ORIGINAL RESEARCH PAPER

Management

TOWARDS SUSTAINABLE BUSINESS PRACTICES: CIRCULAR ECONOMY PRINCIPLES FOR RESOURCE OPTIMISATION AND WASTE REDUCTION

KEY WORDS:

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ABSTRACT

This study investigates the adoption of circular economy principles in Tata Steel and Tata Chemicals, focusing on their efforts in areas such as recycling ferrous scrap and utilising by-products. These behaviours indicate a dedication to sustainability, optimising resource usage, and fostering innovation. The results emphasise the possibility for corporations to utilise circular economy strategies in order to diminish environmental harm and stimulate commercial worth. Businesses can bolster their resilience and competitiveness while also promoting environmental preservation and long-term sustainability by implementing methods such as material recycling, waste utilisation, and adopting renewable energy.

1.0 INTRODUCTION

The current state of the environment all around the world is at a crucial stage. Several reasons have been identified including the growth of technological advancements, changing market dynamics, environmental concerns, and economic shifts as well (Balaman et al. 2018). The advantages that technological innovation has been serving are great but it comes with the challenge of resource depletion and the generation of increased electronic waste. Rapid shifts in consumer demands due to changing market dynamics also lead to increased production, generating more waste and straining resources (Suárez-Eiroa et al. 2019). Additionally, environmental concerns are also developing due to unsustainable practices in business for more profit leading to the urgency for better practices for resource optimisation and waste management. Changes in economic conditions are also affecting the availability and prices of raw materials, resulting in fluctuations in resource costs, hence impacting the feasibility of resource optimisation strategies (Iacovidou et al. 2017).

Therefore, an interplay between factors like technological advancements, changing market dynamics, environmental concerns, and economic shifts has pushed the planet into a critical juncture, where the health of the environment is under substantial threat (Singh & Ordoñez, 2016). In order to improve the current business operational landscape, the concept of circular economy and its principles occurs to be one of the most productive approaches. This approach proposes a transformative change that assists businesses with resource optimisation and waste reduction resulting in environmental preservation (Velenturf & Purnell, 2021). With the help of this approach, the production and consumption models in businesses can be altered in a way that minimises waste and maximises the value of resources through reuse, recycling, and regeneration. This study focuses on understanding the principles of circular economy in the context of reducing waste and optimising the resources, as a result enabling businesses to use sustainable practices.

1.1 Background Information

The concept of the circular economy started in the year 1970, by Dr. Walter Stahel, he argued that extending the product life of the goods was a point where a sustainable economy would start (Stahel, 2019). Throughout the year 1980s and 1990s, various scholars continued to explore and examine the concept and then in the year 2010, the MacArthur Foundation, which was developed by Ellen MacArthur, played a significant role in promoting the circular economy concept at a global level (MacArthur, 2013). The basic idea behind the concept of circular economy was to design out waste, keep products and materials in use, and regenerate natural systems, and this idea has significantly emerged in recent years. Businesses nowadays have increasingly embraced circular economy principles as a means to address environmental challenges, eliminate and reduce waste, and develop more sustainable and resilient economic models (Macarthur & Heading, 2019).

1.2 Problem Statement

The problems associated with the research include the challenge of waste reduction and resource optimisation. The challenge of waste reduction is a major problem for businesses due to increased production and consumption and changing customer and market preferences. Due to this the surge in the level of waste produced is overfilling the landfills and straining the ecosystems, posing a challenge for the environment. At the same time, businesses are using resources inefficiently for increased production resulting in depleting limited resources and adding to environmental strain. Another problem that is interconnected to the first one and is even more complex is the issue of the use of resources in an efficient manner that contributes to the growing waste crisis. To solve the above two problems, utilising the use of the principles of circular economy is recommended. Therefore, by addressing the above issues in business with the help of the circular economy, this study attempts to make a way for sustainable business practices.

1.3 AIM AND OBJECTIVES

The aim of the study is to understand the principles of circular economy and its usage in addressing the problem of waste reduction and resource optimisation in the context of today's business.

The objectives of the study are:

1. To understand the principles of circular economy.
2. To examine the use of the principles of circular economy in waste reduction and resource optimisation.
3. To identify the role of the circular economy in business sustainability practices.
4. To provide recommendations in the context of sustainable business practices.

