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WHY IS CHINA CONSIDERED THE FACTORY OF THE WORLD? (WITH AN EMPHASIS ON ELECTRONICS)

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ABSTRACT:

When China joined the World Trade Organisation (WTO) in 2001, it was but a small player and had but a trivial role, but its development since, into the global manufacturing powerhouse has been astounding. Following the years of modernizing its economy around producing goods for export, its formal entry into the World Trade Organisation has helped boost its output (Bain, 2021). The Chinese economy thrives as a manufacturing powerhouse and the nation's products seem to be everywhere. Moreover the fact that most of the tags, labels and stickers on products read ' Made in China' makes most consumers wonder the reason why 'is everything made in China.' (Bajpai, 2021).

The country has now firmly positioned itself as the world's low cost factory, producing labor-intensive products like as textiles, toys, clothing, footwear, and furniture for businesses and, ultimately, customers all over the world (Bain, 2021). These industries however served as a mere springboard for the Chinese, allowing it so to develop economically and move into production of more advanced products such as electronics – which is the Key Focus Area for the research paper.

Objectives of research

The objectives of the research paper define the direction or content of the research investigation. This section will summarize what the research paper hopes to achieve. Following are the objectives of the research paper.

- This study aims to find out what factors other than low cost have led to China becoming a manufacturing powerhouse and getting the title of world's factory.
- This study aims to find out if China's position as the world's factory is threatened by other countries.
- This study aims to find out why electronics manufacturing companies prefer setting their assembly lines and manufacturing facilities in China.
- This study aims to find out if the general sentiment within different companies supports the idea of continuing operations in China or does it take objection to it.
- This study aims to find out the role factors such as low taxes and duties, less regulatory requirements and competitive currency practices have played in raising China's status as 'the world's factory'.
- This study aims to find out if the increasing wage rates in China can deter companies from continuing their manufacturing operations in the country.
- This study aims to find out if it is feasible for other countries to follow the blueprint laid down by China to become a manufacturing powerhouse.

Review of Literature :

Ghosh, P. (2022, September 18). *The Exodus Of Chinese Manufacturing: Shutting Down 'The World's Factory.'*

This article by Prince Ghosh is titled- The Exodus Of Chinese Manufacturing: Shutting Down 'The World's Factory'. The article was published on Forbes.com and gives wonderful insight on the origins of the Chinese manufacturing powerhouse. It has a complete section which details the rise of the Chinese manufacturing and how it grew to become the factory of the world. In this article he mentions about the last 40 years of growth of China and how it started with former president Deng Xiaoping and his economic reform in the late 1970s. It was with his efforts of economic reforms that the concept of a free market was introduced to China for the first time. Apart from the history lesson, the article also discusses the current scenario of Chinese manufacturing industry.

Blog citation : Engelen, C. (2022, September 15). Why are all electronics made in China?

In this blog by Case Engelen, he tries to answer the question that he is often asked about why most of the electronic products are being manufactured in China. He uses statistics and graphs to put his point across and give an idea of Chinese domination in the electronics manufacturing space. He goes on to make a list of 10 reasons why there is an abundance of Chinese electronics products where he talks about the role that the government played early in the

rise of Chinese manufacturing, the attractive labour prices etc. He also explores the topic if China's manufacturing dominance will continue, and point out facts like how the Chinese have lost the labour advantage over time, but there have things playing in there favour such as robots and Internet Of Things. This blog touched on a lot of aspects being covered in this research paper.

Report citation: Read, J. (2022, August 12). OEM Electronics Manufacturing in China .

This article by Jennifer Read in EMS NOW talks about the emergence of the electronics manufacturing market in China with focus in OEM electronics manufacturing. The Report is aided with a number of graphs and tables to support its statements. The focus of this report is primarily on the original equipment manufacturer (OEM) market in China. These companies are often, but not always, large corporations that perform electronics assembly of products using their own brand or label. While they often outsource the actual assembly of their products, OEMs design and ultimately own the intellectual property rights to their products. In 2020, the total market for OEM suppliers was about \$201.1 billion, accounting for more than 58 percent of the total China electronics market. OEMs will grow through 2025 at a CAGR of 3.6 percent, to a total of \$240.5 billion.

