Supply Chain of the Consumer Electronic Manufacturing Industry in Bangladesh: Feasibility and Sustainability with Bottom of Pyramid

by

MD BONNY AMIN KHAN
Student ID: 22382025

A thesis submitted to the Department of BRAC Institute of Governance and Development (BIGD) in partial fulfillment of the requirements for the degree of
Master in Procurement and Supply Management (MPSM)

Master in Procurement and Supply Management
BRAC University
September 2024

Declaration

It is declared that,

1. The dissertation submitted is my/our original work while completing my studies at BRAC University.

2. The dissertation does not include any previously published or written material by a third party, except where it is properly cited through full and accurate referencing.

3. The dissertation incorporates no material accepted or submitted for another degree or diploma at a university or other institution.

4. I/We have acknowledged every significant source of contribution.

Student's Full Name & Signature:

_____

Md. Bonny Amin Khan
ID - 22382025

Approval:

The thesis titled **"Supply Chain of the Consumer Electronic Manufacturing Industry in Bangladesh: Feasibility and Sustainability with Bottom of Pyramid"** submitted by

1. **Md. Bonny Amin Khan - 22382025**

of Summer, 2022 has been accepted as satisfactory in partial fulfillment of the degree of Masters in Procurement and Supply Management (MPSM) requirement**.**

Examining Committee:

Supervisor:
(Member)

_____
Md. Moniruzzaman
Associate Professor of Finance
College of Business Administration
IUBAT

External Examiner:
(Member)

_____
Mr. Mahbub Ahmed Chowdhury, MCIPS
SVP & Head of Procurement
City Bank PLC

Program Coordinator:
(Member)

_____
Mohammad Sirajul Islam
Senior Academic Coordinator
BIGD, BRAC University

Departmental Head:
(Chair)

_____
Dr. Imran Matin
Executive Director
BIGD, BRAC University

ABSTRACT:

Bangladesh's consumer electronics manufacturing industry has undergone significant expansion due to advancements in technology and global demand. However, problems with sustainability and inclusion persist, particularly concerning the individuals at the base of the pyramid. With an eye on implementing the BoP concepts, this study examines the long-term sustainability of Bangladesh's consumer electronics manufacturing supply chain. Through an evaluation of existing practices, the development of sustainable supply chain management patterns, and the possible advantages of involving stakeholders from the lower echelons of the pyramid, this research suggests ways to improve social and environmental outcomes while advancing the economy. To improve livelihoods and lessen environmental effects, technological innovation, inclusive business strategies, and ethical sourcing are crucial factors to take into account. The results illustrate how important it is for stakeholders to work to create a robust and inclusive consumer electronic manufacturing ecosystem in Bangladesh to ensure long-term growth and equitable distribution of advantages throughout all stages of society.

ACKNOWLEDGEMENT:

I am sincerely grateful to *Dr. Md. Moniruzzaman*, my thesis supervisor, who provided invaluable guidance during the whole thesis effort. He helped me understand the significance of data authenticity, and the idea behind research questionnaires as well as the knowledge they imparted during my studies. It allows my thesis work to be completed smoothly. Also, I am grateful of the people and institutions who gave me access to vital information and perspectives into the consumer electronics manufacturing supply chain in Bangladesh. Their collaboration and willingness to share their experiences played a crucial role in the successful completion of my research.

Furthermore, I would like to acknowledge my current employers Excelerate Energy, Walton Hi-tech Industries Limited, and Fair Electronics Ltd (Samsung & Hisense CE Manufacturer) for giving me the possibility to work in the areas of global sourcing, planning, purchasing, logistics, and customs operation.

Table of Contents

List of Figures

List of Tables

List Of Acronyms

R & I: Research and Innovation

BOP: Base of Pyramid

CBU: Complete Body Unit

CKD: Completely Knocked Down

MS: Market Share

GDP: Gross Domestic Product

KMO: kaiser-Mayer-Olkin

LC: Letter of Credit

CE: Consumer Electronics

SPSS: Statistical Package for the Social Sciences

SD: Supplementary Duty

RQSA/B: Result of Question Segment A/B

VAT: Value Added Tax

C&F: Clearing and Forwarding

FF: Freight Forwarder

Chapter 1: Introduction

The production of consumer electronics has become an important economic sector in Bangladesh in recent years, greatly boosting the country's industrial growth and export revenue. This industry characterized by rapid technological advancements and evolving consumer preferences, plays a crucial role in both domestic consumption and international trade. The complex web of supply chains that makes it easier to source, produce, and distribute electronic items is essential to its success. Bangladesh has established itself as a prominent player in the production of consumer electronics thanks to technological advancements and the demands of the global market.

In addition to bringing about job opportunities and economic growth, this sector's expansion has brought forth issues with sustainability, ethics, and inclusivity, particularly concerning the population at the base of the pyramid (BoP). The supply chain of Bangladesh's consumer electronics manufacturing sector is a complicated web that includes several different parties, including retailers, manufacturers, assembly lines, raw material suppliers, logistics companies, and, in the end, customers. This interconnected system not only influences the efficiency and cost-effectiveness of production but also impacts the sustainability and resilience of the entire industry.

In this sense, sustainability doesn't just refer to environmental issues, it also includes social responsibility, economic viability, and technological innovation. Maintaining sustainable practices across its supply chain presents both opportunities and challenges for the electronics manufacturing industry, which sees Bangladesh as a key global hub for the sector. Specifically, the Bottom of the Pyramid (BoP) segment is a target market for strategies aimed at improving the supply chain's sustainability in the consumer electronics industry. In numerous developing economies, the population that falls into the category of the poor (BoP) presents a significant unexplored market opportunity. The sector can increase its market reach and promote inclusive growth and social development by addressing this market segment's unique requirements and limitations, such as product durability, affordability, and accessibility.

To better understand the dynamics of the supply chain and its potential sustainability in light of the Bottom of the Pyramid, this thesis will focus on Bangladesh's consumer electronics manufacturing sector. This study aims to pinpoint the major obstacles, favorable circumstances, and tactical measures that can improve the sector's socioeconomic influence and resilience through in-depth examination and case studies. This study aims to provide practitioners, policymakers, and researchers interested in promoting sustainable growth in Bangladesh's consumer electronics sector with useful insights by analyzing innovative approaches and best practices from both local and global viewpoints.

Bangladesh's consumer electronics manufacturing industry's supply chain is at a turning point, with potential for increased inclusivity and sustainability. By providing a thorough analysis of current practices, potential future developments, and tactical routes to achieve sustainable development with the Bottom of the Pyramid in mind, this thesis aims to contribute to this transformative journey.

1.1 Literature Review:

The consumer electronics industry, which has a market value of BDT 20,000 crore, is one of Bangladesh's fastest-growing sectors. While local businesses are expanding, most product categories are fully dependent on imports. Around USD 5.29 billion was the estimated market size of the electronics industry, which encompasses both consumer and industrial electronics, at the end of 2019. By 2025, it's anticipated that the industry will have grown to a value of about USD 12 billion, or 15% annually. Few local businesses can meet these demands, as consumer preference for these foreign brands grows owing to their capacity to deliver more dependable services. Government initiatives enabled companies such as Walton to begin exporting, leading to a boom in domestic production despite the reliance on foreign brands. Nonetheless, consistent application is necessary to resolve certain policy inconsistencies.

The ability to embrace innovation through technology adoption and process integration to provide customers with a more personalized experience and a higher value proposition is a key success factor for local businesses. As a result, consumers gain from brand atomization, which reduces their reliance on foreign brands and increases the availability of consumer data across a range of interaction points. The biggest obstacle to local brands' survival in the future will be inflation and growing dollar prices as they compete with foreign brands for these features. Consumers' demands for greater convenience and cutting-edge technologies will also play a role.

As previously mentioned, the consumer electronics market share was dominated by imported consumer electronics goods (86 percent in 2015) as opposed to consumer electronics that were assembled or manufactured locally. For imported consumer electronics products, the cost is ultimately too high. Additionally, the government. offers a significant chance to produce consumer electronics goods at a lower cost by highlighting local manufacturing and eliminating SD and VAT. The population of Bangladesh has more purchasing power now, and the country's GDP is expected to grow significantly in the future, according to numerous research papers that have been published. It is widely acknowledged that as people's income and purchasing power rise, they enhance their standard of living through increased consumption (Hasan, 2022). In Bangladesh, traditionally, lower-middle-class or middle-class families have not been able to afford good quality of consumer electronics products because of their high price.

1.2 Research Objectives:

The thesis has prime objectives with a bird’s eye view. Whereas Secondary objectives are stated also to support the prime objective.

Prime Objectives:

✓ To analyze the current supply chain structure of the consumer electronics manufacturing industry in Bangladesh.

✓ To Align the supply chain with the sustainable concept of the Bottom of the pyramid marketing strategy.

Secondary Objectives:

✓ To evaluate the sustainability practices within the supply chain and their impact on overall performance.

✓ To explore the integration of BoP strategies into the supply chain for enhancing inclusivity and market expansion.

✓ To identify key challenges and opportunities for improving supply chain efficiency and sustainability.

✓ To propose a framework for sustainable supply chain management tailored to the consumer electronics sector in Bangladesh.

✓ To Propose a link between future supply chain and sustainability concept: Bottom of Pyramid.

1.3 Methodology:

Market research, the production of consumer electronics, the current supply chain, quantitative research for future forecasting and feasibility analysis, and a conceptual qualitative research approach linking the future supply chain to sustainability at the bottom of the pyramid are all included in the study. Users of consumer electronics products such as refrigerators, TVs, washing machines, air conditioners, and so on are the primary respondents to the survey. and in a reasonable range for income. To ensure that the data are applicable, several data analysis techniques, including the reliability test (Cronbach Alpha), KMO test, and normalcy test, have been run. The most crucial step is to verify the results with a Chi sq\. fit test.

1.4 Scope:

The thesis will include a descriptive section that includes a history of the consumer electronics industry, a detailed overview of Bangladesh's electronics sector, and the manufacturing process. However, extensive research has been done to ascertain the consumer electronics industry's future supply chain and the viability of forecasts or predictions. Furthermore, the industry for sustainability can be connected to a Bottom of the Pyramid concept. Nearly 200 users of consumer electronics participated in the survey portion of this study. Because respondents must have prior CE product experience to properly respond to the questions. There will be 18 questions in total, 5 of which are demographic in nature and coverage, income range, type of product segments, brand of consumer electronics they have used (such as Samsung, Hisense, SONY LG, Panasonic, etc.), and sex. 07 are the research questions for segment B, and 06 are for segment A and the hypothesis.

1.5 Importance of the Study:

The insights this study offers, particularly to Bangladesh's consumer electronics manufacturing sector, add to the body of knowledge on supply chain management, sustainability, and business-to-person (BoP) strategies. Regarding best practices and strategic approaches for sustainable and inclusive supply chain management, the findings will be useful to academics, industry stakeholders, and policymakers. The primary advantage of the study will be for entrepreneurs involved in the CE sector. Decisions about how to position their product and business will be simpler for the business. For instance: The business can decide whether to import or not, and whether to open an advance credit card if the research results indicate that the manufacturing industry is feasible. This is because lead times for product orders and deliveries can occasionally be very long. Furthermore, small businesses can use their electronics products to understand the opportunity, primarily in the spare parts market. Based on the study's findings, a significant localization

potential is apparent. The business units must profit from the integration of the BoP marketing concept modality in addition to the positive social, environmental, and economic effects it produces.

1.6 Model Development:

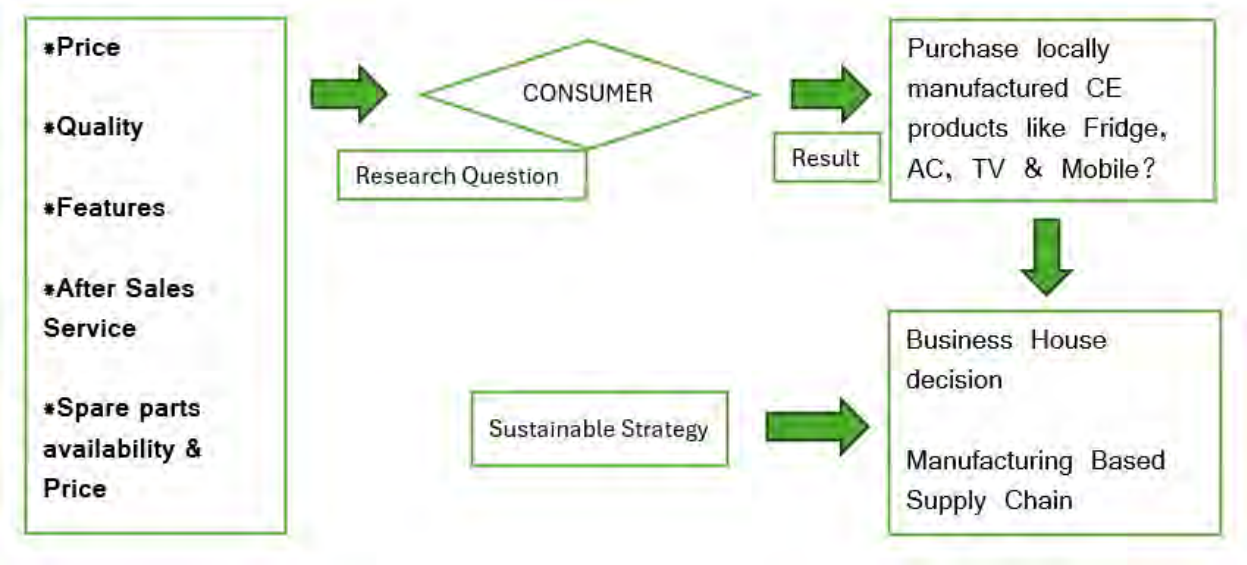


Figure 1: Model Development

1.7 Hypothesis Statements:

H1: "Price is significantly a factor for purchasing Locally fabricated CE products.

H2: "Quality is significantly a factor for purchasing Locally fabricated CE products.

H3: "Feature is significantly a factor for purchasing Locally fabricated CE products.

H4: "Spare Parts Availability & Price is significantly a factor for purchasing Locally fabricated CE products.

H5: "After Sales Service is significantly a factor for purchasing Locally fabricated CE products.

Chapter 2: History of Consumer Electronics (CE) Industry

2.1 Beginning of the Industry: Europe Domination

A vast array of businesses and institutions engaged in the strategy, planning, design, supply chain, manufacturing, marketing, development, selling, and servicing of consumer electronics are included in this industry. It is one of the largest industries in the world in terms of revenue. Furthermore, it is the industry with the finest Research and Development investment.

