

Prospects of sustainable supply chain management for ICT procurement in Bangladesh perspective using block chain technology

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3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
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Abstract

Now a day's supply-chain management is the popular terms for major business revolution to get products to market faster at lower costs. The supply chain has traditionally defined as a one-way, integrated manufacturing process where in raw materials are converted into final products, and then delivered to customers. Under the traditional definition of supply chain, it includes only those activities associated with manufacturing, from raw material acquisition to final product delivery. Sustainable Supply chain is related to the sustainable procurement systems that is a key area in the work to promote Sustainable Consumption and Production (SCP). However, due to recent changing of market demand, technical requirements and environmental condition affecting manufacturing operations, increasing attention is given to backward integration, sourcing of raw materials and the developing new strategies for the supply chain, it is important to explore the utilization of ICT in the sustainability of SCM in the context ICT Procurement in Bangladesh. From this perspective, an extension of existing concept of supply chain is required. This study has been done to assess the scenario of practicing the modern Supply Chain procedure in procurement especially IT Goods procurement in the public and Private sector of Bangladesh. Respective people in charge of procurement in different organizations have interviewed and data gathered for 05 years on; knowledge about modern Supply Chain Management, number of ICT professionals in the organization, ICT budget, number of procurement packages completed through *e-GP* , number of IT professionals ,number of professionals trained on ICT procurement, tendering system for ICT procurement, dependency on few suppliers for ICT procurement, ICT procurement directly from Original Equipment Manufacturer (OEM), sending feedback to the OEM, knowledge about blockchain and some other things. After analyzing the gathered data it has been understood that all the parameters of modern supply chain is gradually increasing. This is worthy to mention that amount of ICT procurement and its budget allocation is sharply increasing. The eagerness on blockchain and the curve of its understanding is also up warding.

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ABBREVIATION

BT=Blockchain technology

CSE=Corporate social responsibility

CTS =Cost to Serve

ERP= Enterprise resource planning

EM=Environmental management

ICT=Information and Communication Technology

GDP= Gross domestic product

GTM=Go to Market

GSSCM =Green Sustainable Supply Chain Management

GSCM=Green production network the executives

OEM= Original Equipment Manufacturer

RTM= Route To Market

TTS= Time To Serve

SCM =Supply Chain Management

SSCM= Sustainable Supply Chain Management

SCOR=The Supply Chain Operations Reference-model

S&OP= Sales and Operations Planning

SFP Shelf Friendly Packaging

WH =Warehouse

WCED=World Commission on Environment and Development

WBCSD=The World Business Council for Sustainable Development

CHAPTER 1

INTRODUCTION

1.1 Objectives

Now-a-days the ICT sector has emerged as the biggest procurement sector of Bangladesh. In the Vision of Digital Bangladesh ICT sector development increased very highly. ICT has become an important sector as like others. The investment of ICT sector in Bangladesh is growing very high. Large number of ICT procurement done every year. Information Technology sector experts feel that implementing policy that supports the ICT sector in achieving its end goals are far more important than the budget allocation. Even then, industry insiders say the government's move to increase the budget allocation for the Information and Communication Technology (ICT) sector is a positive sign that reflects the amount of importance being placed on the industry, especially as promoting the sector will carry forward the government's vision of Digital Bangladesh. SCM is essentially an assignment for business, creating and conveying products and enterprises. How this is practiced is subject to showcase requests and desires. Both the why: drivers, and how: pertinent instruments, must be evaluated to analyze the market preparation and momentum ability of maintainable production network the board. There is likewise a need to characterize the idea – what is feasible production network the executives (Bangladesh Bank, 2009). The major objective of this thesis is to identify the challenges of SCM in ICT procurement in Bangladesh and identify, and analyze how the use of blockchain technology can support sustainable supply chain management strategies and ICT procurement. Also, to represent a proposed framework for sustainable supply chain management with the help of block chain technology.

1.2 Motivation

The main reason of this work is to study the business processes of ICT in line with the sustainability and develop understanding for ICT application for the sustainable ICT in Bangladesh. The system —ICT in Sustainable Supply Chain is ICT based research study for developing understanding of a supply chain management model that are i

evolved with the supply chain of a product at ICT and can pre mediate the timing of getting out of a supply for a certain amount of product. This system is on the basis of practical data and rules basis of the ICT sector.

1.3 Goals and Expected Results

The focus areas of supply chain during years ago were almost nonexistence. Now a day to make the entire supply chain sustainable the corporations started to focus on green issues. A side with environmental management, health, legal and ethical issues has been focused for the long-term perspective. Along with these factors, company should focus on economic factors to make the entire supply chain sustainable. Companies are under pressure in maintaining all the issues together. On the other hand, companies are facing several risk factors in the entire supply chain management process for which even a single breakdown in entire supply chain may make the chain out of reliability and flexibility and thus loosing customer satisfaction, trust and commitment.

To hold the quality of product that are being supplied the production unit need to focus on the entire quality of suppliers holding backward with the multiple tire of raw materials outsourcing. For this there should have efficient flow of information. Cost and quality are major consideration in case of forward. Finally, the consideration for the corporations needs to be taken for such issues that provide sustainability like green issues supporting environment, health, legal and ethical issues. Presently, ecological quality has come to mean "safe drinking water, healthy ecosystems, safe nourishment, lethal free networks, safe waste administration, and the reclamation of polluted. Simultaneously, there has been expanding open consideration put on the general state of the regular habitat. The present state and pattern of natural corruption (from administrative, shopper, and good stances) demonstrate a requirement for an adjustment in assembling theory. That is, there must be a major move in the manner generation frameworks work. There must be a move towards maintainability, accomplished through tremendous decreases in asset use and waste age, and a move away from one-time use and item transfer. The initial phase in such a move is to expand the structure of the present single direction inventory network to a shut circle, including store network tasks intended for end-of-life item and bundling recuperation, assortment, and reuse (in the types of reusing or potentially re-producing).

Thus, the objective of this work is to justify briefly the extended concept of supply chain to hold sustainability by considering economic, social and environmental issues amongst many issues of sustainability. We also focus on the barriers of using sustainable supply chain and the misconception towards the practice of sustainability.

1.4 Layout of the Report

There are six chapters in this work: Introduction, Literature Review, Supply Chain Management with Block Chain, Business Process in SCM of ICT and result.

Chapter one, Introduction; gives the concept behind the work, goals of the work and expected result. Similarly types of work those are already done in all over the world including Bangladesh are also provided in this chapter.

Chapter two describes the literature on sustainable supply chain management in order to describe some important relevant features of this field and identify some research gaps. The chapter provides an overview of supply chain management and sustainability and their historical backgrounds and how supply chain related to the ICT procurement systems in Bangladesh,

Chapter three, Supply Chain management and Block Chain technology ; describes linking/interaction between sustainability and supply chain, and supply chain management activities, Integrated factors towards sustainability, Corporate social responsibility and Environment Management of sustainability, gives the basic idea of quantitative disciplines including Supply Chain management, the brief discussion on the terms associated with structure and process, Conventional and management in industry supply chain sector criteria as well as important ranking procedures of industry sectors.

Chapter four, Sustainable Framework for SCM using Block Chain in ICT: Business process Model; is discussed about of all the methodologies that have been used in this work for the research purpose. It provides a clear concept on how the research work has been conducted by following step by step process and using several tools to have the desired outcome. And also describe about ICT Business Structure, Analysis of sustainable Supply Management using Block Chain.

Chapter Five, Result and Findings and describe the analysis of the result and identify the findings of this thesis.

Chapter Six, conclusion and some main statements and proposals for future research in order to improve the performance and it also gives the sign of the future work.

CHAPTER-2

LITERATURE: SUSTAINABLE SUPPLY CHAIN MANAGEMENT

2.1 Introduction

This chapter examines the literature on related disciplines of supply chain management and sustainable supply chain management (SCM). Independently, sustainability and SCM are moderately entrenched research disciplines; in any case, there is a deficiency of observational research that investigates the combination – sustainable supply chain management (SSCM) – between them. Specifically, an audit of SSCM writing uncovered that researchers have inspected a few independent subjects, methodologies and practices that are identified with improving an organization's SSCM execution. In any case, it gives the idea that as of now the SSCM field is developing quickly however there are moderately barely any experimental examinations that have analyzed SSCM comprehensively. This part starts with a layout of the manageability writing. Initial, a diagram of the maintainability measurements is exhibited, trailed by a concise outline of the momentum condition of manageability examine in the Bangladesh ICT procurement context. In the second section, an overview of SCM is presented, followed by a discussion of SCM perspectives. Next, the interface between sustainability and SCM – the SSCM concept and SSCM using Block Chain– is explored, and the research gaps of this study are presented.

2.2 Supply Chain Management

Supply Chain Management is a network of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system.

Supply chain is the interdisciplinary area where social and the physical science interacts with each other. It is the between generational, multi scale and the multi-dimensional part of the statistical surveying. It has the perplexing idea of the production network the executives. Much research was embraced in the mid 1990's. These analysts have distinguished the idea of the inventory network

The board. It has embraced the coordinated point of view. This has prompted the improvement of the incorporated perspective on the store network the board. In this area, arrange configuration has increased a lot fame. Practice of the corporate social duty has risen. To decide the snags in the inventory network the board, potential regions of things to come inquire about, system of this examination, writing audit, and strategies of the investigation are included. Various methodologies, contextual analyses and investigates are broke down. Various methodologies of SSCM, completeness and its impact, techniques, strategies for basic leadership, institutionalization, productivity, and gauges in the key exhibitions are the primary core interest. The Challenges in Establishing Sustainable Supply Chain in Bangladesh, Mohammad Mazbha Uddin (2015)

It traverses obtainment, assembling and dispersion (Lee and Billington 1995) the fundamental goal of production network the board is to "streamline execution of the chain to include however much incentive as could be expected for the least cost conceivable". As it were, it plans to connect all the store network operators to together collaborate inside the firm as an approach to boost efficiency in the inventory network and convey the most advantages to every related gathering (Finch 2006).

Selection of Supply chain the executives rehearses in businesses has relentlessly expanded since the 1980s. Various definitions are proposed and the idea is examined from numerous viewpoints. Be that as it may, Cousins et al. (2006); Sachan and Datta (2005); Zailani (2011) gave magnificent survey on inventory network the board writing. These papers characterize the idea, principals, nature, and advancement of SCM and show that there is an extreme research being led the world over in this field they fundamentally surveyed improvements in the hypothesis and practice of supply the executives.



