Key Characteristics of the Consumer Electronics Industry in Sri Lanka

- Managers' and Experts' Perspective -

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Thesis submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in Supply Chain Management

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February 2018

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ABSTRACT

The consumer electronics industry is a dynamic industry. Innovations and technology development are the main factors support this dynamic nature. As this industry is dynamic the major elements change with the time it is very difficult to identify them. It has been identified in some other countries but those countries are socially, economically and culturally different from us. There are many differences in our market behavior compared to foreign market. Therefore, branding techniques which are applied in the local market is different to international market. But it is not identified in Sri Lankan context. This paper addresses what are the key characteristics of the Sri Lankan consumer electronics industry because all local market players are not very certain about the key characteristics of their market and it is not a favorable situation for the industry. If market players are certain about the key market characteristics, it is good for distributors and end customers as well. The methodology of this research is a questioner survey and the questions will be Likert Scale-type questions and will apply factor analysis as a statistical test. The questioner has been designed in a way to cover four main aspects of the industry: operation, economic/finance, technical and sustainability. Operations characteristics cover the procurement, order processing, lead time, warehousing, distribution, brand promotion, and sales human resources. Economic/finance characteristics include employment opportunities, profit margins, return on investment, transport cost, payment methods, and import levies credit terms. Quality of products, product durability, and product features, warranty conditions, common spare parts, repair facilities, technically sound staff, and availability of necessary repair equipment are identified as technical characteristics. Sustainability characteristics covers green marketing practices, green warehouses, e–waste management system, 3 R practices, employee training and development, and usage of renewable energy. These questions have designed after reviewing literature and other articles related to this industry. This questioner consists of thirty questions which cover the above mentioned areas. The questioner was forwarded to eighty individuals in the local consumer electronics industry and only fifty seven responses were received, making it have a good response rate .The respondents consist of company Managing Directors , Technical Directors, Board Directors , Heads of after-sales services , Marketing Heads, and Supply Chain Heads and Managers. Most of the respondents are possessing more than ten years of experience. The objective of this research is to identify the key characteristics of the local consumer electronic industry which will help all the interested parties such as

current players, future investors, government authorities and foreign electronic goods manufactures. When we consider an industry, there are various characteristics. Consumer electronics are a specific type of goods which are durable and highly related to the income level of the people, economic level of the country, preferences and consumer segmentation etc. Since income levels and country preferences are different, every country market behaves differently. Characteristics of the market within the local industry are different. This research is mainly focused on understanding about key characteristics specific to the consumer electronic industry with reference to the Sri Lankan consumer electronic industry. The demands for the consumer electronic goods are not a steady one it's a combination of seasonal and the new product launch. Generally there are two seasonal demands one in April and other one in December and in between sales increase when a new product introduce in to the local market.

The target population includes local consumer electronic industry experts, managers and the executive staff. The population of the industry is unknown. Since Sri Lanka is no longer manufacturing consumer electronic goods they purely depend on imported products. There are sole agents/distributors appointed by global manufactures and other parallel importers in the local consumer electronics market. The nature of the current local consumer electronic market structure is highly competitive. Sole Agents and authorized distributors are allowed to import directly form manufactures but any other trader can import from other sources. Unauthorized traders also importing genuine products from authorized distributors in manufacture's country. As an example Sony product can import to Sri Lanka form Sony dealer in Singapore but Sony local authorized distributors can only import from Sony Corporation (Singapore) Private Limited .But Parallel importers there is a cut-throat price war among local distributors between different brands and among the same brand as well. One of the main reasons for this price war is there is more than one local distributor for one brand. This situation leads to an unfair competition resulting from local distributors' profit margins have drastically eroded.

In the recent past most of the renowned brand consumer electronics manufactures set up their representative's office in Sri Lanka in order to look after their brand interest and being involved with brand promoting activities with the collaboration of local distributors. After more than three decade civil war Sri Lankan economy is booming as a result of that demand for consumer electronic activities such as research and development, product design, raw material sourcing and manufacturing products also increased? As the current

customers are very rational and well informed they need to experience the least technology with latest models, therefore local distributors are trying their level best to increase the inventory tern round. Before new model release to the market local distributors apply plenty of sales promotion activities to clear the old model. Sometimes compelled to dispose with very little margin or at break even. As a business there should be acceptable level of return on investment otherwise better to switch to another business. Most challenging fact is principals are not worrying about distributor's profitability as long as they increase the sales volume and they always push for volumes. Current local consumer electronics industry is only handling importation, distribution and aftersales service because Sri Lanka is no longer manufacture consumer electronic goods. This research is subdivided in to five chapters and those are: Introduction, Literature review, Methodology, Data Analysis and result, Analysis Result and Discussion, Conclusion and future research directions. In conclusion twenty characteristics have been identified as key characteristics in the local consumer electronic market and according to the commonalities these variables have grouped in to nine factors those are: Less contribution to environmental sustainability, Satisfactory Level of Finance assurance and flexibility, Manufactures' interests are inadequate over the local market, less attention to sustainable supply chain practices , Lack of market adoptability, Lack of finance sustainability, Lack of market resilience, Lack of principal's finance support, Difficult to determine optimum level of inventory. According to the final outcome these nine factors have been identified as common factors in the Sri Lankan consumer electronics market. Since local consumer electronic industry involves with downstream supply chain activities, therefore, this research will not cover a significant portion of the upstream supply chain activities.

Keywords: - Dynamic industry, branding techniques, aftersales service, local distributors, key characteristics, highly competitive.

ACKNOWLEDGEMENTS

I am most grateful to my supervisor, Dr. Yapa Mahinda Bandara, a Senior Lecturer attached to Department of Transport and Logistics Management of the University of Moratuwa for his support and guidance extended to me during every phase of my research. My special thanks go to Dr.Sanath Coperahewa who dedicated his precious time for proofreading.

I wish to express my sincere thanks to Senior Prof. Amal Kumarage for his guidance whenever needed.

I would also like to thank Mr. Nimesh Udeshi -Managing Director and the rest of the board of Directors of Siedles (Pvt) Limited and all the other respondents of my questionnaire survey who are attached to the Sri Lankan consumer electronics industry.

Finally I would like thank my loving family for the support they extended to me.

TABLE OF CONTENTS

LIST OF ACRONYMS

TQM	Total quality management
LCD	Liquid crystal display
LED	Liquid emission diode
R&D	Research and development
CAGR	Compound annual growth rate
EEE	Electric and electronic equipment
WEEE	Waste from electrical and electronic equipment
ASEAN	The Association of Southeast Asian Nations
EU	European Union
EuP	Energy using Products
KMO	Kaiser–Meyer–Olkn
EFA	Exploratory Factor Analysis
PCA	Principle Component
FDI	Foreign Direct Investment
LC	Letter OF Credit

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1. Background

The consumer electronics industry by 2003 was a $240 billion worth of global industry with a small number of highly competitive global players (Sodhi & Lee 2007) .The structure of the market is highly competitive, which consists of global major players and a large number of small players with their authorized distributors worldwide. All the global players are attracted to emerging economies because that create new business. In Sri Lankan context, before the liberalization of trade, only a few small scale manufactures were in the local industry and they also imported the main components and assembled locally. The UNIC and SIEDLES transistor radios (Siedles, 2000) are examples. At that time the Sri Lankan economic policy was closed economy, therefore, imports were limited and there was an import license system as a result of that the Sri Lankan consumer electronics industry was not widely expanded. With the implementation of the open economy in 1977 local players started to import instead of making/assembling locally. As a result, local assembling plants shut down their operations and moved to trading by importing completely built units. Initially Japanese brands were dominating the thatlocal consumer electronics market until the year 2000. After year 2000 non-Japanese brands gradually came in to the local market with attractive prices but still there were loyal customers for Japanese brands who were willing to pay a premium price for the brand. To be more cost effective Japanese consumer electronic manufactures shifted their production plants to cheap labor cost countries such as China, India, Malaysia, and Philippines, and Vietnam. The South Koreans also came in to the consumer electronic industry with their technology development. Out of The South Korean brands mainly two brands became world popular brands in 2010, both the South Korean brands Samsung and LG (Lucky Goldstar) grabbed the first and third positions in the global market share in consumer electronics industry. At present Samsung is the market leader in the consumer electronics industry. The key success of Samsung is their skill in innovation and lean production system. Ever in the history The South Korean brand Samsung was the 1st brand to grab the 1st place position from the renowned Japanese brand Sony in term of the brand value of the LCD/LED televisions. Most other countries in the world import consumer electronic goods and sell them in the local market through various distributional channels.

The following figure illustrates the global electronics chain.

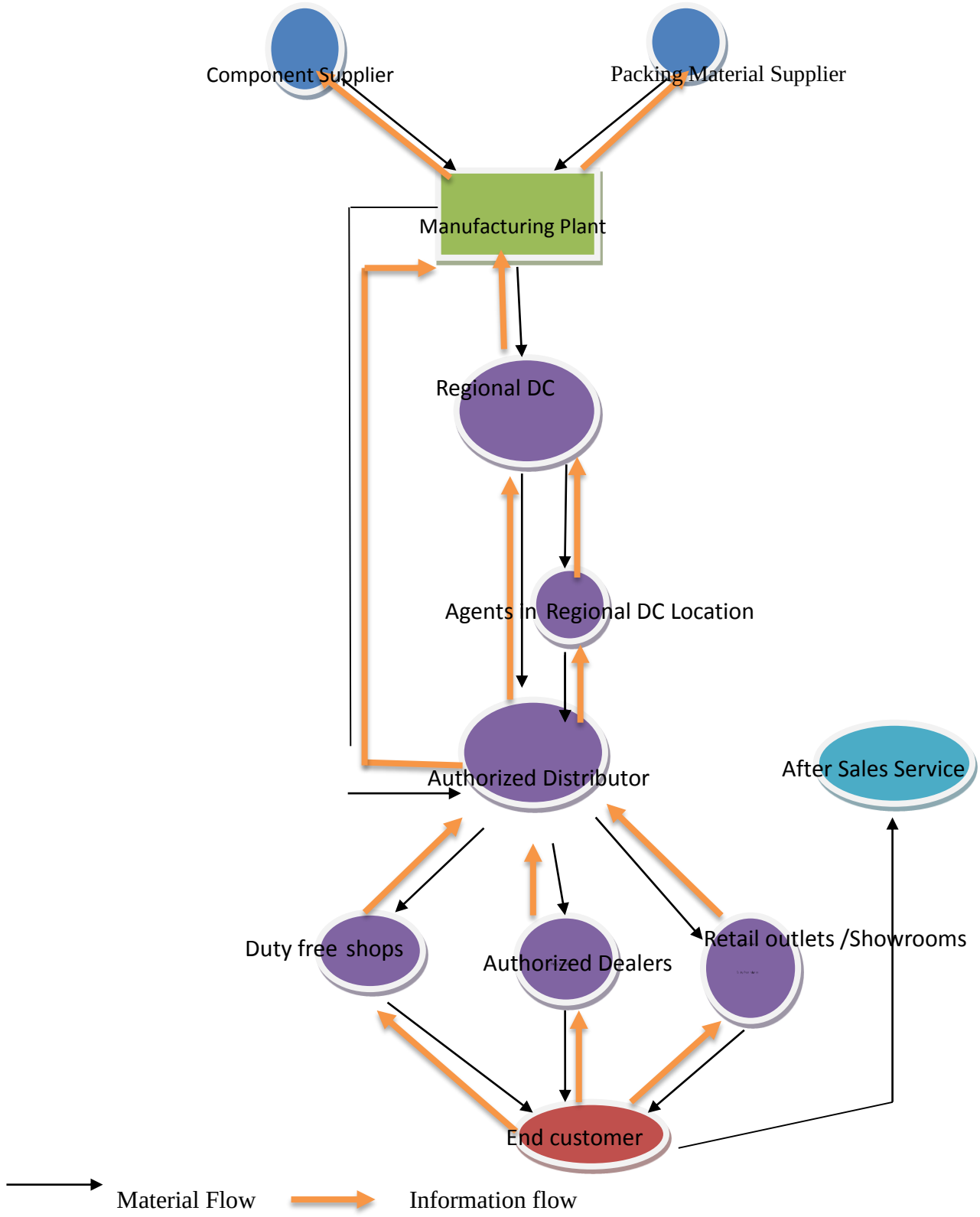


Figure 1: Consumer Electronics Supply Chain in Global context

It is better to identify the industry separately in local context because our country is socially, economically and culturally different to other countries and to date there is no specific study carried out on this subject.

1.2. Problem Statement

What are the key characteristics specific to the Sri Lankan consumer electronics industry?

1.2.1. Research Gap

Since this industry is dynamic the major elements change over a time. Therefore it is very difficult to identify it. It has been identified in some other countries. Since those countries are different with respect to the way of doing business socially, economically and culturally, the market behavior is also different. Because of this, branding techniques which are applied in foreign markets are different. There is no extant literature that has been carried out to identify the key characteristics of the Sri Lankan consumer electronics industry.

1.3. Research Problem

The local consumer electronics industry is dynamic and there are many reasons for this nature.

Due to the rapid advancement of technology, the innovation used for the development of new products and product features are changing constantly. For an example, smart phones have become multitasking electronic equipment and it has put negative impacts on some consumer electronic products such as digital cameras and calculators. Research and developments along with new innovations are playing a vital role in making this industry more dynamic. As a result of market dynamicity, market behavior forecasting is not a very easy task. Customer behavior also varies; therefore it is very hard to forecast the demand.