Article citation : Krishna, S. (2021, April 27). Is China still the factory of the world?

The article is writer by a guest writer for Financial Express, Srivastava Krishna. He uses fact and numbers to explain the scale of Chinese manufacturing industry. He makes comparisons with India, a potential threat to Chinese domination, to highlight just how big the Chinese manufacturing is. The article states, \$4 trillion worth of manufacturing happens in China and that's more than the GDP of India as on date. That is about 30% of global manufacturing and equal to that of the US, Japan and Germany put together. He appreciates the supply chain of China and points out how it is a major factor for companies to stay put in the country.

Article citation : Mullen, A. (2022, December 20). China manufacturing: everything you need to know. South China Morning Post.

This article by Andrew Mullen uses China's two purchasing managers' indices (PMIs) as indicators of the economic health of the economy, gauging sentiment in the business sector. He statistically measures the movement and growth of the Chinese manufacturing. An interesting statistic showed a steep decline in the manufacturing in 2020. This was largely due to the pandemic which almost stopped all operations for several months in the country and around the globe. Throughout the article there was a lot of focus on the affects of pandemic on the industry and also a discussion about the evolution of Chinese manufacturing sector. Andrew also touches on the affects of US-China trade war on the manufacturing industry and the impact the Trump administration had on this war.

Article citation: Soundararajan, N. (2021, July 1). Breaking the Chinese monopoly on electronics manufacturing.

This article by Nirupama Soundararajan talks about the recent impact that the pandemic has had on the Chinese manufacturing industry and whether or not should it be a cause of concern for China. For more than a year the globe has been affected by the pandemic. Geopolitical relationships have changed. Many countries have had to rethink their value chains and over dependence on China. Countries have augmented their supply chains and moved their manufacturing bases from China for both political and economic reasons. The article particularly focuses on how India, a potential threat to replace China, has been manipulating its companies to cut ties with China. In the past year, there has been a clear shift in thinking with regard to investments from China. New policies have come in as a way to track Chinese investments in India. E-commerce companies asked to provide source of procurement for their products and changes to the FDI policy indicating that all investments coming in from countries' with whom India shares a border shall no longer be under automatic route. India is heavily pushing for 5G in the countries and has interestingly chosen to leave out Chinese companies from the auctions.

Analysis :

The objective of this section is to break down the topic into various parts in order to inspect and understand it. The section will use both secondary data analysis , that is, it will make use of existing research data to find answer to a question that is different from the original work and primary data analysis, that is, analysis of data collected for this specific research through questionnaires; in order to lead to findings and conclusions for the study. The results of this section will narrate the findings of the paper.

4.1 Primary Data Analysis

Primary Data Analysis is the original analysis of data collected for a research study. Analyzing primary data is the process of making sense of the collected data to answer research questions or support or reject research hypotheses that a study is originally designed to assess. The choice of data analysis methods depends on the type of data collected, quantitative or qualitative.

1. Gender

Objective – To determine the classification of respondents on the basis of Gender.

