

Report on
Orchestrating Critical Success Factors for the Implementation of a Circular
Economy in Apparel Manufacturing Industry

By

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An internship report submitted to the BRAC Institute of Governance and Development (BIGD), BRAC University in partial fulfillment of the requirements for the degree of Masters in Procurement and Supply Management (MPSM)

BRAC Institute of Governance and Development (BIGD)
Brac University
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Declaration

It is hereby declared that

1. The internship report submitted is my own original work while completing degree at BRAC University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate reference.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Letter of Transmittal

Dr. Md. Moniruzzaman
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Subject: Submission of PSM 665: Supply Chain Management in Practice- Report/Practicum

Dear Sir,

With due respect and humble submission, I would like to submit my report entitled
“Orchestrating Critical Success Factors to implement circular economy in Apparel Manufacturing industry
“As partial requirement to fulfillment to Masters of Procurement and Supply Management (MPSM)
at BIGD, BRAC University.

I have attempted my best to finish the report with the essential data and recommended proposition in as significant compact and comprehensive manner as possible. I sincerely hope that this report meets the standards that is expected from your end.

Sincerely yours,



A.S.M. AQIB

22382008

BIGD, BRAC University

21th May, Sunday 2024

Non-Disclosure Agreement

This agreement is made and entered into by and between Checkpoint Systems Bangladesh Limited as the first party and the undersigned student at BRAC Institute of Governance and Development, BRAC University as the Second Party. The First Party has allowed the Second Party to prepare a report on “Orchestrating Critical Success Factors to implement circular economy in Apparel Manufacturing industry” in partial fulfillment of the requirements for the degree of Masters of Procurement and Supply Management. The Second Party will have the opportunity to work closely with the officials of the organization and have access to official data and information. Based on work experience, data, and information collected, the Second Party will prepare a report. The Second Party will use all sorts of data and information for academic purposes and will not disclose to any party against the interests of the First Party.

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Acknowledgement

First of all, I would like to show my gratitude toward Almighty, who has given me the strength to complete my report due on time.

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I am also grateful to my wife who has made significant sacrifice to the report's completion without her support, it would not have been finished by the deadline after a long tiring office day.

Executive Summary

This report identifies some key critical Success Factors (CSFs) in the successful implementation of a circular economy model within the apparel manufacturing industry. As the global fashion industries are struggling with environmental challenges and resource depletion so Making the shift to a circular economy has been identified as a potential remedy. The goals of the circular economy are to reduce waste, enhance efficiency of resources, and encourage sustainable practices all the way through a product's lifecycle. However, the implementation of circular economy is troublesome in this complex and dynamic landscape of the apparel manufacturing sector.

The report emphasizes on key Critical Success Factor for the effective integration of circular economy practices in apparel manufacturing. These factors encompass organizational, technological, regulatory, and consumer-oriented aspects, highlighting the need for a holistic approach. The note also underscores the role of strategic planning, stakeholder collaboration, and innovation in achieving circularity goals.

By recognizing and prioritizing these CSFs, apparel manufacturers can navigate the challenges posed by traditional linear production models and contribute to a more sustainable and resilient industry. This note provides valuable insights for industry stakeholders, policymakers, and researchers aiming to drive positive environmental change within the apparel manufacturing sector.

Keywords: Critical Success Factors (CSFs); Circular economy; Sustainable practices.

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List of Acronyms

CSF: Critical Success Factor

SCM: Supply Chain Management

CM : Circular Economy

KRA: Key Result Area

KPI: Key Performance Indicator

RMG: Ready Made Garment

Chapter 1

INTRODUCTION

1.1 : Problem Statement:

Both developed and emerging economies face significant problems in the twenty-first century, chiefly related to the environmental effects of the present unsustainable production methods and consumption patterns. These days, production and consumption are increasing at rates that are no longer sustainable for the environment. In this sense, it is hypothesized that the significant technology advancements of recent years would present chances to improve sustainable development and the circular economy. Bangladesh is a densely populated country in South Asia, faces numerous environmental challenges due to its geographical location, vulnerability to climate change, and rapid urbanization. Bangladesh uses large amount of water, plastic, paper etc. Then it consumes larger amount of energy that will lead to shortage in future. So, implementing circular economy in our manufacturing industry is mandatory to reduce waste flows, keeping resources available, Repair and reuse the existing resources. There are some obstacles and challenges to implement Circular Economy. In this report we will try to find out some critical success factor to overcome the challenges based on expert opinion from different apparel manufacturing industries.

1.2 : Purpose of the Study:

One of the most important things we can do to slow down climate change is to evolvement of a circular economy. Action is needed to address the climatic disaster, and material recovery is essential. The mining as well as the use of natural resources is responsible for approximate half of global greenhouse gas emissions, according to the United Nations International Resource Panel.

1.3 : Research Methodology:

