

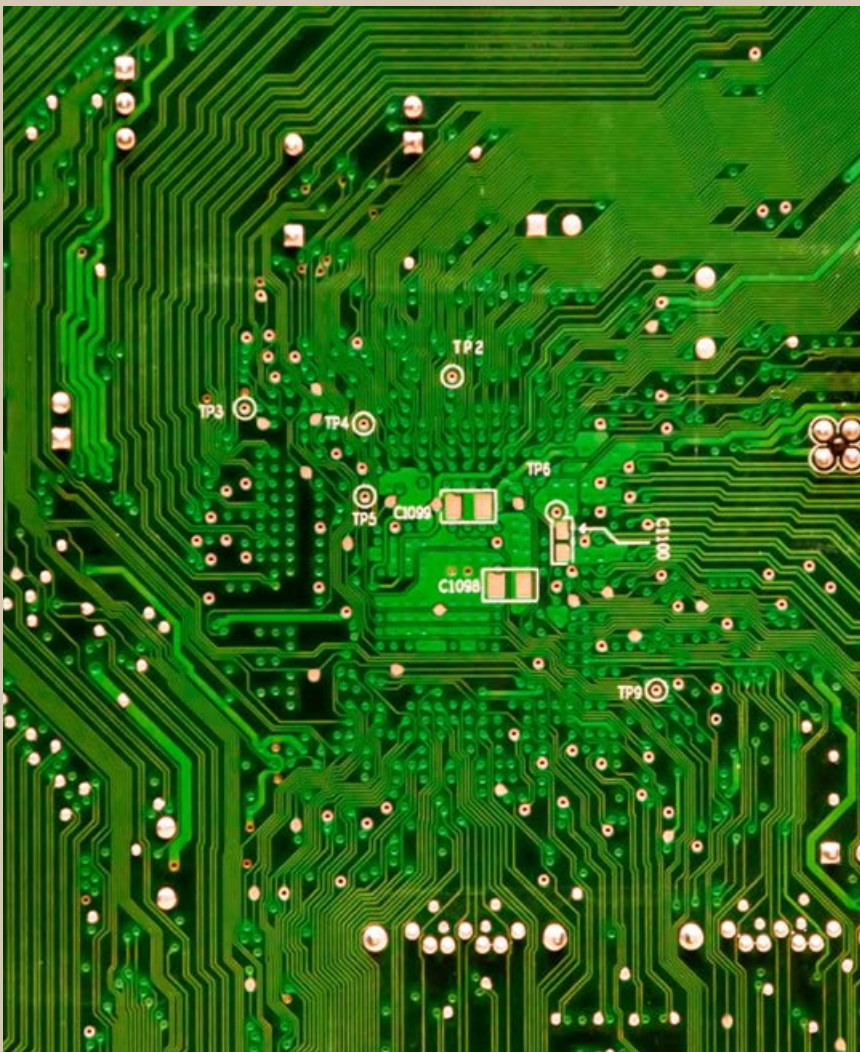


Government of Sri Lanka

NATIONAL EXPORT STRATEGY OF SRI LANKA

ELECTRONIC AND ELECTRICAL COMPONENTS STRATEGY

2018-2022



The National Export Strategy (NES) of Sri Lanka is an official document of the Government of Sri Lanka

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This Electronic and Electrical Components industry strategy was developed using the process, methodology and technical assistance of the International Trade Centre (ITC) within the framework of its Trade Development Strategy programme.

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Government of Sri Lanka

NATIONAL EXPORT STRATEGY
OF **SRI LANKA**
2018-2022

**ELECTRONIC AND ELECTRICAL
COMPONENTS STRATEGY**

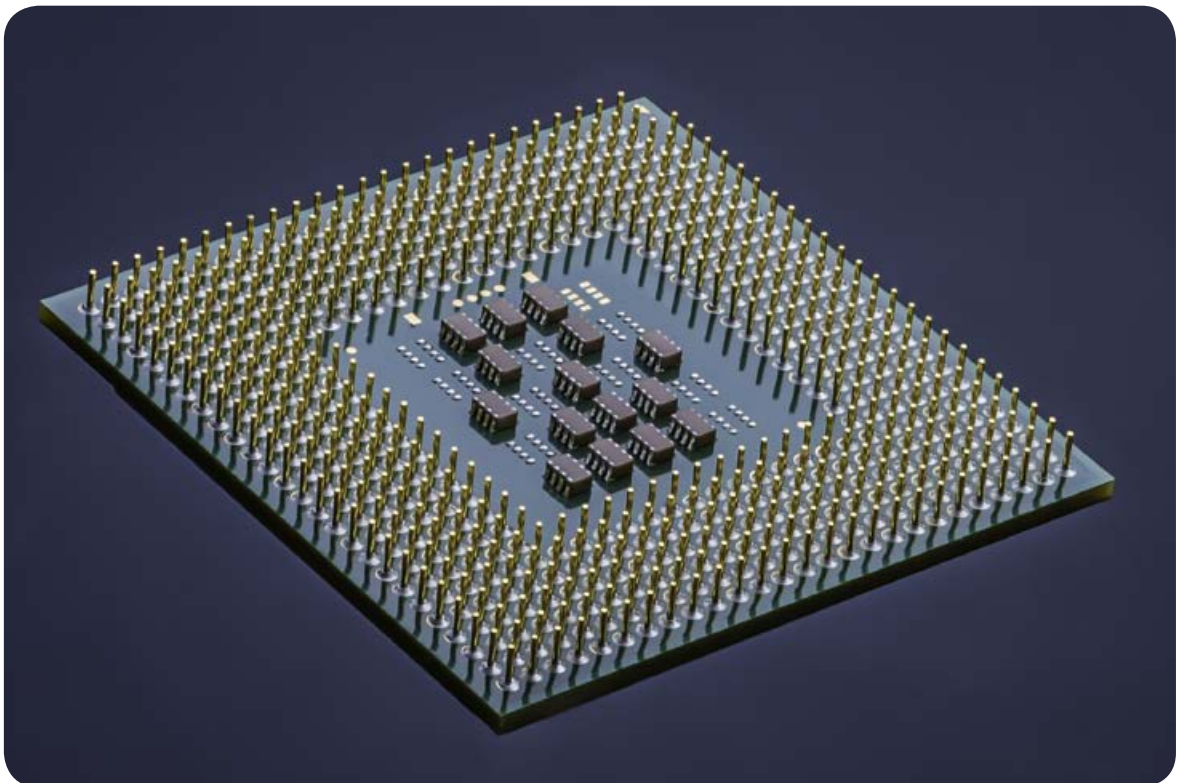


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MESSAGE FROM SRI LANKA ELECTRONICS MANUFACTURERS AND EXPORTERS ASSOCIATION (SLEMEA)

The National Export Strategy (NES) of Sri Lanka has identified the Electronic and Electrical Components (EEC) sector as a visionary sector for growth and development for the next five years. As electronics manufacturing has seen a steady growth in Asia, the NES focus on the sector will position this sector to benefit from expansion of the industry in Asia. This will lead Sri Lanka towards its aspirations to become a hub of growth and innovation in the Asian region, and thereby providing employment and prosperity to millions of Sri Lankans.

Globally, the electronics industry has grown from USD 1.75 trillion in 2008 to USD 2.1 trillion in 2015. It is estimated to further grow to USD 2.4 trillion by 2020. Despite the significant growth of the sector internationally, Sri Lanka has had limited participation in the sector so far. The NES will take into account Sri Lanka's skilled labour, infrastructure and preferential access to key destination markets (such as GSP+) to further develop its EEC industry.

The recommendations of the NES are a combined effort of public and private sector stakeholders to optimise strengths, overcome constraints and move towards establishing the Sri Lankan Electrical and Electronic Component sector as an integral manufacturing and trading hub of the Asian region.

This sectoral strategy under the NES is endorsed and budgeted by the government of Sri Lanka to provide a focused path for the sector to move forward similar to countries in the region, who had their respective government's support, to be guided towards strategic growth in terms of technology, investments and employment generation.

The strategy identifies three main approaches to making the EEC sector successful in the next five

years. These are to leverage existing capacity of being an Electronic Manufacturing Services centre, become a component manufacturing base for large multinational brands and to leverage innovative ideas available in academia and the industry.

This sector has significant potential to contribute towards employment creation and increase livelihoods through export led growth. The NES seeks to address constraints in competitiveness & structural deficiencies to realise this potential.

This strategy is the need of the hour and has been long coming. Implementing this strategy provides the impetus for this sector to reach the great heights that it is destined to reach.

To achieve these milestones, it is imperative that the industry extend its service portfolio from contract manufacturing to R&D, product designing and prototyping, and Internet of Things (IoT) devices to promote the country as an electronics R&D destination and hub.

We as stakeholders of the EEC value chain are committed to implement this strategy to make Sri Lanka an emerging leader in this sector to meet its domestic needs and to export to global markets.



Chandana Dissanayake
President

Sri Lanka Electronics Manufacturers and Exporters
Association (SLEMEA)

ACKNOWLEDGEMENTS

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The document benefited particularly from the inputs and guidance provided by the members of the sector team that steered the formulation of the sector strategy, namely:

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The full list of public and private stakeholders that contributed their precious time to the design of this Strategy are detailed in Appendix 1.

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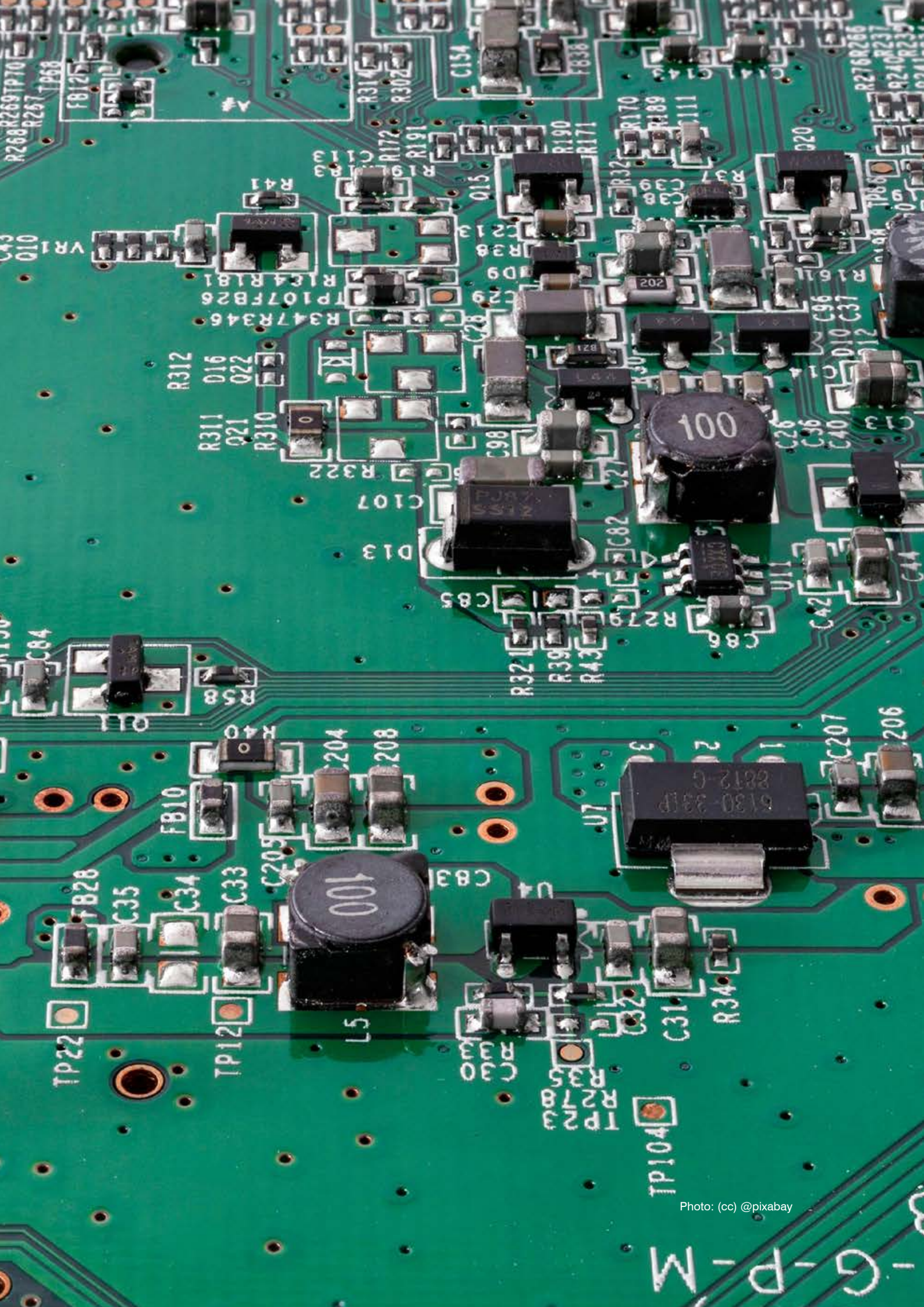


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-G-P-M

ACRONYMS

The following abbreviations are used :

3D	Three dimensional	MCB	Miniature circuit breaker
BOI	Board of Investment	MNC	Multinational corporation
CAGR	Compound annual growth rate	MoDSIT	Ministry of Development Strategies and International Trade
CKD	Completely knocked down unit	MoIC	Ministry of Industry and Commerce
DoC	Department of Commerce	MoU	Memorandum of understanding
EDB	Sri Lanka Export Development Board	NES	National Export Strategy
EEC	Electrical and electronic components	OEM	Original equipment manufacturer
EMS	Electronic manufacturing services	PCB	Printed circuit board
EU	European Union	PoA	Plan of action
FDI	Foreign direct investment	R&D	Research and development
G2B	Government-to-business	SLASSCOM	Sri Lanka Association of Software and Service Companies
G2G	Government-to-government	SLEMEA	Sri Lanka Electronics Manufacturers and Exporters Association
GDP	Gross domestic product	SLINTEC	Sri Lanka Institute of Nanotechnology
HS	Harmonized System	SLSI	Sri Lanka Standards Institution
IT	Information technology	SMEs	Small and medium-size enterprises
ITC	International Trade Centre	UPS	Uninterrupted power supply
IoT	Internet of things		
JV	Joint venture		
LED	Light emitting diode		
LKR	Sri Lanka rupee		



EXECUTIVE SUMMARY

The Electronic and Electrical Components (EEC) sector is an up-and-coming sector for Sri Lanka, with the potential to stimulate innovation, research and development (R&D) and investment in the country. The EEC sector is well positioned to benefit from the electronic and electrical component industry's steadily increasing levels of manufacturing in Asia, and can contribute to the diversification and technological upgrading of Sri Lanka's exports.

Globally, the electronics industry has grown from US\$1.75 trillion in 2008 to US\$2.1 trillion in 2015, and is estimated to grow to US\$2.4 trillion by 2020. During the past two decades, the industry – which encompasses consumer appliances, information and communication technology, industrial electronics, aerospace and defence – has experienced a steady expansion that has been driven by both demand and industrial infrastructure. The exponential growth of the Internet and its use for both personal and business data management and communications continues to be the sector's main driver.

Despite the immense global growth in the electronics industry, Sri Lanka so far has had limited participation in the sector. The country has great potential to develop a competitive electronics industry thanks to skilled labour, relatively well-developed infrastructure and preferential access to key destination markets through trade agreements. Interestingly, the compound annual growth rate (CAGR) for the electronics industry between 2012 and 2016 was 2.57% for Sri Lanka, while the global CAGR was –1.20%.

Global trends and opportunities for Sri Lanka

Electronics is a highly dynamic, globalized industry in which change is a constant; adaptations and upgrades continue to be key enablers and disruptors for the industry. Many trends that evolve from the EEC sector are linked closely with the software and hardware sectors. The main trends are 'digitization', 'automation', 'miniaturization' and, importantly, affordability. Nothing will remain untouched by electronics, in which hardware and software combinations as embedded technologies will continue to deliver disruptive solutions at more affordable prices at an even faster pace.

Several new areas such as security, healthcare, transportation, defence, agriculture, lighting and lifestyles are being digitized and automated at various levels.

This sectoral Strategy under the National Export Strategy (NES) is endorsed and budgeted by the government of Sri Lanka to provide a focused path for the sector to move forward in a way similar to this sector in other countries in the region that have the support of their government. The endorsement of and budget for this Strategy provide the support to guide the sector towards strategic growth in terms of technology, investments and employment generation.

Pressing issues for the sector in Sri Lanka

Many rounds of consultations with public and private stakeholders were held in Colombo and regions across the country to understand the sector, and many issues were highlighted in the value chain. This Strategy targets issues affecting the value chain and makes an informed selection of the most important targets that need to be addressed. Two main criteria were used to assess importance: the level of disturbance (perceived by national stakeholders) and the ease of resolution (both in terms of cost and time involved). The following are the most pressing issues that need to be addressed:

- Limited recognition of Sri Lanka's EEC sector locally and internationally
- Limited availability of skilled and semi-skilled labour
- Substandard products entering Sri Lanka's markets
- Limited access to contemporary and innovative technologies
- Inadequate strategic partnerships to integrate with global value chains
- Absence of sector-specific promotion and branding and limited participation in international trade fairs
- Limited services for product testing and standardization for exports.

Market orientation

Based on trends in the fast-changing EEC sector and on the successful experiences in this sector of neighbouring countries, certain issues must be prioritized. **The government of Sri Lanka needs to focus attention on the EEC sector and play a proactive role** by taking the following actions:

- Provide early support to the EEC sector by introducing a national-level framework for sector development, with focused product lines, and by encouraging investments into these product lines.
- Initiate a few projects of national importance that will lead to improved and enhanced production in the sector, such as encouraging green and clean electricity generation (rooftop solar) and transportation.
- Stimulate demand for electronics products. For example, the government could encourage rooftop solar or light emitting diode (LED) lighting so that these products could be manufactured in large quantities for domestic consumption and export.

Three main approaches could make the EEC sector successful in the next five years. First, **leverage the country's existing capacity in Electronics Manufacturing Services (EMS)** while increasing production of electrical parts and products. Second, **work to become a component manufacturing base for large multinational brands** by linking with the software industry, thus helping Sri Lankan producers to move up the value chain. Finally, **leverage innovative ideas available in academia and industry** to focus on a few high-tech products such as robotics or Internet of Things devices (IoT), among other growth opportunities.

EMS: EEC manufacturers in the country serve as contract manufacturers for a variety of companies from Japan, Scandinavia and the United Kingdom of Great Britain and Northern Ireland, manufacturing auto electronic parts, batteries and small medical equipment, among other products. The country can attract low-hanging opportunities with a two-pronged approach. First, **manufacture high volume but low value products** such as LEDs, miniature circuit breakers (MCBs) and electrical switches for companies from China, Japan, the Republic of Korea and Chinese Taipei; and, second, **manufacture high value, low volume products** such as smart panels, smart energy meters, energy efficiency products and small medical equipment for contracts from Sweden, Denmark, Finland and Germany. Besides the existing electrical products already manufactured in Sri Lanka such as switches, sockets, switch gears and wires, among others, producers can consider manufacturing smart panels, inverters and low power uninterrupted power supply (UPS) units and, if government aggregation support is provided, LED lighting as well. There is already a production base for LED batteries, so linking this

to production of inverters and low power UPS units will be a natural step up the value chain. Products such as LEDs and set-top boxes would not only help exports but could also supply domestic markets.

