

THE PROBLEM OF OVERCOMING MIDDLE INCOME TRAP: GETTING INTEGRATED TO GLOBAL ECONOMY IS THE WAYOUT

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Sri Lanka was elevated to the status of a lower middle income country in 1997 in terms of the World Bank classifications¹. For the next 21 years, the country remained in this category though there was a slow and steady movement upward. According to the predictions made for the 3 year period from 2018, it is likely that Sri Lanka will cross the threshold for an upper middle income country by 2021. Moving up from this status to a rich country – attainment of a per capita Gross National Income (GNI) of US\$ 12,086 at today's threshold level – will be a challenging task since it requires the country to maintain a steady growth rate of at least 9% a year, if the country is to reach this level by 2035. The problem is compounded by a new development relating to emerging economies called 'Middle-income Trap', a term coined by a group of economists attached to the World Bank² to theorise the failure of some developing countries to move from an upper middle income country to a rich country. Sri Lanka is in this category since it may have to spend at least 40 years as a middle income country before it could become a rich a country. That again will depend on its ability to maintain a growth rate of about 9% on average in the next 16 year period.

According to the proponents of the middle income trap hypothesis, a poor country can easily move from a low income country to a lower middle income country. That is because, being a low income country, it could make use of the abundantly available cheap labour for the production of mass consumption goods and supply the same to rich Western nations at a competitive price. Sri Lanka did so by using its labour resources to produce apparels with a significant competitive edge from around 1980. However, once a country becomes a lower middle income country, it will experience an increase in labour costs making it difficult for it to compete in the cheap labour market with newly entering poor countries which have a relatively lower wage level compared to countries which have now attained the lower middle income status. As per statistics compiled by the International Labour Organisation (ILO), in 2014, Sri Lanka had the lowest monthly wages for garment workers out of 25 major garment exporters

¹The threshold applicable to a lower middle income country in 1997 was a per capita Gross National Income of US \$ 786 and above.

²Chiefly due to the work of Kharas and Kohli. For a good exposition of the subject, see Kharas, Homi and Kohli, Harinder (2011), "What is the Middle Income Trap, Why do Countries Fall into It and How Can it be Avoided?" in *Global Journal of Emerging Market Economies*, November; also available at <http://journals.sagepub.com/doi/pdf/10.1177/097491011100300302> ; accessed on 15.11.2018.

in the world³. However, actual costs to employers are about two and a half times higher than the minimum wages set for the industry making Sri Lankan garment exports less competitive in the global markets⁴. As a result, Sri Lanka's garment exports which are less than 2% of the global trade in garments have saturated in the last few years making it difficult for the country to rely on this source of income anymore. Accordingly, though garment exports have increased in absolute terms over the years, they have slightly fallen as a share of total exports. In 2009, its share in total exports amounted to 46%. In 2017, it has fallen to 44%.

To beat the middle income trap, Sri Lanka needs to concentrate on promoting exports by diversifying them to new areas. This is not a new strategy since the country had been relying on international trade for creating prosperity throughout its recorded history. This was facilitated by its location on a convenient naval route connecting the East with the West making it a popular resting centre for navigators to procure essential requirements for passing ships. When foreign vessels began to call on various ports located around the island, it became a trading centre for stocking goods imported from numerous lands and supplying the same to visiting traders⁵. This trade – known as entrepot trade – was continued in the first and the second millennia bringing revenue to the government by way of tariff and earning foreign exchange for financing essential imports. A dramatic change was the shift of this trade from South Indian ports to those in Sri Lanka⁶. In the 12th century when the seat of administration was shifted to Polonnaruwa and the country was under the reign of King Parakramabahu, the First, Sri Lanka was a thriving trading centre. When the King did not have resources to wage war with other sub-kingdoms to become the overlord of the whole island, he is said to have setup a special trading area under the charge of a minister called Antharanga Dhura – similar to a modern export processing zone – bounded by present Kaluganga, Benthara Ganga and Sinharaja Forests to produce gems for exports and earn income to buy weapons from abroad⁷. Sri Lanka's reliance on foreign trade for prosperity was continued unabated even during the colonial period. In addition to cinnamon, the Dutch had exported two new commodities, namely, Ceylon arrack distilled from the sap of coconut flowers and Ceylon sea salt produced in salterns in arid coastal areas. Since both these products were of good quality and enjoyed a high demand from the Indian market, the British in the initial period of their rule, continued to export the same⁸. This was later replaced by adding the three tree crops – tea, rubber and coconut – as the main exportable commodities from Ceylon in the late 19th and 20th centuries⁹.

³https://www.ilo.org/wcmsp5/groups/public/-/asia/-/ro-bangkok/documents/publication/wcms_317002.pdf (accessed on 15.11.2018).

⁴https://globalpressjournal.com/asia/sri_lanka/sri-lankan-garment-factories-boost-wages-benefits-labor-shortage-looms/ (accessed on 15.11.2018).

⁵See, Perera, B J (2012), 'Foreign Trade in Ancient Ceylon' in Ancient Period, Volume I, Tisara Book Publishers, Dehiwala (In Sinhala), pp 77-13

⁶Siriweera, W I (1994), A Study of the Economic History of Pre-modern Sri Lanka, Vikas Publishing House, New Delhi, p 133.

⁷The Mahavansa, Part II, Chapter LXIX, English Translation by L C Wijesinha (2000), Asian Educational Service, New Delhi, pp 151-2.

⁸For details see: University of Ceylon, (1973), History of Ceylon, Vol 3, University of Ceylon, Peradeniya, Chapter IV in Part I, Chapter I in Part II and Chapter IV in Part IV.

⁹Ibid.

