Perspective of Circular Economy in Bangladesh: A Comprehensive Review Towards Ship Demolition Industry

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Abstract

The circular economy (CE) concept is a manufacturing method that represents regeneration, reparation, restoration by the plan. CE is emphasized as an upper-edge national political agenda in China. Meanwhile, it is an apparatus to develop bottom-up ecological, environmental and waste management policies in different regions as European Union, Japan and the USA. Bangladesh is a densely populated country that causes massive waste generation, which can be reused to reduce virgin raw material consumption, leading to economic and environmental amelioration. The review paper is based on factors such as CE perspective and sustainability, synergistic and integrative, CE- Digital technology (DT) framework, CE and industrial symbiosis network. This study fills in the blanks of various limitations and offers conceptual clarity with future work scope. It also analyzes the current CE and CE implementation practice in different industrial and agricultural sectors in Bangladesh. In addition, the study includes the CE in the ship demolition industry. It provides some key insights to implement CE, such as adopting suitable technologies, allowing budget & legislation, setting long term-plans and profitability & performance test. Finally, a suggestion towards implementing deep neural networking (DNN) in the shipbreaking industry was appeared to create a computational tool for estimating the amount of equipment obtained after a demolition project that can be less time-consuming, more efficient, and profitable.

Keywords
Circular Economy, Shipbreaking, Sustainability, Deep Neural Network, Industrial Symbiosis.

1. Introduction

The circular economy is the most trending concept of today's economy. Previously, this whole perspective of production was a linear economy. A linear economy operates on the principle of "take-make-dispose." This approaches entail processing raw materials, transforming them into finished products, and distributing them to customers until they are accumulated as waste. But, a CE is a process focused on reducing waste and continuous resource use. Here, the principle is to reuse, refurbished, and recycled the waste and generate a new form that can be utilized. After the production, this continuous process reuses the waste material to create something new. It does not need to be the same product. Industrial symbiosis can also lead the waste into another good. Recovered waste from one product can be used as a raw material of other production. Thus, the virgin raw material needs can decrease. That is why this circular production has a substantial economic value too. Without this raw material, the circular economy focuses on refurbishment and reuse after the end of life. Sometimes renovations are made. Otherwise, the product demolishes for further utilization. The worldwide attention is focused on circular production. The closer an industrial foundation gets to the circular economy paradigm, the more it reuses and cycles its waste. It becomes more efficient while creating fewer environmental risks. Circular economy primarily encourages the use of recycled materials and the adoption of environmentally friendly technology. It is intended to demonstrate how a circular economy can benefit society in an industrial setting (Nations Encyclopedia, 2021).

The number of papers and journals on this subject has risen dramatically in the previous decade. The CE has also become an important topic of research in academics. Companies are now becoming more conscious of the possibilities offered by the CE and have begun to recognize the value it can provide to them and their clients (Geissdoerfer et al. 2017).

The concept of CE is widely used in the United States and several European countries. European countries are maintaining a circular economy at the highest rate following by America, Canada, and Africa also started focusing on

circular economy. Asian countries like Japan, China, Korea are also moving towards a circular economy. But, developing countries like Bangladesh are quite left behind. Very few industries in Bangladesh have already started using circular production. However, that number is minimal. There is a vast number of industries that are not maintaining a clean production which is causing pollution, health issues. Also, a considerable portion of possible raw materials is turning into waste due to the lack of a developed system. Being a developing country, Bangladesh is continually progressing towards digitization. The possibilities are undeniably vast when the potentiality of the circular economy is considered in Bangladesh. Apparel, leather, wood, and many more industries are introducing a circular economy in their production. Another industry that has considerable hope in the future for Bangladesh is Bangladesh Ship Breaking Industry. Demolition of the ship comes with huge sets of data of recovered material. It is not easy to manually maintain all the calculations and predictions with accuracy and operate this extensive business area. It is also time-consuming and less efficient. For these problems, some advanced technological insights can be taken. The novelty of this study is to point out the strength of CE in the shipbreaking industry and to introduce a deep neural network (DNN) to fill the gaps of technological advancement.

