

LITERATURE REVIEW

This paper identifies key barriers and enablers to adopting circular economy business practices, using input from a literature review, discussions held in the context of the Green Eco Net project and an analysis of two SME circular business models. In the available literature the circular economy has been described as an industrial economy that relies on the “restorative capacity of natural resources” (Bastein et al., 2013) and aims to minimize - if not eliminate - waste, utilize renewable sources of energy and phase out the use of harmful substances (Ellen MacArthur Foundation, 2012). The circular economy involves a distinction and careful management of two different types of materials within a closed-loop economy: 1 materials of biological origin which can return to the biosphere as feedstock (called biological nutrients, e.g. forest products) and technical materials which cannot biodegrade and enter the biosphere (called technological nutrients, e.g. plastics and metals) (Bicket et al., 2014; Ellen MacArthur Foundation, 2013).

The second phase of expansion, which was based on the lessons learned from the problems of technical unfeasibility and economic difficulties, redirected the focus of the CE to the industrial structure (Geng et al., 2016; Yuan et al., 2006). Regarding the early application of the CE, China was the leading country in terms of publications, while in publications from Europe, the usage of the term CE became more common after the European Commission (EC) addressed the issue of waste in 2014 (Türkeli et al., 2018). The EU started the transition with the publication of the Circular Economy Action Plan in 2015, which preceded the environmental directives EC 2005, EC 2011a, EC 2011b and EC 2011c. The EC framework was based on eight building blocks: industrial symbiosis, material resource efficiency, product life-cycle extension, biological products, energy efficiency and renewable energy, the performance economy, the sharing economy and finally, the platform economy (Taranic et al., 2016).

In Brazil, the CE is supported by the National Solid Waste Policy (NSWP) (Brazil, 2010), which institutes a shared responsibility policy for the product life cycle and establishes reverse logistics as an instrument of economic and social development through an environmentally friendly waste disposal process (Azevedo, 2015; Demajorovich and Migliano, 2013). The proposed solutions to this problem include the adoption of effective indicators of waste reduction (Veleva, et al., 2017), life cycle assessment (LCA) methods for the design and measurement of performance (Scheepens, et al., 2016), and streamlined life cycle analysis, which is a quicker and cheaper approach than LCA (Gnoni, et al., 2018). The quality and quantity of recovered materials is a critical aspect for the stock supply of a growing economy, as well the energy required for transformation, and because primary resource extraction is necessary for all economies (Cullen, 2017; Lèbre, et al., 2017; Murray, et al., 2015).

The ideology of circular economy draws analogy from biological ecosystems that are cyclical by nature. There is no such thing as ‘waste’ in the nature: as organisms die, they become nutriment to other organisms eventually ending up to enriching the soil. (Ellen MacArthur Foundation, 2013: 22-23, 27). According to estimations by the Ellen MacArthur Foundation, 80 % of the value of fast-moving consumer goods is currently not recovered. About 18 % is recovered for decomposition (to be recycled or biodegraded depending on the material) and only 2 % is recovered for reuse (including direct reuse for the same or different value streams or industries). (12: Ellen MacArthur Foundation 2013: 87). Mitchell (2015) goes further and emphasizes the importance in a circular economy of

Islam

keeping resources in use for as long as possible as well as extracting the maximum value from products and materials through using them for as long as possible and then recovering and reusing them.

According to Ghisellini et al. (2016), the radical reshaping of all processes across the life cycle of products conducted by innovative actors has the potential to not only achieve material or energy recovery but also to improve the entire living and economic model. One of the most-frequently cited definitions that incorporate elements from various different disciplines has been provided by the Ellen MacArthur Foundation (2013) which describes the circular economy as “an industrial system that is restorative or regenerative by intention and design. Under this framework, the circular economy aims to keep both types of these materials at their highest utility and value at all times through careful design, management and technological innovation (Ellen MacArthur Foundation, 2013; 2015). The overall objective is to “enable effective flows of materials, energy, labor and information so that natural and social capital can be rebuilt” (Ellen MacArthur Foundation, 2013).

“Circular economy is an approach that would transform the function of resources in the economy. Waste from factories would become a valuable input to another process – and products could be repaired, reused or upgraded instead of thrown away”. EEA (2014) Circular economy is “an industrial system that is restorative or regenerative by intention and design. It replaces the ‘end-of-life’ concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models”. The overall objective is to “enable effective flows of materials, energy, labor and information so that natural and social capital can be rebuilt”. European Commission (2015).

DESIGN FOR CIRCULAR ECONOMY

Design in the circular economy is complex and requires a transformation in thinking, to shift ‘from the current product-centric focus towards a more system-based design approach’ (RSA, 2014). Circular design searches for a way to deliver a product or a service, which is functional and made of optimum materials to deliver the best performance while minimizing its negative impact along the whole life cycle. (Aho, 2016). Circular design strategies have tended to focus on the physical aspects of a product (e.g., disassembly, material selection), but the design of products and services can also have an influence on user behavior and, to date, this aspect of circular design has not been fully explored. This qualitative research can be divided in two parts: building of the theoretical framework and the in-depth interviews. The first part is carried out as a desk research by orienting in literature, academic articles and previous theses about circular economy. The second part aims at a more practical view of the topic and is mainly based on conversations with some experts on the field.