This paper presents Sri Lanka's choice for the future. Part I examines the present state of the export sector and the current export strategy as outlined in the National Export Strategy (NES) released by the Export Development Board¹⁰. Part II will examine how Sri Lanka should convert its export sector from simple technology based exports to complex technology based exports. Part III will evaluate the country's strategy to get integrated with the global economy via multilateral and bilateral trade arrangements. Part IV will present summary and main recommendations for the future.

Part I

Sri Lanka's Export Sector: Current State, Challenges and the Future Strategies

a) Current state

Sri Lanka adopted an export driven economic development strategy after it embraced an open economy policy in 1977. Accordingly, the export sector was incentivised through exchange rate reforms, provision of logistical support via modernising port and airport services and introduction of a targeted export drive by inviting foreign direct investments to export processing zones. These policies enabled Sri Lanka to dramatically change its export structure¹¹. In 1976, the export structure was heavily biased toward the three tree crops with a share of 86% in total export earnings. The industrial products had a share of only 14%. By 2017, this structure changed to 24% from agricultural exports and 75% from industrial exports. This change included a host of new export products – minor agricultural products, textiles and garments, manufactured rubber products, and machinery and mechanical appliances – which were non-existent in 1976. Hence, there were appreciable gains by Sri Lanka after it had gone for the export led open economy policy in 1977. It indeed helped Sri Lanka to elevate from a low income country to a lower middle income country. However, when compared with its peers and from a point of continued economic prosperity, the attainments have not been sufficient.

In 1951, Sri Lanka was so heavily reliant on exports that its share in Gross Domestic Product (GDP) amounted to 42%. This ratio gradually declined over the years falling to 12% by 1972. It however, increased slightly to 16% in 1976 mainly due to the slower economic growth recorded by Sri Lanka compared to the growth in exports. After the introduction of the open economy policy in 1977, the share of exports in GDP rose to 30% in 1978, but the country could not sustain that high share since then. It gradually fell to 19% in 1986 before it started to reverse reaching a peak of 33% in 2000. After that high performance, exports began to fall once again in comparison to GDP. Finally, it fell to 13% in 2017. Meanwhile, imports were rising both in volume and as a share of GDP, exerting pressure for Sri Lanka's current account

¹⁰Available at: <http://www.srilankabusiness.com/pdf/nes/sri-lanka-nes-4-3-web.pdf> (accessed on 15.11.2018).

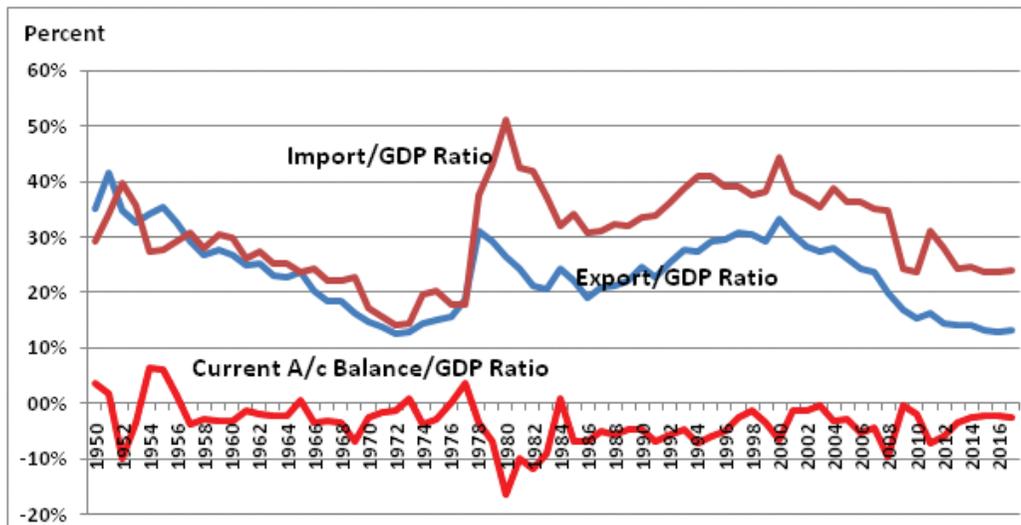
¹¹For details, see, Yapa, Lloyd F (2017), Export Competitiveness and Poverty Alleviation in South Asia with Special Reference to Sri Lanka, Godage Brothers, Colombo, Chapter 4.

to record a significant deficit. It in turn affected the country's overall balance of payments which was financed basically by resorting to external borrowings and the rupee's ability to maintain a stable value. Accordingly, the country's foreign borrowings which amounted to 4% of GDP in 1948 increased dramatically to 60% in 2017. Figure 1 gives the ratios of exports, imports and current account balance to GDP during 1950 to 2017.

The inadequate performance of the export sector is evident from the faster growth in GDP in absolute terms compared to the absolute levels of exports and imports. Accordingly, GDP which amounted to US \$ 10 billion in 1993 has risen sharply to US \$ 87 billion in 2017, recording an eight-fold growth during the period. However, exports have risen in absolute terms more slowly. In 1993, exports amounted to US \$ 2.7 billion. It has increased to US \$ 11.4 billion in 2017, only a four-fold growth. Figure 2 presents Sri Lanka's GDP, Exports and Imports in absolute terms during 1950 to 2017.