The strength of Sri Lanka's manufacture of existing products such as panels, electric meters and wiring harnesses and cables, combined with its strong production capacities for emerging products, switches and MCBs would make manufacturing products such as smart panels for export a natural next step. This could lead to local companies being able to execute medium to large scale projects internationally, thus moving up the value chain. India could provide partners for electrical parts and products manufacturing. **Indian companies are looking for alternative destinations to manufacture** these products in order to increase trade with Africa and the Middle East. **With Sri Lanka's existing manufacturing strengths, it should be possible to attract Indian investment in Sri Lankan manufacturing for the African and Middle Eastern markets.**

Component manufacturing base: Once the country is an EMS destination, the next step would be to **manufacture components in Sri Lanka**. Among the current products the industry can concentrate on are transformers, capacitors and wiring harnesses, and the range could be deepened by producing cable connectors, PCBs and relays. The latter products have low capital requirements but demand a high labour input. Countries in which to approach companies for such contracts would include Japan, the Republic of Korea and Germany. Such approaches should be supported by setting up a cluster for component manufacturers.

While undertaking initiatives to become a component manufacturing base, consideration also should be given to manufacturing passive and electromechanical components first, since active component manufacturing has high costs and presents technology challenges. Sri Lankan companies already manufacture passive components such as films and transformers; electrolytic and ceramic capacitors and resistors also could be manufactured. In the electromechanical space, Sri Lankan manufacturers already produce wiring harnesses and cables and connectors and relays could be added. Successfully manufacturing these products can **strengthen opportunities to become an EMS hub** as well.

Globally, manufacturers in **high-cost locations** such as Japan, the EU (especially Germany) and the United Kingdom **are actively looking for an alternative China+1 location**. Mostly large multinationals, these companies could be invited to relocate to Sri Lanka to meet their China+1 requirement. This can be achieved by encouraging companies from the Republic of Korea, Japan, Germany and other European countries to establish themselves in Sri Lanka.



Photo: (CC BY-NC 2.0) Mahinda Rajapaksa, Sri Lanka's First PC Manufacturing Plant.

Innovations through academia and industry: Entrepreneurs should be encouraged to develop and commercialize **innovative designs and products that have been invented by Sri Lanka's academic institutions and industry**, specifically low-cost, high-tech products such as robotics, three dimensional (3D) manufacturing, e-surveillance security devices and IoT devices.

Institutional adjustments

The development of the EEC sector depends significantly on the functions and roles of trade and investment support institutions and on overall inter-institutional coordination. These institutions are divided into four main categories: **policy support, trade support, business support, and academia and civil society**. They are the drivers for future EEC industry growth but certain capacity and resource issues must be addressed to ensure their effectiveness. The adjustments that can be made to directly benefit the sector are:

- Improve recognition of the EEC sector and strengthen its industry body, the Sri Lanka Electronics Manufacturers and Exporters Association (SLEMEA).
- Build and fortify linkages between industry and academia.
- Streamline, strengthen and simplify the intellectual property regime.
- Strengthen the Sri Lanka Standards Institution (SLSI) as the local governing body for product compliance testing.
- Develop human resources and emphasize skills development.

Investment requirements

The following investments in the value chain are key areas on which to focus in order to achieve a positive outcome for the EEC sector:

- Create an industry cluster to boost local production and exports.
- Target promotional events for contracts and investments.
- Enhance R&D facilities to encourage innovation.
- Support an incubation centre housed in a university.

The omnipresent sector

The EEC sector has great potential to make significant socioeconomic contributions to Sri Lanka through export-led growth. To realize this potential, competitive constraints and structural deficiencies must be addressed and identified opportunities need to be leveraged. The following delineates the vision and strategic approach needed to achieve this.

All stakeholders in the EEC value chain in Sri Lanka agreed on the following vision statement.

“ To be an emerging leader in the electrical and electronics manufacturing sector to meet Sri Lanka's needs and export to the global market ”

THE STRATEGIC OBJECTIVES

The Plan of Action (PoA) responds to this vision by addressing the sector's constraints and leveraging opportunities in a comprehensive manner. Particular efforts will be made to achieve the following strategic objectives:

Strategic objective 1: Be recognized at the national level as a sector with export and employment potential led by the private sector

- Strengthen the leading industry body, SLEMEA.
- Raise awareness of the electronics and electrical manufacturing industry (locally and internationally).
- Build strong and regular private-public dialogue (getting public institutions involved and supportive of the EEC sector).

Strategic objective 2: Establish Sri Lanka as a value added electronics manufacturing hub

- Be recognised as a contract manufacturing destination through targeted promotional events.
- Support innovation, start-ups and new product development.
- Leverage existing and forthcoming free trade agreements and concessionary market access schemes.

Strategic objective 3: Make existing industry players more globally competitive

- Strengthen electronics import regulations and ease regulatory constraints to motivate sector growth.
- Concentrate on specific, strategic product lines and identified target countries.

Strategic objective 4: Improve supply of semi-skilled and skilled professionals to satisfy the EEM sector's needs

- Enhance awareness about the EEC sector, especially among youth, to create a stable work force.
- Improve industry-academia collaboration in order to enhance knowledge and experience sharing between them.

Critical to achieving these targets will be coordination of activities, monitoring of progress and mobilization of resources for implementation. Industry representatives recommended that a public-private 'advisory committee' for the EEC sector be rapidly established, operationalized and empowered.

The EEC advisory committee has been established and is now responsible for overall coordination, policy guidance and monitoring of industry development. This effectively organized and supported committee will plan strategic industry development.

High-level support from the Government and strong championship by the private sector will be the real drivers to transform Sri Lanka into a globally recognized EEC destination and Asia's favourite centre of excellence.

ELECTRICAL AND ELECTRONICS –THE OMNIPRESENT SECTOR

Electronics is the science of controlling electricity; electrons play a fundamental role. Electronics includes circuits in electrical components such as vacuum tubes, transistors, diodes, integrated circuits, optoelectronics sensors, associated passive electrical components (such as capacitors, inductors, resistors, etc.) and interconnection technologies, such as printed circuit boards (PCBs), connectors and wiring harnesses, etc. Two concepts that encompass the breadth of development in this sector are 'information, communication technology and electronics' and 'electronic systems design and manufacturing'.

The key segments within the electronics sector are:

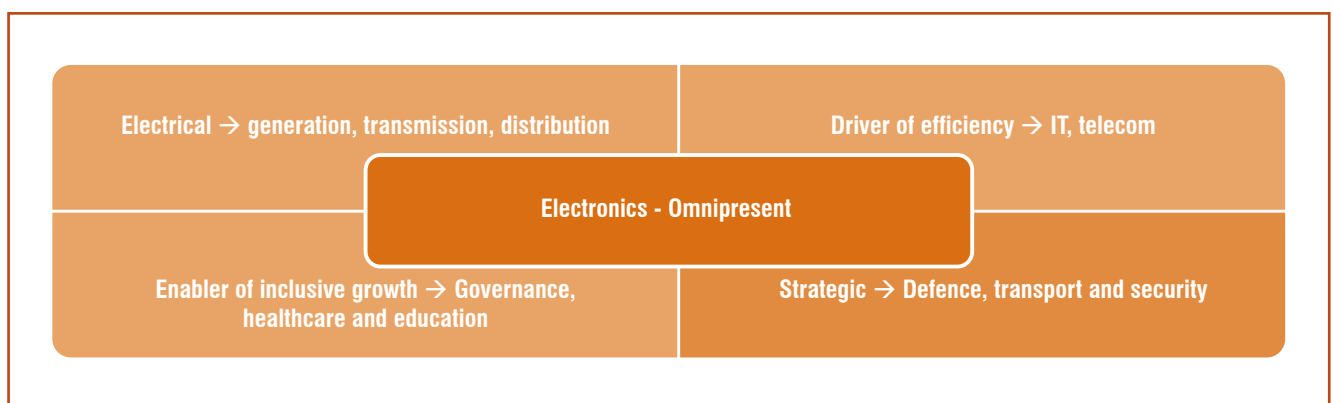
- Consumer/entertainment: televisions, set-top boxes, audio and video recorders and players, cameras, public address systems, lighting electronics, home appliances;
- Telecommunications: network equipment, handsets, routers and switches;
- Information technology (IT): personal computers, laptops, tablets, wearables;
- Strategic and defence electronics;
- Automotive electronics;
- Medical, healthcare and wellbeing electronics;
- Industrial electronics including capital equipment and machinery and
- Electronic components and parts.



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It would be a mistake to see and approach electronics only as a standalone sector or as a vertical within the manufacturing sector. Along with IT, electronics today serves as a meta resource and is an (horizontal) enabler to other sectors (figure 1).

Figure 1: Electronics: The omnipresent sector



Globally, the electronics industry has grown from US\$1.75 trillion in 2008 to US\$2.1 trillion in 2015, and is estimated to grow to US\$2.4 trillion by 2020. During the past two decades, the industry –encompassing consumer appliances, information and communication technology, industrial electronics, aerospace and defence– has experienced a steady expansion that was both demand-driven and industrial infrastructure-driven. The exponential growth of the Internet and its usage for personal and business data management and communications continues to be the driving phenomenon. In general, the industry is growing 2.5 times as fast as major industries such as oil, petrol and minerals or chemicals and plastics; 2.4 times as fast food, beverage and tobacco; and twice as fast as transportation and electricity and gas.

The growth of the electronics industry is underpinned by transnational companies' efforts to make the production process efficient. Due to the global nature of the electronics industry, its production facilities have spread to locations with the lowest labour and production costs. The production process in most electronics sub-sectors has been organized so that individual parts can be manufactured in different places and the final product assembled in yet another location, thus providing low costs and high profitability

International electronic manufacturers increasingly are expanding their sales not only in established economies like the United States of America, the EU and Japan but also in emerging markets in Asia, South America and Africa. Within this framework, the main criteria for choosing suitable

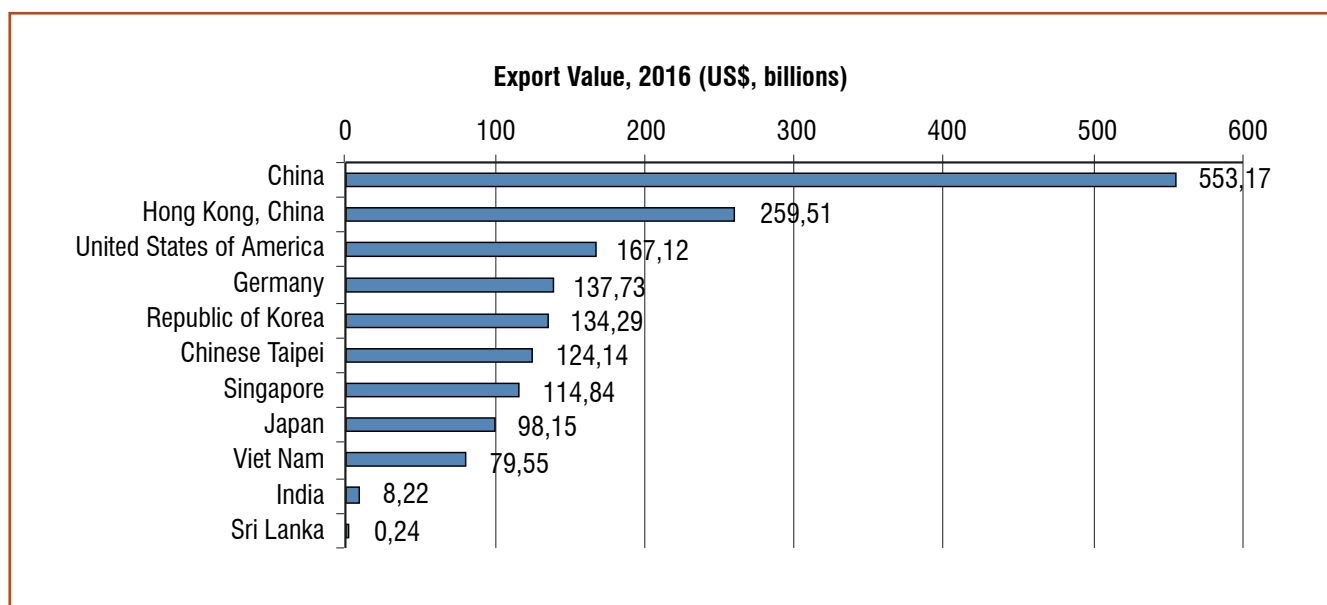
locations for production hubs are proven production efficiency and optimal distances from numerous markets.

The significant distinguishing factor between the electronics and other manufacturing industries is its fast-changing technology, innovation and product adaptation. Currently, electronic product manufacturing is expanding at an unprecedented scale in the Asia Pacific region, with Japan, the Republic of Korea, China, Chinese Taipei, India, the Philippines and other countries becoming manufacturing hubs for electronic goods and products.

Learning from peers, from the region

Recently, countries that have achieved an exponential growth in gross domestic product (GDP) per capita have had a robust electronics manufacturing industry (figure 2). The key countries in electronics manufacturing [code 85 under the Harmonized System (HS)] are Japan, the Republic of Korea, Chinese Taipei, Philippines, China, Viet Nam and India [for completely knocked down units (CKD)]. Most manufacturers from Northeast Asia have transitioned successfully from technology-followers to technology-leaders by undertaking local system design and component production. Emerging markets in the region such as China, India, the Philippines and Viet Nam increasingly have expanding their share in the global electronics market. It is important for Sri Lanka to analyse the growth patterns of these nations, especially those neighbouring countries that were in a situation similar to that of Sri Lanka today but that transformed rapidly into leaders in the EEC industry.

Figure 2: Export value of HS 85: electrical machinery, equipment and parts thereof



Source: ITC calculations based on Comtrade data.

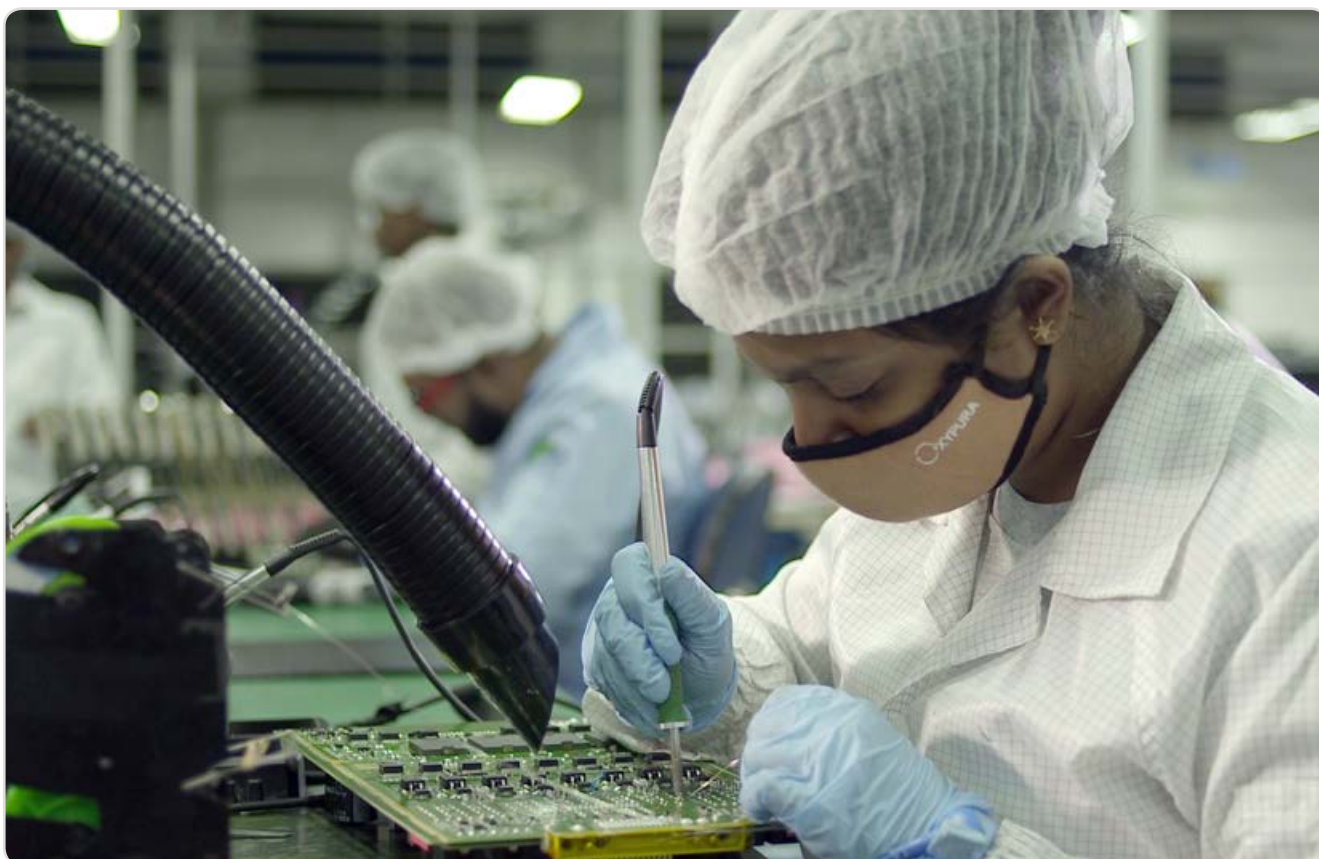


Photo: ITC

The Japanese electronics industry competed on cost initially, but rapidly moved up the value chain by providing high value and high quality products and by building global brands. Japan achieved this through an export-led growth strategy that emphasized exporting to the United States and by developing its R&D to manufacture innovative and high quality products. The government of Japan played a major role in supporting the private sector to establish several brands with a global presence in consumer electronics and, to a lesser degree, in industrial and automotive products.

The story of Chinese Taipei, the Republic of Korea and Viet Nam are similar to that of Japan, with export-led strategies supported by their respective governments. While the Chinese Taipei government promoted the Hsinchu Science Park to produce IT products, semiconductors and power supplies, the government of the Republic of Korea encouraged the production of consumer electronics, components and semiconductors through *chaebols*, family-controlled corporate groups. The Vietnamese turned around their EEC industry in the past six years through government policy and tax holidays, combined with a low-cost labour force. The result has been growth in many ways, led by foreign direct investment (FDI) from the Republic of Korea and American original equipment manufacturers (OEMs). In turn, these

manufacturers have persuaded their supply chains to follow them to Viet Nam.

Another example of EEC sector development is that of the Philippines, which established itself as an efficient, quick turnaround EMS destination. Logistics parks such as that at Subic Bay were established to assemble circuits quickly, especially for customers in Singapore, Japan and the United States, but the Philippines could not leverage their early success and retain manufacturers because of shallow value addition and a limited technology base.

Although the strategies adopted by other countries might not be totally applicable to Sri Lanka, this analysis of the neighbours offers three important messages for developing the EEC sector. The strong growth of the EEC sector in Japan, Chinese Taipei, the Republic of Korea and Viet Nam was due to (i) provision of early support by their respective governments, (ii) a strategy that is export-led and (iii) excelling initially by being an EMS hub, as in the Philippines.