Circularity is not new as a concept. Especially in the field of process industry companies have utilized waste and side products of other companies as their raw materials. One may say that the term ‘circular economy’ is much younger than the idea itself. However, circular economy has become the focus of attention quite recently. Even though the concept has been described before, for instance in 1982 by Walter J. Stahel, almost all material about circular economy, at least under

that name, have been published over the past five years. When exploring the material, it became very clear that circular economy is a rising trend in the business field as well as in research. The empirical part is based on theme interviews. The first interviewee is Mr. Heikki Sorasahi, M.Sc. (Tech.), from Sitra. His special fields of expertise are responsible mining and circular economy. Sitra is a public fund founded by the Bank of Finland to promote Finland's competitiveness and the well-being of the Finnish people. Their tasks are defined by law and they report directly to the Finnish Parliament. The organization employs a number of experts working on projects focusing on themes such as 'resource-wise and carbon-neutral society' and 'new working life and sustainable economy'. They have produced several publications on the topic of circular economy and have hands-on knowledge on Finnish business life, which makes their outlook valuable for this research.

This research presents an applied nature and is characterized as exploratory, because it intends to approach the theme, as well as to solve specific problems, by performing an intensive analysis of an individual unit, such as a person or community, stressing developmental factors in relation to the environment (Prodanov & Freitas, 2009). An enterprise input-output approach is used to model physical and monetary flows of the manure-based biogas supply chain. Computational experiments are performed on all variables to identify under which conditions the cooperation is beneficial for all actors (Figure 1).

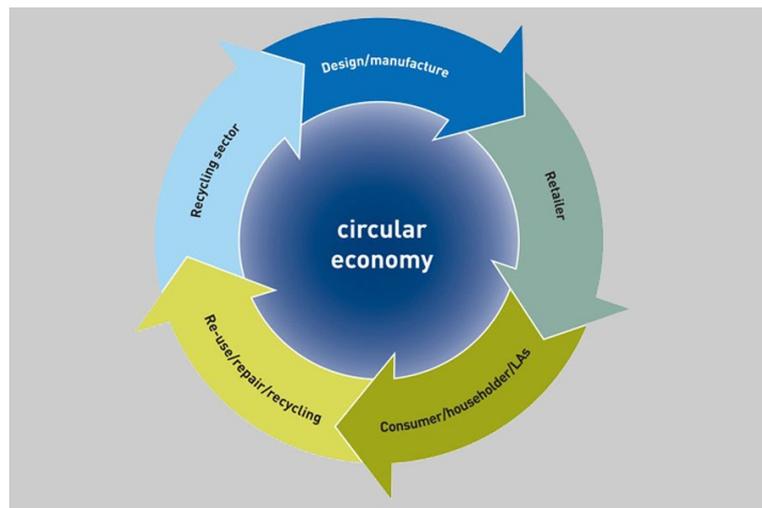


Figure 1. Circular economy.

Identification of Main Circular Economy Processes

The research has identified the following three different categories of CE process, namely i) using fewer primary resources, ii) maintaining the highest value of materials and products and iii) changing utilization patterns. It should be emphasized that the categories of circular processes are not mutually exclusive. Many of their elements are often interlinked, while in some cases businesses can adopt a strategy that involves multiple circular processes (Rizos et al., 2016). Murray et al. (2017) provide the example of bamboo chopsticks that in their view would be more easily recycled and returned to the biosphere than longer-lasting plastic forks.

Recycling

Recycling has been defined by United Nations et al. (2003) as “the reintroduction of residual materials into production processes so that they may be

Islam

reformulated into new products’’. For many decades it has been the most traditional way of implementing circular economy principles by capturing the value of existing products and materials and decreasing the use of primary materials. Reducing the extraction of primary resources through recycling can provide multiple environmental benefits (EEA, 2016) and also help reduce GHG emissions associated with material resource use.

Plastics are an example of a material with a high calorific value and which therefore might be suitable for burning to use for energy recovery. Nevertheless, in line with the waste hierarchy, it would be better to recycle the plastic as recycling would result in higher overall economic and environmental benefits (JRC, 2011). Carbon capture and utilization also falls under the scope of renewable energy sources utilization, as this technology enables re-using the captured carbon inter alia in fuels or chemicals (Aresta et al., 2013).

Importantly, in the case inter alia of electronic products, product life extension practices deal not only with extending the lifetime of the hardware but also with the durability of the software. This is related to expanding the product lifetime by tackling planned obsolescence. Planned obsolescence may entail negative environmental impacts such as excessive use of natural resources and environmental damage. Selling the product as service, rather than the product itself (see more details about this process below) may be a way to deal with this issue (Valant, 2016).

While the process of product life extension is generally considered to have a positive environmental contribution, there are also some concerns regarding its net benefits. In particular, it has been suggested that in some cases this process might postpone the market penetration of new technologically advanced products. This could be particularly the case for products such as household appliances and cars in which the transition from one ‘generation’ to another could entail significant benefits (for example, reduced energy or fuel consumption) (Demailly & Novel, 2014). Product as service. Product as service refers to the concept of offering the product as a service which challenges the traditional business approach of selling tangible products. It can be implemented via practices of leasing, renting, pay-per-use or performance-based business models.

Bangladesh current scenario

Waste management refers to the process of collecting, transporting, processing, recycling and disposing of garbage. This process involves the use of substances to reduce the harmful effects of health, or to preserve the beauty of the environment. It deals with solid, liquid or gaseous waste by different methods and skills.