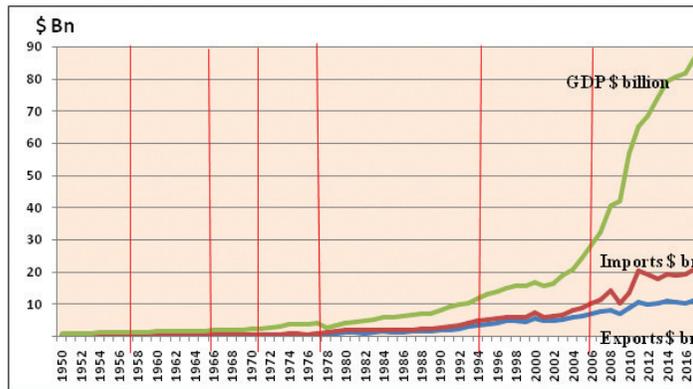
The slow growth in exports has been the bane of Sri Lanka's economic performance in the past. The faster growth in GDP than exports reveals that the economic growth has basically been attained by concentrating on domestic economy based economic policies. They offer the advantage of allowing a country to go through adverse external shocks with minimum damage to the economy. However, they do not help a country to grow because of the limitations in the domestic market. Hence, the growth rate to be attained is slower than the potential growth as well as the growth rates achieved by peers who have got integrated to the global economy.

Figure 1: Sri Lanka: Exports, Imports and the Current Account Balance as a Percentage of GDP during 1950-2017



Source: Central Bank of Sri Lanka digital data base

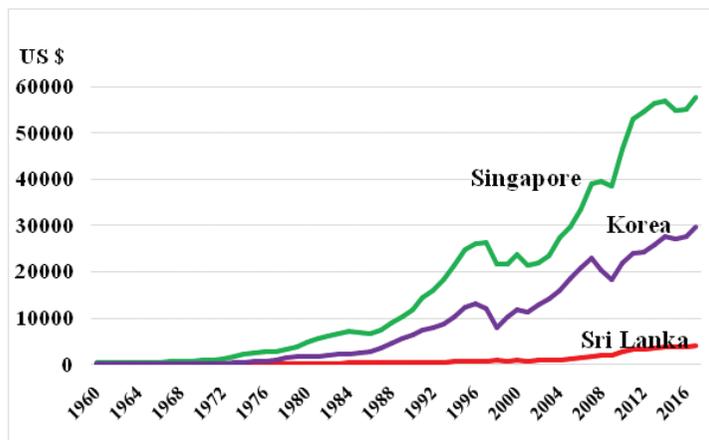
Figure 2: Sri Lanka: GDP, Exports and Imports during 1950-2017



Source: Central Bank of Sri Lanka digital data base

Figure 3 shows the per capita income of Sri Lanka, Singapore and South Korea during 1960-2017. All these three countries started at the same level of per capita income in 1960.

Figure 3: Per capita income of Sri Lanka, Singapore and South Korea during 1960-2017



Source: World Bank

However, Singapore and South Korea had adopted export led economic growth policies since around 1970. As a result, the per capita income of both countries began to move away from that of Sri Lanka, rising to higher levels at each successive year. Both Singapore and South Korea have been able to beat successfully the middle income trap and become rich countries within a generation.

b) Challenges

The challenge for Sri Lanka is to beat the middle income trap through a viable export development policy. This is because Sri Lanka's domestic economy alone is not sufficient for the country to produce goods and services in volumes that would push the country up to the level of a rich country in view of the limitation of the market. Sri Lanka's domestic market is limited by both the size and the income. It has a population of 22 million but its middle class – the segment of population that creates a demand for products – is estimated to be 3.6 million or 16% of the total population¹². In comparison, USA's middle class numbering 232 million amounts to 74% of the population¹³. Bigger the middle class, larger the domestic market that enables a country to rely on the domestic economy based economic policies. The choice for Sri Lanka is, therefore, to adopt a strategy of selling its outputs across its borders. This is known as export-oriented economic development policies. A classic example of how exports would facilitate a product or an industry to grow is provided by Sri Lanka's tea sector which produces about 330 million kg of tea annually. But its domestic consumption is about 30 million kg, making it necessary for the country to seek external markets to sell the extra production. If these markets are not found, the country's GDP will shrink by 1%, export earnings by 12% and employment by 2.5% as per data for 2017. Similarly, if the volume of tea exports can be increased by 25%, it will provide a significant boost to Sri Lanka's economy.

Sri Lanka's main manufactured export – textiles and garments – face a major challenge due to two related developments. The textiles and garments sector benefitted from the wave of globalization that took place in the global economy in 1980s. Accordingly, the rich countries in the world taking advantage of the low wage costs in low income countries began to set up their mass consumption product factories in the latter category of countries. This process was known as off-shoring¹⁴. However, an unintended consequence of this process was the development of the bazaar effect in which the rich countries simply became trading nations – bazaars in a traditional sense – with manufacturing off-shored to low income countries¹⁵. With the consequential decline in manufacturing jobs in rich countries, there was a wide public outcry against off-shoring which became a political weapon for leaders to gain popularity among the masses. Hence, the production model was changed to locate the mass production consumption goods industries near the final markets – called near-shoring – or on the land itself – called on-shoring – through product automation. The textile and garments industry has been the first industry to exploit these new production models.

A recent survey conducted by McKinsey and Company on the apparel sectors in North America and Europe has revealed that both near-shoring and on-shoring have become the

¹² Kharas, Homi, (2011), 'The Rise of the Middle Class' in Ejas Ghani (ed) Reshaping Tomorrow: Is South Asia Ready for the Big leap? Oxford University Press/World Bank, New Delhi (p 65).

¹³ Ibid.

¹⁴ A vivid description of how this practice got rooted as a new production model is found in Friedman, Thomas L (2005), The World is Flat: A Brief History of the Twenty First Century, Farrow, Strauss and Giroux, New York.