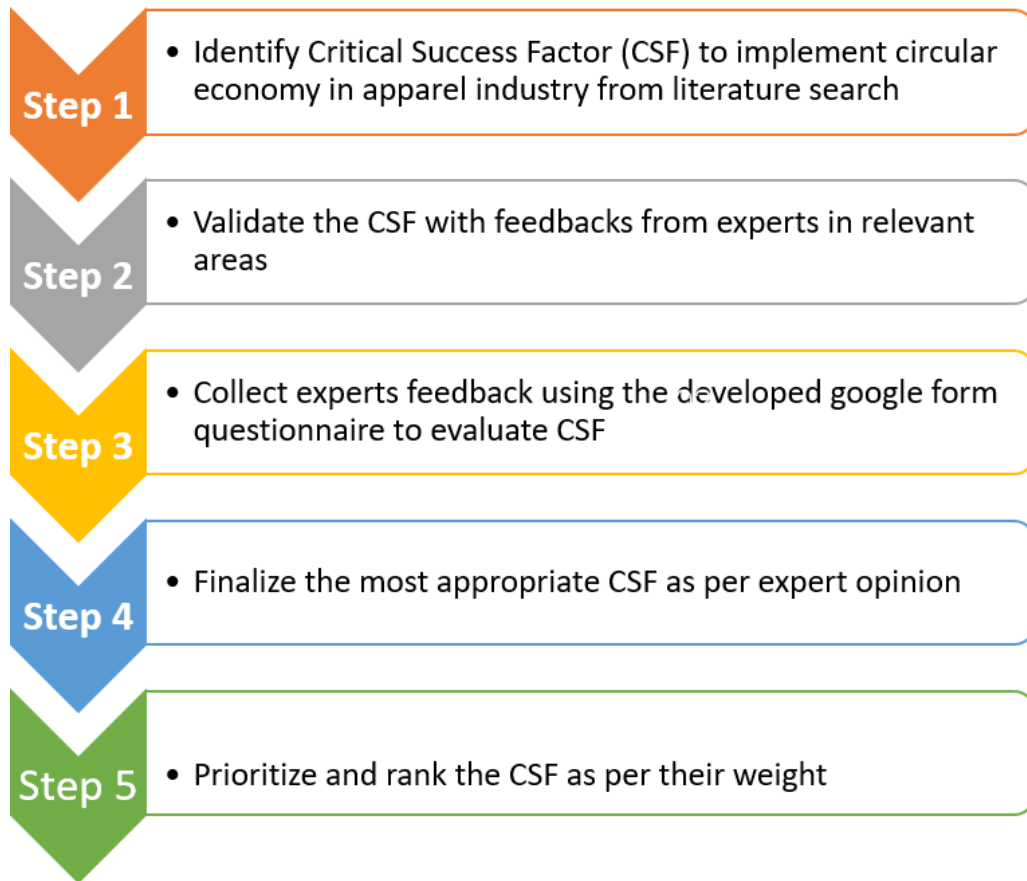


Fig 1: Research Methodology Diagram

Source: The Author

1.4 : Limitation of the report

Any sector's growth is a multifaceted, dynamic, and ongoing process. Plans and tactics must be modified in order to accommodate this process. Thus, the plan has undergone several additions, revisions, and extensions. There are some limitations are given below:

- Time limits posed a serious challenge to organizing and carrying out thorough investigation.
- There was not enough time or scope to conduct a complete survey among all professional in all industry.
- It was difficult to get information from other professionals in the clothing manufacturing sectors.

Chapter 2

Critical Success Factor

2.1: Critical Success Factor:

In business and project management, the phrase "critical success factor" (CSF) refers to the crucial components or tasks that must be successfully completed in order for a project or organization to meet its goals. The essential elements that are vital to an undertaking's success are known as critical success factors, and they are usually discovered at the planning or strategic stage. These variables change based on the project's or organization's particular objectives and environment. For strategic planning and execution to be effective, it is imperative to identify and prioritize Critical Success Factors. They assist organizations in setting priorities for their work and resources so that the most important issues are taken care of first, hence raising the probability of success in the end.

2.2: Importance of CSF in Apparel Manufacturing Industry:

In the apparel manufacturing industry, Critical Success Factors (CSFs) are critical components that determine whether a corporation will succeed or fail in accomplishing its goals. The below criteria demonstrate the significance of CSFs in the following industry:

- **Customer satisfaction and loyalty:** In apparel sector, knowing the wants and needs of customers and providing them with high-quality items are crucial CSFs. A company's ability to succeed is closely correlated with the happiness and loyalty of its customers.
- **Innovation of Product design:** To maintain a competitive edge in the apparel industry, one must consistently innovate in both product design and development. Businesses must recognize market trends, produce original ideas, and launch new goods fast.
- **Efficiency and Controlling cost:** Profitability depends on keeping operating efficiency high and production costs under control. A crucial CSF for maintaining pricing competitiveness is efficient cost management, from procurement to production.
- **Brand Reputation and Marketing:** Essential CSFs include developing a powerful brand image and efficient marketing. Prosperous clothing companies allocate resources towards marketing tactics that connect with their intended consumer base, cultivating brand awareness and allegiance.
- **Compliance and Sustainability:** Following industry rules and upholding moral and sustainable business standards are becoming more and more crucial CSFs. Customers are becoming more environmentally aware; Thus, businesses must match their actions to these demands.
- **Talent Management:** It is essential to hire and keep competent workers in disciplines like design, production, and marketing. The workforce's dedication and experience play a major role in the success of clothing companies.

- **Technology Adoption:** It is imperative to integrate cutting-edge technologies into online sales platforms, inventory management, and production processes. Businesses that use technology effectively increase their operational efficiency and acquire a competitive advantage.
- **Trend and Market Analysis:** Keeping up with customer behavior and market trends is a CSF. In order to predict and adapt to shifting consumer tastes and market demands, businesses must perform in-depth market research.
- **Globalization:** For many apparel companies, expanding into international markets is essential for growth. Understanding global market dynamics and navigating international regulations become critical success factors.

2.3: Types of CSF:

- **Industry Related:** Businesses are guaranteed to stay competitive by industry-related success factors. Maybe a business wants to strengthen its bond with its intended market. Enhancing marketing campaigns' copy and graphic design are examples of actions that could be crucial to their success.
- **Environmental:** Environmental considerations encompass the capricious elements of conducting business, such as shifts in state policies, market conditions, or unforeseen technological breakthroughs that revolutionize a sector. Keeping up with trends in the target demography could be an important success element for a business looking to forge closer ties with its customers.
- **Peer Factors:** Peer-related variables influence how a business interacts with its rivals. Companies that wish to increase their market share need to consider their competitive landscape carefully and pinpoint the CSFs that set them apart. A business might provide a special service or feature, such as the online store providing one-on-one pre-purchase consultations to customers.
- **Management Role in CSF:** Role in management CSFs emphasize inward transformation. These elements are driven by managers, who have objectives like enhancing workplace culture and performance. One way to make performance management successful is by teaching salespeople how to communicate with customers more effectively.