The goal of this study was to provide some essential insights for implementing CE in different sectors after a comprehensive assessment of relevant literature. Moreover, the current situation of the ship demolition industry in Bangladesh was explained. The growth and the scopes of this industry were discussed. Later on, a suggestion was mentioned about a neural networking model that can positively impact this sector.

2. Recent Application of Circular Economy in Different Sectors of Bangladesh

2.1 Contribution to GDP by Different Sectors of Bangladesh

A current statistics of Bangladesh's economy has shown that agriculture & industry-based economy is the main contributor to its GDP (Gross Domestic Product (GDP) of Bangladesh, 2020).

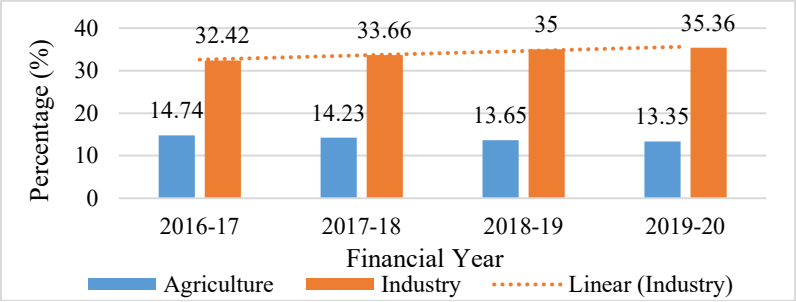

Figure 1: Industrial & agricultural share of GDP at a constant price (Million Taka)

Over the years, agricultural & industrial sectors overshadowed other sectors in economic growth. Figure 1 has clearly visualized the two major sectors are agriculture and industry. Research that has been developed based on CE in these sectors is briefly shown in the following segments, which are textile & apparel, leather, wood and agricultural sectors.

2.2 Recent Implementation of CE in Different Industrial Sectors

2.2.1 Textile & Apparel

Bangladesh's industrial sectors must expand at a faster rate to increase GDP. The Ready-Made Garments (RMG) may objectively lead it. RMG's native performance is well-known all over the world (FAST Report, 2016). As a result, there is a greater need for growth and sustainability in the manufacturing RMG market. According to a study, adopting the CE model in the textile & apparel sectors require three steps those are product design and production, sorting as well as waste collection, and successful recycling (Koszewska and Małgorzata 2018). A study was conducted so that top-level management can easily understand and identify the prime points of total quality management (TQM) implementation. Among those points, simplicity of the system, continuous monitoring for system development, etc., under enabling factors for the procedure can avail CE execution in the textile & apparel sector (Talapatra et al. 2019). Another research gathered information from twenty-three textile companies in Bangladesh to determine the root cause of water pollution caused by these businesses. According to the report, a lack of corporate commitment to engage in environmental conservation is the root cause of the country's escalating water pollution. In addition, a lack of ETP (effluent treatment plants) in Bangladesh contributes to emission. The results were also compared to an Indian study

because the author assumed India had similar resources and the same socioeconomic environment (Sakamoto et al. 2019).

Several obstacles were found on CE in textiles by other authors in their respective researches.
1. Planning and policy barriers in the company: A poorly designed structure and procedure can obstruct the creation of a model and the successful detection of sustainability issues (Zhu et al. 2007).
2.Improper performance evaluation: A company's success rate would be high if it maintains correct performance methods and practices (D'Amato et al. 2017).
3. Brand image: Companies often desire to maintain the brand identity of their customers and buyers, causing them to refrain from reusing materials. As a result, CE activities in the Textile & Apparel sector are on the decline. Customers and buyers should also persuade the business to recreate goods from waste in the interest of the environment and trash management (Jia et al. 2020). Despite this, several textile & apparel companies have begun to employ a supply chain recycling network for their products. (Fischer et al. 2017).