¹⁵ Mainly due to Sinn, Hans-Werner, (2006), 'The Pathological Export Boom and the Bazaar Effect: How to Solve the German Puzzle', CESifo Working Paper Series 1708, CESifo Group Munich.

most popular production model adopted by a large segment in the final consumer countries¹⁶. According to the survey, about 67% of the US apparel executives and 80% of the global chief procurement officers have indicated that the top-most priorities in the apparel sector have been the speed at which the final products should be delivered to the market and how the goods could be procured within the season. In the past, fashions developed by apparel companies had been fed to consumers. But, that trend is fast changing and instead, a bottom-up consumer preference system in which the consumers will inform garment manufacturers to produce the fashions they desire is developing in the apparel sector. To gain capacity to produce and supply these products, apparel trading companies need to have manufacturing facilities near the markets. That is the reason for near-shoring and on-shoring to get established in the apparel sector value chain. On-shoring has been facilitated by automation of apparel manufacturing brought in by such technological advancements as 3D print manufacturing, gluing and bonding instead of stitching and robotic employment. As a result, the cost advantage enjoyed by low income countries with respect to garment manufacturing is fast eroding.

McKinsey Survey has predicted that by 2025, a large segment of both the North American and European markets will be supplied by both on-shoring and near shoring. Table 1 presents the countries that are located around North America and Europe standing to benefit by adopting the new value chain model.

Table 1: Suppliers of apparels to North American and European Markets by 2025

North America		Europe	
Near-shoring		Near-shoring	
Country	Percentage of the market	Country	Percentage of the market
Mexico	20	Turkey	29
Guatemala	7	Morocco	10
Haiti	7	Tunisia	5
El Salvador	5	Macedonia	5
Honduras	5		
On-shoring		On-shoring	
USA	30	UK	7
		Portugal	5
Total	74	Total	61

Source: McKinsey and Company Survey 2018, p 9

¹⁶McKinsey and Com (2018), Is Apparel Manufacturing Coming Home? Near-shoring, Automation and Sustainability-Establishing a Demand-Focussed Apparel Value Chain, Available at: https://www.mckinsey.com/~media/mckinsey/industries/retail/our%20insights/is%20apparel%20manufacturing%20coming%20home/is-apparel-manufacturing-coming-home_vf.ashx (Accessed on 17.11.2018).

Both North America and Europe are Sri Lanka's established markets for apparel products. During the 5 year period from 2013 to 2017, European Union absorbed 43% of Sri Lanka's apparel exports, while North America absorbed 46%. Thus, these two markets had accounted for 89% of the country's apparel exports. Accordingly, if they are to near-shore and on-shore apparel supplies, Sri Lanka's traditional apparel industry will face a serious risk of maintaining sustainability. It is therefore necessary for Sri Lanka to change the focus of its production to new export commodities to avert possible downside development of its export sector.

c) Way forward strategy

Taking into account the above mentioned global developments today, Sri Lanka has released a new National Export Strategy (NES) in April, 2018¹⁷. The strategic vision of the document has been to develop Sri Lanka as an export hub, driven by innovation and investment. The hub component of the vision has no practical value since Sri Lanka produces only a limited number of exportable products. NES also has identified four strategic objectives to pursue in order to attain its goal of setting up an export hub in the country.

1. To have a business enabling, predictable and transparent policy and regulatory framework that supports exports;
2. To strengthen Sri Lankan exporters' market-entry and compliance capacities;
3. To become an efficient trade and logistics hub to facilitate exports; and
4. To drive export diversification through innovation and by strengthening emerging sectors.

According to NES, an enabling business environment will be created by improved logistics, trade information and promotion, developing a national quality infrastructure and inculcating a culture of innovation and entrepreneurship. Given Sri Lanka's present endowments and comparative advantages, six main focus sectors have been identified for development during the strategy period.

1. Information Technology (IT) and Business Process Management (BPM);
2. Development of a wellness tourism sector;
3. Boat building;
4. Manufacture of electrical and electronic components;
5. Manufacture of processed food and beverages; and
6. Spices and concentrates.

NES has attempted to break away from Sri Lanka's reliance on the three tree crops and apparels as the main source of export earnings and develop six new areas that include the export of services as well. This vision was expressed by the Prime Minister in November 2015 when

¹⁷ National Export Strategy of Sri Lanka 2018-2022, Export Development Board, Colombo, (Available at: <http://www.srilankabusiness.com/pdf/nes/sri-lanka-nes-4-3-web.pdf>) (Accessed on 18.11.2018)

he presented the first economic policy statement of the government to Parliament¹⁸. It was reiterated in subsequent statements¹⁹ as well as the policy document titled Vision 2025 released in June 2017²⁰. However, it is after three years that this vision was codified and presented as an export development strategy document by the bureaucracy.

NES has diagnosed the ailments faced by the country's export sector correctly. But its strategic vision should be converted to concrete policy action plan²¹. For implementation of the plan, there should be a number of programmes involving the key sectors covered in NES. Each programme should have its own targets, key performance indicators, a time bound action plan and the resource base to achieve goals. Third, each programme should be split into a number of sub projects that should be assigned to different implementation units. It is this ground force that should deliver results to the nation. Therefore, these units should be provided with necessary resources – both financial and logistical – on the one hand and properly incentivised, monitored and directed, on the other. The fourth process is the most crucial for attaining the goals of NES. That is to give political leadership to the implementation of NES at the national level. It involves coordination of work among different agencies, trouble-shooting and acquiring resources for the implementation of the national plan to be developed under NES.