The question remains, where is the market for Sri Lanka if the neighbours are already competing for market share in the region? The answer lies in new regions such as Africa, the Middle East, Oceania and Latin America.

VISIONARY SECTOR FOR SRI LANKA

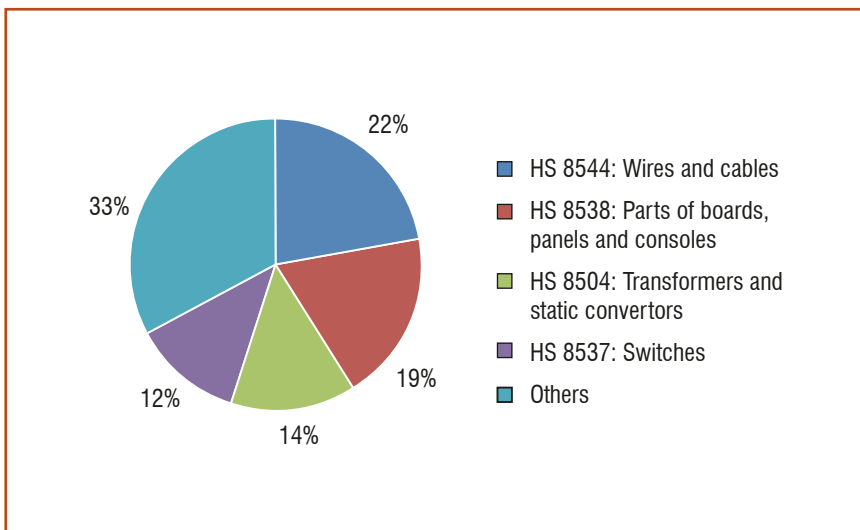
The EEC sector is a forward-looking sector with strong potential to stimulate innovation, R&D and investment in the Sri Lankan export sector. EEC is well positioned to benefit from the growth in electronic and manufacturing production in Asia, as well as to contribute to upgrading the technology of Sri Lanka's production.

In 2016, the Sri Lankan electronics industry (HS 85) accounted for just US\$241.80 million in exports but US\$1.37 billion in imports, creating a trade deficit of US\$1.13 billion. This shows that there is a sizeable demand for electronic products within the country, especially for finished goods. Although the growth of the sector has been volatile, with export growth rates of 45% in 2014 and -22% in 2015, the overall export growth trend between 2011 and 2015 was 4%,

outperforming world export growth by 2%. The CAGR for the electronics industry between 2012 and 2016 has been 2.57% for Sri Lanka, while for the world the CAGR has been -1.20%

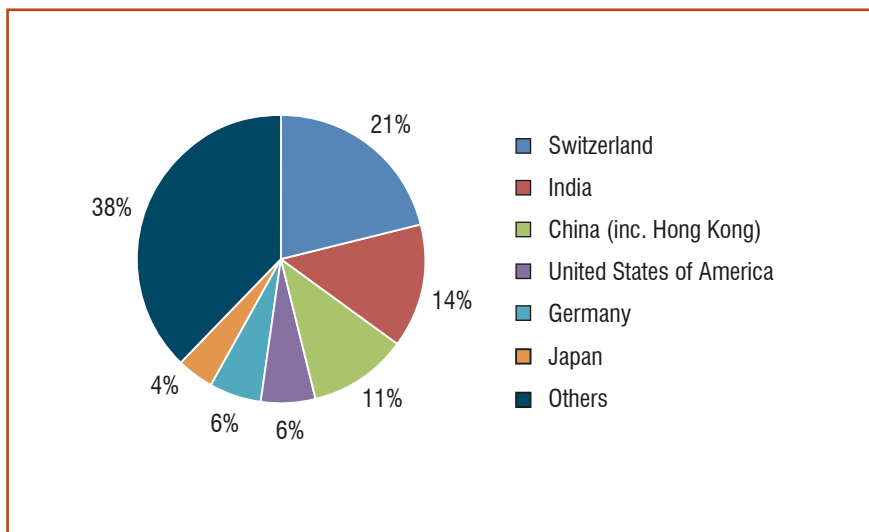
The Sri Lankan EEC industry has experienced a resurgence in FDI inflows since 2013, reaching US\$90 million in 2016. The sector's main exports (figure 3) are wires and cables (22%); parts of boards, panels and consoles (19%); transformers and static converters (14%); switches (12%) and other components (33%). The industry caters to the automobile, telecommunication, consumer electronics and industrial application sectors, and provides employment for approximately 30,000 people countrywide. Most companies are based in export processing zones, under the supervision of the Board of Investment (BOI).

Figure 3: Sri Lanka's EECs main export values (percent)



Source: ITC calculations based on Comtrade data.

Figure 4: Sri Lanka’s EECs main export values (percent)



Source: ITC calculations based on Comtrade data.

Sri Lanka’s main export destinations for this sector (figure 4) are Switzerland (21%), India (14%) and China, including Hong Kong SAR (11%). Exports to the United States, the EU and Japan lag, but are growing. Despite the immense global growth of the electronics industry, Sri Lanka has limited participation in the sector so far. However, the country has great potential to develop a competitive electronics industry

thanks to a skilled labour force, relatively well-developed infrastructure and preferential access to key markets through trade agreements.

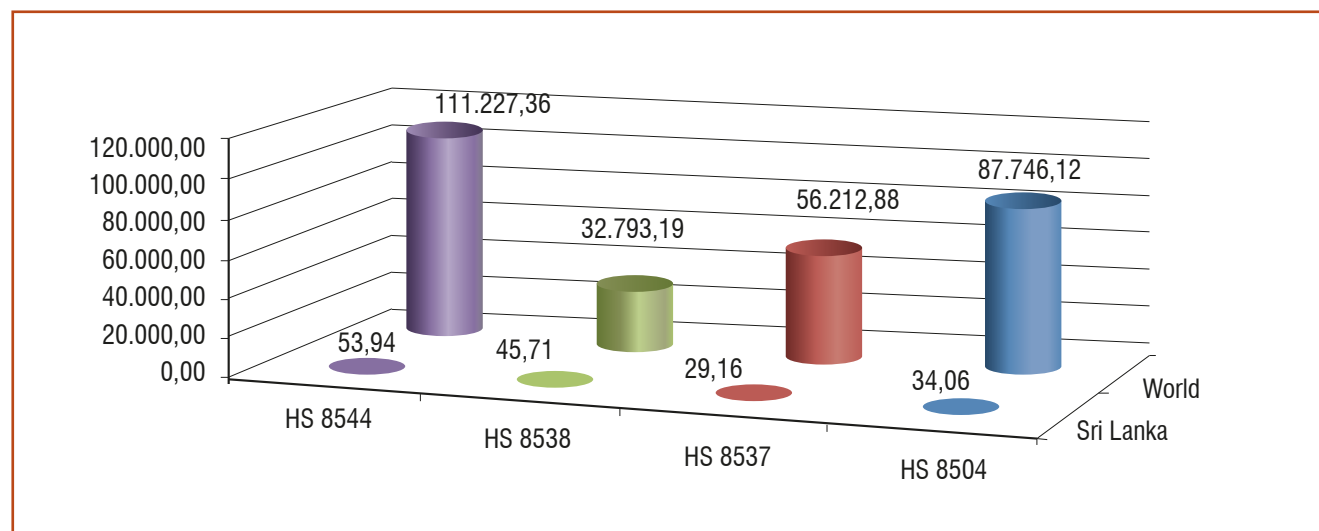
Table 1 lists the top exports in the EEC sector at the HS code six-digit level.

Table 1: Top four Sri Lankan exported EEC products

HS 2-digit chapter	HS 6-digit products
HS 8504 (Electrical transformers, static converters such as rectifiers and inductors) US\$37.04 million	HS 850431 (Transformers for power below or equal to 1KVA) US\$23.49 million
HS 8537	HS 853710 (Switches for voltage below or equal to 1000 volts) US\$25.02 million
HS 8538 (Parts suitable for use solely or principally with the apparatus of heading 8535, 8536 or 8537, not elsewhere specified) US\$42.78 million	HS 853810 (Boards, panels, consoles, desks, cabinets and other bases) US\$14.59 million
	HS 853890 (Parts suitable for use solely or principally with the apparatus of heading 8535, 8536 or 8537) US\$31.12 million
HS 8544 (Insulated 'including enamelled or anodised' wire, cable 'including coaxial cable' and other insulated electric conductors) US\$53.77 million	HS 854430 (Ignition wiring sets and other wiring sets or vehicles, aircraft or ships) US\$37.78 million
	HS 854449 (Electric conductors for a voltage below or equal to 1000 volts not fitted with connector) US\$11.44 million
	HS 854442 (Electric conductors for a voltage below or equal to 1000 volts fitted with connector) US\$2.28 million

Source: ITC calculations based on Comtrade data.

Figure 5: Sri Lankan and global export values of HS codes 8544, 8538, 8537 and 8504 in 2016 (US\$ Million)



Source: ITC calculations based on Comtrade data.

As seen in figure 5, in 2016, the top four electronics products exported from Sri Lanka under HS Code 85 were HS Code 8504 (electrical transformers and static converters, such as rectifiers and inductors) valued at US\$34.06 million, HS 8537 (boards, panels, consoles, desks, cabinets and other bases, equipped with two or more apparatus) at US\$29.16 million, HS 8538 (parts suitable for use solely or principally with the apparatus of heading 8535, 8536 or 8537, not elsewhere specified) at US\$45.71 million and HS 8544 (Insulated 'including enamelled or anodised' wire, cable 'incl. coaxial cable' and other insulated electric conductors) at US\$53.94 million. These products mainly are manufactured under contract for export, but with some supply for the local market.

As seen in table 2, Sri Lanka's CAGR for HS 8504 between 2012-2016 was 0.68%, while global CAGR for the same period was 1.19%. The top five global importers for HS 8504 good were the United States, China, Hong Kong SAR,

Germany and Mexico; Sri Lanka exports to all these countries. For HS 8537, Sri Lanka's CAGR between 2012-2016 was 22.66% while the world CAGR was 3.71%, with the top five global importers being the United States, Germany, China, Canada and Mexico. Sri Lanka exports these products to Switzerland, Maldives and Bahrain. For HS 8538, Sri Lanka's CAGR between 2012-2016 was -0.33%, while the world CAGR for the same period was -1.14%, with the top five global importers being China, Mexico, the United States, Germany and the Republic of Korea. Within these top five countries, Sri Lanka exports to United States and Germany, and it also exports to Switzerland. For HS 8544, Sri Lanka's CAGR between 2012-2016 was -1.24%, while the world CAGR was 0.79%, with the top five global importers being the United States, Germany, Japan, Mexico and China. Sri Lanka exports these products to India, Maldives and Japan. China is the top exporter for all four of these HS codes and Sri Lanka does not have a significant share of global exports for any of the above products.

Table 2: Sri Lankan and global CAGR for HS codes 8504, 8537, 8538 and 8544

HS Code	CAGR (2012-2016) (percent)	
	Sri Lanka	World
HS 8504	0.68	-1.19
HS 8537	22.66	3.71
HS 8538	-0.33	-1.14
HS 8544	-1.24	0.79

Source: ITC calculations based on Comtrade data.



Photo: ITC

The necessary approach

To make the EEC sector successful in the next five years, the Government of Sri Lanka should view the sector as export-led, with a strong potential to stimulate innovation and investment. Existing capacity as an EMS centre should be leveraged to increase electrical parts and products manufacturing and to move towards becoming a component manufacturing base. This sector can be an incubator for successful innovation and public-private cooperation in R&D, building on existing cooperation between the industry, universities and research institutes. Moreover, Sri Lanka

is well situated in the middle of the main maritime transport corridor that links Asia and the Pacific to Europe and to North America, which provides logistic access to key overseas markets such as the EU, China, Japan, countries in the Association of Southeast Asian Nations and the United States.

This sectoral Strategy under the NES is endorsed and budgeted by the Sri Lankan Government to provide a focused path so that the sector can grow strategically in technology, investments and employment generation, in a way similar to other countries in the region that had their respective government's support.

- The EEC sector has significant potential to make socio-economic contributions to Sri Lanka through export-led growth.
- EEC is a forward-looking sector for Sri Lanka with the potential to make the country an EMS hub, to become a leading contract manufacturing centre in the region and to move up the value chain by leveraging innovative ideas from academia and industry.
- Sri Lanka can be a destination of choice for companies in high cost countries that actively are looking for an alternative destination as a China+1 location.
- EEC is a dynamically changing sector with disruptive tendencies, if not followed closely.
- Exports from the Sri Lankan EEC sector stand at US\$ 241.80 million, low in comparison with China's, which stand at US\$ 557.06 billion.

THE VALUE CHAIN DIAGNOSTIC

Electronics is a globally integrated industry with supply chains all over the world. Even the largest players depend upon significant imports, with no one country manufacturing all components and products.

The electronics value chain has several parts that are capital and technology intensive (figure 6). These parts also add high value. Raw materials for electronics, components and parts form the bulk of this category of the value chain. The design, assembly and testing of the final products make up the other significant part of the value chain, as seen in figure 7.