Table No. 1
Gender Classification Of Respondents

Gender	Number of Respondents
Male	69
Female	19

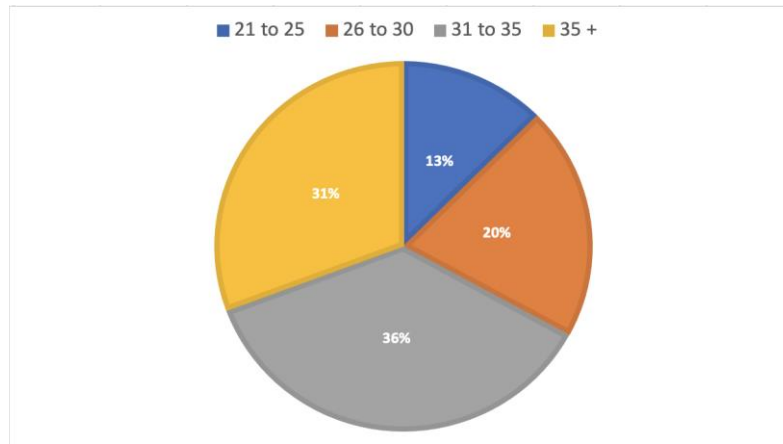
Prefer Not to Say	0
Total	88

2. Age Group

Objective – To determine the general age group to which the respondents belonged.

Chart No. 1

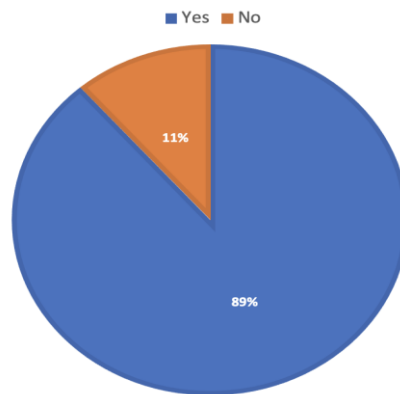
Age-Group Classification of Respondents



3. Are you aware of the Chinese dominance in the manufacturing sector?

Objective – This is to get an idea if the respondents are aware of the mammoth that China is and its unrivaled dominance in manufacturing space.

Chart No. 2



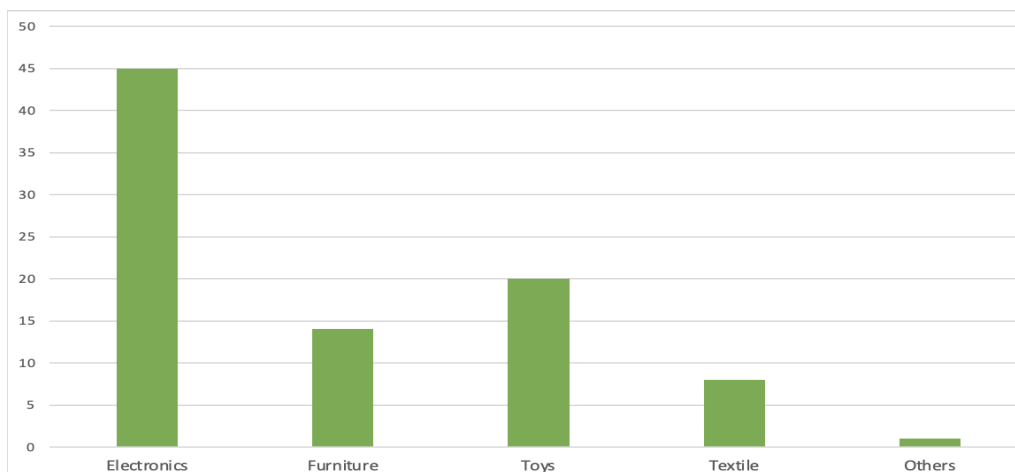
Interpretation –

From the data collected and represented in graphical form in Chart No. 2 above, it can be seen that 89% of people, that is, 78 respondents replied positively to the question and were well aware of the dominance of China in the manufacturing sector. The data reveals that 11% of the respondents, that is, 10 people were not aware of Chinese dominance in the manufacturing sector.

4. Which category of products do you think China exports the most of?

Objective – This is to gauge the respondents’ knowledge of the exports from China

Chart No. 3



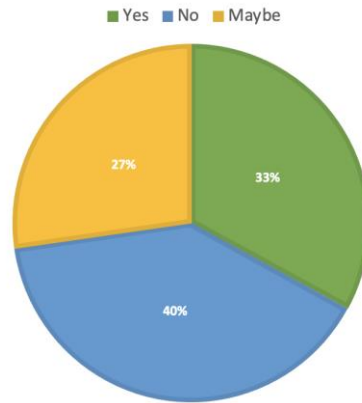
Interpretation –

The fact that over half the respondents correctly selected electronics as the option inspires confidence in the questionnaire as it shows that the people being surveyed are aware of the Chinese dominance in the electronics manufacturing sector.