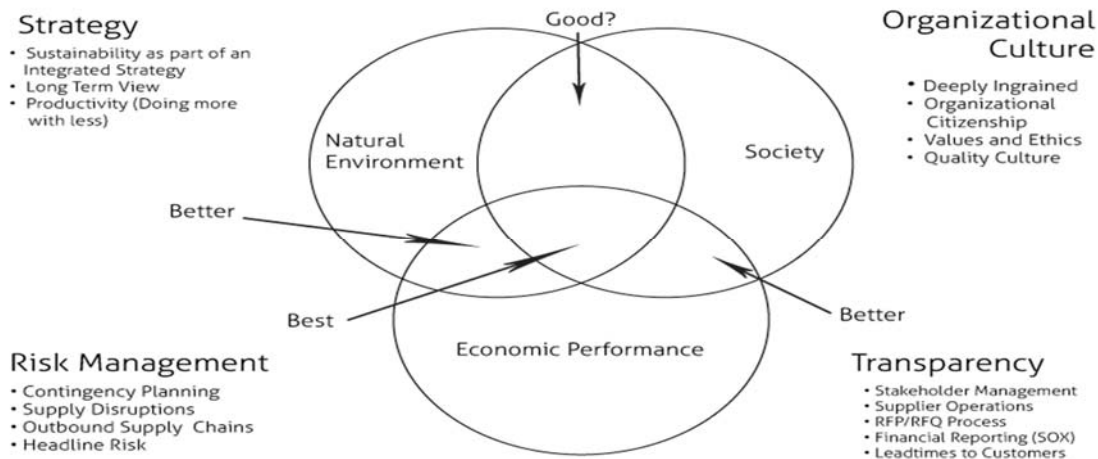
Fig 2.1: Supply Chain Management

Table2.1: Evolution eras of supply chain management (Jain et. al. 2010)

S.No.	Era	Description
1	Creation Era	The term supply chain management was first coined by an American industry consultant in the early 1980s. However the concept of supply chain in management, was of great importance long before in the early 20th century, especially by the creation of the assembly line.
2	Integration Era	This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems.
3	Globalization Era	This era is characterized by the globalization of supply chain management in organizations with the goal of increasing competitive advantage, creating more value-added, and reducing costs through global sourcing
4	Specialization Era Phase One-Outsourced Manufacturing & Distribution	In the 1990s industries began to focus on “core competencies” and adopted a specialization model. Companies abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies.
5	Specialization Era Phase Two - Supply Chain Management as A Service	Specialization within the supply chain began in the 1980s with the inception of transportation brokerages, warehouse management, and non asset based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance management.
6	Supply Chain Management 2. 0 (SCM 2. 0)	Web 2. 0 is defined as a trend in the use of the World Wide Web that is meant to increase creativity, information sharing, and collaboration among users.

2.3 Sustainability

This section presents the idea of sustainability and a short foundation of its reasonable improvement in the literature. This is trailed by a diagram of sustainability measurements and their applied advancement. At long last, the idea of sustainability is investigated inside the Bangladesh setting to exhibit the requirement for sustainability inquire about in the Bangladesh business context. Sustainability is a mind boggling and all-encompassing methodology that incorporates improvement of three free however interlinked measurements – financial advancement, social value and ecological security (Dyllick and Muff, 2015; Slawinski and Bansal, 2015; I Montiel and Delgado-Ceballos, 2014); Wexler, 2009). In the business setting, it is by and large alluded to as triple main concern (TBL) or Triple Ps – individuals, planet and benefit (Closs et al., 2011; John Elkington, (1998). The conventional business point of view urges organizations to place a restrictive accentuation on the standard of benefit amplification (Milton Friedman, 1970). As indicated by Milton Friedman (1970), the 'matter of business will be the same old thing', contending that sustainability and CSR-related issues ought to be overseen by governments, NGOs, foundations and different types of social welfare associations. Then again, the manageability worldview is strong and comprehensive commonly in light of the fact that it advances concurrent business improvement in social, ecological and financial viewpoints



(Elkington, 1998; Epstein, 2008).

Fig 2.2: Sustainable Supply Chain Management

The term sustainability became a force to be reckoned with during the 1980s (Lele, Sharachchandra. (1991), and is gotten from an expansive idea called 'reasonable improvement' that has different translations (Carroll and Buchholtz, 2008; *Lele, Sharachchandra. (1991)*). Barbier (1987, p.103) expressed that the point of manageable improvement is to “maximize simultaneously the biological system goals (genetic diversity, resilience, biological productivity), economic system goals (satisfaction of basic needs, enhancement of equity, increasing useful goods and services), and social system goals (cultural diversity, institutional sustainability, social justice, participation)”. The World Commission on Environment and Development (WCED) defined sustainable development as “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43). This definition remains the most quoted definition for sustainable development since it was first proposed by the Brundtland Commission in 1987 in its report ‘Our Common Future’ (Ashby et al., 2012). The key principles of this definition are:

Be that as it may, at the start, the idea of feasible advancement stays ambiguous to numerous business experts (Paul, 2008). The business segment was uncertain regarding how it might add to reasonable advancement. The disarray was prevalently connected with an expansive meaning of practical advancement by WECD (Mebratu, 1998). Specifically, this definition didn't obviously underscore how organizations are engaged with process and what exact job they have to play so as to advance the objectives and standards of economic improvement. Over the progression of time the comprehension of the term 'supportable advancement' has been improved in the business division, and at present there is generally better mindfulness with respect to how organizations can add to maintainable advancement. Along these lines, the idea of sustainability in the business setting is at present conceptualized as the combination of social, natural, financial, and social concerns and duties into business methodology (Carter and Rogers, 2008; Eweje, 2011). Basically, one of the essential factors that drive organizations towards executing sustainability system in their business activities is mounting partner pressure (Closs et al., 2011; Epstein, 2008; Parmar et al.,

2010). These partners progressively anticipate that organizations should be increasingly responsible and dependable towards the necessities of society, just as to show themselves as great.

2.4. Economic Aspects of Sustainability

Economic sustainability at the macro level deals with efficiently and effectively managing scarce resources to achieve economic development and macroeconomic stability (ILO, 2007). According to Kopnina, Helen & Blewitt, John. (2014), “economic sustainability is linked to well-being in relation to financial indicators such as GDP [gross domestic product] and is characterized by underlying economic approaches to the range of social issues attempting to capture the values embedded in human and natural capital”. The GDP is an every now and again utilized pointer for estimating monetary strength of a nation (Mankiw, 2003). The World Bank (1997) characterized GDP as the all-out estimation of generation in an economy. Besides, the key parts of macroeconomic manageability include: controlled expansion rates, reasonable and productive markets for exchange, low joblessness rates, a positive equalization of exchange and other helpful financial and money related conditions (Buckley, Sala-Xirinachs, and Henriques, 2009; Mankiw, 2003; Sexton, 2011; Steurer et al., 2005).

2.5 Environmental Aspects of Sustainability

Environmental sustainability focuses on managing the negative environmental impacts in business operations. Kramar (2009) defined environmental sustainability as “the protection and renewal of the biosphere for present and future generations”. As indicated by Kopnina, Helen & Blewitt, John.(2014), contemporary writing on ecological maintainability shows that excessive modern development is probably the biggest risk to indigenous habitat and biological frameworks. Hence, present ecological dangers, for example, environmental change, a worldwide temperature alteration, contamination, deforestation and loss of biodiversity are worldwide issues, and partners progressively put weight on organizations to grasp naturally cordial practices to improve their ecological presentation.

2.6 Social Aspects of Sustainability

Corporate social responsibility (CSR) epitomizes the social dimension of sustainability, and the terms ‘social sustainability’ and ‘CSR’ are often used interchangeably. According to Buckley et al. (2009), CSR is “voluntary and varied by nature”. The World Business Council for Sustainable Development (WBCSD) (1998) defined CSR as “the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large”. According to Kopnina, Helen & Blewitt, John. (2014), “social sustainability refers to issues concerned with social equality, poverty, and problems associated with justice. Equity considerations are primary in order to have the resources to reduce poverty and increase the well-being in developing countries”. Thus, the notion of social sustainability deals with meeting a human’s cultural, emotional, physical, social needs (Kopnina, Helen & Blewitt, John. 2014).

CHAPTER-3

SUPPLY CHAIN MANAGEMENT AND BLOCK CHAIN

3.1 Introduction

The supply chain traditionally defined as a one-way, integrated manufacturing process where in raw materials are converted into final products, and then delivered to customers. Under this definition, the supply chain includes only those activities associated with manufacturing, from raw material acquisition to final product delivery. However, due to recent changing environmental requirements affecting manufacturing operations, increasing attention is given to developing environmental management (EM) strategies for the supply chain. There are five basic components of supply chain: Plan, source, make, deliver and return as shown in the Figure 3.1.

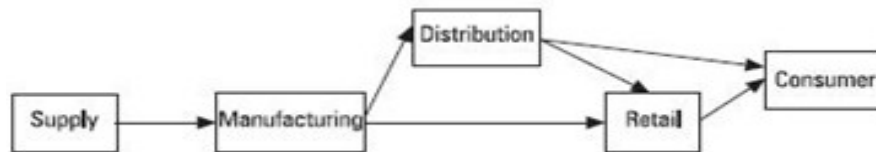


Figure 3.1: Traditional supply chain

The traditional concept focus on the process started its network from the supplier that ends with the process until the finished product reaches to the hand of consumer. In this figure the supply chain or parties involved in whole integration are includes manufacturer, distributor, retailer and finally the ultimate consumer based on the raw material supplied by the supplier the finished product produced by the manufacturer. Thus, the whole network covers the supply chain network.

We can define a sustainable system as —a dynamic system that can reliably grow in the long term and can preserve its core value in different aspects, such as economic, social, institutional and environmental. Sustainable supply chain is referred as the sustainable system that is mapped by the definition of supply chain, which is the network of flows for both physical and non-physical entities between demand and supply through the system. A general representation is shown in the Figure 3.2 [23].



Figure 3.2: Extension of supply chain with backward and forward integration

The above Figure 3.2 shows the extension of supply chain with forward integration where in this integration the supply chain network or the chain started from supplier has been eliminated thus named as forward integration, distribution chain or consumer supply chain network. The network starts after the product is converted to finished product then it goes to headquarter, from where the network begins for distribution of finished goods. Then it goes to different distribution of market segmentation until the finished product reaches to consumer.

3.2 Linking/Interaction between Sustainability and Supply Chain

An emphasis on supply chains is a stage towards the more extensive appropriation and improvement of manageability, since the inventory network thinks about the item from starting handling of crude materials to conveyance to the client. In any case, manageability likewise should incorporate issues and streams that stretch out past the center of inventory network the board: item configuration, fabricating side-effects, side-effects created during item use, item life expansion, item end-of-life, and recuperation forms at end-of-life. Sustainability has profound roots in both the physical and sociologies (Figure 3.3). Understanding the impact and collaboration of various exercises with the regular habitat and its suggestion on present and future personal satisfaction depends on progresses in a wide range of zones of the normal sciences. In addition, the sociologies are basic to decipher and demeanor towards sustainability, including social standards, individual and gathering practices, job of government and network, association with science, and association with the common habitat. In this way, humanities, political theory, brain research and human science communicate with the regular sciences and are deciphered and oversight through the improvement of arrangement.