2.4: Identifying CSF:

1. **Strategize:** Make a project plan or an organizational strategy that outlines the goals of the activity. These have to be overarching objectives that set the course for the company over the ensuing years or define the purpose of a particular project.
2. **Gain Feed Back:** Ask all pertinent parties for their opinions. When developing an organization-level strategy, collaborate to determine the key results areas (KRAs), which are overarching objectives that are essential to the operations of the business and include things like profitability and customer happiness. Additionally, while embarking on a new project, determine the goals that your team cannot compromise on.
3. **Identify CSF:** After establishing project objectives or KRAs, connect CSFs to each. Assume a KRA is becoming more well-known to a new target market. Marketing initiatives may be reframed by a CSF for a distinct target market.
4. **Establish and Monitor Metric:** Metrics should be used to monitor progress as you strive toward objectives. Establish key performance indicators (KPIs) that the teams will watch to make sure the CSFs are healthy. You may establish a KPI for an increase in the proportion of engagement from a particular demographic on social media to ensure that a redesigned marketing approach is reaching the intended audience. Then, you may monitor traction gains with in-app data.

Chapter 3

Circular Economy

3.1: Circular Economy:

The aim of circular economy is to minimize waste and optimize resource consumption. In a circular economy, resources, materials, and products are used for as long as it is effective, and while they are in use, their full value is extracted. Products and materials are recovered, regenerated, and recycled at the end of their useful lives in order to make new goods or to serve as resources for future projects. The concept of a circular economy is in conflict with the conventional linear economy, which produces, uses, and then discards items as waste. Resources are taken out, processed, and then thrown away in a linear economy, which causes pollution, environmental damage, and the depletion of natural resources.

Redesigning systems, goods, and business models is a necessary step in the shift to a circular economy in order to reduce waste, increase resource efficiency, and establish more sustainable patterns of production and consumption. A circular economy's guiding principles include building durable and recyclable products, encouraging reuse and repair, putting in place effective waste management and recycling systems, and encouraging cooperation between stakeholders along the entire value chain.

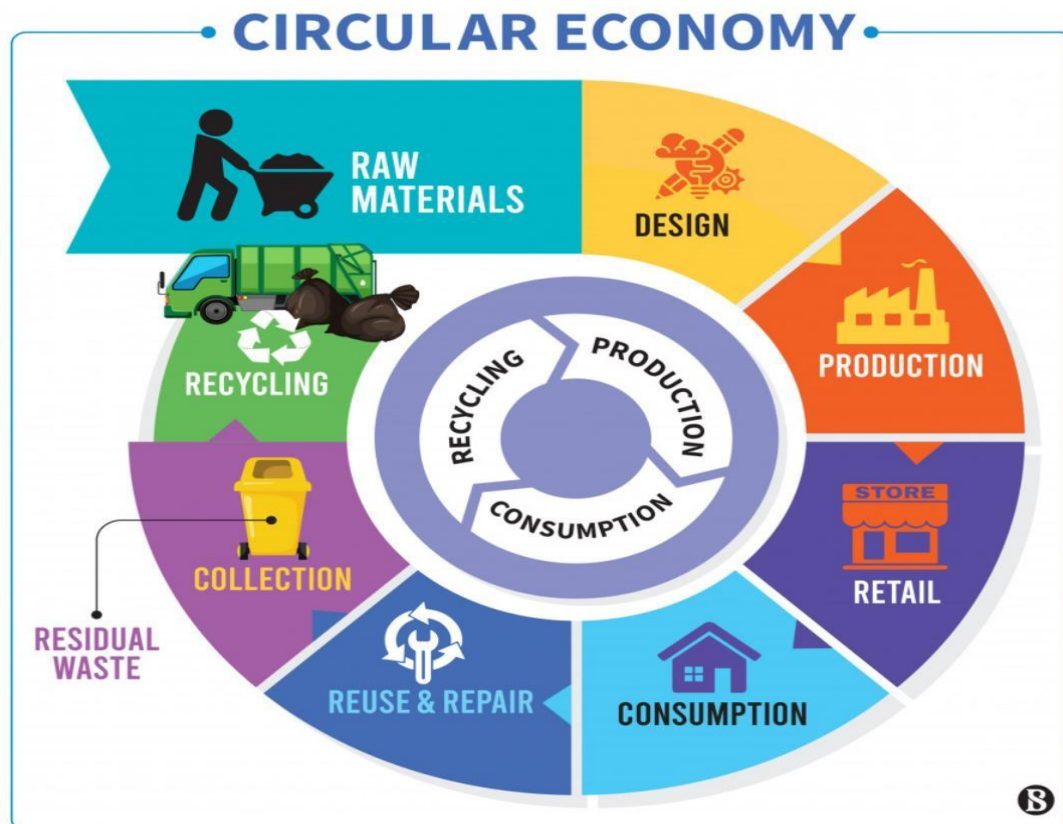


Fig 2: Circular Economy Diagram

Source: The Business Standard

3.2 : Importance of Circular Economy in Apparel Manufacturing Industry:

The concept of a circular economy is gaining increasing attention across various industries, including apparel manufacturing. Here's why it's particularly important in the apparel sector.