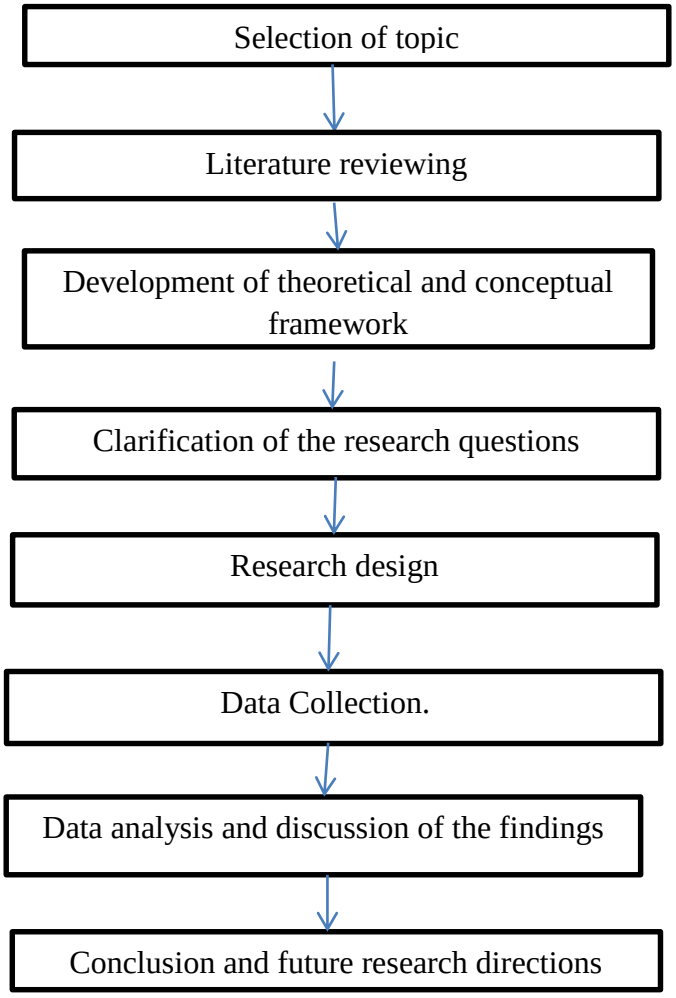
This market seems highly competitive and also there is a cut–throat price war among all local market players. Most of global consumer electronic goods manufactures have appointed more than one local authorized distributors and created artificial competition in the market. As a result of that all the local players have to operate with very thin profit

margin and this market situation gives losses to some traders in the market. In order to make this business viable companies have to operate with low overheads while increasing the sales volumes. To develop market strategies all in all it is very important to identify the key characteristics of this market in order to be a successful player in this market.

1.4. Objective of the Research

The main objective of this study is to identify the key characteristics specific to the consumer electronics industry with reference to the Sri Lankan consumer electronic industry. When considering an industry, there are various characteristics those determine the structure of the industry. Consumer electronics are a specific type of goods which are durable and highly related to the income level of the people, economic level of the country, preferences and consumer segmentation. Since income levels and consumer preferences are different in local economies in every country its market behaves differently. Thus the characteristics of the market within the local industry are also different.

1.5. Research process



1.6. Research scope

This research is mainly focused on Sri Lankan consumer electronics industry under several market segmentations such as

a) Operational aspects
b) Economic / Finance aspects
c) Technical aspects
d) Sustainability aspects

Since Sri Lanka is no longer manufacturing consumer electronic goods, firms are not dealing with upstream supply chain process but, only undertake distribution and aftersales service, basically the latter part of the downstream supply chain process. Therefore, this research will focus only on the downstream supply chain process of the consumer electronic market which is limited to the Sri Lankan consumer electronic market.

1.7. Significance and contribution of the research

Due to the dynamic nature of the electronic industry local distributors are facing an uncertain situation about the key industry features of the local industry. As a result of that many supply chain related issues such as longer order processing period, longer transit time, minimum order quantity, payment settlement issues, incomplete shipping documents, increased financial cost, insufficient warehousing and distribution facilities, clearing and forwarding issues, and bureaucracy of government authorities. It is very important to know the key characteristics of the industry in local context because the interested parties in the local consumer industry do not have a clear understanding of the key characteristics of the market. As a result of that many local market players are facing difficulties in their business operations. On the other hand, government authorities who are taking policy decisions also have less understanding of the industry. This study will help all the interested parties to get a clear idea about key characteristics of the local consumer electronic industry. From the academic research point of view, this thesis contributes to the research in consumer electronic goods market and its dynamics.

There are many studies that have been carried out in an international level about this industry. Those are under different industry characteristics and scopes such as “supply chain performance, supply chain management practices, risk of material source, demand

risk, e-waste, and green supply chain management practices. The Asian Electronics carried out a survey of Total Quality Management practices in the Malaysian electrical and electronic industry. Developing countries have not done any research in the area of this market. Therefore the intention of this study is to fill that knowledge gap.

- From consumer electronic industry point of view: Firms in the industry will be able to strategize its operations, distribution and sales by taking in to account basic industry characteristics and better position themselves in the competitive environment. The areas of focus include:
  - Planning of operations
  - Technical application in ordering
  - Payment settlements
  - Better negotiations
  - Decision making in operations
  - After sales service decision making

- Public policy point of view: Government can also get its policy right towards consumer electronics industry to help maximize welfare of the society.
  - Tax policies (Fiscal policies)
  - Import export facilitation
  - Competition control
  - Market regulation
  - Exchange control point view

In general, any potential investors of this industry can get a brief idea about the industry, which will help them take correct investment decisions. Financial institutes will be able to make use the outcome of the research when they are dealing with this industry. Government authorities such as Customs department, Inland Revenue department, Sri Lanka Port authority, Import control department, Exchange control department also can make use the outcome of this research when they are dealing or taking policy decision related to this industry.

1.10. Chapter breakdown

Chapter	Description
Chapter No 01	Introduction
Chapter No 02	Literature review
Chapter No 03	Methodology
Chapter No 04	Data Analysis and result
Chapter No 05	Analysis result and discussion
Chapter No 06	Conclusion and future research directions

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

This literature reviewed presented in the proceeding section has covered many characteristics of consumer electronic industry in global context. There are numerous operational researches in the world studied about the behavior of the consumer electronics industry from many perspectives such as:

- Electronics Market in global context.
- Supply chain in Electronic products.
- Sustainability in Electronic product manufacturing and disposal.
- Technology and manufacturing of Electronic product.
- Total quality management in Electronic products.

2.2. Electronics Market in gable context

This industry started in the 1920s just after the 1st World War in Europe and America, but only very few old European brands still exist in the global market. Philips (Koninklijke Philips N.V. Amsterdam. The Netherlands) is still a globally popular brand because they shifted their production in to the cheap labour regions in the world in order to bring production cost down. American brands such as Apple and Dell are leading in their product categories. After-1950 Japan introduced many brands to the market and finally they reached the world renowned status. A list of Japanese consumer electronic brand manufactures details are given below.

1) Sony – Sony Corporation Tokyo Japan
2) National/ Panasonic - Panasonic Corporation Osaka Japan
3) Sanyo – Sanyo Corporation Tokyo Japan
4) Toshiba – Toshiba Corporation Kanagawa Japan
5) Mitsubishi - Mitsubishi Corporation Tokyo Japan
6) Sharp - Sharp Corporation Osaka Japan

In the latter stage in 1990 South Korean and Chinese manufactures gradually started to acquire the global consumer electronic market by introducing their local brands to the international market and those are Samsung– Samsung Electronics Seoul, South Korea and LG - LG Electronics Seoul, South Korea.

Chinese manufactures also introduced their brands in parallel to Korean manufactures, but the global market demand increased after 2000 and their main brands are:

1. Hisense - Hisense Electronic Company Qingdao China.
2. Haier - Haier Group Corporation Qingdao China
3. TCL - TCL Corporation Guangdong China
4. Changhong - Guangdong Changhong Electronic Co., Ltd.
5. Skyworth - Hong Kong Skyworth Digital Holdings Co., Ltd
6. Konkan - Shenzhen Konkan Electronic Group Co.

Under the globalization all Japanese brands shifted their manufacturing plants to cheap labor markets such as China, Vietnam, Malaysia, Indonesia, Thailand, and the Philippines and continued their business under low cost operations. When analyzing the behavior of the players in the market, one individual can't influence on the price and it will be decided by the market force. Apart from the major player there are many suppliers and no restriction over entry and exit. Therefore, the consumer electronic market is highly competitive with major players' price war and they are operating with low profit margins. In order to withstand in the competitive environment manufactures are offering low cost products in price sensitive regions such as Asia Pacific, Middle East and Africa.

All the consumer electronic producers are carrying out many activities to uplift their brand image in the market. Brand image is used as tool to differentiate their product and after sales services of the product. Though producers carry out many marketing activities finally customer perspectives will be the deciding factor of the brand image. Consumer Electronic brands are competing with each other.

This is a brand comparison in the US market. (Rosen, 2016).

1. Apple

Apple maintains their own stores and given Apple's sales channels and status as a household name, it's no doubt that the brand dominates the U.S smartphone market. Despite maintaining less than 50% brand share, Apple reaps over 90% of the profit. (Rosen, 2016).

2. Samsung - Though Samsung owned retail locations and invest in brand controlled store- within- a- store capabilities on best store buy and Walmart. This franchise sales channel helps to increase highest visibility of the brand in term of physical and e-trailer platforms. Samsung has gained 80% ownership of brand searching in YouTube (Rosen, 2016).

3. LG - This constantly innovating industry needs to make customers aware and update about new products. LG convinces the customers and makes them feel the product is worth buying. The product and customer interactive visualization is letting customers feel the product features.

4. Sony - Sony always uses innovations to differentiate their product and is struggling to compete with Korean brands while maintaining their margin. (Rosen, 2016)

Table 1: Estimated growth rates for the global electronics industry from 2015 to 2017 by region.

	2015	2016	2017
World	3%	3%	3%
Europe	3%	3%	3%
America	2%	1%	3%
Asia	4%	4%	5%
Australia/New Zealand/ Africa	3%	2%	3%

Source: GmbH (2017)

Trade statistics always indicate the actual position of the market. The below table gives the global market share held by LCD manufactures from 2008 to 2016.

Table 2: Global market share held by LCD manufacturers (2008-2016)

Brand	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Samsung	19.7%	13.8%	17.9%	18.8%	20%	20.5%	20.8%	21%	21.6%
LG	10%	11.2%	12.1%	12%	13.1%	13.8%	13.58%	12.4%	11.9%
TCL	2.3%	4.6%	3.6%	4.8%	5.8%	6.5%	5.19%	7.7%	9%
Sony	13.7%	10.5%	11.3%	9.9%	7.4%	6.2%	6.22%	5.5%	5.6%
Hisense	1.6%	4.1%	3.9%	4.5%	4.7%	4.7%	4.93%	5.6%	6.1%
Skyworth					4.1%	4.4%	3.95%	4.6%	4.5%
Toshiba	6.4%	5.8%	7.7%	7.2%	5.5%	4.2%	3.4%		
AOC						4.1%	3.24%	3.7%	3.8%
Panasonic	4.2%	4.4%	5%	6.2%	4%	3.9%	3.59%	2.9%	
Sharp	9%	6.7%	7.4%	6.6%	4.1%	3.8%			
VIZIO						3.1%	3%	3.4%	3.7%
Changwon							2.68%	3%	3.2%
Haier								2.9%	3.4%
Others	33.1%	33.9%	31.5%	30%	26.5%	24.8%	29.4%	27.3%	27.2%

Source: GmbH (2017)

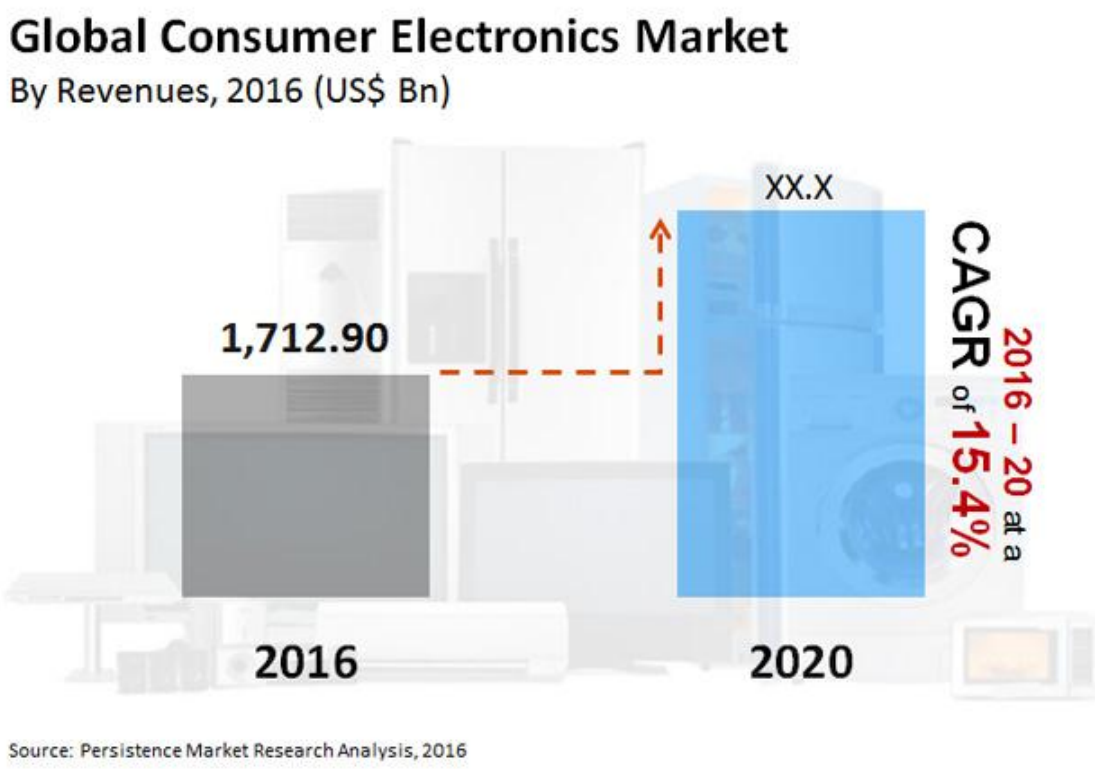


Figure 2: Global Consumer Electronic Market forecast up to year 2020.