5. Do you think any country can take the title of 'world's factory' away from China?

Objective – This is to get an idea of how do respondent’s feel about China holding the title of ‘world’s factory’

Chart No. 4



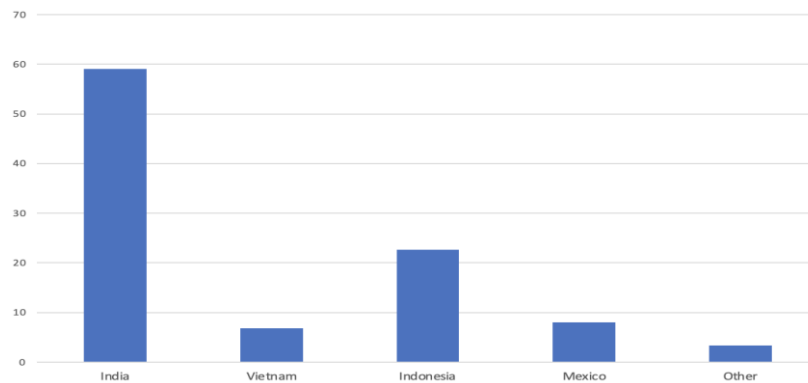
Interpretation –

The data collected and represented in the chart above shows a very unique result. This particular question has the most balanced answers and all respondents almost evenly opted for all three options. 40% of the people, that is, 35 people selected ‘No’ as their answer. 33% of the people, that is, 29 people selected ‘Yes’ as their answer and 27% of the people, that is, 24 people selected ‘Maybe’ as their answer. This answer is indicative of the real life situation due to the fact as there was no heavy majority in the answers, there is no clear idea as to what will actually happen.

6. Which country do you think can challenge China’s dominance in the electronics manufacturing sector?

Objective – to select the most suitable candidate to replace China’s dominance in the electronics manufacturing sector.

Chart No. 5



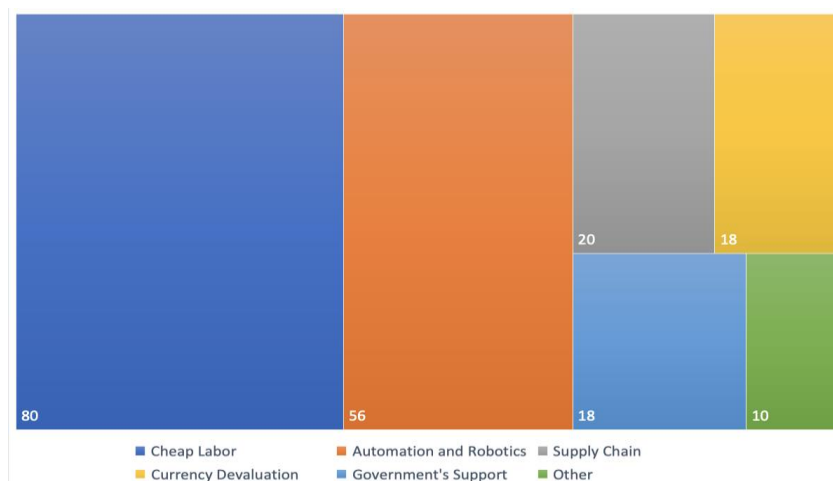
Interpretation –

The data collected and represented in the chart above shows the respondents opinion as to which country they think can replace China’ dominance in the electronics manufacturing sector. This is an interesting result after the fact that Chart No 7 clearly showed that a majority of the respondents feel that no other country can take away the title of world’s factory away from China.

7. Which factors do you think work in favor of China with regards to its manufacturing dominance? (select all that apply)

Objective – This is to find out the factors which respondents believe are majorly contributing to the Chinese dominance in the manufacturing sector.