- **Conservation of Resources:** The fashion business is well known for using a lot of resources, such as electricity, water, and raw materials. A circular economy strategy places a strong emphasis on minimizing resource use through durable, reusable, and recyclable product design. This lessens the impact on the environment and conserves resources.
- **Reduction of Waste:** Significant waste is produced by the apparel industry at several points during the production process, from fabric scraps to unsold inventories. By promoting product and material reuse, refurbishing, and recycling, adopting circular economy concepts helps cut down on the amount of trash that ends up in landfills and incinerators.
- **Energy Efficiency:** Energy efficiency is promoted throughout the clothing production process by circular economy principles. This entails utilizing energy-efficient production techniques, recycling and upcycling to cut down on the requirement for virgin resources, and employing renewable energy sources.
- **Increased Product Life Span:** Products in a circular economy model are made with high-quality materials and robust construction to endure longer. This lessens the frequency of purchases and encourages a change in consumer habits toward something more sustainable, which eventually lessens the clothing industry's environmental impact.
- **Business Model Innovation:** Innovative business models including platforms for apparel rentals, leasing, and resale are encouraged by the concepts of the circular economy. By encouraging clothes sharing and reuse, these models increase the longevity of clothing and lower the need for new manufacture.
- **Consumer Engagement:** Demand for apparel that is made sustainably and ethically is rising as people become more aware of environmental issues. Adopting circular economy principles can help clothing companies better reflect the ideals of their target market, build their brand's reputation, and increase consumer loyalty.
- **Regulatory Compliance:** Adopting circular economy ideas can assist apparel makers in staying compliant with current and future requirements, avoiding potential fines and reputational damage. requirements and standards connected to environmental sustainability and waste management are becoming more and more stringent.

Chapter 4

Discussion, Process and Result

4.1 : Context of The Study:

In terms of trade, employment, investment, and income, the apparel manufacturing sector is the most significant in the world economy. This is made possible by short product life cycles, wide product differentiation, erratic demand, and comparatively lengthy and rigid supply chains.

Environmentally sensitive industrial activity (Statista, 2022). Bangladesh is a major worldwide player in the apparel business, exporting clothing to the majority of the world's nations, and during the past three decades, there has been a consistent upward trend (Fathi, 2022). shows the scenario of garment exports for the last ten years.

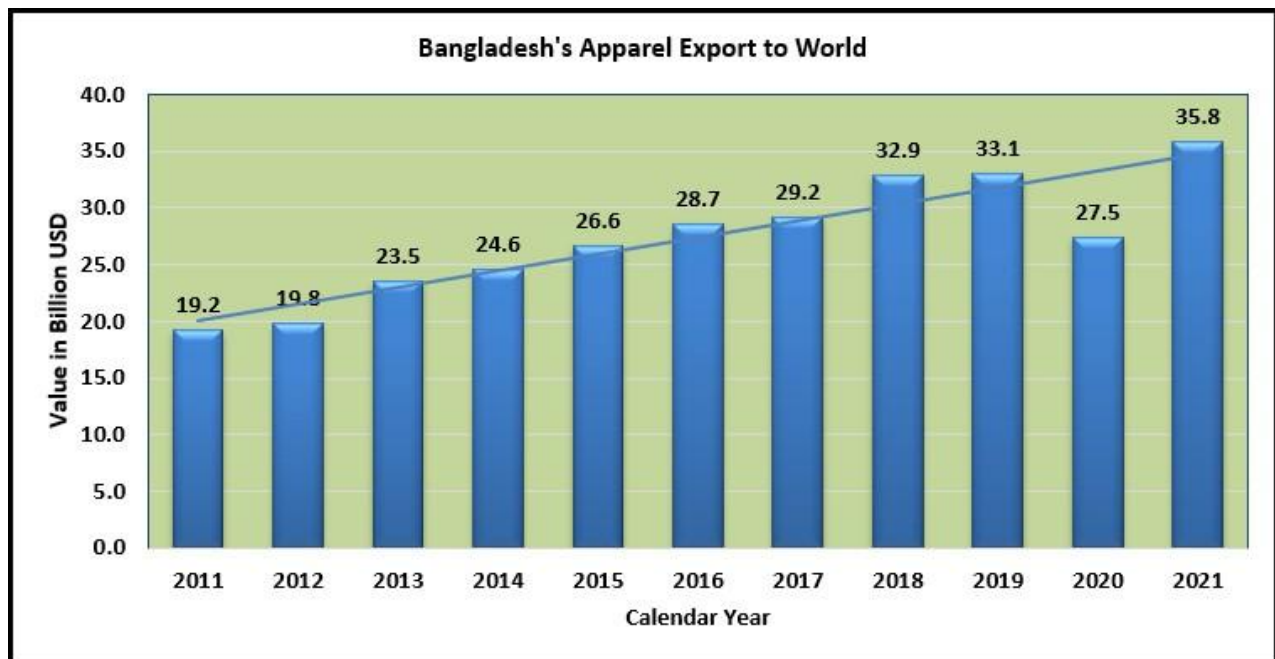


Figure 3: The apparel export scenario over past ten years (BGMEA, 2022)

Source: BGMEA Website

Natural resources are contaminated by the apparel manufacturing industry's massive water use during the various stages of production (Hossain and Khan, 2020). In addition to the amount of water used, different energy sources and waste produced also need to be taken into consideration for sustainable operations and the adoption of green practices in this developing sector.

This study considered the apparel sector for a number of reasons. First of all, despite of being Bangladesh's most lucrative business and one with great potential for growth, this sector has a bad reputation because of inadequate waste management practices and environmental effects.

Secondly, the global society is putting a lot of pressure on our apparel sectors supply chain to adopt green techniques instead of the more conventional ones. Thirdly, in order to increase their competitiveness in the global market, owners of the garment industry are eager to use green supply chain management techniques that will achieve sustainability for social and environmental growth.

4.2: Identify CSF to Implement Circular Economy:

The most common critical success factors for the implementation of the circular economy were identified as the first stage in the suggested approach. Numerous scholars have studied different CSFs to apply the circular economy in a variety of industries within the past 20 years. The key CSFs for the adoption of the circular economy in the apparel manufacturing sector were identified by reviewing the studies published between 2010 and 2022 that were accessible through the Google Scholar and Scopus databases.