2.0 Literature Review

2.1 Principles of Circular Economy

According to the Ellen MacArthur Foundation, (2023), the circular economy is a system where materials never become waste and nature is regenerated. In the circular economy, products and materials are kept in a circulation process for example, maintenance reuse, refurbishment, remanufacture, recycling, and composting. It also tackles climate change and other global challenges, like waste, pollution, and biodiversity loss, by decoupling economic activity from the consumption of finite resources (Murray et al. 2017).

Unlike the traditional approach of products, "take-make-dispose," the concept of circular economy represents redefining economic and industrial systems by breaking a link between economic growth and the depletion of natural resources, as well as the generation of waste (Ellen Macarthur Foundation, 2023). The circular economy promotes a closed-loop system, that emphasises efficient resource utilisation, the

reutilisation, remanufacturing, and recycling of goods, and a reduction in waste generation.

The circular economy is based on three principles (refer to image 1), driven by design:

1. Reduce (eliminate waste and pollution)
2. Reuse (circulate products and materials at their highest value)
3. Regenerate nature

Figure 1. 3 Principles of Circular Economy as Presented by the Ellen MacArthur Foundation

(Source: Ellen Macarthur Foundation, 2023)

The first principle of the circular economy is to eliminate waste and pollution. The economy currently, works in a take-make-waste system, as individuals and businesses take raw materials from the Earth, make products from them, and then throw them away as waste. Much of the waste ends up in landfills or incinerators and is lost. This system cannot work in the long term because the resources on the planet are infinite. Many products, such as crisp packets, face a dead-end after use, lacking options for reuse, recycling, or composting, ultimately contributing to the waste problem (Ellen Macarthur Foundation, 2023). These items, made of multi-material flexible plastics, are often designed with disposability in mind. Despite the apparent inevitability of waste in certain cases, it is crucial to recognise that waste is a consequence of deliberate design choices. Unlike nature, which operates without the concept of waste, our human-made economy is replete with products, both small and short-lived like crisp packets, and larger structures such as buildings and roads, that often lack consideration for their end-of-life implications during the design phase (Kirchherr & Piscicelli, 2019).

The second principle of circular economy highlights the importance of circulating products and materials at their highest value. This means keeping materials in use, as a product, or when they can no longer be used, as components or raw materials. In this way, nothing becomes waste, and the intrinsic value of products and materials is retained (Ellen Macarthur Foundation, 2023).

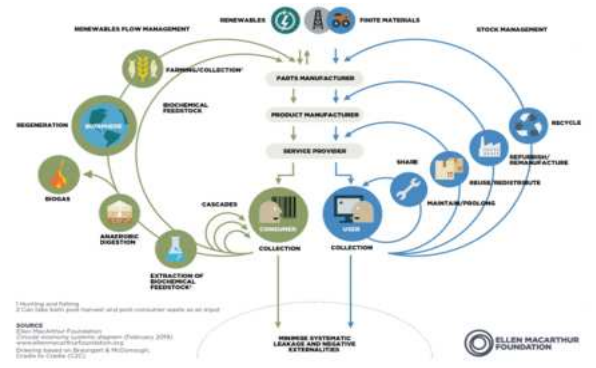

Figure 2. Butterfly Diagram of the Circular Economy

(Source: Ellen Macarthur Foundation, 2023)

There are several ways products and materials can be kept in circulation and there are two fundamental cycles (refer to Figure 2, which illustrates the flow of materials in a circular economy): the technical cycle, and the biological cycle. In the technical cycle, products are reused, repaired, remanufactured, and then recycled (Velenturf & Purnell, 2021). In the biological cycle, biodegradable materials are returned to the earth through processes like composting and anaerobic digestion.

The third principle of the circular economy is to regenerate nature, which means moving from a take-make-waste linear economy to a circular economy. This suggests natural processes and results in leaving more room for nature to thrive (Ellen Macarthur Foundation, 2023). By shifting the economy from linear to circular, the focus is on regeneration rather than extraction. This involves adopting agricultural practices that enable nature to rejuvenate soils, enhance biodiversity, and facilitate the return of biological materials to the earth. Currently, a significant portion of these materials is discarded after use, contributing to the depletion of nutrients in the land used for their cultivation (Chen et al. 2020).