Chart No. 6



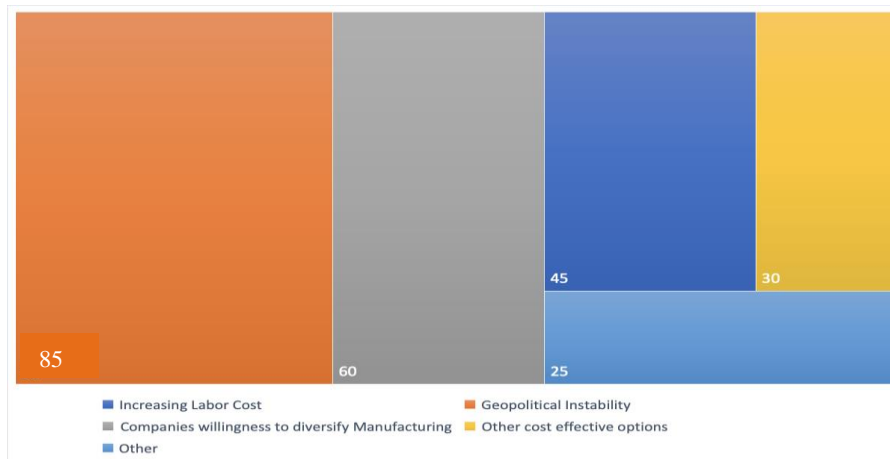
Interpretation –

The overwhelming majority selected Cheap Labor as the biggest factor that works in favour of Chinese manufacturing. Cheap labor was selected a total of 80 times, this means that out of all the respondents, 80 think that cheap labor is one of the factors that work in favour of China’s dominance in manufacturing sector. Cheap Labor is followed by Automation and Robotics which is indeed quite ironic. Automation and Robotics was selected by 56 people. 20 people selected supply chain as a factor; Government’s support and currency devaluation tied with 18 votes each. 10 people selected ‘ other’ as an option, indicating that they feel a factor other than the ones mentioned in the options is the biggest factor which works in favor of China’s manufacturing industry.

8. Which factors do you think work against China with regards to its manufacturing dominance? (Select all that apply)

Objective – This is to find out which factors do the respondents believe work against China with regards to its manufacturing dominance

Chart No. 7



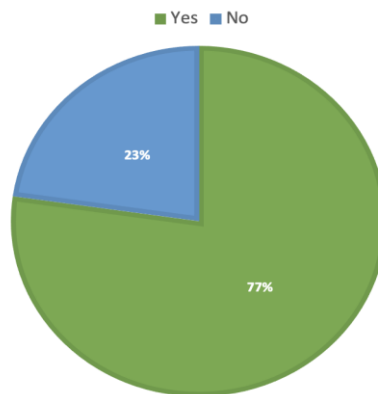
Interpretation –

The data collected and represented in the chart above shows the factors which the respondents believe are majorly contributing to companies moving their manufacturing out of China or reduce their dependence on China. It must be noted that the respondents were free to select more than one option for this answer as it helps in understanding their broader perspective of the factors which they believe can be the reason of China’s replacement as the world’s factory by some other country or group of countries.

9. Do you feel automation and robotics will replace the need for cheap labor in the next 5 years?

Objective – this is to find out if the problem of increasing labor cost in China can be mitigated with automation and robotics in the light of rapid technological advancements being made by mankind.