Exports will not happen automatically simply because a government body has made a pronouncement. To change the structure of exports of a country within a short period, it is necessary to disrupt the whole economy from top to bottom and across all the sectors. The government machineries which are usually moving at a snail's pace should be accelerated to the maximum speed possible to provide support services. Labour markets which are rigid and ruled by uncompromising trade unions should be made flexible with respect to entry, exit, on the job training and new skill and talent acquisition. The biggest disruption to be effected to the labour market is the conversion from the present 'seniority and fixed salary based system' to a 'merit and output-based system'. When a society has lived hundreds of generations in a seniority and elders-worshipping society, it is normally embedded irrevocably in the genes of its members. Thus, the introduction of a merit based system to such a society, however much it is desired, will be a painful exercise. It requires the disruptors to inflict mental violence on the subjects who are to be changed; but the reaction of the subjects too is characterised by a similar response making it difficult to introduce the disruption without social costs. This may

¹⁸ Economic Policy Statement of the Unity Government presented to Parliament on 5 November 2015 (Available at: <http://www.lankabusinessonline.com/full-text-economic-policy-statement-made-by-pm-in-parliament/>) (Accessed on 19.11.2018)

¹⁹ Second and Third Economic Policy Statements presented to Parliament in Nov 2016 and Nov 2017, respectively. (Available at: The second statement could be accessed at: https://economynext.com/Sri_Lanka_Prime_Minister_s_policy_statement-3-6467.html and the third statement at: <https://www.colombotelegraph.com/index.php/economic-policy-statement/>) (Accessed on 19.11.2018)

²⁰ Vision 2025, Government of Sri Lanka, Colombo, (Available at: http://www.treasury.gov.lk/documents/10181/66400/Vision_2025_English.pdf/8d93e8db-2c3a-4e15-9ab2-fc619817e6fd) (Accessed on 18.11.2018).

²¹ Wijewardena, W A (2018a), 'Part I: National Export Strategy 2018-2022: Disrupt the Economy Fast, if the Goals are to be Attained' in Daily FT (Available at: <http://www.ft.lk/columns/Part-I-National-Export-Strategy-2018-22-Disrupt-the-economy-fast-if-the-goals-are-to-be-attained/4-659860>) (Accessed on 18.11.2018)

appear to be difficult but not impossible to attain at all. It involves the change of the mindset of people through a back and forth consultative process removing fears and providing assurance. It is quite a challenge and Sri Lanka's NES will also be subject to this challenge.

A glaring deficiency in NES is the absence of measurable annual targets for exports during the strategy period²². Though EDB claims that it is working on some internal numbers, without targets fixed for each year, the progress of the strategy cannot be measured²³. It also becomes an opaque exercise since the authorities can always claim that they have reached the targets set in NES, despite the fact that independent reviewers are unable to verify such claims. Without measurable physical export targets, NES has just become a paperwork incorporating some academic exercise. The rationale and wisdom embodied in NES are appreciable and should be used for developing a concrete plan with time bound goals for Sri Lanka to promote its exports and beat the middle income trap.

Part II

Conversion Of Simple Technology Based Production System to Complex Technology Based System

As presented earlier, Sri Lanka's production system is based on simple technology, borrowed from Western nations when they moved from simple technology to complex technology. According to MIT's Economic Complexity Index, in 2000, Sri Lanka was ranked at 78 out of 120 countries, implying a low technology based production mix²⁴. Since then, it has more or less remained at that level before slightly improving its position to 70 by 2016. The export items which Sri Lanka had been producing mostly have been apparels and the three tree crops. That level of technology can no longer support Sri Lanka's planned goal of creating an export hub supported by inventions and entrepreneurship as envisioned in NES. Simple technology has the advantage of being used en masse and helps a country in its initial phase of economic development where mass production is the order of the requirement. Yet, once a country has passed that stage, hanging onto simple technology will become an impediment for further growth. It also makes a country's economy vulnerable to new competition since it is quite easy for new comers to adopt such simple technology and get into mass-production systems. At a firm level, this was experienced by the General Electric Company (GEC) when it was competed out of the market in 1970s by Japanese electric goods producers by adopting the simple technology which GEC had been using for producing household electrical appliances. Hence, to make a turnaround in the company, its CEO, Jack Welch had to move from simple

²² Wijewardena, W A (2018b), 'Part II: National Export Strategy 2018-2022: Introducing Measureable Physical Targets' in Daily FT (Available at: <http://www.ft.lk/columns/Part-II-National-Export-Strategy-2018-22-Introducing-measurable-physical-targets/4-660298>) (Accessed on 18.11.2018).

²³ Wijewardena, W A (2018c), 'Part III: National Export Strategy 2018-2022: Focus on Selected Sectors Welcome but Challenging' in Daily FT (Available at: <http://www.ft.lk/columns/Part-III-National-Export-Strategy-2018-22-Focus-on-selected-sectors-welcome-but-challenging/4-660762>) (Accessed on 18.11.2018)

²⁴ <https://atlas.media.mit.edu/en/profile/country/lka/> (Accessed on 18.11.2018).

technology to complex technology and concentrate in producing jet engines, sophisticated medical equipment and electricity generating turbines²⁵. Since the high technology involved in producing these products could not be available to mass producers, GEC was able to shield itself from unwarranted competition coming from technology adopters. Hence, what is relevant to a firm is relevant to a nation as well.

Technological advancements are disruptive and therefore painful. Those who are able to predict and adapt to the disruption will be winners, while others will be destined to be losers. Human history has often taught this painful lesson to mankind. When the motorised vehicles emerged, the horse-driven carts were driven out of the road; when the spinning machines were invented, handlooms had to give in. They made thousands of people around the globe jobless but created new jobs for people who could train themselves to adopt the new technologies. However, a concern for many societies today has been that disruptive technologies are emerging at an exponential rate. It is just like that a person wakes up every morning today to be surprised by the next big thing that has hit the world. It is happening so fast, that it is difficult even to keep pace of them let alone getting trained to adopt them. Yet, this frightening pessimism has also given rise to hopeful optimism as opined by Peter Diamand is in a TED lecture in 2012²⁶. What Diamand is said was that the fear of scarcity is unfounded. The emerging technology can make this world a place of abundance. One has to create a need for it and wait patiently until the next big thing happens in the scientific world. The global community is creating this need for technology creators to meet that need. Then, technology adopters have been able to supply the same in collaboration with the technology creators. In this manner, the four famous technology adopters in the initial pace, Singapore, South Korea, Taiwan and Hong Kong, were able to beat the middle income trap successfully in 1990s. Today, they have been upgraded from the status of technology adopter to that of technology creator in competition with the rich Western nations.