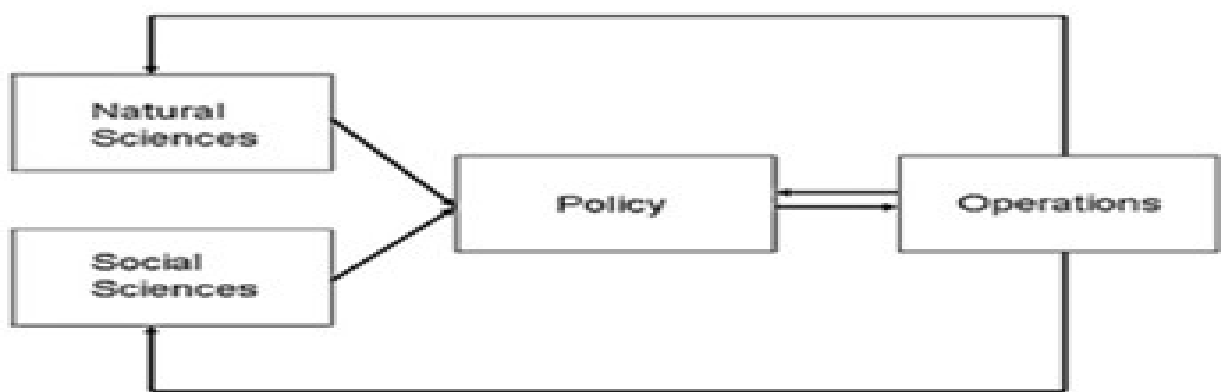


Figure 3.3: Relationship between different disciplines in the consideration of sustainable chain

3.3 Sustainable Supply Chain Management activities

A sustainable supply chain consists of many several activities such as:

- Prequalification of suppliers;
- Stipulation of new requirements at the purchasing phase;
- Supply base performance management;
- Launch of new considerations into product design;
- Cooperation with suppliers;
- Use of new materials and process optimization;
- Reverse logistics;
- Transportation facility;
- Stimulation of suppliers;
- Lobbyism to facilitate better policies;
- Work with industry peers to standardize requirements;
- Industrial clusters formation; and
- Information and ideas exchange.

3.4 Integrated Factors towards Sustainability

A sustainable supply chain should consist of several factors, thus elimination of one of them will not be considered a sustainable supply chain. The factors including :

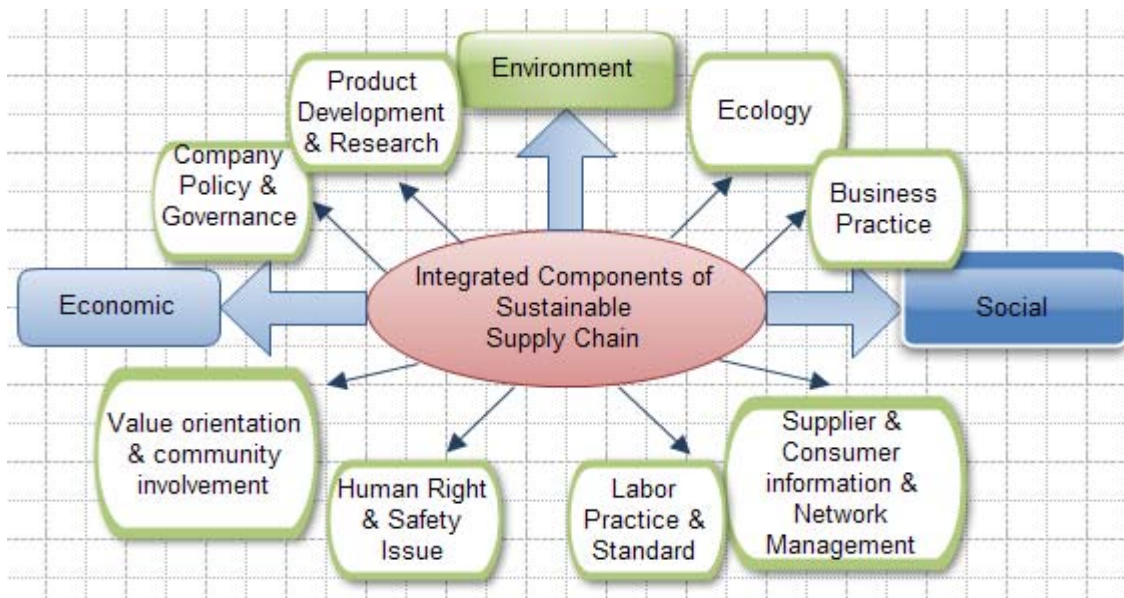


Figure 3.4: Integrated components of a sustainable supply chain

3.5 Sustainable Supply Chain Management: Corporate Social Responsibility

SCM may be placed underneath the umbrella of corporate social responsibility (CSR). The framework of CSR can be into four groups:

1. Economic responsibilities: supply products and services.
2. Legal responsibilities: obey laws.
3. Ethical responsibilities: conduct business in a way that is morally consistent with the beliefs of society; not required by law.
4. Philanthropic responsibilities: engage in activities beyond responsibility and expectation.
5. While much of the CSR focuses on the economic, legal, and ethical Responsibilities of the firm, the vast majority of the work in ethical responsibilities centers on buyer-supplier relationships and safety.

3.6 Sustainable Supply Chain Management: Environmental Management

To get a sustainable supply chain the channel individuals must worry about the green issues or the elements that makes obstruction acquire manageability. In this way, the organization now daily practice Green Supply Chain Management, which can be characterized as coordinating condition suspecting into store network the board, including item structure, material sourcing and determination, fabricating forms, conveyance of the last item to the shoppers, and end-of-life the executives of the item after its valuable life .

In this way, a Green Sustainable Supply Chain Management, A Green Sustainable Supply Chain can be characterized as the way toward utilizing ecologically well-disposed data sources and changing these contributions through change Business Process - who's results can improve or be reused inside the current condition. This procedure creates yields that can be recovered and re-utilized toward a mind-blowing finish cycle subsequently, making an economical production network. The entire thought of a green supportable store network is to diminish costs while helping the earth. There are some conventional perspectives associated with supportable ecological business practice and speculations, are:

1. Source reduction
2. Recycling
3. Material substitution

4. Reuse of materials
5. Waste disposal
6. Refurbishing
7. Repair
8. Re-manufacturing
9. Product returns

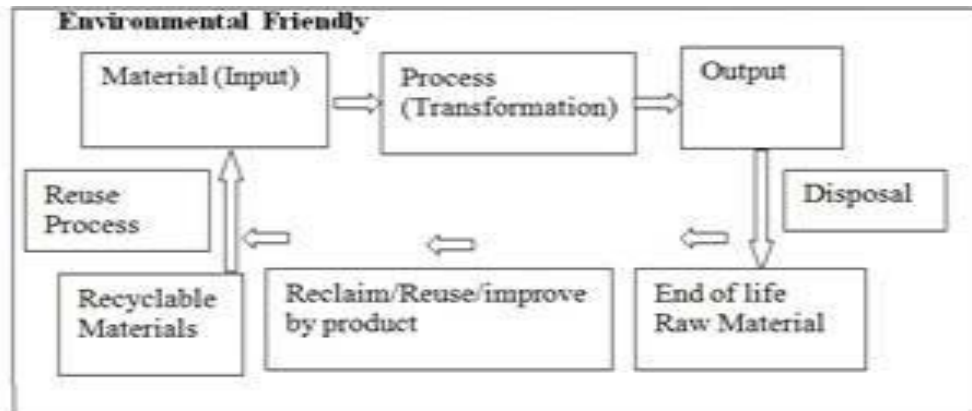


Figure 3.5: Green Supply Chain

Figure 3.5 explains the process of end of life raw material reutilization and recycling for material use as input. Here the assumption of recycling will continue holding that the environmental attitude towards recycling is friendly enough.

It has been expanding in cognizance of nature over the most recent couple of decades. More individuals know about the world's ecological issues, for example, a worldwide temperature alteration, harmful substance use, and diminishing in non-renew assets. The Government has discharged battles to elevate this issue to individuals. A few associations reacted to this by applying green standards to their organization, for example, utilizing natural agreeable crude material, decreasing the utilization of oil force, and utilizing the reuse papers for bundling.

The green standards were extended to numerous divisions inside association, including inventory network. Green production network the executives (GSCM) was rising over the most recent couple of years. This thought covers each phase in assembling from the first to the last phase of life cycle, for example from item configuration to reuse. Manufacturing, yet GSCM can likewise be utilized to different business segments, for example, government, training and administrations. There are

some natural drivers those are Part of manageable development: environmental change, maintainable asset use and landfill accessibility. Hence, we can scientifically display Green SC as:

Green Inbound Logistics/Material Management + Green Manufacturing/Operations + Green Outbound Logistics/Marketing + Reverse Logistics

A green supply chain concept can be achieved by conserving the energy/resources used in the supply chain and by reducing the waste it produces

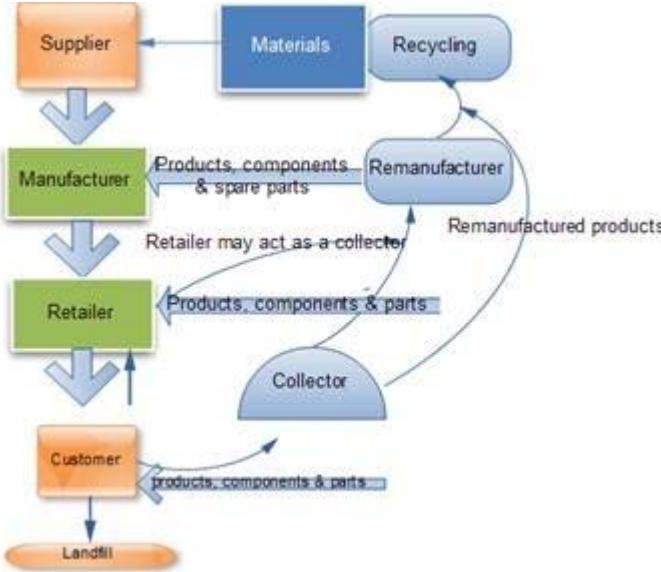
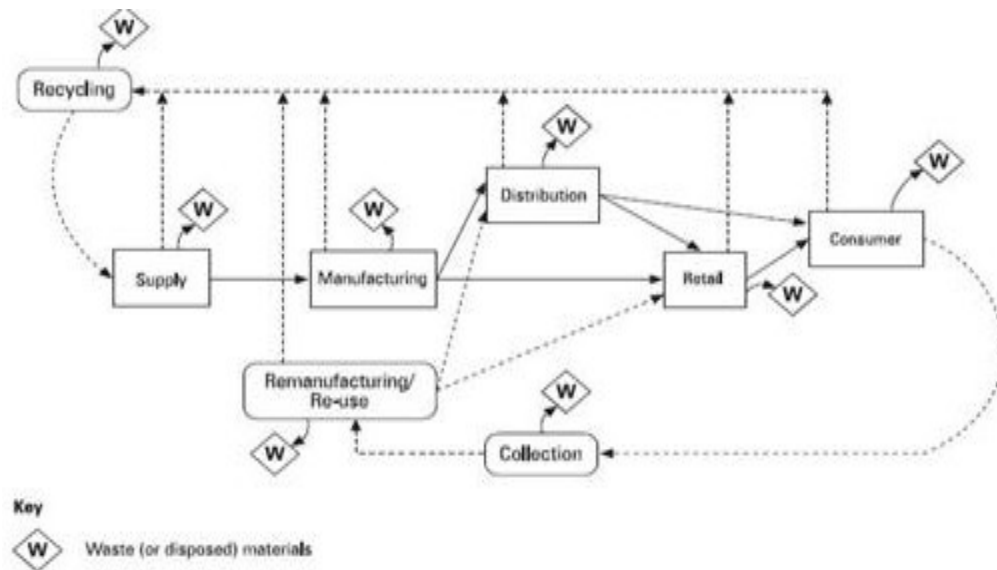


Figure 3.6: The recycling flow between channel players

Thus, the Figure 3.6 explain how waste are being collected by the supply chain team players, some waste is finally disposed and those are being recycled or remanufactured goes to manufacturer or supplier for further utilization. There can be independent collector to collect the end materials or the retailer can also perform the task. Following figure explains the team player that produces waste within the traditional



3.7: Waste Disposal by the different key channel players

Figure 3.7, explains waste management through recycling the unused materials by the supplier and waste associated with the finished goods until it reaches to the consumers. Channel players produce wastes that are being collected for recycling. The chain with large supply network may not possible to recycle the waste thus can be done by the partners in supply chain network rather than going through integration of entire waste management at one point of time. Most of the cases cost of recycling seems to be higher but it is safe for making environment friendly, which can make environment green and a sustainable supply chain. Where as in Figure 2.8 we can see that the revenue generated out of each stages of recycling and the waste generated for reproduction to use in the secondary market of raw materials where as some are being kept for final disposal.