Waste management

Inadequate modern and safe disposal of waste materials is one of the major environmental problems in Bangladesh. Houses, businesses and industries have been created in the capital city in an unplanned urbanization process. For these infrastructures, in most cases there is no modern and scientifically sound system of waste disposal. As a result, large amounts of household waste are being dumped here and there every day. Due to the rapid population growth in Dhaka, the issue of waste management is becoming increasingly complex. Huge amounts of household waste are being dumped here and there from the homes of countless people.

Waste management is becoming riskier because of unsure of the kitchen's abandoned garbage, decaying vegetables in the market, litter in the mill factories, the blood of the slaughterhouse, the color of the press, the safe disposal of poisonous waste from the hospital. At present, the use of chemical fertilizers and pesticides in agriculture and the use of aluminum foil, packets of foodstuffs for modern living are increasing the scope of complete waste management. As a result, the pathogenic bacteria and toxins, both solid and liquid wastes, are causing serious harm to public health and the environment. The successful effectiveness of waste management depends on the public health, technical and economic conditions of the area. 3000 people die in Bangladesh in one year due to environmental pollution. The World Bank says that in Bangladesh, 28% of all people die every year due to environmental pollution. But the average of such deaths worldwide is only 16%. Bangladesh is one of the countries most affected by pollution and environmental risks, according to a World Bank report. The World Bank cites figures of 2015, saying that the levels of pollution in the urban areas have reached a critical level, saying that in pollution, 80 thousand of people have died in different cities in Bangladesh.

Toxic and hazardous waste

Toxins and hazardous wastes are harmful substances for human health that harm the physical environment and destroy the interplay of organisms. Human activities often produce many toxic and hazardous wastes. The nature and extent of these wastes depends on the socio-economic status of the country, the level of the factory, the cultural and ethnographic characteristics of the public. They are also source of various houses, commercial establishments, factories, transport, agriculture etc. Household toxins and hazardous wastes mainly contain broken-glass, sharp metallic materials, dyes, petroleum organic matter, and so on. The same type of waste is usually produced from various commercial establishments such as hotels, restaurants, gasoline-stations, factories, hospitals, clinics. A large part of this waste comes from factories and, to a lesser extent, agricultural fields. Most pesticides used in agriculture are stored in high levels in soil and water, which can be a serious risk to human health. Billions of pieces of animal skin are processed in about 250 leather factories in Hazaribagh area of Dhaka city. Most of the toxic chemicals used in these are being polluted in the river.

Electronic waste

Electronic waste or e-waste refers to abandoned electrical or electronic equipment or machinery. These are mainly electrical and electronic appliances used in the consumer's home, such as fridge, camera, microwave, laundry and dryer, television, computer, mobile phone, etc. Unregulated management and processing of electronic waste in developing countries can have adverse effects on human health and lead to environmental pollution.

Plastic contamination

Plastic pollution is the collection of plastic substances by the environment that subsequently adversely affects wildlife, wildlife habitat, or even humankind. Regular plastic use is increasing the level of plastic contamination Polythene bags, cosmetic plastics, household plastics, most of the plastic products used for commercial use are not recycled. They take the form of waste from the environment Anesthesia is the main cause of plastic pollution Plastic is a chemical that takes a long time to digest or reproduce in a factory.

SOCIAL, ECONOMIC AND ENVIRONMENTAL DEVELOPMENT OF BANGLADESH

Social development

In the passing year 2018, the economy of Bangladesh has had a positive impact. A review of the country's economy indicators shows that Bangladesh is capable of economic activity. Besides, Bangladesh is well positioned in terms of human development and social development index. In addition to the macroeconomic indicators, the indicators of macroeconomics also have a positive impact on the socioeconomic status of the country. Bangladesh's progress in the expanded policy has increased economic transactions in several countries, including Japan, China, India, Malaysia, Korea, Russia. Bangladesh's exports to the United States also increased by several hundred million dollars over the past year. Gradual development in the economy helps sustain the growth of total national wealth. The adoption of a balanced tax management and collection strategy has been positive for the economy.

Extensive programs have been taken to increase the supply of energy and power sectors. Coal-based electricity needs to be produced. Besides, the construction, renovation and expansion of roads, railways have been increased. Others, including Korea and China, have extended their cooperation in the construction of the Padma Bridge for domestic financing. In the 57th session of the United Nations Social Development Commission, Bangladesh's Permanent Representative to the United Nations, Masood Bin Momen, said, "Bangladesh has made significant progress in all areas of socio-economic development, including sustainable development of the Human Development Index. "We have reviewed the minimum wage for the garment sector recently twice in order to maintain income-growth," he said. The sector is the largest foreign exchange earner sector in the country. Considering the social development sector, Bangladesh is in a strong position in South Asia even as the neighboring countries are ahead of India. Nevertheless, the expectation is that more inequalities in the forest system will be eliminated. Moreover, the private sector has to play a key role. Hopefully, industry entrepreneurs are again encouraged to invest in the country.