The radio's invention and widespread commercialization marked the beginning of the consumer electronics industry. Radio broadcasting gained popularity in the 1920s, which prompted radio receivers to be widely used. The industry was completely transformed by the invention of television. Commercial TV broadcasting started in the late 1930s, following the demonstration of the first electronic television in 1927. TVs became standard household appliances in many nations after World War II.

The introduction of color televisions, solid-state electronics, and the early development of computers brought about significant advancements in the industry. Key players included companies like Sony, Philips, and Panasonic. Leading the charge in the personal computer revolution were IBM, Apple, and Microsoft. This decade witnessed the rise of personal audio devices, notably the Sony Walkman, which changed the way people consumed music. The development of video cassette recorders (VCRs) also transformed home entertainment. The invention of compact discs (CDs) by Philips and Sony transformed the way that music was stored and played. With the introduction of consoles from firms like Atari and Nintendo, the gaming industry also started to take off.

The consumer electronics industry underwent a significant transformation in 2007 with the release of smartphones, specifically the iPhone. High-definition (HD) television improved home entertainment, and digital cameras supplanted film cameras. Apple, Samsung, and Nokia were among the leading companies in the mobile phone industry. With more features that combined computing, entertainment, and communication into one unit, smartphones continued to proliferate. The market for consumer electronics continued to grow as tablets, smartwatches, and other wearable technology became more popular. Smart home appliances like Google Home and Amazon Echo started to become more and more common.

Apple, a well-known American company, has gained significant market share worldwide thanks to its inventive products, which include the iPad, iPhone, and Mac computers. Microsoft: As a pioneer in software, the company is known for its Office suite and Windows operating system. Xbox and Azure are two of its major gaming platforms. Japan: Sony: Well-known for its audio and video products, it is a prominent player in both technology and entertainment. With the PlayStation, Sony has made significant contributions to the gaming industry. TVs, home appliances, and personal electronics are just a few of the many consumer electronics that Panasonic and Sharp are well-known for. South Korea: Samsung: Pioneering in smartphones, TVs, home appliances, and semiconductors, Samsung is among the world's biggest electronics corporations. LG: Another significant participant, especially in appliances and home theater systems. China: Huawei: Quickly expanding its global presence, Huawei is a major force in smartphones and telecommunications. Xiaomi has experienced significant growth in recent years and is well-known for its reasonably priced smartphones and smart home appliances. The leading producer of tablets, smartphones, and personal computers is Lenovo.

Figure 2: A radio and TV store in 1961

2.2 First Industrial Robot in the Consumer Electronics Industry

It is widely acknowledged that the Unimate, created by Unimation and unveiled in 1961, was the first industrial robot in the consumer electronics industry. Using the Unimate, General Motors was able to perform repetitive and hazardous tasks for human workers like welding and handling die castings at their New Jersey facility. The emergence of industrial robotics was signified by this robot, which was not associated with consumer electronics. Industrial robots began to be utilized more frequently in the consumer electronics sector in the 1980s. When Sony used robots to assemble their Walkman portable cassette player, it was one of the first instances. By enhancing accuracy, consistency, and efficiency, the introduction of robots completely changed the manufacturing process.

Introduced in the 1980s, the SCARA (Selective Compliance Assembly Robot Arm) gained popularity for assembly tasks because of its high speed and precision, making it another example of an early robot used in the consumer electronics industry. The highly automated and complex manufacturing processes used in the consumer electronics sector today are the result of these advancements.

Figure 3: The robotic linkage arm is used in electronics production lines with the lighting effect.

2.3 First Refrigerator:

Numerous inventors have been trying to build a device that could keep food cold for centuries before the refrigerator was ever invented. The first artificial refrigerator was created in 1748 by Scottish physician and professor William Cullen. He demonstrated how rapidly turning a liquid into gas has a cooling effect, even though he didn't use the technique. The development of the current mechanical refrigeration

technology was facilitated by the efforts of several inventors in the 1800s. The first vapor compression device was invented in 1834 by an American named Jacob Perkins, while a German scientist by the name of Carl von Linde created a ground-breaking technique for liquefying gases in the late 1800s. By the turn of the 20th century, commercial refrigeration had become widely used, especially in industries like meat-packing plants and breweries, thanks to advancements in refrigeration technology. The Fred W. The first electric refrigerator for a home was created in 1913 by American inventor Wolf and consisted of a refrigeration unit atop an icebox. Upon William C. After Durant introduced the first residential refrigerator featuring a self-contained compressor in 1918, the manufacturing of domestic refrigerators began to gain momentum. In modern currency, the initial cost of a household refrigeration unit was between $500 and $1,000, or roughly $6,575 and $13,150. Household refrigerators were therefore considered luxury goods in the early years of their use. In the late 1920s, refrigerators became more and more common in private homes. Instead of F.

Figure 4: Initial model of Refrigerator and its revolution

2.4 First Consumer Electronics Product:

The radio, which came out in the first few decades of the 20th century, was the first real consumer electronic device. The consumer electronics industry began with Edison's electric typewriter and phonograph in the latter part of the 19th century. After the introduction of a fully electronic gadget into British homes for the first time, the consumer electronics sector flourished. In 1967, the world's largest consumer electronics show, now known as CES, was established in Las Vegas. Over the years, consumer electronics associations have developed at an astonishing rate, progressing from radios to other audio equipment, then to smarter devices like personal computers, and finally to more mobile devices like cell phones. They have accomplished this by continuously searching for novel technologies or goods that are not only inexpensive and useful for resolving common issues, but also inventive. Due to consumer demand for products with greater capabilities, they have been able to sustain their growth by staying up to date with updates and improvements.

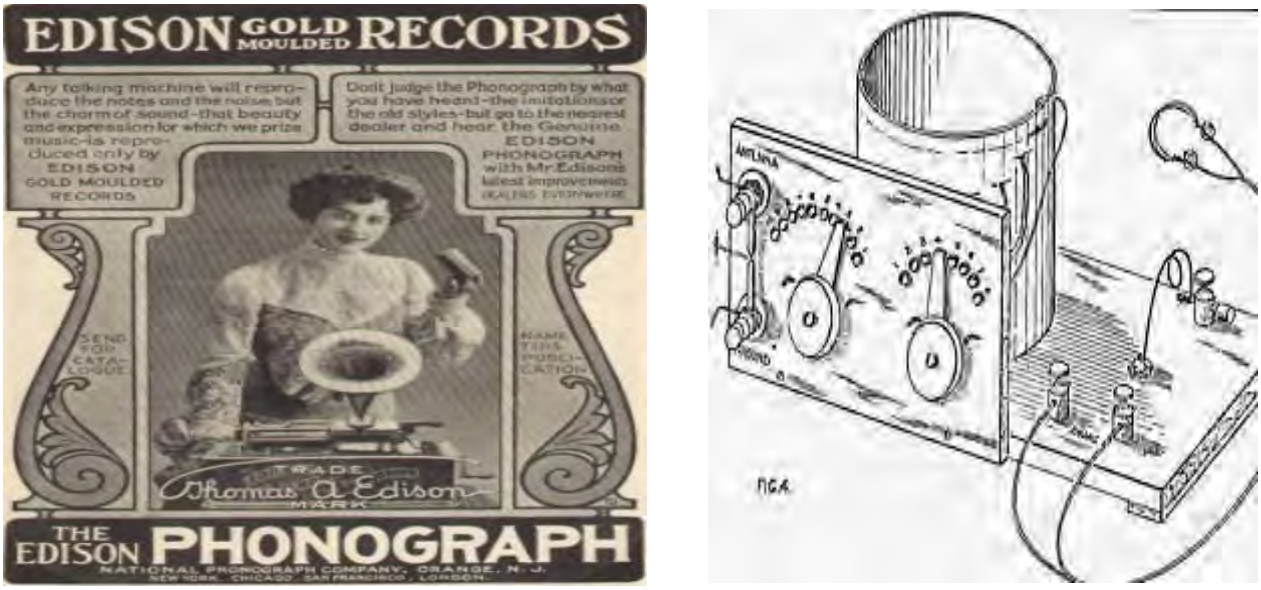


Figure 5: World's First CE Product

Chapter 3: The Supply Chain Process of Consumer Electronics

Consumer electronics are manufactured in Bangladesh using a complicated, multifaceted process that necessitates careful management and coordination at several stages. Manufacturers can produce high-quality goods that satisfy the demands of the general market and the bottom-of-the-pyramid segment by concentrating on sustainable practices, effective production techniques, and creative marketing strategies. This strategy advances Bangladesh's overall economic and social development and increases competitiveness. The manufacturing process of consumer electronics in Bangladesh involves several stages, each critical to producing high-quality, affordable, and sustainable products. Here's a broad overview of the process:

3.1 Sourcing

Material management, waste reduction, and working capital optimization are the main topics of the sourcing section, which attempts to give manufacturers the tools they need for operational success. Included in its scope is supply chain planning, which is precisely scheduling the flow of goods or materials from the point of raw materials to the point of the final consumer.

In addition, the section highlights how crucial strategic sourcing is to supply chain operations. An organization can use its combined purchasing power to negotiate the best prices in the market by using a formal approach called strategic sourcing, which organizes the process of gathering and using information. This method matches the overall business objectives with the purchasing strategy. Also covered in this section are the operational and strategic initiatives a business uses to effectively and promptly satisfy the needs of its current clientele. In the complicated supply chain environment, it also emphasizes how crucial agility is to meet the demands for customized and personalized products. For manufacturers looking to improve their supply chain and sourcing procedures for increased operational effectiveness and customer satisfaction, this section is a great starting point.

3.2 Purpose and Scope

In supply chain management, sourcing serves the following purposes: locating and securing trustworthy suppliers; streamlining the procurement process; and securing the best prices available. Organizations can increase cost efficiencies, leverage their purchasing power, and match their purchasing strategy with business objectives with the aid of strategic sourcing. Businesses may guarantee a consistent supply of high-quality materials, lower costs, and improve supply chain performance by emphasizing efficient sourcing techniques.

3.3 Roles and Responsibilities

3.3.1 In charge of Planning and Sourcing (all products)

Under the Chief Supply Chain Officer's instructions, lead the Planning and Sourcing team in achieving the ultimate goal of Walton's core stakeholders. Achieving the designated KPIs by working in tandem with other HODs/In-Charges, SCM Section In-Charges, and Product-Specific SCM Coordinators.

3.3.2 In-Charge of Sourcing (Product-wise)

Based on the functional specifications, to find reliable suppliers of various materials and components for electrical and electronic products. to research, assess, and evaluate the markets and supply of every item, sourcing from the most reliable sources possible. to create contract terms and negotiate them with suppliers while making sure that procurement is done using the best practices possible. To ensure optimal supply of supplies, it is necessary to collaborate with the production and planning sections, monitor raw material stock, verify purchase orders to suppliers, and maintain reorder points for each item. to collaborate with the Costing Section and Randi to provide the necessary data for the analysis of the viability of any new projects. gathering, evaluating, and choosing the best alternative bids while taking into account the five procurement rights from suppliers. following the organization's policies, preparing the LC permission form, and obtaining honorable management's approval. to collaborate with the import/commercial operations section to create a letter of credit and monitor shipments. To maximize customs benefits, commercial staff should collaborate to procure materials or components while taking into account all available VAT and Customs SROs and suggesting appropriate HS Codes. to cultivate relationships with suppliers and, through appropriate negotiation, guarantee suppliers' competitiveness for any straight rebuy bids at certain times. making a monthly procurement report for management and creating a budgetary report for the purchase of raw materials.

3.4 Identify Supply Source

Incorporate the comparable material checklist and highlight the R & I standard specifications and initiatory requirements. Initial consideration of the following factors is made to find a potential supply source: Consistency in meeting the agreed-upon requirements for the material specification. The manufacturer's perceived reputation in the industry and with regulatory bodies, as determined by past experiences supplying comparable materials or components (newsletters, communications). country of origin, price, lead time,

terms of trade and payment, capacity, financial resources, and R&I facility are all taken into consideration when determining the necessary level of technical support.

3.4.1 Sample Collection & Confirmation

Gather samples for testing following the material specifications that the relevant R & I and the possible supplier have agreed upon. Choose a possible supplier using the New Material/ Supplier Approval Form after receiving confirmation from R&I, Process, Material Manager Sourcing Concern, QM, and Production. When considering every new material or suggestion made directly by the customer, R&I confirmation will be considered the final confirmation.

3.4.2 Supplier Quality Audit

1. Supplier Audit to be conducted by SQA Engineer and/or Sourcing Concern and/or Sourcing Head. In Charge of Sourcing and Planning

2. The Supplier audit will be conducted by following the Supplier Quality manual. A previously defined checklist will be used to evaluate the risk for product conformity and uninterrupted supply.

3. If a supplier gets 80% or more than 80% marks, he will be considered as an “Approved” supplier.

4. If a supplier gets 60% to 79% marks, he will be considered as a “Probationary” supplier.

5. If a supplier gets less than 60% marks, he will be considered a “Not Approved” supplier.

3.5 Agreement

3.5.1 Technical Agreement:

R&I may standardize the specification of material, based on the confirmation of R&I, Process, QM & Sourcing. Technical agreement with the supplier may be completed based upon approved specifications, warranty policy, shelf-life information, storage condition, and packaging information.

3.5.2 Purchased Agreement

Based on the material list, the settled price, the length of the agreement, the trade term, the payment term, the lead time, the compensation policy, and any other relevant terms and conditions, the purchased agreement with the supplier may be completed.

3.5.3 Comparative Statement (CS)

The relevant Sourcing staff confirms CS with the necessary consent from important stakeholders before submitting a trial order. Occasionally, trial orders are placed without CS to develop suppliers; these orders also need the required approval.

3.5.4 Supplier Verification

Before the execution of the Trial order, we verify the supplier's legal presence, manufacturing capacity, and financial stability, among other things. The product-wise Sourcing Concern or the regional offices are responsible for this.

3.5.5 Trial Order Execution

Include the MOQ and container capacity when submitting a trial order to an approved or probationary (in consideration) supplier. The supplier must supply all required paperwork (i.e. E. procedures, production, material manager, and quality manager will verify the lot following line pilot production, and R&I will confirm the trial order under engineering pilot production (new development). OQM report, COA, MTC, reliability test report, photo of packing, etc. We will redact the subsequent two trial orders (and, if necessary, the third trial, if there are any minor issues with the first trial lot) for additional verification. For this material, the supplier will be deemed ineligible if there are any significant problems with the trial lot.