(Source: Persistence market research analysis 2016)

The consumer electronic industry by 2003 is $240 billion worth of global industry with a small number of highly competitive global players. The consolidated revenues for Samsung Electronics were $55 billion in 2003. Samsung Electronics UK is a subsidiary of Samsung Electronics contributing $1.2 billion in revenues. Samsung Electronics has one of the highest R&D expenditure as a proportion of revenues in the industry and spent about $2.9 billion in 2003. Like its competitors, Samsung Electronics is global and employs 88 000 people in 89 offices in 46 countries. Not including facilities in Korea, it has 24 manufacturing complexes, 40 distribution bases and 15 branches spread over all continents except Antarctica. Countries with manufacturing facilities include the US, Malaysia, China, India, and Hungary. As any business, the consumer electronic industry is also associated with risk such as political risk and instability of home country, capacity risk, supplier risk and demand related risk (Sodhi & Lee 2007) . Globalization has driven many corporations to widen their resources and capability enhancement from internal environmental practices to greater heights. Attention is increasingly shifting towards external collaboration and networking outside the boundaries of the organization. This requirement has become essential in order to be competitive locally and across the borders

(Pandiyan Kaliani Sundram et al. 2011) . In recent years the electronics industry has become a considerable focus of attention for Third World policy- makers because of its apparent success in generating substantial employment and growth opportunities in a limited number of Asian and Latin American newly industrializing countries (Clarke & Cable 1982). The production of electrical and electronic equipment (EEE) is one of the fastest growing global manufacturing activities. This development has resulted in an increase of waste electric and electronic equipment (WEEE). Rapid economic growth, coupled with urbanization and growing demand for consumer goods, has increased both the consumption of EEE and the production of WEEE, which can be a source of hazardous wastes that poses a risk to the environment and to sustainable economic growth (Balakrishnan Ramesh Babu et al. 2007)

The global consumer electronics market is projected to grow at a CAGR of over 15% to nearly US$ 3 trillion in revenues by 2020**.** Unsurprisingly, Asia Pacific will continue to be the hotbed of future demand, as many consumers in these countries move to buy their first smartphone or HD TV. Unlike in developed markets of the West, where new consumer electronics sales are fueled on the back of innovation, success in Asia Pacific will be based on a large part on offering the maximum features at the lowest cost. An estimate of the opportunities in the Asia Pacific consumer electronics market can be made from the fact that in India, the second largest smartphone market in the world, the smartphone penetration is below 30%.

In a bid to offer an accurate overview of the global consumer electronics market has segmented into following areas

- Consumer electronics devices
- Smart home devices
- Wearable electronic devices

Smart home devices and wearable electronics sector is at a nascent stage currently. Of the US$ 1.22 trillion worth of consumer electronics sold globally in 2014, smart home devices and wearable electronic devices accounted for nearly US$ 23 billion. However, manufacturers who choose to ignore these two fledgling markets may miss out on a plethora of opportunities, as future growth projections remain overly positive. Smart home devices revenues are projected to increase by 23% CAGR through 2020 (Anon., 2016) .

When we consider the consumer electronics retail market in general, there are lots of dimensions that effect the competition in retailing sector and everyday it is becoming more challenging to gain and sustain competitive advantage. Also, for consumer electronics the situation is tougher because of unprecedented change in technology and consumer preferences (Candemir et al. 2016) . Competing among global players are common to this industry as well, study has carried put to measure Samsung Electronics Corporation and Sony Corporation (Anon., 2004). Asia region is playing a vital role in current global electronic market and this has become more capital incentive industry and is was identified in 1982 (Clarke & Cable 1982).

2.3. Supply Chain in Electronic products

Supply chain management is a very important factor to function this industry. The best practices in all ways affect the supply chain performance. Supply chain management performance (SCMP) has been defined as the set of activities undertaken in an organization to promote effective management of its supply chain. Also recommended that SCMP to include the flow of materials and information and postponement (POS) strategy and mass customization. (Pandiyan Kaliani Sundram et al. 2011).Supply chain design influences supply chain performance through delivery and information sharing. Information sharing and delivery have a direct influence on supply chain performance. Flexibility influences supply chain performance through delivery and information sharing. This affects supply chain performance directly and has also an indirect impact on supply chain performance through flexibility (Pejman Sheibani Esferjani 2011). Managing the supply chain risk is difficult; mitigating one risk may lead to increase the possibility or the impact of another. But still these tools (as reserves) can be used to mitigate the risk, inventory, capacity, redundant suppliers and responsiveness (Sodhi & Lee 2007). Supply chain risk measures need to be considered carefully in light of operations. It is quite possible to adopt too many measures and then not use them because they are too many or too complicated. There are two major risk measures can be used in this industry, one is demand risk and the inventory risk. Even though its customers give their orders in advance to the company, the reality is that end-consumer demand is uncertain. The restrictions on the plants regarding changing the replenishment schedule and on the customers (i.e., retailers and distributors) changing their forecast or orders for future

weeks mean that supply from the warehouse need not match end-consumer demand. If customers like Best Buy cannot meet consumer demand, it is bad not only for these customers (possibly even if consumers switch to competitors' products), but also for the company. An end-consumer not finding or seeing the product in the customer's store may purchase a competitor's product and stay with that competitor for accessories and up-grades. Likewise, excess inventory with the customer is also a risk. If the inventory keeps building up, the customer will eventually have to sell at a discount because the company does not allow returns from customers. Eventually, the customer may decrease shelf space for this product in favor of those selling better and order smaller quantities (or none) of this product as soon as it can (Sodhi 2005). Globally electronic retailers are facing huge inventory risk , in order to over come this situation principals have introdcued - retail market vendor management inventory systems to help to reduce the supply chain risk at the retailers end . Some of the acclaimed benefits of VMI were subjected to some of the key barriers common in any IT implementation and reengineering initiatives. Establishing trust among supply chain members is another major barrier to the success of VMI. But even if the information needed is available, supply chain members may be reluctant to reveal it due to a lack of trust and a fear that the information will be revealed to competitors. In the case of VMI, high employee involvement ensures success. By co-opting internal employees in the process of information sharing and task execution, organizations are cultivating high-level involvement to provide opportunities for employees to make a significant contribution. Participation allows individual employees to see the value of the linked operations from supply to delivery. As the supply chain becomes transparent, employees are likely to under- stand their roles and, in turn, develop a high sense of task identification. The rapid evolution of logistics and its effect on order fulfillment has implications for selecting supply chain partners. At a minimum, organizations should look for partners that can provide on-line supply chain visibility and connectivity in addition to performing traditional distribution and customer service functions. The findings indicate that the added values of VMI are more transparent to supply chain members in a strategic than in a less integrated logistics partnership. Then VMI technologies have a dual role: (1) to enable the coordination of information flow; and (2) to harness the collaborative aspects of a supply chain (Kuk 2004).

2.4. Sustainability in Electronic product manufacturing and disposal

With increase in environmental concerns during the past decade, a consensus is growing that environmental pollution issues accompanying industrial development should be addressed together with supply chain management, thereby contributing to green supply chain management. Since the Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and Eco- design for Energy using Products (EuP) directives were passed by the European Union (EU), GSCM has been adopted as a proactive strategy by leading electronic industry companies, including Dell, HP, IBM, Motorola, Sony, Panasonic, NEC, Fujitsu and Toshiba . Nowadays, similar regulations has been spread throughout the world in the US, China, Japan and Korea; the emerging issue of green product seems to be quickly picked up in Asia. Some countries such Japan, Taiwan and Korea are the heralds in terms of green electronic products (Hsu & Hu 2008). Sustainable supply chain management combines green procurement, green manufacturing/materials management, eco accounting, green distribution/marketing and reverse logistics. There are two basic processes in the supply chain: (1) production planning and inventory control, and (2) distribution and logistics. Environmental protection and conservation of natural resources has become an absolute necessity at national and international levels. Management of hazardous waste is an important part in attaining environmental protection throughout the world. Minimizing the generation of hazardous waste, recovery of valuable materials from the waste and preventing the environmental deterioration are some complex issues which require prime attention (Kumar et al. 2012). Once electronic products reach the end of their useful life, they become e-waste (electronic devices) or WEEE, waste from electrical and electronic equipment. In Europe, the production of electrical and electronic equipment (EEE) is one of the fastest growing business sectors. Hence, the amount of WEEE will also increase very rapidly. For example, in Europe the expected growth rate of WEEE is at least 3 to 5% per year. In the former (before May 2004) 15 European Union member countries (EU15), the amount of WEEE produced during 1990–1999 was 3.3–3.6 kg per capita and is projected to reach 3.9–4.3 kg per capita for the period 2000– 2010 . According to this study (which assessed only five appliances: refrigerators, personal computers, televisions, photocopiers, and small household appliances), these items account for only 25% of the whole WEEE stream of the EU15. Another estimate of the total per capita WEEE generation in the EU15 is 4–20 kg per year. Other estimates of total WEEE generation

rates for the EU range from 14 to 20 kg per capita(Balakrishnan Ramesh Babu et al. 2007). Green supply chain can be implemented in three areas such as green procurement, green manufacture, green distribution and green logistics. Supplier selection and 3R comes under the green procurement while hazardous substance control, energy efficient technology and 3R method & waste minimization fall under green manufacture .The subsections comes under green distribution green logistics and green packing. The areas coming under green logistics are final treatment /Landfill Company, disassembly /recycle plants, waste collectors, and used computer stores (Ninlawan C.2010).

2.5. Technology and manufacturing of Electronic products

Technology is playing vital role in the consumer electronics industry and it has been transferred to parent companies to overseas subsidiaries. Knowledge transfer can therefore include product and process technology information exchange, or transfer of managerial, technical, marketing skills through various methods of transfer. The most common source of knowledge transfer provided by foreign subsidiaries is linked to the technical support related to the production process and the product. In the great majority of cases, the foreign firm will supply blueprints to its suppliers. It may further provide special tools. In the case of subcontracting, the subsidiary may take part in the capacity and production planning of the subcontractors. Support is frequent for the learning of specific process technologies, but upgrading of technological know-how to product design is limited. In order to shift Japanese consumer electronic production facilities to cheap labor countries, parent companies are compelled to transfer the technology and the manufacturing knowledge to those countries (Giroud 2000).

With the expansion of the consumer electronic industry in Asian countries they imported the technology from already developed countries. The cumulative dimension of technology offers firms the opportunity to learn from already developed technologies. Countries such as Japan, South Korea and Taiwan generally imported foreign technology through imitation and licensing from transnational corporations (TNCs). Others such as Singapore and Ireland have relied extensively on transnationals' foreign direct investment (FDI) to stimulate learning and innovation (Rasiah 2004). In order to make good quality products , companies are required to adopt ''World Class Manufacturing'' practices to be the best, either in the design and quality of the products, capability and standing of the organization, minimum manufacturing cost, the ability to continuously produce new

products at a faster rate than your nearest competitor and achieving customer satisfaction with the services provided (Yusuff 2004).

2.6. Total Quality Management in Electronic Products

Total quality management is very important concept for a consumer electronic industry. Total quality Management (TQM) is one of the key approaches towards realizing the goal of meeting customer satisfaction .Quality management has been recognized and as an important area by organization. Quality holds the key to competitiveness in today's global market, regardless of the size of the company. Total quality management programs and practices are primary embraced in large multinational organizations. TQM can be classified in to these six areas: management leadership and commitment, continuous improvement, total customer satisfaction, employee involvement, training and education, rewards and recognition. Some principles and practices of TQM many differ among firms and industries, but there is unanimous agreement as to the importance of leadership by top management when implementing TQM. This requires management to actively participate in quality transformation. Management has to outline the quality goals, quality policies and quality plans so that employees are constantly reminded that the customer, not the product, is the top priority. (Eng & Yusof 2003) . Japanese consumer electronic manufactures consider quality as very important aspect of the consumer electronics industry as well; therefore total quality management practices are one of the main management tools in the industry. Japanese companies are very successful in producing quality products due to their commitment for TQM and quality practices adoption, as expounded by quality gurus such as Deming, Juran, Taguchi and others. Malaysia has long realized the importance of adopting and learning from Japan and South Korea in terms of their work-culture, technology, etc., in its effort to become an industrialized country. The Japanese government has also contributed through the Japan/ASEAN TQM project which was established in 1995, mainly to facilitate the implementation and promotion of TQM activities in ASEAN countries including Malaysia to develop their industries and promote international trade. It is therefore important to know what kind and level of quality practices that differ between Japanese and non-Japanese companies in the Malaysian context. Thus, the objective of this study is to compare quality practices and importance between Japanese and non-Japanese companies (Bin Ahmad et al. 2007).

2.7. Chapter Summary

Many studies have carried out in global context about the consumer electronics market's individual characteristics such as market behavior, TQM , green supply chain management, supply chain best practices, supply chain performances, supply chain risk , supply chain design, vender management inventory system, e-waste management, best manufacturing practices and knowledge transferring form developed countries to other countries. According to my knowledge not a single study has carried out with regard to the Sri Lankan consumer electronics industry.

CHAPTER 3

METHODOLOGY

3.1. Introduction

Methodology is a very important part of a research and the output of the research always depends on the validity of the methodology. Methodology was carefully selected after analyzing the data collection method and expected outcome of the research. If the appropriate methodology isn't selected, the expected level of data won't be collected. As a result of that there will be a huge variance between the expected outcome of the research and the final outcome. Different research methods have different purposes and different levels of validity. This is one measure that helps determine how accurate the results of a research method are. Validity is a term that refers to whether or not a study measures what it's supposed to measure. The results of a study provides stronger evidence if the research has a higher measure of validity (Roundy, 2017) . This is an exploratory research which intends merely to explore the research questions and does not intend to offer final and conclusive solutions to the existing problem. There are two different research methods, quantitative and qualitative. Quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study, while qualitative research is the approach to data collection, analysis, and report writing differing from the traditional, quantitative approaches (Creswell 2002). According to a literature review, exploratory research (questioner survey/ interview – qualitative method) was carried out in many studies. Case studies are also done for few researches.

Other than Exploratory Factor analysis method there are other data analysis methods such as Linear Regression method and Hypothesis method. Linear regression is a basic and commonly used type of predictive analysis. The overall idea of regression is to examine two things: (1) does a set of predictor variables do a good job in predicting an outcome (dependent) variable? (2) Which variables in particular are significant predictors of the outcome variable, and in what way do they–indicated by the magnitude and sign of the beta estimates–impact the outcome variable? These regression estimates are used to explain the relationship between one dependent variable and one or more independent variables. The simplest form of the regression equation with one dependent and one independent variable is defined by the formula y = c + b*x, where y = estimated

dependent variable score, c = constant, b = regression coefficient, and x = score on the independent variable. On the other hand Hypothesis method is used based on researcher's guess, or hypothesis about what is going on. The process begins with a Working Hypothesis. This is a direct statement of the research idea. For example, researcher assumed that Sri Lankan Consumer Electronic business is running at very low profit margin .Based on this guess carry out the research. The strength of the data will determine whether the null hypothesis can be rejected with a specified level of confidence. When compare all three methods the most appropriate data analysis method for this research is Exploratory Factor analysis method because there are so many variables.