Economic development

The name of Bangladesh as a member of the emerging economically strong state club has been discussed for the last few years by various reliable research organizations around the world. According to Goldman Sachs, investment in Bangladesh is the most likely area for investment in the power, energy, cement and telecommunication sectors, and the Wealth Report 2012, jointly co-authored by Knight Frank & City Group, is the first to achieve rapid growth in the world through wealth flows and potential investments. Not only that, according to the Guardian, Bangladesh will outperform the western countries in terms of growth in the 2021. According to a survey by various international organizations around the world, if current economic growth of 6 percent or higher is achieved and poverty rate reduction, like 'magic', Bangladesh will be able to become a middle income country by 2021. On the other hand, according to research by the Oxford Poverty and Human Development Initiative, the poverty rate in India decreases by 1.2 percent every year, but in Bangladesh the rate is 3.2 percent.

In the nineties, only 23 million people could cross the poverty line in Bangladesh, but with the increase in the number of people in the 2020-2021

decade, the economy of Bangladesh has been able to get rid of the poverty scandal. In spite of the lack of good governance, abject human rights abuses, political outrage, overpopulation of the population, Bangladesh has become one of the five economic countries in the world for human resource development. It should be noted that although the neighboring India and China set the target of growth at around 5 percent, the target in Bangladesh has never been above 7 percent. But to make Bangladesh a middle-income country, there is no option to keep the growth rate at 7-8% on average. It should be noted that Bangladesh has been able to set a precedent for developing countries, even in developing countries, in achieving MDG goals, including education, healthcare, women's empowerment, increased life expectancy, reduction of maternal and infant mortality rates, access to sewage treatment. The question is, how populous and problematic is the population of this state like Bangladesh making this impossible? The main contributors to this achievement are the growth of internal demand for labor income by increasing production and economic activities by combating the inefficiencies of the economy and the weaknesses of the governance process through its own processes and methods, and the global economic of a group of young talented and entrepreneurial people. The pain of being involved in the process mental desire and effort accordingly. Economists believe that Bangladesh has achieved a milestone in economic development in the last five years under the current government.

Environmental development

Environmental protection and sustainable development are major challenges of the present government. Environmental experts blame political pressure as a major obstacle to environmental protection, disregard of influential law and inefficiency and mismanagement of responsible government agencies. Bangladesh is one of the countries most affected by pollution and environmental risks, according to a World Bank report. In Bangladesh, about 28% of the people die every year, due to various pollution-related diseases. But the average of such deaths worldwide is only 16%. The level of contamination in Bangladesh's urban areas has reached a critical level. Thousands of people have died in various cities in the country due to environmental pollution. According to a report by the Environmental Protection Agency (EPI) of the United States Environment Agency last year on the government's role in protecting the environment in five countries, the position of Bangladesh has fallen to 179th position from 2010 to 2018. And in the 180th position in this index is Burundi, the war-torn country of Africa. Bangladesh is one of the top ten countries on top of polythene pollution - deforestation, wind, water and panacea.

The continuous deterioration of Bangladesh's position in the world for environmental protection is a matter of great concern and fear for the common people. This is because, the worst sufferers suffer from environmental pollution, are women, children and low-income marginalized people. It is learned that out of the 1,212 bricks of the country, 2, 220 bricks have not yet been adopted by advanced technology. Expired vehicles, especially buses, are the most polluted. Although the Bangladesh Road Transport Authority and the Department of Environment are planning to take action against the polluting vehicles, it has been alleged that the agency could not play two effective roles in controlling pollution due to the influence of the ruling party leaders in the transport sector. Many fear that if the level of air pollution continues this way, the situation in Bangkok could be created in the capital Dhaka.

Islam

Polythene is an important factor in Bangladesh's environmental pollution. The production and use of polythene bags were also banned in the country in the country to control water pollution. However, at present, there are no hats and markets where polythene is not used freely. There are still many factories and wholesale shops producing illegal polythene bags in the capital Lalbagh, Chawkbazar, Tongi, Gazipur and Chittagong.

The illegal use of these polythene bags is one of the major causes of water logging and soil contamination of various cities and villages of the country, including the capital Dhaka. It is reported that a family in Dhaka city consumes an average of four polythene bags per day. As a result, about 20 million polythene bags are thrown away once daily in Dhaka City. There is no way to deny that environmental pollution is causing huge harm to people, animals and ecosystems. People are suffering from a variety of complex diseases. Animal habitat is being destroyed. The food chain is being destroyed. Many animals are becoming extinct from nature. Earth's temperature is rising. Glacial melting is increasing sea level. Due to the increase in salinity in coastal areas, acute water crisis is occurring. Agricultural production is declining. Storms, tornadoes also increase the severity and number of cyclones. Due to the untimely floods and rains, the crops in the Hauer region are also being destroyed. Due to the river breakdown many crop lands and towns are being destroyed. Thousands of people are taking refuge in the slums of the city every year, losing ever-evolving homes, which is inconsistent with the golden dream of independence, and is also the result of achieving our constitution and sustainable development goals. It is expressly stated that the state shall preserve and develop the environment for the present and future citizens and preserve and protect the natural resources, biodiversity, wetlands, forests and wildlife. Environmental experts blame political pressure as a major obstacle to environmental protection, disregard of influential law and inefficiency and mismanagement of responsible government agencies. Overcoming these obstacles and ensuring sustainable development of the country by tackling the effects of environmental protection and climate change is a major challenge for the current government and an electoral commitment. Therefore, no matter how difficult the interests of the people and the nation, along with the development of the environment, the security of the environment must be coordinated with this challenge.