3.5.6 Supplier Enlistment

According to the Vendor Enlistment Form (Annexure-1), Sourcing Concern will list the possible supplier as an approved Supplier for the material. The system must approve the enlistment via the approval path. Unlisted suppliers will not receive regular orders from us. The procurement officer will update the information system with the relevant vendor's details. The vendor's registration will be completed by means of system approval. The vendor will not be qualified if any required information is not included in the entry, which needs to be completed in a certain format. The criteria of sustainability, compliance, and product quality will be used to determine the vendor category. The purchase monitor/procurement officer will gather quotes from various suppliers and input the costs into the system. In the steps that follow, these prices will be displayed as a Comparative Statement (CS). Here is the CS format. It should be mentioned that the system would not record the prices of vendors who are not approved. The CS system will determine which approved vendors' prices and quality, and a purchase order (PO) will be issued for each of them. For additional processing, the PO will adhere to the currently authorized system.

3.5.7 Order Scheme

Verify a strict order based on the state of the market and strategic planning. Personnel from SCM's import operation and assigned planner will carry out the process. The supplier must supply all required documentation (i.e. e. the reliability test report, the OQM report, the COA, the MTC, the packing photo, etc.)

3.5.8 Mass Order

Following the protocols, a mass order is placed once the supplier confirms that the trial order was successful. Purchasing and Technical Agreements: New Agreements need to be signed by the companies. Purchasing New Material from New Sources. Purchasing New Material from Existing Sources. Except for Supplier Enlistment, every point is followed. Purchasing Current Material from New Source: All of the

previously mentioned points are followed, except for Identifying the Supply Source, Sample Collection, Sample Confirmation, Agreements, Trial Order Execution, and Supplier Enlistment for Ongoing Business.

3.5.9 Sourcing and Development for New Raw Material from New and Existing Sources

The process of locating and creating new raw materials is strategic and calls for careful preparation, investigation, and cooperation. Here's a methodical approach to exploring new sources and optimizing current ones:

1. Determine Needs and Requirements Analyze Current Usage: Recognize the limitations, costs, and performance of the raw materials currently in use. Define Specifications: Establish the precise qualities—physical, chemical, environmental, and financial—that the new material must have. Sustainability Considerations: Assess the materials' effect on the environment, suitability for recycling, and ethical sourcing.

2. Market Research New Sources: Look into possible new raw material sources, such as developing technologies, substitute materials, and market trends. Current Sources: Evaluate current sources and suppliers to see if they can offer new materials or raise the caliber of the ones that are already available.

3. Building Relationships with Suppliers: Talk to manufacturers and suppliers who specialize in new or unusual materials. This could entail going to industry conferences, visiting trade exhibitions, or conducting direct outreach. Cooperation: Examine possibilities for joint development of new materials and get to know suppliers' capabilities by working closely with them.

4. Material Testing and Validation: Develop prototypes utilizing the novel material to assess its functionality under actual conditions. To assess the material's qualities, including tensile strength, thermal resistance, and durability, conduct comprehensive laboratory tests. Conduct field tests in controlled settings to confirm the suitability of the material.

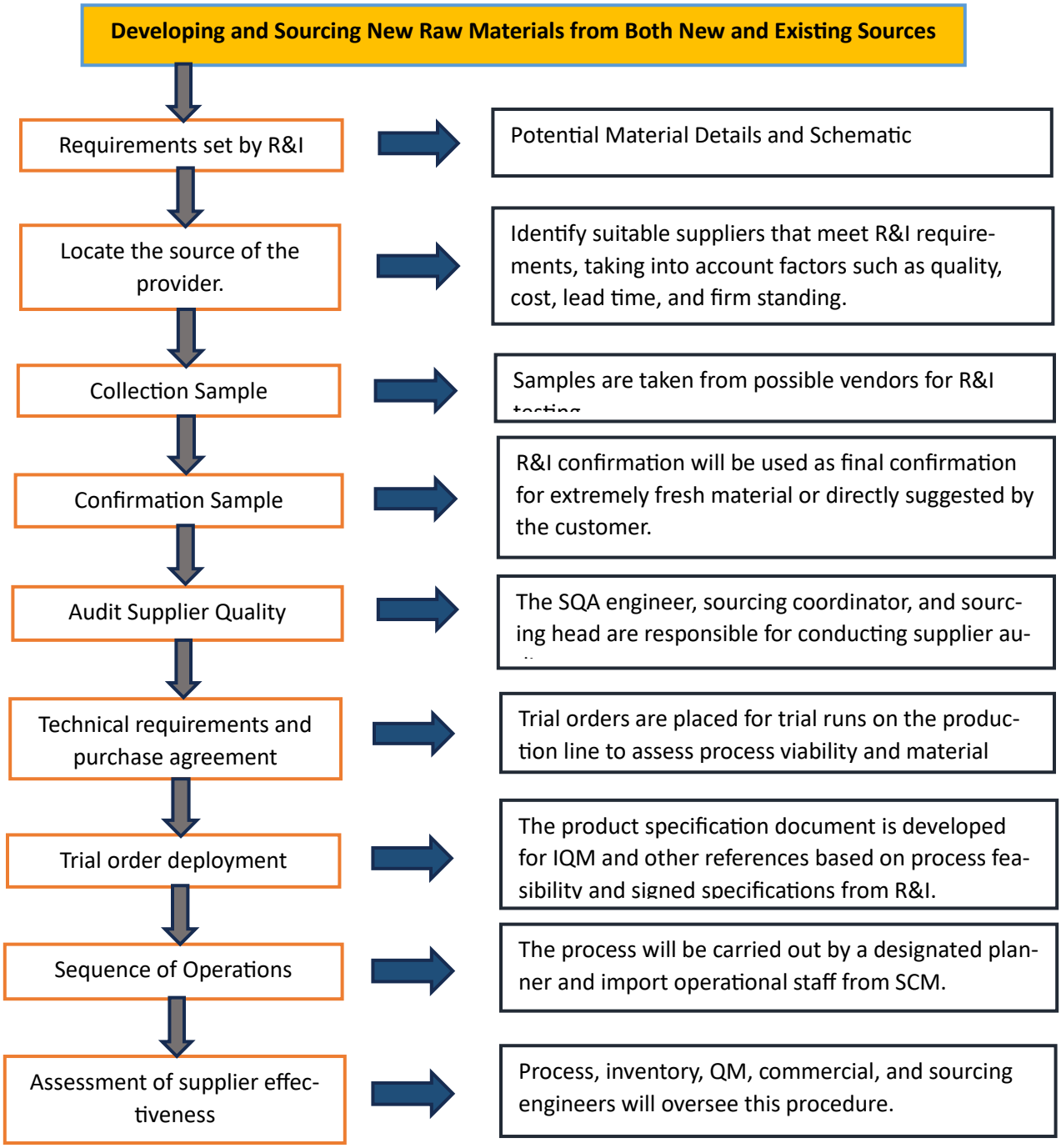


Figure 6: Developing and sourcing of RM

3.5.10 Workflow: Sourcing and Development for Existing Raw Material from New Supplier

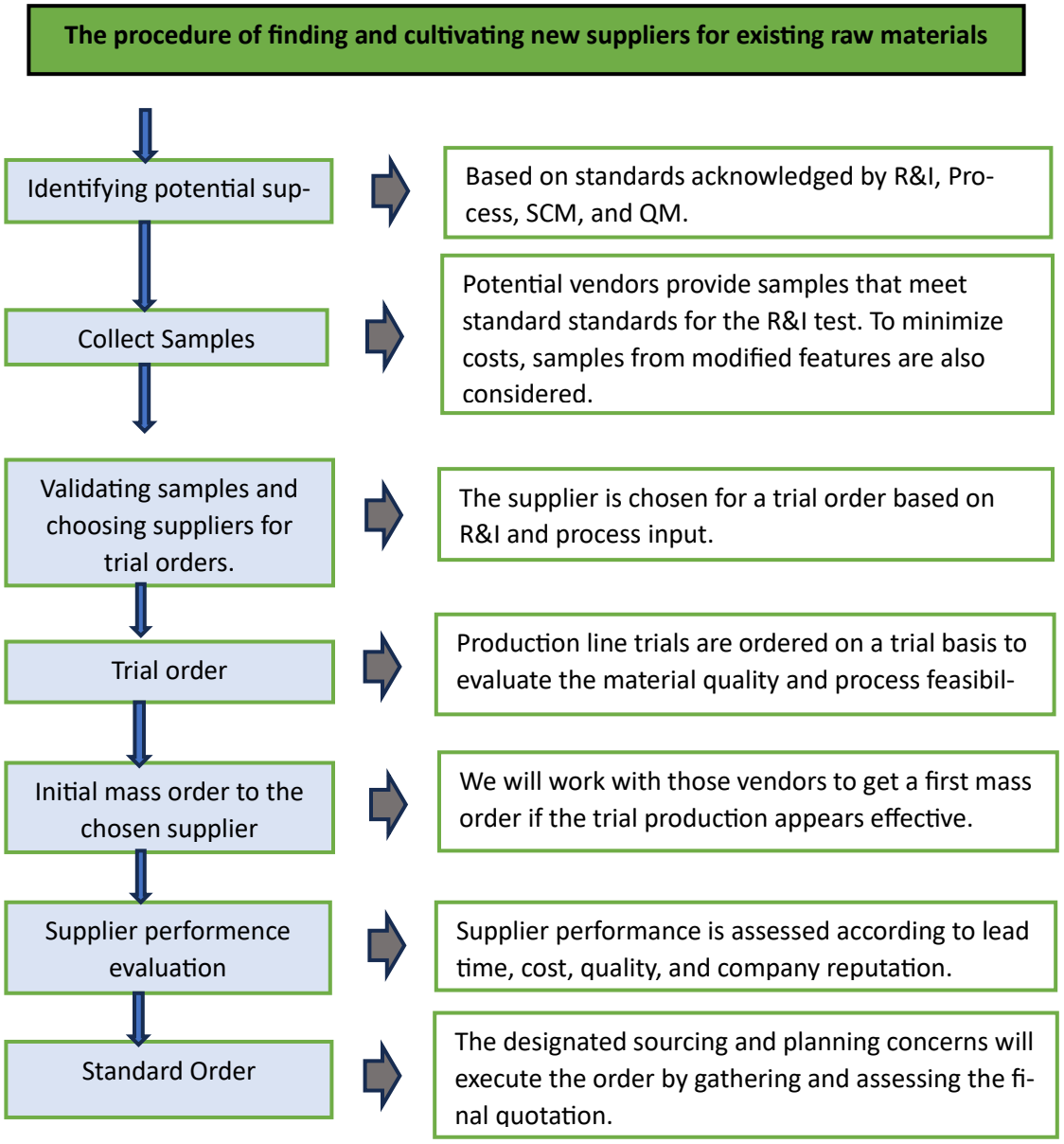


Figure 7: Sourcing and incorporating new suppliers

3.6 Commercial Activities (LC/TT/CAD)

The import of raw materials, semi-finished goods, finished goods, service payment (CH-10), capital machinery and equipment, spare parts, consumable tools, and any other oddball item for Walton Hi-Tech Industries PLC's operating unit falls under the purview of SCM and is handled by the commercial procurement section. In their daily operations, the commercial procurement section strives for efficiency, quality output, consistency of performance, speed of work, dependability, and flexibility while minimizing errors, costs, miscommunication, and noncompliance with industry regulations.

The section's main objective is to assist in the timely completion of the procurement cycle to support efficient production. To accomplish the organization's strategic goals, the commercial procurement section consistently places a strong emphasis on cooperation, collaboration, and alignment with both intra-company and intercompany SCM stakeholders. This section also supports efficient cross-functional collaboration as a means of generating supply chain surplus. The commercial section's main goals are to place orders with suppliers on time, arrange for timely delivery and shipment in an economical manner, release goods from port and customs on time while minimizing unnecessary costs, and resolve disputes when they arise. As a result, every business concern has the potential to increase overall organizational growth and profit.

3.6.1 Commercial Concern

1. Arrange to create a Purchase Order as per approved PR & final PI received from Sourcing & Planning/Supplier.

2. Ensure timely Order Confirmation to supplier by LC/TT/CAD method maintaining proper description of goods, H. S. Code, and compliance of government regulatory bodies.

3. Coordinate with supplier & WSL to arrange timely shipment in cost cost-competitive way to replenish the inventory in a view to support the smooth running of production.

4. Closely monitoring document preparation, checking, and submission as per LC/TT/CAD terms and conditions with the supplier and WSL. Arrange timely documents for retirement from the bank.

5. Co-operate & coordinate with the C&F team for smooth cargo release from customs minimizing unwanted costs.

6. Follow-up delivery promptly. Resolving any dispute regarding quality, quantity, specification, model, shortage, and damage, etc. maintaining a proper communication with all stakeholders including suppliers.

7. Sample goods import for new product development as per R&I requirement.

8. Liaison with Bangladesh Bank, CCI&E, and other trade bodies for service payments & machinery-spare parts export cum import for repairing/replacement cases. (For machinery, spare, and service payment-related concerns).

3.6.2 Shipment Arrangement and Follow-up

With the help of the supplier, sourcing, planning, and procurement departments, the commercial procurement manager will arrange for the necessary shipping plans under CAD/LC or advance payment. The supplier will receive notification or confirmation regarding shipment arrangements regarding freight prepayment from the Commercial Procurement Manager. The supplier will schedule the shipment and provide shipping advice based on that information. If a shipment is being shipped under freight collection, the concerned commercial manager will make the shipment booking and provide all relevant information along with an accurate shipping term. Following the ship's departure or flight date, he or she will obtain the required pre-alert from the relevant shipping company. Regarding vessel/flight arrival date at the destination port, as well as shipment and transshipment status, the Commercial Procurement Manager will keep track.