2.2.2 Leather

Different Bangladeshi leather corporations fill 10% of the total market for leather products worldwide (Textile Today 2021). Bangladesh has a 3% market share in the global leather and goods industry and almost 95% of its annual output is being exported (A Report on Bangladesh Leather Industry, LFMEAB, 2021).

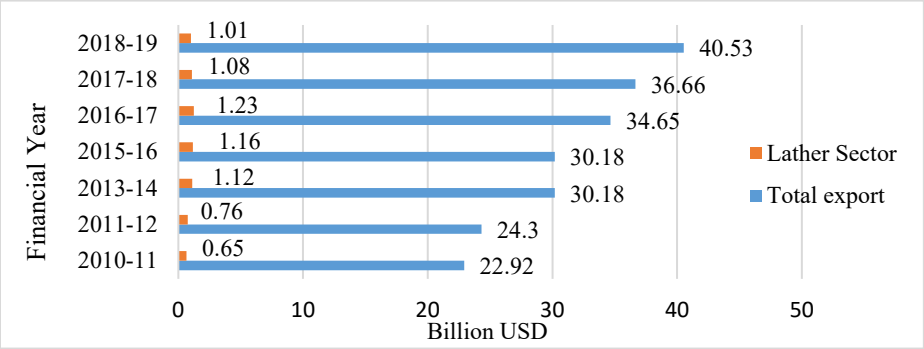

Figure 2: Bangladesh's overall exports and the leather sector's total exports (In Billion USD) from analysis based on Export Promotion Bureau (EPB) statistical yearbook (2019)

Figure 2 is the graphical representation of the total export and leather export of Bangladesh. The leather industry is a significant source of revenue for developing countries like Bangladesh. However, recent statistics indicate that the benefaction of merchandise leather exports to the nation's GDP has decreased significantly (Rakib and Md Abdur 2020). According to a study conducted in Bangladesh, this industry makes a remarkable contribution to the country's financial state. However, due to a high level of emissions, the industry cannot maintain a positive picture with its customers. As a result, various productions had adopted CE and green supply chain management (SCM) to minimize waste and conserve environmental resources. The study assesses, prioritizes, and ranks different drivers of sustainable manufacturing style here. After analyzing specific drivers using the matrix method and graph theory, the researcher discovered that knowledge of CE was the essence of practicing circular economy and sustainable manufacturing in this industry (Moktadir et al. 2018). According to a study conducted in Bangladesh on the leather industry and its long-term growth, most tanneries lack adequate effluent plants and generate approximately 20000 m^3 tannery sewage and 232 ton of solid garbage per day. The study recommended that the tannery economic zone to be relocated, as well as a site in Savar for existing industrial plots. The author also developed a simplified Effluent Treatment Plant (ETP) plant for the leather industry (Paul et al. 2013). According to a report, the most challenging term for CE practice in Bangladesh's leather sector was "lack of financial support from the government" (Moktadir et al. 2020). The author agreed with another argument that financial support was vital in the leather industry as this sector was associated with many complex technological operations for the reuse of scrap materials (Pringle et al. 2016). Essential success factors must be identified and evaluated to establish a business plan for CE practices and reduce pollution in the leather industry (Moktadir et al. 2020).

