

Startups Accelerating Circular Economy for Sustainable Bharat

Survey Report | July 2024

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Executive Summary

India is on track to become the world's third-largest economy, entering a crucial phase in its sustainable development journey. As the nation aims for economic growth and achieving the Sustainable Development Goals (SDGs), enhancing waste management infrastructure and transitioning to circular practices becomes increasingly urgent. A circular economy strategy benefits businesses, the public, the environment, and society overall.

According to a PVEAC report, India has seen an increase in consumption from 118 billion tonnes to 7 billion tonnes, potentially doubling to 14.2 billion tonnes by 2030. E-waste is also expected to surge due to rapid growth in solar and wind energy infrastructure and EV adoption, with solar Photovoltaic module waste projected to increase from 100 kt in FY23 to 340 kt by 2030, and 500 kt of EV batteries expected to reach recycling units. India generates 7,800 kt of textile waste annually, accounting for 8.5% of global textile waste.

Given these circumstances, transitioning to a circular economy is crucial for India, considering its growing population, urbanization, environmental challenges, and international commitments. Strategies like regenerating ecosystem services, minimizing hazardous materials, reusing products, recycling materials, and recovering energy from residual flows are essential. Success will depend on effectively incorporating technology and innovation. India's startup ecosystem is pivotal in advancing sustainability goals and addressing environmental issues. By 2030, India is projected to host over 180,000 startups with significant capital investments, with nearly 400 startups already active in the circular economy space.

Chase India and the International Council for Circular Economy (ICCE) conducted a survey titled "Startups Accelerating Circular Economy for Sustainable Bharat" to gather insights from startups in recycling, waste management, agriculture, AI-enabled services, sustainable product manufacturing, and sustainable fashion. The survey aimed to identify gaps and challenges in the circular economy from the perspectives of policy frameworks, infrastructure, technology adoption, and other crucial factors. The findings provide an overview of the state of circular economy startups, their regulatory interactions, consumer awareness levels, and the essential role of government support.

Here are some significant findings and recommendations:

Survey Findings:

- **Regulatory & Policy:** More than 60% of survey respondents emphasized on enhanced policy incentives and sector-specific reforms.
- **Environmental impact by adopting circular economy practices:** Close to 50% of startups are creating significant impact on environment protection, while the other 20% of startups are making sustained impact.
- **Enhanced adoption of technology:** 52% of the respondent startups have adopted technology for their operations, however a cumulative respondent of 44% are either in their initial stage of adoption or partially embracing technology.
- **Focus on waste management:** Over 40% of respondents deal in plastic waste-management, followed by e-waste (22%), and textile waste (1%).
- **Moderate consumer awareness:** According to startup responses, the survey indicates that approximately one-third of consumers are not well-versed in circular economy practices. However, more than 50% of consumers are partially aware of proper waste disposal methods.

Key recommendations:

- **Fiscal support by both state governments:** State governments across the country could create a circular economy fund (similar to Tamil Nadu) dedicated to startups working in the sector.
- **Dedicated & simpler policy frameworks:** Introducing sector-based policies in order to have expedited processes and effective sustainable solutions that support the circular economy startups ecosystem.
- **Policy based incentives:** In order to encourage circular economy, the government might consider formulating policies similar to the PLI Scheme for circular economy, including the circular economy in the Companies Act, etc.
- **Building infrastructure:** Government & industry collaboration under public-private partnership model to build adequate infrastructure for the identified circular economy zones. This shall foster innovation and technology within the circular economy.
- **Technology embracement & development:** Government could organize tech-hackathons through different line ministries (like Niti Aayog, DST, MeitY, MbEFCC) in order to encourage technology & innovation development within the startup ecosystem.



