

”
OPENNESS TO FOREIGN BUSINESSES, INVESTMENTS AND FREE TRADE ARE VIETNAM'S HALLMARK

19.5%

CAGR growth of exports, 2010–2019

INSIGHT ON VIETNAM 2023

Significant investments are expected in Vietnam across the panorama of IR 4.0 technologies. Two in five respondents have a roadmap in place and, most notably, 94 per cent of companies confirm that they plan to invest in disruptive technologies in the next three years. Lack of skills and implementation know-how were cited as key challenges.

TYPES OF IR 4.0 INVESTMENTS

Smart machines and robots: **81%**

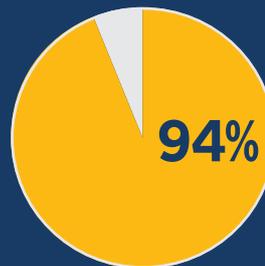
Virtual modelling: **86%**

E-learning: **67%**

Additive manufacturing: **62%**

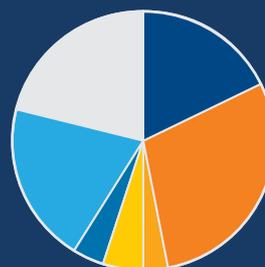
AR/VR: **62%**

Big data: **86%**



SURVEY: INDUSTRY VOICES

94 per cent of respondents plan to invest in IR 4.0 technologies over the next three years.



SEGMENT SHARE*

- Food & Beverage 18%
- Electronics 29%
- Chemicals 3%
- Transport equipment 5%
- Metal 4%
- Textile 20%
- Other 21%

*Manufacturing output 2018

CONCLUSION

SPOTTING OPPORTUNITIES

ASEAN is one of the fastest growing consumer markets in the world with thriving manufacturing sectors that contribute 20 per cent of the region's GDP. Foreign investments reached an all-time high in 2018 (USD 149 billion) and surpassed FDI in China (USD 139 billion). As such, promising opportunities in the drive towards smart manufacturing have opened up right across Southeast Asia.

The US-China trade conflict and volatile tariffs have added a powerful dimension to the transformation of ASEAN's manufacturing sector. Vietnam, Thailand and Indonesia have seen a pronounced upswing in direct investments. The geography of manufacturing and supply chains in Asia is shifting rapidly and as change gets underway, Southeast Asia is seizing the moment to Hoover up investments and jumpstart the Industry 4.0 journey in one fell swoop.

This means that a new business landscape is unfolding for a host of "new players", including system integrators, ICT specialists and tech start-ups. At the same time, Swedish innovations in digitised production stand a good chance of helping manufacturers leapfrog to the next level of efficiency and productivity. Now is the time to tap into strategic national goals defined in the Industry 4.0 roadmaps presented by governments in the ASEAN bloc. Understanding structure of the regional supply chain is also key as tech-related decisions are often taken elsewhere in Asia, the US or Europe.

Business Sweden's survey confirms that general awareness in ASEAN of the importance of smart manufacturing is currently high. Some 68 to 94 per cent of respondents have confirmed investment pipelines for IR 4.0 technologies until 2023. So, what's the best way of leveraging the opportunities identified in the survey?

By concentrating on critical needs, bottlenecks and barriers to progress in each market, Swedish suppliers and tech providers can hit the ground running. The ASEAN countries are thirsting for assistance not just in the realm of robotic automation, Big Data or virtual modelling – they also need help to make operations more demand-driven and dynamic based on the principle of de-centralised innovation and cross-border collaboration.

4 RECOMMENDATIONS FOR SWEDISH TECH PROVIDERS:

- 1 Embrace customer proximity**
Strategies need to be demand-driven and not technology-led.
- 2 Expand the horizon**
Map decision-makers across the whole supply chain as they may be located beyond SEA region
- 3 De-segment your market**
Adapt your value proposition to the supply chain conditions and customer needs in each country.
- 4 Collaborate in ecosystems**
Tap into local ecosystems and build new partnerships – while leveraging your existing network.





ABOUT BUSINESS SWEDEN

Business Sweden's purpose is to help Swedish companies grow global sales and international companies invest and expand in Sweden. Swedish companies can trust us to shorten time to market, find new revenue streams and minimise risks. We offer strategic advice and hands-on support in more than 50 markets.

Business Sweden covers all ten markets in Southeast Asia through our six offices located in Singapore, Jakarta, Kuala Lumpur, Bangkok, Hanoi and Manila. Business Sweden is owned by the Swedish Government and the industrial sector, a partnership that provides access to contacts and networks at all levels.

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