2.2.3 Wood

The wood industry has begun developing a positive reputation by offering high-quality goods to domestic and foreign consumers. Home furniture accounts for roughly 70% of the total furniture demand, with office furniture accounting for the remaining 30%. The development of CE may positively impact this sector because there is a shortage of skilled workers familiar with heavy and modern equipment, limiting the sector's potential growth (Winans et al. 2017), (Databd, 2021). An analysis of various furniture manufacturing industries had shown that using 6R reduces wood waste. They started by identifying waste using value stream mapping, which was built from the indicators of green manufacturing like material utilization and scrap management. The waste was then used as a source of raw materials for future processing. They distinguished five different forms of wood waste. Finally, they built a coffee table using the defined waste (Hartini et al. 2021). Another research used data from 190 relevant samples of SME (Small and Medium Enterprises) to investigate CE practice in the conventional business of wooden furniture. According to the findings, ESCC (environmental oriented supply chain cooperation) and CE procedures had a favorable outcome on circular economy targeted outputs. The analysis also showed that SMEs could be classified as leaders, followers, or laggards based on the variety of ESCC practices they used, which determined the degree to which they followed the CE theory (Susanty et al. 2020). Another author focused more on the 6R practice (Jawahir et al. 2016). In addition, according to a report, implementation of 6R in CE practice might result in resource optimization (Bradley et al. 2018). Furthermore, establishing an integrated management system (IMS) in the wood sector might benefit the implementing of CE, as the system saved resources and increased productivity (Talapatra et al. 2019).

2.3 Circular Economy & Perspective of Industrial Symbiosis

According to some reports, industrial symbiosis allows some companies or organizations that would normally be separated to share resources, contribute to stable sustainability with environmental, economic, and social benefits (Neves et al. 2020). Another study tied industrial symbiosis and circular economy together. According to the study, industries connected to benefit each other through multiple SCM have evolved in the CE model using industrial symbiosis (Tseng et al. 2018). An analysis based on industrial networks in Shitakunda, Chittagong, showed the connection of the related industries theoretically and represented that industrial symbiosis can allow massive waste recycling (Gregson et al. 2012). A study showed that industrial symbiosis provided environmental benefits and contributed to sustainable energy usage by measuring net fuel, energy consumption, and greenhouse gas discharged for an industrial park (Sokka et al. 2011). Another research focused on the structure and morphology of industrial symbiosis systems and discovered that the power station, refining, and Novo industries were the leading players in their respective networks. The power station was the most significant of them all, not only for the number of direct link they had with the rest of the network members but also because of their capacity to connect other nodes to maintain network cohesion (Domenech et al. 2011).

2.4 Recent Implementation of CE in Agricultural Sectors

Bangladesh's economy will be impossible to imagine without agriculture, as the sector employs 63 percent of the country's workforce (Nations Encyclopedia, 2021). Even though the sector is heavily reliant on weather, proper CE practice could yield some positive results by aiming to minimize waste while also making the best use of it (Nations Encyclopedia, 2021) (Toop et al. 2017). Agricultural waste, particularly which is utilized in the kitchen, accounts for 92 percent of total primary energy consumption in Bangladesh (Toop et al. 2017). A research in Bangladesh found ways to collect waste (including agricultural waste) to generate biogas and use it as a source of energy. The study also showed that Bangladesh had a great environmental and agricultural waste back up to generate a large amount of biogas (Uddin et al. 2019) by bringing some statistics. Another research aimed to provide a paradigm shift in how urban agriculture solid waste was perceived to provide by-product treatment from the start. The results showed that the solid waste produced in integrated rooftop greenhouses (i-RTG), specifically tomato stems, had great potential to use as an eco-friendly material. After examining roots, stems, and leaves at the ending of the harvest, as well as trimming branches seven leaves, the research discovered 1% plastic, 27% substrate, and 72% total biomass. The study prioritized tomato stems to generate bio-gas. It had been found that stems of tomato can be utilized as an eco-material by compressing them with heat or using a natural binder to make containers, bricks by strengthening fiber content in polymer metrics for making bioplastics. To achieve this, the materials' physical, chemical, and mechanical properties must be appropriately characterized (Manríquez-Altamirano et al. 2020).

3. Circular Economy in Ship-Demolition Industry

Bangladesh is ruling over the shipbreaking industry for more than a decade. A significant part of the ship demolition or shipbreaking industry is eliminating the scrap from the old ship and utilizing those in different areas. Usually, the

scrap of the vessels contains explicit materials like steel, iron metal, non-ferrous metals, plastic, wood, electric wire, generator, engine, electric hardware, furniture, siphon, gear, other mechanical gear, and apparatuses. Without this, consumed oil, coolant, fuel can be recuperated. Most of these materials can be reused or reused. Otherwise, those which arrived at the end of the life (EOL) cycle need to be dumped in a technique that cannot affect the environment.