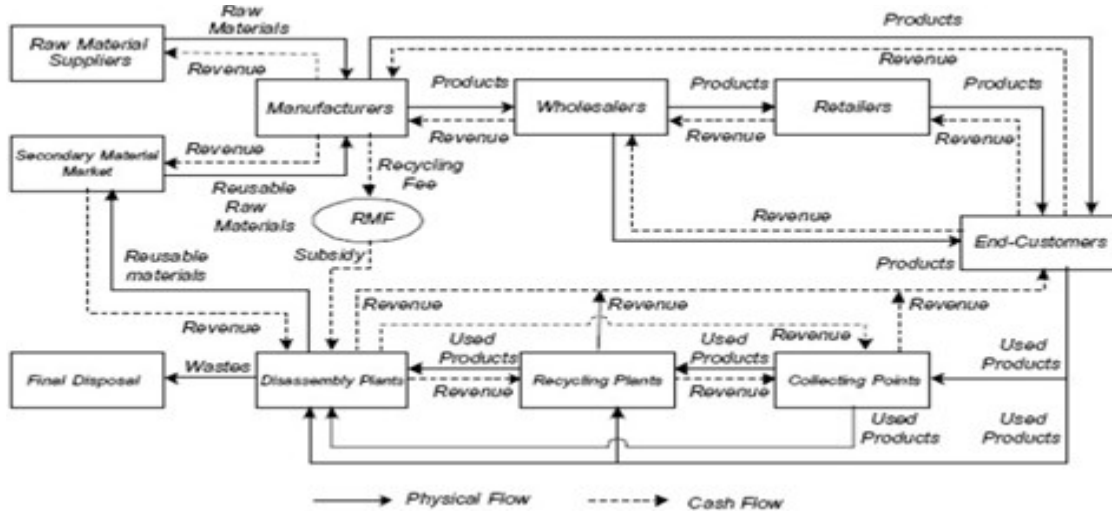


Figure 3.8: Flow of logistics and revenue (cash) across the green supply chain

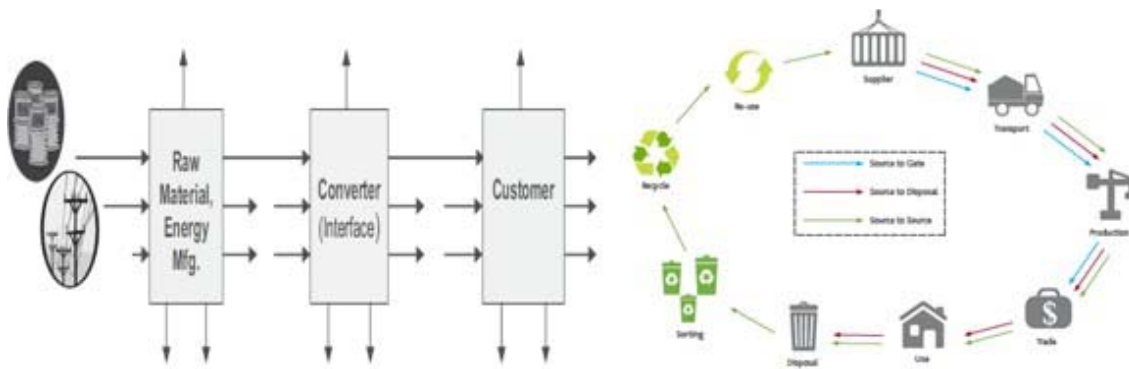


Figure 3.9: End of life disposal process

Thus, in every channel some waste is being generated those are disposed within a process which has been explained by the Figure 3.9.

Much raw material and energy sucked into this system spews out as processing waste along the way. Then we can evaluate waste in the customer's use of the product if it consumes material and energy, and finally the waste if the customer throws the product—in the landfill at the end of useful life. Finally greening the supply chain generates environmental benefits as well as financial results by:

1. Reducing risk
2. Optimizing supply network
3. Reducing manufacturing cost and environment impact
4. Reducing transportation cost
5. Reducing energy cost and extending the life of assets
6. Increasing reverse of supply chain efficiencies

The recommendations for green supply chain lead to:

1. Productivity Improvement in the supply chain
2. Environmental Accounting Technique
3. Waste Reduction Programs

3.7 Environmental Management: Green Accounting

While crude material and work costs are legitimately assigned to the proper item or procedure, different expenses are aggregated into overhead records, which are designated relatively (e.g., in light of the quantity of units fabricated) to all items, procedures, or offices.

This designation technique may be suitable for some overhead costs, for example, lease and upper administration pay rates. Be that as it may, this methodology can prompt incorrect costing and incapable choices when critical costs—squander transfer, preparing costs, ecological allowing expenses, and other natural expenses—are not distributed to the mindful items and procedures.

Therefore, store network chiefs frequently can't accomplish their general goals except if they handle significant ecological concerns. Numerous organizations have handled this issue by utilizing ecological bookkeeping procedures to generously decrease inventory network costs. With these costing strategies, organizations can methodically distinguish ecological expenses all through the store network, e.g., costs related with the board of perilous materials, which regularly are not caught through customary bookkeeping techniques. When the expenses (or potential advantages) have been distinguished, organizations can examine the cost drivers and assess elective cost decrease openings.

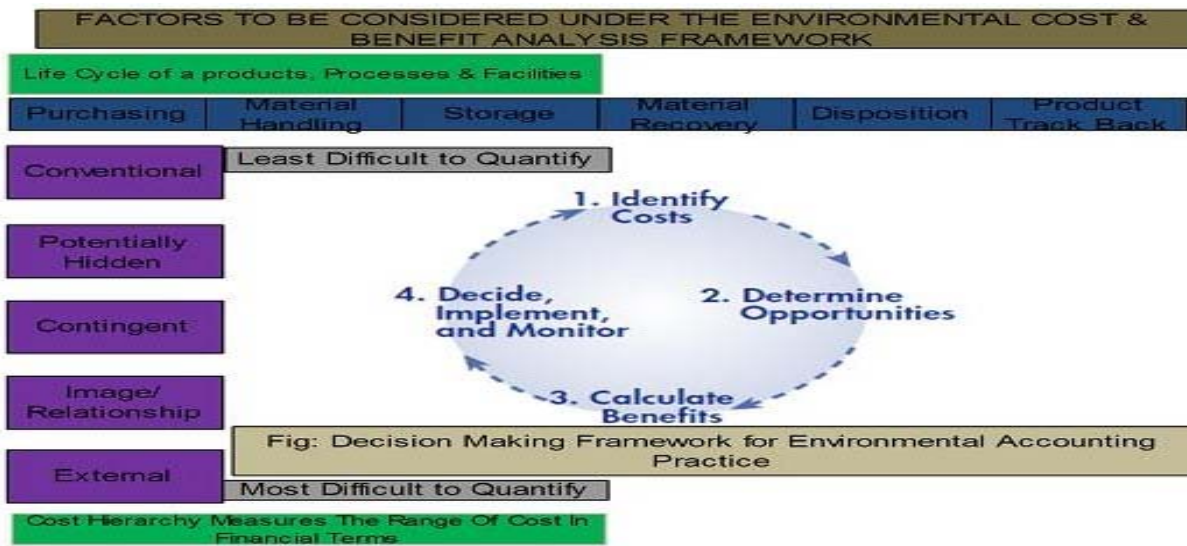


Figure 3.10: Environmental cost factors and decision-making framework

To take out the misallocation of ecological expense under the expense and advantage investigation structure some cost components to be considered. These expenses are concealed cost that gives a store network to accomplish most extreme advantage by lessening cost. **Refining Cost Hierarchy:**

1. Conventional: Material, labor, other expenses, and revenues that are commonly allocated to a product or process.
2. Potentially Hidden: Expenses incurred by and benefits to the firm that are not typically traced to the responsible products or processes, e.g., supervisor salaries and safety training courses.
3. Contingent: Potential liability or benefit that depends on the occurrence of a future event, e.g. potential occupational health and clean-up costs related to a spill of a hazardous substance.
4. Image/Relationship: Costs/benefits related to the subjective perceptions of a firm's stakeholders, e.g., a community group's resistance to a plant expansion or an insurer's concern

about the lack of a formal environmental management system.

External: Costs/benefits of a company's impacts upon the environment and society that do not directly accrue to the business, e.g., the benefits of reduced traffic congestion from a company's telecommuting program.

3.9 Environmental Management: SCOR Model & Green SCOR

The Supply Chain Operations Reference-model (SCOR) is a process reference model that has been developed and endorsed by the Supply Chain Council as the cross-industry standard diagnostic tool for supply chain management. SCOR enables users to address, improve and communicate supply chain management practices within and between all interested parties.

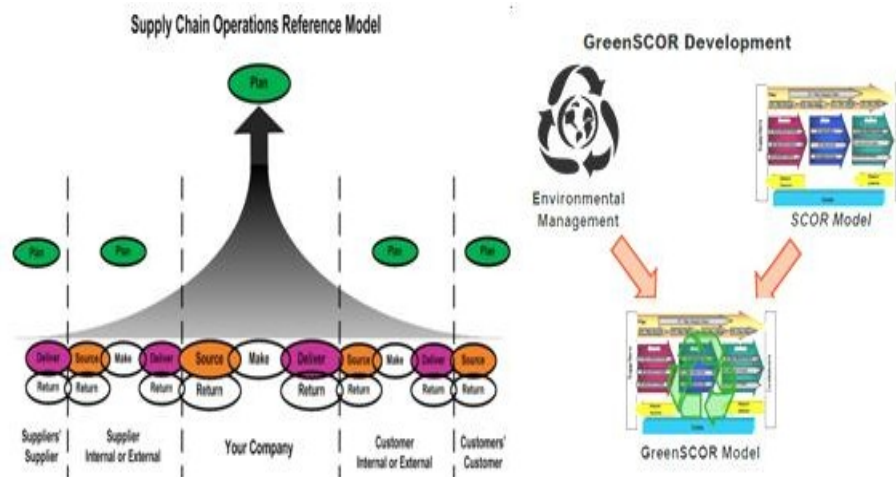


Figure 3.11: SCOR Model Vs Green SCOR Development

The SCOR model provides a framework for running and analyzing supply chain processes. Figure 3.11 It has three levels: Level 1 defines the process categories; Level 2 defines the supply chain type; and Level 3 defines the specific processes within each operation.