3.2. Research design

This research has a cross-sectional design. This research has an explorative nature and the type of information sought was qualitative. The method of data collection was a questioner survey. Primary data was utilized for this research. The questionnaire was sent to conveniently selected Experts, Directors, Senior Managers and Managers in the local consumer electronic industry and some persons are processing more than 25 years of industry experience.

3.3. Selection of Population and Sample selection

3.3.1 Population

The Sri Lankan consumer electronics sector is a vastly spread sector and the number of sales companies and agencies as the population of this research was unknown.

3.3.2 Sample Selection

Sample selection was carried out as a convenience method. The selected sample consisted of stakeholders in electronic industries such as Company Directors, Top level managers, Department heads and senior executives who are attached to different functions in their respective electronic sales organizations.

3.4. Questionnaire

3.4.1. Overview

This questionnaire has been designed based on the literature review and the industry experience. It was carried out in a methodical way because it decides the outcome of the survey. Further, it was not a complex one because the respondents did a volunteer job. The questioner was simple and it consisted of straight forward questions because complicated and poorly designed questions will mislead respondents. In all surveys, there are two generally recognized types of error, sampling error and none sampling errors. Sampling errors arise from the random variations in the selection of respondents. The extent of it can be calculated and its effects can be taken in to account. Sampling errors can be reduced, most commonly by increasing the size of the sample, which usually means additional cost. According to the literature review many researches covered one or more of the following points and this questioner also will cover the entire local consumer electronics market as well. This questionnaire consists of 5 point Likert scale questions which allow respondents to accurately specify their preference or views (totally disagree = 1 , disagree = 2 , neutral = 3 , agree = 4 , totally agree = 5). The response rate was 57/80 (71%).

3.4.2. Structure of the questionnaire

- These questions were designed under the different aspects of the industry characteristics.
  - Operational aspects
  - Economic/Finance aspects
  - Technical aspects
  - Sustainability aspects

- Details of the questionnaire :
  - Operational characteristics:
    - Procurement
    - Order processing
    - Lead time
    - Warehousing

+ Distribution
+ Brand promotion
+ Sales
+ Human resources

- Economic /Finance characteristics:

+ Employment opportunities
+ Profit margins
+ Return on investment
+ Transport cost
+ Payment methods
+ Import levies
+ Credit terms

- Technical characteristics:

+ Quality of products
+ Product durability
+ Product features
+ Warranty conditions
+ Common spare parts
+ Repair facilities
+ Technically sound staff
+ Availability of necessary repair equipment

- Sustainability characteristics:

+ Green market practices
+ Green warehouses
+ E –waste management system
+ 3 R practices
+ Employee training
+ Usage of renewable energy

3.4.3 Implementation of the questionnaire survey

The implementation of the questioner survey was online and Google Forms® was used as the tool. The questionnaire link was emailed to eighty individuals who are attached to local consumer electronics industry.

3.5. Chapter summary

This is an exploratory research and this online questioner survey was carried out as a data collection method. The population of this research was unknown and the sample selection was done on the convenience method. The respondents were not anonymous. The questioner has been designed under four subtopics: operation, economics/finance, technical and sustainable. EFA based principal component analysis (CPA) was used to identify the underlying latent construct for the variables.

CHAPTER 4

DATA ANALYSIS AND RESULT

4.1. Overview

Since there are many variables under this study, the exploratory factor analysis (Principle Component Analysis) will be the most suitable data reduction method. The Factor Analysis is an explorative analysis. Much like cluster analysis grouping cases, the factor analysis group's similar variables into dimensions. This process is also called identifying latent factors. Since factor analysis is an explorative analysis it does not distinguish between independent and dependent variables. Factor Analysis reduces the information in a model by reducing the dimensions of the observations. This procedure has multiple purposes. It can be used to simplify the data by reducing the number of variables in predictive regression models. If factor analysis is used for these purposes, most often factors are rotated after extraction. Factor analysis has several different rotation methods some of them ensure that the factors are orthogonal. Then the correlation coefficients between two factors are zero, which eliminates problems of multicollinearity in regression analysis. Factor analysis is also used in theory testing to verify scale construction and operationalization. In such a case, the scale is specified upfront and we know that a certain subset of the scale represents an independent dimension within this scale. This form of factor analysis is most often used in structural equation modeling and is referred to as Confirmatory Factor Analysis (Lain, 2017).

4.2. Characteristics of the respondents

This questionnaire survey achieved 71% response rate (Sample of eighty) and it is a highly acceptable rate. The respondents' designations, administrative department and experience in consumer electronic industry are given Figure 03, 04 and 05 respectively. Forty percent (40%) of the respondents are attached to sales and marketing departments while thirty percent (30%) are attached to supply chain related departments. Thirty one percent (31%) are Managers, twenty percent (20%) are Executives and there are senior level staff members such as Directors (11%) and General Managers/Deputy General Managers (11%). When considering the industry experience of the respondents, seventy five percent (75%) have more than sixteen years of experience.

4.3. Descriptive Analysis – Demographic factor

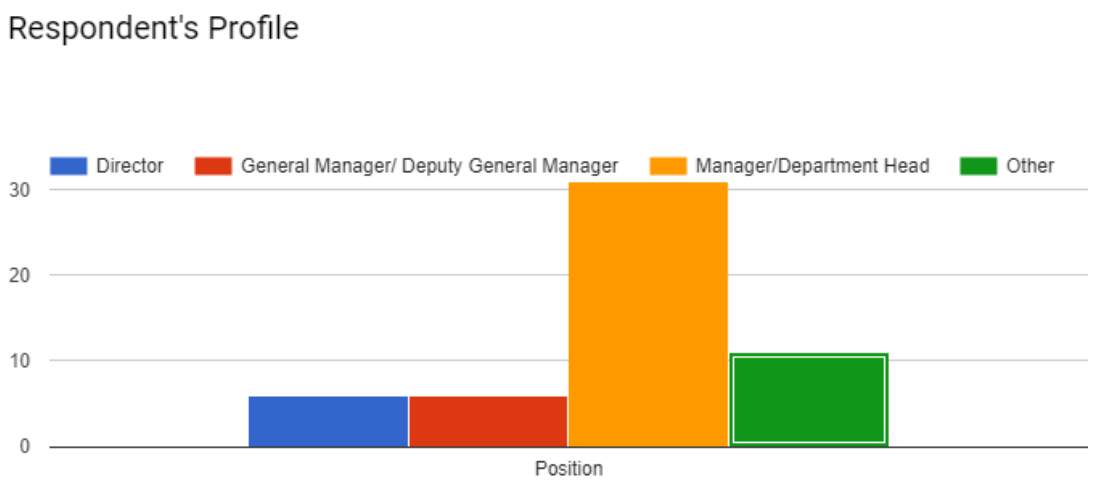


Figure 3: Designations of respondents

Above bar chart depicts the respondents' designation details and Managers are the highest number of respondents while Directors and the General Manager/ Deputy General Managers are among least number of respondents . The number respondents which are below managerial grades employees are more than the number of Directors and General managerial category respondents.

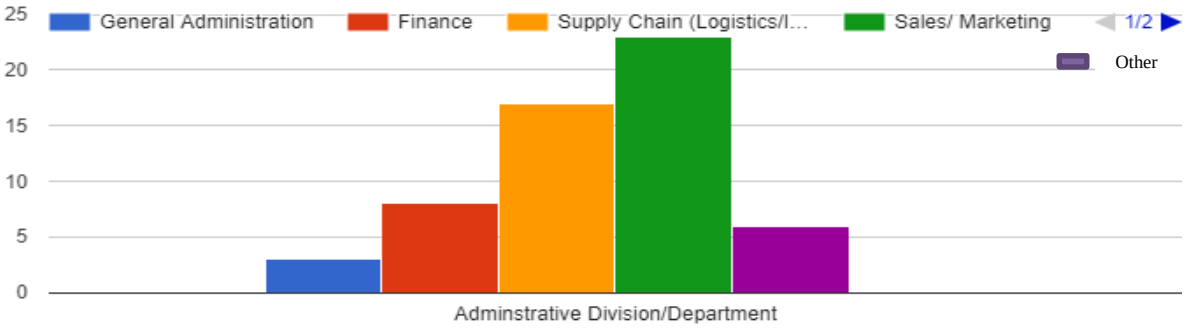


Figure 4: Respondents administrative department

The figure 4 represent the respondents' administrative departments and according to the above bar chart most number of respondents are attached to Sales/Marketing departments and least number of respondents are working for general administrative departments .

Comparatively respondents working for supply chain related departments are higher than the respondents attached to finance departments.

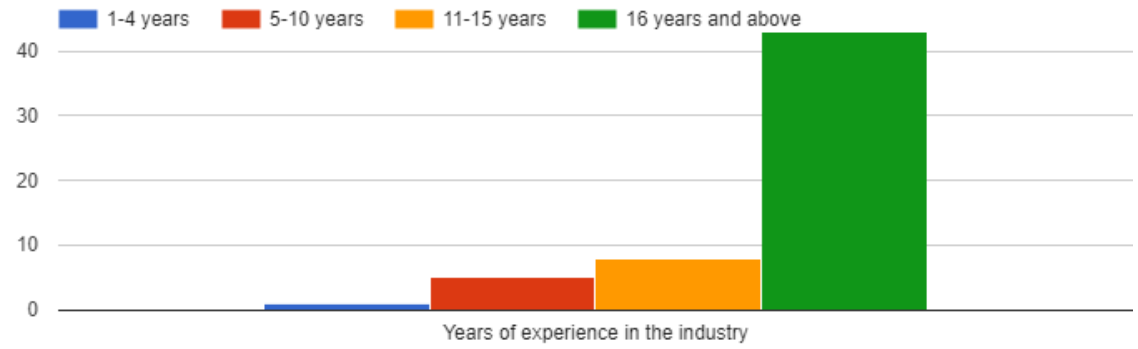


Figure 5: Respondents industry experience

The above bar chart illustrates the industry experience of the respondents and highest numbers of respondents are possessing more than sixteen year experience while very few are with less than ten year experience. This reflects that selected sample is consisting of experience individuals in the Sri Lankan consumer electronics industry.

4.4. Exploratory factor analysis

This section presents the results of EFA based on the questionnaire. EFA based Principle Component Analysis (PCA) is used to identify the underlying latent construct for the variables. The sampling adequacy and sphericity were also tested using the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's test of Sphericity(Table-3). The KMO result is 0.547 which is above the suggested minimum. As shown in Table 4, the first nine factors have the initial eigenvalues of 4.223, 2.494,2.251, 1.793,1.448,1.237 ,1.200,1.143 and 1.001, which are larger than 1; and they explain 79.96% of the total variance of the variables. Therefore, according to the Kaiser criterion, these factors can be retained for further analysis. According to the Rotated Component Matrix (Table – 05) twenty variables are loaded in to nine factors. As shown in the table 5 nine factors have been named according to the commonalities of the loaded variables .As per reliability test (Table-07) Cronbach's Alpha is .805 for all 30 variables.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.547
Bartlett's Test of Sphericity	Approx. Chi-Square	483.909
	Df	210
	Sig.	.000

Table 4: PCA factor analysis of factors influential to the local consumer electronic industry total variance explained (9 factor model).

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**4.223**	**20.112**	**20.112**	**4.223**	**20.112**	**20.112**	**3.104**	**14.782**	**14.782**
2	**2.494**	**11.876**	**31.988**	**2.494**	**11.876**	**31.988**	**2.256**	**10.741**	**25.523**
3	**2.251**	**10.721**	**42.708**	**2.251**	**10.721**	**42.708**	**2.087**	**9.936**	**35.460**
4	**1.793**	**8.539**	**51.247**	**1.793**	**8.539**	**51.247**	**1.831**	**8.717**	**44.177**
5	**1.448**	**6.898**	**58.145**	**1.448**	**6.898**	**58.145**	**1.661**	**7.907**	**52.084**
6	**1.237**	**5.892**	**64.037**	**1.237**	**5.892**	**64.037**	**1.633**	**7.775**	**59.859**
7	**1.200**	**5.713**	**69.750**	**1.200**	**5.713**	**69.750**	**1.561**	**7.431**	**67.290**
8	**1.143**	**5.445**	**75.195**	**1.143**	**5.445**	**75.195**	**1.366**	**6.502**	**73.793**
9	**1.001**	**4.769**	**79.963**	**1.001**	**4.769**	**79.963**	**1.296**	**6.171**	**79.963**
10	.710	3.383	83.347						
	.	.	.						
	.	.	.						
21	.061	.291	100.000						

Bold values show latent factors which have eigenvalues greater than one and those 9 factors explain 79.96% of variation of the data.

Table 5: twenty variables loaded in to nine factors

Rotated Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
Emission	.854								
Renergy	.835								
Capital	.777								
Eco	.730								
HirePur		.855							
LC		.798							
Dynamic		.669							
Technical			.860						
NotDura			.715						
Green			.593						
E-waste				.833					
Reduce				.654					
Mindset					.748				
Repair					.735				
Thin						.688			
Training						-.680			
Fiscal									
Backbo							.879		
Wellequ							.601		
Creterm								.859	
Tradeof									.887

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 20 iterations.