3.1 History

It all started in 1960 when the Bay of Bengal was struck by a cyclone and a giant cargo Greek ship, 'MD Alpine', stuck in Shitakunda. The owner disowned the ship, and after few years, local workers started to disassemble the vessels with the help of the locals. In 1965, 'Chattagram Steel House' purchased the vessel and broke it. The scrapping of the ship took a few years but it introduced a new industry in Bangladesh. In 1971 during the war, a Pakistani ship known as 'Al Abbas' was partly destroyed by bombing. Later the ship was subsequently rescued and taken to the Fauzdarhat beach. Karnafully Metal Works Ltd got it as scrap in 1974. Thus, the official ship demolition industry started. At present, Bangladesh dismantles 47.2% of the world's ships (History of Chittagong Shipbreaking Yard, 2021).

3.2 Present Situation on Ship Demolition Industry

Bangladesh is currently one of the world's leading shipbreakers. As Bangladesh is one of the developing countries, it has a vast need for iron ore (the raw material for the production of iron) as lack of iron mines. The shipbreaking industry of Bangladesh supports monetary development by creating an enormous amount of steel and iron in the local business. The industry is estimated at approximately $1bn (£640m) and shipyard-holders say the sector is the main income source for about 200,000 workers (Studymode, 2021). A Comparison between Bangladesh with other countries in terms of ship breaking is shown in figure 3 (Shipbreaking Bangladesh, 2021).

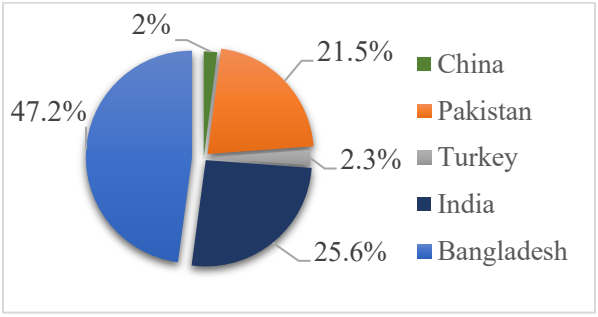

Figure 3: Comparison of major vessel disposal rate of Bangladesh to other nations, 2018.

3.3 Circular Economy in Ship Demolition Industry

The circular economy can be largely discussed in the ship-demolition industry. The significance of the shipbreaking industry is to reuse the scrap generated from shipbreaking. Re-rolling industries are a huge platform for recycling the ship scrap; also, steel industries are vastly maintaining the re-production from the vessel scrap (Rahman et al. 2016). No wonder this industry has an immense sight toward an appropriate circular economy which can lead this region towards a new coordinated cycled production.

3.4 Studies Related to Circular Economy in Ship Demolition Industry of Bangladesh

Here, some aspects of the shipbreaking industry have been discussed by the various disciplines of the papers.

3.4.1 Regional Aspects

The global shipping industry is an integral part of the infrastructure that supports the world's social metabolism. More than 90% of the vessels slated for breaking are presently moved to Bangladesh, China, Pakistan, Turkey, Vietnam and the Philippines. The fundamental purpose for seeking after shipbreaking in these districts is the lower labor cost, weak ecological guidelines, weak safety concerns. The development of the ship demolition industry in South and Southeast Asia has a positive commitment to the domestic market (Rabbi et al., 2017). Because recycling is cost-effective only in few developing nations. For example, countries with natural yards, low-cost labor, and strong demand for recycled products (Steuer et al. 2021) (Foysal et al. 2009).