BENEFITS OF CIRCULAR ECONOMY

There are many benefits associated with activating the various levers of the circular economy, both for the environment and for economic growth. It is a process of innovation and transformation of business models, which, despite having a very positive overall impact, could see both winners and losers, notably among companies whose value chain will be affected.

a. Earth and humanity: Environmental benefits and resource savings

i. Resource savings

A large number of commodities are facing important supply pressures due to limited stocks and an explosion in demand following increases in population and per capita GDP. The first advantage of the circular economy is its capacity to limit this pressure, which otherwise leads to high costs, increased price volatility, and, in the long-run, risks of global shortages.

ii. Environmental and social benefits

There is a need for a concerted effort by all actors, public and private, to reduce emissions and increase climate change adaptation action. As much as the public sector can act to help fight climate change via various policies, legislations and incentives for business to be greener and less polluting, there is still a need for a bigger and effective engagement of the private sector into mitigation and adaptation actions. Sustainable supply, aiming at reducing the impact of the raw materials supply or replacing non-renewable raw materials by renewable ones,

Eco-design, aiming at taking environmental impacts into account throughout a product life cycle and integrating them from the very first design stages, (e.g. creation of biodegradable supermarket bags for businesses; manufacturing of machines which are easily repairable and, at the end of their life cycle, recyclable or with a reduced environmental impact.

Industrial and local ecology: Establishing a method of industrial organization characterized by an improved management of stocks and flows of materials, energy and services within the same geographic area,

Circular economy as a climate friendly economic model despite, the growing international focus on circular economy and publication, there is not a real definition yet. However, the most widely accepted definition was formulated by the Ellen MacArthur Foundation, which defines circular economy as a “restorative and regenerative model that keeps materials, resources and components as long as possible in the system to maintain their highest value”. In other terms, the concept of circular economy was developed based on the idea of a closing loop where energy and material are constantly circulating. This is also known as value retention, and this encompasses the idea of using to its maximum products and material that already exist in the market. The value retention idea, within the circular economy is achieved thanks to the 3Rs: reducing the material and waste, reusing products or part of it, recycling materials and see them as secondary raw materials.

RESULTS AND DISCUSSION

Challenges and opportunities for CE in Bangladesh

Although there is considerable heterogeneity among SMEs across different sectors, their responses and capacities to take up a ‘green solution’, are usually similar in terms of organizational and management regime. The manager is usually also the owner of the company and thus has significant power on the strategic decisions of the firm. As such, some SME managers may have a positive attitude towards green business, while others may not. This divergence of views towards ‘green businesses has been attributed to a number of reasons in the available literature. Naturally, the extent to which SMEs are generally willing to adopt ‘green’ measures, as well as their attitudes towards green policies also depends on the sector in which they operate (Bradford & Fraser, 2007).

Financial barrier: The cost of ‘green’ innovation and business models has been extensively cited in the literature as one of the major barriers to the adoption of sustainability practices by SMEs (Vasilenko & Arbačiauskas, 2012; Lawrence et al., 2006; Trianni & Cango, 2012). The upfront costs of any type of investment and the anticipated pay-back period are particularly important for SMEs, which are generally more sensitive to additional financial costs resulting from green business activities compared to large enterprises (Oakdene Hollins, 2011; Rademaekers et

Islam

al., 2011). A study has shown that in some cases SMEs lack the financial resources to establish and manage a recycling scheme (Eunomia Research & Consulting, 2011), while a survey conducted in the UK has indicated that collection and recycling of waste are less economically favorable options for SMEs that produce low volumes of waste (WRAP, 2007). Aside from the direct financial costs, there are also indirect ‘hidden’ costs such as the time and human resources that businesses need to devote to make environmental improvements (Revell & Blackburn, 2005). Lack of government support and effective legislation: The lack of government support and encouragement (through the provision of funding opportunities, training, effective taxation policy, import duty, etc.) is widely recognized as a significant barrier in the uptake of environmental investments (Calogirou et al., 2010; Studer et al., 2006).

Interestingly, the majority of the participants had either never heard of the term ‘circular economy’ or did not understand its meaning. On the positive side, when participants were given a clear definition of circular economy, involving aspects such as the re-use and recovery of waste materials, the majority responded that they were making efforts to recycle and repair. Additionally, companies identified waste management as one of the sectors that could unlock new business opportunities.

Administrative burden: The transition of SMEs to green business practices usually incurs administrative burdens stemming from environmental legislation. The administrative burdens represent a key issue for European SMEs; burdens that frequently demand unaffordable financial and time resources (OECD, 2010). According to a study produced for the European Commission (Calogirou et al., 2010), although SMEs are generally aware of the environmental national legislation, they lack the specific knowledge and capacity to comply with the necessary requirements. As a result, they often rely on external consultants to meet their obligations; this in turn entails an extra cost, which might be significant for very small enterprises.

In light of both the barriers and enablers of the implementation of circular economy business models, to face the upcoming challenges of the transformation, stakeholders suggested the following solutions:

A better understanding of the value of products and materials Focusing too much on waste as the starting point for a solution is an incorrect approach; better design of materials and products is a more valuable starting point. Manufacturers often do not fully understand the value of keeping products in circulation longer or of reusing materials. Giving products and materials multiple lives is far more valuable than disposing of them, maintaining value rather than destroying it through land filling, incineration and down cycling.