Table 6: Nine factors have named according to the commonalities of loaded variables

Component No	Name of the factor	Variables
1	Less contribution towards environmental sustainability	This industry has not done any major contribution to reduce **carbon emission.** **Renewable energy** usage is not popular in this industry Due to **high initial capital** cost the renewable energy usage is not encouraging Eco friendly **e-waste management** systems not introduced to the local industry. (Emission ,Renegy, Capital,Eco)
2	Satisfactory Level of Finance Assurance /flexibility	Most of rural area sales are on **hire purchase** **Letter of credit** is the most suitable method in term of settling foreign supplier payments Sri Lankan consumer electronic industry is **very dynamic** industry. (Hirepur,LC, Dynamic)
3	Manufactures lack of interest of the local market	Manufactures' **technical service support** is inadequate Current consumer electronic goods are **not durable**. **Green marketing concept** is not popular in this market. (Technical, NotDura,Green)
4	Less attention for sustainable supply chain practices	No proper mechanism to **collect e-waste** from customers. Reduce, reuse and recycle **(3R) practice** is not very popular in this industry. (E-waste, Reduce)
5	Lack of market adoptability	Local consumers' mindset is not prepared to accept manufactures new concept "**use and dispose** ". Some product **repair cost** exceeds the product purchased price (Mindset , Repair)
6	Lack of financial sustainability	Due to high competition, distributors are compelled to operate with very **thin profit margins**. **Employee training and development** is not very important for this industry

		(Thin, training)
7	Lack of market resilience	Inconsistencies in government **fiscal policies** have an impact on the local consumer electronic market. **After sales service** is the back bone of this industry (Fiscal , backbo)
8	Lack of principal's finance support	Suppliers' **credit terms** are not attractive Creterm
9	Difficult to determine optimum level of inventory.	There is **trade-off between** spare parts (service parts) stock holding cost and new unit replacements (Tradeof)

Table 7: Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	57	100.0
	Excluded[a]	0	.0
	Total	57	100.0

a. List wise deletion based on all variables in the procedure.

Table 8: Reliability test

Reliability Statistics

Cronbach's Alpha	N of Items
.805	30

Note: - Exploratory factor analysis details enclosed under the appendix

CHAPTER 5

ANALYSIS RESULTS AND DISCUSSION

4.1. Introduction

Questionnaire deployed consisted of thirty questions and the same was forwarded to eighty persons, only fifty-seven persons responded. Since this questionnaire is 5 points Likert scale type one, it allows respondents to accurately specify their preference or views. Each question consists of one characteristic of Sri Lankan consumer electronics market. All the responses were analyzed using Factor Analysis. Based on the analysis, twenty variables have been identified as key characteristics of Sri Lankan consumer electronics industry. Those twenty characteristics have loaded into following nine factors according to the commonalities of each variable.

i. Less contribution towards environmental sustainability.

ii. Satisfactory level of Finance Assurance/flexibility.

iii. Manufacturers' interest is inadequate to the local market.

iv. Less attention to sustainable supply chain practices.

v. Lack of market adaptability.

vi. Lack of financial sustainability.

vii. Lack of market resilience.

viii. Lack of principal's financial support.

Ix. Difficult to determine the optimum level of inventory.

The following sections describe each factor.

Less contribution towards environmental sustainability

According to the analysis results, the electronic trading industry has no major contribution to reducing carbon emission, meaning there is a lack of sustainability focus. In the world context global emission has reached greenhouse gas 17,000 times the planet-warming capacity of carbon dioxide, which is at least four times higher than previously estimated. This is due to nitrogen difluoride (NF3) usage mainly by the semiconductor industry to

clean the chambers in which silicon chips are made. In this clearing process, 98% were used and only about 2 percent escaped into the air. For an example in the flat panel LCD television industry, it is found that in the American context the nitrogen difluoride is used as a cleaning agent. In this case which has contributed to the higher gas emission. Further, there is another industry problem that electronic manufacturing company will not reduce carbon emission because there is no regulation. The emissions will escalate as nitrogen difluoride's use increases. Since semiconductor is one of the main components and with the expansion of the electronic industry, the demand for semiconductors also increased during 1980's. As a result of that nitrogen fluoride usage also exceeded the upper tolerance level. Though electronic giants such as LG, Samsung, and Toshiba has taken few steps to reduce the carbon emission with some additional cost, a large number of small players are not in a position to bear that additional cost, especially in LCD manufacturing sector. The fluoride which is use for LCD panel manufacturing is a toxic which damage teeth and bones. Under the Kyoto Protocol nitrogen difluoride also included in the list of greenhouse gases. As a result of that carbon dioxide and six other greenhouse gases usage will come down at least in the countries which ratified this protocol (Patel-Predd, 2008). Information technology items such as computer, laptops, tablets and mobile phones are responsible for 1.3 percent of the world's total greenhouse emissions in the year 2007. It has revealed that in the year 2007 three billion mobile phones, one billion PCs and 1.7 billion TV used, and statistics indicate mobile phones has increased to 4.5 billion in 2010 (Roos, 2010). Global consumer electronics manufacturers are responsible for a considerable percentage of world greenhouse gas emission. In the local context, very less carbon emission from the consumer electronics industry as they are only handling the downstream part of the supply chain process, but still there is some percentage. As a social responsibility, local market operators have not taken considerable steps to reduce the carbon emission. Local consumer electronics market players are heavily using diesel and petrol powered vehicles for their island-wide goods distribution and staff transport purposes, they can switch to hybrid and electric vehicles in order to reduce carbon emission.

As per survey results, renewable energy usage is not popular in the local consumer electronics industry. It is better to check in global context whether they are using the renewable energy. According to the study carried out in the Sony Corporation, they are using renewable energy and as a result of that they have reduced approximately 78,000.00 tons of CO2 through the use of renewable energy and they have a plan to increase the

usage of renewable energy and reduce carbon emission by 300,000 tons by the year 2020. They are pushing all the worldwide manufacturing plants for Green Energy Certificates and renewable energy using solar power systems (Corporation, 2016). Above articles evident that global consumer electronics industry is using renewable energy and it is very popular because they consume a large volume of energy for product manufacturing purpose. Sri Lanka also encourages stakeholders for renewable energy usage by offering incentives in many ways. But as far as local consumer electronics industry is concern, renewable energy usage is very low because they are not in the manufacturing operation and only involved with import and distribution activities. Therefore, renewable energy usage is not very popular in Sri Lanka consumer electronics industry.

As per the outcome of the survey results, it has been identified due to high initial capital cost, the renewable energy usage is not cost effective in the local consumer electronics industry. The well-known obstacle to renewable energy is initial cost specifically, capital costs to build or install solar or wind farms. Once the renewable energy system is built, their operational cost is cheaper compared to fuel generated power sources, but the bulk of the expense comes from setting up the technology. This is capital incentive technology and cost of capital plays an important role when making a decision to invest in renewable energy technology (Anon., 2016) Investment can be justified if the power consumption is high because initial investment can be recovered over a period. Since local consumer electronics market payers only involving with distribution, their power consumption is law compared consumer electronics manufacturers. Therefore, due to high initial capital cost, the renewable energy usage is not encouraging in the local consumer electronic market.

As per results, eco-friendly e-waste management system has not been introduced to the local consumer electronics industry. Discarded, obsolete or broken electronic devises called as e-waste and though these items imported from different manufacturing countries finally end up as Electronic Waste at the importing country and there is no mechanism to send it back to original equipment producer.

In the local context, the stakeholders of consumer electronics industry do not implement a proper system to collect e-waste from their customers. Apart from renowned brands, a lot of inferior quality stuff importing to the country and a considerable share of these imported items are dead on arrival and compelled to dispose at the imported destination.

Since there is no proper waste management practices disposals are happing haphazard way which gives adverse impacts on human health and the environment.

There are many toxic chemical substances contained in the e-waste such as lead, mercury, cadmium, Polychlorinated Biphenyl's, Brominated Flame Retardants. All type computer monitor and TV picture tubes contain lead glass which is 6% of total weight of CTR tube (ICTA, 2013). One local electronic goods major distributor has published in their website that they accept e-waste in their sales outlets but it is not operating effectively and it appeared to be that they use this as a marketing tool and do not genuinely practicing it.

Only one local consumer electronics goods distributor has published on their company website the way they accept the e-waste form customers but practically is not very active. It is not mentioned the procedure of disposing of because that is the most important point. Once collected the items, it should dispose of eco-friendly of manner. If in Sri Lanka e-waste is disposed of in an environmentally friendly manner there should be e-waste all over the garbage dumping yards or used as landfill.

These provide evidence that eco-friendly e-waste management systems not introduced to the local consumer electronics industry. When considering all the above factors, though global consumer electronic goods manufacturers are a threat to the environmental, they have taken are some initiatives for the benefit of environmental sustainability but local player's contribution towards environmental sustainability is less. The main reasons for less interest towards environmental sustainability are lack of legal commitment and no consumer electronic goods manufacturing taking place in locally.

Satisfactory Level of Finance Assurance and Flexibility

In Sri Lanka, consumer electronics distributors of major multi-branded have their own Island wide retail outlets which cover most of the rural areas in the country. All local big consumer electronics market players have their own hire purchase scheme which backed by their own finance arm, for example, Singer (Finance) PLC, Abans (Finance) PLC, Softlogic (Finance) PLC.

Hire purchasing sales to improve total sales revenue if-if the sellers have a good recovery team. The major local electronic distributors indicate that the major portion of rural area sales on hire purchase and customer are very attractive when they can enjoy a product without a single cent of initial payment. Some electronic distributors are going to

customer’s doorstep and offer goods on hire purchase method and installment collections also from the customer's doorstep, which benefits the customer as well as the trader. From customer point of view, the seller comes to the doorstep and seller fined it easy to recover and make strong customer relationship. There are some other reasons as well such as, most of the rural area customers are low-income holders and their outright purchasing power is less but they have a dire to use modern consumer electronic goods. Therefore, the best solution is a sale on hire purchase. Though customers have to pay more than the cash price, it is very popular among rural area customers because they can enjoy the product by paying a small monthly installment. From retailer’s point of view, they can maintain very healthy profit margins on the product price and this helps to increase overall sales.

As far as foreign supplier payments concerns there is a various method of payments are available in international trade such as Advance payment (telegraphic transfer is commonly known as TT in advance), Open account, Documentary Collection and Letter of credit (LC).

Letters of credit (LCs) are one of the most secure methods of payment available in the international trade. This is a multipurpose and safes payment instrument available in the international business. Compared to other payment methods under the LC applicant’s bank given the payment assurance to the importer that he will receive the payment subject to fulfillment of the stipulated terms and conditions in the LC itself. Since the letter of credit is a credit instrument, the importer can use his credit facility in his bank to open an LC and cost will be commission and the service charge. Only thing exporter should satisfy with the creditworthiness of the importer’s bank. This method also safeguards the importer's interest as well because importers bank will not release the funds without receiving all necessary documents. LC has a facility cover importer all interest, if the importer needs to carry out independent quality inspection from the third party, can include that into LC terms. After all, if there is any discrepancies importer has freedom accept it or reject it. Letter of credit is a contractual agreement where the opening banks agree on behalf of the importer that he will make the payment to exporter subject to the fulfillment of stipulated terms and conditions. The letter of credit is not a sale contact and it is opening based on the sales contract. The opening bank’s agreement is conditional one; therefore, the exporter has to satisfy the LC terms and conditions to get the payment. Letter of credit is governed by the UCP 600 (universal customs practice) this will helps to mitigate the disputes among all interested parties.

When we compare all the payment methods available in the international trade the letters of credit is the most suitable method in term of settling foreign supplier payments. Since main market elements are constantly changing due to varies reasons, Sri Lankan consumer electronics market can be considered as a dynamic market.

Import levy changes: most of the times import levies of consumer electronic goods been revised on annual government budget and that change market situation and sales will shift from Katunayake airport duty-free shops to island-wide retail outlets and vice versa.

Interest rate fluctuation: When interest rates are low hire purchase sales will drop and interest rates are high sales will drop. Because of hire purchase prices always higher than cash price, this price computed by considering the prevailing interest rate and other administration charges.

Local consumer electronic market has finance assurance and flexibility in various ways when it comes to foreign supplier payment settlements suppliers have assurance on payment for the goods.

Local consumer electronic customers have flexibility in their purchasing because there are many methods available in the market such as cash, credit card and hire purchase. Apart from that, there are many schemes available in the local financial market for borrowings for working capital and other requirements.

Manufactures' interests are inadequate over the local market

Electronic distribution/trading companies are playing a vital role in downstream supply chain process and they are not merely trading operation they involve with other actives including after sales service which is more technical oriented operation. Therefore, they need to have sound technical service support from product manufacture. Apart from that need to supply all necessary spare parts on time, especially current consumer electronic goods are high-tech items and need sound knowledge to carry out repairs. Therefore, brand owners need to provide adequate service support to carry out after sales service and satisfy their customers. The current trend is electronic manufactures pass entire repair responsibility to the local distributor and they are not happy with the technical service support given by the manufactures. Local distributors require continuous technical service support in order to carry out after sales repairs.

There are two reasons for the less life expectancy in current consumer electronic goods.

Low product cost: Due to high competition in the global consumer electronics market all the product manufacturers are trying to be more competitive by reducing the production cost as a result of that quality of the products drop. Since there is a trade-off between cost and the quality, it will never able to achieve the best cost and quality targets. After China started to produce their own brands at the very low-cost other world-renowned brand manufactures failed to complete with chines prices and their products became noncompetitive in the global market. As a strategical decision, most of the world-renowned brand manufacturers also shifted their production facilities to cheap labor markets such as China, Malaysia, Philippine, Vietnam, Taiwan, and India. After shifting production facilities to cheap labor countries they achieved cost targets by compromising the quality as a result of that durability of the consumer electronic products came down.

Innovation: innovation introduces new technology to the industry and that comes to the market with new electronic product. Those products stimulate customers to desire to experience it. As a result market change such as demand for the existing product will drop and inventory will pileup at distributors end.

An inherent feature of the product:

Life Span: First of all we should know what lifespan is, it is usable hours of a product, and this doesn't mean that after the specific period product get packed up. Most of the manufactures not indicating the lifespan in their website or in the operation instruction booklet, even if they mentioned the real lifespan is very much less than that.

As explained above current consumer electronic goods manufacture is not indicating the product lifespan. Instead of giving the lifespan they only give usable hours and after the specific usable hours.

All in all current consumer electronic products are not durable compared to the products which were on the market twenty years back.

Principles are not supporting encouraging local market players for green marketing concept. Green marketing is a range of activities which start from product design to the after the product consumption. Particularly in consumer electronics industry from product design stage to the e-waste management point green marketing concept can be applied. In a global context, there are many examples for the green marketing application in their

production processes such as the use of renewable energy, paperless trading, electrical and hybrid vehicle usage, green procurement policy and recyclable packing materials. As an example Sony Global Manufacturing & Operations Corporation has come forward to thrive forest at their manufacturing plants, started programs to make Japanese people aware how to helps the e-waste recycling programs, gradually shifting to renewable energy usage, obtained a green legacy certificate, eco-friendly packing materials (Corporation, 2017). Though green marketing concept is popular at global consumer electronic goods manufactures end local manufacturers are not paid a considerable amount of attention to green marketing activities. Since local consumer electronic market operators are only handling trading activities, the green marketing concept is not very popular among them. In the end, any concept should be commercially viable, if not that will not be very popular in that industry. If any local distributor practice green marketing activities they should able use that as marketing tool and increase their sales revenue or jack up product price. Since local distributors are using product brand image for local marketing activities, therefore, very less green marketing activities are applying in the local context.