Using a range of closely related keywords and search strings, including "Sustainable Supply Chain Management implementation in Apparel Manufacturing Industry," "Implementation of CSFs in circular economy," "Sustainable Advancement Goals and Green Practices in Ready Mate Garment Sector," and "Green practices in the apparel manufacturing industry," the CSFs were located. Other associated terms and phrases were "CSFs for eco-friendly supply chain management," "The supply chain of the clothing manufacturing industry's effects on the environment," or "green supply chain management techniques' effects on sustainable development objectives".

Experts reviewed the first eighteen CSFs for the application of circular economy in the apparel manufacturing sector in order to confirm the applicability of the data inclusion. Four CSFs—"Pressure of relevant stakeholder", "Sustainability of greener products," "Negotiating leverage with suppliers," and "Management of Green lifecycle"—were disregarded by the experts since they were seen to be less important in relation to the garment manufacturing business. Two other CSFs were also included: "Demand from buyer" and "Supplier cooperation and training." Following expert evaluation, sixteen CSFs in total were chosen for additional study shown in table 1.

Table 1: Lists of CSF

Code	CSFs	References
CSF1	Sustainable waste management system	Ho et al. (2022); García Alcaraz et al. (2022)
CSF2	Demand from buyer	Expert feedback
CSF3	Achieving and sustaining environmental (LEED, Higg FEM, ISO 14001, ZDHC) certifications	Habib and Bao (2019); Hoque et al. (2022); Banik et al. (2022); Kalpande & Toke (2021)
CSF4	Green awareness	Wang et al. (2022); Wang et al. (2020)
CSF5	Global competition factor	Banik et al. (2022); Rane et al. (2021)
CSF6	Green sourcing and procurement	Adamides et al. (2021); Zhou et al. (2019); Yildiz Çankaya & Sezen (2019); Sellitto et al. (2019)
CSF7	Economic and tax benefits	Barman et al. (2021); Goyal et al. (2021)
CSF8	Efficient reverse logistics management	Tumpa et. al. (2019); Plaza-Úbeda et al. (2020); Sellitto et al. (2019)
CSF9	Supplier training and cooperation	Expert feedback
CSF10	Availability of qualified and skilled manpower	Banik et al. (2022)
CSF11	Sustainable logistics and inventory management	Teixeira et al. (2018); Teixeira et al. (2020)
CSF12	Top management commitment	Moktadir et al. (2017); Kitsis and Chen (2021); Kumar et al. (2019)
CSF13	Sustainable energy management and reduction of fossil fuel usage	Anam et al. (2022); Gawusu et al. (2022); Khan (2020)
CSF14	Government rules and regulations	Nezakati et al. (2016); Agrawal et al. (2022)
CSF15	Sustainable adoption of green technologies	Kazancoglu et al. (2018); Toke & Kalpande (2019); Singh et al. (2022)
CSF16	Sustainable supplier selection	Chowdhury et al. (2020); Shin and Cho (2022); Khokhar et al. (2022)

4.3: Description of CSF:

- **Sustainable waste management system:** To effectively use resources while protecting the environment and public health, a sustainable waste management system is necessary. It seeks to reduce the amount of trash produced, encourage recycling and reuse, and safely dispose of or treat any leftover garbage. Societies can advance toward a more sustainable waste management system, preserving resources, cutting pollution, and lessening the effects of climate change by implementing a comprehensive strategy that incorporates these tactics.
- **Demand from buyer:** Growing public awareness of the environmental problems caused by linear economic models—which focus on the production, use, and disposal of products—has occurred in recent years. As a result, there has been a change in favor of the circular economy's tenets, which place an emphasis on sustainable practices, waste minimization, and resource efficiency. In an increasingly environmentally sensitive society, businesses must make this shift in order to be relevant and accountable. As important participants in the supply chain, buyers are vital in promoting this circularity movement. Their strong demand for goods and services that adhere to the principles of the circular economy is a potent force for change.
- **Green Awareness:** The term "green awareness" describes the degree of consciousness and comprehension that people, groups, and society have about sustainability, environmental challenges, and the value of protecting natural resources. It acts as a vital catalyst for

encouraging a group commitment to sustainable practices and positive behavioral changes.

- **Global Competition factor:** Global competitiveness has a big impact on corporate operations in today's linked world, particularly the adoption of circular economy principles. The circular economy has arisen as a strategic response to environmental concerns as well as economic imperatives, with its focus on resource efficiency, waste reduction, and sustainable production.
- **Green Sourcing and Procurement:** It is also known as sustainable sourcing and procurement, refers to the practice of acquiring goods, services, and materials in a way that minimizes the impact on the environment, encourages social responsibility, and maintains economic viability along the whole supply chain.
- **Economic and Tax benefit:** Economic and tax benefits refer to advantages provided by governments or economic systems to individuals, businesses, or specific industries in order to stimulate economic activity, encourage investment, or achieve certain policy objectives.
- **Efficient reverse logistics and Management:** In order to manage the movement of goods, materials, and resources in a way that maximizes value recovery and reduces environmental effect, strategic procedures and systems have been put in place. The core tenets of a circular economy are to maximize the value extracted from products and materials during their use, recover and regenerate products and materials at the end of their life cycles, and keep products and materials in use for as long as possible.
- **Supplier Training and Cooperation:** It refers to the extent to which suppliers are equipped with the necessary knowledge, skills, and resources to participate effectively in circular economy practices. With recycling, reuse, and refurbishment, the circular economy seeks to prolong the useful life of goods, parts, and materials while reducing waste and optimizing resource value.
- **Availability of qualified and skilled manpower:** Availability of qualified and skilled manpower in the circular economy refers to the presence of individuals with the necessary expertise, knowledge, and abilities to effectively operate within the framework model of a circular economy. In a circular economy, materials and products are recovered and renewed at the end of their useful lives after being used for the longest feasible time and having the most value derived from them during that time. This requires a workforce that is well-versed in sustainable practices, resource efficiency, waste management, recycling, remanufacturing, and other aspects of circularity.
- **Sustainable logistics and inventory management:** Sustainable logistics and inventory management in a circular economy involves the application of principles and practices aimed at reducing waste, maximizing resource efficiency, and minimizing environmental impact throughout the entire supply chain. This model that keeps resources in use for as long as feasible, extracts as much value as possible from them, and then recovers and regenerates at the conclusion of their life cycle replaces the conventional linear "take, make, dispose" paradigm.