Level 1 has five process categories that serve to define supply chain management:

- 1. Plan**
- 2. Spource**
- 3. Make**
- 4. Deliver**
- 5. Return**

Level 2 consists of three standard supply operation types:

- 1. Make to Stock**
- 2. Make to Order**
- 3. Engineer to Order**

Level 3 customizes the processes according to specific operations. For example, process elements are fully defined.

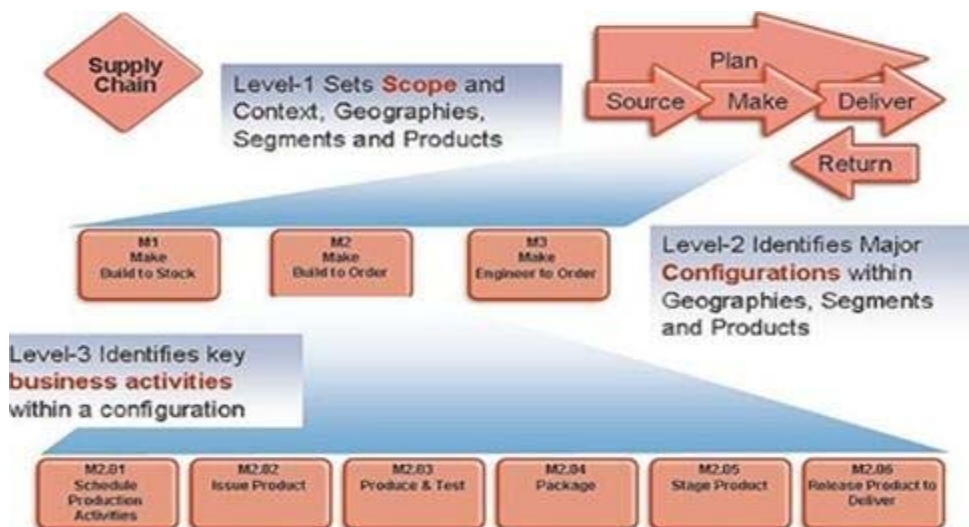


Figure 3.12: SCOR framework level

3.10 Block Chain

Block chain technologies may have a profound impact on development-oriented investment, not only by revolutionizing global payment systems but also through improvements to access to

finance, supply chain management, digital identities or land registries (through decentralized applications). This impact goes beyond traditional financial services and business processes and extends to other industries important for the SDGs, such as agriculture, healthcare and transportation.

Blockchain technologies, or disseminated record advances (DLT), have grown quickly in the course of recent years. Beginning with Bitcoin in 2009, a decentralized advanced money (cryptographic money), the innovation has created past a worldwide installments framework and began to likewise affect different territories, for example, access to back, production network the board, computerized characters, land vaults or help, through decentralized applications (dApps). Blockchain innovations may give conventional monetary administrations and business forms at a lot of lower cost and with more prominent speed, security and straightforwardness. Some conventional money related foundations are as of now beginning to apply the innovation to their business forms, yet additionally different enterprises, for example, agribusiness, human services and transportation, are moving rapidly toward trialing blockchain ventures.

As blockchains may change (and conceivably upset) various enterprises, it presents the two dangers and chances to organizations, purchasers and governments, and thusly new difficulties for policymakers and controllers. Specific issues are raised by the development of blockchain-based cryptographic forms of money or advanced tokens. This session will highlight introductions from the two sides of the discussion. It will give a diagram of key blockchain applications, with an exceptional spotlight on suggestions for economic advancement and tasks of global ventures (MNEs). Given the decent variety of changes these innovations are realizing, there is additionally an assorted variety of government arrangement reactions, from rationalist to positive and negative, which will likewise be a piece of the talks during this session. As changes are occurring quickly, both conventional ventures and governments have so far been delayed to adjust to the evolving scene. This thorough session will realize a superior comprehension of blockchain advances and their potential improvement suggestions. It will be of incredible incentive to all venture partners, including policymakers, business pioneers and common society, in giving an elevated level diagram of the principle advancements in this field and taking into consideration an open and comprehensive discussion on the fate of blockchains for practical improvement. Issues for the debate:

- The application of blockchain technologies in enterprise and finance
- The risks and opportunities of blockchain for sustainable development
- Regulatory and policy precedents, concerns and responses

3.10 Differences between the Conventional and GSCM and Block Chain SCM

One of the initial perceptions about introducing green products in the market is that they lead to higher cost of manufacturing compared to conventional ones. However, recent findings showed that innovations and optimal planning could dramatically reduce the costs in most cases. For the cost problems to be managed effectively, the efficiency of the entire supply chain must be evaluated. Compared to conventional chains, which have a large number of conventional materials and suppliers, green chains are relatively inferior in terms of speed and flexibility. Table 3.2 summarizes the major differences between the conventional and green supply chain management.

Table 3.1 Differences between the conventional and GSCM

Characteristics	Conventional SCM	Green SCM
Objectives and values	Economic development	Economic and ecological
Ecological optimization	Very High ecological impacts	Integrated approach Very Low ecological impacts
Supplier selection criteria	Short-term relationships	Long-term relationships
Cost pressure and prices	Low prices and High cost pressure	High prices and High cost pressure
Speed and flexibility	Very High	Very Low

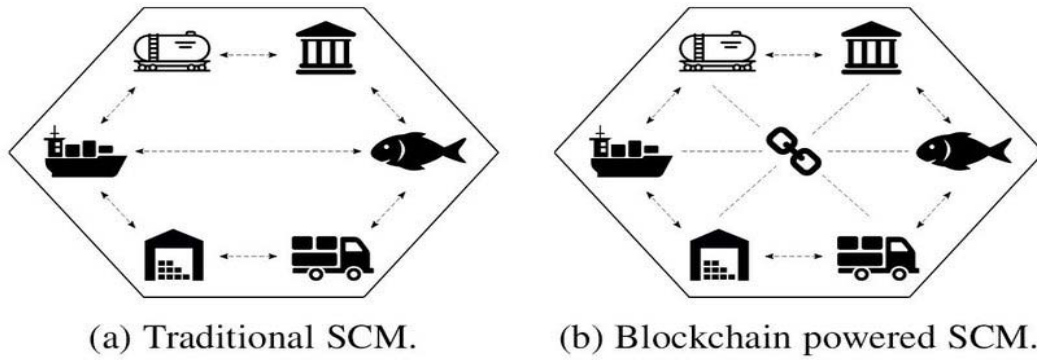


Fig 3.13: Difference between Traditional and Block Chain SCM

However, in some cases the costs involved in a green SCM are high compared to conventional supply chains, consumer conscience on environment help organizations to create a brand image and in turn gain a unique competitive edge.

3.11 Making supply chain more –Responsivel implies

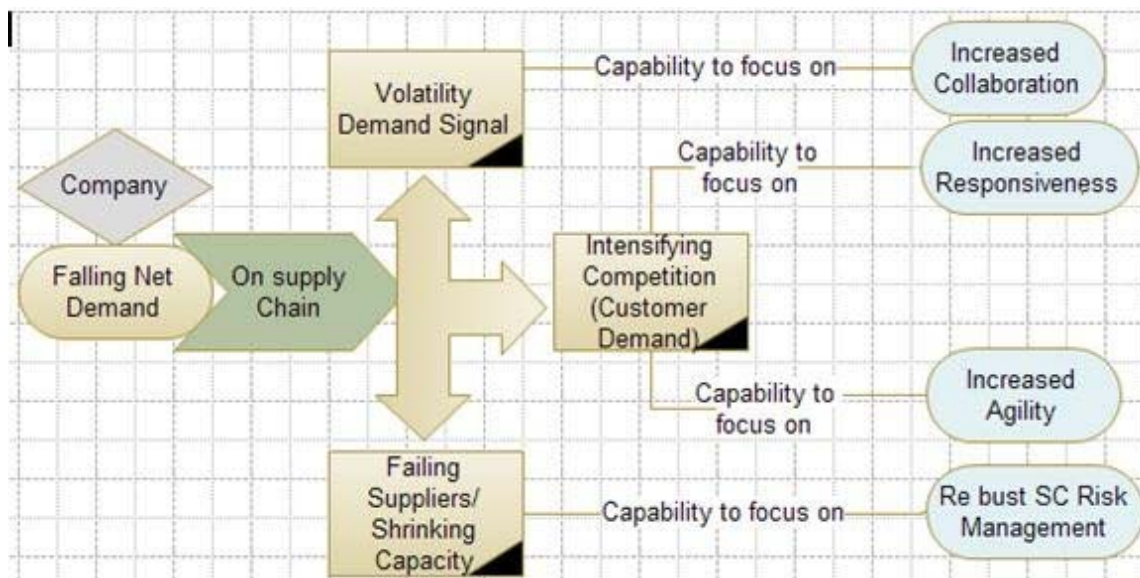


Figure 3.14: Impact of Economic Downturn

Figure 3.14 explain the required responses of supply chain during economic downturn. When the demand falls the chain fall under demand volatility, increased competition and capacity failure; the chain should react with increased collaboration; immediate response and robust supply chain risk management

3.12 Barriers in front of the use of SSCM

The supply chain as a whole reflects some barriers for which it remains very difficult to achieve sustainability, these including:

1. Lack of resources;
2. Limited capacity in EHS and sustainability capabilities;
3. Complexity of SCM practices;
4. Fragmented supply chains characteristic of many global industries;
5. Lack of experience with partnership-based strategies and management practices;
6. Business opportunities seen through the lens of existing products, processes, and customers;
7. Fluctuating business conditions that lead to emphasis on short-term performance improvement;
8. Lack of adequate models;
9. Resistance to change; Lack of open dialogue within and between suppliers and customers
10. Lack of environmental awareness/ values;
11. Lack of scheme for cost sharing;
12. Conflicting reporting requirements;
13. Lack of lead time,
14. Knowledge and skills for implementing initiatives;
15. Technological barriers;
16. Exposure risk;
17. Expensive or uneconomical programs;
18. Lack of commitment

Chapter -4

Sustainable Framework for SCM using Block Chain in ICT

4.1 Introduction

Modern supply chains must integrate economic, environmental, and social goals to achieve sustainability. The ongoing quest to coordinate several potentially conflicting goals calls for a flexible supply chain design that integrates the physical chain with information and financial support chains. The advancement of technology supports these efforts. Two of the most prominent technological innovation drivers to emerge during recent years are blockchain technology and the PI, both of which have attracted substantial attention among practitioners and academics.