Figure 6: Value chain in electrical and electronics

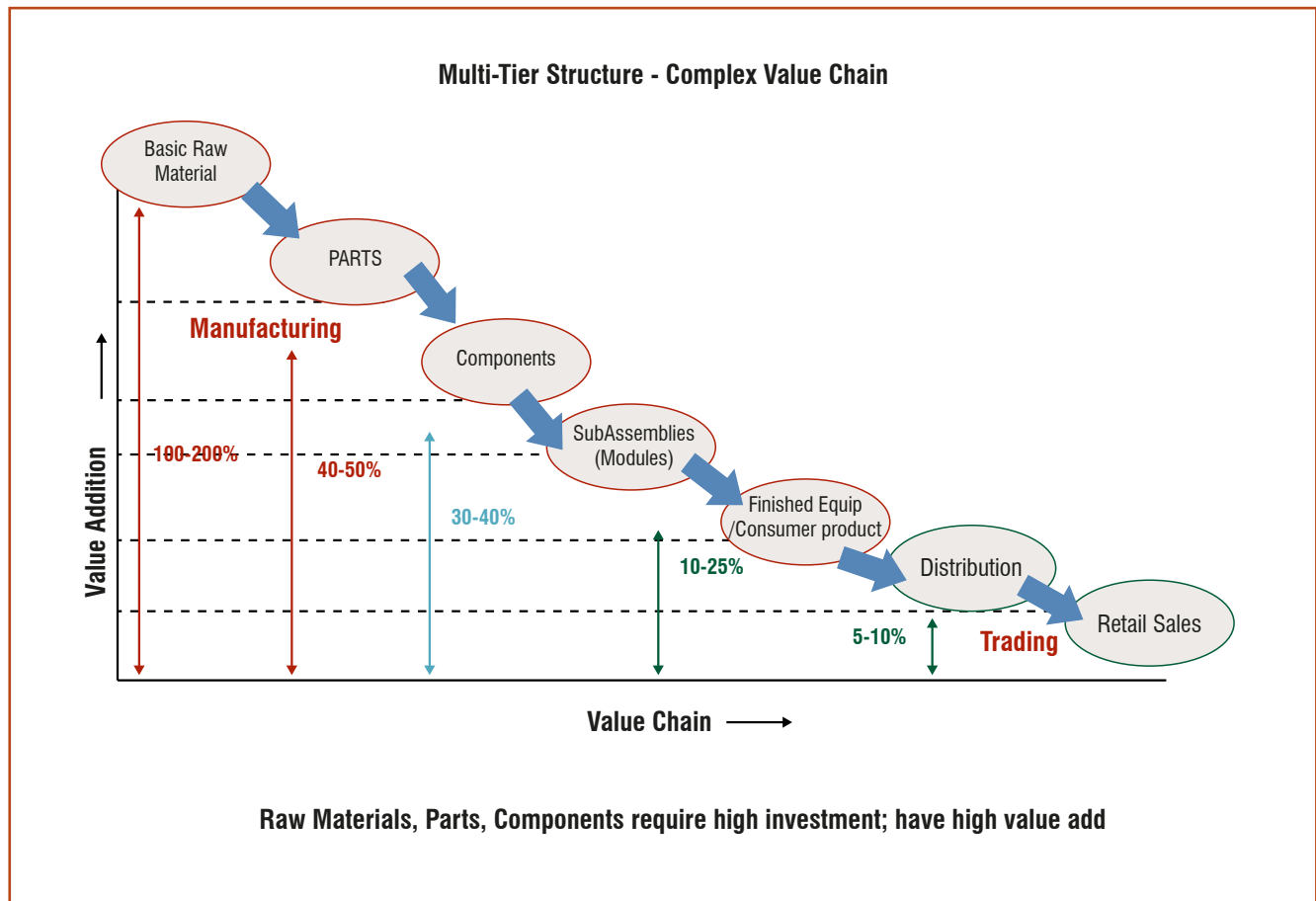


Figure 7: Existing value chain of the EEC sector

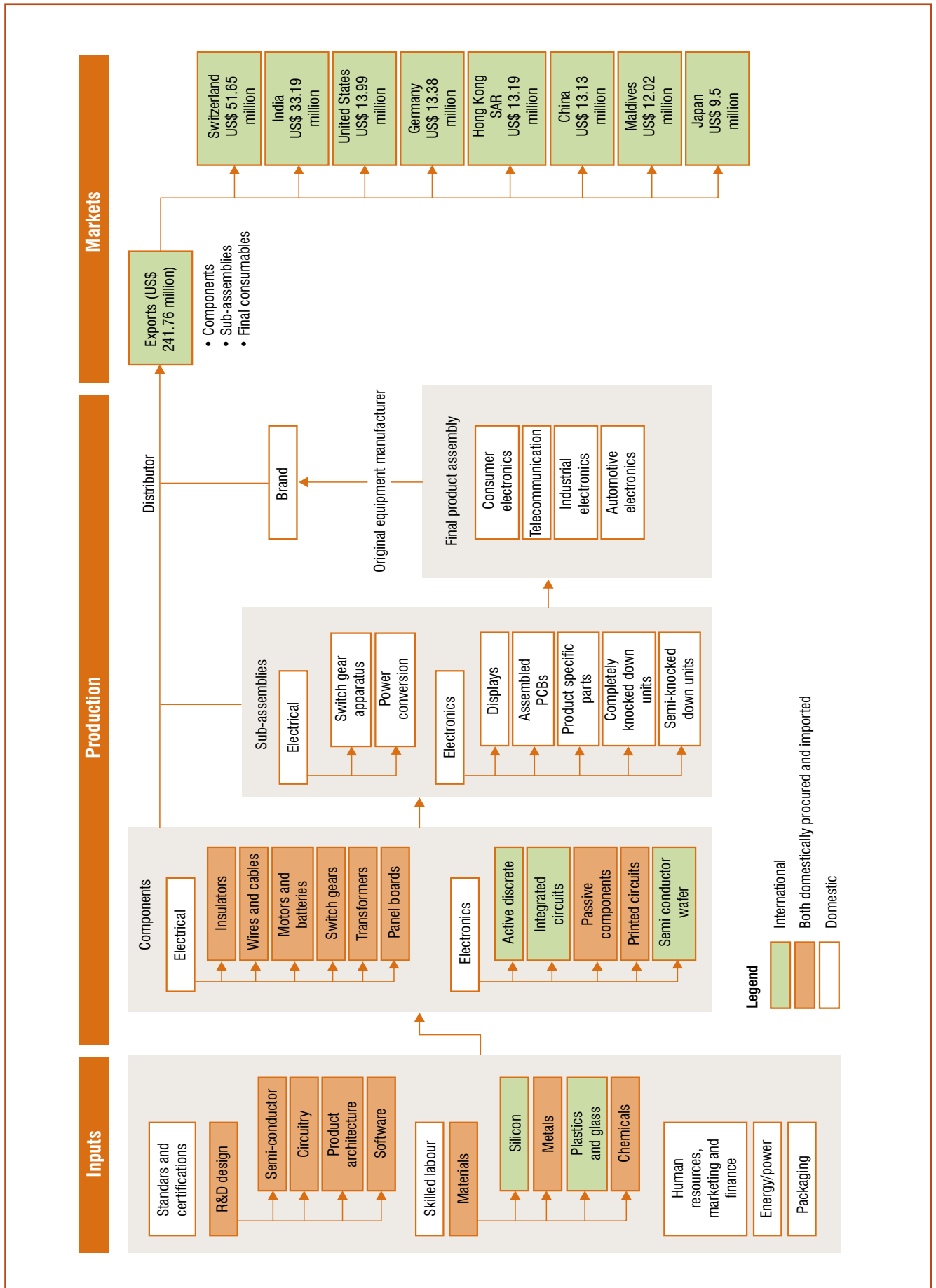
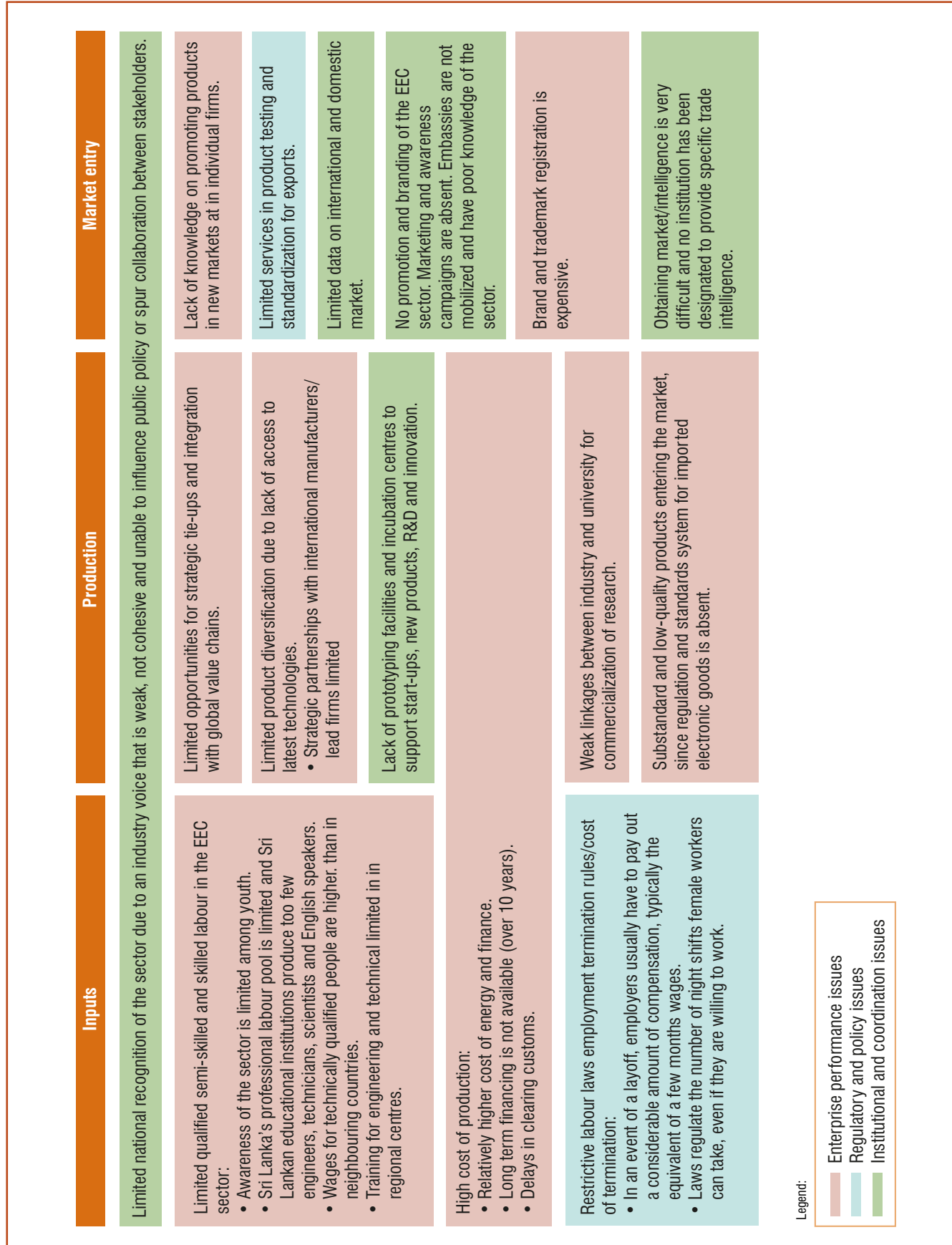


Figure 8: Long list of constraints faced by the EEM sector.



FOCUSING ON THE MOST PRESSING ISSUES

To remain realistic and resource-efficient, this Strategy will not focus on all the issues affecting the value chain. Instead, it will make an informed selection of the most important issues to be addressed. Criteria used to determine importance are the level of disturbance (perceived by national stakeholders) and the ease of resolution (both in terms of cost and time involved).

Top issues to be addressed across the value chain spectrum

Limited recognition of the EEC sector

There is limited knowledge and awareness about the EEC sector's growth in Sri Lanka and limited understanding among policymakers of the sector's concerns. Rarely have officials visited factories to gauge the potential of the sector or to address industry needs. This lack of awareness has been exacerbated further by the lack of a strong and unified industry voice to influence public policy or to spur collaboration between EEC companies. The industry body, SLEMEA, has a limited membership and has not been able to voice its concerns actively or to seek assistance from public sector stakeholders, since there has been inadequate interaction between key stakeholders and SLEMEA. The need for a strong industry/sector body was identified as a key priority during consultations.

This constraint is addressed through PoA: 1.2.1, 1.2.2, 2.1.2, 4.1.1, 4.1.2, 4.1.3.

Top issues to be addressed for input provisions

Limited availability of skilled and semi-skilled labour

Labour shortages remain a challenge for both local and foreign manufacturers in Sri Lanka, given the country's limited pool of workers. Sri Lanka's labour market is very small (about 8.8 million) when compared to that in China's Pearl River delta and Sri Lanka's more populous South Asian neighbours such as India (481 million) and Bangladesh (77 million). According to Sri Lanka's Department of Census and Statistics, men constitute more than 65% of the total labour force, largely thanks to a higher participation rate than women.

The lack of a skilled labour force is a problem heightened by the fact that many high school graduates prefer 'white collar' jobs to labourer or semi-skilled positions in the manufacturing sector. Additionally, some skilled workers tend to seek higher-paid work overseas, making it difficult for companies to hire or retain skilled workers and management-level staff.

A further constraint is that youth – particularly students – are not aware of the career opportunities in this sector, due to the lack of national recognition for the industry.

This constraint is addressed through PoA: 4.1.1, 4.1.2, 4.1.3.

Substandard products entering Sri Lanka's markets

An efficient supply chain is the most critical success factor for the development of the EEC industry. An input suppliers' ecosystem is mostly absent in Sri Lanka, which challenges efficient industry growth. Many local input producers struggle to comply with quality requirements, which leads manufacturers to rely on imports. However, there are also challenges with imports, since it is difficult to find reliable overseas providers; 90 days is the average time needed to import materials. Low component manufacturing activity in Sri Lanka and the absence of strong component distribution hubs that can import and trade components in large quantities heightens the problem of fake components entering the electronics industry. Although there is some manufacturing activity in the country, it is limited to a few parts of the component ecosystem. Approximately 60% to 70% of inputs for major electronic appliances must be imported, and Sri Lanka lacks regulations and a standards system for manufacturing electronic goods.

This constraint is addressed through PoA: 3.1.1.

Top issues to be addressed on production provision

Limited access to contemporary and innovative technologies

Product life cycles of electronics are brief, responding to the fast-changing demands of consumers who are hungry for up-to-date products. Manufacturers in this industry are required to have the latest, most up-to-date and highest quality technologies and processes in place for new product introduction or they will be left behind. Sri Lanka has limited access to such contemporary and innovative technologies.

Environmental concerns are paramount, not only during the manufacturing process but also throughout the lifespan of electronics devices. Because of environmental concerns, new standards and regulations are pushing electronic manufacturers to consider social responsibility when making decisions. In this process, the entire life cycle of a product must be considered, from manufacturing (with the use of harmful chemicals and human exposure to those chemicals) to consumer use (with the consumption of energy) to the end of a product's life, which may entail waste disposal and complex disassembly. **A push for energy-efficient electronics also is forcing manufacturers to develop new methods**



Photo: (cc) - Anushka Wijesinha

to produce devices that consume less energy; this technology is also missing in the EEC sector in Sri Lanka.

This constraint is addressed through PoA: 1.2.1, 2.1.1, 2.1.2, 2.2.2, 4.2.2.

Scarce strategic partnerships that integrate with global value chains

In the evolving landscape of technology equipment manufacturing, contract manufacturing is undergoing a major shift. As OEMs increasingly outsource product design and development to EMS partners, they can reduce overall costs and change fixed costs into variable costs, a key benefit in the race to control manufacturing costs.

This trend spells opportunity for EMS partners in Sri Lanka, enabling them to expand into new lines of business and revenue opportunities and, as a result, to make more strategic partnerships with global partners. Such strategic partnerships are valuable, since Sri Lanka has the opportunity to become a contract manufacturing hub.

This constraint is addressed through PoA: 1.2.1, 2.1.1, 2.1.2, 4.2.2.

Top issues to be addressed on market entry

Deficient in sector promotion and branding and limited participation in international trade fairs

Because the industry body is weak, at a firm level manufacturers find that participation in international trade fairs is not

successful, as the trade fairs attended are not necessarily the appropriate ones for the industry. Moreover, individual firms making singular marketing efforts leads to competition between companies, instead of cooperation. Overall, there is no standard branding that supports the entire EEC sector in Sri Lanka and this also leads to limited access to market intelligence, both for manufacturers and for potential customers.

This constraint is addressed through PoA: 1.2.2, 2.1.1, 2.1.2.

Limited services for product testing and standardization for exports

In the global marketplace, it is common for components in an electronic product to skate across multiple continents –sometimes more than three– before arriving at their end point. As most electronics manufacturers know, regulatory requirements vary from one part of the world to another. Companies must be prepared to deal with varying international standards and compliance and traceability issues, which can raise operational problems. Companies that are positioned best to deal with such complexities in international sales are those best positioned to succeed in the long run.

In Sri Lanka, manufacturers struggle to find testing centres and are turning to internationally recognized third-party testing and certification organizations, which leads to higher costs. The sector is also at a disadvantage because there are no specific local standards set in Sri Lanka that adhere to international norms.

This constraint is addressed through PoA: 1.2.1, 2.1.1, 2.1.2, 4.2.2.

THE WAY FORWARD

The EEC sector has significant potential to make socioeconomic contributions to Sri Lanka through export-led growth. To realize its potential, competitive constraints and structural deficiencies need to be addressed and identified opportunities need to be leveraged. The following delineates the proposed vision and strategic approach for the sector.

“ To be an emerging leader in the electrical and electronics manufacturing sector to meet Sri Lanka’s needs and export to the global market ”

THE VISION

All stakeholders of the EEC value chain in Sri Lanka agreed on the following vision statement:

THE STRATEGIC OBJECTIVES

The PoA responds to this vision by addressing the sector’s constraints and by leveraging opportunities in a comprehensive manner. Particular efforts will be made to meet the strategic objectives outlined in figure 8 in order to meet the needs of the future value chain in the EEC sector (figure 9).

Figure 9: Strategic objectives for the Sri Lanka EEC sector



THE FUTURE VALUE CHAIN

Figure 10: Future value chain of EEC sector

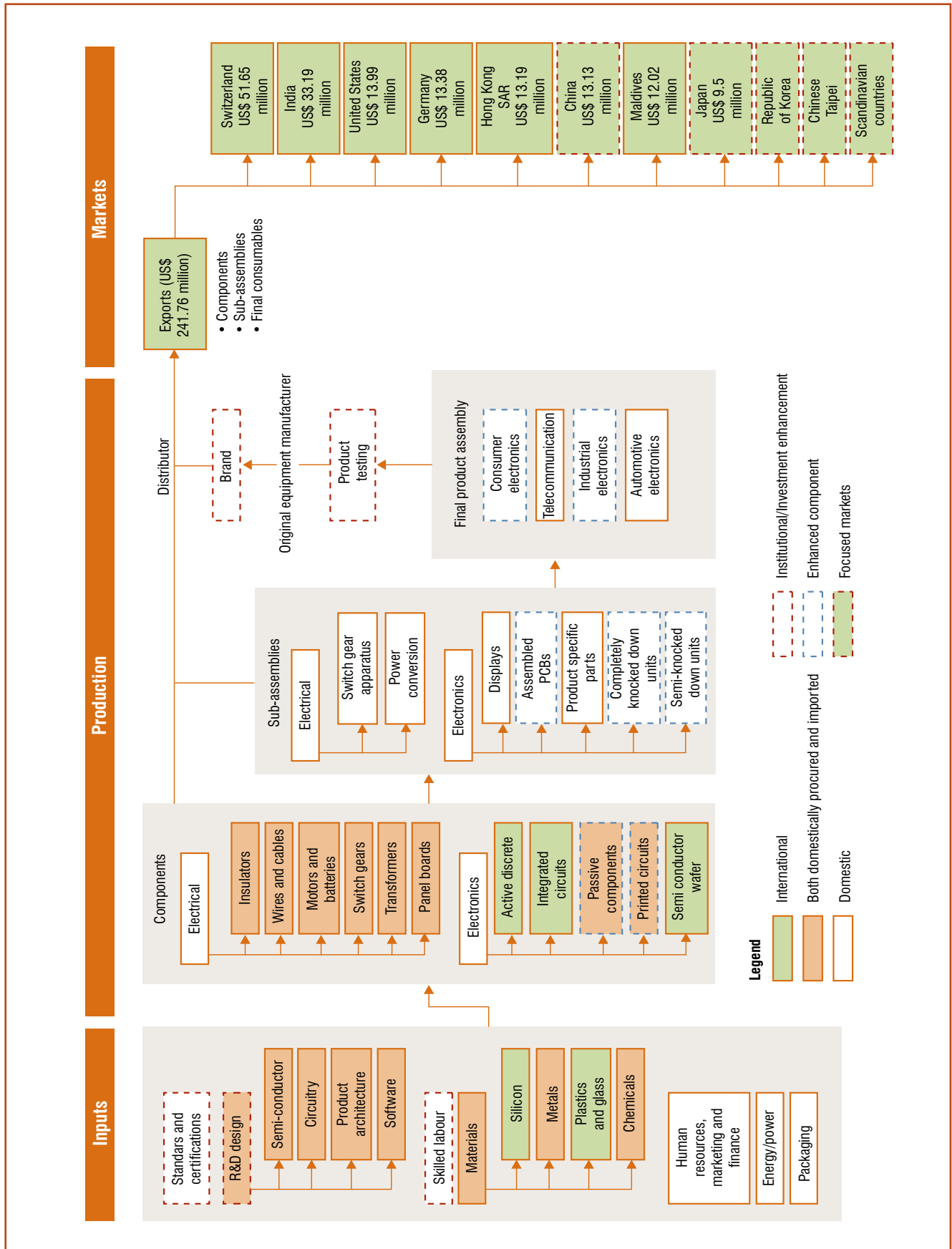
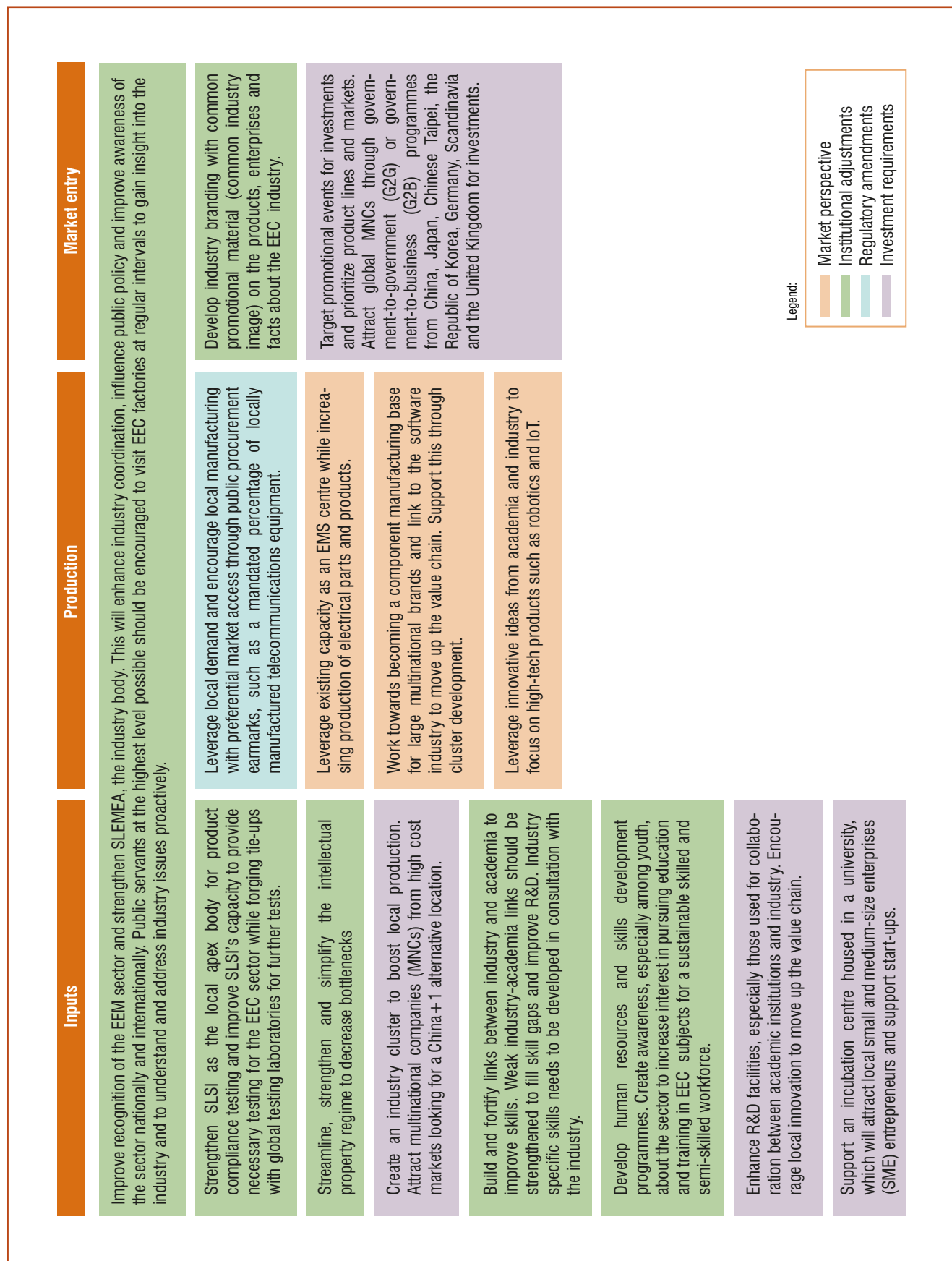


Figure 11: Main Areas of improvement along the value chain



FUTURE TRENDS IN THE EEC SECTOR AND DRIVERS FOR SRI LANKA

Electronics is a globalized industry in which the needs and aspirations of people across the globe are met almost concurrently through electronic means. This sector is highly dynamic, with change being a constant more frequently than not; adaptations and upgrades continue to be key enablers – and hence disruptors – for the industry. No technology enabled by electronics will remain static for long; invention and adaptation in short time frames makes previous technology obsolete. Unlike other sectors, in which a technology's life span is longer, the rapidly changing nature of the electronics industry means that disruption occurs if there is not ongoing assessment and adaptation. The rate of obsolescence and technology disruption in this sector is second to none. Another key aspect of this industry is the synergy of software and hardware that has led to the embedded systems era, which has dominated recent developments.

