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THE SCOPE OF CIRCULAR ECONOMY IN THE HEALTHCARE SECTOR IN THE INDIAN CONTEXT

Aayushi Kalra [1], Dr. Anil Khurana [2], Dr. Shivani Bali

[1] Research Scholar, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Haryana, India
[2] Professor, Department of Management Studies, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Haryana, India
[3] Professor, Jaipuria Institute of Management Noida, Uttar Pradesh, India

ABSTRACT

The use of the circular economy in India's healthcare sector is encouraged by environmental concerns and aims to keep the economy sustainable(S. et al., 2017) Additionally, since India is home to the largest population in the world and is expanding rapidly, its healthcare sector is creating a lot of waste and using up many resources.(Voudrias, 2018)Notably, following the circular economy model can help address these challenges, by making the most of resources and reducing environmental impact(Salvioni & Almici, 2020). Recently, it has been observed that Indian healthcare facilities are choosing circular economy ideas to replace the old linear systems by using resources more economically and having a smaller impact on the environment(Guzzo et al., 2020). The event of the pandemic has made us understand that our traditional healthcare systems need to be improved and that stronger and sustainable approaches need to be implemented to maintain excellent care and protect the environment (Baudier et al., 2022).

Corresponding Author

Aayushi Kalra,
aayushi.phd2024@gmail.com

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1. INTRODUCTION

The healthcare system in India is put at risk by environmental problems, so the adoption of circular economy solutions should be sped up. Apart from creating waste, this sector adds to the country's worsening environment with its use of energy, water, release of pharmaceutical waste, and complicated emissions within its supply chains(Goyal et al., 2016). Almost everywhere in India, healthcare facilities produce different kinds of waste, such as biomedical waste, waste drugs, medical device electronic parts, and great quantities of general waste that does not receive adequate sorting and care(Kumar et al., 2021). Since the healthcare infrastructure is developing rapidly because of population growth and government actions, there are now more challenges to the environment and more opportunities to use circular principles from the start.

Because of the pandemic, we could see that our current ways of dealing with waste were not strong enough and that circular economy solutions could have helped (Vanapalli et al., 2020). The pandemic caused medical centers to make record amounts of waste, especially with personal protective equipment and single-use medical items, which made it hard for them to manage and dispose of such waste(Liang et al., 2021). As a result of this crisis, people realized that healthcare systems too focused on single-use products are not strong enough and should be improved to be safer for both people and the environment. It was clear from the pandemic that problems in global supply could stop healthcare services, which highlighted the need for circles of reliable local supplies(Wuyts et al., 2020).

A considerable part of India's carbon pollution results from healthcare activities, mainly from energy-using medical devices, medicines made in factories, transportation needs, and dealing with waste. Since many healthcare facilities depend on inefficient technology for various operations, the energy sector plays a major role in creating challenges in India's healthcare infrastructure (Bhatia & Singh, 2021). Also, since drugs and chemicals are an important part of healthcare in India, the pharmaceutical sector leads to a lot of waste and heavy manufacturing activities that hurt or improve the environment depending on how they are handled. Since there are many challenges along the supply chain, it is important to deal with waste and at the same time ensure energy savings, use resources more efficiently, and follow sustainable practices all along the chain (Fogarassy & Finger, 2020).

Water issues and their effects on the environment are also serious within India's healthcare sector because the industry requires a lot of water and the country is experiencing water shortage (Bajpai et al., 2019). Most healthcare facilities do not have proper water recycling and end up making wastewater that has to be treated by special methods before being disposed of. The issue of water pollution caused by antibiotic leftovers and chemicals in the pharmaceutical industry is now a big concern, and this is especially true in places with many pharmaceutical factories. This shows that sustainable healthcare systems should include water conservation, recycling, and pollution prevention due to the challenges involved(Strade et al., 2020).