3.6.3 Shipping documents

The following procedures will be followed by the Commercial Procurement Manager when gathering the appropriate shipping documents: Before issuing original copies, the Manager will review drafts of all required shipping documents, particularly the Commercial Invoice, Packing List, Goods Description (GD), HS code, Net Weight/ Gross Weight (NW/GW), Bill of Lading/Air Way Bill/Lorry Receipt, and Country of Origin. If necessary, the Commercial Procurement Manager will monitor the original document courier's progress and retrieve the original documents from the relevant bank. The Commercial Procurement Manager will, if appropriate, apply for the relevant insurance coverage against the relevant shipping documents. Obtain the insurance policy from the appropriate insurance provider. To identify any discrepancies in the documentation, the Commercial Procurement Manager will review the original insurance policy and shipping documents (if any). The Commercial Procurement Manager will, if required and feasible, work with the supplier, bank, C&F agent, and other parties to resolve any discrepancies in the documentation or insurance policy. The relevant C&F team will receive the original shipping documents along with the insurance policy and any other required documents (if applicable) from the Commercial Procurement Manager. The Commercial Procurement Manager will check in with the C&F team to find out the status of the consignment's assessment, examination, and clearance.

3.6.4 Duty Payment

Based on the evaluation copies that were received from the relevant C&F team, the commercial procurement manager will make the necessary arrangements for duty payment through the accounts section.

3.6.5 Delivery Follow-Up

The relevant C&F agents and commercial Procurement Manager will inquire about the delivery status of each consignment.

3.6.6 LC Settlement & Work Settlement

S/L No	Work	Approval process	Responsibility
1	Issue Purchase Requisition (PR)	Approved by HOD or Concerned	SCM Planning / Inventory
2	Sourcing & Development	R&D. QC & Production	SCM Sourcing
3	Price collection from enlisted suppliers	Email or RFQ (Analysis)	SCM-Import Operations & Sourcing
4	Prepare Management Approval for Import LC/TT	Approved by management	SCM - Import & Sourcing
4.1	PR Approval by Management	Approved by management	SCM-Import Operation & Inventory
5	Purchase Order (PO) Creation	Approved by HOD/Concerned, SCM	SCM - Data Entry official
6	Approach to Finance & Account for Bank Selection with all source document	For LC Opening- as per sanction letter	Import Operations & Finance
6.1	LC/TT Issue bank-related info [Bank name, Branch. Interest Rate and Libor. Tenure (Days). Finance by own/Third Bank Discounting (if any), LCA Form Number entry in Oracle Software.	LCA Form distribution	Finance & Accounts
7	LC/TT Processing with Bank & SWIFT with Insurance cover note	By Concern Commercial person	Import Operations & LC Opening Bank
8	LC/TT info entry and match with PO	In Oracle software	SCM - Import Operations
8.1	Mgt Approval, PI, LC Copy. Insurance Policy, Sales Contract	Entry	SCM - Data Entry official
9	LC/TT Pre Shipment cost booking/necessary actions	Concern Finance dept, person	Finance & Accounts
10	For Air/Sea/Road shipment (For FOB/Freight collect)	Place booking confirmation to WSL	SCM - Import Operations
11	Shipment Entry in Oracle software	After collect original docs/Shipping Guarantee from Bank	SCM - Import Operations
12	Upload Shipping Documents (CI. CO. WBL. PL)	Entry in WDMS	SCM - Data Entry official
13	Handover complete shipping documents to C&F with Insurance policy	For goods release purpose	SCM - Import Operations
14	Loan Creation after Bill payment to Supplier from Importer Bank/Post shipment	Goods In-transit	Finance & Accounts
15	Customs Examine & Assessment	By C&F (Bill of Entry Generated)	SCM C&F

16	Import Duty Paid by Pay order/Cash through C&F	SCM-Import Operations provide Bill of Entry & Assessment Notice to Finance & Accounts Dept.	Finance & Accounts
17	Landed Cost Management Entry (LCM)	Post shipment jobs	Inventory Section
18	Inbound/Freight payment arranged as per contract with Importer & Forwarder	Freight Invoice issued by WSL	SCM WSL
19	Collect Delivery Order (DO)	From the Forwarder & Shipping line	SCM C&F
20	Transport management & delivery	From Chittagong/Benapole/Dhaka to Factory Side	SCM C&F
21	Delivery Report inform by email/Software daily basis to all concerned	Actual Delivered product information	SCM C&F
22	Gate Entry Number (With Date & Time) in Software	Need Develop in Oracle software	From Factory side/Admin (Parking mode)
23	Costing (Final costing of goods) checklist source document	Before GRN costing is done	Finance & Accounts
24	Goods Receive Note in Software (GRN)	Goods received complete	From the factory side / Admin
25	Inspection	After GRN goods are inspected	Purchase Monitoring
26	Store Received (Respective PR - Store)	After inspection goods will be received by the store	Inventory Section
27	Adjustment/Matching of AP Accrual-Foreign	The store received complete adjustments that will be done	Finance & Accounts
28	Goods Missing/Broken/Shortage/Insurance claim procedure	Costing complete total LC goods will be received. After GRN Missing /Broken / Shortage/Insurance claim negotiations	Import Operations, SCM- Inventory, Insurance, Purchase Monitor, Finance & Accounts, Admin.
29	Gate outnumber (With Date & Time) refers to the LC or PO number in the software.	Return of empty container/Covered Van/Truck to C&F/Transport agent after unloading the Goods at factory	SCM-Inventory, Purchase Monitor, Finance & Accounts, and Admin

Table 1: LC Settlement

3.7 Inventory:

An integral component of the organization's operations is the warehouse's material management system. The role of material management is particularly important for companies. The efficient operation of the

warehouse depends critically on the planning and receiving of the materials, their handling and storage, and the accuracy of the accounting during the issue.

Figure 8: Reporting Path

3.8 Material Planning Procedure:

Determines the net requirements for all quantities that need to be planned, including local raw materials, spares, and consumable items. thereby making a comparison between planned independent requirements, material reservations, incoming sales orders, and the available warehouse stock or the scheduled receipts from Purchasing and Production. Procurement proposals are generated in the event of a material shortage, which occurs when the amount of stock on hand is less than the quantity needed. Examine the amount specified in the purchase order in light of the MPS, Production Plan, and Sales Forecast.

The procurement proposal is also scheduled, which means that the production dates are calculated for materials produced internally and the delivery and release dates for materials obtained externally. The dependent requirements of the components are established during the BOM explosion for materials made internally. The higher-level material's internal production time is applied to each component, delaying the dependent requirements date. The materials forecast in Material Planning can be used to cover additional requirements (unplanned goods issues, excess consumption of components in Production, etc.). The forecast is based on the historical values of unplanned requirements. The precise requirement quantities are then taken into account along with these requirements.

3.9 Overview Flow Chart of Material Planning

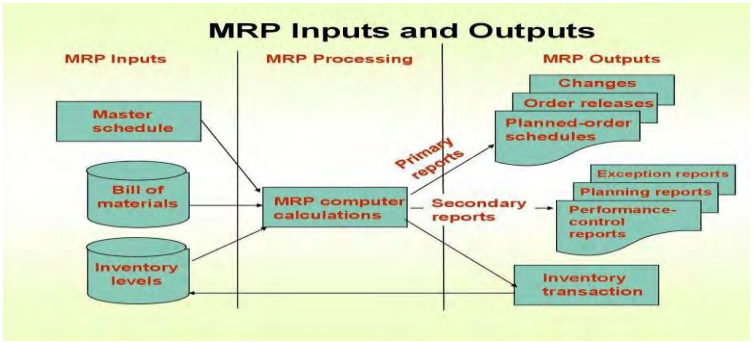


Figure 9: Material Requirement Planning

3.10 SOP of the Material issue by FIFO method:

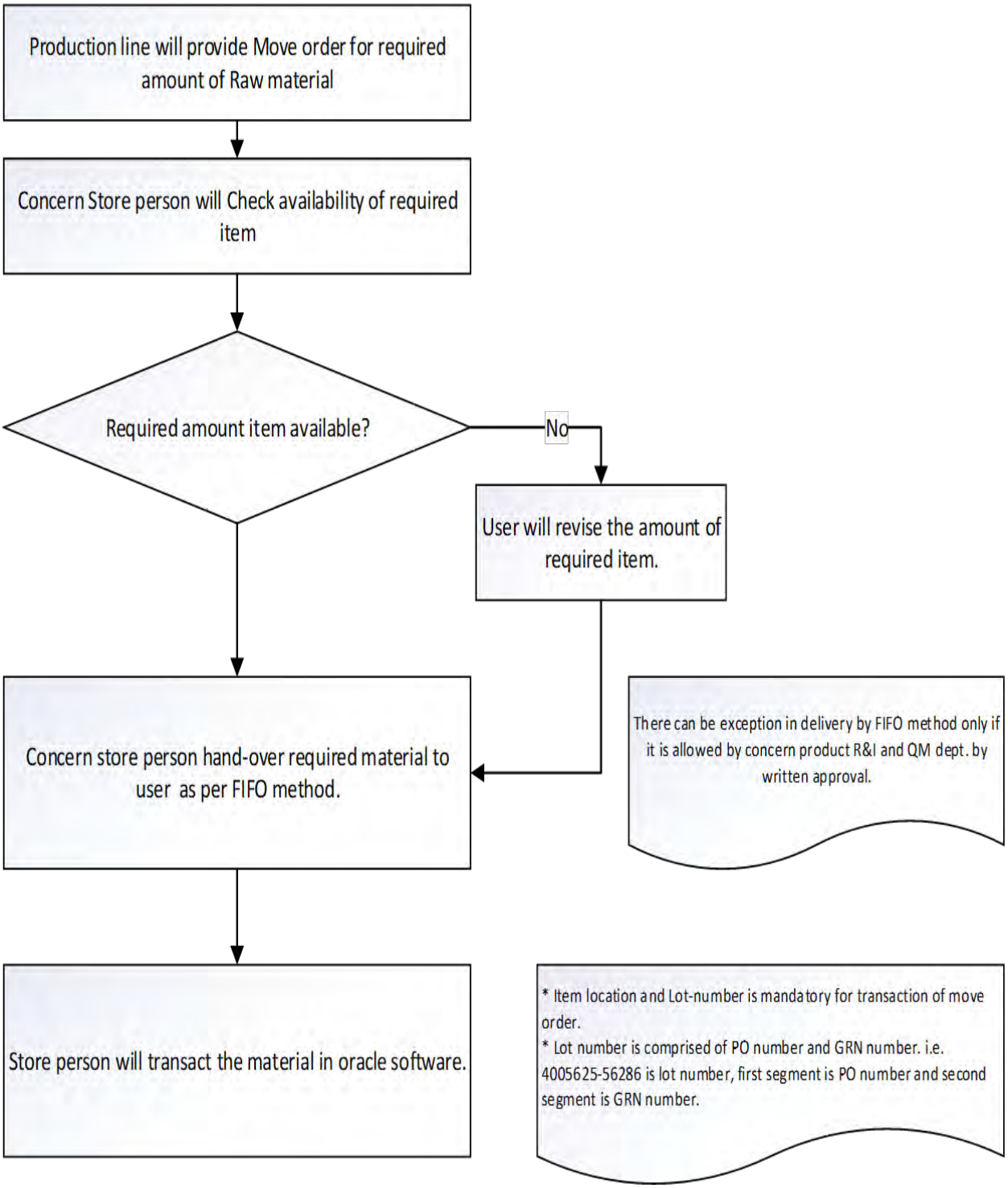


Figure 10: Material issued by FIFO method

Chapter 4: The Base of Pyramid: Marketing and Supply Chain Strategy

When it comes to marketing strategies, the strategies employed by organizations to reach the BOP segment differ from those used by those at the top of the pyramid. The marketing tactics employed elsewhere and those that focus on regions with a high density of BOP customers will differ significantly from one another. Unilever employed a particular procedure that focused on pricing, as an example. By lowering the amount of a product, they sell to make it more affordable, they were able to put this strategy into practice. Unilever produced cleansing sheets that their customers could purchase for less money while still receiving a high-quality product. Pricing strategies also include offering a price pack. The term "cost pack" refers to a set of products that are combined at a discounted price. BOP customers can get a good deal on products like the triple-pack of Pepsodent toothbrushes.

The lower echelons of the pyramid refer to approximately 66 percent of the global population who live in poverty. In Bangladesh, there is a significant socioeconomic market at the base of the pyramid (BOP). Although this market pays low wages, it may be advantageous to organizations and is seen as the global rising class. The idea of fortune at the base of the pyramid is exemplified by this market's disregarded requirement. With a family income of nearly $7 trillion, the market comprises 80% of the working population worldwide. It is imperative to recognize that companies venturing into bottom-of-the-pyramid (BoP) markets may face intriguing supply chain challenges, which could present opportunities. As a result, these companies may need to employ explicit development methodologies to implement their strategy within these business sectors.

More research is needed to understand how companies in BoP markets handle sales, production, distribution, and procurement as well as how they address supply chain issues. Conducting comprehensive studies that focus on specific supply chain functions or industries will be advantageous. Finally, we acknowledge that further research should examine the supply network architectures of companies operating in distinct BoP markets to better understand the impacts of different LCs within distinct BoP markets.

4.1 Bottom of the Pyramid (BoP) Concept and Its Relevance in the Context of Bangladesh

The term Bottom of the Pyramid (BoP) describes the socioeconomic group that consists of the world's poorest people, usually those who make less than a few dollars a day. This group, which numbers billions worldwide, constitutes a sizable but frequently disregarded market force. The main concern is how to involve suppliers and increase the managerial level of those suppliers through business. It can be described as "a way of building a profitable business while also helping to alleviate poverty."

The BoP segment is vital in determining market dynamics, social development programs, and economic strategies in Bangladesh, a developing country where a sizable portion of the population lives below the poverty line. With a population of over 170 million and an economy that is expanding quickly, Bangladesh faces the dual challenges of poverty alleviation and economic advancement. The fact that about 20% of its people are below the federal poverty line emphasizes the breadth and significance of the BoP segment's needs. Consumer electronics, which include everything from cell phones to household appliances, are vital parts of everyday life for people in Bangladesh who make different amounts of money. For BoP consumers, However, accessibility and affordability continue to be major obstacles that prevent them from fully

engaging in the formal market economy. An analysis of the opportunities and challenges that the concept of BoP presents in Bangladesh must be done to fully comprehend its relevance. Consumer electronics manufacturers and retailers hoping to grow their customer base and boost sales have a lot of unrealized potential in the BoP segment. Businesses can encourage inclusive business models that have a positive social impact and are financially sustainable by creating goods and services that are affordable and suited to the preferences of consumers in the bottom 50% of the market

In addition, the incorporation of business-to-person (BoP) strategies into the supply chain of Bangladesh's consumer electronics manufacturing sector can support wider socio-economic objectives like employment generation, poverty alleviation, and community empowerment. Meeting the specific needs of consumers at the Bottom of the Pyramid (BoP) while maintaining environmental and social responsibility requires localizing production, sourcing raw materials sustainably, and utilizing technological innovations that improve product durability and affordability.