Above factors well evident that global electronic goods manufacturers pay less attention to the Sri Lankan market and their customer behavior and they are not designing any product for local market.

Local electronic market players don't have control over global manufactures because compared world market our share for a particular brand is very insignificant. Therefore, principals don't have very much interest in the local market compared to other South Asian region markets such as India, Pakistan, and Bangladesh.

Less attention to sustainable supply chain practices

Local consumer electronics market players are not that much of interest over the sustainable supply chain practices because they have not introduced a proper mechanism to collect e-waste from their customers and not very keen to use 3 R practices as well.

A large range of electronic and electrical waste considered as e-waste and here we concentrate only consumer electronic goods waste. E-waste is the remaining parts of consumer electronic goods after their useful life. These items include video and audio equipment, including MP3 players and peripherals, CRT picture tubes, LED/LCD TV panels, laptops, mobile phones. Globally there are very systematic ways implemented by

the manufactures to collect their own e-waste. Many consumer electronic goods manufacturing global payers have introduced reverse logistic systems to collect their customers. Whereas local distributors not setup proper method to collect e-waste from their customers neither not introduced reverse logistics method. Since e-waste contains valuable substances such as lead, mercury, cadmium, copper, gold, silver, polychlorinated biphenyl (PCB) and brominated flame retardants (BFR) there are separate small size local operators who collect and recycle the e-waste. Collecting e-waste is one aspect critical part is a process, recycle and disposal in a proper way otherwise; it will have health issues to the all living beings.

Though some local consumer electronics distributors mentioned on their websites they accept the e-waste at their sales outlets, that is not happening and it has been using as a marketing tool. Since there are so many local parties operating for distributing the same global band nobody taken interest to collect the e-waste of that particular brand. But all the local distributors should maintain a closed-loop supply chain management system which can use to collect the e-waste from their customers.

Manufacturing stage many of global player practice this concept. It says before any new purchasing try to reduce the purchasing volumes, there are many ways and means to reduce, such as by upgrading existing parts and equipment and some occasions it may be usable to some other business unit, then better to transfer those rather than sending for disposal. By minimizing the waste can reduce the consumption, it may be raw materials or by maximizing the utilization of the existing resources.

As local consumer electronic business limited to distribution and after-sale service, this concept is not very popular but still they can apply this to two sections such as distribution and after sales operations, there are many areas can apply this concept in goods distribution operations but it not popular in those divisions. Another important area is after sales division they can apply this concept better than the goods distribution operation they can reduce spare parts importation by cannibalizing the parts/ complete PBC boards from the old units which are beyond economical reaper. Units which are coming for warranty claims and if those items can’t be repaired due vary reasons, those items can, be cannibalized and used the good condition parts for future repairs.

Some Sri Lankan consumer electronics customers are not willing to reduce their usage of electronic items because they always go for the latest model through the current item in

usable condition. Due to rapid change of models usage also increased accordingly. According to local culture, the Reuse is practicing up to a certain extent, used items they give on charity to underprivileged people, but still, some customers will keep the old one with them even after replaced with a new item. There are local e-waste recycling operators and that is their core business but none of the consumer electronic goods distributors/ traders has taken interest to recycle the e-waste and following are the reason for that.

• None of them are manufacturing and they only act as agents of principal.

• It is deviating from their core business.

When we analyze above factors Reduce, reuse and recycle (3R) are practicing in a very small way but it is not very popular in this industry.

Apart from the above local consumer electronic market it has been noticed that none of the local player are practicing green supply chain practices. Manufactures indicate many green manufacturing logos on the outer packing of the product but knowledge of the local staff over those concepts are very limited. Another issue is over stock of products those are due to unrealistic minimum order quantity of products. Because foreign suppliers wanted to increase their sales targets.

Lack of Market adaptability

As local consumer electronics market and customers can't influence the design or the features of the product and local consumer's preferences are hardly considered when designing the product. Product life expansion is also designed according to the global market requirement. On average local consumers expect five to six years lifespan of consumer electronic goods and if anything happens in between they need to repair it. There are some extraordinary customers need to use it much longer line based on some sentimental value but some consumer electronics manufacturers are not carrying spare parts more than three years from the new product launch date. Most of local consumer electronic customer's perception is different to well-developed economies.

But there are instances when customers willing to dispose of the existing one when a new arrivals launch with additional features or completely new technology. When touchscreen

mobile phones replaced with a smartphone as customers like to experience the new feature they willingly dispose the old phone and purchase the first smartphone. When LCD TV was introduced to the market customers bought new LCD TV as they like to experience the product with new technology. But apart from that customers are not willing to dispose the electronic products due to:

• Obsolescence of spare parts - When repair can't be performed as the part production has to discontinue.

• Beyond economical repair – Where the parts are available and repair cost is close to eighty percent of the new unit it considered has beyond economical repair and recommend disposing of and go for a new product.

• Lack of technical knowledge – when the necessary technical knowledge is not available with a local distributor.

• Unavailability of necessary service manuals – Sometimes local distributors can't perform repairs due to unavailability of service manuals for a particular product.

Due to rapid change of product lineup manufactures are not encouraging for repair and use but local culture and the financial situation of customers not willing to accept it.

There are instances that some product repair cost exceeds or more than eighty percent of the complete product price due to various reasons such as

a) The high cost of spare parts.
b) Local distributors exorbitant profit margins on spare parts.
c) When local distributors trying to operate as another profit center as goods trading operation.
d) Some complete unit prices are low due to bulk purchasing such as standalone DVD players.
e) Very old product prices against current spare part prices
f) High labor cost because irrespective of the product there is minimum labor rate of a technician.

If any repair cost above the eighty percent of the product it is treated as beyond economical repair. All in all these consumer electronics global brands have less adaptability to the local market because those are not made to attract small markets and they always target mass markets.

Lack of financial sustainability

Sri Lankan consumer electronic business is not very lucrative businesses because of profit margins are very low.

There are various reasons for the low-profit margins such as:

a) High competition among local distributors.
b) More than one local official distributor in the local consumer electronic market for the same brand.
c) Customers are well informed and updated about global consumer electronics market.
d) Parallel importation of consumer electronic goods into the local market.
e) So many fake consumer electronic products are available in the market.
f) Availability of inferior consumer electronic products in the local market.
g) Cut –trout price war among same brand local distributors.

Any business should be financially viable to run, if it is not, management will switch to another business. If the return on investment is not healthy stakeholders will withdraw their shares and invest in high ROI business venture. Consumer electronics retail business is associated with may infrastructure requirements such as retail outlet network back office operation and well equipped with sales center and the human resources. Those requirements incur a high operational cost; on the other hand, current market conditions push them to price competition. Another challenge faced by the locally authorized distributors is parallel importers and the e-commerce traders who operate with very fewer overheads. As a result of these authorized distributors have to run the business with a very thin profit margin. In long run it difficult to operate with very low-profit margins which will not give the best return on the investment and end of the day shareholders value will not increase, therefore, local consumer electronic financially business is not that financially sustainable.

Lack of market resilience

Sri Lankan consumer electronics industry does not have the capacity to recover quickly from difficulties. This industry purely depends on imported consumer electronic goods and inconsistency in import levies disturbs the market situation and to come back to the original status of the market will take time. When analyzing the history of import levies

for consumer electronic goods it is clearly visible that it has been revising after every annual budget. When duty rates are high duty-free sales at Katunayake airport duty-free outlet sales increase, they need to focus on that sales channel by allocating more resources to leverage the opportunity. When import levies go down by next annual budget duty-free sales reduce and other channel sales increase, as a result of that need to do some major changes within the organization to face the demand shift. But to respond to the demand shift is slow because of the need to do some major changes in their operation, for an example when duty-free outlet sales high need to have warehouses close to Katunayake airport and when another channel demand is more need to have the facility in the centralized location to cater all island-wide sales outlets. Import Levis change over the night but distributors can't adjust so quickly it will take some time to adjust. Many of global consumer electronics manufacturers' order processing period is more than two months and if there are sudden demand, suppliers will not able to supply, because most of the goods are made based on the demand. One another example camera lenses factory of Sony Corporation in Japan got damaged due to tsunami and cameras for out of stock for more than five months in the local market and local distributor couldn't source from any other factory and meet the local demand.

After-sales service plays a key role in supporting marketing activities to build customer loyalty and increase the sales revenue in long run. Always they should be well geared to handle any nature of after-sales service matters in order to satisfy their valued customers. But when it comes to the quality issue which comes with a high volume of warranty claims with the same defect, service arm not in a position to cater the entire customer and solve their issue. There are reasons for that such as unavailability of large quantities for one identical spare part, as for example LED panel of a TV set. Due to bad weather conditions or natural disaster unexpected volume of repairs comes to the service centers which they can't handle.

The aftermath of the tsunami in the year 2004 local distributors couldn't handle all the repairs and it took more than months to settle all pending repairs and customers had to wait for a long period without their electronic goods. Due to varying reasons, local consumer electronic market is lack of resilience.

Lack of principal's financial support

Sri Lankan consumer electronic marker players are always depending on their principals because they are the brand's owners and their financial support always counts. Most of the global suppliers are not offering credit terms, even if they offer only for a very short period. Principals' goods supply on credit helps local distributors in many ways: This will helps to reduce the financial cost, can increase working capital facilities, and helps to increase profit margins. But at present principals, financial support is very low because global manufacturers also facing a highly competitive situation in the global market. During the past principals use to financially compensate for the aging stock at distributor's inventory now it not practicing. In the past when local distributor facing any financial difficulties principal comes with solution and strength relationship, unfortunately, that supporting hands and attitude are not with the current management of global manufactures. With regard to brand promoting activities cost: such as adverting cost, free give away cost, new product launching cost fully borne by the principals in the past, whereas now local distributors also have to bear some share of those expenditures.

Difficult to determine the optimum level of inventory

Piling up inventory is killers of an organization, efficient inventory management system always have an impact on bottom line of a firm. Therefore any consumer electronics local distributor has to pay very good attention to the inventory management. There are two main inventories in a consumer electronics distributor, one is a complete unit and another one is service parts inventory. Complete units inventory: - There are many factors impact on this inventory such as minimum order quantity, lead time, and order processing period. There is an occasion supplier insists to buy full product line up and some unpopular models end up as dead stock which affects the company profitability.

Service and repair (spare parts) inventory:- It is very clear that any local distributor is not in a position to stock all the service parts at their after sales divisions and only stock the fast moving parts and the critical parts of products which they sold. Most critical inventory management is the spare parts inventory management because it is very difficult to forecast especially new line product line up; the only solution is to order few critical parts (most easily breakable parts) and keep.

The very serious issue is under warranty repairs have to be done at least within a week otherwise need to replace with a new unit which is lost to the company. On the other hand

service division can’t maintain a full range of service part inventory because their inventory holding cost will increase.

When analyzed above situation can notice that there is a relationship between the service parts (spare parts) inventory holding cost and new unit replacing cost for under warranty claims because if the parts are not available or can’t be sourced and complete the job within one week, have to satisfy the customer with brand new unit . There is a tradeoff between spare parts inventory holding cost and new units replacement cost for under warranty repair jobs.

CHAPTER 6

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

5.1. Introduction

Contributing to the existing literature on global consumer electronics industry, this paper examines the key characteristics of the Sri Lankan consumer electronics industry in experts and managers' perspective. This questioner survey carried out with fifty-three senior level staff members and four stakeholders of Sri Lankan consumer electronics goods distributing and trading companies. As per factor analysis, twenty variables have been identified as the keys characteristics in the local consumer electronics market. These variables have loaded into nine factors according to commonalities.

5.2. Summary of Research Findings conclusions

After the factor analysis, twenty characteristics have identified as key characteristics and those have been loaded into nine factors according to the commonalities. Following are the nine factors:

a) Less contribution towards environmental sustainability.
b) Satisfactory level Finance Assurance/flexibility.
c) Manufacturers' interest is inadequate to the local market.
d) Less attention to sustainable supply chain practices.
e) Lack of market adaptability.
f) Lack of financial sustainability.
g) Lack of market resilience.
h) Lack of principal's financial support.
i) Difficult to determine optimum inventory level.

5.3. Conclusions

Sri Lankan consumer electronics industry is a very dynamic industry. As his industry is dynamic the major elements change time to time, therefore it is very difficult to identify them. Compared to global market condition local market has some common and unique characteristics as well, because there are no local consumer electronic goods manufacturing taking place. According to research findings

The local market has paid less attention sustainability. Currently, local distributors/ traders facing many financial constraints because they are running at very small profit margins. The lifespan of consumer electronics goods are short and some products are beyond economical repair, therefore customers have to dispose it and go for a new product, but local customers are not willing to accept this. Inconsistencies in government fiscal policies have a negative impact on the local consumer electronic market. Finally after sales service arm is playing a vital role in this local industry.

5.4. Research Limitations

This paper is subject to limitations. Though the response rate was closer to the expected level, the ways of questionnaire understood by the respondents and their responses may impact on the reliability of the statistical analysis results, although both EFA and CFA strongly demonstrated a high level of reliability. Secondly, the outcome of the survey depended on the respondents' perspective and they are attached to various administrative departments in their organization.

5.5. Future Research Directions

This would hopefully pave the way towards making a better understanding of Sri Lankan consumer electronics industry and its key characteristics and their commonalities. Further, this study will help for future researchers to carry out detail study on any specific characteristics of the market.

5.6. Chapter Summary

Sri Lankan consumer electronics industry is a very dynamic industry. Since this industry is dynamic the major elements change time to time, therefore it is very difficult to identify them. Twenty factors have identified as key characteristics of Sri Lankan consumer electronics industry and that variable loaded into nine factors according to the commonalities of the variables. This research was completed with some limitations as

mentioned above. Future researchers use these findings as a foundation and do detail studies on individual characteristics.