The company's business system has been implemented by using of ICT application when the author hand experience with consulting agency from this research idea. All their earning on selling and implementing software packages related to logistics it's totally based on this consultant agency and consultants are two types: consultants of business and consultants of technical.

Consultants of business can help to manufacturer clients how they apply of ICT systems and to support their organization from point of view business. These people were professionally highly educated and expert and had special knowledge on software packages how to use and could support in the business functions within expertise area like marketing and selling, production activities, accounting, distribution, maintenance, purchasing, shipment and other activates. The ICT system was also that handles of their own consultants of technical group. Consultants of technical help the client in technical issue in the ICT systems like helping programming or hardware and software related problem and installation and also can help in various software errors. The employed of consultant agency also many business consultants as three times than consultants of technical. Application of ICT systems in organization are connected and challenges of the board part that is indicated and technical character is not of that organization which connected to apply of ICT systems. Application of ICT systems for logistics of a strategic, organizational and also logical manner of business are more challenges concern.

4.2 Sustainable Framework for Supply Chain Management

This definition of Somewhat is based on the triple bottom line and the three supporting facets of sustainability reviewed above environmental profits, transparent integration, strategy and organizational culture is conceptualized and shown in Figure4.1. Sustainable supply chain has three parameters one is Economic, Social and Environmental. This model covered all those parameters a manufacture company collect raw material from raw material supplier based on the economic market analysis. Then after production send to the warehouse and transportation to the partner for delivery the client after product received in the client, they give feed to the manufacture company.

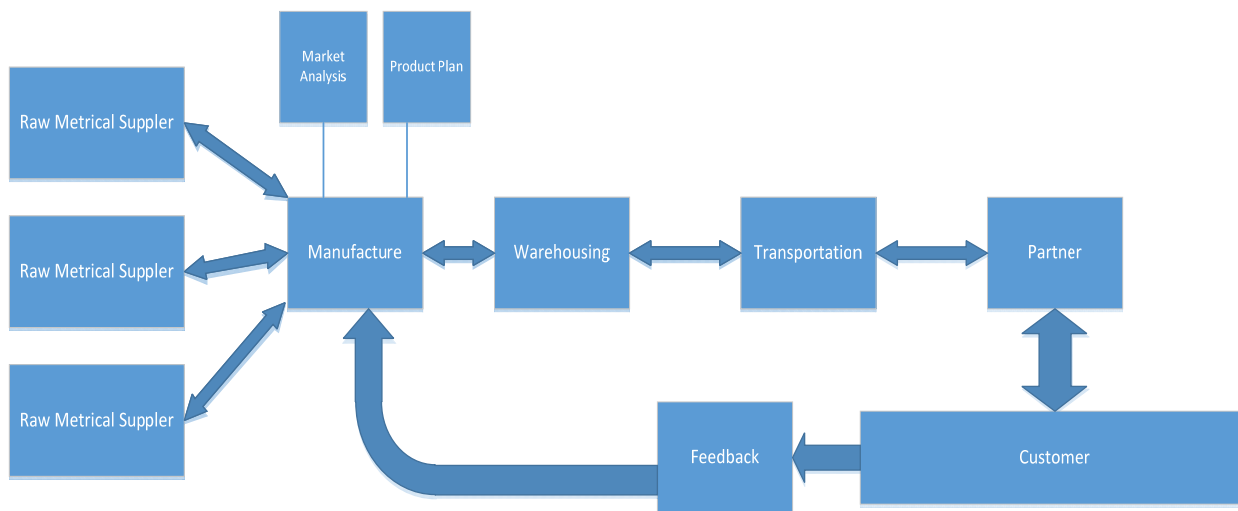
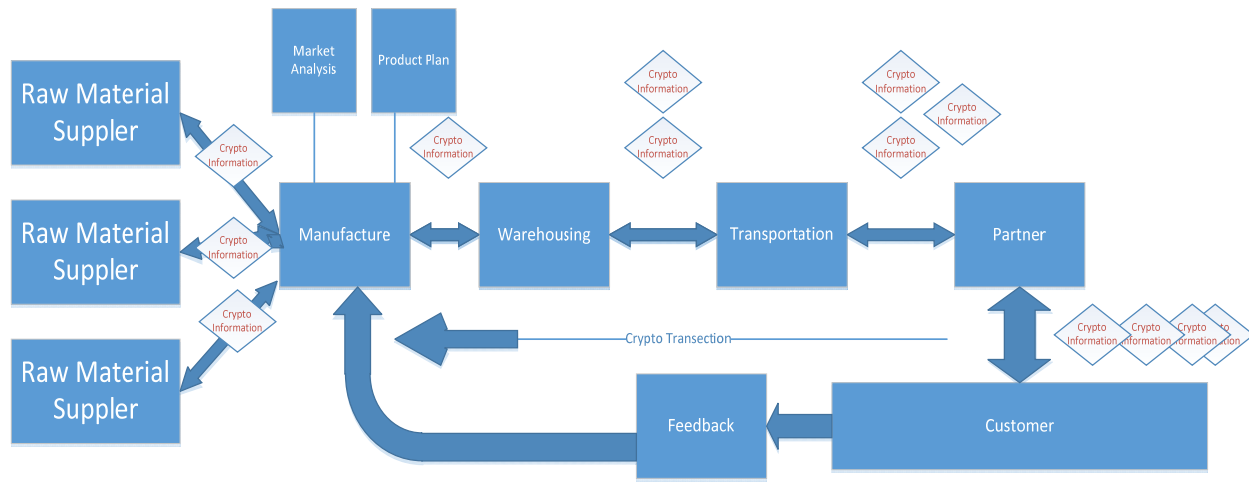


Fig4.1: Fig Sustainable Framework for Supply Chain Management

4.3 Sustainable Framework for Supply Chain Management using Block Chain

Globalization of supply chains makes their management and control more difficult. Block chain technology, as a distributed digital ledger technology which ensures transparency, traceability, and security, is showing promise for easing some global supply chain management problems. Figure 2 shown the sustainable supply chain management proposed framework using block chain technology. The process of Raw material supplier to customer are in an encrypted data channel. A central management system using this system and the data flow is fully secured and maintain integrity so the no change to change and modify the main data form

manufacture to customer and customers get the ensured to getting the original product from main OEM and OEM also identify the customer requirement in a secured block chain system.



Proposed Supply Chain management Using Block Chain

Fig4.2 Sustainable Framework for Supply Chain Management using Block Chain

4.4 Proposed ICT Procurement Process using Block Chain based Supply Chain Management

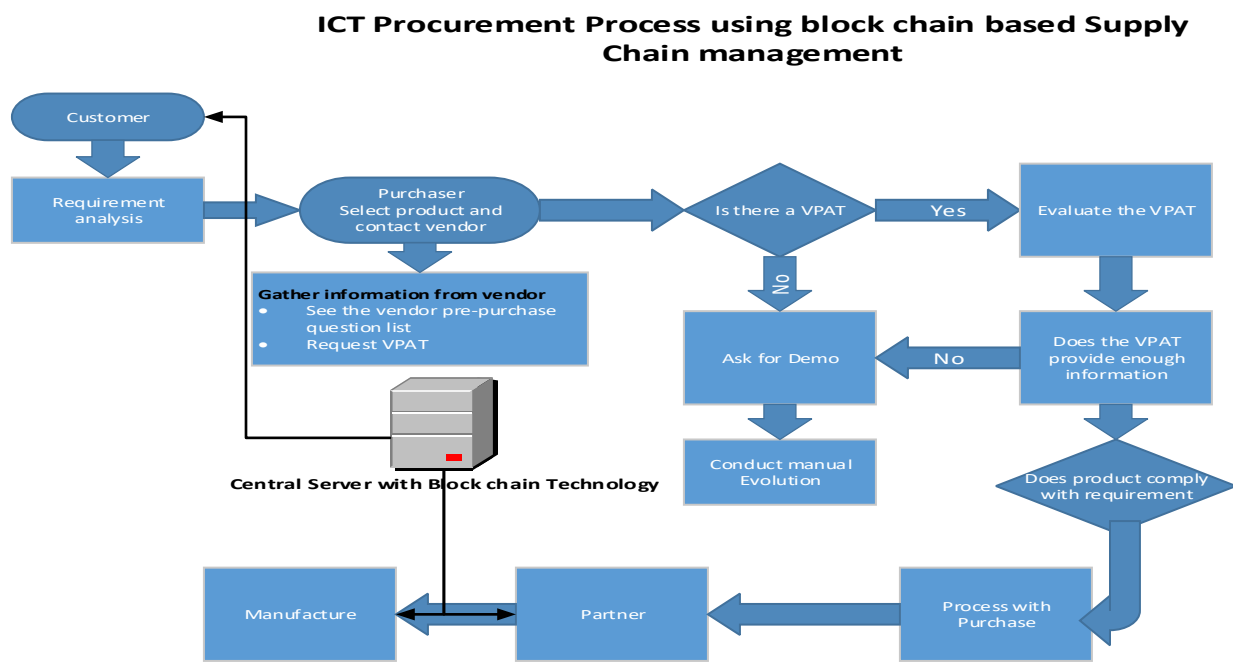


Fig 4.3: Proposed ICT Procurement Process using Block Chain based Supply Chain Management

The fig 4.3 shown the proposed ICT procurement model using blockchain technology. Using block chain customer, partner and manufacture are in a same cycle with data integrity. All types of communication and process in a secured and encrypted web panel. Customer analysis the requirement and select product and relevant vendor. The vendor is sending the query request to the main manufacture. After demo and VPAT purchase process start and the customer added to the same web panel with the partner vendor. Partner product order and delivery status all are available in the customer web portal. All types of data are fully secured and ensure the integrity using blockchain technology. Also customer can get support from main manufacture directly and manufacture can get product and service feed from partner.

CHAPTER -5

Result and Findings

Respective people in charge of procurement in different organizations have interviewed and data gathered for 05 years on; knowledge about modern Supply Chain Management, number of ICT professionals in the organization, ICT budget, number of procurement packages completed through *e-GP* , number of IT professionals ,number of professionals trained on ICT procurement, tendering system for ICT procurement, dependency on few suppliers for ICT procurement, ICT procurement directly from Original Equipment Manufacturer (OEM), sending feedback to the OEM, knowledge about blockchain and some other things. For this reason, structured questionnaire was developed. In this research, number of interviewees were chosen. For this situation, every one of the information was gathered through the deliberate way. Collected data was analysed using excel software. In table and diagram subjective information was displayed. . Findings of data analysis and interpretation are as follows:

5.1 ICT Procurement and Supply Chain management

A survey has done on different public organizations for their present situation of ICT procurement system. The data analysis of this survey is shown in the different graphical presentation.