2. LITERATURE REVIEW

2.1. CIRCULAR ECONOMY PRINCIPLES AND FRAMEWORKS IN HEALTHCARE

Introducing circular economy in healthcare means special adjustments are necessary to meet the rules, concerns over safety, and high quality standards that must always be followed in this field. Following the rule of Refuse and Reduce at the top and Recover and Recycle at the bottom, the 10R approach ensures secure and reliable usage of circular principles in healthcare (Bressanelli et al., 2020). According to the framework, critical healthcare systems may gain more from Refuse and Reduce priorities than from "regular" recycling, especially during the management of infectious materials or important medical devices (Voudrias, 2018). In order to apply circular economy to healthcare, one should understand all the related guidelines, infection-preventing practices, and safety matters that could affect but not stop circular management (Kane et al., 2017).

Digital transformation is now crucial in helping healthcare systems apply circular economy practices by allowing them to see data and improve their processes for managing resources and cutting waste. With advanced digital solutions, it is possible to instantly observe how resources are used, prevent possible equipment problems, improve how goods are managed, and back decisions that focus on reusing resources(Sharma et al., 2021). When digital tools are used with circular economy ideas, it opens up new business ideas, such as using equipment-as-a-service, which focuses on the equipment's service and useful life instead of how often it should be replaced (Abbate et al., 2023). They help manage the environment better, improve the way healthcare is delivered, and provide cost savings that sustain above-mentioned requirements (Fragão-Marques & Özben, 2022).

For the healthcare sector to use circular economy, it should pay close attention to how materials are processed and used from the early stages to the last (Guzzo et al., 2020). It is understood that focusing only on waste management is not enough; before wasting can be cut down, decisions need to be made about materials, products, suppliers, and actions at every level of the business (Kyriakopoulos et al., 2019). Healthcare facilities should be able to check if different products and materials can be made into new products without losing their effectiveness and safety. This overall approach allows healthcare organizations to choose actions that benefit the healthcare process and help the environment (Schmalz & Galler, 2017).

In order to make circular business models work well in healthcare, it is important to use new ideas that support the economy and the environment, as well as ensure that people still have access to high-quality medical treatment (Salvioni

& Almici, 2020). Healthcare providers usually choose products by focusing on low first costs, which overlooks both the lifetime costs and any impact on the environment, so they find it difficult to embrace circular economy and need to review how they set priorities and choose. Some recent examples of circular business models in healthcare are selling healthcare products with included maintenance, starting take-back programs for medical equipment, platforms that allow people to share and use specialized instruments, and utilization of traditional medical waste in new ways (Boerdonk et al., 2020). Such models work best when supported by regulations, when different stakeholders join forces, and when the financial side gives importance to the long-term advantages of a circular approach(Lacy et al., 2019).

2.2. WASTE MANAGEMENT AND RESOURCE RECOVERY IN INDIAN HEALTHCARE

Dealing with healthcare waste in India follows circular economy rules and supports recovery of valuable resources from clinical waste, offering important benefits for the environment and solving serious public health and safety need (Fiksel et al., 2020). The waste stream in India's healthcare sector includes both hazardous infectious medical waste that is hard to treat and non-hazardous substances that can be easily used in recycling (Khan et al., 2019). At the current stage, waste management does not make full use of resources because the systems for separating waste are insufficient, the treatment facilities are limited, and the government's main concern is safety instead of looking for ways to meet both goals at once.

To make circular economy concepts work in healthcare facilities, it is necessary to use full segregation of waste so that the right materials are identified and separated. It was found in India that separate collection details by type led to more recycling and better management of waste disposal(Garg, 2014). Since non-hazardous hospital waste accounts for much of the waste produced in healthcare, it offers a great chance to use circular economy via recycling, composting, and ways to produce energy that can help the environment and the economy. If on-site waste treatment is used, it can help increase circularity, bring down waste management expenses, and protect the environment (Ferreira et al., 2012).