This offers an opportunity for Sri Lanka to be a partner of the present technological advancement wave. With this objective in mind, the government had announced that it would set up a techno city under its Megapolis project in Pitipana, Homagama with a planned investment of over Rs 19 billion²⁷. This is a part of the Technopolis to be set up in the land area from Malabe to Pitipana under the government's Megapolis project that aims at elevating the Western Province of the country to the status of wealth creator for the nation. The objective of the authorities has been to develop the Techno City as an innovation centre making available the inventions to be made at the Techno City to entrepreneurs for commercial production, a process known as 'innovation'²⁸. It has also been pointed out that if Sri Lanka could get back the Sri Lankan scientists working in USA, the country could make a true quantum leap in developing its scientific and technological invention base. According to media reports, five institutions are to locate their research centres at the Techno City initially. They are the National Science

²⁵ Welch, Jack, (2001), *Straight from the Gut*, Headline Book Publishing Com, London.

²⁶ https://www.ted.com/talks/peter_diamandis_abundance_is_our_future (Accessed on 18.11.2018).

²⁷ <http://www.ft.lk/article/569426/Govt-aims-for-hi-tech-with-Techno-City-> (Accessed on 18.11.2018)

²⁸ Wijewardena, W A, (2016a), 'Technocity is the first step in the right direction, but there is much more to be done to attain the goals' in Daily FT (Available at: [http://www.ft.lk/columns/techno-city-is-the-first-step-in-the-right-direction-but-there-is-much-more-to-be-done-to-attain-the/4-569655](http://www.ft.lk/columns/techno-city-is-the-first-step-in-the-right-direction-but-there-is-much-more-to-be-done-to-attain-the/)) (Accessed on 18.11.2018).

Centre, Arthur C Clarke Institute for Modern Technologies and Universities of Moratuwa, Sri Jayewardenepura and Colombo. Of them the University of Sri Jayewardenepura has got the lion's share of RS 7.5 billion or US \$ 50 million as a start-up technology based university in the country²⁹.

In the past, Sri Lanka had missed the 'global technology-bus' by being a passive spectator of the emerging technology developments. But it need not continue to do so. The other countries in the region had teamed up with world's giants in technology and extracted a high external benefit by being a partner of technological developments. Singapore did so by linking its universities to the best universities in USA and attracting foreign direct investments or FDIs from large corporations which had already developed high technology. South Korea, Malaysia, Taiwan and Thailand had attracted FDIs with high technology. Sri Lanka could have been a breakout nation in early 1980s but the costly ethnic war and the insane reaction of majority Sri Lankans had prevented worthwhile FDIs from coming in. An often cited example is the shifting of the proposed manufacturing plants of two major electronics multinationals, Motorola and Harris Corporation, from Sri Lanka to Malaysia and elsewhere, respectively, due to the ethnic riots of 1983³⁰. Therefore, it has been suggested that Sri Lanka should now restart its efforts at converting its economy into a complex economy which also includes development of nanotechnology³¹.

The technological advancements have changed the way industries operate in the world during the last 250 years. A chronological examination reveals that what is termed today as Industry 1.0 started around 1784 with the mechanisation of industrial operations through steam power first applied to weaving in the textile industry. Then came Industry 2.0 around 1870 in which goods were produced on a mass scale in assembly lines using electric energy. The third phase was Industry 3.0 in which operations were automated by engaging computers and electronics. The next phase to which the world is moving today is Industry 4.0 in which cyber-robotics guided by artificial intelligence and internet of things coupled with networks to support mankind is being introduced competitively by world's advanced nations. Sri Lanka with its goal to beat the middle income trap and become a rich nation has no choice but to join the race.

According to McKinsey Global Institute (MGI), there are twelve miracle technologies that are disrupting the world today³². The list is not exhaustive but provides a guideline for nations to follow.

1. Mobile Internet: Increasingly inexpensive and capable mobile computing devices and Internet connectivity; If you are with a smart phone with internet connection today, you have

²⁹ *ibid.*

³⁰ Kelegama, Saman (2006), *Development Under Stress: Sri Lankan Economy in Transition*, IPS, Colombo, p 57

³¹ Wijewardena, W A (2014), 'Sri Lanka can 'leap-frog' into the future through nanotechnology' in Daily FT (Available at: <http://www.ft.lk/opinion/sri-lanka-can-leap-frog-into-the-future-through-nanotechnology/14-348176>) (Accessed on 18.11.2018).

³² <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies> (Accessed on 18.11.2018).

the entire world at your finger tips. A comparison has been made by MGI on this count with computers of yesteryear: It has said that the most powerful computer in 1975 costing \$ 5 million had the same performance of an iPhone today costing only \$ 400.

2. Automation of knowledge work: Intelligent software systems that can perform knowledge work tasks involving unstructured commands and subtle judgments. The distributed intelligence now being developed in USA and elsewhere in Europe seeks to replicate human brain and pretty soon most of the brainy work handled by humans will be outsourced to these smart and intelligent computers.

3. The Internet of Things: Networks of low-cost sensors and actuators for data collection, monitoring, decision making, and process optimization; software applications are now being developed in the Western world at a rate that it is practically possible to beat the limitation created by time and space when it comes to human interaction.

4. Cloud technology: Use of computer hardware and software resources delivered over a network or the Internet, often as a service; This system of data protection and storage will help people to use only a fraction of the installed capacity in their computers and travel abroad just with a bag of clothes but still access to their data files from any place in the globe. The only requirement is that they should remember their password, but today with new apps, even password management has become possible.