Chart No. 8



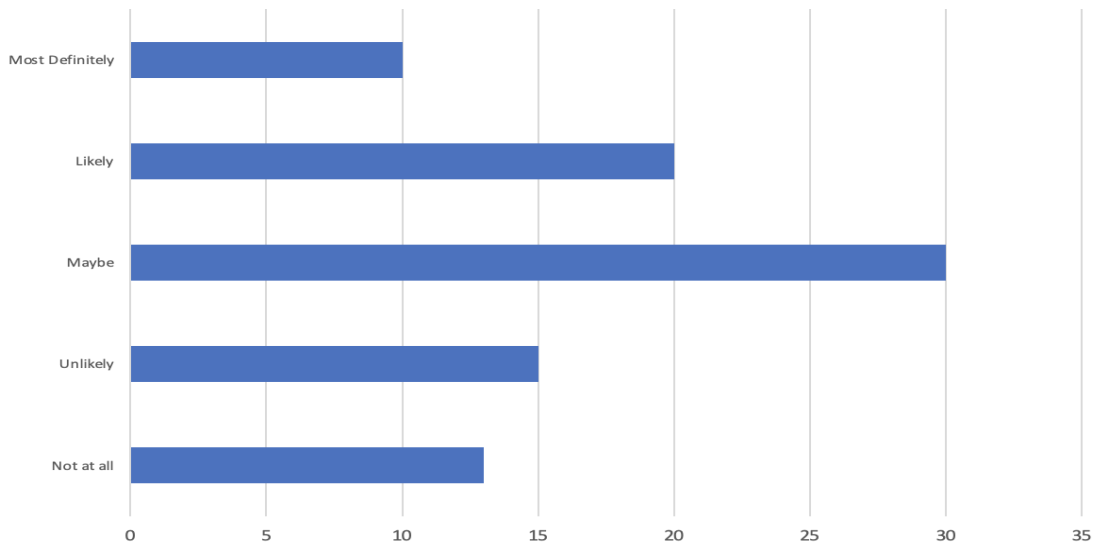
Interpretation –

The chart shows that a majority of the people believe that in the coming 5 years the need of cheap labor will be reduced by automation and robotics. 77% of the people, that is, 68 people ticked ‘Yes’ while the remaining 23% of the people, that is, 20 people ticked ‘No.’ It is interesting to look at this chart against Chart No. 9 where majority of the people believed that Cheap Labor is the factor which has worked in favor of China but followed by this the second most popular answer was automation and robotics, indicating.

10. With tech giants like Samsung deciding to move their manufacturing plants out of China, do you see a future where other Tech companies follow suit ?

Objective – this is to find out if decisions of a tech giant like Samsung which is a big player in electronics manufacturing effect other companies’ decisions.

Chart No. 10



Interpretation –

The data was collected using the 5 point Likert scale where the respondents had to choose a number between 1 to 5 (both included), 1 representing ‘Not at all’ and 5 representing ‘Most definitely.’ It can be seen from the chart above that 30 respondents selected 3 which represents ‘Maybe’ indicating they can not determine with certainty if Samsung’s moves will have an effect on other companies. 20 people selected option 4 which represents ‘Likely’. 15 selected 2 which represents ‘Unlikely’. 13 selected 1 which represents ‘ Not at All’ while 10 selected 5 which represents ‘Most definitely’.

Table No. 2

Mean	2.8
Median	3
Mode	3

The mode of the data is 3 (30 people selected it). The mean is 2.8 which can be rounded of to 3. And the median is also 3.

Secondary Data Analysis

Secondary data analysis refers to the analysis of existing data collected by others. Secondary analysis affords researchers the opportunity to investigate research questions using large-scale data sets that are often inclusive of under-represented groups, while saving time and resources. Despite the immense potential for secondary analysis as a tool for researchers in the social sciences, it is not widely used by psychologists and is sometimes met with sharp criticism among those who favor primary research. Secondary data analyses are for the most part significantly cheaper and quicker to complete than primary data analyses because you're not collecting the data yourself. The data has often been prepped and validated statistically and can be used immediately.