References

Balakrishnan Ramesh Babu, Anand Kuber Parande & Chiya Ahmed Basha, 2007. Electrical and electronic waste: a global environmental problem. *Waste Management & Research*, 25(4), pp.307–318. Available at: http://wmr.sagepub.com/cgi/doi/10.1177/0734242X07076941.

Candemir, A. et al., 2016. COMPETITION ANALYSIS OF CONSUMER ELECTRONICS RETAILING NETWORKS IN TURKEY. *Journal of Management, Marketing and Logistics -JMML*, 3(3). Available at: file:///C:/Users/Priyanga/Downloads/5000206176-5000422473-1-SM (1).pdf [Accessed July 20, 2017].

Clarke, J. & Cable, V., 1982. The Asian Electronics Industry Looks to the Future. *The IDS Bulletin*, 13(2), pp.24–34.

Eng, Q.E. & Yusof, M., 2003. Comparison of Tqm Implementation Practices in Malaysian Electrical and Electronics Industry – a Survey. *Total Quality Management and Business Excellence*, 1(14), pp.63–78. Available at: http://www.fkm.utm.my/~shari/download/paper9.pdf [Accessed July 10, 2017].

Giroud, A., 2000. Japanese transnational corporations' knowledge transfer to Southeast Asia: the case of the electrical and electronics sector in Malaysia. *International Business Review*, 9, pp.571–586.

Hsu, C.-W. & Hu, A.H., 2008. Green supply chain management in the electronic industry. *International Journal of Environmental Science & Technology*, 5(2), pp.205–216.

Kuk, G., 2004. Effectiveness of vendor-managed inventory in the electronics industry: Determinants and outcomes. *Information and Management*, 41(5), pp.645–654.

Kumar, S., Chattopadhyaya, S. & Sharma, V., 2012. Green supply chain management: a case study from Indian electrical and electronics industry. *International Journal of Soft*. Available at: http://www.filekadeh.ir/wp-content/uploads/edd/2014/05/Green-Supply-Chain-Management-in-India.pdf [Accessed July 13, 2017].

Pandiyan Kaliani Sundram, V., Razak Ibrahim, A. & Chandran Govindaraju, V.G.R., 2011. Supply chain management practices in the electronics industry in Malaysia. *Benchmarking: An International Journal*, 18(6), pp.834–855. Available at: http://www.emeraldinsight.com/doi/10.1108/14635771111180725.

Rasiah, R., 2004. Exports and Technological Capabilities: A Study of Foreign and Local Firms in the Electronics Industry in Malaysia, the Philippines and Thailand. *The*

European Journal of Development Research, 16(3), pp.587–623.

Sodhi, M.S. & Lee, S., 2007. An analysis of sources of risk in the consumer electronics industry. *Journal of the Operational Research Society*, 58(11), pp.1430–1439. Available at: http://link.springer.com/10.1057/palgrave.jors.2602410.

Yusuff, R.M., 2004. Manufacturing best practices of the electric and electronic firms in Malaysia. *Benchmarking: An International Journal*, 11(4), pp.361–369. Available at: http://www.emeraldinsight.com/doi/10.1108/14635770410546764.

http://www.cmathew.com/shipping-and-admiralty/shipping-goods-to-sri-lanka-import-regulations/279 advance-payments-for-importers-in-sri-Lanka

Appendix

Questioner

Key characteristics in the Consumer electronic industry in Sri Lanka – Managers' and Experts' Perspective.

The consumer electronic industry is a very dynamic industry due to varies factors such as technology development, innovation, high competition and emerging economies in the world. The structure of this market is highly competitive which consists of global major players and large number of small players along with their worldwide authorized distributors. This study will be focused only on the Sri Lankan consumer electronic industry .The Objective of this study is to identify the '' Key characteristics of Sri Lankan consumer electronic industry in Managers' and experts' perspective.

Dear Sir/Madam,

I am reading for a Master of Business Administration degree in Supply Chain Management at the University of Moratuwa in the Department of Transport and Logistics Management. I will be most thankful if you could spend 15 mins. To answer this questionnaire .This survey is conducted to identify key characteristics of the local consumer electronic industry.

Your participation is valuable to our research and is highly appreciated

Best regards,

Priyanga Kirihena

Mob. 0777315217

Questioner E 1

	Questions	*Strongly Disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1	Sri Lankan consumer electronic industry is very dynamic industry.	☐	☐	☐	☐	☐
2	Inconsistency in government fiscal policies has an impact on the local consumer electronic market.	☐	☐	☒	☐	☐
3	*After sales service is the back bone of this industry.*	☐	☐	☐	☐	☐
4	Due to high competition, the distributors compelled to operate with very thin profit margin.	☐	☐	☐	☐	☐
5	Logistics cost is comparatively high.	☐	☐	☐	☐	☐
6	Letters of credit is the most suitable method in term of settling foreign supplier payments.	☐	☐	☐	☐	☐
7	In general import levies are too high for consumer electronic products.	☐	☐	☐	☐	☐
8	Suppliers' credit terms are not attractive.	☐	☐	☐	☐	☐
9	Local customers are expecting free give away items at every purchase.	☐	☐	☐	☐	☐
10	Credit card instalment payment methods help to increase sales.	☐	☐	☐	☐	☐
11	Most of rural area sales are on hire purchase.	☐	☐	☐	☐	☐
12	Customers are expecting high quality Products at attractive prices.	☐	☐	☐	☐	☐
13	Current consumer electronic goods are not durable.	☐	☐	☐	☐	☐
14	Most of customers are demanding for more than	☐	☐	☐	☐	☐

	one year warranty period.					
15	Some product repair cost exceeds the product purchased price.	☐	☐	☐	☐	☐
16	Service parts become obsolete after three years.	☐	☐	☐	☐	☐
17	Manufactures' technical service support is inadequate.	☐	☐	☐	☐	☐
18	Local consumers' mindset is not prepared to accept manufactures new concept " use and dispose "	☐	☐	☐	☐	☐
19	In order to satisfy the customers, it is needed to repair a product at least within a week.	☐	☐	☐	☐	☐
20	There is trade-off between spare parts (service parts) stock holding cost and new unit replacements.	☐	☐	☐	☐	☐
21	After sales service centres should be well equipped with technical sound staff and equipment.	☐	☐	☐	☐	☐
22	Paperless transactions are not practicing in this industry.	☐	☐	☐	☐	☐
23	Reduce, reuse and recycle (3R) practice is not very popular in this industry.	☐	☐	☐	☐	☐
24	No proper mechanism to collect e-waste from customers.	☐	☐	☐	☐	☐
25	Employee training and development is not very import for this industry.	☐	☐	☐	☐	☐
26	This industry has not done any major contribution to reduce carbon emission.	☐	☐	☐	☐	☐
27	Renewable energy usage is not popular in this industry.	☐	☐	☐	☐	☐
28	Due to high initial capital cost the renewable energy usage is not encouraging.	☐	☐	☐	☐	☐
29	Eco friendly e-waste management systems not introduced to the local industry.	☐	☐	☐	☐	☐
30	Green marketing concept is not popular in this market.	☐	☐	☐	☐	☐

A. Respondent's Profile

Please provide the followings

F1. Position: ☐Director ☐General Manager/ Deputy General Manager
☐Manager/Department Head ☐Other

F2. Administrative division/department: ☐General Administration
☐Finance
☐Supply chain (Logistics/Import/ Shipping/Stores)
☐Sales/ Marketing
☐Technical
☐Other

F3. Years of experience in the industry.
☐ 1-4 years ☐ 5-10 years ☐ 11-15 years ☐ 16 years and above

F5. Please provide contact detail:
Email: - ……

Contact no (fixed or mobile) ……

Thank you very much and we highly value your contribution & time spent for this survey

Details of the factor analysis

In order to reach the final factors ten logs have done only first and the ninth details given below

Long -1

```
GET
  FILE='C:\Users\Priyanga\Documents\DataSet2.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
FACTOR
  /VARIABLES Dynamic Fiscal Backbo Thin Logistic LC Imtx Creterm Freeite Ccards HirePur HighQua NotDura Warrant Repair Svcparts Technical Mindset
WithinW Tradeof Wellequ Paperles Reduce Ewaste Training Emission Renergy Capital Eco Green
  /MISSING LISTWISE
  /ANALYSIS Dynamic Fiscal Backbo Thin Logistic LC Imtx Creterm Freeite Ccards HirePur HighQua NotDura Warrant Repair Svcparts Technical Mindset
WithinW Tradeof Wellequ Paperles Reduce Ewaste Training Emission Renergy Capital Eco Green
  /PRINT INITIAL CORRELATION KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.50)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

Factor Analysis

[DataSet1] C:\Users\Priyanga\Documents\DataSet2.sav

Correlation Matrix

		Dynamic	Fiscal	Backbo	Thin	Logistic	LC	Imtx	Creterm	Freeite	Ccards			
HirePur	HighQua	NotDura	Warrant	Repair	Svcparts	Technical	Mindset	WithinW						
Tradeof	Wellequ	Paperles	Reduce	Ewaste	Training	Emission	Renergy	Capital	Eco	Green				
Correlation	Dynamic	1.000	-.161	-.035	-.210	.018	.388	-.138	-.014	-.131	.194	.449	-.068	-.319	-.254
-.176	-.057	-.267	.126	-.037	-.026	-.113	-.301	-.081	-.101	.128	-.187	-.146	-.193	-.040	-.261
	Backbo	-.035	-.087	1.000	.121	.437	.213	.412	-.086	.196	.258	.202	.533	.310	.370	.027
.040	.211	.182	.249	.097	.314	.115	.414	.052	.060	.039	.071	.054	.038	.095		
	Thin	-.210	.224	.121	1.000	.249	-.019	.050	.146	.288	.048	.086	.293	.034	.118	.161	.270
.173	.140	.010	.102	.259	.047	.154	.035	-.173	.097	.319	.402	.180	.320				
	Logistic	.018	.044	.437	.249	1.000	.055	.322	-.023	.175	.251	.095	.270	.092	.138	-.104
.062	.127	.057	.424	.187	.399	.060	.238	.271	.173	.185	.077	.257	.028	.003		
	LC	.388	-.250	.213	-.019	.055	1.000	-.125	.014	.225	.387	.554	.105	-.270	.037	-.331	.070
-.016	.033	.138	.243	.035	.052	.026	.045	.039	-.051	.040	-.064	.196	.197				
	Imtx	-.138	-.017	.412	.050	.322	-.125	1.000	.392	.104	.007	-.126	.378	.486	.149	.106	-.100
.353	.144	.237	.169	.309	.252	.525	.235	.113	.116	-.020	-.029	-.037	.148				
	Creterm	-.014	-.016	-.086	.146	-.023	.014	.392	1.000	.117	-.153	-.075	.016	.234	-.065	.181
-.058	.223	.317	-.024	.081	.289	.220	.212	.263	-.047	-.045	.140	.039	-.069	.116		

Freeite	-.131	-.066	.196	.288	.175	.225	.104	.117	1.000	.213	.175	.419	-.071	.573	.102	.358	.324
.020	.256	.344	.133	.287	.357	.213	.035	-.057	-.021	.012	.067	.196					
Ccards	.194	-.085	.258	.048	.251	.387	.007	-.153	.213	1.000	.483	.250	-.081	.263	-.012	-.096	.077
.139	.140	.337	.069	-.133	.232	.118	.214	-.032	-.071	-.123	.063	.175					
HirePur	.449	.014	.202	.086	.095	.554	-.126	-.075	.175	.483	1.000	.056	-.178	-.045	-.135	-.049	.065
.087	-.049	.257	-.175	-.072	.088	.081	.056	-.114	.017	-.123	.155	.211					
HighQua	-.068	-.075	.533	.293	.270	.105	.378	.016	.419	.250	.056	1.000	.168	.477	.140	.216	.266
.122	.323	.181	.429	-.019	.381	-.058	-.090	-.134	-.002	.161	-.179	.073					
NotDura	-.319	-.012	.310	.034	.092	-.270	.486	.234	-.071	-.081	-.178	.168	1.000	.220	.258	.159	.570
.247	-.063	-.049	-.020	.213	.377	.270	.179	.247	.136	.027	.131	.317					
Warrant	-.254	-.135	.370	.118	.138	.037	.149	-.065	.573	.263	-.045	.477	.220	1.000	.180	.251	.567
-.073	.202	.160	.122	.198	.310	.031	.151	.054	-.052	.137	-.016	.223					
Repair	-.176	.113	.027	.161	-.104	-.331	.106	.181	.102	-.012	-.135	.140	.258	.180	1.000	.144	.139
.373	-.015	.185	-.032	-.015	.163	.084	.025	-.016	-.070	.083	-.221	-.087					
Svcparts	-.057	-.088	.040	.270	.062	.070	-.100	-.058	.358	-.096	-.049	.216	.159	.251	.144	1.000	.422

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.521
Bartlett's Test of Sphericity	Approx. Chi-Square	848.556
	df	435
	Sig.	.000

Communalities

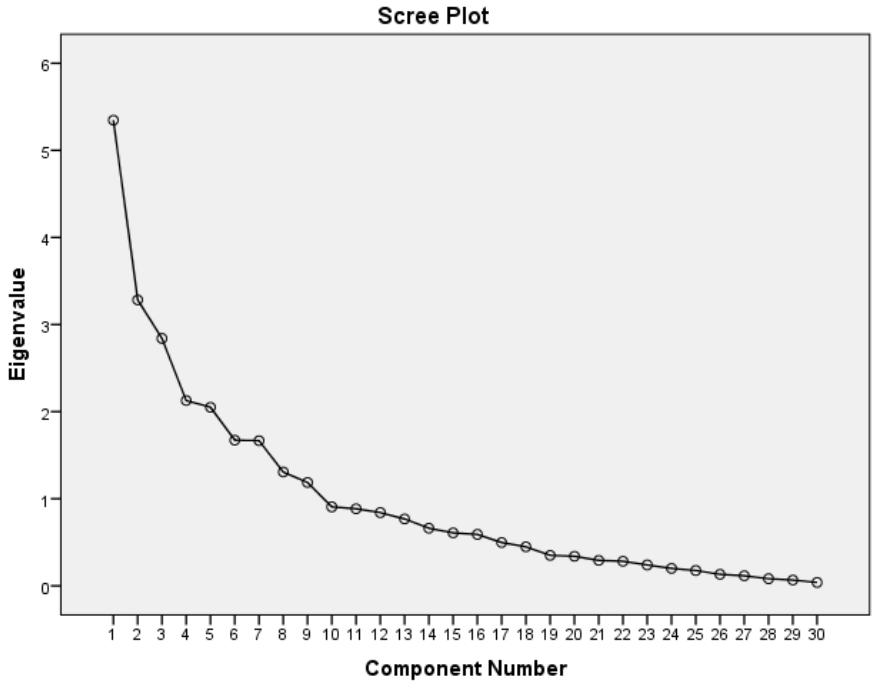
	Initial	Extraction
Dynamic	1.000	.692
Fiscal	1.000	.612
Backbo	1.000	.702
Thin	1.000	.655
Logistic	1.000	.616
LC	1.000	.761
Imtx	1.000	.728
Creterm	1.000	.775
Freeite	1.000	.683
Ccards	1.000	.689
HirePur	1.000	.749
HighQua	1.000	.753
NotDura	1.000	.811
Warrant	1.000	.723
Repair	1.000	.765
Svcparts	1.000	.688
Technical	1.000	.728
Mindset	1.000	.713
WithinW	1.000	.612
Tradeof	1.000	.636
Wellequ	1.000	.725
Paperles	1.000	.619
Reduce	1.000	.701
Ewaste	1.000	.689
Training	1.000	.679
Emission	1.000	.837
Renergy	1.000	.779
Capital	1.000	.751
Eco	1.000	.802
Green	1.000	.804

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.346	17.820	17.820	5.346	17.820	17.820	3.438	11.460	11.460
2	3.283	10.942	28.763	3.283	10.942	28.763	3.019	10.062	21.522
3	2.841	9.469	38.231	2.841	9.469	38.231	2.906	9.686	31.208
4	2.127	7.091	45.323	2.127	7.091	45.323	2.661	8.868	40.077
5	2.050	6.834	52.157	2.050	6.834	52.157	2.607	8.691	48.768
6	1.672	5.574	57.731	1.672	5.574	57.731	1.839	6.131	54.899
7	1.667	5.557	63.288	1.667	5.557	63.288	1.766	5.887	60.786
8	1.307	4.357	67.645	1.307	4.357	67.645	1.727	5.757	66.543
9	1.186	3.955	71.600	1.186	3.955	71.600	1.517	5.057	71.600
10	.907	3.022	74.622						
11	.884	2.948	77.571						
12	.841	2.804	80.374						
13	.768	2.560	82.934						
14	.662	2.205	85.140						
15	.608	2.026	87.166						
16	.590	1.968	89.134						
17	.497	1.657	90.791						
18	.448	1.492	92.283						
19	.350	1.168	93.451						
20	.340	1.132	94.583						
21	.292	.974	95.557						
22	.282	.940	96.497						
23	.240	.799	97.295						
24	.200	.667	97.962						

25	.176	.588	98.550						
26	.132	.439	98.989						
27	.116	.386	99.375						
28	.082	.273	99.648						
29	.067	.222	99.869						
30	.039	.131	100.000						

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
Reduce	.674								
Technical	.640								
Green	.604								
Warrant	.529								
Imtx	.524								
Ewaste	.524								
Freeite	.509								
Backbo	.509								
NotDura									
Logistic									
Emission		-.602							
Renergy	.501	-.584							
Eco		-.549	.538						
HighQua		.530							
Ccards									
LC			.691						
HirePur			.675						
Dynamic									
Repair									
Wellequ				.584					
Svcparts									
Mindset									
Capital									
Thin									
WithinW									
Paperles							-.533		
Training									
Tradeof									
Fiscal									
Creterm									

Extraction Method: Principal Component Analysis.

a. 9 components extracted.

Rotated Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
Renergy	.841								
Emission	.822								
Eco	.790								
Capital	.727								
Technical		.772							
Warrant		.746							
Svcparts		.605							
NotDura									
Logistic			.719						
Backbo			.671						
Wellequ			.669						
HighQua		.507	.618						
WithinW			.613						
Imtx			.516						
HirePur				.822					
LC				.808					
Dynamic				.662					
Ccards				.551					
Ewaste					.730				
Reduce					.705				
Green					.530				
Mindset						.765			
Repair						.712			

Paperles									
Training							-.725		
Thin							.595		
Fiscal									
Tradeof								.729	
Freeite		.508						.558	
Creterm									.762

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Component Transformation Matrix

Component	1	2	3	4	5	6	7	8	9
1	.447	.551	.436	.020	.487	.115	.061	.201	.105
2	-.709	.158	.466	.428	-.059	.030	-.001	.252	-.063
3	.405	-.146	-.170	.783	-.031	-.258	-.122	.178	-.244
4	.211	-.653	.548	.099	.012	.327	.263	-.199	.052
5	-.218	-.191	-.224	.191	.651	.265	-.480	-.229	.229
6	-.071	.125	-.453	.252	.036	.509	.641	.121	.159
7	.111	.271	.026	.048	-.329	.625	-.354	-.257	-.470
8	.114	-.211	-.033	-.141	-.231	.301	-.358	.741	.316
9	.101	.232	.082	.268	-.413	-.045	-.131	-.378	.724

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Log 9 details