5. Advanced robotics: Increasingly capable robots with enhanced senses, dexterity, and intelligence used to automate tasks or augment humans; These robots will not only handle monotonous routine jobs but also are capable of making decisions faster than humans having processed all the necessary information. Thus, the concept of bounded rationalist which Herbert Simon came up with in 1955³³ to propose that people are not rational because they cannot access to all the information and even if they have access, they are constrained by a lack of time and ability will be just a thing in the past.

6. Autonomous and near-autonomous vehicles: Vehicles that can navigate and operate with reduced or no human intervention; These are smart vehicles and already vehicle manufacturers have started to fix their products with all types of software packages that help drivers to better control their vehicles while avoiding fatal accidents or crashes.

7. Next-generation genomics: Fast, low-cost gene sequencing advanced big data analytics, and synthetic biology (“writing” DNA); This is the most disruptive of the new technologies because sequencing one’s genome will not only be cheaper but also be quicker. This will help the diagnosis of ailments more accurately and find treatments by simply changing the copy of the genome just like we write computer software programmes today to handle processing problems.

³³ Simon, Herbert A (1955) ‘A Behavioural Model of Rational Choice’, QJE, Vol 69, No 1, pp 99-118 (Available at: <http://www.math.mcgill.ca/vetta/CS764.dir/bounded.pdf>) (Accessed on 19.11.2018)

8. Energy storage: Devices or systems that store energy for later use, including batteries; This is a real contributor to energy saving because it will help the world to develop more energy efficient machines and thereby conserve energy.

9. 3D printing Manufacturing: Additive manufacturing techniques to create objects by printing layers of material based on digital models; The invention of 3D printers from around early 1980s and reaching its adulthood in early 2010s³⁴ has been termed as the second industrial revolution because it has enabled producers to use 3D printers to produce practically anything from precise parts of airplanes to cars to body parts.

10. Advanced materials: Materials designed to have superior characteristics (e.g., Strength, weight, conductivity) or functionality; Nano carbons and other strong materials are to replace steel as the main input in producing machines and constructing buildings.

11. Advanced oil and gas exploration and recovery: Exploration and recovery techniques that make extraction of unconventional oil and gas economical; USA and Canada have been able to come up with hydraulic fracturing and octopus horizontal drilling for tapping what was hitherto inaccessible as shale oils and natural gas that lie in shale rocks about 5 miles deep down in the interior of the earth. USA is to be self-sufficient in natural gas and fossil fuel by 2025 by tapping its vast shale oil fields the northern parts of the country.

12. Renewable energy: Generation of electricity from renewable sources with reduced harmful climate impact; The development of new nano solar photo voltaic solar power harvesters will revolutionise the world's new renewable energy production methods.

Sri Lanka should orient its education, research and development systems to be a partner of this changing technological base in the world. For this purpose, the resources that are presently directed toward consumption in the budget should be pruned and rationalised to enable the government to divert them to research, development and promote innovative practices.

³⁴ See: <https://3dinsider.com/3d-printing-history/> (Accessed on 18.11.2018).

Part III

Getting Integrated to the Global Economy

A salient feature of Industry 3.0 has been the unbundling of the production processes and engaging different production units to manufacture and supply the same for final assembly in a different location. As a result, no country can claim ownership to any product today. For instance, iPhone 6 is assembled in FoxConn facility located in China. However, parts for iPhone 6 come from 754 production units located in 31 different countries in the world³⁵. This is known as the global supply chain facilitated by the advancements in information and communication technology, air and shipping transportation and improvements in global logistical services. However, following Peter Drucker, management Guru, some authors have preferred to call it 'global production sharing'³⁶. What is known as production sharing today is a hybrid of the already known economic policy strategy – regional or global value chain. However, values can be created by enhancing the value added of the same product. For instance, value added in cut-flowers can be increased by undertaking the packing part of cut-flowers within the country before being exported. Thus, the country in question joins the value chain of the same product with greater participation in the process. Production sharing, on the other hand, involves producing and supplying different components of a single product connected to the final product being assembled through quality assurance and technology transfer. For instance, motor vehicles are manufactured in different countries; but the parts for same are supplied by a variety of suppliers who have manufacturing facilities located in the same country or elsewhere. But all these manufacturers maintain quality, produce parts according to the specifications laid down by principals and enjoy the new technologies developed and transferred by the principals concerned. For instance, sensors for air bags are manufactured in a facility called Harness Lanka located in Sri Lanka³⁷. The profits to be earned from a single part may not be that much; but, when a manufacturer in the network produces for a massive global operation, he would be able to make his operation financially viable.

Accordingly, calling this production method 'supply chain' denotes a wrong meaning because it connotes that the brand name holder buys the intricate and complex components involved off-the-shelf in the market. In a sophisticated product like an iPhone, that cannot be done because the brand name holder has to ensure the quality of the product he supplies to the global market. Thus, they happen in prearranged contractual relationships known as 'global production networks'. These networks and their associated global production sharing chains

³⁵ <https://betanews.com/2014/09/23/the-global-supply-chain-behind-the-iphone-6/> (Accessed on 18.11.2018).

³⁶ Chiefly, Prema-chandra Athukorala of the Australian National University has called it global production sharing. See: Prema-chandra Athukorala and Shahbaz Nazir, (2012), Global Production Sharing and South-South Trade, UNCTAD and South Centre. (Available at: https://unctad.org/en/PublicationsLibrary/ecidc2013misc1_bp1.pdf) (Accessed on 18.11.2018).

³⁷ Wijewardena, W A, (2018d), 'RohanPallewatta: Man who has proved that Sri Lanka can also do' in Daily FT (Available at: <http://www.ft.lk/columns/Rohan-Pallewatta-Man-who-has-proved-that-Sri-Lanka-can-also-do/4-654568>) (Accessed on 18.11.2018).

cover both manufacturing and trade in services; in both cases, the brand name holder has to ensure quality in manufacturing, distributing, marketing and after-sale services.