Chapter 1

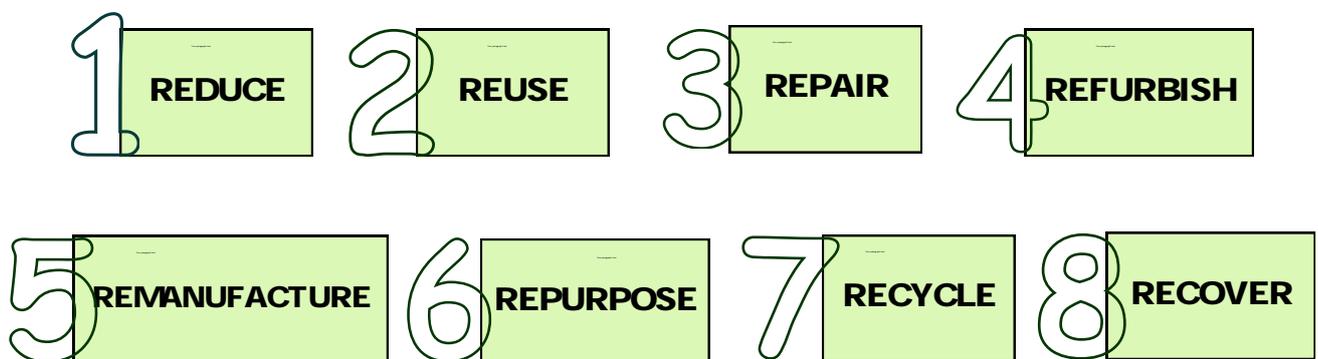
THE PATH TO CIRCULAR ECONOMY IN INDIA



1.1 Circularity & its significance

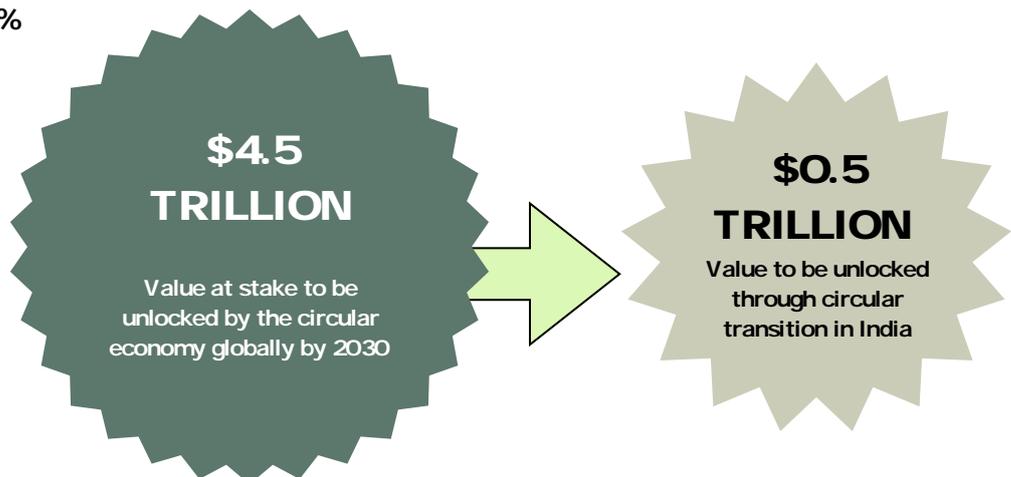
Circular economy is not merely about "recycle, reuse, refurbish" but involves a more fundamental shift in how products are designed, used, and recycled to eliminate waste and continuously circulate resources. It aims to redesign the system and is about more than just improving resource efficiency—it's about transforming the way our economy operates to work within planetary boundaries.

Circular economy focussed strategies



The global transition to a circular economy offers a value potential of \$4.5 trillion by 2030. India stands to capture 11% of this potential, equating to half a trillion dollars. However, the prevailing linear economic model—characterized by resource extraction, production, consumption, and disposal—has led to significant environmental degradation and hinders the achievement of this target. In India, only 20%

of goods are recycled, in stark contrast to 70% in Europe. Furthermore, India is the third-largest emitter of greenhouse gases, contributing 9.2% to global emissions.



These pressing challenges underscore the urgent need for India to adopt a circular economy model to attain the expected projection. According to industry reports, the global transition to a circular economy offers a value potential of \$4.5 trillion by 2030. India stands to capture 11% of this potential, equating to half a trillion dollars.