Chapter 5: Conceptual Framework - Hypothesis & Research Question

5.1 Hypothesis:

A research paper's hypothesis is one of its most important components. Writing a hypothesis for a research paper is primarily done to forecast the data, conclusions, and findings of the thesis. The thesis's premise is that consumers of consumer electronics will favor locally-produced goods over imported CBUs (Complete Building Units). A precise, verifiable forecast or explanation for an event or collection of observations is called a hypothesis. It is a well-informed estimate that serves as a springboard for additional research.

A hypothesis is developed based on known information and then verified or refuted through experiments and observations in scientific inquiry and experimentation. Choosing what data to collect and how to design trials are made easier by the hypothesis. It gives the study a distinct focus and aids in the interpretation of the findings. There are two variables in this hypothesis: an independent variable and a dependent variable. The independent variable is consumer electronics made locally that are less expensive. On the other hand, the dependent variable is what customers purchase. Segment A of the questionnaire will reveal the hypothesis's outcome.

5.2 Research Question:

Respondents are also asked to identify which factors' contributions are crucial to strengthening the hypothesis in the second segment of the questionnaire. Six factors were included in the answers to questionnaire segment B: price, quality, features, availability and cost of spare parts for after-sales service, and warranty. Furthermore, questions 3, 4, and 7 are concerned with sustainability. They ask about the base of the pyramid, reverse logistics, closed-loop supply chains, and which factor is important in terms of sustainability.

Chapter 6: Research Method

6.1 Research Design:

A and B of the questionnaire were the foundation for the design of the research. The purpose of Questionnaire Segment A is to determine whether the hypothesis is correct or incorrect by asking twelve questions. In Questionnaire Segment B, the factors that primarily contributed to the hypothesis are interrogated using a computational approach. The questionnaire, which was developed in Microsoft Word and distributed to 100 respondents, focused on the primary research method. The consumer electronics market is a niche market; demographic significance such as consumer electronics users and income patterns, etc., are taken into consideration when interviewing respondents, given the complexity of the subject and the uniqueness of the products under consideration.

6.2 Measurement:

In questionnaire segment A, 5-point Likert scales are used to measure the feasibility of the hypothesis. The response categories on each scale item are 5, with the first number representing "strongly disagree" when presented vocally and the fifth representing "strongly agree.". Furthermore, other items like number 3 express verbally "neutral," while numbers 2 and 4 indicate the respondents' perceptions of "agree" and "disagree," respectively. When someone says they strongly agree with a statement, they are expressing strong opinions about it, while they strongly disagree with the hypothesis. Both agreement and disagreement are shown by neutral items, which also frequently display indecision. Results of Questionnaire Segment A, or RQSA for short, is a computational approach that shows the overall result by adding up the number of respondents' responses.

6.3 Data analysis & feasibility of research parameters:

Several methods have been used to assess the viability of the research data, including total variance, KMO and Bartlett's tests, normality tests, and scree plot analyses. The criteria of the study, including the answers and the calculative approach, proved to be practical for the investigation and its outcome based on the test results.

6.4 Sampling:

Survey questions have been administered via questionnaire segments, as previously mentioned. encompasses Segment A and Segment B demographic inquiries. Most of the time, in-person interviews and printed questionnaires are used to collect responses from the respondents. because the primary focus of the study is on consumer electronics, which are utilized by a specific demographic. To get the best responses, respondents must choose their responses. A mass population, for example, uses a mobile phone but does not use TV. Thus, it's critical that the responders have knowledge of the consumer electronics they use. and have the financial means to purchase consumer electronics products.

Chapter 7: Analysis

7.1 Demographic Analysis

Over the past ten years, Bangladesh's local consumer electronics market has grown significantly. Rising income levels, urbanization, affordability of gadgets, and technological developments are the main drivers of this expansion. With tax rebates and lower import duties on raw materials required for manufacturing, the Bangladeshi government has aided in the expansion of the electronics sector. By encouraging domestic production and export, the government hopes to establish Bangladesh as a significant electronics manufacturing hub in South Asia.

Demographic analysis is the study of socioeconomic variables, demographics, and their traits. Five questions about age, sex, type of consumer electronics user (using imported or locally made products), brand of consumer electronics used, and income range were all included in the demographic analysis.

Table 1 displays the frequency analysis results of the respondents' demographic information. Each of the 100 respondents responded to every question. Figure: 11, provided by Infographic, displays the total number of respondents by age group, gender, CE brand, and income bracket. Nearly every brand of consumer electronics included in the survey was examined, with consideration given to age groups of 18–25, 26–30, 31–40, 41–50, 51–60, and 60 and older.

The income range is computed using six different segmentations. The findings indicate that out of the 100 respondents, 61 are men and 39 are women. The survey comprises multiple age ranges; the respondents indicate that the age range between 41- and 50 years old accounts for the largest percentage at 54%, followed by the age range over 60 years old at 19%. Furthermore, 80 percent of the total respondents use consumer electronics made in their own country.

To a greater extent, the majority of respondents own consumer electronics items from the most well-known Bangladeshi brand, Walton. Consumer electronics products bearing the Walton brand are used by 63% of all respondents. In the same market share as Haier and Hisense, Samsung is the second-highest brand.

Six distinct segmentations are used in the computation of the income range. 39 women and 61 men make up the 100 responders, according to the data. The poll includes a variety of age categories, and the respondents say that the age group between 41 and 50 makes up the biggest percentage (54%), followed by the age group over 60 (19%). In addition, eighty percent of all respondents utilize consumer devices that are domestically produced.

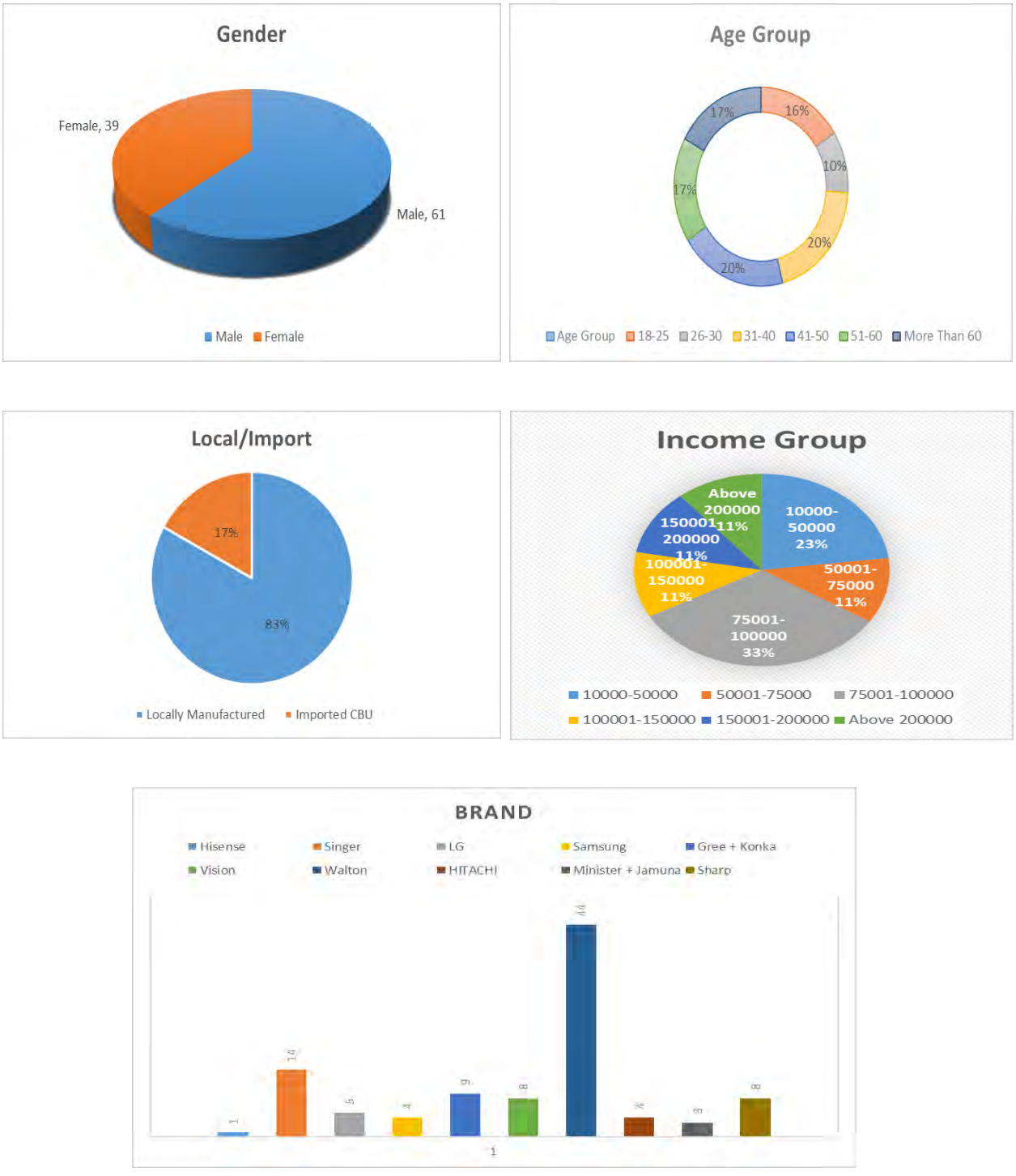


Figure 11: Demographic data (Gender, Age Group, locally made vs Imported User, Income range)

7.2 Missing Value Analysis:

Here in Table 3, it is shown that zero missing data means every respondent inputted all the data.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
RQSA	100	100.0%	0	0.0%	100	100.0%

Table 3: Missing Value Analysis Output

7.3 Pictorial Analysis:

Table 4 displays the descriptive analysis. is used to denote the mean, median, variance, standard deviation, and their respective confidence intervals. deviance, the range is displayed. Most significantly, both skewness and kurtosis are almost close to zero, which is favorable.

Descriptives

			Statistic	Std. Error
RQSA	Mean		25.10	.248
	95% Confidence Interval for Mean	Lower Bound	24.61	
		Upper Bound	25.59	
	5% Trimmed Mean		25.13	
	Median		25.00	
	Variance		6.152	
	Std. Deviation		2.480	
	Minimum		19	
	Maximum		30	
	Range		11	
	Interquartile Range		4	
	Skewness		-.141	.241
	Kurtosis		-.443	.478

Table 4: Descriptive Data-SPSS Output

7.4 Normality test Analysis:

We determined whether or not the data is normally distributed by using the Test of Normalcy. The Kolmogorov-Smirnov and Shapiro-Wilk tests are the two types of tests. Table 5 displays the results of both tests, which were greater than 0 points05. For the Kolmogorov-Smirnov test, the result was 0 points79, and for the Shapiro-Wilk test, it was 0 points 108. As a result, the data are normally distributed and not statistically significant, and they do not defy the normalcy assumptions.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RQSA	.084	100	.079	.979	100	.108

a. Lilliefors Significance Correction

Table 5: Normality Test-SPSS output

The histogram and Normal Q-Q plot are also given in Figure: 21 and in that histogram, we observed the data is normally distributed.

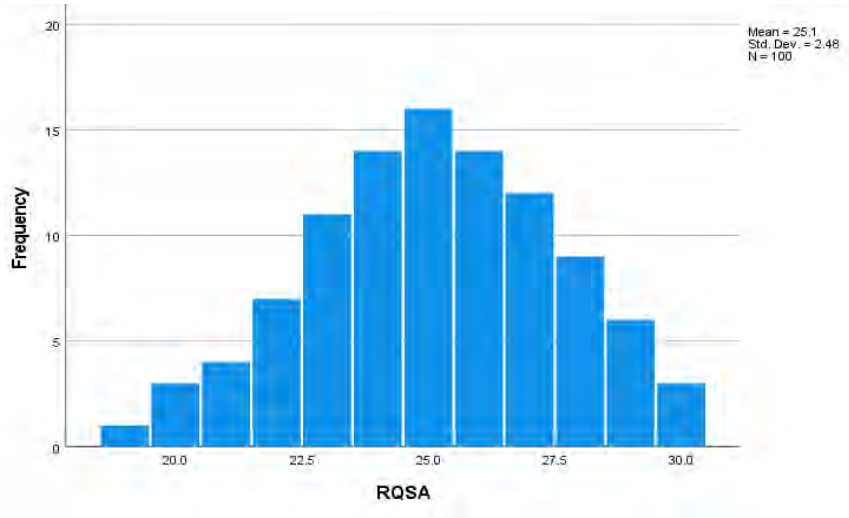


Figure 12: Histogram

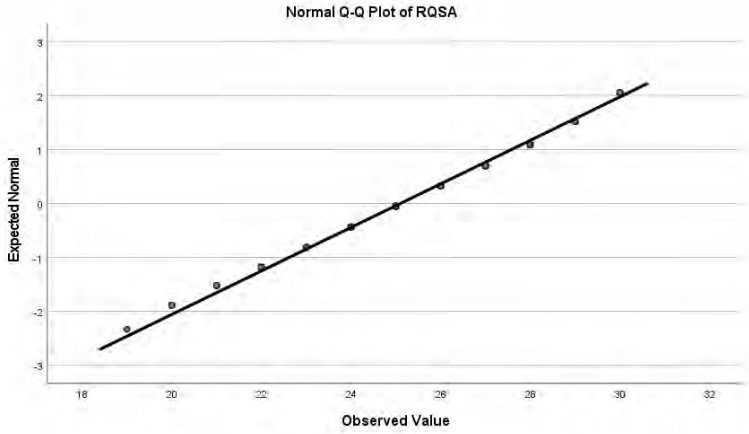


Figure 13: Q-Q Plot

7.5 KMO and Bartlett's Test:

The kaiser-Mayer-Olkin (KMO) index was 0.613, exceeding the recommended value of 0.6 (kaiser, 1970), bartletts Test of Sphericity (Bartletts, 1954) reached statistically significant as p= 0.002 which is p<0.05.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.613
Bartlett's Test of Sphericity	Approx. Chi-Square	35.124
	df	15
	Sig.	.002