China electronics assembly value :

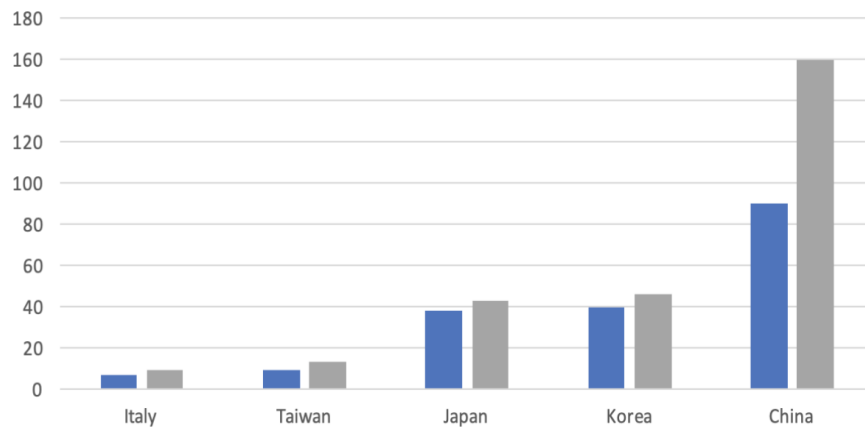
	2020	2021	2022	2023	2024	2025	CAGR
Assembly Value (\$M)							
Total China Market	346,255.8	361,432.9	378,037.6	394,004.9	409,105.9	423,302.3	4.1%
OEM Assembly Value	201,066.5	208,506.0	217,263.3	225,737.6	233,512.9	240,460.7	3.6%
Percent of Total Market (%)	58.1%	57.7%	57.5%	57.3%	57.1%	56.8%	

(Chart No. 13)

The table above shows the forecast of assembly value of electronics manufacturing in China. In 2020, the total market for OEM suppliers was about \$201.1 billion, accounting for more than 58 percent of the total China electronics market. OEMs will grow through 2025 at a CAGR of 3.6 percent, to a total of \$240.5 billion. However, its percent of the total market will decline slightly as more suppliers rely on contract manufacturing, and especially EMS, firms. China holds a unique position in the global electronics industry sector. It possesses, simultaneously, the largest manufacturing capacity for every type of electronics product made, and nearly the largest consumer market of those products.

Technological advantages and automation in the consumer electronics industry
(Chart No. 15)

World Largest Robotics Importers (in thousands)



China has adopted advanced technologies to optimize its manufacturing prowess, investing in smart robotics, cloud data and automated factory technologies as groundwork for industrial upgrade (Westrom, 2020). According to the International Federation of Robots, the number of installations of robot technology in China's industrial settings increased by 27% and are expected to grow another 75% by 2019. By 2021, China is expected to reach a density of about 150 per 10,000 human workers to fuel automation across the consumer electronics industry.

5.1 Findings :

- In order to beat or match China's electronics manufacturing countries first need to become independent of Chinese imports. Be it developed economies like USA (14.9% of the supplies) and Japan (21.2% of the supplies) or emerging market economies like India (24.9% of the supplies), they heavily rely on supplies being imported from China in order to create their own export goods. Independence from such foundation will be a first step to reducing Chinese dominance in electronics manufacturing.
- While most of the major economies are reliant on China for their components to produce export goods, China itself has a huge original equipment manufacturer market. This market is growing at a rapid speed and is expected grow through 2025 at a CAGR of 3.6 percent, to a total of \$240.5 billion, up from the \$201.1 billion in 2021. Out of the top 10 OEM companies (market share wise) 8 are headquartered in China, giving them a massive edge.
- China is the largest exporter of consumer electronics and there is no country even close to competing. China exports nearly a third of the world's consumer electronics. This would make it extremely difficult for any country in the world to challenge it in electronics manufacturing any time soon. Electronics equipment and machinery continues to be the single largest item being manufactured and exported from China and contributes to over 22% of the country's total export value.
- The availability of cheap labor is just one of many factors that have kept the "Made in China" label on so many products purchased by consumers around the world. It will take more than low labor costs for emerging economies to set up a business ecosystem that can compete with China's.
- It comes down to whether the advantages China offers outweigh concerns such as labor costs, as well as trade tensions and questions about global supply chain security. Alternatives such as Vietnam and India cannot match it in terms of infrastructure or a (vastly improved) ease of doing business. Bringing home assembly and the production of commodity components would be extremely difficult, partly because few would want the low-paying, repetitive jobs. Firms are more likely to pass the costs of tariffs on to customers and invest in supply-chain security.