3.4.2 Economic Aspects

Bangladesh's ship demolition industry is vital to the country's economy. Almost 20000 workers depend on this sector. Steel, shipbuilding, and other heavy and light engineering industries also benefit from the ship breaking industry. Scraps generated from ship vessel has a huge impact on the economy because Bangladesh has no iron mine and iron ore is the main raw material in iron production. Moreover, scraps are hugely used in steel manufacturing which has a huge impact on construction sites. These raw materials are minimizing a huge import cost every year. Various local markets are also depending on this market (Knapp et al. 2008).

3.4.3 Market Efficiency

The maritime markets are divided into four segments: the freight market, which transports goods through sea and produces surplus; the sale and purchase business and newbuilding business, which complies with new ships; and the demolition market, which depends on scrapped ships (Açık et al. 2018). The global market has captured by the shipbreaking business of Bangladesh, scrapping about 47.2 percent of all international ships (Dhaka Tribune-UNCTAD, 2019). Bangladesh, India, and Pakistan has held 70–80 percent of the global marine vessel reuse market, with China and Turkey accounting for the bulk of the remaining market. According to the research, India scrapped 25.6 percent of marine vessels in 2018, Pakistan 21.5 percent Turkey 2.3 percent, and China 2 percent (Dhaka Tribune, 2019).

3.4.4 Environmental Aspects

Despite the fact that it is a thriving business, it has many harsh critics due to its negative environmental consequences. The entire contents cannot be recycled during the recycling process. Rather, it generates hazardous waste that is extremely harmful to the environment. Scrapped ships contain steel and a significant amount of lead, cadmium, arsenic, zinc, and other heavy metals (Foysal et al. 2009).

3.4.5 Safety and Law Enforcement

The darkness behind this accomplishment of shipbreaking demolition is cheap resource of labor. Low maintenance of conducted inadequate law enforcement on safety and environmental issues. Every year hundreds of workers face accidents. These shipyards sometimes do not even maintain the minimum safety resulting in lots of unpleasant occurrences. In the matter of environmental pollution in the shipbreaking industry, there are no laws in the sense of Acts of Parliament, Ordinances, or Orders. On February 12th, 2011, the government announced a policy for the shipbreaking industry. However, none of these regulations are severe in the sense that they have failed to implicate (Foysal et al. 2009). The significance of the shipbreaking sector to Bangladesh's economy has inhibited the state from taking tougher arrangements against it, even in cases where it was clearly justified (Ahmed 2020).

4. Strength of Circular Economy of Ship Demolition Industry in Bangladesh

Recycling a ship is the primary purpose after the end of life of the vessel. The sole purpose of this is to reuse the scraps as much as possible. The products that are not reusable need to be recycled for the desired outcome. This reused, recycled and refurbished vessel scrap supports numerous subsidiary businesses. The shipbreaking industry has been practicing circular economy with our without knowing it from 1960. This industry is the primary source of earning for workers around the shipping yard. Also, lots of industries are maintaining production, and local markets are depending on various scraps. By recycling ships, a "Restorative Design" philosophy has been applied, built on the concept that the stocks and flows of resources in a supply chain are reconstructed rather than destroyed/degraded (Hartig et al. 2008). Recycling would reduce retail material costs as well as resource extraction for virgin goods. This restorative idea holds immense promise for creativity and the creation of a diverse range of jobs. Ship recyclers will expand their businesses much more sustainably if they use systematic scientific expertise and follow the relevant policy regulations. In any multi-stakeholder recycling sector, this is a first-of-its-kind effort to resolve the idea of the circular economy (Hiremath et al. 2018). The ship demolition industry is a promising industry that can perform circular economy. Bangladesh is moving forward to catching up with this new era of green production along with the circular economy.