5.1.1 Percentage of known Supply Chain Management Organization

Table 5.1: Percentage of known Supply Chain Management Organization

YES	NO
7	2

Have you Known about Supply Chain Management?
9 responses

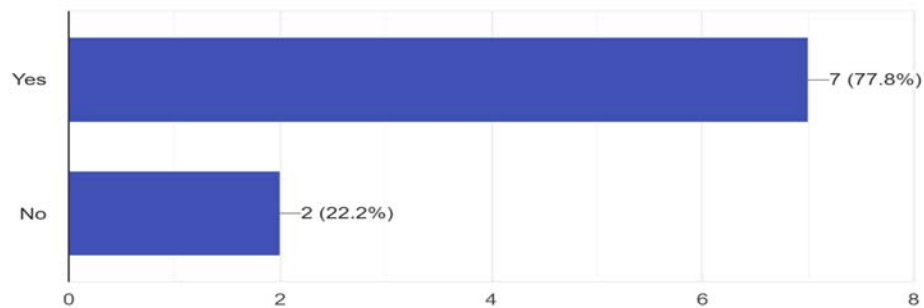


Fig 5.1: SCM knowledge in Bangladeshi Organization

The respondents were asked the SCM knowledge of his organization the seven have knowledge about supply chain management system and two organization have no knowledge about SCM.

The graphical representation. On the basis of this survey, 77.8% are known the Supply chain management of the Bangladeshi organization and 22.2% are not known about the supply chain process. Analysis of the study is shown in figure 5.1 and detail (with score) is shown in the table 5.1 below:

5.1.2 Percentages of ICT professional for the last Five years

Table 5.2: Number of ICT professional in the Organization (last five year)

Year	>5	.>20	>50	>100
2015-16	4	2	3	0
2016-17	3	3	2	1
2017-18	2	3	2	2
2018-19	1	5	1	2
2019-20	0	5	2	2

Total Number of ICT professional in Your Organization last Five year ?

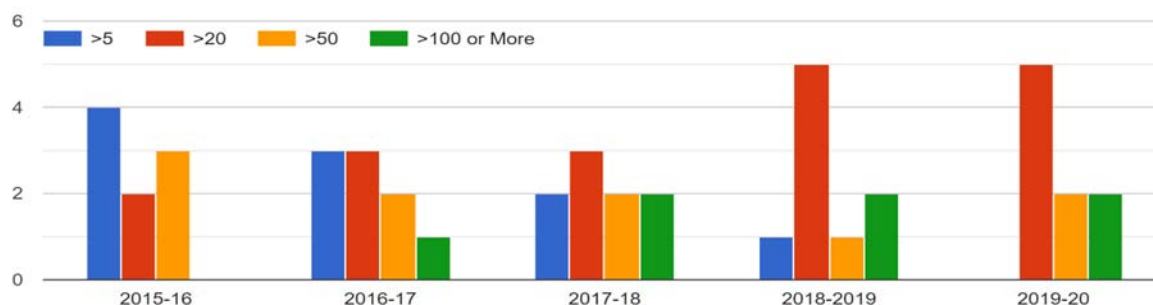


Fig 5.2: Number of ICT professional in the Organization last Five year

Table 5.2 shown that in the fiscal year 2015-16 the number of ICT professional four organization selected less than 5 and two organizations selected less than 20 and three organizations selected less than 50. The fiscal year 2016-17 the number of ICT professionals three organizations selected less than 5 and three organizations selected less than 20 and two organizations selected less than 50 and one organization selected less then or more then 100. In the year 2017-18 the number of ICT professionals of two organizations selected less than 5 and three organizations select less than 20 and two organizations selected less than 50 and two organizations selected less or more the 100. In the year 2018-19 the number of ICT professionals in one organization selected less than 5 and five organizations selected less than 20 and one organization selected less than 50 and two organizations selected less or more the 100. In the year 2019-20 the number of ICT professionals in five organizations selected less than 20 and two organization selected less than 50 and two organization selected less or more the 100.

5.1.3 ICT Organization Budget of for last five year

Table 5.3: ICT Budget in Organizations

Year	>20000	.>50000	>100000	>100000000
2015-16	7	0	2	0
2016-17	7	0	2	0
2017-18	4	3	0	2
2018-19	3	4	0	2
2019-20	3	5	0	1

ICT Budget in your Organization During (FY2015-2016, FY2016-2017, FY2017-2018, FY2018-2019, FY2019-2020)?

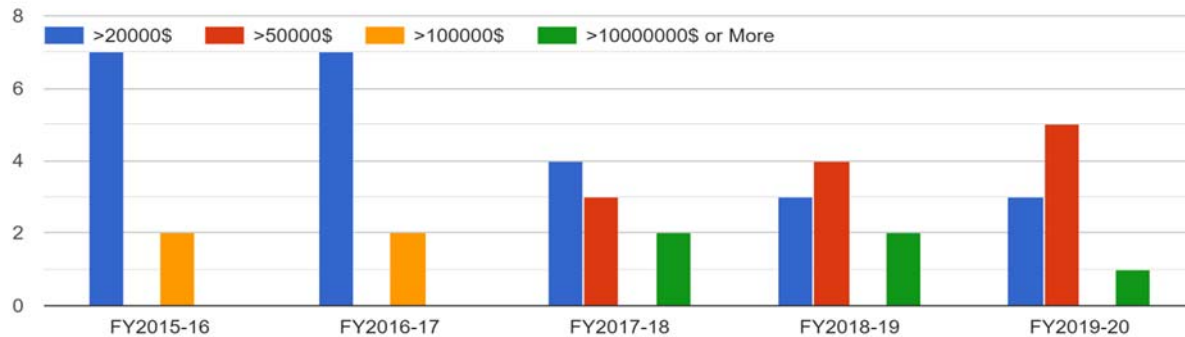


Fig 5.3: ICT Budget in Private and Public Organization

On the basis of this survey, in the year of 2015 to 2018 the majority of organizations ICT budget below 20000\$ but in the year of 2019 to 2020 the budget started to increase. Analysis of the study is shown in figure 5.3 and detail (with score) is shown in the table 5.1.3 above.

5.1.4 Percentage of using e-GP Systems

Table 5.4: Number of ICT packages procured through e-GP

Year	>5	.>25	>50	>100
2015-16	5	2	2	0
2016-17	5	2	3	0
2017-18	3	1	4	1
2018-19	3	1	1	4
2019-20	2	3	2	2

The number of Procurement package completed by the E-GP system Last five Years?

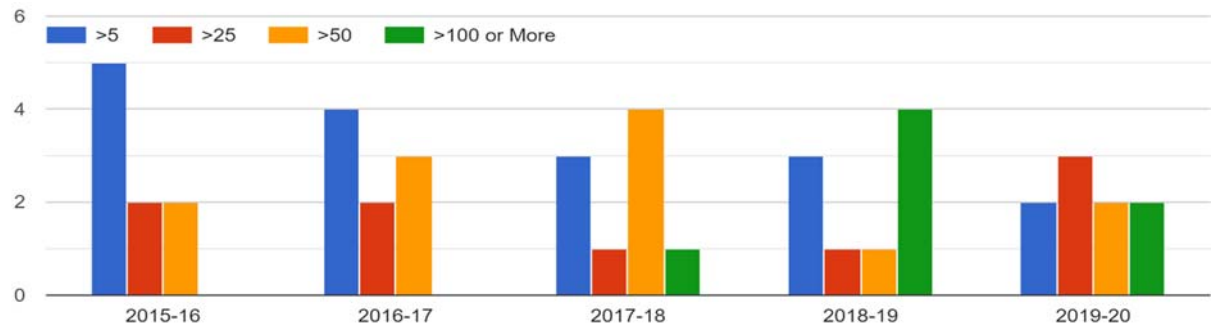


Fig 5.4: The number of Procurement package completed by the e-GP system Last Five Years

On the basis of this survey in the last two years the percentages of using E-GP system is increased for purchasing ICT equipment. Analysis of the study is shown in figure 5.4 and detail (with score) is shown in the table 5.4 above.

5.1.5 Dependable suppliers for ICT Procurement

Table 5.5: Dependable suppliers for ICT Procurement

Dependable suppliers for ICT Procurement	
YES	NO
5	4

Does your organization rely on a few dependable suppliers for ICT Procurement ?
9 responses

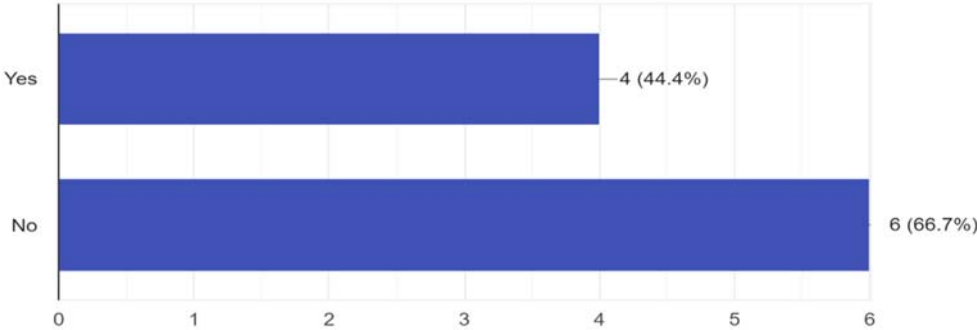


Fig 5.5: Dependable suppliers for ICT Procurement

The fig 5.5 represent that 44.4% organization are dependable of suppliers and 66.6% are not dependable of the suppliers in ICT procurement.

5.1.6 Percentages Organization contact Original Equipment Manufacturer (OEM) Directly

Table 5.6: Percentages Organization contact Original Equipment Manufacturer (OEM) Directly

Percentages Organization contact Original Equipment Manufacturer (OEM) Directly	
YES	NO
5	4

Does your Organization contact Original Equipment Manufacturer (OEM) Directly or Help of Suppliers?
9 responses

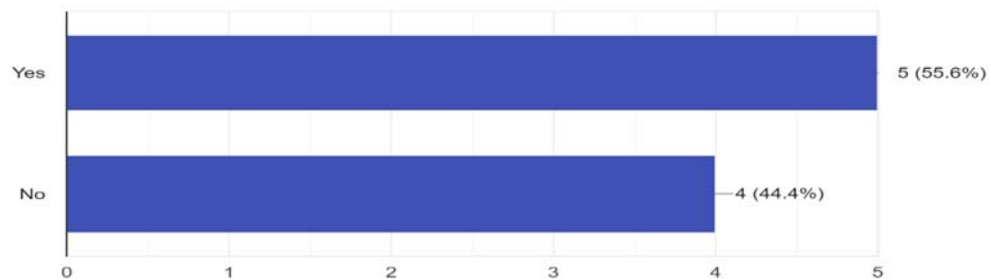


Fig 5.6:

Percentages Organization contact Original Equipment Manufacturer (OEM) Directly

Most organization (66%) contract directly with OEM for ICT procurement.

5.1.7 Organization know the Original Equipment manufacturer (OEM) Price

Table 5.7: Organization know the Original Equipment manufacturer (OEM) Price

Organization know the Original Equipment manufacturer (OEM) Price	
YES	NO
6	3

Does your organization know the Original Equipment manufacturer(OEM) Price?
 9 responses

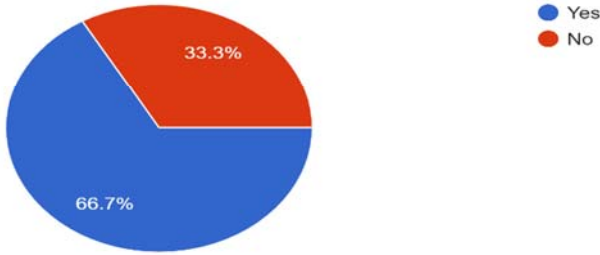


Fig 5.7: Organization know the Original Equipment manufacturer (OEM) Price
 Most organization (67%) know the OEM price.