Sustainable logistics and inventory management play a crucial role in facilitating this transition by optimizing transportation, storage, and distribution processes while minimizing resource consumption and waste generation.

- **Top Management Commitment:** Top management commitment in circular economy refers to the active involvement and support of senior leadership within an organization towards transitioning to and implementing circular economy principles.
- **Efficient energy management and minimization of fossil fuel usage:** Sustainable energy management and reduction of fossil fuel usage within the framework of a circular economy involves the strategic integration of renewable energy sources, energy efficiency measures, and circular principles to minimize environmental impact, maximize resource efficiency, and promote economic viability.
- **Government rules and regulations:** circular economy" aims to maximize resource utilization and reduce waste. It is predicated on the ideas of minimizing waste and pollution, preserving the useful life of goods and resources, and restoring natural systems. Government rules and regulations play a crucial role in promoting and regulating circular economy practices.
- **Sustainable adoption of green technologies:** The sustainable adoption of green technologies in a circular economy refers to the integration of environmentally friendly technologies into the principles and practices of a circular economy framework. A circular economy is a type of economic structure that maximizes resource reuse, recycling, and regeneration in order to reduce waste and maximize resource utilization.
- **Sustainable supplier selection:** Sustainable supplier selection in a circular economy refers to the process of identifying and partnering with suppliers who adhere to principles of sustainability within the framework of a circular economic model. Resources are used as long as feasible in a circular economy, and waste and pollution are reduced. Therefore, selecting suppliers who prioritize sustainability aligns with the broader goal of reducing environmental impact and promoting resource efficiency.

4.4: Expert Selection:

Unlike random sampling, the purposive or judgmental sampling technique was used in this study to choose the experts. When using purposive sampling, the researcher's procedure of selecting experts is heavily influenced by the decision-maker's experience and ability to offer feedback on that particular topic. Thirty specialists were taken into consideration in this study, considering academic and business professionals. a bachelor's degree or more, as well as theoretical and practical expertise in SCM and Sustainable supply chain management techniques, comprehension of the survey questionnaire, and a minimum of ten years of work experience in the apparel manufacturing sector were requirements for selection of the industrial experts. The identities of the experts and the companies they worked for were kept secret in order to preserve privacy and confidentiality. Table 2 shows an overview of the survey respondents.

Table 2: Details of Experts

Attributes			Number of experts	Percentage of experts
Total Respondent (n = 30)	Designation	Executive Director	3	10%
		General Manager	9	30%
		Manager	12	40%
		Professor (Academic)	3	10%
		Assistant Professor (Academic)	3	10%
	Area of expertise	Procurement	8	27%
		Manufacturing	10	33%
		Merchandising	5	17%
		Supply chain management	4	13%
		Operations	3	10%
	Level of experience	10-15 years	15	50%
		15 to 20 years	10	33%
		20 years +	5	17%

Source: The Author

4.5: Process and results:

In order to assess the detected CSFs, a Google form-based survey questionnaire was distributed to thirty specialists. To create the comparison, a questionnaire was created and distributed to the experts. and rate (0-10) the top CSFs in apparel manufacturing industry. Each expert gives rating to the CSF and Finally, we will develop a priority chart of CSF according to expertise rating. The rating chart is shown in below table 3.

Table 3: Rating given by Experts

EXPERT-1																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	6	7	7	6	7	5	6	6	5	8	6	8	6	8
EXPERT-2																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	5	6	6	5	6	4	5	5	4	7	5	7	5	7
EXPERT-3																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	8	9	7	8	8	7	8	6	7	7	6	9	7	9	7	9
EXPERT-4																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	5	6	6	5	6	4	5	5	5	7	5	7	5	7
EXPERT-5																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	9	6	7	5	6	6	6	6	5	6	8	6	7	7	9
EXPERT-6																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	6	6	7	6	7	6	5	5	7	5	8	6	9
EXPERT-7																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	9	6	6	7	5	6	6	7	6	6	8	6	7	7	9
EXPERT-8																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	6	5	6	6	5	6	6	7	6	7	6	7	8	8
EXPERT-9																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	6	6	7	6	7	6	5	5	7	5	8	6	9
EXPERT-10																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	8	9	7	8	8	7	8	6	7	7	6	9	7	9	7	9
EXPERT-11																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	5	6	6	7	7	7	6	5	8	6	8	7	7
EXPERT-12																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	5	6	5	7	5	5	7	5	4	8	6	8	7	9
EXPERT-13																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	4	4	6	6	5	5	6	5	6	7	6	6	7	7
EXPERT-14																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	6	6	7	6	7	6	5	5	7	5	8	6	9
EXPERT-15																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	6	6	7	6	7	5	7	5	6	7	6	8	7	8