For biomedical waste, it is important to invent new ways to ensure safety as waste is managed and as much value is kept in the products as possible. Before, biomedical waste management concentrated on treating and disposing of waste, but today, some are considering to use material recovery procedures after proper safety measures (Shekdar, 2008). The pandemic made healthcare facilities face obstacles in handling more waste and also find new chances to extract and reuse some waste materials after proper treatment (Liang et al., 2021). Studies reveal that following the circular economy principles can protect safety, save the environment, and ensure waste management does not become an issue during a pandemic.

Widening the use of sustainable waste management practices in healthcare can happen when regions have waste treatment services set up for the circular economy. A lack of proper capacity and advanced technology in many Indian regions makes it hard for circular economy ideas to be carried out and calls for coordinated actions(Kumar et al., 2017). By bringing together several healthcare facilities, it is easier for them to use advanced ways of handling waste and split the costs involved(Kumar & Rahman, 2014). When waste management is combined with circular economy projects, there are more opportunities to save money and increase the value of managing healthcare waste(Morris et al., 2021).

2.3. MEDICAL DEVICE LIFECYCLE MANAGEMENT AND CIRCULAR DESIGN

Better ways of managing the life cycles of medical equipment, with an eye on repair, improvements, and reusing resources at the end, help the industry adopt the principles of a circular economy. It is observed in the study of circular principles in low-retorce medical device design, mainly in India, that better durability, repair, maintenance, and upgrade allow devices to last longer and make use of existing resources (MacNeill et al., 2020). Since Indian hospitals are constrained by equipment and want to keep their resources working effectively, these principles are made for them. To begin using circular design in medical devices, the effort of producers, healthcare specialists, and regulations should merge to develop useful and sustainable standards (Damha et al., 2019).

Many small and medium businesses that are part of the Indian medical device market make it easier as well as more complex to switch to circular economy practices. In India, most medical devices come from SMEs, which tend to be more capable of adjusting quickly to new trends than other bigger devices companies(Li et al., 2015). As a result, new circular economy strategies for India can be created that meet the needs of Indians and provide opportunities for building within the country's medical technology area. Combining artificial intelligence and digital technology with circular design helps

devices get better lifecycle support thanks to predictive maintenance, better performance, and appropriate planning for when products reach their end of life (Hapuwatte & Jawahir, 2021).

As additive manufacturing is used more often in the medical industry, it brings particular support to the circular economy with on-demand production, the ability to customize medical devices and optimize materials. They make it possible to create less waste during manufacturing, produce gadgets less far from buyers, and help repair and customize items so they last longer(Zhang et al., 2017). Additive manufacturing should be used hand in hand with circular design after minding material selection, operating duties, and regulatory rules, and while making the best use of material leftovers. Establishing additive manufacturing in the healthcare system in India would benefit the circular economy by helping to produce medical devices more steadily and using fewer resources at the same time (Vishwakarma et al., 2022).

To make circular economy ideas work for medical devices, smart reverse logistics is required and should be facilitated by the cooperation among device manufacturers, healthcare providers, and specialized service organizations (Damha et al., 2019). Generally, reverse logistics in Indian healthcare are quite restricted, so new approaches are needed to handle equipment recovery and help the circular economy(Shukla et al., 2023). The use of digital tools to track devices can increase the effectiveness of reverse logistics since it provides information about their location, status, and functioning all along the lifecycle. With these systems, companies can decide the best solution for a product while meeting quality and safety levels.

2.4. SUPPLY CHAIN CIRCULARITY AND COLLABORATION AMONG STAKEHOLDERS

To achieve the full potential of the circular economy in healthcare, it is essential to update the supply chain process, and this can only happen when healthcare facilities, their suppliers, distributors, waste handlers, and technology partners cooperate(Ritchie, 2021). Since there are various safety, regulatory, and quality rules for different healthcare products, it is necessary to create effective ways to manage and coordinate the supply chain (Yadav, 2015). Situations happening recently, such as the pandemic and political events, have made it clear that supply chains should be strong and circular ideas may help keep medical supplies secure and support the environment.