Better terminology It is necessary to re-categorize “waste” as a resource. By calling end-of-life products “waste”, their value is immediately decreased, and regulations often require that they be handled as non-valuable. However, when such products are somebody else’s resource, language and laws should reflect that.

Engage the whole value chain Joining efforts along the value chain can support businesses in their journey towards circularity and eco-friendliness. By engaging the whole value chain through B2B and B2C collaborations, insights and solutions can be obtained. No single organization will be able to make this

transition alone, and multi-stakeholder cooperation will both multiply the opportunities and spread the risks.

Public procurement led by financial criteria Public procurement decisions are based predominantly on financial criteria, often without consideration of the environmental costs associated with linear business models. Given their important contribution to an economy's Gross Domestic Product (GDP), by not shifting demand from 'traditional' to 'circular' goods, local authorities do not contribute to incentivizing the shift of businesses to circular business models.

Poor waste management legislation Poor and inconsistent legislation concerning waste management represents a barrier for the achievement of a circular economy. In the absence of strong and consistent legislation, the risk occurs of having to face the inefficient high costs associated with the recycling of mixed waste, which ultimately reduces the residual value of recycling.

Lack of mandatory goals around circular targets In addition to the lack of specific measurements enabling firms to assess their circularity progress, precise mandatory goals are missing. Setting clear, mandatory objectives can help cities in implementing projects linked to circular economy.

As a result, the usual speed of liquid waste removal is being hampered. Liquid waste disposal or drainage system is more critical than solid waste in Gramganj. There is still no sanitary latrine system in many areas of the country. In these places people leave excreta in the open. As there is no system for household waste disposal, it is spread around the house. These can spread bad smells and spread the germs. These contaminated liquid wastes then fall into the pond, canal or river and cause pollution. The situation is even worse in the area where the slum dwellers of the suburbs and the people of distressed are living. There is no sanitation system for people living in small places. People living temporarily on the railway lines, bus or launch terminals and on the pavement leave the sewage in the vicinity of where they cook. It causes serious pollution of the environment. Without the rehabilitation of these disadvantaged people, it is not possible to ensure sanitation. For the protection of the environment, the labor force concerned with sewage management must be trained. People also need to be made aware. In this case, media support can be taken.

BARRIERS AND CHALLENGES

Due to the rapid population growth in Dhaka, the issue of waste management is becoming increasingly complex. In addition to garbage dumped in the house, huge amounts of solid and liquid waste from the open space are constantly complicating waste management. In most cases, the number of dustbins is lower than in the waste. Dustbins are not used properly due to human ignorance and carelessness. As a result, waste is left here and there.

Circular economy is being introduced as an alternative to the Linear Economy. Supporters of the circularity introduced the 'Linear Economy' phrase. The Linear Economy emphasizes: The industrial sector is a waste of society's valuable resources. Yet, there is no doubt that the current industrial model is not sustainable. The question is, what kind of change will the alleged circular economy bring? This concept has been described in many scientific studies as an 'idealized idea' or an 'idealized vision'. It has been said that it is an idea of combining different concepts from different domains. Other studies have said that this is a vague idea based on macro-scientific concepts. The criticism of the circular

Islam

economy can have three things: 1. Recycling is very complicated, 2. How to recycle fuel and 3. The output will be exceeded.

The first blow to the dependence on the circular economy is that the recycling process of modern products is far from achieving 100% efficiency. In fact, negotiations with the circular economy are now intensifying, but this is not new. In the Middle Ages, ancient fabrics were recycled and made of paper. The waste feed was fed to chickens or pigs. And the old building used to be built with ruins. The only difference between securities and securities is that of used assets.

The second formulation of thermodynamics is that when a fuel is transferred or converted, its quality decreases. For example, it is not possible to run a car or a power station, with one additional heat. As a result, fossil fuels will be required at all times. In addition, materials need to be recycled through the fuel, the recycling process, and also through the conversion process of recycled and to-be recycled materials.

The third obstacle is that the input exceeds the output, which impairs the reliability of the circular economy. The use of global resources - energy or material - has increased over the years. In the last century, the use of resources has increased by 5 percent. Where the resource was used in 1 Gigaton in 1970, it reached 32 Gigat in 2020 and in 3 Gigat in 2025. That is, on average, the use of resources is increasing at an average rate of 5 percent per year, which is more than twice the rate of population growth. For developing and emerging market countries, transitioning to a circular economy is extremely daunting for at least four reasons.

First, they have the enormous challenge of building capabilities in municipalities to ensure safe and efficient systems of collection and treatment of household and industrial waste. Second, public spaces are often considered to be the responsibility of the state, making indiscriminate littering the behavioral norm. But this culture obviously cannot be sustained, and therefore behavioral change has to be nudged. Indeed, no government in the world can keep public spaces clean without the full cooperation of its citizens. Third, since January 01, 2018, China, the world's largest importer of waste, has decreed that it will no longer be the garbage dump of Western countries. Its ban on imports of 24 types of waste, notably household waste plastics, unsorted wastepaper and waste textiles, is causing pile-ups in Western countries, which are now turning to other major waste acceptors like Indonesia, India, Vietnam and Malaysia. Finally, they have to grapple with severe resource constraints, capability gaps and heavy poverty burdens. Given such challenges, how can developing and emerging market countries aim to catch-up with high income countries in terms of industrial, scientific, technological and innovative capabilities and still attempt to transition to a circular economy?