EXPERT-16																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	5	6	6	7	7	7	6	5	8	6	8	7	7
EXPERT-17																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	6	4	7	6	6	5	7	5	5	6	6	8	7	8
EXPERT-18																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	7	5	6	5	7	7	5	6	7	7	8	6	8	6	9
EXPERT-19																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	7	5	6	6	5	5	8	4	6	7	6	6	7
EXPERT-20																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	6	6	7	6	7	6	5	5	7	5	8	6	9
EXPERT-21																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	5	6	6	7	6	7	6	5	5	7	5	8	6	9
EXPERT-22																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	4	4	6	6	5	5	6	5	6	7	6	6	7	7
EXPERT-23																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	7	5	7	6	6	6	7	6	5	6	7	5	6	8
EXPERT-24																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	5	5	6	6	7	7	7	6	5	8	6	8	7	7
EXPERT-25																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	6	8	5	6	6	5	6	4	5	5	4	7	5	7	5	7
EXPERT-26																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	6	5	7	7	6	5	8	6	4	6	6	7	7	8
EXPERT-27																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	5	6	7	7	6	7	8	6	5	7	7	8	7	9
EXPERT-28																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	5	5	7	6	6	7	7	6	5	6	6	7	7	8
EXPERT-29																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	8	6	6	7	6	6	6	7	6	5	8	6	8	7	8
EXPERT-30																
Rating out of 10	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
	7	9	7	6	7	7	6	6	7	6	5	7	6	8	7	9

Source: From Expert Professionals

Now we have calculated the average value of each CSF as per expert rating.

Table 4: Average value of CSF

CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15	CSF16
68%	83%	55%	58%	63%	63%	62%	58%	64%	57%	52%	73%	59%	75%	65%	81%

Source: The Author

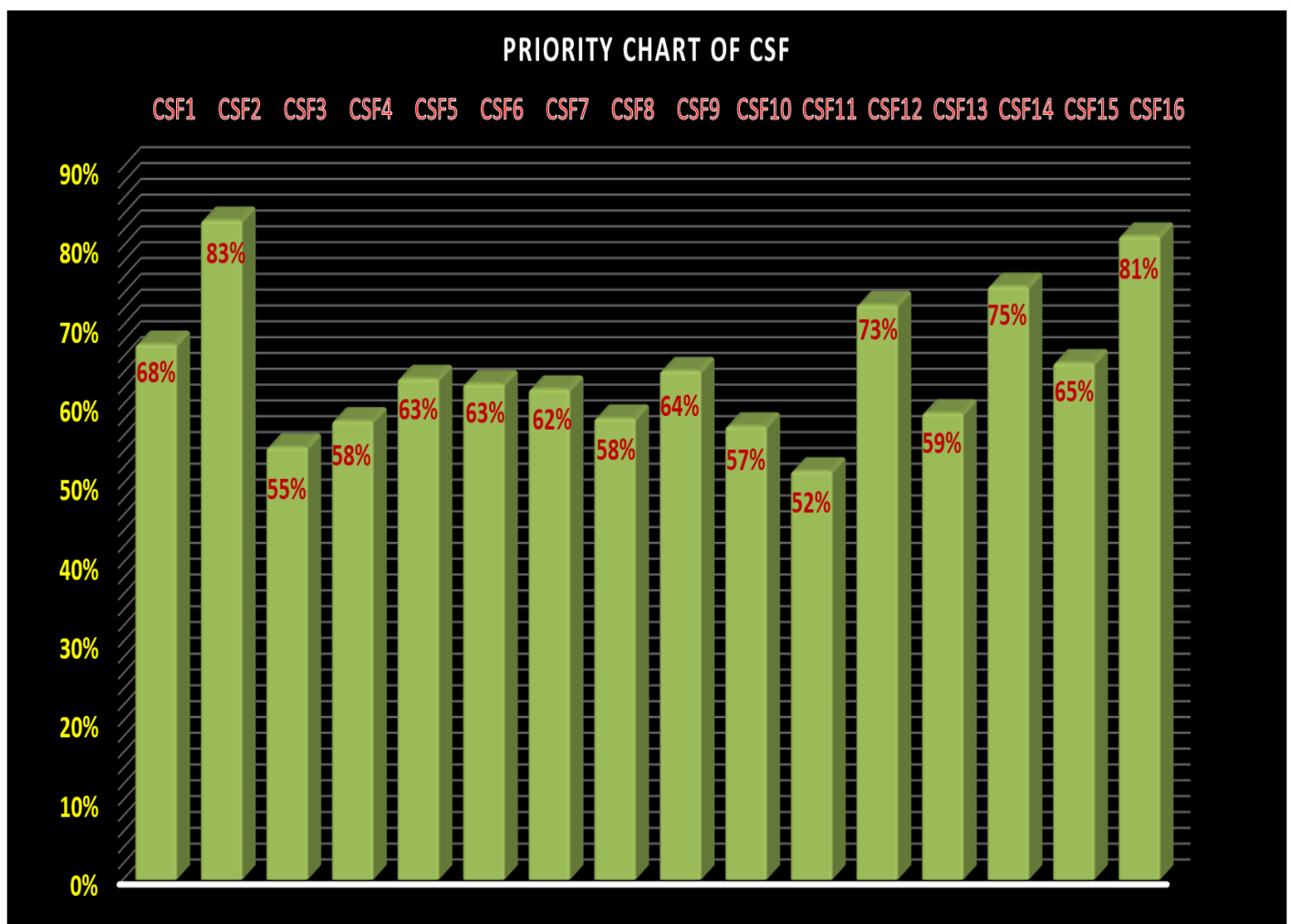


Fig 4: Priority Chart of CSF

Source: The Author

TOP 5 CSF:

Table 5: Top 5 CSF

TOP 5 CSF/Primary CSF	Factors Code	Factors	Rating
	CSF2	Demand from buyer	83%
	CSF16	Sustainable supplier selection	81%
	CSF14	Government rules and regulations	75%
	CSF12	Top management commitment	73%
	CSF1	Sustainable waste management system	68%
Secondary CSF	CSF15	Sustainable adoption of green technologies	65%
	CSF9	Supplier training and cooperation	64%
	CSF5	Global competition factor	63%
	CSF6	Green sourcing and procurement	63%
	CSF7	Economic and tax benefits	62%
	CSF13	Sustainable energy management and reduction of fossil fuel usage	59%
	CSF8	Efficient reverse logistics management	58%
	CSF4	Green awareness	58%
	CSF10	Availability of qualified and skilled manpower	57%
	CSF3	Achieving and sustaining environmental (LEED, Higg FEM, ISO 14001, ZDHC) certifications	55%
	CSF11	Sustainable logistics and inventory management	52%

Source: The Author

Chapter 5

Challenges, Recommendation and Conclusion

5.1 Challenges:

We have faced some challenges during this project.