Table 6: KMO and Bartlett's Test-SPSS output

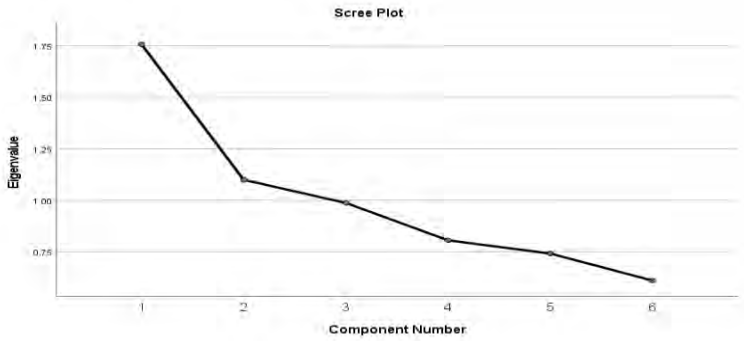


Figure 14: Scree Plot

7.6 Reliability analysis (Cronbach's Alpha):

The Cronbach's alpha calculation is used to assess the internal consistency reliability. A Cronbach alpha of 0.7 or greater is deemed acceptable. The Cronbach alpha result was within the acceptable range, at 0 point 745. Furthermore, the tables below also display item statistics, item-total statistics, summary item statistics, and inter-item correlation matrix.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.734	.751	12

Table 7: Cronbach Alpha Reliability Test

Item Statistics

	Mean	Std. Deviation	N
A1	4.62	.633	100
A2	4.46	.701	100
A3	3.59	.866	100
A4	4.27	.719	100
A5	4.22	.764	100
A6	3.83	.936	100
A7	4.70	.637	100
A8	4.45	.746	100
A9	3.83	1.067	100
A10	4.12	.873	100
A11	4.24	.810	100
A12	4.11	.912	100

Table 8: Item Statistics

Inter-Item Correlation Matrix

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	1.000	.241	.068	.052	.218	.275	.788	.359	.149	.025	.213	.219
A2	.241	1.000	.081	.160	.118	.276	.204	.721	.162	.101	.174	.359
A3	.068	.081	1.000	.182	.140	.038	.132	.136	.687	.251	.022	.083
A4	.052	.160	.182	1.000	.132	.195	.036	.149	.160	.619	.240	.183
A5	.218	.118	.140	.132	1.000	.024	.223	.119	.253	.099	.613	.100
A6	.275	.276	.038	.195	.024	1.000	.272	.322	.097	.109	.129	.863
A7	.788	.204	.132	.036	.223	.272	1.000	.256	.100	.007	.138	.165
A8	.359	.721	.136	.149	.119	.322	.256	1.000	.016	.002	.139	.355
A9	.149	.162	.687	.160	.253	.097	.100	.016	1.000	.043	-.017	.054
A10	.025	.101	.251	.619	.099	.109	.007	.002	.043	1.000	-.098	.024
A11	.213	.174	.022	.240	.613	.129	.138	.139	-.017	-.098	1.000	.162
A12	.219	.359	.083	.183	.100	.863	.165	.355	.054	.024	.162	1.000

Table 9: Inter Item Correlation Matrix

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.188	3.581	4.611	1.031	1.289	.096	12
Inter-Item Correlations	.197	-.098	.864	.962	-8.848	.038	12

Table 10: Summary Item Correlation Matrix

7.7 Chi-Square Fit Test:

H1: Price is significantly a factor for purchasing Locally Manufactured CE.

The relationship between the price factor and the purchase of locally manufactured consumer electronics was examined using a Chi-Square test for independence with α = 0.05. With a Phi coefficient of 0.588 and an χ2 (N=100) is 34.617, $p < 0.001$, the Chi-Square test was statistically significant. This suggests that **price is a significant factor** when buying locally manufactured CE, with a higher concentration when the Phi value is equal to or greater than 0.5.

Locally Manufactured CE Purchase vs CBU Purchase * Price vs Other Factors Crosstabulation

			Price vs Other Factors		
			P	P N	Total
Locally Manufactured Purchase vs CBU Purchase	LM	Count	49	18	67
		Expected Count	34.1	32.9	67.0
	LM N	Count	3	30	33
		Expected Count	16.9	16.1	33.0
Total		Count	52	48	100
		Expected Count	51.3	48.7	100.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	34.617[a]	1	<.001		
Continuity Correction	32.159	1	<.001		
Likelihood Ratio	38.579	1	<.001		
Fisher's Exact Test				<.001	<.001

Linear-by-Linear Association	34.271	1	<.001		
N of Valid Cases	100				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 16.17.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.588	.000
	Cramer's V	.588	.000
N of Valid Cases		100	

Table 11: Chi-Square Fit Test Results of H1

H2: "Quality is significantly a factor for purchasing Locally Manufactured CE Products.

To determine whether the purchase of CE Products made locally is related to the quality factor, a Chi-Square test for independence with α = 0.05 was used. Purchasing locally manufactured CE is negatively correlated with quality, as indicated by the statistically significant Chi-Square test with a χ^2 (N=100) is 52.48, p < 0.001, and a Phi coefficient of - 0 points654. To clarify, when purchasing a CBU rather than a locally made CE, **quality consideration is a major consideration.**

Locally Manufactured Purchase vs CBU Purchase * Quality vs Other Factors Crosstabulation

			Quality vs Other Factors		
			Q	N Q	Total
Locally Manufactured Purchase vs CBU Purchase	LM	Count	3	64	67
		Expected Count	16.9	50.1	67.0
	LM N	Count	21	12	33
		Expected Count	8.4	24.7	33.0
Total		Count	26	74	100
		Expected Count	24.0	76.0	100.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	52.480[a]	1	<.001		

Continuity Correction	48.981	1	<.001		
Likelihood Ratio	53.997	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	51.965	1	<.001		
N of Valid Cases	100				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 8.25.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.654	.000
	Cramer's V	.654	.000
N of Valid Cases		100	

Table 12: Chi-Square Fit Test Results of H2

H3: "Feature is significantly a factor for purchasing Locally Manufactured CE.

The purchase of locally manufactured CE was tested for a relationship with the feature factor using a Chi-Square test for independence with $\alpha = 0.05$. Using the Chi-Square test, the results showed that the hypothesis was incorrect and that the **feature is not a significant factor in the decision to purchase locally manufactured CE** (χ^2 (N=100) is 1.585, $p > 0.05$).

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.585[a]	1	.208		
Continuity Correction	.403	1	.525		
Likelihood Ratio	1.454	1	.226		
Fisher's Exact Test				.253	.253
Linear-by-Linear Association	1.571	1	.210		
N of Valid Cases	100				

Table 13: Chi-Square Fit Test Results of H3

H4: "Spare Parts Availability & Price is significantly a factor for purchasing Locally Manufactured CE.

The purchase of locally manufactured CE products was tested for a relationship with the factors of spare parts availability and price using a Chi-Square test for independence with α = 0.05. Purchasing locally manufactured CE is **significantly influenced by spare parts availability and price**, as demonstrated by the statistically significant Chi-Square test result (χ^2 (N=100) is 5.981, p > 0.05)

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.981[a]	1	.014		
Continuity Correction	4.752	1	.029		
Likelihood Ratio	7.214	1	.008		
Fisher's Exact Test				.016	.011
Linear-by-Linear Association	5.921	1	.015		
N of Valid Cases	100				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 6.60.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.245	.014
	Cramer's V	.245	.014
N of Valid Cases		100	

Table 14: Chi-Square Fit Test Results of H4

H5: "After Sales Service is significantly a factor for purchasing Locally Manufactured CE.

A Chi-Square test for independence with α = 0.05 was used to assess whether the Purchase of Locally manufactured CE products is related to the Feature factor. The Chi-Square test was statistically not significant, (χ^2 (N=100) is 1.735, p > 0.05) indicating the hypothesis is wrong and **After Sales Service is not significantly a factor for purchasing Locally Manufactured CE.**

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.735[a]	1	.188		
Continuity Correction	.687	1	.407		
Likelihood Ratio	1.612	1	.204		
Fisher's Exact Test				.328	.200
Linear-by-Linear Association	1.718	1	.190		
N of Valid Cases	100				

Table 15: Chi-Square Fit Test Results of H5

Two categorical variables are required to extend for the Chi-square fit test. Locally manufacturing CE purchasing (Yes/No: CBU Purchasing) is one categorical variable. It is calculated from the RQSA (Result from Questions Segment A) between 24.6 - 30 or 67 customers—alternatively, B1. The factors (price, quality, features, spare parts price, availability, and after-sales service) are measured as a second categorical variable).

Chapter 8: Result and Feasibility Analysis

8.1 Responder's Willingness to Buy Locally Manufactured CE Products

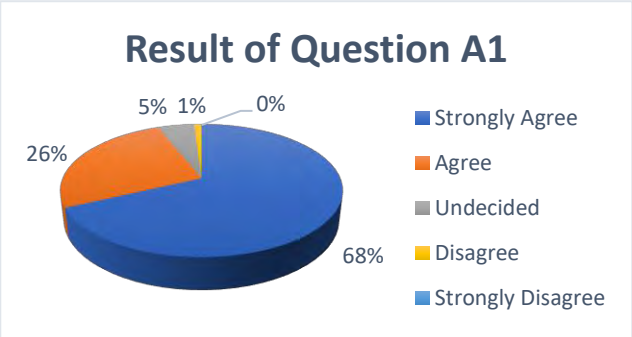
8.1.1 Result outcome of Question Segment of A:

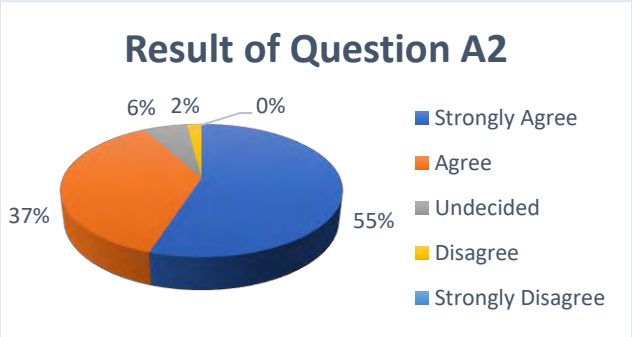
Question A1: It was found that 94% of respondents were willing to purchase locally-made consumer electronics, with 68% indicating a strong willingness to do so. The study asked respondents, "As a User of Consumer Electronics (CE), will you buy competitive locally manufactured CE products against fully imported CBU CE products?". The information is displayed in Figure 23 (Answer to Question A1).

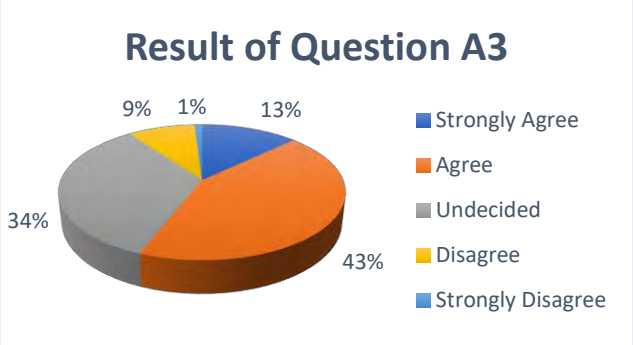
Question A2: In the survey, the question was, "Do you think fully imported Completely Built Up (CBU) CE products will have high selling prices and be unaffordable for you in the upcoming years due to high forex, global war, and economic turmoil?". Observations reveal that 94% of respondents said they would purchase consumer electronics locally, with 55% indicating a strong willingness to do so. Figure 23 (Result of Question A2) presents the details.

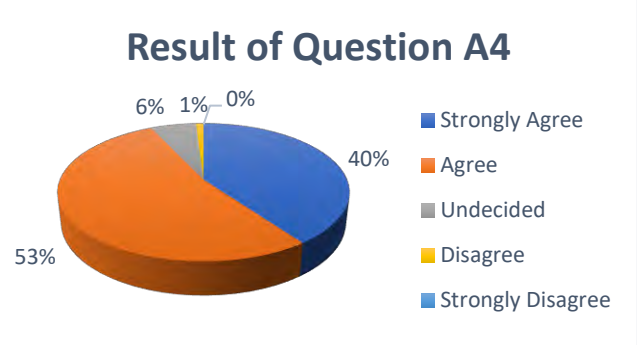
Question A3: Regarding Consumer Electronics (CE), do you think locally made CE products will have a higher quality than CBU consumer electronics products? was the question posed to the respondents in

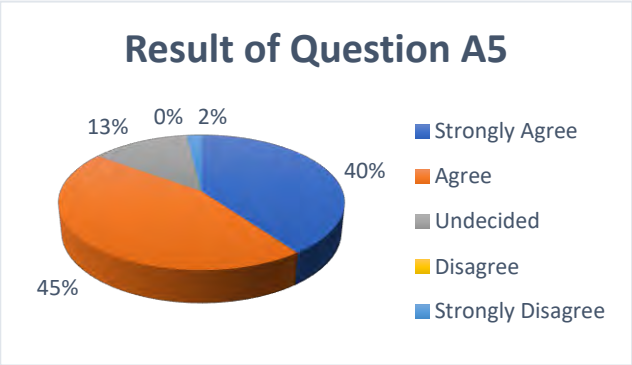
the study. The data indicates that, out of the respondents, 13 strongly agreed, 43 agreed, 34 were undecided, 9 disagreed, and 1 strongly disagreed. The findings indicate that a mere 56 respondents overall concurred with the assertion. Throughout the question segment, the greatest proportion of respondents disagree. In Figure 23 (Result of Question A3), the specifics are displayed.