OPPORTUNITIES

It suits balanced regional development; it is unrealistic to initiate the circular economy concept in all sectors and regions at the same time. A systematic iterative approach that considers Bangladesh realities will be preferable. Such an approach will first start key projects within key areas and help the country to enhance the worst effects of industrialization. By carrying out pilot studies, the government will collect relevant experiences and lessons, and learn from implementation, in order to set up national regulations and standards and promote the concept to new industrial

sectors and regions. In fact, the Bangladesh Government has recognized the value of such an approach and has initiated some efforts.

Business opportunities: This aims to take a look at economic and business aspects of circular economy. According to estimations, circular economy has significant economic potential in the currently untapped value. It provides auspicious job creation prospects around circular activities. The transition is also going to have interesting impacts on the business ecosystem as the new business models and rising market segments challenge the established conditions.

The economic and job creating potential of circular economy: According to an estimation by the World Economic Forum, the shift to a circular economic model could lead to the creation of 500,000 new jobs in the EU alone. (World Economic Forum, 2014:4) The Ellen MacArthur Foundation estimates that within five years of a shift to the circular economy, there is potential for 100 000 new jobs globally. These jobs are forecasted to open up in the fields of remanufacturing and recycling. There is also potential for new industries built around specialties like repair and new forms of waste management logistics. (JWT, 2014: 7)

The estimations vary, but it is obvious that the business potential of the transition is huge. The European Commission estimates that the net benefits of improving business efficiency are between 245 – 604 billion euros per year, while in the Ellen Mac Arthur Foundation's vision the business opportunities of circular economy could be up to 630 billion USD annually in Europe alone (IMSA, 2013).

According to Accenture, the varying results of studies estimating the overall value of circular economy are due to varying definitions of the concept. Also, the calculations based on certain products, materials and industries are not always comparable to studies with different starting points. However, also Accenture concludes that circular economy has the potential to become a trillion-dollar opportunity. (Accenture, 2014: 6).

CONCLUSIONS

However, the actual design of a circular economy is still in development, and its potential has not fully been tapped. More research into value chains and the discipline of ecological economics (as opposed to environmental economics) are needed, which could render a circular economy a reality both in Bangladesh and abroad. So, what is the true picture of the circular economy? That's right, responsible use of resources is a wonderful idea. However, recycling or recycling is not sufficient to achieve this. Because 71% of all assets cannot be recycled or recycled. Of these, 44% is energy and 27% is added to existing reserves. Therefore, the demand for circular economy will be - we will use less fossil, and we will reduce the use of less raw material in the product. Most importantly, we will create or use less cars, less microchips, fewer buildings. As a result, our profits will be heavy, we will need more resources. Waste management is the safe removal of waste or waste through a proper control system. The purpose of waste management is to systematically collect, transfer, process and finalize waste generated from various sources. And the safe removal of garbage through proper control is one of the most important ways to protect the environment. For this, there is no alternative to modernizing and modernizing waste management.

REFERENCES

- Accenture. (2014) Circular advantage –innovative business models and technologies to create value in a world without limits to growth. Accentur strategy. Accenture.
- Einstein, A. (1997) Author(s) Fölsing, Albrecht, New York, NY: Viking,. pp 882.