```
FACTOR
  /VARIABLES Backbo LC Creterm HirePur HighQua NotDura Repair Technical Mindset Wellequ Reduce Emission Renergy Capital Eco Green Ewaste Tradeof Thin
Dynamic Training Fiscal
  /MISSING LISTWISE
  /ANALYSIS Backbo LC Creterm HirePur HighQua NotDura Repair Technical Mindset Wellequ Reduce Emission Renergy Capital Eco Green Ewaste Tradeof Thin
Dynamic Training Fiscal
  /PRINT INITIAL CORRELATION KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.50)
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

Factor Analysis

[DataSet1] C:\Users\Priyanga\Documents\DataSet2.sav

Correlation Matrix

		Backbo Reduce	LC Emission	Creterm Renergy	HirePur Capital	HighQua Eco	NotDura Green	Repair Ewaste	Technical Tradeof	Mindset Thin	Wellequ Dynamic	Fiscal Training				
Correlation	Backbo	1.000	.213	-.086	.202	.533	.310	.027	.211	.182	.314	.414	.039	.071	.054	.038
.095	.052	.097	.121	-.035	.060	-.087										
	LC	.213	1.000	.014	.554	.105	-.270	-.331	-.016	.033	.035	.026	-.051	.040	-.064	.196
.197	.045	.243	-.019	.388	.039	-.250										
	Creterm	-.086	.014	1.000	-.075	.016	.234	.181	.223	.317	.289	.212	-.045	.140	.039	-.069
.116	.263	.081	.146	-.014	-.047	-.016										
	HirePur	.202	.554	-.075	1.000	.056	-.178	-.135	.065	.087	-.175	.088	-.114	.017	-.123	.155
.211	.081	.257	.086	.449	.056	.014										
	HighQua	.533	.105	.016	.056	1.000	.168	.140	.266	.122	.429	.381	-.134	-.002	.161	-.179
.073	-.	.181	.293	-.068	-.090	-.075										
	NotDura	.310	-.270	.234	-.178	.168	1.000	.258	.570	.247	-.020	.377	.247	.136	.027	.131
.317	.270	-.049	.034	-.319	.179	-.012										

Repair	.027	-.331	.181	-.135	.140	.258	1.000	.139	.373	-.032	.163	-.016	-.070	.083	-.221	-.087	.084	.185	.161	-.176	.025	.113
Technical	.211	-.016	.223	.065	.266	.570	.139	1.000	.059	.016	.298	.136	.084	.222	.157	.489	.254	.151	.173	-.267	.187	.027
Mindset	.182	.033	.317	.087	.122	.247	.373	.059	1.000	.190	.203	.031	.066	.072	.118	-.076	.150	-.054	.140	.126	.108	.183
Wellequ	.314	.035	.289	-.175	.429	-.020	-.032	.016	.190	1.000	.283	-.022	.201	.316	.000	-.002	.188	.048	.259	-.113	-.224	.108
Reduce	.414	.026	.212	.088	.381	.377	.163	.298	.203	.283	1.000	.139	.257	-.008	.178	.311	.511	.238	.154	-.081	.049	.065
Emission	.039	-.051	-.045	-.114	-.134	.247	-.016	.136	.031	-.022	.139	1.000	.645	.538	.700	.297	.218	.054	.097	-.187	.343	.186
Renergy	.071	.040	.140	.017	-.002	.136	-.070	.084	.066	.201	.257	.645	1.000	.619	.617	.488	.308	.112	.319	-.146	.086	.133
Capital	.054	-.064	.039	-.123	.161	.027	.083	.222	.072	.316	-.008	.538	.619	1.000	.276	.212	.044	.001	.402	-.193	.098	.283
Eco	.038	.196	-.069	.155	-.179	.131	-.221	.157	.118	.000	.178	.700	.617	.276	1.000	.615	.404	-.				

.180	-.040	.242	.225														
Green	.095	.197	.116	.211	.073	.317	-.087	.489	-.076	-.002	.311	.297	.488	.212	.615	1.000	.486
.164	.320	-.261	.084	.076													
Ewaste	.052	.045	.263	.081	-.058	.270	.084	.254	.150	.188	.511	.218	.308	.044	.404	.486	1.000
.236	.035	-.101	.084	.099													
Tradeof		.097	.243	.081	.257	.181	-.049	.185	.151	-.054	.048	.238	.054	.112	.001	-.009	.164
.236	1.000	.102	-.026	.102	-.180												
Thin	.121	-.019	.146	.086	.293	.034	.161	.173	.140	.259	.154	.097	.319	.402	.180	.320	.035
.102	1.000	-.210	-.173	.224													
Dynamic		-.035	.388	-.014	.449	-.068	-.319	-.176	-.267	.126	-.113	-.081	-.187	-.146	-.193	-.040	-.261	-.
-.026	-.210	1.000	.128	-.161													
Training		.060	.039	-.047	.056	-.090	.179	.025	.187	.108	-.224	.049	.343	.086	.098	.242	.084
.084	.102	-.173	.128	1.000	-.088												
Fiscal	-.087	-.250	-.016	.014	-.075	-.012	.113	.027	.183	.108	.065	.186	.133	.283	.225	.076	.099	-
.224	-.161	-.088	1.000														

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.565
Bartlett's Test of Sphericity	Approx. Chi-Square	520.672
	df	231
	Sig.	.000

Communalities

	Initial	Extraction
Backbo	1.000	.796
LC	1.000	.764
Creterm	1.000	.856
HirePur	1.000	.831
HighQua	1.000	.784
NotDura	1.000	.821
Repair	1.000	.804
Technical	1.000	.783
Mindset	1.000	.786
Wellequ	1.000	.813
Reduce	1.000	.760
Emission	1.000	.846
Renergy	1.000	.786
Capital	1.000	.820
Eco	1.000	.853
Green	1.000	.848
Ewaste	1.000	.796
Tradeof	1.000	.854
Thin	1.000	.709
Dynamic	1.000	.713
Training	1.000	.692
Fiscal	1.000	.738

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.278	19.446	19.446	4.278	19.446	19.446	3.123	14.197	14.197
2	2.577	11.712	31.158	2.577	11.712	31.158	2.267	10.306	24.503
3	2.467	11.211	42.369	2.467	11.211	42.369	2.193	9.968	34.470
4	1.887	8.579	50.948	1.887	8.579	50.948	2.071	9.414	43.885
5	1.517	6.896	57.844	1.517	6.896	57.844	1.853	8.425	52.309
6	1.378	6.263	64.107	1.378	6.263	64.107	1.657	7.534	59.843
7	1.205	5.480	69.587	1.205	5.480	69.587	1.613	7.334	67.177
8	1.144	5.199	74.786	1.144	5.199	74.786	1.373	6.240	73.417
9	1.001	4.552	79.338	1.001	4.552	79.338	1.302	5.920	79.338
10	.715	3.249	82.587						
11	.578	2.626	85.213						
12	.536	2.436	87.649						
13	.475	2.158	89.808						
14	.395	1.795	91.603						
15	.360	1.638	93.241						
16	.320	1.454	94.695						
17	.302	1.374	96.069						
18	.244	1.107	97.176						
19	.232	1.053	98.229						
20	.203	.924	99.153						
21	.126	.571	99.724						
22	.061	.276	100.000						

Extraction Method: Principal Component Analysis

Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
Renergy	.708								
Green	.703								
Eco	.637	-.625							
Emission	.611	-.509							
Reduce	.583								
Ewaste	.577								
Technical	.557								
Capital	.546								
HighQua		.609							
Repair									
LC			.799						
HirePur			.754						
Dynamic			.557						
Wellequ				.571					
NotDura	.521			-.540					
Thin									
Mindset					.705				
Training						.533			
Backbo									
Tradeof								.553	
Fiscal								-.514	
Creterm									

Extraction Method: Principal Component Analysis. a. 9 components extracted.

	Component								
	1	2	3	4	5	6	7	8	9
Emission	.853								
Renergy	.838								
Capital	.779								
Eco	.730								
HirePur		.851							
LC		.798							
Dynamic		.679							
Backbo			.828						
HighQua			.826						
Wellequ			.595						
Technical				.852					
NotDura				.691					
Green				.614					
Ewaste					.825				
Reduce					.681				
Mindset						.754			
Repair						.727			
Training							-.672		
Thin							.663		
Fiscal							.512		
Creterm								.863	
Tradeof									.881

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 14 iterations.

Component Transformation Matrix

Component	1	2	3	4	5	6	7	8	9
1	.670	-.036	.285	.466	.425	.155	.139	.133	.096
2	-.555	-.307	.581	.147	.007	.337	.145	.291	.138
3	-.191	.850	.325	.010	.188	-.167	-.130	.019	.236
4	.299	.098	.349	-.515	-.309	-.117	.624	.101	-.071
5	.039	.262	-.316	-.332	.191	.709	-.010	.398	-.148
6	.249	.060	.410	-.046	-.434	.393	-.503	-.357	-.203
7	-.011	.163	-.274	.299	-.393	.352	.363	-.297	.556
8	.227	-.197	.002	-.295	-.150	-.126	-.409	.400	.676
9	.043	.190	-.099	.454	-.536	-.152	-.042	.594	-.285

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.