Many trends that evolve from the EEC sector are linked closely to the software and hardware sectors. The main trends are digitization, automation, miniaturization and, importantly, affordability. A key trend in this sector is digitization, in which efficiencies in areas such as communication, governance and business are driven by digitization both at the backend and at the application level, such as online access of citizen information for e-governance purposes. Industrial applications are moving toward automation. Robotics, 3D additive manufacturing and IoT will establish a connected industry, often referred to as 'Industry 4.0'. For example, industrial machinery, especially in the developed world, is being automated to improve efficiencies and lower costs due to the high price of labour. Another trend is miniaturization, in which electronic products become more efficient and compressed, which results in new technological areas such as wearables, augmented reality and virtual reality. For example, music was recorded on records, then on cassettes, then on compact discs and now on a small chip and in the cloud.

The most important of all trends in the electronics sector is affordability. The cost of owning high end technology is now affordable to the ordinary consumer. This will lead to larger volumes of production at lower cost thresholds. For example, mobile telephones with technologies like augmented reality are now within easy reach of consumers.

It is reasonable to state that nothing will remain untouched by electronics – embedded technologies will continue to deliver disruptive solutions at more affordable prices at an even faster pace. Several new areas such as security, healthcare, transportation, defence, agriculture, lighting and lifestyles are all being digitized and automated at various levels. It is important to note that import tariffs across the world are at their lowest for this sector. This means that global trends are the drivers for the industry, irrespective of where they are located.

At this pace of change and adaptation, the Sri Lankan electronics industry and policymakers must focus on specific products to develop a successful electronics export sector. It is important to agree upon a few product lines as focus areas for the next few years. After research and discussions with the stakeholders, below is a suggested list of product lines:

- Specialized low volume, high value circuits and systems
- Passive components – resistors, capacitors, inductors
- Electro mechanical components – transformers, switches, relays
- Interconnection devices – PCBs, connectors.

The above product lines have been chosen because of the following reasons:

- Existing capabilities – injection moulding, metal sheet fabrication, PCB assembly (largely through hole and some surface mounted devices), wiring harnesses, passive components and certain engineering skills
- Outsourced contract manufacturing destination
- Market potential (domestic and export) due to geographic location.

- It is a dynamically changing sector with disruptive tendencies, if not followed closely.
- Main trends are digitization, automation, miniaturization and, importantly, affordability.
- It is important to emphasize on focused product lines:
 - » Specialized low volume, high value circuits and systems,
 - » Passive components – resistors, capacitors, inductors,
 - » Electromechanical components – transformers, switches, relays and
 - » Interconnection devices – PCBs, connectors.
- Little will remain untouched by electronics, and the use of hardware and software combinations as embedded technologies.

OPPORTUNITIES FOR SRI LANKA'S EEC INDUSTRY

The sector's future value chain is driven by its market development objectives, which define needed value chain enhancements and the areas on which to focus investments. There is great potential for EEC sector growth in existing products and for expansion through development of new products that, in time, can reach new markets.

MARKET ORIENTATIONS

Based on trends in the fast-changing EEC sector and on the experiences of successful neighbours, it is suggested that Sri Lanka make the following priorities, with short and long term goals. It is essential that the Sri Lankan Government recognizes the opportunities in the EEC sector and plays a proactive role to:

- Provide early support to the EEC sector by introducing a national-level framework for sector development, with focused product lines, and by encouraging investments into these product lines.
- Initiate a few projects of national importance that will lead to improved and enhanced production in the sector, such as encouraging green and clean electricity generation (rooftop solar) and transportation.
- Promote aggregation of demand for electronics products: for example, by encouraging rooftop solar or LED lighting so that these products can be manufactured in large quantities for both domestic consumption and export.

Three main approaches can be followed to make the EEC sector successful in the next five years. First, existing capacity as an EMS centre could be leveraged to increase production of electrical parts and products. Second, this increased production could be used to make the country a component manufacturing base for large multinational brands and to develop links to the software industry that can help move the Sri Lankan EEC sector up the value chain. Finally, innovative ideas from academia and industry should be leveraged and a focus should be placed on a few products such as robotics and IoT.

Electronics manufacturing services

Currently, EEC manufacturers in the country, including those in the export processing zones, manufacture on contract for a variety of companies from Japan, Scandinavia and the United Kingdom. These local EEC companies already possess technology and are serving as EMS units for these OEMs by manufacturing auto electronic parts, batteries and

small medical equipment, among other products. Sri Lanka can leverage already available BOI incentives to entice more companies to use Sri Lanka as an EMS hub. To begin with, the country can attract 'low-hanging' opportunities using a focused, two-prong approach. First, manufacture high volume, low value products such as LEDs, MCBs and electrical switches for companies from China, Japan, the Republic of Korea and Chinese Taipei. Second, pitch for high value, low volume contracts from Sweden, Denmark, Finland and Germany for products such as smart panels, smart energy meters and other energy efficiency products, and then further diversify into small medical equipment.

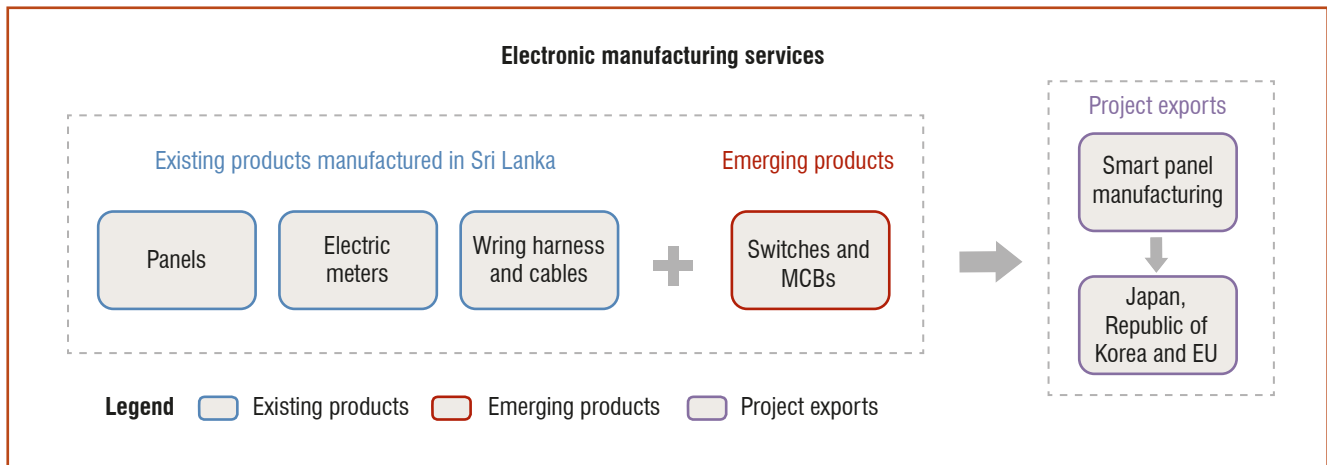
It has been pointed out earlier in this Strategy that Sri Lanka has a sizeable import bill from EEC products. Providing credible substitutes for imported products can lead to improved possibilities for exports. On the strength on this emerging export competence, Sri Lanka should aim to establish itself as a manufacturer of products for its domestic markets as well as for exports to new markets. This will help the Sri Lankan EEC sector move up the value chain as awareness of the sector improves and local innovation in the sector increases due to domestic consumption of locally manufactured products that take the place of imports.

It has been observed that many electrical parts and products are manufactured in Sri Lanka currently. Besides existing electrical products like switches, sockets, switch gears and wires, among others, manufacturers can consider manufacturing smart panels, invertors, low power UPS units and, if Government aggregation support is provided, LED lightings as well. There is already a base for production of LED batteries, and linking it to production of inverters and low power UPS units will be a natural step up in the value chain (figure 10). Products such as LEDs and set-top boxes could be manufactured both for export and to supply domestic markets.

With Sri Lanka's manufacturing strengths in existing products such as panels, electric meters, wiring harnesses and cables, combined with production of emerging products in Sri Lanka such as switches and MCBs, the natural next step would be to become exporters by manufacturing products such as smart panels. This can lead to local companies being able to execute medium to large scale projects internationally and to move up the value chain.

Indian companies are looking for alternative destinations to manufacture electrical parts and products in order to further trade with Africa and the Middle East. Attracting Indian companies to invest in Sri Lankan manufacturing for the African and Middle Eastern markets is plausible.

Figure 12: EMS path



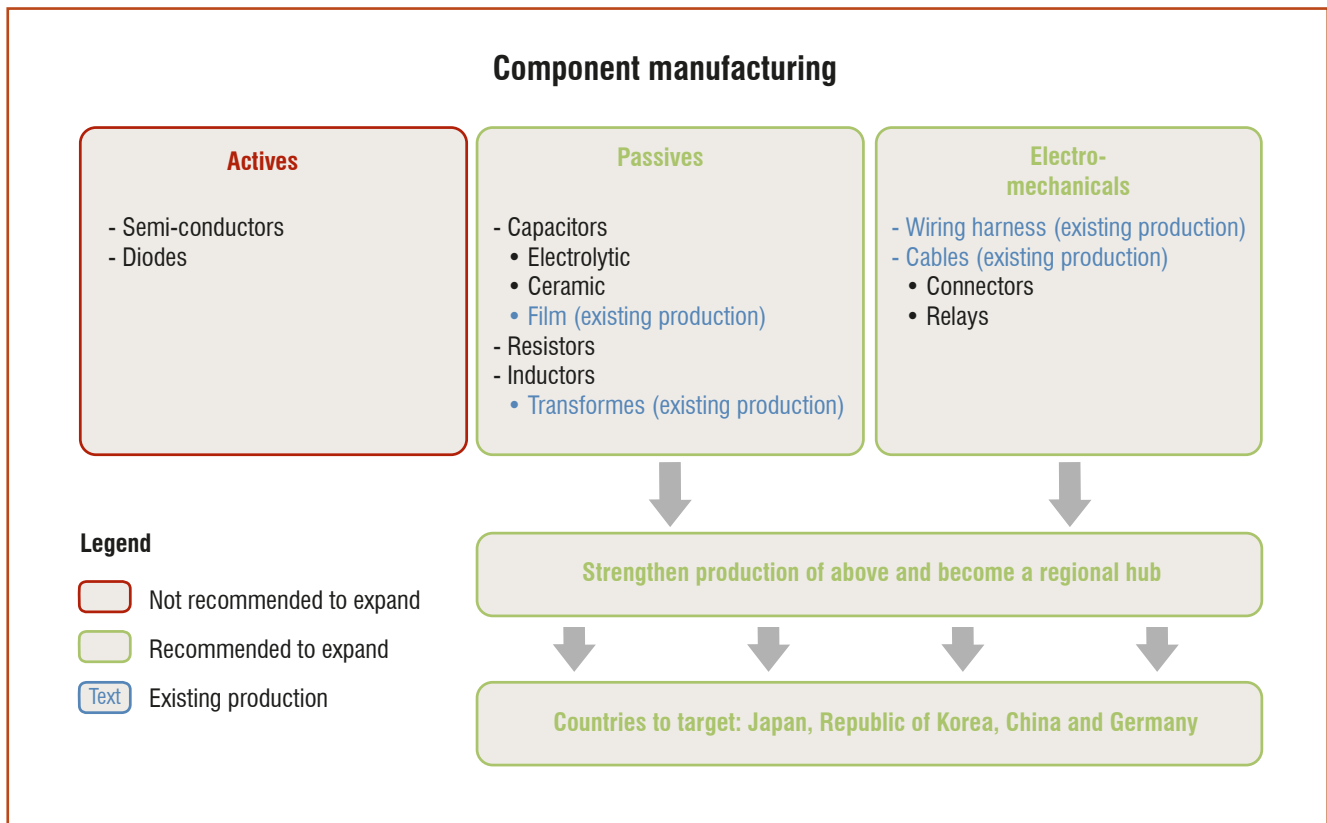
Source: ITC.

Component manufacturing base

The next practical step in Sri Lanka's EEC growth would be to manufacture components (figure 11). Among the current products that industry should concentrate on are transformers, capacitors and wiring harnesses. The component sector

could be enhanced by producing cable connectors, PCBs and relays. The latter products require low capital inputs but are labour intensive. Countries in which to approach companies for such contracts would be Japan, the Republic of Korea and Germany. This could be supported by setting up a cluster of component manufacturers.

Figure 13: Path for component manufacturing



Source: ITC.

While striving to become a component manufacturing base, it is important also to consider manufacturing passive and electromechanical components and not to venture immediately into the active components space due to its high cost and technology challenges. Among the passive components that Sri Lankan companies already manufacture are films and transformers, and industry stakeholders suggested that electrolytic and ceramic capacitors and resistors could also be manufactured. Electromechanical wiring harnesses and cables are already manufactured and stakeholders suggested that connectors and relays could be manufactured. These products could strengthen opportunities to become an EMS hub as well.

Globally, manufacturers in high cost locations such as Japan, the Republic of Korea, the EU (especially Germany) and the United Kingdom are actively looking for an alternative China+1 location. These companies, mostly large multinationals, could be invited to relocate to Sri Lanka to meet their China+1 requirement. Examples of companies on which to focus attention include TDK Corporation, Panasonic Corporation and Murata Manufacturing Co., Ltd from Japan and Vishay Intertechnology, Inc. from the United States, among others.

Innovations through academia and industry

Encouraging development and commercialization of innovative designs and products that have been developed by Sri Lanka's academic community or industry is key to moving up the value chain. Low-cost, high-tech products such as robotics, 3D manufacturing, e-surveillance security devices and IoT devices could be developed.

INSTITUTIONAL ADJUSTMENTS

The development of the EEC sector depends significantly on the functions and roles of trade and investment support institutions (table 3) and overall inter-institutional coordination. These institutions are divided into four main categories: policy support, trade support, business support, and academia and civil society. They are the drivers for future EEC industry growth, but certain issues of capacity and resources must be addressed to ensure they can effectively support the sector. The organizations that directly impact this sector are as follows:

Table 3: Support institutions in Sri Lanka for EEC

Policy support	<ul style="list-style-type: none"> • Ministry of Development Strategies and International Trade • Ministry of Industry and Commerce • Ministry of Science, Technology and Research • Ministry of Power and Renewable Energy • National Science Foundation • National Science and Technology Commission • Ministry of Skills Development and Vocational Training • Telecommunications Regulatory Commission • Ministry of Finance and Mass Media • Central Environmental Authority
Trade support	<ul style="list-style-type: none"> • Sri Lanka Export Development Board • Sri Lanka Customs
Business support	<ul style="list-style-type: none"> • Sri Lanka Electronic Manufacturers and Exporters Association • Board of Investment of Sri Lanka • Sri Lanka Standards Institute • Industrial Technology Institute • Ceylon Chamber of Commerce • National Chamber of Exporters • Exporters Association of Sri Lanka • Ceylon Electricity Board • Lanka Electricity Company
Academia, research and civil society	<ul style="list-style-type: none"> • State universities: for instance, University of Moratuwa, University of Colombo, University of Peradeniya • Arthur C. Clarke Institute for Modern Technologies • Sri Lanka Institute of Nanotechnology • Regional Centre for Lighting of the Sri Lanka Sustainable Energy Authority • National Engineering Research and Development Centre of Sri Lanka

Source: ITC.

Improve recognition of the EEC sector and strengthen the industry body – SLEMEA

In order to improve awareness of the EEC sector that has been emerging quietly in Sri Lanka, public servants at the highest level possible should be encouraged to visit EEC factories at regular intervals to learn about the industry and to address industry issues proactively. It is also important to strengthen SLEMEA to provide a unified industry voice to influence public policy and to spur collaboration between EEC companies. Strengthening also means increasing membership to at least 85% of all the EEC manufacturers in Sri Lanka. For effective strengthening of SLEMEA, it has been recommended that a member from the Ministry of Development Strategies and International Trade (MoDSIT) be included on the council of SLEMEA as an honorary member.

To improve recognition and awareness of the EEC sector domestically and internationally, promotional material that includes key facts about the EEC industry and information on products and enterprises should be used in national and international outreach campaigns to create a common industry image. Such promotional material could be used through G2G or G2B programmes to attract global multinational corporations (MNCs) (major global EEC players) from China, Japan, Chinese Taipei, the Republic of Korea, Germany, Scandinavia and the United Kingdom for investment.

In order to boost exports and increase FDI in Sri Lanka, the Government announced in its 2017 budget proposal that it would undertake a 'structured and focused global marketing campaign' to brand Sri Lanka, for which the government allocated LKR 1,000 million (approximately US\$6.5 million). Further to this, the Sri Lanka Export Development Board (EDB) has constituted a committee with public and private stakeholders to draft and design a strategy to develop and implement such a brand and marketing campaign. It is essential that EEC branding also be undertaken in the design of such a national branding and marketing strategy.

Build and fortify linkages between industry and academia

The links between industry and academia are weak and there is an urgent need to identify skills gaps and to address the R&D needs of the industry. Currently, there is a lack of labour with technical and practical skills and lack of awareness among students about jobs in electric and electronics sector. To supply human capital with industry specific skills, university and vocational training programmes for electric and electronics technical skills must be developed based on regular consultation with a private sector.

To strengthened R&D and product development, fiscal benefit schemes for industry and research centre collaboration must be implemented. Key universities and private institutions such as University of Moratuwa, University of Colombo, University of Peradeniya, Sri Lanka Institute of Nanotechnology (SLINTEC) and the National Engineering Research and Development Centre of Sri Lanka could provide facilities for R&D and new product development and could offer product testing and prototyping.

Streamlining, strengthening and simplifying the intellectual property regime

Sri Lanka adopted an intellectual property law in 2003 and is party to major intellectual property agreements, including the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights, often referred to as 'TRIPS.' The country also acceded to the Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks (commonly called the 'Madrid Protocol') in 2015. Nevertheless, the procedures to obtain intellectual property rights –including those pertaining to copyrights, trademarks, patents, industrial designs, layout designs of integrated circuits, geographical indications and others– are a tedious process. Businesses face numerous bottlenecks in registering their trademarks due to these cumbersome procedures, and there is a need to simplify procedures and to strengthen the country's intellectual property regime to safeguard Sri Lanka's indigenous technology.