2.2 Use of Principles in Waste Reduction and Resource Optimisation

By advocating for a change in mindset, one can view waste as a design flaw rather than an inevitable outcome. Within the context of a circular economy, a fundamental requirement for any design is that materials must re-enter the economic cycle after their primary use. This transformation shifts the conventional linear take-make-waste system towards a circular approach (Sariatli, 2017). Various products hold the potential for sustained circulation through practices such as maintenance, sharing, reuse, repair, refurbishment, and remanufacturing. In cases where these options are exhausted, recycling becomes the last step. Additionally, in the context of food and other biodegradable materials that are deemed safe for return to nature, the circular approach facilitates the regeneration of the land (Singh & Ordoñez, 2016). This process contributes to the production of new food and materials, embodying the essence of a circular economy.

Based on the second principle's technical cycle or biological cycle, every product has to be successfully circulated in either way as they must be designed with their eventual circulation in mind. In the current economy, a multitude of products poses challenges for circulation in both cycles, ultimately culminating in their designation as waste (Velenturf & Purnell, 2021). This issue is particularly pronounced in products that intricately combine technical and biological materials, such as textiles blending natural and plastic fibres. A potential solution lies in the proactive consideration of a product's fit into either the technical or biological cycle after its primary use during the design phase. For products intended for the technical cycle, designers could optimise for ease of repair and maintenance, disassembly, and modular components that facilitate replacement (Pires & Martinho, 2019). Durability would be a key consideration to withstand the wear and tear associated with multiple users. Moreover, the choice of materials should prioritise easy recyclability.

Conversely, products designed with the biological cycle in mind, like for example, wooden furniture, could be not only easy to maintain and repair but also designed to facilitate the separation of biodegradable materials (such as wood) from technical materials (like screws). If glues and paints are employed, they should be biodegradable, aligning with the principles of the biological cycle (Huysman et al. 2017). Similarly, products like takeaway food containers have the potential to be designed for composability after a single use, increasing the likelihood of the food scraps they contain returning to the soil. This forward-thinking approach to design holds the promise of reducing the incidence of products becoming waste and aligns with the principles of a circular economy (Walker et al. 2018).

2.3 Role of Circular Economy in Business Sustainability

The adoption of circular economy practices emerges as a key driver for heightened business sustainability. By conserving resources and minimising waste, businesses operating within this framework can significantly diminish their ecological footprint, effectively mitigating environmental risks. This strategic shift not only promotes environmental stewardship but also contributes to economic resilience by decreasing dependence on finite resources. Moreover, it opens avenues for exploring innovative business models, including product-as-a-service and collaborative consumption platforms, thereby diversifying revenue streams (De los Rios & Charnley, 2017).

One of the primary roles of the circular economy is the significant reduction of waste. When it comes to materials, organisations have the ability to reduce the amount of waste they produce by completing the material cycle. The reduction of waste through activities such as reusing products, recycling materials, and refurbishing goods helps to alleviate the environmental effect that is linked with the disposal of waste in landfills (Pieroni et al. 2019). One more compelling role of circular economy methods is the substantial cost savings they offer. The adoption of these techniques can result in cost savings by allowing for the reuse of materials and components, hence lowering the requirement for the continuous extraction and processing of new resources that would otherwise be required. Longer product life cycles and lower costs associated with waste management are two factors that might lead to more overall economic benefits for firms.

One of the most important forces behind the circular economy is innovation. Innovation in product design, manufacturing techniques, and business models are all factors that fall under this category. When businesses adopt circular practices, they have the opportunity to discover new revenue streams through the provision of services such as leasing or take-back programmes, as well as the creation of unique products that utilise recycled or upcycled materials (Hysa et al. 2020). There is a growing connection between sustainability and the desire and loyalty of consumers. Consumers place a high value on companies that can demonstrate their dedication to the principles of the circular economy. Businesses that adhere to these principles have the potential to attract customers who are environmentally sensitive, improve their brand reputation, and generate customer loyalty over the course of a longer period of time (Geissdoerfer et al. 2017).

In addition, regulatory compliance is an important factor to take into account. When it comes to solving environmental concerns, governments and regulatory organisations are beginning to acknowledge the significance of the implementations of circular economy and sustainability principles. There is a possibility that companies that adhere to the concepts of a circular economy may have an easier time complying with the ever-changing environmental legislation and requirements (Ferasso et al. 2020). It is possible for circular economy approaches to improve the resilience of supply chains. Businesses are able to construct supply chains that are stronger and more sustainable if they reduce their dependency on limited resources and make efforts to mitigate the risks associated with fluctuating commodity prices. An increase in stability can be achieved by the diversification of supply chains through the use of recycling and reuse.