Suggestions :

- China might be able to save itself from a manufacturing driven economic free fall by cementing itself as not necessarily the "world's everything factory", but the "world's electronics factory". Shenzhen still retains the ability to be the world's leader in electronics development specifically for post fabrication and assembly portions of the supply chain. Through investment in operational efficiency, customer satisfaction, and supply chain transparency and simplicity, China has the ability to continue to serve as a preferred partner for global companies. As the world becomes more dependent on software and robotics to automate every part of the homes and workspaces, China ramped up production to deliver on that dependency.
- In response to the unstable and hostile outside world, China should take efforts to turn to its huge domestic market of 1.4 billion people for consumption and rely on home-grown innovation, to support future growth. Even when India eventually over takes China to become the world's most populous nation in the world, its domestic market will still be ample to hold the Chinese economy afloat. The government is already working towards this by what they are calling the dual circulation strategy. The strategy is bolstering growth through exports by a focus on domestic demand as the international trade environment comes less supportive. Nevertheless, the strategy still calls for the production of high-value exports, or external circulation. Beijing will also push for technological self-reliance, having already provided incentives to build up the domestic development and production of semiconductors and other cutting-edge technologies, particularly in areas that are, and could be, the target of sanctions by Washington.
- For countries trying to reduce China's dominance, they have to recognize that they cannot do it by themselves. They need to take bites from different sides of the pie in order to reduce its size. Individual countries have started eating up niche specialties and are quickly gearing up to take over some of China's business. Vietnam, for example, made massive efforts to grab everyday apparel manufacturing. Popular sportswear brands like Nike and Adidas have rapidly re-allocated a vast majority of manufacturing and footwear base to Vietnam, from China. Thailand has seen an increase of about 19.7% export volume from the US, specializing in automotive, food and beverage, and natural rubber manufacturing.

Conclusion :

It is evident that China's hold over electronics manufacturing is too strong to challenge for any single country. Even during the pandemic when the world slowed down, its electronics manufacturing industry grew. It has solidified itself as the world's factory and it seems that no single country is in position to take that title away from it. Too many companies and too many countries rely on it too much to let go of it now. The cost of moving out of China is much more than just the relocation costs; the supply chains and the assembly lines are not replicable in such scales in any country. Even if the biggest draw that China initially had, that is, cheap labor is no longer there, over the years the ecosystem it has built for electronics manufacturing is simply too attractive for companies to leave behind. Most companies are willing to pay extra and pass this premium on to their customers just to have access to that ecosystem and logistical convenience. A very important reason for manufacturing electronics in China is the availability of its complete and cost-effective ecosystem of components. It is the largest and the most complete in the world.

However, the negative factors at play cannot be entirely ignored either. They are too many and too big now to not be considered significant. The geopolitical tensions, the raising wage rates, the willingness within companies to diversify and upcoming countries which are showing promise to become strong manufacturing hubs of the world have all made an impact which will in fact hinder the growth of the electronics manufacturing in China. Companies have started to move out to different countries and set up their plants elsewhere from China. This process is however a slow one. It is not possible for such large corporations to transfer their manufacturing overnight or even over a period of one year. So Chinese manufacturing might not have anything to worry about in the short run, but over the long run they surely will see a big problem.

While the future remains uncertain as ever one thing is that is certain is that China will remain the factory of the world for near future, however it can not remain as confident in its throne as it has been over the past decade, there is a strong challenge coming its way; not in the form of any single country but in the form of many emerging economies that are ready to take on the electronics manufacturing giant that China is. These countries are able to replicate a lot of strengths of China at the same time eliminating some of their weaknesses. These are the countries that have seen the blueprint laid down by China their technology and workforce is ready to handle the load of the ever so fast growing electronics manufacturing industry. Until then, for some time to come, China will be "the world factory" with its low production costs, huge labor pool, vast talent base, and business ecosystem.