Strengthen SLSI as the local apex body for product compliance testing

Most, if not all, of Sri Lanka manufactured EEC products are sent overseas for testing to ensure that they meet the standards required by overseas buyers. SLSI does not have the capacity to provide even basic laboratory testing. It is essential that SLSI be strengthened as an apex body and that it establish EEC specific laboratories that can offer services such as basic testing. Stakeholders also suggested that SLSI maintains tie-ups with laboratories globally in order to guide Sri Lankan EEC companies to obtaining further testing when such services are not available from SLSI. In order to establish a EEC laboratory, the University of Moratuwa was given a budget of LKR 100 million (approximately US\$ 650,000); however, only LKR 10 million (approximately US\$ 65,000) was disbursed. This shows that the government has recognized the issue, but further timely investment in strengthening SLSI would be beneficial for the development of the sector.

Develop human resources and skills development

Increasing the availability of a labour pool with the requisite skill sets and training is crucial for the progress of this sector. It is important to build awareness about the sector among youth by conducting yearly annual campaigns in schools on the potential of the EEC sector and by encouraging them to study subjects related to the sector. The industry should consider organizing an annual industry forum with educational institutions, students and prospective employees to share industry experiences with youth, to recruit semi-skilled labour, and to campaign for an increase in training in the skills demanded by the EEC industry. To assess the sector's growth, a periodic survey of the top ten skills demanded by the sector should be undertaken and the results published. This would provide information to educational institutions about the training courses needed and would encourage potential workers to pursue education in this sector, which could lead to the creation of a continuous and stable work force.

INVESTMENT REQUIREMENTS

The following value chain investments should be key areas of focus in order to achieve a positive outcome for the EEC sector.

Create industry clusters to boost local production and exports

Improved provision of local inputs will ensure a steady supply of materials to industry and continuous business opportunities for companies. Local production of components of a quality that meets global electrical and electronic industry standards will reduce costs and increase component availability. In order to develop this segment of the value chain, a review should be undertaken to assess what production is available locally and what are the bottlenecks for companies manufacturing electrical and electronic products. Reinforcement of local production can be built on the current output and facilities of existing companies.

Major global MNC component manufacturers from target countries who are looking at a China+1 strategy should be invited and encouraged to relocate, preferably in a joint venture (JV) with a local manufacturer. This can lead to development of clusters by large component manufacturers through FDI.

Targeted promotional events for investments

In order for Sri Lanka to be a globally recognized EMS and contract manufacturing destination, it is essential to identify and prioritize the markets in which JVs and investments

are to be pursued. This could be undertaken in a three-step process. First, EEC manufacturers or SLEMEA may set priorities and attend a minimum of two trade shows and exhibitions per year that are specific to their sector, preferably shows that focus on Japan, China, Chinese Taipei, the Republic of Korea, Sweden, Denmark, Finland, the United Kingdom or the Netherlands. Focused business-to-business meetings should lead to three successful memorandums of understanding (MoUs) or JVs in three years, each of US\$5,000,000 or more. Second, an international trade fair in Sri Lanka for EEC products should be organized every two years to attract new partners and technologies.

Third, three to five global EEC MNCs could be approached for investments through G2G or G2B programmes, so that Sri Lankan EEC companies can become part of global supply chains, undertake JVs or be contracted as EMS companies to do more design-driven work in Sri Lanka. Sri Lankan Government institutions, in collaboration with SLEMEA, should work to attract these MNCs to industrial zones in Sri Lanka. The Government and SLEMEA could target countries that have market access agreements with Sri Lanka, such as members of the EU, the United States and India in order to leverage their technology backbone. Of these, two to three countries need to be identified to champion products following a '4x4 strategy' (four times the growth within four years, with the first year for planning and years two through four for implementation), which could lead to US\$1 billion in exports.

Enhance R&D facilities

To enter the global value chains and to expand electronic industry production, companies need to undertake R&D activities in collaboration with universities and research centres. Working jointly on adapting new technologies and building efficiency will reduce costs and help collaborators move up in the value chain. Establishing a fund for electronic industry research, development and training will also lead to enhanced skills and increased knowledge in the sector. Coordination with the Sri Lanka Association of Software and Service Companies (SLASSCOM) to develop links between the IT and EEC sectors can be explored to support this skills development and knowledge building.

Incubation centre housed in a university

In order to encourage local SMEs and innovation, it is suggested that a structured programme be introduced to create a conducive environment for entrepreneurs and to support start-ups. This would require an incubation centre to attract Sri Lankan SME entrepreneurs and encourage local R&D, and could be started at a university facility, such as at SLINTEC Park run by University of Moratuwa.



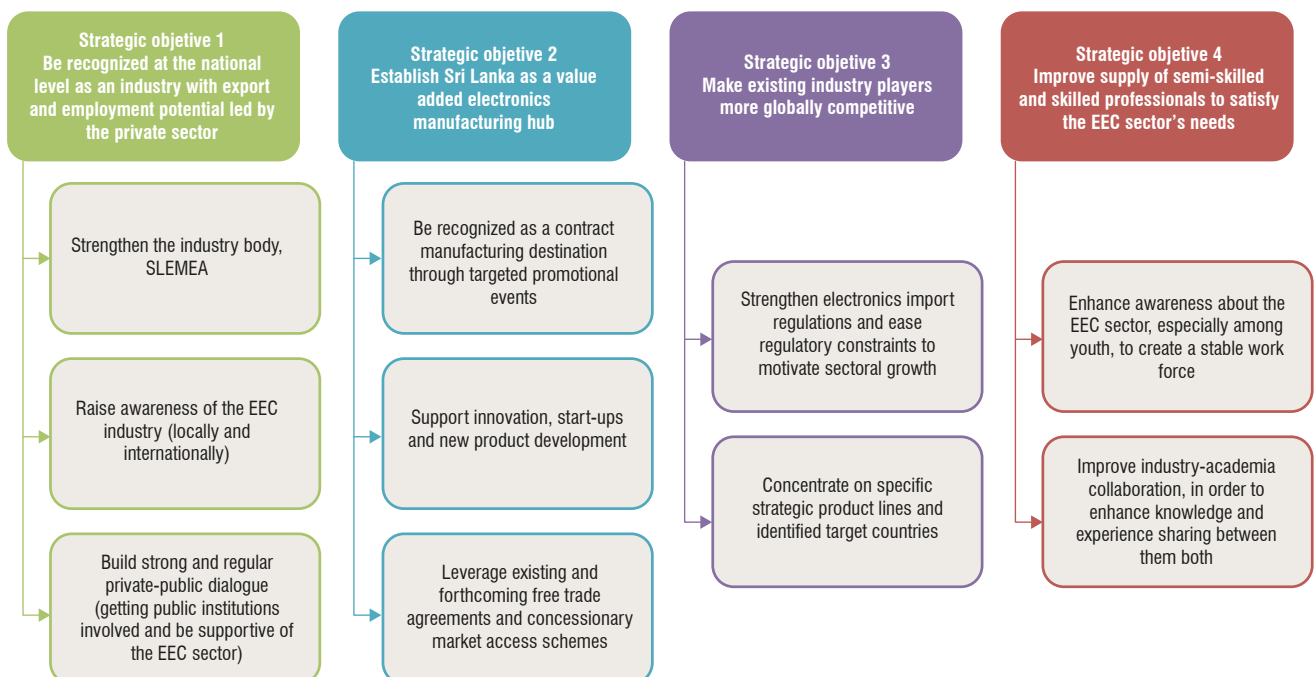
MOVING TO ACTION

IMPLEMENTATION FRAMEWORK

The strategic objectives delineated for the EEC sector define the main directions that will guide Strategy implementation in order to achieve the vision laid out by the industry. The PoA flowing from the operational objectives (figure 12) will respond to the vision by addressing the sector's constraints and by leveraging opportunities in a comprehensive manner. To this end, particular efforts will be made in the following strategic directions:

- Urgently strengthen the EEC industry association, SLEMEA, so that the sector can benefit from a body that can lobby on its behalf with policymakers and provide a common platform for interaction and coordination by the members of the association.
- Integrate Sri Lankan EEC manufacturers with MNCs so that they have access to latest global technologies and integration to global markets, first through contract manufacturing and then through FDI into local companies or through JVs.
- Expose youth to the industry and encourage them to consider the EEC sector as a viable, gainful and exciting industry in which to work. This would not only help increase employment numbers but also would lead to new start-ups within this sector.

Figure 14: Strategic and operational objectives



The immediate, low-hanging opportunities to target are those in which Sri Lankan companies could serve as contract manufacturers for Chinese, Japanese, Korean and Chinese Taipei OEMs, which would involve mostly high volume, low value production. At the same time, high value, low volume contracts from Swedish, Danish, Finnish and German OEMs should also be explored. These immediate quick-win activities are necessary to initiate successfully the Strategy implementation and to create rapid industry growth.

Managing for results

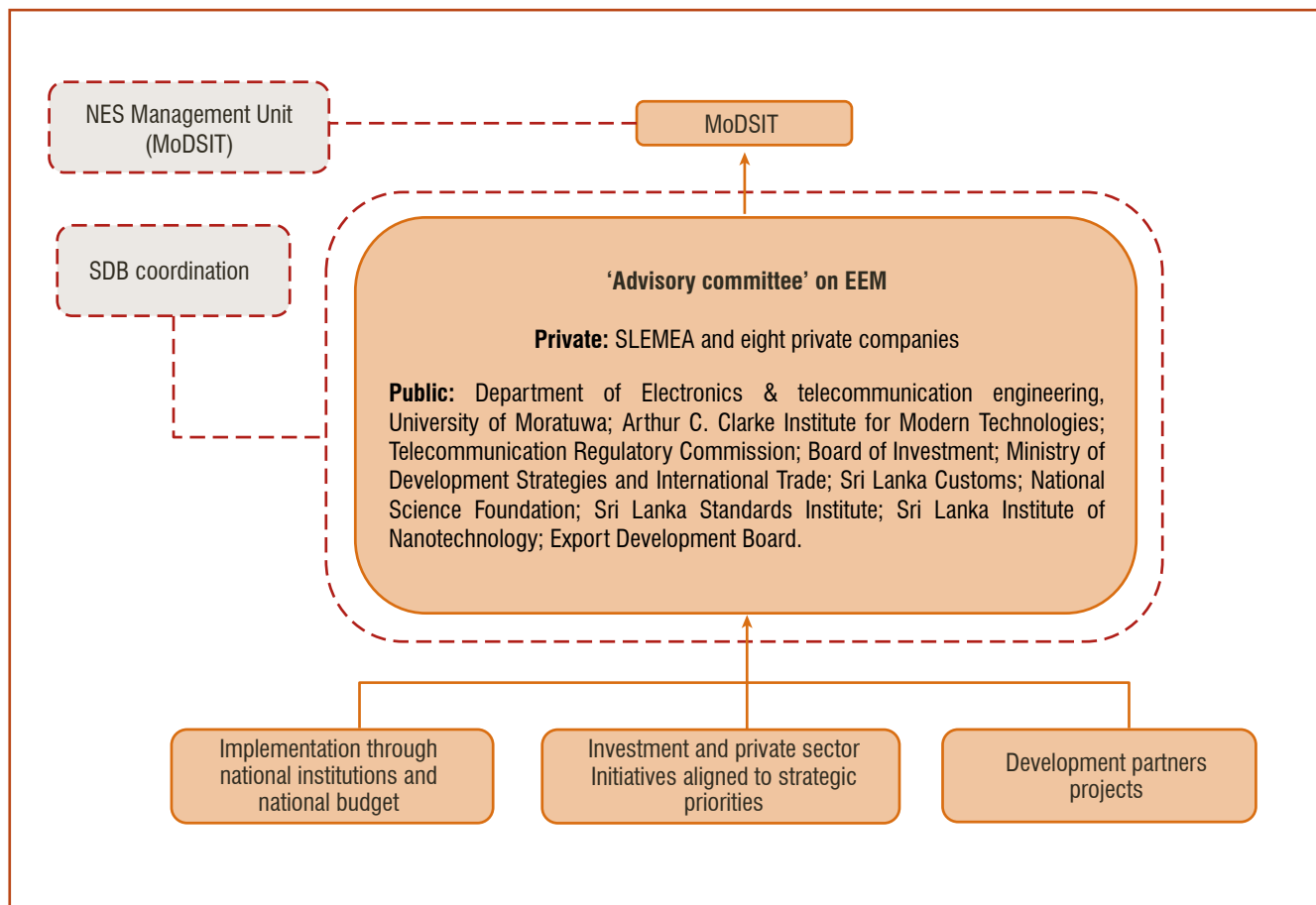
It is the translation of these priorities into implementable projects that will achieve the substantial increase in export earnings and export competitiveness envisaged under the Strategy. These will be driven by reforming the regulatory framework, optimising institutional support to exporters, and strengthening private sector capacities to respond to market opportunities and challenges. The allocation

of human, financial and technical resources is required to efficiently coordinate, implement and monitor overall implementation.

Success in the execution of activities will depend on the ability of stakeholders to plan and coordinate actions in a tactical manner. Diverse activities must be synchronized across public and private sector institutions to create sustainable results. This requires the fostering of an enabling environment and creation of an appropriate framework for successful implementation.

Key to achieving targets will be coordination of activities, progress monitoring and mobilization of resources for implementation. Industry representatives recommended that a public-private 'advisory committee' for the EEC sector be rapidly established, operationalized and empowered. The EEC 'advisory committee' is to be responsible for overall coordination, provision of policy guidance and monitoring of industry developments against the Strategy.

Figure 15: Institutional framework for EEC sector development



EEC 'advisory committee'

The Export Development Act (1979) empowers the EDB to 'On the advice from the Board, the Minister may by Order in the Gazette, establish advisory committees the development and promotion of certain products, product groups and commodities as well as functional aspects of trade.' Additionally, 'each such advisory committee shall have the power to fix and regulate its own procedure, including the power to determine the number of members necessary to form a quorum at its meeting.' The advisory committees have the function 'to advise the Board on any or all of the matters which the Minister considers necessary for the purposes of carrying out of giving effect to the principles and provisions of this act.'

An EEC advisory committee has been established in February 2018 by the Minister of MoDSIT and effectively organized by EDB to give the industry the capacity to steer its development strategically.

The EEC advisory committee is composed of the following members:

- Nine private companies
- Sri Lanka Electronics Manufacturers and Exporters Association
- Department of Electronics & telecommunication engineering, University of Moratuwa
- Arthur C. Clarke Institute for Modern Technologies
- Telecommunication Regulatory Commission
- Board of Investment
- Ministry of Development Strategies and International Trade
- Sri Lanka Customs
- National Science Foundation
- Sri Lanka Standards Institute
- Sri Lanka Institute of Nanotechnology
- Export Development Board

The advisory committee is empowered to meet quarterly and implement the following functions:

- i. Create a shared understanding of key market challenges and opportunities facing the sector;
- ii. Set goals and targets that, if achieved, will strengthen the sector's competitive position and enhance Sri Lanka's overall capacity to meet the changing demands of markets;
- iii. Propose key policy changes to be undertaken and promote these policy changes among national decision makers;
- iv. Support the coordination, implementation and monitoring of activities in the sector by the Government, private sector, institutions or international organizations to ensure alignment to goals and targets and, as required, contribute to resource identification and alignment.

As part of the overall trade policy and NES design process, it has been recommended that an *inter-ministerial and multi-industry private sector* ' be organized and structured to address overall challenges and opportunities to Sri Lanka's trade performance.

Key success factors for effective implementation

The presence of an advisory committee to oversee the implementation of the Strategy is a key success factor, but it is not sufficient to effectively fulfil its assigned functions.

Private sector support and participation in implementation

The private sector clearly expressed its willingness to contribute, directly or in partnership with public institutions, to the implementation of the Strategy. Their implementation efforts can range from providing business intelligence to institutions to contributing to project design, promotion and branding, policy advocacy, etc. The private sector's practical knowledge of business operations is essential to ensuring that the Strategy remains aligned to market trends and opportunities.

Proactive networking and communication

The key implementing institutions detailed in the PoA need to be informed of the content of the Strategy and its implications for their 2018–2022 programming. This networking and communication is essential to build further ownership and to provide institutions with the opportunity to confirm the activities they can implement in the short-to-long term. It will be important for the EDB, MoDSIT and members of the advisory committee to reach out to relevant institutions nationally to create awareness and support for EEC industry development.

Resources for implementation

The advisory committee, in collaboration with the EDB and the NES Management unit at MoDSIT, will need to leverage additional support for efficient implementation. Effective planning and resource mobilization is indispensable in supporting Strategy implementation. Resource mobilization should be carefully planned and organized.

As the EEC sector is a priority of the NES, the Government of Sri Lanka should define annual budget allocations and support to drive industry growth. This commitment will demonstrate the Government's clear intent to strengthen the sector

and will encourage private partners to support development. In addition to national budget support, resource identification will require that the BOI to effectively target foreign investors in line with the priorities of the Strategy. Investment flows to Sri Lanka should also be considered as a valuable driver of Strategy implementation and overall industry development.

The various implementation modalities detailed will determine the success of Strategy implementation. However, high-level support from the Government, in collaboration with strong championship by the private sector, will be the real driver of successful Strategy implementation.

To achieve the Strategy's vision and strategic objectives, a robust, actionable, realistic and strategic PoA is required. This is provided in the section below, and constitutes the core of this Strategy.

The PoA is structured along the strategic and operational objectives described above. For each of these objectives, the PoA outlines detailed activities and their implementation modalities, which include:

- **Priority level:** priority 1 being the highest and 3 the lowest.
- **Start/end dates:** the desired timeframe of the activity.
- **Targets:** quantifiable targets which allow monitoring of activity completion during the implementation stage.
- **Lead implementation partners:** one single accountable lead institution per activity. The institution can restrict its participation to oversight and coordination or it also can have a technical role.
- **Supporting implementation partners:** any institution that should be involved at any stage of the activity's implementation.
- **Existing programmes or potential support:** existing initiatives ongoing in the specified area of the activity.
- **Cost estimation (US\$):** an estimate of the activity's cost for the entire implementation period.