Recycling, remanufacturing, and repair are all examples of industries that could potentially produce new job opportunities as a result of the transition towards circular economy models. Encouraging the creation of jobs and the development of skills, not only contributes to the growth of the economy but also improves the social sustainability of the community. Therefore, the circular economy has an effect on a worldwide scale (Dey et al. 2022). The implementation of circular economy methods has the ability to address global environmental concerns such as climate change and the depletion of resources. This is accomplished by lowering the overall ecological footprint that is caused by production and consumption operations. The adoption of circular concepts by businesses is a significant factor in the development of a global economy that is more resilient and committed to sustainability (Schroeder et al. 2019).

3.0 Research Method

This research aims to provide key strategies that are in line with the principles of the Circular Economy and can be implemented in businesses. Numerous studies have already tackled this aspect; however, the focus was not on waste reduction and resource optimisation, but rather all focused on the challenges and their implications rather than their application. This research will provide a better understanding of a common research question, which is how the principles of the Circular Economy are used in solving the problems of waste reduction and resource optimisation. This is done by analysing the example of TATA Group (specifically two units TATA Steel and TATA Chemicals) as a case study to provide a holistic framework that takes into account the principles of Circular Economy throughout business waste reduction and resource optimisation techniques.

The selection of Tata Company for the case study on circular economy in business is due to its unique standing as a globally influential conglomerate with a diverse business portfolio. It includes industries spanning steel, automotive, information technology, and consumer goods, Tata provides a comprehensive and varied landscape to scrutinise the application of circular economy principles. Renowned for innovation and a steadfast commitment to corporate social responsibility, Tata's approach to circular economy practices presents an opportunity to comprehend the multifaceted impact of sustainability initiatives on research, consumer products, and industry leadership.

4.0 Case Study

The concept of the circular economy has emerged as a widely accepted approach in businesses around the globe and the world has been rethinking the way of designing, making, and remaking their products.

TATA Group's current linear economy model of 'take-make-dispose' leads to substantial waste generation, exacerbated by geopolitical tensions and supply risks, contributing to volatile commodity prices. The imperative shift from a belief in infinite natural resources to one acknowledging limits and actively reducing waste is disruptive, prompting firms to reassess resource efficiency throughout their life cycles. A circular economy offers a solution by decoupling economic growth from resource consumption.

Figure 3. Three-Pronged Approach to enhance resource productivity and embed circular economy principles

(Source: TATA Sustainability Group, 2023)

In this approach, TATA Group has acknowledged the presence in resource-intensive sectors like steel, chemicals, and infrastructure, aiming to secure long-term raw material access and enhance competitiveness through processes minimising waste and prioritising resource productivity. The strategic three-pronged approach involves creating awareness, applying Circular Economic (CE) concepts to identify business opportunities, and advocating for policies on resource productivity. Addressing the challenge of

resource productivity, we collaborate with the Ellen MacArthur Foundation to establish a shared understanding of the latest CE thinking. While several Tata companies were already engaged in resource efficiency and waste management, the ReSOLVE framework by EAF broadened perspectives, translating circular principles into actions such as Regenerate, Share, Optimise, Loop, Virtualise, and Exchange. Nearly 200 Tata executives have undergone training on circular economy concepts and design for environment & disassembly in recent years.

The circular economy concept has made headways in many Tata companies. One is TATA Steel, the company adopted initiatives like Ferrous Scrap Recycling, Solid Waste Management, and Solid Waste Utilisation.

Utilising ferrous scrap, which is infinitely recyclable, to produce steel offers a reduced carbon footprint compared to the traditional method of using iron ore. India faces a deficit in producing high-quality shredded scrap and is a net-importer of scrap. Tata Steel has taken a pioneering step by establishing a scrap collection and shredding facility in Rohtak (Delhi-NCR) and plans to replicate such facilities across the country. Despite facing challenges posed by COVID-19, the Rohtak plant of the Steel Recycling Business completed its first year of operation, commissioning a virtual shredder (TATA STEEL, 2023). The plant achieved approximately 112 thousand tons dispatch and generated around □460 crore in revenue during FY 2021-22. Notably, the procurement of scrap is facilitated through the world's first digital FerroHaat app, with over 180 vendors registered for scrap supply. There has been a concerted effort to increase scrap charging in Tata Steel's steel melting shops as a key strategy to reduce the carbon footprint. In FY 2021-22, clean scrap charging in Tata Steel India's steel melting shops increased to 6.6%, up from 4.8% in FY 2020-21 (TATA STEEL, 2023). Continuous investments are being made to enhance infrastructure for scrap management and charging in Tata Steel's India operations, aiming to align with the internal benchmark set by the European steelmaking facility at IJmuiden. Additionally, Tata Steel's facilities in Thailand rely on 100% steel scrap as their primary raw material.