Because of the complex and closely regulated nature of the industry, the pharmaceutical supply chain in India provides many chances for applying the circular economy, but also comes with many difficulties(Khan & Ali, 2022). In pharmaceutical packaging, there is a big chance to use more circular solutions, because current methods stress product safety and security over what happens at the end of a product's life, creating a lot of waste that circular design can cut down(Yuan et al., 2020). Creating reusable packaging and collecting and using packaging materials again in pharmaceutical chains helps protect the environment, lowers expenses, and ensures products are produced safely according to the rules. Growing use of digital technologies makes it easier to create a circular supply chain by giving companies better visibility, traceability, and ways to cooperate around the cycle of recycling and reuse. Using blockchain, IoT sensors, and intelligenty designed analytics tools, one can check information on locations, conditions, and availability of products and make decisions that support recycling(Ghoreishi & Happonen, 2020). With these tools, companies can use shared equipment pools, software for predicting needs to avoid making unneeded products, and collaborative means to transfer resources as needed between different healthcare outlets. Using digital tools in line with circular economy ideas can make supply chains more efficient and stronger, and environmentally friendly than the usual straight line approach(Arenkov et al., 2019).

The formation of regional circular economy networks in the healthcare sector in India depends on cooperation among healthcare providers, suppliers, waste management companies, providers of technology, and the regulatory bodies. Economies of scale needed for advanced circular technologies are achieved and the risks are evenly distributed when organizations become a part of these networks(Ruiz-Salmón et al., 2020). A network is successful if it follows standard practices, has systems that work together, and uses governance that gives everyone equal parts in the program. By bringing circular economy activities together in certain areas or healthcare fields, we can confirm that group work works well and gives businesses the opportunity to improve and apply the concept more widely.

2.5. REGULATORY FRAMEWORK AND POLICY IMPLICATIONS

The way circular economy is applied in India's healthcare industry is shaped by regulations, so it is important to ensure safety, the environment's protection, and advances are all managed properly. Although cur-rent Indian healthcare regulations mainly focus on safety and how well something works, they do not clearly address circular economy

practices, meaning that simply coming up with innovative ideas may be difficult unless there are improvements in the laws (Kondala et al., 2023). Ensuring the right rules are in place for circular economy practices in healthcare while ensuring safety calls for the efforts of healthcare workers, those who develop technology, environmental agencies, and rule-makers to work together and look for ways to effectively improve both health and environment(Yellowlees et al., 2010).

Policy development in biomedical waste management is very valuable, since the main focus of many current rules is on eliminating waste instead of finding ways to recover it in a safe manner. Studies on biomedical waste management point out that the circular economy could be improved by having set guidelines for collecting discarded materials, deciding on waste processing technology, and offering clear benefits for businesses that minimize their waste(Myllymäki et al., 2019). The crisis caused by the COVID-19 pandemic showed that existing regulations have good points but also some drawbacks, so it is important that new approaches can adapt to major challenges and still maintain their long-term objectives.

Applying circular economy methods in healthcare purchases offers a good chance to increase their use and guarantee that public funds benefit both patients and the environment. Procurement strategies generally choose the lowest short-term option, ignoring how much a solution will cost over its life, how green it is, and its chances for recycling, making it difficult for circular economy adoption to happen(Alhola et al., 2018). Healthcare organizations can find the best solutions for both their medical and environmental needs by using circular procurement standards, evaluating costs during the lifecycle, and reviewing the environmental effects of their decisions. For these changes to be effective, all relevant agencies should ensure that they consider activities of the circular economy. Making changes in policy and regulation is very important to advance circular economy ideas, to increase the amount of recycling and reused products, and to control excess consumption(Negrete-Cardoso et al., 2022).