Photo: ITC

PLAN OF ACTION 2018-2022

Strategic objectives	Operational objective	Activity	Priority	Start date	End date	Targets	Leading implementing partners	Supporting implementing partners	Indicative costs (USD)
1: Be recognized at the national level as an industry with export and employment potential led by the private sector.	1.1: Strengthen the industry body, SLEMEA.	1.1.1 SLEMEA needs to be strengthened to effectively defend and promote the EEC industry in Sri Lanka. Develop and implement a precise strengthening strategy by setting up a SLEMEA technical committee that will lead the strengthening process and monitor progress.	1	01/04/2018	30/07/2018	<ul style="list-style-type: none"> Detailed strengthening strategy validated by membership. Annual report of implementation, for monitoring progress Improved financial sustainability of SLEMEA. 	Sri Lanka Electronics Manufacturers and Exporters Association	Ministry of Industry and Commerce; Export Development Board; Ceylon Chamber of Commerce (CCC)	20,000
		1.1.2 Organize a membership awareness and outreach drive to reach out to existing, non-active, and past members of SLEMEA and non-members from the industry so that they join and contribute to the revival of the organization technically, administratively and financially.	1	01/07/2018	31/12/2018	<ul style="list-style-type: none"> Increase the membership of SLEMEA to include up to 85% of all electronic manufacturers in Sri Lanka. 	Sri Lanka Electronics Manufacturers and Exporters Association	Ministry of Industry and Commerce; Export Development Board; Ceylon Chamber of Commerce (CCC)	5,000
	1.2: Raise awareness of the EEC industry (locally and internationally).	1.2.1 Attract three to five global MNCs through G2G or G2B programmes so that Sri Lankan EEC companies can plug into global MNC supply chains, develop JVs and act as contract manufacturing companies doing more design-driven work in Sri Lanka. Government of Sri Lanka institutions, in collaboration with SLEMEA, to attract these MNCs to industrial zones in Sri Lanka.	2	01/07/2018	31/12/2022	<ul style="list-style-type: none"> 3 MNCs established in 3 years 5 MNCs in 5 years 	Board of Investment (BOI)	Ministry of Development Strategies and International Trade; Export Development Board; Department of Commerce	160,000
		1.2.2 Through the EEB's Branding Committee (already established) prepare promotional material (with a common industry image) on the products, enterprises and key facts of the EEC industry to be used as promotional material in national and international outreach campaigns.	2	01/07/2018	31/12/2018	<ul style="list-style-type: none"> A common industry image and promotional material to improve awareness of Sri Lanka's EEC sector. Linked to the trade portal. Branding collaterals such as brochures, marketing material designed and produced. 	Export Development Board	Board of Investment (BOI); Department of Commerce; Sri Lanka Electronics Manufacturers and Exporters Association	100,000
	1.3: Build strong and regular private-public dialogue (getting public institutions involved and be supportive of the EEC sector).	1.3.1 Encourage public servants at the highest level possible to visit EEC factories at regular intervals to gain awareness of the industry and to understand the issues at hand in order to address them proactively.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Public sector agents' awareness of the EEC sector. 	Sri Lanka Electronics Manufacturers and Exporters Association	Ministry of Industry and Commerce; Board of Investment (BOI); Export Development Board	5,000
		1.3.2 Strengthen EEC advisory committee chaired by the private sector, including public sector stakeholders, to meet quarterly to: <ul style="list-style-type: none"> Confirm strategic market orientation of the industry. Plan annual implementation of the strategic orientation. Track implementation progress by lead implementing partners and Assess the need to establish adequate support mechanisms (policy, regulations, institutions, etc.). 	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Create a quarterly dialogue between public and private stakeholders. 	Export Development Board	Ministry of Development Strategies and International Trade; Department of Commerce; Sri Lanka Electronics Manufacturers and Exporters Association	5,000

Strategic objectives	Operational objective	Activity	Priority	Start date	End date	Targets	Leading implementing partners	Supporting implementing partners	Indicative costs (USD)
2: Establish Sri Lanka as a value added electronics manufacturing hub.	2.1: Be recognized as a contract manufacturing destination through targeted promotional events.	2.1.1 In a public-private partnership with SLEMA, prioritize international EEC trade shows and exhibitions around the world and participate in events with specific importance given to business-to-business meetings. Concentrate on Japan, China, Chinese Taipei, the Republic of Korea, Sweden, Denmark, Finland, the United Kingdom and the Netherlands.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Annual participation of SLEMA members in a minimum of two target trade fairs per year. Three successful MoUs or JVs in three years; each of US\$5 000 000 or more 	Export Development Board	Ministry of Industry and Commerce; Ministry of Foreign Affairs; Department of Commerce ; Sri Lanka Electronics Manufacturers and Exporters Association	25,000
		2.1.2 Organize an international trade fair for EEC products in Sri Lanka, to attract new partners, technologies and investment to Sri Lanka. This would lead to exposure of the Sri Lankan EEC sector to foreign investors and provides an opportunity for JVs, contracts, etc.	3	01/01/2019	31/12/2022	<ul style="list-style-type: none"> One international trade fair every two years. Five MoUs/JVs/Contracts of each US\$5 000 000 in five years. 	Export Development Board	Ministry of Industry and Commerce; Ministry of Development Strategies and International Trade; Sri Lanka Electronics Manufacturers and Exporters Association	50,000
		2.1.3 Organize semi-annual consultation between EEC and software companies to identify collaboration opportunities and synergies, including on hardware and software partnerships. The electronics and software industries are becoming increasingly inseparable.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Two EEC and software industry meetings per year. Five partnerships between EEC and IT-business process management companies formalized in five years. 	Sri Lanka Electronics Manufacturers and Exporters Association	Information and Communication Technology Agency (ICTA); SLASSCOM; University of Moratuwa	10,000
	2.2: Support innovation, start-ups and new product development.	2.2.1 Campaign for start-up programme to create a conducive environment for entrepreneurs (not limited to the EEC sector) to improve innovation, to provide support for raising finance and to help in incubation of new ideas. This is not an EEC specific programme but a campaign at a national level that will attract new local investments and encourage local R&D.	1	01/07/2018	30/06/2019	<ul style="list-style-type: none"> Course of action to encourage new local investments in EEC sector and improved innovation and R&D. 	Ministry of Development Strategies and International Trade	Ministry of Industry and Commerce; Export Development Board; Ministry of Science, Technology and Research; Sri Lanka Electronics Manufacturers and Exporters Association ; University of Moratuwa	25,000
		2.2.2 Establish an incubation centre at SLINTEC Park, run by University of Moratuwa, as a facilitation centre for advanced electronic design, to encourage local R&D.	1	01/07/2018	31/12/2019	<ul style="list-style-type: none"> Incubator established at an educational institution. 20 start-ups supported per year. 	University of Moratuwa	<ul style="list-style-type: none"> Ministry of Higher Education and Highways; SLINTEC Sri Lanka Institute of Nanotechnology; SLASSCOM 	500,000
		2.2.3 Simplify Intellectual Property (trademarks, patents) registration regime (which currently has extremely complex procedures), in order to safeguard ideas and technologies that are designed and/or manufactured in Sri Lanka as per international standards with the help of WIPO.	2	01/07/2018	31/12/2021	<ul style="list-style-type: none"> Intellectual property process and registration simplified. 20% reduction in delay when registering a patent or trade mark. Safeguard Sri Lanka's indigenous technology. 	National Intellectual Property Office	SLASSCOM; Sri Lanka Electronics Manufacturers and Exporters Association ; University of Moratuwa	25,000

Strategic objectives	Operational objective	Activity	Priority	Start date	End date	Targets	Leading implementing partners	Supporting implementing partners	Indicative costs (USD)
2: Establish Sri Lanka as a value added electronics manufacturing hub.	2.3: Leverage existing and forthcoming free trade agreements and concessionary market access schemes.	2.3.1 Invite and encourage relocation of component manufacturers from target countries who are looking at a China+1 strategy. This can lead to development of clusters by large component manufacturers through FDI.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Establishment of clusters by large component manufacturers. 	Board of Investment (BOI)	Ministry of Development Strategies and International Trade; Export Development Board; Department of Commerce	50,000
		2.3.2 Attract investment from specific countries that have market access agreements with Sri Lanka, such as countries in the EU, the United States and India, especially to leverage their technology backbone. This needs to be done through targeted investor missions every year.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Targeted investor mission conducting a minimum of two investor target activities per year. 	Board of Investment (BOI)	Ministry of Development Strategies and International Trade; Export Development Board; Department of Commerce	50,000
3: Make existing industry players more globally competitive.	3.1: Strengthen electronics import regulations and ease regulatory constraints to motivate sectoral growth.	3.1.1 Establish new import inspection scheme for EEC products from overseas to ensure robust quality control according to existing SLSI standards.	1	01/07/2018	31/12/2019	<ul style="list-style-type: none"> 80% of imported electronics controlled for quality compliance in five years. 	Sri Lanka Standards Institution (SLSI)	Ministry of Industry and Commerce; Sri Lanka Customs; Import and Export Control Department (IECD)	25,000
		3.1.2 As part of a national innovation budget, provide dedicated matching grants for R&D in EEC sector for new product developments. This will encourage local R&D and innovation.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> EEC sector supported by a national R&D budget. 	Department of Development Finance MoF	Ministry of Industry and Commerce; Ministry of Finance; Export Development Board; National Science Foundation	100,000
4: Improve supply of semi-skilled, and skilled professionals to satisfy the EEC sector's needs.	3.2: Concentrate on specific strategic product lines and identified target countries.	3.2.1 Focus energies on specific product lines such as: <ul style="list-style-type: none"> Specialized low volume, high value circuits and systems (such as lightening protectors), Passive components (resistors, capacitors, inductors), Electromechanical components (transformers, switches, relays) or Interconnection devices (PCBs, connectors). 	1	01/01/2019	31/12/2022	<ul style="list-style-type: none"> Focused manufacturing in specified product lines. 	Sri Lanka Electronics Manufacturers and Exporters Association	Export Development Board; SLASSCOM; Coordinating Secretariat for Science Technology and Innovation	20,000
		3.2.2 Target three countries for champion products' exports following a 4x4 strategy (four times growth in four years – the first year for planning and years two through four for implementation), leading to US\$1 billion in exports.	1	01/01/2019	31/12/2022	<ul style="list-style-type: none"> Two to three countries for champion products in five years. Increase in exports by US\$1 billion. 	Sri Lanka Electronics Manufacturers and Exporters Association	Export Development Board; SLASSCOM; Coordinating Secretariat for Science Technology and Innovation	100,000
	4.1: Enhance awareness about the EEC sector, especially among youth, to create a stable work force.	4.1.1 Conduct yearly annual campaign in schools to create awareness among youth on the potential of the EEC sector and to encourage them to study subjects related to the sector.	1	01/07/2018	31/12/2022	<ul style="list-style-type: none"> One annual awareness campaign conducted. Students encouraged to study subjects related to the EEC sector. 	Ministry of Education	Ministry of Skills Development and Vocational Training; Vocational Training Authority of Sri Lanka; Sri Lanka Electronics Manufacturers and Exporters Association	10,000

Strategic objectives	Operational objective	Activity	Priority	Start date	End date	Targets	Leading implementing partners	Supporting implementing partners	Indicative costs (USD)
4: Improve supply of semi-skilled, and skilled professionals to satisfy the EEC sector's needs.	4.1: Enhance awareness about the EEC sector, especially among youth, to create a stable work force.	4.1.2 Conduct periodical surveys of top 10 skills demanded in the EEC sector and publish results. This will provide information to youth and encourage them to pursue education in this sector.	2	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Output would be an annual survey report. Increase in interest in EEC skills. 	University of Moratuwa	Sri Lanka Electronics Manufacturers and Exporters Association	25,000
		4.1.3 Organize an annual industry forum for educational institutions, students and prospective employees to share experiences with youth, to recruit semi-skilled labour and to campaign for more training for skills demanded by the EEC industry.	2	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Encourage youth to train in the EEC sector, leading to domestic availability of skilled manpower. 	Vocational Training Authority of Sri Lanka	University of Moratuwa	20,000
	4.2: Improve industry-academia collaboration, in order to enhance knowledge and experience sharing between them both.	4.2.1 Introduce an industry-educational institution coordination exchange mechanism by organizing short-term contracts for professors/lecturers to serve as consultants in the EEC industry and for experienced managers to serve as short-term, visiting lecturers to share knowledge and practical experience.	2	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Ensure two yearly exchange programmes between academia and industry. Local R&D and innovation at academic centres has a chance to be commercialized. 	Ministry of Higher Education and Highways	Ministry of Skills Development and Vocational Training; Authority of Sri Lanka; University of Peradeniya	25,000
		4.2.2 Through a partnership programme, invite international universities to tie-up with Sri Lankan universities and through an industry-academic institution exchange programme enhance advanced skills and R&D capacity at international level.	2	01/07/2018	31/12/2022	<ul style="list-style-type: none"> Ensure at least one tie-up per year by local universities with foreign education institutions. Sri Lanka gets access to global R&D. 	University of Moratuwa	Ministry of Higher Education and Highways; Sri Lanka Electronics Manufacturers and Exporters Association; National Research Council	75,000

APPENDIX 1: LIST OF PARTICIPANTS IN THE PUBLIC-PRIVATE CONSULTATIONS

No.	Name	Designation	Name of Institution
1	Mr. Daya Wahalantiri	Executive Director	ACL Cables PLC
2	Mr. D. Thudewattage	Head International Marketing & TQM	Associated Battery Manufacturers (Ceylon) Ltd
3	Mr. Gamini Rajapakse	Manufacturing / Health and Safety Manager	Balfour Beatty Engineering Services Ceylon (Pvt) Ltd
4	Mr. W.U.K.M.A. Wijayakulathilaka	Director - Investment Appraisal	Board of Investment (BOI)
5	Ms. Lakmali Withange	Assistant Director- Investment	Board of Investment (BOI)
6	Mr. Anuruddha Perera	Project Officer- Investment Appraisal	Board of Investment (BOI)
7	Mr. Kapila Fernando	-	Ceylon Electricity Board
8	Mr. Ronald	-	Ceylon Electricity Board
9	Mr. Chaminda Lankagama	Market Development Manager	Electro Metal Pressings (Pvt) Ltd
10	Mr. Siri J. Samarakkodi	Managing Director	Esjay Electronics (Pvt) Ltd
11	Mr. D. Chandana Thennakoon	Assistant Manager HR & Administration	Greentel Mobile
12	Eng. Buddhika Marasingha	Director / Mechanical Engineer	Hitech Solutions (Pvt) Ltd
13	Mr. Lakshan Algama Perera	Director-Finance and Business Development	K.I.K. Lanka (Pvt) Ltd
14	Mr. Sanka Wijeratne	Director - Finance and Planning	K.I.K. Lanka (Pvt) Ltd
15	Mr. John Fernando	Assistant Sales Manager - Exports	Kelani Cables PLC
16	Ms. Ishara Jayasinghe	Product Development Executive	Kevilton Electrical Products (Pvt) Ltd
17	Mr. Rohan Pallewatta	Managing Director/CEO	Lanka Harness Co. (Pvt) Ltd
18	Mr. Pubudu Ediriweera	Head of Operations & Compliance	Lanka Harness Co. (Pvt) Ltd
19	Mr. Shayne Madappuli	Business Development Manager	Lanka Hiqu (Pvt) Ltd
20	Mr. J.G. Shantha Siri	Senior Scientific Officer	National Science Foundation
21	Mr. Kushan Kodituwakku	Managing Director	OREL Corporation (Pvt) Ltd
22	Mr. Dashan Rathnasinghe	R&D Engineer Electronics	OREL Corporation (Pvt) Ltd
23	Mr. Duminda Perera	R&D Junior Project Manager	OREL Corporation (Pvt) Ltd
24	Mr. Indika Kulatunga	General Manager Innovation	OREL Corporation (Pvt) Ltd
25	Mr. Anuradha Abeyweera	R&D Manager	OREL Corporation (Pvt) Ltd
26	Mr. Palitha Ethulgama	Deputy General Manager - Marketing	Sierra Cables PLC
27	Mr. S. Mahesan	Director (Exports)	Sri Lanka Customs
28	Dr. Shehan De Silva	Head of Strategic Planning/ Senior Scientist	Sri Lanka Institute of Nanotechnology (SLINTEC)
29	Mr. T. Uthayakumar	Senior Deputy Director	Sri Lanka Standard Institution (SLSI)
30	Mr. Farazy Fahmy	Director - Research and Development	Synopsys Lanka (Pvt) Ltd
31	Mr. Merrick Gooneratne	Executive Director	TOS Lanka Co. (Pvt) Ltd
32	Mr. D. Fernando	ICT Manager	TOS Lanka Co. (Pvt) Ltd
33	Dr. Ajith Pasqual	Head - Department of Electronics & Telecommunication Engineering	University of Moratuwa
34	Mr. Chandana Dissanayake	President	Sri Lanka Electronic Manufacturers and Exporters Association (SLEMEA)
35	Mr. M.K.S.K. Maldeni	Director – Export Services	Export Development Board
36	Mr. Akila De Zoysa	Assistant Director	Export Development Board
37	Ms. Nilani Rathnayake	Development Officer	Export Development Board

APPENDIX 2: TSI CHARTS OF INSTITUTIONS

Policy support institutions

Name of institution	Coordination of interventions in sector	Human and financial capacity	Influence on sector development
Department of Commerce	Medium	Medium	Low
Ceylon Electricity Board	Medium	Medium	High
Lanka Electricity Company	Medium	Medium	High
Regional Centre for Lighting of the Sri Lanka Sustainable Energy Authority	High	High	High
Ministry of Skills Development and Vocational Training	High	Medium	High
Telecommunications Regulatory Commission	Low	High	Medium
Ministry of Finance and Mass Media	High	High	High
Central Environment Authority	high	Medium	Medium

Trade services institutions

Name of institution	Coordination of interventions in sector	Human and financial capacity	Influence on sector development
Sri Lanka Export Development Board			
Sri Lanka Customs			

Business support institutions

Name of institution	Coordination of interventions in sector	Human and financial capacity	Influence on sector development
Board of Investment of Sri Lanka	High	High	High
Sri Lanka Electronic Manufacturers and Exporters Association	Low	Low	Low
Sri Lanka Standards Institute	Medium	Medium	Medium
Industrial Technology Institute	Medium	Low	Medium
Ceylon Chamber of Commerce	Medium	Low	Medium
National Chamber of Exporters	Medium	Low	Medium
Exporters Association of Sri Lanka	Medium	Low	Medium

Academia and civil society networks

Name of institution	Coordination of interventions in sector	Human and financial capacity	Influence on sector development
State Universities For instance, University of Moratuwa, University of Colombo or University of Peradeniya	High	Medium	High
Arthur C. Clarke Institute for Modern Technologies	High	Medium	High
Sri Lanka Institute of Nanotechnology	Medium	High	Medium
National Engineering Research and Development Centre of Sri Lanka	Low	Low	Low

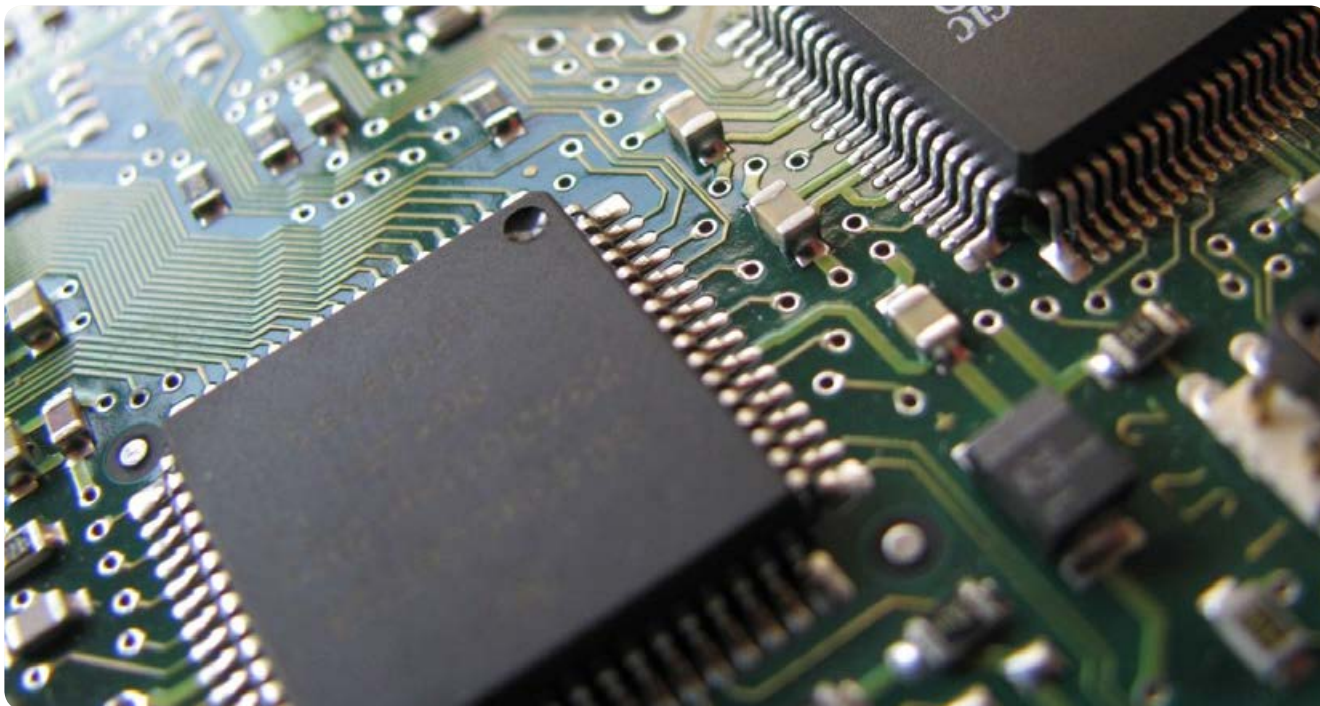


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APPENDIX 3: REGIONAL PEER ANALYSIS

Japan: A developed economy with GDP of US\$4.94 trillion (2016) and GDP per capita of US\$38,894, with an average growth rate of 1.0%, Japan has been engaged in the electronics sector since the early 1970s. The Japanese electronics sector contributed exports of US\$98.15 billion and had US\$89.83 billion of imports, ending in a trade surplus of US\$8.32 billion (2016).