When goods are supplied through global production networks which are arranged for specific purposes, pricing becomes a problem. That is because they are not open market prices, but those agreed upon with the supplier after deliberate contractual arrangements. Since such prices are normally lower than the open market prices, the tax authorities might suspect that there is some form of 'transfer pricing' that enables the profits to be earned in the domestic economy to be transferred to a foreign destination. Suspecting transfer pricing, the tax authorities might insist on paying a higher tax on the basis of the recalculated high profits based on the perceived earnings of the local company. Athukorala says that tax authorities should exercise care and caution in such cases to avoid the destruction of the whole industry through high taxation³⁸. Since producers have thin margins and global production networks are highly competitive, such short-sighted tax treatment of network participation will be fatal to local industries.

There are several important areas which a country should consider when jumping the bandwagon of global production sharing networks. First, there is a choice between high value addition and low value addition. If a country desires to go for high value addition, it has to necessarily choose research and development stages in the pre-production stage or marketing and sales, in the post-production stage. But both are less labour intensive and based on high creative and inventive knowledge. A country cannot harp on these production stages unless it has already invested in an advanced science and technology foundation.

Second, as a result, it is not a short term option for an emerging nation like Sri Lanka whose science and technology foundation is at a very poor state. The countries like Israel, Ireland, Singapore, South Korea and Taiwan are already swimming upstream well ahead of others in this respect. Then, there are second tier countries like India, Malaysia and Thailand in this region which are now picking up those front-swimmers fast. Sri Lanka has to jump the bandwagon onto Singapore or India if it is to harness benefits from the emerging production network model. Hence, the free trade agreements signed with India and Singapore will enable Sri Lanka to join the global production sharing networks through these two countries.

Third, more labour intensive and less-knowledge based stage of production is the manufacturing part of a product. But it gives less value addition and if a firm or a country is to benefit out of the Global Production Networks, it is necessary to strategise on scale of operation rather than the component itself. An example quoted is Thailand's Hard Disk Drive or HDD industry. The components for HDD come from a dozen of other countries and their current market price ranges from \$ 0.04 to \$ 0.045 per Giga Byte. Hence, there is no prospect of making big profits by a manufacturer or high value addition by a country. Yet, Thailand has

³⁸ See: Wijewardena, W A (2016b), 'Prema-chandraAthukoralaChinthana: Joining Production Sharing Chain is the Way-out for Sri Lanka' in Daily FT (Available at: <http://www.ft.lk/columns/prema-chandra-athukorala-chinthana-joining-production-sharing-chain-is-the-way-out-for-sri-lanka/4-555377>) (Accessed on 18.11.2018).

been the leading HDD supplier to the global market supplying about 180 to 190 million units per annum. On that high scale, it makes a sizable addition to export earnings and GDP. Yet, with changes in technology from server based data storage to extra-server based or cloud based data storage technologies, HDDs are increasingly being replaced by Solid State Drives or SSDs or Flash Solid State Drives or FSSDs. Hence, the future of the HDD industry is at risk today but Thailand is now making rapid progress in transforming the industry from HDDs to SSDs or FSSDs. What this means is that acquisition of and adaptation to the latest technology is a must for any emerging economy desirous of benefitting from the new global production network model.

Joining the global production sharing networks will be challenging for Sri Lanka but it is not impossible. But, if Sri Lanka is to beat the middle income trap within the next 25 year period, it has no choice but to get into these networks and be a partner of the global production system. Sri Lanka's present goal is to beat the middle income trap by 2045 and become a rich country. Being a small economy, Sri Lanka's wealth and prosperity have to be created by producing to a bigger market than the limited market it has domestically. Sri Lanka is a 'small fish in a big pond' with scary waters all around. But with proper technology, as Singapore, South Korea and Taiwan did in 1970s and 1980s, it can swim in those scary waters safely.

Part IV

Summary and Conclusions

Sri Lanka has been a beneficiary of getting integrated to international trade throughout its recorded history. This was facilitated not only by being located on a convenient point on the East-West naval route but also by the general consensus which Sri Lankan kings held about the benefits of foreign trade. Even during the colonial period, this policy was continued creating wealth and prosperity to Sri Lankans. Today, Sri Lanka is facing the challenge of beating what is known as the middle income trap and becoming a rich country. The way to beat this problem is to produce for a market bigger than the market within Sri Lanka. It essentially requires Sri Lanka to have a new export drive since its export sector has been growing at a snail's pace. Though in absolute terms exports have increased, in relative terms, as a percent of the country's GDP, it has been falling continuously. It is necessary for Sri Lanka to reverse this declining trend.

Sri Lanka's main export product, garments and textiles, is facing a new challenge today. This industry was relocated from the rich countries to low income countries with low cost labour. One problem faced by the industry is the rise in wages making the industry no longer competitive. Another is the preference by main buying countries to locate the supply sources close to the consumers. Hence, once off-shored industry is now returning to its home countries through both near-shoring and on-shoring. A report filed by McKinsey Global Institute reveals that by 2025 about 74% of the apparels used in North America and about 68% in Europe will be supplied by production entities located near the main users or in the country in which they live. This has been facilitated by automation and improvements in logistical services.

Sri Lanka cannot rely on the garments and textile industry anymore as a wealth creator. It has to move into new exportable products that involves high technology. Since Sri Lanka cannot develop high technology within the country immediately, it has to obtain the same from other countries which have been developing new technologies. In this connection, having bilateral free trade agreements with countries that matter to Sri Lanka's external trade is a policy taken in the direction.

Today, countries do not produce a whole product, but components which are assembled in a factory located elsewhere. This system is known as global production sharing networks. In this system, a country produces only one or two components but make money from the high volumes of supplies they make to final product assembling companies. Sri Lanka should also join these networks and become a partner of the global production networks.

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