Helping the healthcare sector with circular economy through tax policies and incentives is particularly important since the technologies are costly and return take time to appear. Studies on how to implement the circular economy through policies recommend that tax breaks, cash rewards, and other programs encourage people to invest while boosting the demand for circular goods and services(Nikiema & Asiedu, 2022). To guarantee public resources back supports worthwhile innovations, key factors such as market needs, progress in technology, and the possible effects on the environment need to be considered during the design of incentive programs. Experiences in other countries with circular economy rewards offer helpful advice for setting up India-tailored policies that are suitable for India.

2.6. TECHNOLOGICAL INNOVATION AND DIGITAL TRANSFORMATION

To implement a circular economy in health care, digital transformation provides the tools needed for improving how information is seen, processes are run, and resources are handled so as to minimize waste. Integrating equipment sensors, tracking tools for supply and waste, and digital operations records, the latest digital platforms give full insight into what happens to all the organization's resources(Watson et al., 2021). Greater visibility makes it easier to decide through data and reach effective and eco-friendly outcomes for the healthcare system. The formation of digital ecosystems linking all three groups enables teamwork in adopting circular economy ideas and reduces the expenses and difficulties of close cooperation(Tseng et al., 2021).

Machine learning and artificial intelligence are expected to play a major part in promoting circular economy by using light analysis, optimization of processes, and making automated choices to spot areas where resources can be better used and waste can be lowered. Such technologies can spot hidden ways to improve operations by inspecting various patterns in equipment and supply use and waste generation(Watson et al., 2021). With AI in place, equipment can last longer and save both resources and waste from having to be prematurely replaced or facing unwanted breakdowns. When combining AI and circular economy ideas, privacy, bias in algorithms, and transparency must be well managed so that there are no barriers to sustainable innovation(Ghoreishi & Happonen, 2020).

Circular economies are better possible through blockchain because traceability, transparent data, and trust support are particularly essential in the healthcare area. Blockchain technology helps create records of the product's root and all its steps, certification for quality, that helps in remanufacturing, refurbishing, and recovering parts without losing track of safety and performance(Kshetri, 2021). While setting up blockchain-based platforms for the circular economy, it is necessary to focus on scalability, compatibility of different systems, and legal compliance to benefit everyone involved.

Trying out blockchain in healthcare supply chains allows one to see its value and pave the way for increasing its use for circular economy strategies.

There are chances to include circular economy ideas in healthcare through smart textiles and wearable technologies that are durable, upgradable, easy to fix, and always provide monitoring while reducing their negative impact. It is necessary to think about how long, tough, serviceable, and environmentally safe the smart textiles must be when they are used in healthcare(Alsuradi & Yoo, 2019; Crean et al., 2012). In this way, these technologies help by cutting down on wasteful monitoring gadgets and offering better ways to look after patients by constantly monitoring their health. Smart textiles can only follow circular design if the partners in the textile industry, technology, healthcare, and recycling industries come together to support this aim.

3. METHODOLOGY

The research uses a broad analysis by doing a review of studies to learn about how India's healthcare sector is applying the principles of circular economy. Several resources such as Google Scholar and Scopus are merged in the process to give a complete look at present practices, obstacles to implementation, and possible changes in the Indian health sector.

4. RESEARCH DESIGN AND APPROACH

Both qualitative and quantitative methods are applied in this study to manage the fact that circular economy implementation in healthcare is very complex. The research uses existing tools from the circular economy world, but changes them to suit the healthcare industry in India.

As well, analyzing policy documents, regulations, and formal guidelines revealed more about the setup for carrying out the circular economy in India's healthcare sector. It looked into the rules, shortages in policies, economic incentives, and compliance demands that affect the adoption of the circular economy.

5. DISCUSSION

5.1. ECONOMIC OPPORTUNITIES AND BUSINESS MODEL INNOVATION

Using circular economy practices in healthcare makes it possible for businesses to earn more money, save costs, and improve their influence on the environment. Several studies show that circular economy projects in healthcare often save resources, make profits from recycling, and improve efficiency at the same time(Gupta et al., 2021). It is important to use advanced accounting and performance systems that measure financial and environmental outcomes to enhance decision-making that optimizes all parts of a company's value creation.