Tata Steel has been at the forefront of leveraging waste and by-products to create value, aligning with its commitment to nurturing a sustainable ecosystem within the iron and steel industry. The company is actively working towards attaining a 'Zero Waste' goal through the adoption of circular economy principles, specifically focusing on Reduce, Reuse, and Recycle (3R). Managing an extensive volume of by-products, totaling around 15 million tons per annum (MnTPA) and spanning over 25 product categories with more than 250 Stock Keeping Units (SKUs), Tata Steel has effectively converted these by-products into valuable resources. These enhanced by-products serve as essential raw materials for diverse industries, such as cement, chemicals, and construction (TATA STEEL, 2023). Notably, in the fiscal year 2021-22, Tata Steel's facilities in Jamshedpur and Kalinganagar achieved complete solid waste utilisation, reaching 100%, while Tata Steel Meramandali demonstrated commendable utilisation with an impressive 97%, showcasing the successful implementation of best practices.

Tata Steel has made significant investments in research to develop technologies for the reuse of iron and steel slags, showcasing a journey marked by pioneering technologies and an ongoing innovation pipeline focused on slag-based products. Utilising an in-house developed process of accelerated weathering of steel slag (basic oxygen furnace slag), Tata Steel introduced Tata Aggreto, India's first steel slag-based branded product. This innovation, extensively used in the construction of national highways, contributes to conserving natural aggregates and reducing the environmental footprint (TATA STEEL, 2023). Another product, Tata Nirman, based on steel slag fines, has become a preferred raw material for the brick manufacturing industry. In support of the farming sector, Tata Steel has developed Dhurvi Gold, a multi-nutrient soil enhancer providing low-cost soil conditioning solutions. Beyond steel slag, the company has successfully developed downstream products from blast furnace slag, including ground granulated blast furnace slag (GGBS) and activated GGBS. These can be used as a partial replacement for Ordinary Portland Cement (OPC) in concrete production, positively impacting the carbon footprint of cement manufacturers.

Tata Steel's commitment to circular economy practices has earned recognition, with the company winning the 'Indian Circular Economy Award 2021' in the large enterprise category at the Circular Economy Symposium organised by FICCI. The award acknowledges Tata Steel's innovative and impactful efforts in accelerating its business toward a circular model. Additionally, the company received the 'Excellence in 3Rs (reduce, reuse, recycle)' Award from CII for the second consecutive year during the International Conference on Waste to Worth (TATA STEEL, 2023). This recognition highlights Tata Steel's innovative 3R initiatives in managing its own wastes. The company remains dedicated to achieving 100% material efficiency, sustaining 100% solid waste utilisation across all locations, and increasing EBITDA by 2.4 times from the by-products business.

Another example is TATA Chemicals, in keeping with the Tata group's Aalingana commitments, it is integrating energy efficiency, lowering liquid and solid waste, adopting circularity, and switching to low-carbon renewable energy sources into its core operations. In order to help reduce, reuse, and recycle important natural resources needed in manufacturing as well as the waste produced, the company has identified crucial levers. To do this, it has started a variety of environmentally friendly technological and managerial procedures at its factories and production sites (TATA, 2023). Tata Chemicals is concentrating on water neutrality, solid waste management, recycling, and renewable energy because the circular economy is essential to this process. 90% of the water used by the company is already recycled, and at its cement factory in Mithapur, Gujarat, it uses 100% fly ash and 865 MT of plastic trash that is co-processed. The facility has installed a quadruple effect evaporator, saving 150 equivalent kilo tonnes of carbon, and has begun using biomass as feedstock, which will assist cut traditional energy usage (TATA, 2023). Additional initiatives of this type include constructing a solar rooftop at its Innovation Centre in Pune and switching to renewable energy at its manufacturing sites.

The company installed the first at-scale carbon capture and utilisation plant (CCU) in the United Kingdom in Europe. This facility not only lowers carbon emissions but also offers a reliable internal source of crucial input. To create premium sodium bicarbonate for use in food and medicine, it absorbs CO2 and purifies it to 99.99%. The plant emits 11% less carbon dioxide (TATA, 2023). As required by the state of Wyoming, it is commissioning a dry sorbent injection system in the United States, which will reduce SO2 emissions. Rallis India, a subsidiary of Tata Chemicals, has already started putting carbon abatement action plans into action and has made the move to green energy, using solar power exclusively at one of its operations. Additionally, 2% more energy efficiency was attained, lowering the CO2 footprint in every unit. Additionally, the business is committed to ending supply chain deforestation caused by commodities and is promoting ethical mining and supply chains.