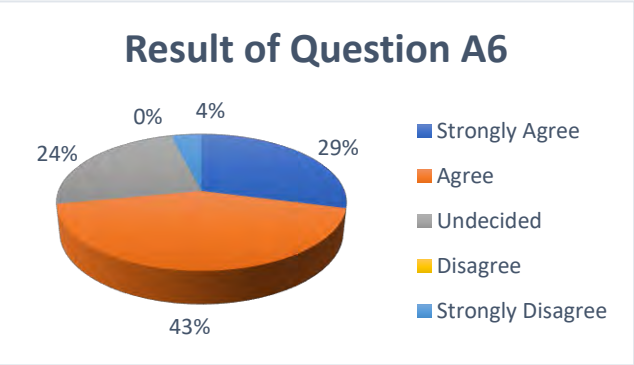












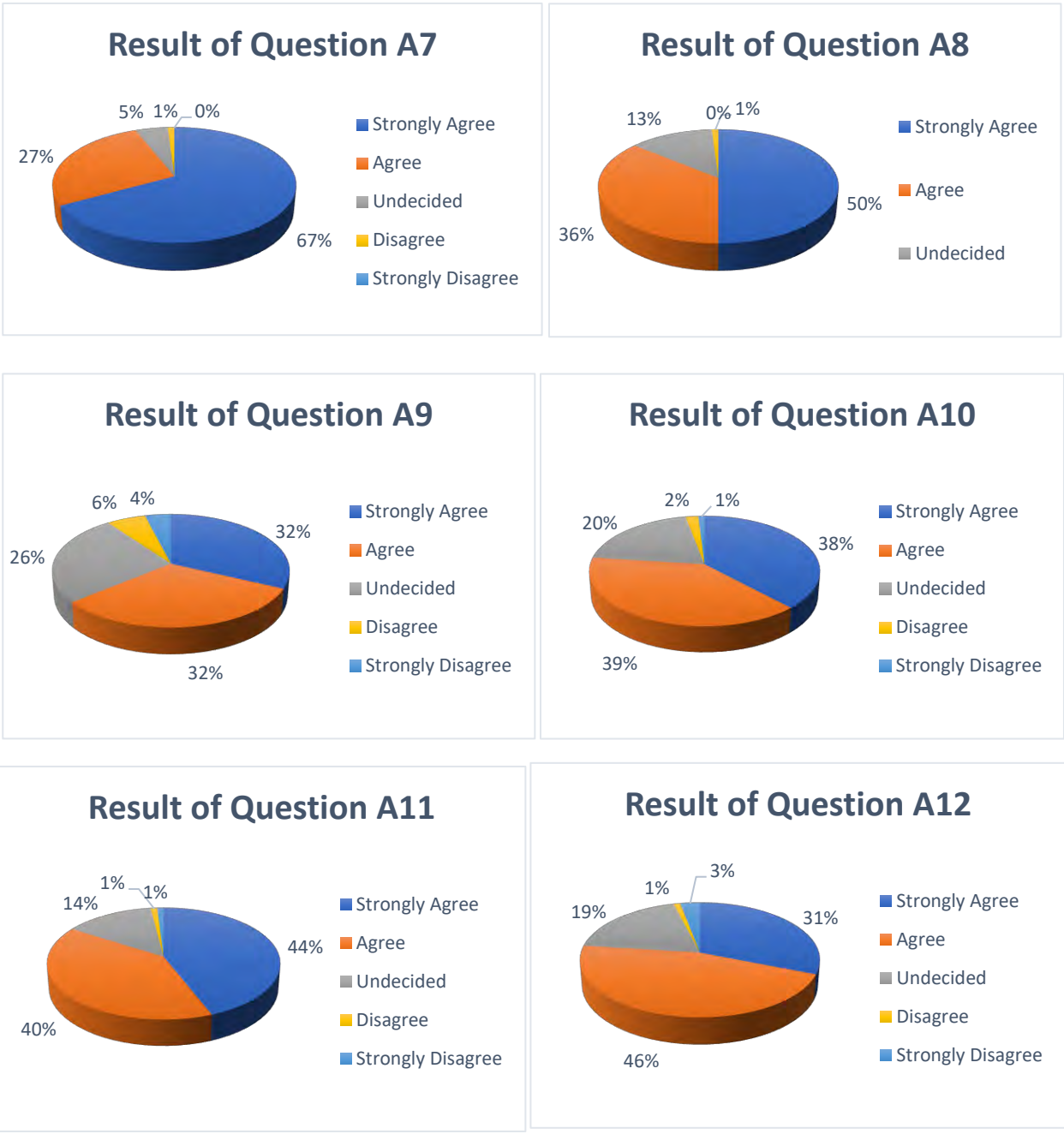


Figure 15: Pie chart of RQSA

Scale/Q	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Total
Strongly Agree (5)	67	56	11	41	39	30	66	51	31	37	45	33	507
Agree (4)	25	38	42	53	45	42	26	35	31	43	39	45	464
Undecided (3)	5	6	35	6	13	24	5	13	26	21	14	20	188
Disagree (2)	1	2	9	1	0	0	1	1	6	2	1	1	25
Strongly Disagree (1)	0	0	1	1	1	4	0	0	4	1	1	3	16
Total	100	100	100	100	100	100	100	100	100	100	100	100	1200

Table 16: Result of question segment A

Question A4: As consumers of consumer electronics (CE), do you agree that locally made CE will have adequate warranties, after-sales service facilities, and spare parts availability? was the question posed to the respondents in the study. 40 respondents strongly agreed, 53 agreed, 6 were unsure, 1 disagreed, and 0 strongly disagreed with what was recorded. Ninety respondents overall agreed with the statement, according to the results. Figure 23 (Result of Question A4) presents the specifics.

Question A5: Does the Made in Bangladesh tag have a positive effect on consumers' decisions to buy CE products? the study asked its respondents. 40 respondents strongly agreed, 45 agreed, 13 respondents were unsure, 0 disagreed, and 2 strongly disagreed, according to the observations. The information is displayed in Figure 23 (Answer to Question A5).

Question A6: "Will the Made in Bangladesh tag create a positive impact on purchasing CE?" was the question posed to the respondents in the study. 49 respondents agreed, 24 were unsure, 0 disagreed, and 4 strongly disagreed. 29 respondents strongly agreed, 43 agreed, and 4 disagreed. The information is displayed in Figure 23 (Answer to Question A6).

Result Question Segment of A (RQSA):

The questionnaire segment of A leads to an RQSA-elaborated calculative approach of questions A1 through A12. The computation is the 5-point Likert scale added up. Thus, assumptions can be drawn from the RQSA and specific staff responses to the research questions. In contrast to imported CBUs, all of the Segment A questions either directly or indirectly show which electronics consumers will choose to buy locally-built products. In summary, respondents' answers are highly agreed and agreed upon for question statements A1, A4, A2, A7, A8, and A11, resulting in points below.

- Customers agree to buy cost-competitive or cheaper locally manufactured CE Products.
- Customer assurance factors of locally manufactured CE products will be there as per respondents such as warranty, after-sales service facility, and spare parts availability.
- Imported CBU is mostly unaffordable for customers.

However, there is also a consideration given to the high level of ambiguity and disagreement raised by Questions A3, A6, and A9, which address "quality concern, Manpower Skill, and Political stability of locally manufactured Consumer Electronics Products."

8.1.2 Result outcome based on Question Segment of B:

The outcome of the question part Customers will purchase locally made CE products, as shown by A. Survey Segment B's goal is to identify the variables that will affect the outcome what is the contribution, and how does it work? An overview of respondents' responses to the question. The table displays segment B. In this case, the most important variables are cost, replacement parts, and Significant quality.

In summary, the following variables will consistently encourage the purchase of consumer electronics made in the country.

:

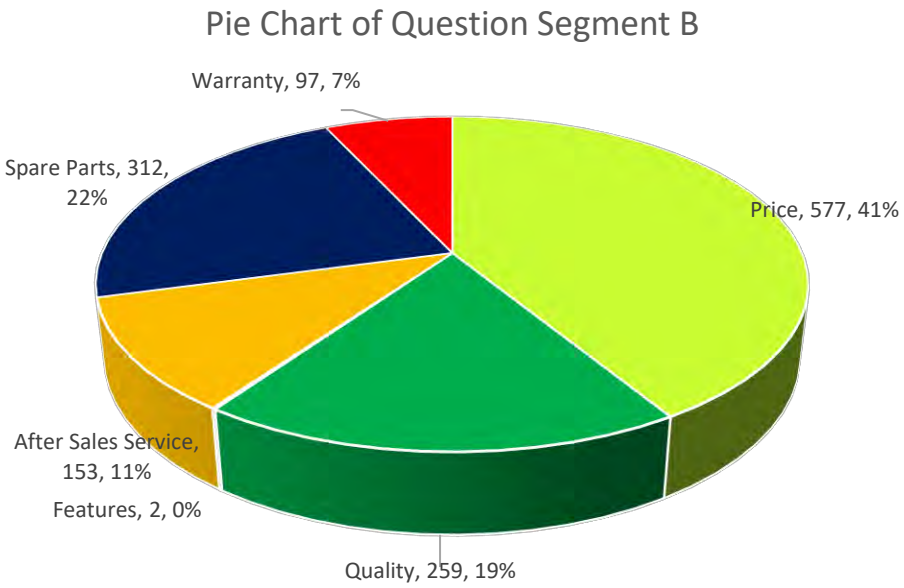


Figure 16: Result of question segment B

The first factor is that the cost of locally produced consumer electronics (CE) should be less than the cost of imported CBU CE products; the second is the availability and affordability of spare parts; and the third is that the highest concern is the quality of locally produced CE products. Hence, it can be concluded that the main reasons why consumers choose to buy locally-made consumer electronics over imported ones are cost and spare parts. But there's also the matter of quality.

Q/A	Price (1)	Quality (2)	Features (3)	After Sales Service (4)	Spare Parts (5)	Warranty (6)	
B1a	77	23					100
B1b		13	2	5	62	18	100
B2a	88	6			6		100
B2b					74	26	100
B3a	92			8			100
B3b		50		29	19		100
B4a	76	4		20			100
B4b				52	48		100
B5a	75	10		15			100
B5b		75			15	10	100
B6a	85	11		4			100
B6b		65		2	10	23	100
B7a	84			8	8		100
B7b				12	68	22	100
Total Count=	577	259	2	155	312	99	

Table 17: Result of question segment B

8.2 Feasibility:

The research design concluded that price is the primary factor influencing customers' decision to purchase locally manufactured CE products over imported products. We will now investigate the viability of the produced goods and determine whether they will be more affordable than imported units.

The government of Bangladesh has lowered import taxes and other levies since the 2010–11 fiscal year to promote domestic manufacturing of goods, particularly consumer electronics, and draw in investment and growth. According to Walton Hi-tech Industries' annual report for 2022–2023, 70–75 percent of air conditioner (ACs) sales in Bangladesh are currently made domestically. For refrigerators, too, more than 80% of the demand is satisfied by local production. Also, Walton estimates that in 2021, home appliance sales in Bangladesh will bring in $2.4 billion. Over the previous ten years, the figure has increased at an average annual pace of 14%. Walton predicted that by 2025, sales of local consumer electronics—that is, devices used for communication, entertainment, or information—will reach $5.17 billion.

In the words of Walton, the annual sales of appliances for the home and kitchen, including gas stoves, kettles, electric and rice cookers, ovens, blenders, and juicers, are currently above Tk 2,000 crore. According to Walton, this will increase to almost Tk 3,000 crore by the fiscal year 2027–2028 at a continuous rate of about 7% market growth. In the previous fiscal year, sales of electrical appliances, including fans, LED lights, and electrical accessories, exceeded Tk 15,000 crore. With a growth rate of 23%, it is anticipated to reach over Tk 18,000 crore this year. This is expected to expand at an average annual rate of 19% until the fiscal year 2027–2028.

In the ensuing years, numerous local business owners have flourished by introducing new or comparable products. Because people always feel that local goods are better, and because the various government organizations of South Asian countries that have convenient borders with Bangladesh place large orders with them, the local and South Asian markets have also benefited from the respective businesses' empowerment.

By looking at Manufacturing Duty structure formulation By the Government of Bangladesh (GOB) as per S.R.O- 164/2024/16/Customs Bangladesh is emphasizing local manufacturing. About 75 different kinds of electrical and electronic items are produced in Bangladesh; these fall under the HS Codes 84, 85, 90, and 94. Of the four chapters, the electronic items that are pertinent to this study are primarily found in HS Codes 84 and 85. Among the numerous additional electronics products specified in HS Chapter-84 are ceiling, table, and other fan kinds; various air conditioning machine types; refrigerator types; and washing machine types. Other pertinent products covered by HS chapter 85 include various battery types, UPSs, microwave ovens, and television parts (Bangladesh Customs Tariff Section XVI, NBR).

So, the price will be reduced by a significant amount. The components of the final price are FOB value, Freight cost, LC charges, Customs Duty, Shipping and port charges, Clearing and C&F agent cost, Bank interest, operational cost, Mark up, and VAT.

Cost Components
FOB Price
Freight
CFR
LC Opening Charge
Insurance
Cost of Products
Customs Landing Load
Assessable Value
Custom Duty
Regulatory Duty
Supplementary Tax
VAT
AIT
AT
Total Item Tax
Global Taxes and Com
Total Tax
Port, Transit, Clearing, C&F
Total landing Cost
Bank Interest
Operational Cost
Cost Price
Mark Up
VAT
Selling Price

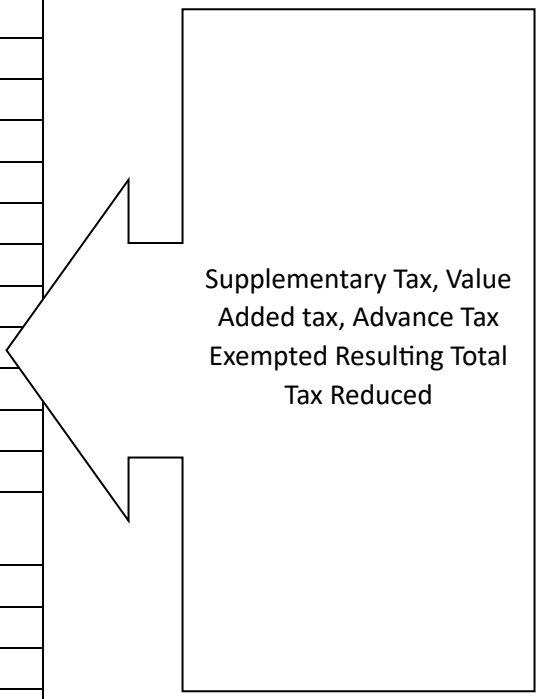


Figure 17: Cost Component of Product Pricing

8.3 Result in a Nutshell:

Using a 5-point Likert scale, it can be said that consumers prefer to buy domestically-produced consumer electronics products over CBU-imported products because nearly 974 respondents indicated that they agreed or strongly agreed. Additionally, statistical observations show that the primary motivator for buying

locally produced CE products is price. Hypothesis H1 has the highest effect, stating that "Price is significantly a factor for purchasing Locally Manufactured CE Products," while the other hypotheses, H2, and H4, all showed statistical significance in the Operating Chi sq\. (χ^2) fit test.