Islam

- Allwood, J.M., Worrel, E., & Reuter, M.A. (2014). Squaring the circular economy: The Role of Recycling within a Hierarchy of Material Management Strategies. Handbook of Recycling State-of-the-art for practitioners, analysts, and scientists, Waltham: Elsevier.
- Avdiushchenko, A., Smol, M., & Kulczycka, J. (2018). Circular economy indicators in relation to eco-innovation in European regions Clean Technologies and Environmental Policy, 2017
- Aresta, M., Dibenedetto, A., & Angelini, A. (2013). The changing paradigm in CO2 utilization. *Journal of CO2 Utilization* 3(4), 65-73.
- Azevedo, J., Oliveira, E. & Beites, P. (2019). Using Learning Analytics to evaluate the quality of multiple-choice questions. *International Journal of Information and Learning Technology* 36(4), 322-341.
- Bastein, T., Roelofs, E., Rietveld, E., & Hoogendoorn, A. (2013). Opportunities for a Circular Economy in the Netherlands. TNO, Report commissioned by the Netherlands Ministry of Infrastructure and Environment.
- Bicket, M., Guilcher, S., Hestin, M., Hudson, C., & Razzini, P. (2014). Scoping study to identify potential circular economy actions, priority sectors, material flows & value chains. Study prepared for the EU Commission, DG Environment.
- Bradford, J., & Fraser, E.D.G. (2007). Local Authorities, Climate Change and Small and Medium Enterprises: Identifying effective policy instruments to reduce energy use and carbon emissions. *Corporate Social Responsibility and Environmental Management* 15, 156172.
- Calogirou, C. (2010). SMEs and the environment in the European Union. PLANET SA and Danish Technological Institute, Published by European Commission, DG Enterprise and Industry.
- Chaliki, P., Psomopoulos, C., & Themelis, N. (2016). WTE plants installed in European cities: A review of success stories. *Management of Environmental Quality* 27(5), 606-620.
- Crocker, R., Saint, C., Chen, G. & Tong, Y. (Ed.) Unmaking Waste in Production and Consumption: Towards the Circular Economy, Emerald Publishing Limited, pp. 123-142.
- Cullen, J.M. (2017). Circular economy: The or etical benchmark or perpetual motion machine? *Journal of Industrial Ecology* 21(3), 483-486.
- Demailly, D., & Novel, A.S. (2014). The sharing economy: Make it sustainable. Report prepared for IDDRI.
- Ellen MacArthur Foundation. (2013). Towards the Circular Economy. Opportunities for the consumer goods sector. Cowes: Ellen MacArthur Foundation. Ellen MacArthur.
- Eunomia Research & Consulting. (2011). Increasing SME Recycling. An examination of the barriers that exist to increasing levels of SME recycling and recommended solutions to these barriers. Summary Report.
- European Commission. (2010). Communication from the Commission, Social Business Initiative, Creating a favourable climate for social enterprises, key stakeholders in the social economy and innovation. COM(2011) 682 final, Brussels.
- European Commission. (2015). Communication from the commission to the european parliament, the council, the european economic and social committee and the committee of the regions. COM(2015) 614/2
- Foundation and WRAP. (2013). Wales and the circular economy. Favourable system conditions and economic opportunities. Cowes: Ellen MacArthur Foundation.
- Geng, Y., Sarkis, J., & Ulgiati, S. (2016). Sustainability, wellbeing, and the circular economy in China and world wide. *Science* 6278, 73-76.
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production* 114, 11-32.
- IMSA. (2013). Unleashing the power of the circular economy. Report by IMSA Amsterdam. April 2, 2013.
- JRC. (2011b). Supporting environmentally sound decisions for waste management - A technical guide to Life Cycle Thinking (LCT) and Life Cycle Assessment (LCA) for waste experts and LCA practitioners. JRC Scientific and Technical Reports.
- JWT Intelligence. (2014). Writer: Jessica vaughn. The circular economy. J. Walter Thompson Company, New York, USA.
- Lawrence, S.R., Collins, E., Pavlovich, K., & Arunachalam, M. (2006). Sustainability Practices of SMEs: the Case of NZ. *Business Strategy and the Environment* 15, 242-257.
- Lèbre, É., Corder, G., & Golev, A. (2017). The role of the mining industry in a circular economy: a framework for resource management at the mine site level. *Journal of Industrial Ecology* 21(3), 662-672.

- Murray, A., Skene, K., & Haynes, K. (2015). The circular economy: An interdisciplinary exploration of the concept and application in a global context”, *Journal of Business Ethics*, 140 (3), pp. 1-12.
- Hollins, O. (2011). The Further Benefits of Business Resource Efficiency. Research report completed for the Department for Environment, Food and Rural Affairs. OECD (2010). Regulatory Policy and the Road to Sustainable Growth.
- Rademackers, K.P., Asaad, S.S.Z., & Berg, J. (2011). Study on the competitiveness of the European companies and resource efficiency. ECORYS, Teknologisk Institute, Cambridge Econometrics, CES info and Idea Consult. Study prepared for the European Commission, DG Enterprise and Industry.
- Revell, A., & Blackburn, R. (2005). The Business Case for Sustainability? An examination of small firms in the UK’s construction and restaurant sectors. *Business Strategy and the Environment* 16, 404-420.
- Rizos, V.A., Behrens, W., Gaast, E., Hofman, A., & Ioannou, T. et al. (2016). Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and Enablers. *Sustainability* 8(11). *Royal Society for the encouragement of Arts, Manufactures and Commerce*. June 2013. Investigating the role of design in the circular economy. The Great Recovery – redesigning the future. Report 01: June 2013. London.
- Scheepens, A.E., Vogtländer, J.G., & Brezet, J.C. (2016). Two life cycle assessment (LCA) based methods to analyse and design complex (regional) circular economy systems. Case: Making water tourism more sustainable. *Journal of Cleaner Production* 114, 257-268.
- Trianni, A. & Cango, E. (2012). Dealing with barriers to energy efficiency and SMEs: Some empirical evidences. *Energy* 37, 494-504.
- Türkeli, S., Kemp, R., Huang, B., Bleischwitz, R., & McDowall, W., et al. (2018). Circular economy scientific knowledge in the European Union and China: A bibliometric, network and survey analysis (2006–2016). *Journal of Cleaner Production* 197(1): 244-1261.
- UK's Department for International Development (DFID) World Health Organization. Global Action Plan for the prevention and control of NCDs 2013-2020. http://www.who.int/nmh/events/ncd_action_plan/en/. Accessed October 27,2016 United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development and World Bank (2003). Handbook of National Accounting: Integrated Environmental and Economic Accounting 2003.
- Valant,J. (2016). Planned obsolescence: Exploring the issue. European Parliamentary Research Service.
- Vasilenko, L., & Arbačiauskas, V. (2012). Obstacles and drivers for sustainable innovation development and implementation in small and medium sized enterprises. *Environmental Research, Engineering and Management* 2(60), 58-66.
- Veleva, V., Lowitt, P., Angus, N., & Neely, D. (2016). Benchmarking eco-industrial park development: the case of Devens. *Benchmarking: An International Journal* 23(5), 1147-1170. <https://doi.org/10.1108/BIJ-06-2014-0056>