By 2030, Tata Chemicals wants to become water-neutral, cut carbon emissions by 30%, and have no waste going to landfills. As this is going on, its Innovation Centres in Bengaluru and Pune are working nonstop to create a high-performing green portfolio, which will include green

fermentation technology to bolster its line of nutrition products. In response to local and international consumer demands, the Rallis Innovation Chemistry Hub develops products that are excellent, safe, and sustainable (TATA, 2023). The commercialisation of RHA Green Technology to produce highly dispersible silica, the development of green surfactant technology, the investigation of value-added chemicals from the captured CO2, such as sustainable aviation fuels, the recovery of salts and minerals from waste streams, and the production of biopesticides are some of the upcoming sustainability projects.

"Green Chemistry and green applications will continue to be at the core of the Tata Chemicals growth story," says Shivang Mahadevia, Head of Corporate Strategy and Sustainability at Tata Chemicals. "The specialty product business's prebiotics & formulations and specialty silica products are gaining significant customer traction, and Tata Chemicals specialty products revenue is registering a growth of 45% in FY 2021-22" (TATA, 2023). Therefore, Tata Chemicals' path to sustainability is closely linked to the ideas of the circular economy, highlighting the significance of minimising the negative effects on the environment, recycling materials, and reusing valuable resources in order to build a resilient and regenerative business model. Through these initiatives, Tata Chemicals supports the global circular economy paradigm and ensures future generations have a sustainable future.

5.0 FINDINGS AND DISCUSSION

Findings from Tata Steel:

1. Tata Steel has commenced the process of recycling ferrous scrap, a material that can be recycled indefinitely, hence decreasing the carbon footprint in comparison to conventional techniques.
2. The organisation efficiently handles solid waste, achieving complete utilisation in sites such as Jamshedpur and Kalinganagar, demonstrating a strong dedication to circular economy concepts.
3. Steel Aggreto and Tata Nirman are two examples of innovative product creation that demonstrate Tata Steel's dedication to circular economy activities. These products make use of by-products such as steel slag for construction and soil enhancement, and they are examples of Tata Steel's commitment to circular economy principles.

Findings from Tata Chemicals:

1. Tata Chemicals incorporates circular economy principles into its fundamental operations, with a specific emphasis on enhancing energy efficiency, minimising waste, and embracing renewable energy sources.
2. The company's objective is to achieve water-neutrality by 2030, showcasing a strong dedication to sustainable water management.
3. Tata Chemicals maintains a prominent Carbon Capture and Utilisation (CCU) facility in the UK, where they capture CO2 and manufacture sodium bicarbonate, demonstrating their pioneering approach to carbon utilisation.
4. Actions such as implementing solar rooftops and transitioning to renewable energy sources support a low-carbon circular paradigm.
5. Tata Chemicals' focus on speciality goods, accompanied by a remarkable 45% increase in sales during FY 2021-22, is in line with the circular economy model and the principles of green chemistry.

DISCUSSION:

The findings from Tata Steel and Tata Chemicals show strong circular economy progress. Tata Steel's recycling of ferrous scrap and development of novel products like Steel Aggreto and Tata Nirman from by-products show its dedication to resource efficiency and waste reduction. Tata Chemicals' pursuit of energy efficiency, waste reduction, and renewable energy shows its holistic sustainability strategy. These findings show that organisations may use circular economy ideas to innovate, decrease their environmental footprint, and produce revenue. By incorporating circular economy methods into their operations, organisations may protect the environment and boost their resilience, competitiveness, and longevity. Material recycling, waste utilisation, renewable energy uptake, and product innovation can help firms benefit from the circular economy. Companies may become sustainability leaders and save money by taking early steps and investing strategically.

6.0 CONCLUSION

The case study of Tata Group provides a compelling illustration of how major conglomerates can successfully apply circular economy principles across many industries. The findings highlight that circularity is not just an essential requirement for the environment, but also a strategic approach that may stimulate innovation, minimise environmental harm and support long-term company sustainability. Tata Group's experiences offer useful insights for organisations worldwide as they negotiate the intricacies of a shifting economic landscape and begin on a circular economy journey.

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