Initially, the Japanese electronics industry competed on cost, but rapidly moved up the value chain by providing high value quality products and by building global brands. Japan pursued export-led growth (especially to the United States) and developed its R&D to manufacture creative and high quality products. With support from the government, the private sector established several brands with global presence, first in consumer electronics and then in industrial and automotive products. Key Japanese players such as Sony, Panasonic, Toshiba, JVC, Canon, Nikon and Fujitsu are multi-billion dollar global leaders.

Republic of Korea: A largely successful economy, with a GDP of US\$1.41 trillion (2016), a GDP per capita of US\$27,538 and an CAGR of 2.80%, the Republic of Korea has a robust electronics manufacturing sector, with exports of US\$134.35 billion and imports of US\$75.14 billion, resulting in a trade surplus of US\$59.21 billion.

The Korean electronics industry began its exports as a contract electronics manufacturer supplying Japan. Initially competed on costs, the Republic of Korea soon became a worthy competitor to Japan. The Korean strategy was based on export-led growth, first to Japan and China and later to the rest of the world. Value for money positioning became the country's key strength during 1990s, when supply chains were developed for several key products. Backed by state support, *chaebols* with strong brands earned a global presence, primarily in consumer electronics, components and semiconductors. Industrial electronics, capital goods and embedded hardware followed. In the past fifteen years, major manufacturing has moved to China and Viet Nam to lower costs. Korean brands Samsung, LG and Daewoo are globally recognized brands today.

Chinese Taipei: An IT and semiconductor power house, Chinese Taipei's manufacturing of electronics products has been the backbone of the Chinese Taipei economy, which stands at US\$0.47 trillion, with a GDP per capita of US\$31,900 and a growth of 2.05%. Chinese Taipei also has a trade surplus in the electronics sector, with US\$124.14 billion in exports and US\$58.44 billion in imports.

Chinese Taipei invited their diaspora from Silicon Valley in the United States to establish technology based companies in Chinese Taipei by providing them tax incentives for venture

funding. This led to Chinese Taipei emerging as an IT product and component manufacturing base. The government also encourages the industry to work with academia to commercialize indigenously designed products.

Hsinchu Science Park, promoted by the Chinese Taipei government, is a world class cluster example in which the strategy has been focused on export-led growth, especially in IT products, semiconductor fabrication and power supplies, a very focused product line. Technology driven, medium-size companies and a few global OEMs were the corporate mainstays. Some later moved their manufacturing base to mainland China, retaining technology, capital goods and design in Chinese Taipei. Globally known players include Acer, Delta and Foxconn.

The Philippines: An emerging economy with a GDP of US\$0.3 trillion (2016), a per capita income of \$ 2,951 and a healthy growth rate of 6.9%, the Philippines is a late but successful entrant on the list of nations that have leveraged their electronics manufacturing industry to increase employment rates and increase exports.

Electronics contract manufacturing services have played a significant role in the growth of the Philippines, with an electronic trade surplus of US\$4.52 billion, based on exports of US\$25.22 billion and imports of US\$20.7 billion. The core strategy adopted by the Philippines has been to establish the country as an efficient, quick turnaround, EMS destination. They have established successful logistics parks such as Subic Bay to assemble circuits quickly, especially for customers in Singapore, Japan and the United States. The Philippines could not leverage their early success to retain industry because of little value addition and a low technology base. Key players operating in the Philippines are APC Schneider (EMS) and Emerson.

China: The factory of the world in the electronics manufacturing sector is perhaps the best example of a large economy that has delivered high growth for over two decades. Electronics manufacturing and exports have played a central role in China's growth trajectory, which has seen many leaders in the electronics space outsource manufacturing to the country. The Chinese GDP was US\$11.20 trillion in 2016, with GDP per capita of US\$8,123 and a relatively high growth rate of 6.70%. While the country has been very successful, it has recently seen a slowdown. Electronics has been a top contributor to Chinese exports, with exports of US\$ 557.06 billion set against imports of US\$412.88 billion.

The strategy that China adopted has been infrastructure intensive and intended to create world class, export focused manufacturing. China has established probably the most robust supply chain for electronics in the world. Provincial/city administrations have displayed ownership and are held accountable for each sector, based on a sub-sector focus for

each province. A top down, centralized approach has been coupled with strong policy support, including high levels of export incentives. The industrial policy incentivized major global players to set up manufacturing in China, bringing along state-of-the-art technology. Two decades later, the local industry has now come into its own, developing technology and establishing brands. The earlier, low value added phase is now over, with the current focus shifting to higher value added components and products. Key players such as Midea, Haier, Lenovo, Huawei, Oppo, Vivo and Gionee are now acquiring market share all over the world.

Viet Nam: Although Viet Nam is a developing economy with a GDP US\$0.2 trillion (2016), a GDP per capita of US\$ 2,111 and a robust growth rate of 6.20%, the country is the latest destination on the global manufacturing map and has shown tremendous export growth within a period of six to seven years.

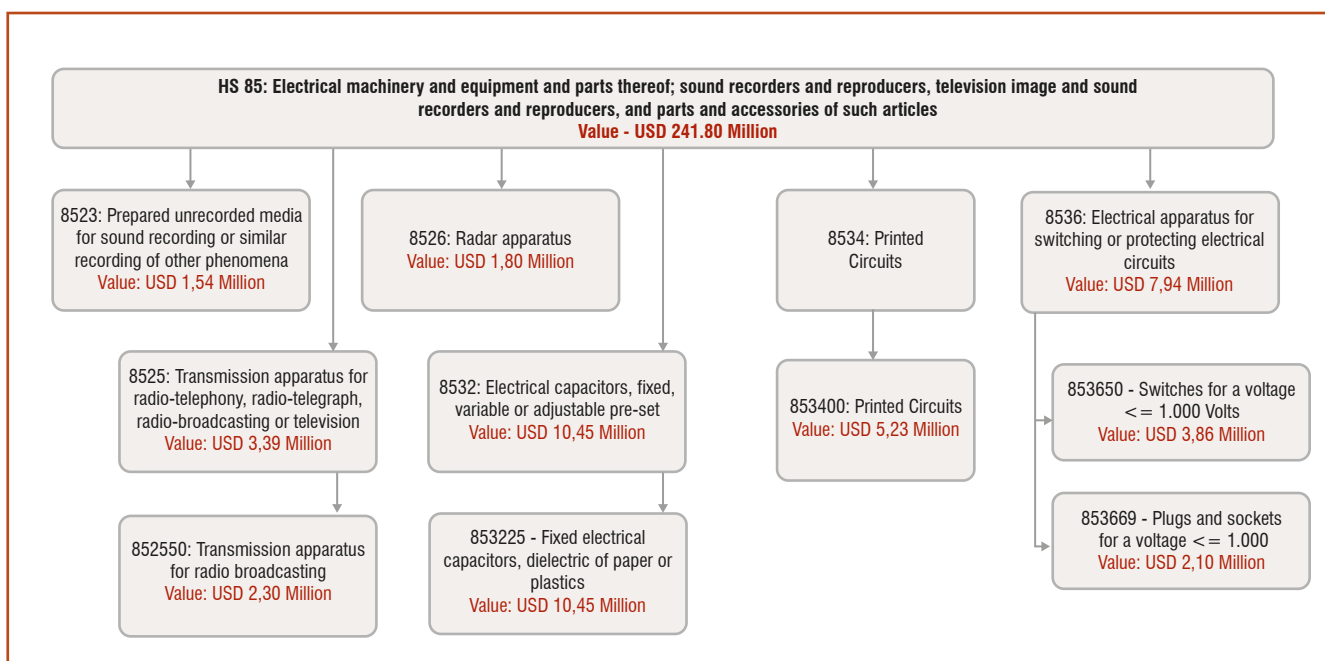
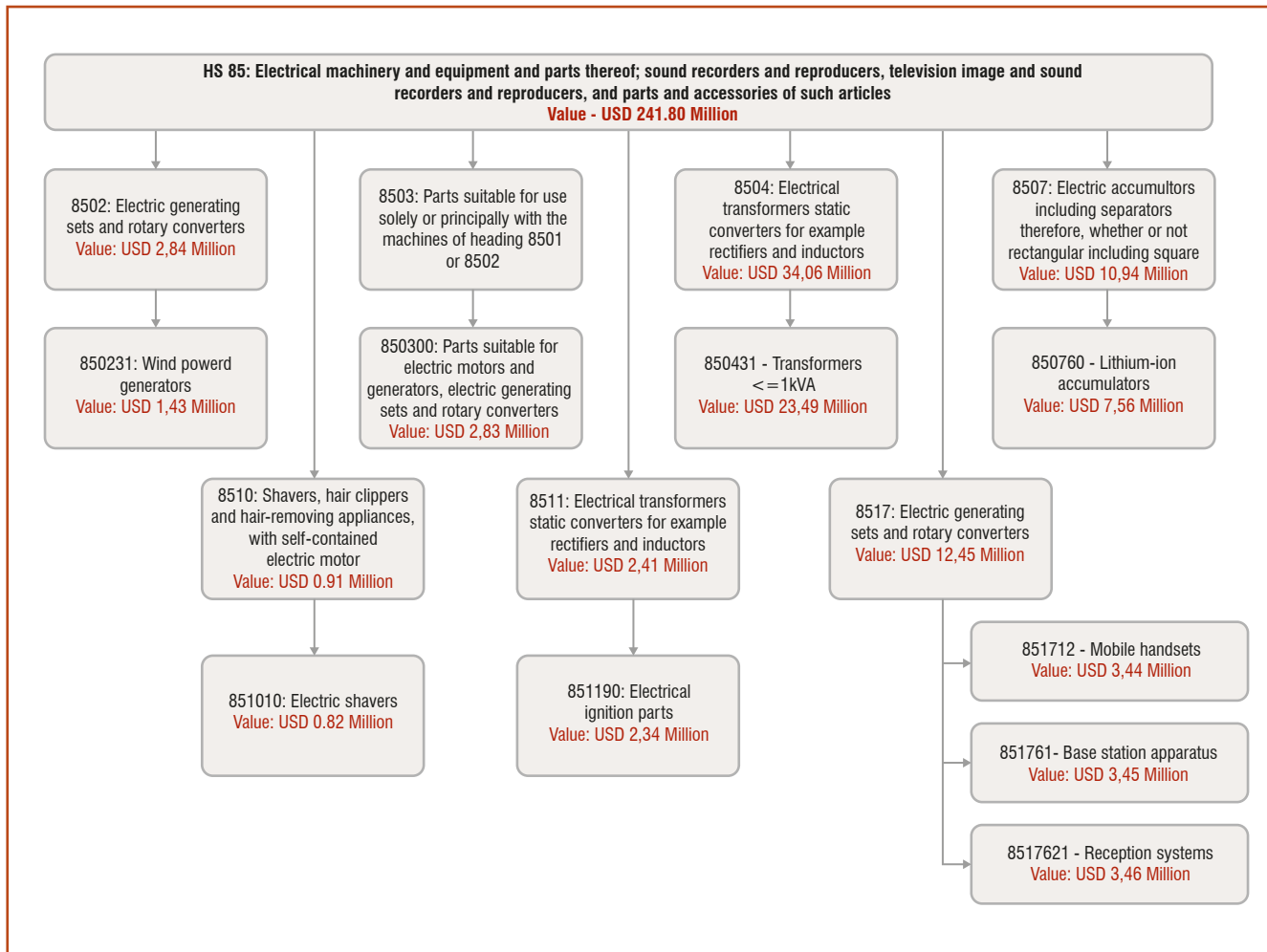
Electronics is a key manufacturing export sector for Viet Nam, contributing to exports of US\$77.51 billion and imports of US\$45.58 billion, resulting in a trade surplus of US\$31.52 billion. The key factors for this turnaround has been government policy and tax holidays combined with a cheap labour force. The result has been manifold growth during the last six years, led by investments by Samsung and Canon. Those companies have, in turn, persuaded their supply chains to follow them to Viet Nam. Several tax incentives favour large brands rather than the whole supply chain. Although there is currently little value added manufacturing, that is likely to change in the next 5 years.

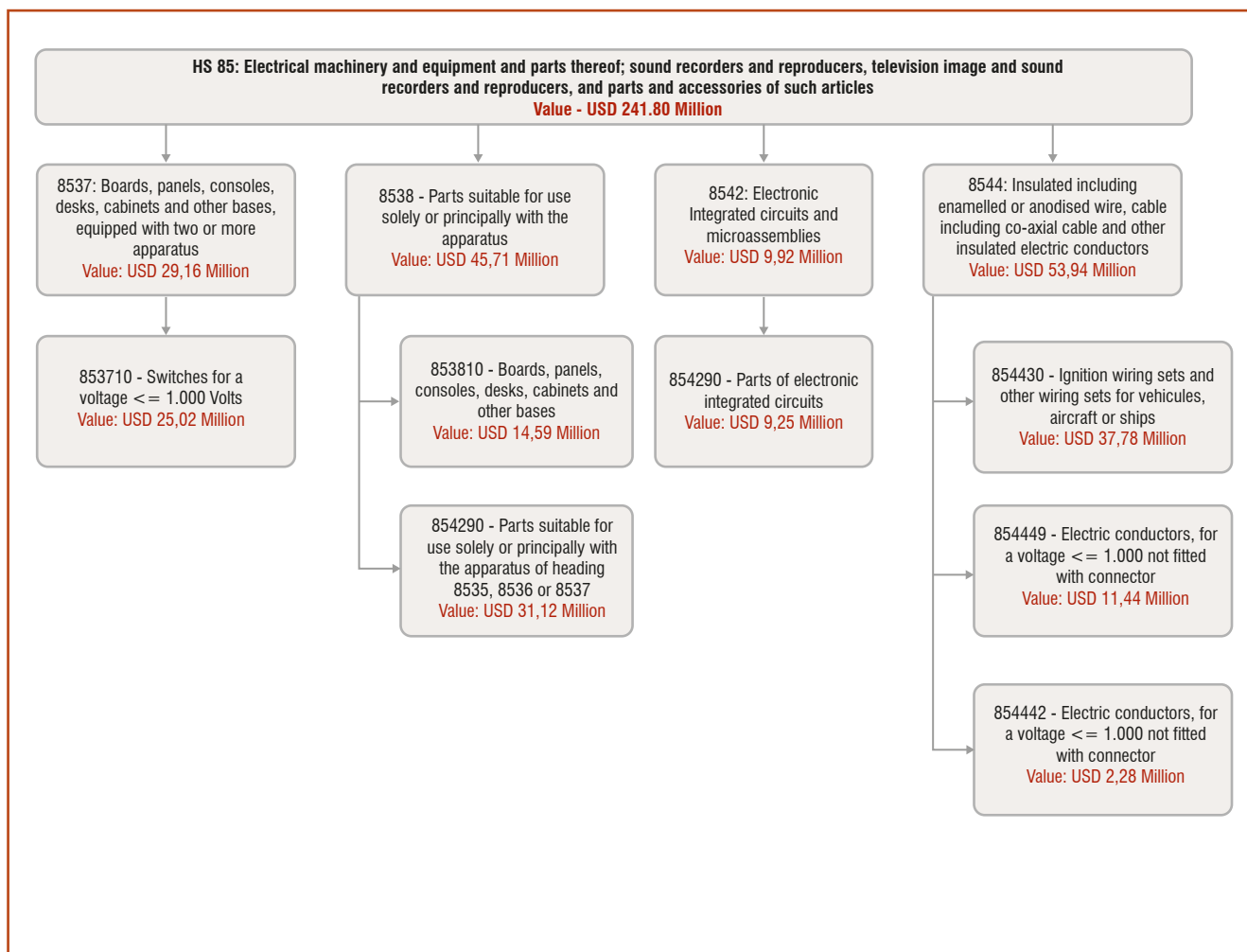
India: India has always represented the group of nations that have a very large potential but have not yet reached peak performance. India's GDP is US\$2.26 trillion (2016), with a low GDP per capita of US\$ 1,709, but the country's silver lining is its high growth rate of 7.10%.

Electronics has been recognized as a key growth sector and the current figures indicate a performance far below potential. The sector has a large trade deficit, with imports at US\$37 billion and exports of a meagre US\$8.21 billion. India has a large domestic market that could support a globally competitive industry. The National Policy for Electronics 2012 promises to be a turning point. This policy aims to leverage the country's experience in manufacturing during the last four decades to build a robust ecosystem. Several global companies are now investing in India to serve the Indian market while exporting to neighbouring regions. Embedded software combined with hardware aimed at fostering a digital society may prove to be a game changing opportunity.

A few key Indian companies have emerged, including global players such as Microtek, Lava, HCL, Videocon, Ahuja, Sukam and Intex.

APPENDIX 4: PRODUCT MAP OF THE EEC SECTOR





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Ministry of Development Strategies
and International Trade



Sri Lanka Export Development Board



International
Trade
Centre



SLEMEA

Sri Lanka Electronics Manufacturers & Exporters Association



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