4.1 Limitations of Previous Paper and Future Work Scope

First, based on the descriptive analysis result, it is clear that the single case study is the most common approach used in apparel field. Their findings provide unique insights into the successful utilization of a circular supply chain, as well as the position of strategic capitals and shareholder connections. Nevertheless, they are not reflective of all traditional garment companies, and therefore cannot be applied to the entire textile and apparel industry. Some

research focused on the complexities of goods and programs while ignoring the organizational barriers that prevent the CE model from being implemented. As a result, a second priority for future CE research may be organizational barriers, such as how a firm's internal structure and activities can be rearranged or structured to accommodate CE adoption (Jia et al. 2020). For another study, it is possible to demonstrate a sustainable production process and analyze the drivers more thoroughly; a machine learning approach can be used. This approach may addressed how waste parts of leather can be reused and how to dispose of the least valuable parts in an environmentally friendly manner (Moktadir et al. 2018). Since the lather factory generates a significant amount of waste, a multiple waste strategy for waste recovery should be shown for CE implementation. The study places an excessive amount of focus on the literature review or theoretical approach over the practical consequences. The proposed critical success factor's (CSF) effect could be demonstrated (Moktadir et al. 2020).

Future studies may be conducted with the implementation of digital technologies in a genuine case study (Okorie et al. 2018) (Pagoropoulos et al. 2017). For better production, it is always welcomed more strategical design and model. The results of CE market and utilization models indicating the sale of a system (rather than an item) or its leasing, restoration, and reproducing that can be studied through a developed design model (Ghisellini, et al. 2016). Improved supply chain models and infrastructures can be introduced (Bocken et al. 2016). It can also include zero waste, green recycle and optimal recycling methods, which are linked to consumer requirements, infrastructure, and other facts of a socialized lifestyle, such as crucial improvements in education, culture, public policy, and waste reduction (Kyriakopoulos et al. 2019) (Kavitha et al. 2014) (Foysal et al. 2009). The ship demolition sector can have tremendous future scope. Ship recycling policy and green recycle can be introduced to this current situation (Hossain 2015). In another study, future research can be conducted on environmental and econometric analysis. Moreover, research can be done into the impact of alternative pollution control policies on demolition studies if possible also in the area of law enforcement (Knapp et al. 2008).

5. Recommendation

Some common insights to implement circular economy based on research findings are shown below:

- To adopt CE, industrial engineers need to look for modern technologies to support their budget and effort. To perform complex and mechanical tasks, automation could be used as it is used in other countries. It may be easier to use data science to identify possible waste and reuse, recreate, and dispose of it properly. This method may help to reduce waste while also allowing waste to be used as production raw materials in some cases.
- In a traditional corporation, CE implementation demands new regulations as well as additional funding. As a result, top-level management should not be torn in this regard. One of the few essential factors of CE implementation is proper low and budgeting.
- Industrial engineers must foresee future market conditions and develop long-term business goals in consideration of this. This long-term strategy requires less waste and lower production costs to achieve maximum profit. In this way, long-term goal setting will allow CE to be implemented more sustainably.
- The development of industrial symbiosis would undoubtedly encourage the better implementation of CE in any industry. Following the method used by other industrialized countries to build industrial symbiosis will be helpful in this regard.
- Before deploying CE in production, some research into the influence of CE adoption on profitability and financial performance is required.

Technological research is required in the shipbreaking industry of Bangladesh as it is a very profitable sector. From the necessity of time savings, make the shipbreaking industry manual hassle-free & most importantly for the betterment of the environment, a future study scope may arise in the following process.
The number of resources that can be recyclable, reusable and net profit from these items can be determined by Deep Neural Networking (DNN) model. Resolving the maximum derivable economic and environmental values from a vessel at the end of life (EOL) before the deconstruction and demolition of ships is the main concern of this study. The procedure of the plan is shown in figure 4 below:

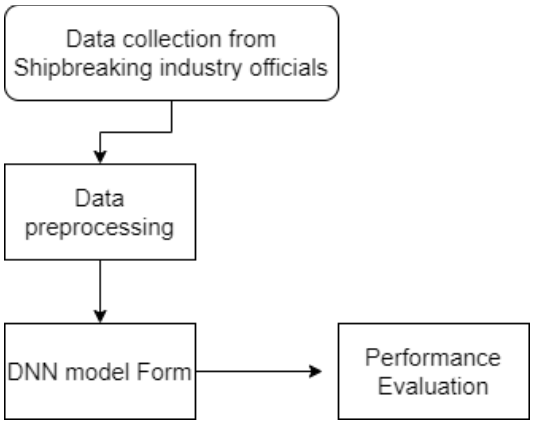

Figure 4: Procedure of the proposed study

Ship archetypes, ship usage, area and volume of a ship can be considered as the independent variable and corresponding recyclable materials, reusable materials, and approximate net profit can be determined as dependent variables in the deep neural network (DNN). The accuracy may be shown and R square maybe measured the performance parameter by the DNN model. In addition, the environmental impact may be able to predict based on previous data by the model. A schematic view of DNN model in figure 5 may give some quick hints.

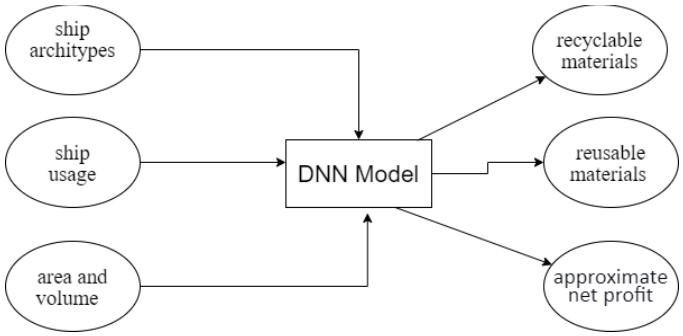

Figure 5: Schematic view of the DNN model

Consequently, management in the ship demolition business may able to make more rational decisions by weighing aspects such as profit, usable resources, and environmental effects. This effort may assist the business as well as the environment by reducing the amount of pollutants produced by the ship demolition sector. The proposed action may address the requirement for a new system that can automatically maintain the hassle by analyzing data and building a chain utilizing recovered materials and cost analysis.

6. Conclusion

This study ought to share some CE implementation insights after conducting a thorough literature review. Textile & apparel, leather, wood, ship breaking industry agricultural sector has an enormous impact on the overall contribution to the GDP of Bangladesh. The role of the industrial sector to GDP from 2016-17 to 2019-20 financial year has increased by 2.94 % (figure 1). In the last ten years, the leather industry has contributed 3.194% to the total export (figure 2). 47.2 % of world vessel has demolished by Bangladesh shipbreaking industry (figure 3). The study emphasizes CE perspectives on textile & apparel, leather, wood, shipbreaking industries, agriculture sectors and highlights the significance of industrial symbiosis on CE practices to achieve more economic advantage from these sectors. Later on, the study provides a comprehensive review of how CE can positively affect the shipbreaking industry of Bangladesh. It reviews some of the work by pointing out the strength of CE in the shipbreaking sector. Following that, it identifies several limitations in previous research and suggests a better approach. Finally, it offers a machine learning approach that allows managers in the shipbreaking industry to make the right decision based on specific data

while avoiding manual work. After analyzing numerous research papers and economic reports, the final thought is that proper education and training for employees, top-level management, will certainly help CE performance. The government should emphasize on industries to implement CE values for environmental issues. A CE-based program's effectiveness depends on the use of social technologies that increase community involvement, public education, and media attention. Bangladesh's ship recycling business has outstripped that of its neighboring nation in terms of income. The DNN model may forecast the revenue from an impending ship that needs to be dismantled. As a result, the user of this strategy may not have to bear the financial risk. In this approach, the suggested DNN model may contribute to the GDP growth of Bangladesh. Establishing a green ship recycling yard, a ship recycling economic zone, creating an industrial symbiosis network with local relevant industries, improving bilateral technology on ship breaking, adhering to the Hong Kong convention and detecting hazardous elements and properly disposing of them are some of the essential actions in the circular economy.

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