Service business models are a prime way to coordinate incentives because the provider's financial goals are to prolong equipment long-term and keep it working at its best efficiency. As a result, fewer resources are needed by healthcare providers to access new and kept-up equipment that guarantees high-standard care for patients(Deusen, 1995). For a service-based business model to work well, managers need to understand all details about equipment costs, what is needed from the equipment, and which risks are involved. The achievement of equipment-as-a-service models elsewhere has given helpful lessons for making applications that fulfill healthcare's specific needs(Davies et al., 2023).

Circular economy ideas can be put into action by turning wastes from healthcare into valuable resources and use them for further purposes like energy production. Research shows that dividing waste into different groups and processing it effectively in healthcare facilities in India helps earn money while cutting down costs and negative environmental effects(Sengodan, 2014). It is necessary to purchase proper technologies, organize training, and use quality control systems while still following the necessary rules for safety and the environment. When healthcare facilities collaborate, they can use larger scale technologies and share the costs and hazards of handling complicated waste(Kumar & Rahman, 2014).

By incorporating circular economy concepts in healthcare financing, it becomes possible to explore new ways of investing sustainably and divide costs over a suitable time span. Using green bonds, impact investing, and sustainability-linked financing helps fund the circular economy and guarantees that objectives for improving the environment are achieved(Anderson, 2016). Setting up standard metrics and various reporting standards will make performance in

circular healthcare easier to judge and trustworthy for investors. These innovations in healthcare funding call for coordination among hospitals, banks, and people who set the laws to set the stage for the circular economy(Adamo et al., 2022).

5.2. CHALLENGES AND BARRIERS TO IMPLEMENTATION

Although there are many chances to apply the circular economy in healthcare in India, several issues and obstacles make it hard for these opportunities to be used well, so strategic planning is needed to identify and manage these barriers. Out of all the issues, regulatory rules are the most important reason why the circular economy is not fully adopted in healthcare supply chains, so the government must introduce clear and consistent guidelines that help with circular practices and maintain required safety and quality(Alshemari et al., 2020). Some of the regulatory problems are lack of circular economy provisions in healthcare rules, not all regions interpreting the existing regulations the same, and delays in giving approval for new and innovative ideas(Shin, 2019). Primary healthcare providers, technology developers, regulators, and policy makers must keep interacting to build frameworks that ensure new technologies are safe and useful(Gilbert et al., 2021).

Restrictions caused by finances and economics stand in the way of circular economy growth, especially because many circular innovations require a lot of money and take a long time to recover their investments. Since they are often short of money, healthcare organizations single-mindedly focus on daily activities and do not invest in sustainability, making it difficult for them to take up the circular economy(Cavicchi et al., 2022). Since there are no standard techniques for showing how much sustainable choices save healthcare organizations, it is hard for them to convince stakeholders to invest in green solutions. Developing proper ways to raise funds, assess performance, and change incentives can help meet these financial challenges and highlight the economy's benefits of circular economy.

In healthcare, technical and technological barriers are very important, mainly because healthcare applications have specific needs and must meet high safety and quality standards at all times. Because lots of technologies for a circular economy are still advancing, or have not been modified for use in healthcare yet, there is not much certainty about how well they will work, how reliable they are, and how they comply with regulations(Mang et al., 2023). The use of different technologies and systems in carrying out a circular economy can be too much for many healthcare organizations to handle and can lead to various complexities. Resolving technical issues takes time and effort, showing new designs, and involving several parties to improve technical abilities and reduce the risks of new reforms.

Difficulties related to culture and organizations are often the toughest challenges for implementing the circular economy, because people and systems are so tied to their current methods that they are hard to change, even when technology and finances make change a good idea. Many healthcare organizations may value safety and risk management in their work cultures so much that they resist new methods, despite the possible advantages of those methods(Litwin et al., 2012). Making healthcare professionals aware of circular economy can help eliminate doubts and make them ready to implement its concepts. Circumventing these challenges in culture and encouraging healthcare organizations to join the movement is possible through development programs, strong leadership, and proper management of change.