5.1.8 Organization certify its suppliers for quality

Table 5.8: Organization certify its suppliers for quality

Organization certify its suppliers for quality	
YES	NO
7	2

Does your organization certify its suppliers for quality?
 9 responses

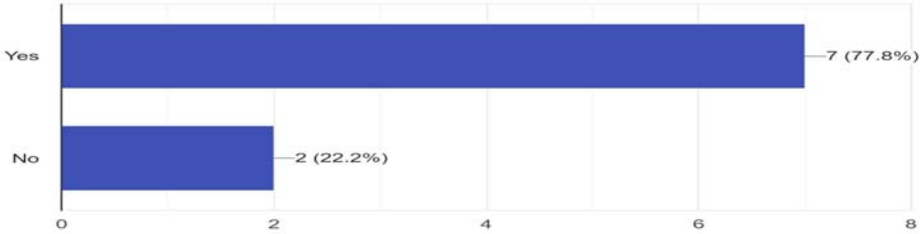


Fig 5.8: Organization certify its suppliers for quality

Most organization (78%) certify the suppliers quality if necessary.

5.1.9 Organization contacts directly OEM for Support

Table 5.8: Organization contacts directly OEM for Support

Organization contacts directly OEM for Support
--

YES	NO
6	3

Does your Organization contacts directly OEM for Support?

9 responses

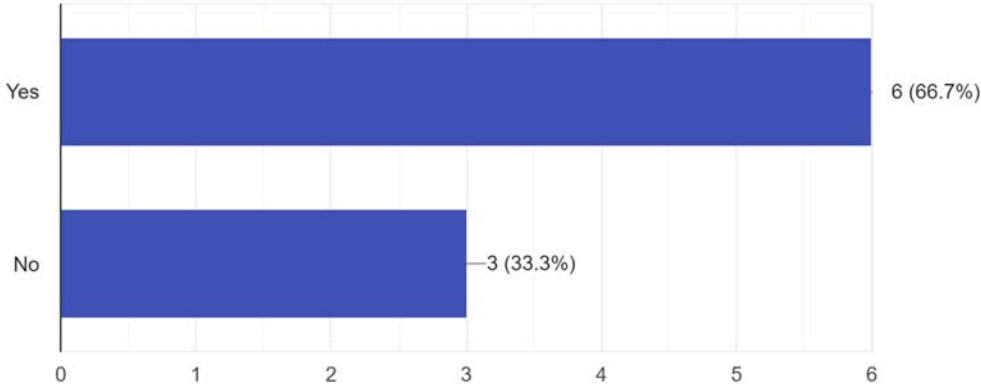


Fig 5.9: Organization contacts directly OEM for Support

Most organizations (77%) taking support directly from the OEM

5.1.10 Percentages of known about Blockchain in Bangladeshi Origination

Table 5.9: Known about Blockchain in Bangladeshi Origination

Known about Blockchain in Bangladeshi Origination	
YES	NO
5	4

Have you Known about BlockChain?

9 responses

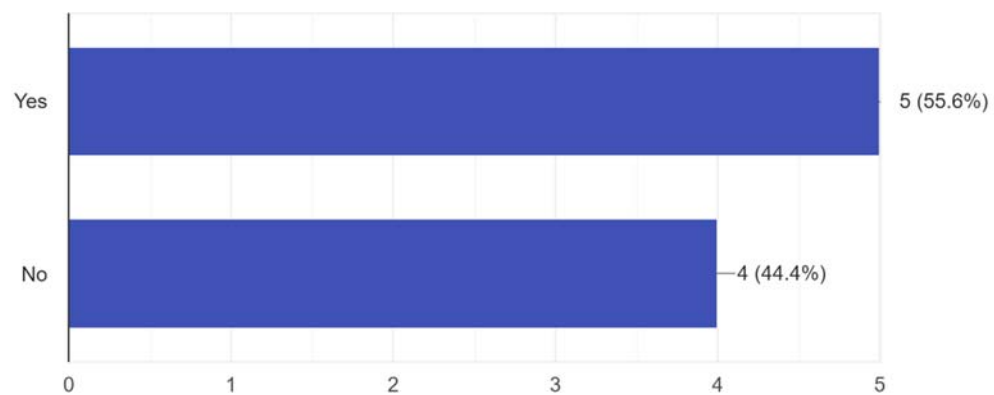


Fig 5.10: Percentages of known about Blockchain in Bangladeshi Origination

Many people (56%) aware about Blockchain technology in Bangladeshi

5.1.11 Organization currently implementing—or does it plan to implement—Block-chain technology

Is your organization currently implementing—or does it plan to implement—Block-chain technology?

9 responses

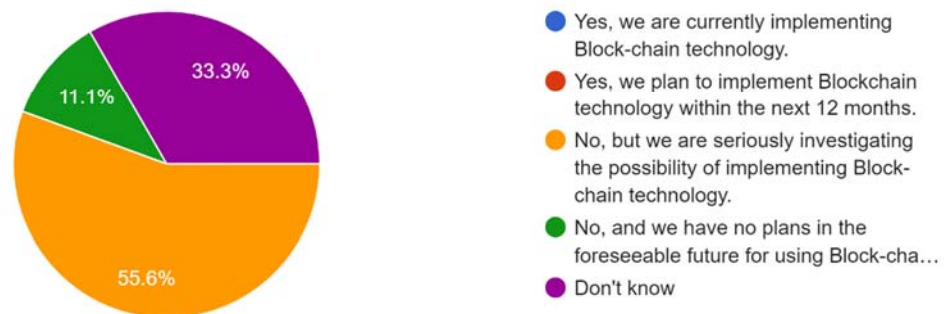


Fig 5.11: Organization currently implementing—or does it plan to implement—Block-chain technology

The respondents were asked about implementation of block chain technology 55.5% respond no but they are thinking about this. 33.3% respond they don't know about this and 11.1% respond no they have no plan about this. Analysis of the study is shown in figure 5.11

5.2 Findings

In the worldwide aggressive business condition, supportability is the significant concentration in various regions. It has coordinated the social issues to the inventory network. Supply chain is the main concern of any organization. Sustainable supply chain management is one of the important parts for organizational development and procurement system.

Most of the organizations using SCM but not completely sustainable procedure and the situation is vulnerable. If the blockchain technology is used for sustainable supply chain management the data integrity system is improved and the communication between OEM, Partner and Client are well established with proper trust and integrity. In Bangladeshi Organization employees has SCM knowledge but there is huge lack of implementation and sustainability's. A sustainable ICT procurement and SSCM framework is needed for implementation of sustainable supply chain in different organization in Bangladesh.

CHAPTER-6

CONCLUSION

ICT is already established as potential business and there are many opportunities to develop this sector. Business process-based system will help to determine and observe the total process and find out the scenario of the total procedure of the procurement. In the ICT procurement perspective, there are various planning and concept control of ICT systems. In supply chain, management is the basic role of use of supply chain where concept of blockchain for logistics and other business process synchronization is important. And finally supply chain with block chain process that perspective the role of inherent logistics through that are available in present market in application of ICT systems. A Quantitative Methods help to identify the present condition of Bangladesh ICT procurement system and also help to finding the major challenges to established sustainable supply chain for ICT procurement and integrated with block chain technology.

From this study it has been explored that awareness and eager about Sustainable Management System is increasing among the stakeholders, ICT procurement using e_GP also increasing day by day but still the organizations didn't start using the blockchain technology may be due recent introduction of this concept in Bangladesh.

More study need to be done to explore and overcome the obstacles in the way to procure ICT goods and systems in Bangladesh maintaining sustainability.

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Appendix

Prospects of sustainable supply chain management for ICT procurement in Bangladesh perspective using block chain technology

This Survey is ICT Procurement in Bangladesh and usefulness of Supply Chain Management system

* Required

Name *

Your answer

Designation *

Your answer

Phone Number *

Your answer

Organization Name *

Your answer

Organization Type *

Public

Private

Have you known about Supply Chain Management? *

Yes

No

Total Number of ICT professional in Your Organization last Five year ? *

	>5	>20	>50	>100 or More
2015-16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2016-17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2017-18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2018-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2019-20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ICT Budget in your Organization during (FY2015-2016, FY2016-2017, FY2017-2018, FY2018-2019, FY2019-2020)? *

	>20000\$	>50000\$	>100000\$	>1000000\$ or More
FY2015-16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FY2016-17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FY2017-18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FY2018-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
FY2019-20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The number of Procurement package completed by the E-GP system Last five Years? *

	>5	>25	>50	>100 or More
2015-16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2016-17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2017-18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2018-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2019-20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The number of IT professionals engaged by The ICT Procurement department during the Last five Years? *

	>100	>200	>300	>400 or More
2015-16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2016-17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2017-18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2018-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2019-20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The number of professional training on ICT Procurement during the Last five Years?

*

	<5	<25	<50	<100 or More
2015-16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2016-17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2017-18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2018-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2019-20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Does your Organization using any tender system for ICT Procurement? *

Yes

No

Does your organization rely on a few dependable suppliers for ICT Procurement?

*

Yes

No

Does your Organization contact Original Equipment Manufacturer (OEM) directly or Help of Suppliers? *

Yes

No

Does your organization know the Original Equipment manufacturer (OEM) Price? *

Yes

No

Does your organization certify its suppliers for quality? *

Yes

No

Does your Organization contacts directly OEM for Support?

- Yes
- No

Does your Organization Sends any feedback to the OEM? *

- Yes
- No

Have you known about BlockChain? *

- Yes
- No

Is your organization currently implementing—or does it plan to implement— Block-chain technology? *

- Yes, we are currently implementing Block-chain technology.
- Yes, we plan to implement Blockchain technology within the next 12 months.
- No, but we are seriously investigating the possibility of implementing Block-chain technology.
- No, and we have no plans in the foreseeable future for using Block-chain technology.
- Don't know
- Other:

Has your organization developed a budget for its Blockchain efforts? *

Yes

No

When do you expect your organization to develop a budget for its Blockchain efforts? *

2019-20

2020-21

2021-22

2022-23

2023-24

Don't know

Other:

What benefits specific to your organization/industry do you hope to obtain from using Blockchains in ICT Procurement? *

- Improved business efficiency
- Identifying new ways of automating business processes among partners
- Better transaction integrity and visibility
- Increased transaction speed
- Better data protection provided by Blockchain's ability to eliminate points of failure in business networks
- Lower transaction cost
- Stronger working relationship with partners (via better collaboration, etc.)
- Enabling new business models (e.g., in contract management, financial transaction management, identity management, etc.)
- Time savings (i.e., reducing time required for settling disputes, finding information, and verifying a transaction, leading to quicker settlement and deliveries, etc.)
- Reduction of risks (i.e., by eliminating the risk of collusion, tampering, and unintentional leakage of information, etc.)
- Don't know

Any Suggestion for improvement of ICT Procurement Systems? *

Your answer