- The selection process of expert professionals is arbitrary and based on their availability.
- Sometimes it's troublesome to collect the questionnaires from the expert professional
- Due to time constraint, it has not been possible to engage more expert professional
- Our survey was conducted within 16 CSF. There might be more CSF rather than these.

5.2 Recommendation:

If we can focus on top 5 CSF successfully, definitely we can ensure a circular economy among all apparel manufacturing industry.

- **Demand from buyer:** In the transition towards a circular economy, demand from buyers plays a pivotal role. To create the comparison, a questionnaire was created and distributed to the experts. Buyer demand serves as a catalyst for change in this transition. When consumers express a preference for products designed for durability, repairability, and recyclability, manufacturers are incentivized to adapt their production processes accordingly. This demand signals to businesses that there is a market for sustainable products and encourages them to innovate in ways that align with circular economy principles.
- **Sustainable supplier selection:** In a circular economy, the goal is to minimize waste and maximize resource efficiency throughout the entire product lifecycle. Sustainable supplier selection ensures that materials and components used in manufacturing processes are sourced responsibly, produced with minimal environmental impact, and designed for longevity and recyclability. By partnering with sustainable suppliers, businesses can access materials and resources that align with circular economy principles. Environmentally friendly methods, like using renewable energy, conserving water, and lowering emissions, are frequently given top priority by these companies. They may also offer products made from recycled or upcycled materials, which contribute to closing the loop on resource use.
- **Government rules and regulations:** Firstly, regulations can establish clear standards and requirements for product design, manufacturing, and waste management that prioritize resource efficiency, recycling, and reuse. This can include mandates for eco-design principles, extended producer responsibility schemes, and minimum recycled content requirements. Such regulations provide businesses with certainty and guidance on how to integrate circularity into their operations.

Secondly, government policies can stimulate investment in circular economy infrastructure and innovation through financial incentives, grants, and tax breaks. By offering support for research and development, technology deployment, and the establishment of circular supply chains, governments can accelerate the transition towards circularity and create new economic opportunities.

Thirdly, regulations play a crucial role in shaping consumer behavior and market demand. Measures such as labeling schemes, product standards, and awareness campaigns can empower consumers to make more sustainable choices and reward companies that embrace circular practices. Additionally, policies that discourage wasteful consumption patterns, such as bans on single-use plastics or landfill taxes, can help drive demand for circular alternatives.

Moreover, government rules and regulations can foster collaboration and coordination among stakeholders across the value chain. By convening industry stakeholders, non-governmental organizations, and academia, governments can facilitate knowledge sharing, promote best practices, and develop joint initiatives to overcome barriers to circularity.

- **Top management commitment:** Top management commitment is indispensable for the successful implementation of a circular economy within an organization. The leadership's dedication to embracing circularity sets the tone for the entire company and drives the necessary cultural and operational shifts needed to embed circular principles throughout the business.

Firstly, top management commitment signals to employees, stakeholders, and customers that the organization is serious about sustainability and environmental stewardship. When leaders prioritize circular economy initiatives, it encourages workers to feel accountable and purposeful, which inspires them to actively support the company's sustainability objectives.

Secondly, top management commitment is crucial for allocating resources and investments towards circular economy projects. Initiatives such as redesigning products for recyclability, implementing take-back programs, or transitioning to renewable energy sources often require upfront investment and long-term planning. When top management prioritizes these initiatives, it ensures that the necessary funding, expertise, and support are available to drive implementation.

- **Sustainable waste management system:** The effective adoption of a circular economy depends on a sustainable waste management system. The objective of a circular economy is to reduce waste and extend the life of materials and resources through recycling, reusing, and repurposing. A robust waste management system is necessary to facilitate the collection, sorting, processing, and recovery of materials, ensuring they can be reintegrated into the economy instead of ending up in landfills or polluting the environment. Firstly, a sustainable waste management system helps to close the loop on resource use by enabling the recovery and recycling of valuable materials from discarded products and materials. Instead of being disposed of as waste, these materials can be recovered and transformed into new products or inputs for manufacturing processes, reducing the need for virgin resources and minimizing environmental impacts.

Secondly, a well-designed waste management system contributes to resource efficiency and conservation by maximizing the recovery of materials and energy from waste streams. Through methods such as composting, anaerobic digestion, and incineration with energy recovery, organic waste can be converted into valuable resources such as compost, biogas, or heat and electricity, further reducing reliance on finite resources and fossil fuels.

5.3 Conclusion:

Implementing circular economy principles in the manufacturing industry is not just a trend but a necessity for a sustainable future. Manufacturers can minimize their environmental effect and establish a more resilient and resource-efficient economy by adopting a circular model that emphasizes reuse, remanufacturing, and recycling instead of the conventional linear "take-make-dispose" paradigm. This transformation involves redesigning products for longevity and recyclability, establishing closed-loop supply chains, embracing product-as-a-service models, and fostering collaboration across the value chain. With growing awareness of environmental issues and increasing pressure to mitigate climate change, circular economy practices are poised to become the norm in the manufacturing industry, driving innovation and fostering sustainable growth for years to come. In this report we have developed a critical success factor and their priority based on expert opinion. If we could successfully implement the top 5 CSF first, we may expect an efficient circular economy in all manufacturing industries.

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