6. LIMITATIONS

The method used in the research admits that some factors might reduce the findings' usefulness in other cases. Grouping the survey in certain places in India could affect its true representation on a national level since the levels of healthcare, rules, and economies differ greatly in different states and regions[2].

7. FUTURE DIRECTIONS

The further growth of sustainable healthcare practices in India depends on making sure various organizations and individuals keep exploring, innovating, and collaborating to face the open issues and look for new opportunities in the healthcare industry. Thanks to advanced materials, nanotechnology, biotechnology, and digital progress, circular economy implementation has a great potential to perform better, work more efficiently, and increase the functionality of its systems(Fragão-Marques & Özben, 2022). To use these new technologies in a circular economy, strong research and development should be carried out to find out how they can be used, whether they are affordable, and how safe they

are, as well as to design ways for them to be applied in healthcare settings suitable for organizations regardless of their differences.

Building frameworks that are well-suited to healthcare in a circular economy is very important, as other frameworks are usually not detailed enough for the healthcare industry's special needs in safety, regulations, and performance. The development of circular economy frameworks for healthcare should consider all sides of healthcare activities like clinical care, managing facilities, the supply chain, and getting rid of waste, as well as the different groups involved in healthcare(Voudrias, 2018). These frameworks have to help implement policies well and also be able to respond to the many different situations and strengths found in Indian healthcare centers.

It is especially important to concentrate on policy and regulation efforts in the future, since their impact on the circular economy is strong and we need detailed research about policies that address health, the environment, and the economy together. References to circular economy policies applied abroad could give India helpful ideas on how to create policies reflecting the nation's unique situation and needs as well as successes achieved in other places(Kazançoğlu et al., 2021). The use of policy evaluation tools and performance systems can contribute to evidence-based policies and help make sure policy interventions help everyone and deliver the intended outcomes.

For circular economy in healthcare, successful research and implementation requires teams from several disciplines to come together, since all the influence factors are complex and related. When researchers from different fields unite, it means knowledge can be produced faster and solved through practical use(Scheibner et al., 2021). Teamwork with other countries can give us new ideas and experts as we split and combine resources to research how to provide sustainable healthcare globally. With steady financial support, interdisciplinary research on the circular economy can progress and improve institutions' ability to carry out long-lasting research and innovation work.

8. CONCLUSION

The kind of circular economy that India is adopting in healthcare aims to radically change the sector by focusing on sustainable design, new business concepts, using technology, as well as collaborating to deal with environmental problems and improve the level of healthcare care. It is clear from research that using circular economy methods in healthcare can cut down on negative impacts, grow the economy, and improve how health organizations work, but good results depend on applying the right strategies to handle challenges in technology, rules, money, and organization while increasing everyone's ability and willingness to follow sustainable practices. The pandemic has revealed both the weaknesses of standard healthcare and the positive effects of circular healthcare on environmental and economic strength, prompting people to act more urgently in supporting sustainable changes in healthcare.

There are different chances and challenges for implementing circular economy ideas in India, one of them being a big and growing healthcare market, major environmental pressure, varied who can take part, and new laws that now support sustainable healthcare. Meeting local requirements and using global knowledge should be the focus of effective circular economy initiatives in healthcare in India, which needs everyone involved to cooperate. Mixing such technologies with circular economy concepts offers a chance to invent new methods that take advantage of India's technologies and help address sustainability problems in healthcare.

The adoption of circular economy ideas in health services will develop well when innovative research and practice are used over the long term to deal with all the issues and provide answers for all Indians. Creating quality policy structures, obtaining proper funds, and making systems more effective will let many people use circular economy methods without reducing their access to healthcare. Achievements in India will make the environment better and also help the country provide healthcare to its growing population without harming people in the future.

CONFLICT OF INTERESTS

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