Hn	Hypothesis	Status	Effect
H1	**"Price is significantly a factor for purchasing Locally Manufactured CE Products"**	statistically significant, χ^2 (N=100) ***p< 0.05***	**Phi = 0.588 Higher Effect**
H2	"Quality is significantly a factor for purchasing Locally Manufactured CE"	statistically significant, χ^2 (N=100) ***p< 0.05***	Phi = -0.654 Higher Negative Effect
H3	"Feature is significantly a factor for purchasing Locally Manufactured CE"	statistically not significant, χ^2 (N=100) ***p > 0.05***	NA
H4	"Spare Parts Availability & Price is significantly a factor for purchasing Locally Manufactured CE".	statistically significant, χ^2 (N=100), ***p< 0.05***	Phi = 0.245, Lower to medium effect
H5	"After Sales Service is significantly a factor for purchasing Locally Manufactured CE".	statistically not significant, χ^2 (N=100), ***p > 0.05***	NA

Table 18: Result in a Nutshell

8.4 Linking with BoP Modality:

The study design concluded that consumers of CE products will buy domestically produced items rather than imported ones and that the primary factor influencing viability is price. Since price is the most important factor, finding other ways to lower prices will be necessary to maintain manufacturing. Bangladesh's consumer electronics manufacturing sector presents a great opportunity to implement the Base of Pyramid marketing concept. Because most Bangladeshi consumers who purchase imported CE products are from higher income brackets. Thus, a new client segment could be pitched to raise the MS. Bop marketing concept can be used to target customers as per their income range. The figure below illustrates a supply chain integration using Bop Modality:

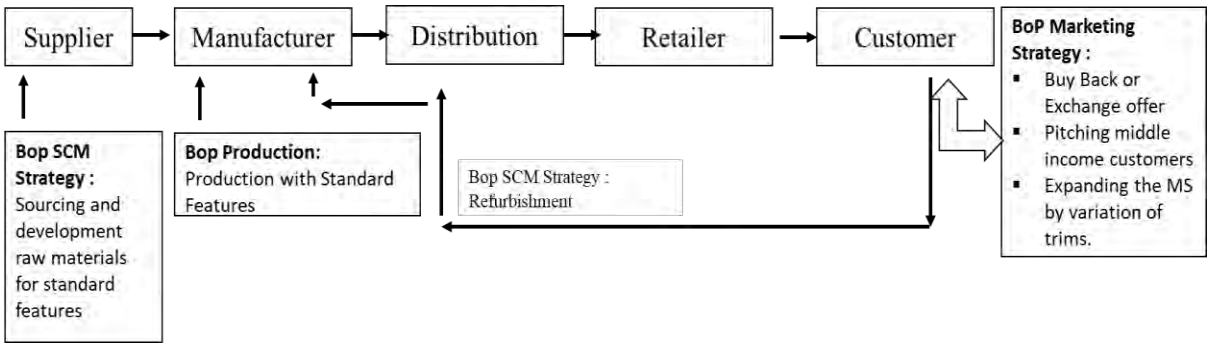


Figure 18: Supply Chain Entities and BoP Modality

The cost of the products can be reduced by equipping them with standard features like solid cover over glass cover, customized voltage protectors over default stabilizers, Safety features over various smart features (a few not supported in Bangladesh), Regular display over high-resolution HMI, UPS over Variable frequency Drive, a standard sound system, etc.

Features	Perceived Value
Glass Cover or door	BDT 3,000
Default Stabilizer	BDT 1,000
Smart Features	BDT 4,000
Smaller and Standard Display	BDT 2,000
VFD enabled	BDT 4,000
Standard interior	BDT 1,000
Total=	**BDT 15,000**

For a BDT 100,000.00 Electronics Product, if 15,000.00 reduced then 15% of the Price is reduced

Table 19: Perceived Value of Premium Features

The table above illustrates how we can significantly lower prices by switching some premium specifications to standard specs. The integration of Bop is displayed in the figure within the supply chain value chain. Standard feature raw materials can be sourced more affordably than premium features in inbound logistics, giving you a competitive edge. Reducing factory costs through the use of renewable energy sources reduces operations costs over time. Repairing existing products and remanufacturing them can result in new, less expensive products as well as the creation of new companies. The most crucial way that Bop can increase MS in the marketing domain is by focusing on Bangladesh's all-class buyers' segment of consumer electronics, understanding their needs, and emphasizing the safety features. The figure below also constructs an integration of Bop Modality with the value chain

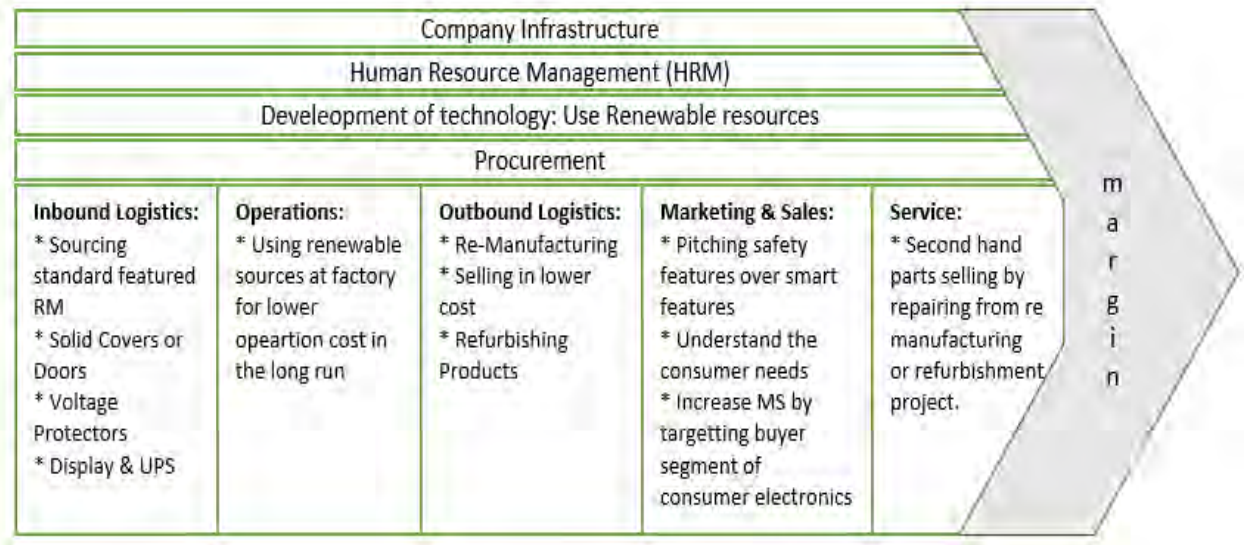


Figure 19: Value Chain Entities and BoP Modality

Chapter-9: Conclusion

Bangladesh's economy is expected to grow, changing consumer preferences, government policies, and increased GDP make it an excellent place for locally manufactured consumer electronics products. Highlighting manufacturing through the provision of VAT, SD benefits, exchange rate volatility, LC barrier for CBU import, and numerous other measures. According to the study, consumers will favor products made in Bangladesh in the future due to their competitive advantage over imported consumer electronics branded products in terms of price. In light of social, environmental, and economic considerations, the bottom-of-the-pyramid marketing concept can catalyze the development of sustainable manufacturing practices. In summary, the consumer electronics supply chain will transition more quickly from solely relying on imports to sourcing raw materials for manufacturing. Furthermore, opportunities for localization, workforce development, and exporting will be opened.

Bangladesh's consumer electronics industry has been preparing to stay in the market with the hope of sustainability, and the supply chain plays a crucial role in this competitive market. There are 4As - Supplier, Logistics, Owner, and Purchaser - like agents, that are used in the supply chain. Each link plays a significant role separately and contributes as an important part of the supply chain by contributing their expertise.

References

[1] https://www.tcl.com/global/en/blog/playbooks/history-of-refrigerator-invention

[2] https://www.thedailystar.net/business/news/bangladesh-turning-consumer-electronics-manufacturing-hub-3568926

[3] Md Shahjalal, Raiyan Rabbani & Debajit Datta, “Consumer Electronics Industry and Market Share in Bangladesh” in IDLC monthly business review *(V. 18/Issue 09/ Spetember*2022.

[4] https://www.builderonline.com/products/kitchen/how-installed-appliances-have-evolved-over-the-past-century_o

[5] https://www.assosia.com/sectors-channels/consumer-electronics#:~:text=The%20consumer%20electronics%20industry%20started,decades%20of%20the%2020th%20century.

[6] https://www.hcidhaka.gov.in/pdf/Report_on_Consumer_Electronics_Industry_in_Bangladesh(1).pdf

[7] http://www.ornskoldsvik.se/Kultur-fritid-och-turism/Ornskoldsviks-museum konsthall/Ornskoldsviks-stads-historia/Del-13

[8] "Auto-play: A data mining approach to ODI cricket simulation and prediction," by V. V. Sankaranarayanan, J. Sattar, and L. S. Lakshmanan, in SIAM International Conference on Data Mining, 2014.

[9] "The Magic of Selling to the Bottom of the Pyramid: How the Private Sector Can Help Alleviate Poverty" is written by A. Karnani. Manag. Rev. Calif. 2007, 49, 90–111

[10] Including "Sustainable supply chain management into the base of the pyramid research" is Khalid, R.U., Seuring, S., Beske, P., Land, A., Yawar, S.A., and Wagner, R. J. Supply Chain Management International, 2015, 20, 681–696

[11] "Legitimacy Contexts of BoP Markets: Characterization and Implications for Supply Chain Functions," Maryam Zomorrodi and Sajad Fayezi, Concept Paper Sustainability, MDPI, 2022

[12] Bangladesh Customs Tariff Section XVI. National Board of Revenue (NBR). Retrieved from: http://nbr.gov.bd/taxtype/tariff-schedule/eng

[13] Md. Mujibur Rahman and Md. Joynal Abedin. (2012). Bangladesh's Electrical Sector: Issues and Opportunities, published in the SSRN Electronic Journal.

[14] World standard electronics products being manufactured in Bangladesh. The News Today. (2011). Retrieved from: https://web.archive.org/web/20110620080232/http://www.newstoday.com.bd/index.php?option=details&news_ id=27248&date=2011-05-11

Appendix A

Questionnaire for Thesis

First Part: Demographic Questionnaire

D1. Sex of the answerer. o Male o Female o Other	**D4. Which Electronics brand do you prefer?** o Walton o Vision o Samsung o LG o Beko o Singer o Sharp o Hitachi o Transtec o Philips o Minister o Panasonic
D2. Age of the answerer. o 18 – 25 o 26 – 30 o 31 – 40 o 41 – 50 o 51 – 60 o More than 60	**D5. Income Range** o 10,000 – 50,000 o 50,001 – 75,000 o 75,001– 1,00,000 o 1,00,001 – 1,50,00 o 1,50,001 – 2,00,00 o Above 2,00,00
D3. CE User type Q1 o Imported Consumer Electronics user o Manufactured Consumer Electronics User o non-user o Others	

Second Part: Segment A

A1. What is your opinion on purchasing cost-competitive locally manufactured CE products against fully imported units? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.	**A4.** As a User of Consumer Electronics, do you agree that locally manufactured CE will have sufficient Warranty, after-sales service facility, and spare parts availability? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.

A2. Do you think fully imported Completely Built Up (CBU) CE Products will have high selling prices due to high forex, global war, and economic turmoil in upcoming years and unaffordable for you? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.	**A5.** Will the "Made in Bangladesh" tag create a positive impact on purchasing manufactured CE products? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.
A3. Does "Bangladesh" have the capacity (Technology, skilled manpower) to manufacture purchasing CE products in Bangladesh? o Strongly Disagree o Disagree. o Undecided o Agree o Strongly Agree.	**A6.** Do you think, Bangladeshi engineers and technicians are experts in consumer electronics manufacturing process? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.
A7. Do you think, private investors in Bangladesh will be eager to invest in consumer electronics manufacturing? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.	**A8.** Do you think, consumer electronics manufacturing can be sustainable in terms of economic, social, and environmental factors? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.
A9. Do you think, the CE manufacturing supply chain will run smoothly operations in Bangladesh in terms of the political situation: o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.	**A11.** Do you think CE manufacturing will be supported by concerned government entities and regulations? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.
A10. Do you think, consumer electronics manufacturing can reduce the pressure of forex reserve regarding importing CBUs? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.	**A12.** Do you think, consumer electronics manufacturing can develop local manpower? o Strongly Disagree o Disagree o Undecided o Agree o Strongly Agree.

Third Part: Segment B (Select any two)

B1. As a customer purchasing CE, what factor will be the most deciding factor?

- ☐ Price
- ☐ Quality
- ☐ Features
- ☐ After-sales Service
- ☐ Spare Parts Availability and cost
- ☐ Warranty

B2. For high manufacturing volume, what could be the factor below?

- ☐ Price decrease.
- ☐ Quality Concern.
- ☐ Premium Features incorporation.
- ☐ After-sales Service cheaper.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B3. Will it be sustainable to do a consumer electronics manufacturing plant in Bangladesh, if yes then what are the below factors for sustainability?

- ☐ Less Production Cost.
- ☐ Good Quality output.
- ☐ Premium Features incorporation.
- ☐ After-sales Service cheaper.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B4. For Incorporating Reverse Logistics and closed loop supply chain sustainable concept in the supply chain which below factor will be affected?

- ☐ Refurbish Product cost will be less.
- ☐ Good Quality output.
- ☐ Premium Features incorporation.
- ☐ After-sales Service cheaper.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B5. Which factor will customer satisfaction be achieved?

- ☐ If the Product Price is lesser
- ☐ Good Quality.
- ☐ Premium Features incorporation.
- ☐ Good After-sales Service.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B6. For which below factor "Made in Bangladesh" consumer electronics product will replace CBU dominated importing?

- ☐ If the Product Price is lesser
- ☐ Good Quality.
- ☐ Premium Features incorporation.
- ☐ Good After-sales Service.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B7. What could be the main factor in introducing the Base of the pyramid sustainability concept in the consumer electronics supply chain?

- ☐ Product Price must be for the medium-income segment.
- ☐ Good Quality.
- ☐ Premium Features incorporation.
- ☐ Good After-sales Service.
- ☐ Less Spare Parts cost.
- ☐ Extended Warranty period.

B1.a. As a customer, purchasing CE what factor will be the most deciding factor?
(Select any one, same as B1)

- ☐ Price
- ☐ Quality
- ☐ Features
- ☐ After-sales Service
- ☐ Spare Parts Availability and cost
- ☐ Warranty