1.2 Initiatives for accelerating Circular Economy: Indian Government

Indian government has demonstrated significant advancements for circular economy model. In the last full Union Budget 2023-24, the Hon'ble Finance Minister announced that the vision of the government is "green growth", which is being implemented through programmes for greening of fuel, farming, mobility, buildings and energy access.

Highlights from the Budget 2023-24

- Energy Transition Budget: ₹ 35,000 crores allocated for energy transition, promoting green growth.
- Biogas and Bio-CNG Plants: ₹ 10,000 crores for 300 community-based biogas plants and 200 bio-CNG plants, with 75 in urban areas.
- National Green Hydrogen Mission: ₹ 19,700 crores to drive low carbon economy, cut fossil fuel reliance, and lead in green hydrogen technology.
- Battery Energy Storage Systems with capacity of 4,000 MWh will be supported with Viability Gap Funding.

Historically, EPR has covered e-waste, batteries, plastics, used oil, and tyres. However, it does not yet apply to sectors like textiles or chemicals. Expanding EPR to these areas is key for advancing a sustainable and circular economy. Between 2019 and 2024, the government significantly enhanced India's EPR compliance system through key regulations and initiatives. The introduction of specific EPR targets in the February 2022 EPR Guidelines and the PWM Amendment Rules, 2023, marked significant milestones. The E-Waste (Management) Rules of 2022 led to a 43% increase in e-waste collection, formalizing operations for over 10,000 dismantlers and recyclers. The Battery Waste Management Rules, introduced in 2022 and amended in 2023 defined clear EPR obligations.

These initiatives illustrate the government's dedication to environmental sustainability and resource efficiency in India. Despite these, the growth in the adoption of circularity remains slow, and given the extensive environmental damage, climate change and resource depletion, sustaining future generations with essential materials and a healthy environment will be increasingly challenging.

Notable Initiatives by the Central Government

01.

National Resource Efficiency Policy (NREP)

This policy aims to promote sustainability and reduce environmental impact by enhancing resource efficiency and encouraging responsible production and consumption.

02.

Mission LiFE (Lifestyle for Environment)

Mission LiFE promotes sustainable lifestyles and eco-friendly practices, focusing on mindful consumption and waste reduction to address climate change.

03.

Swachh Bharat Mission (SBM)

Launched in 2014, the Swachh Bharat Mission focuses on promoting cleanliness, hygiene, and effective waste management across India.

04.

Atal Innovation Mission

Launched in 2016, the Atal Innovation Mission aims to foster innovation and entrepreneurship in India.

05.

GOBARDhan Scheme

The scheme is establishing 500 new "waste to wealth" plants across India. These plants include 200 compressed biogas facilities and 300 community or cluster-based plants.

06.

Niti Aayog

Niti Aayog formed 11 committees to transition to a circular economy in key sectors like waste management and renewable energy. This aligns with national sustainability goals, aiming to optimize resources and reduce environmental impact through reuse and recycling practices.



Notable Initiatives by State Government

01.

Maharashtra: Green Maharashtra Initiative

The government is in the process to set up four circular economy parks for major industries and an enabling policy will also be rolled out soon. These circular economy parks will primarily focus on recycling scrap and other waste.

02.

Telangana: T-Hub

AIC T-Hub Foundation is a partnership between Atal Innovation Mission (AIM) and T-Hub to foster a culture of innovation across India by supporting promising startups working on cutting-edge solutions in the healthcare, mobility and sustainability sectors.

03.

Karnataka: Elevate 100 Program

Under this program, Karnataka provides grants and funding to startups working in various sectors, including those focusing on circular economy solutions.

The state aims to foster innovation in waste management, renewable energy, and sustainable agriculture.

04.

Tamil Nadu: StartupTN

The government has dedicated funds under the StartupTN initiative to support startups in the circular economy.

The focus is on recycling, waste management, and sustainable manufacturing practices, aligning with the state's goals for environmental sustainability.



1.3 Role of Startups: India's Circular Economy

In India, startups are poised to play a critical role in pushing forward the sustainable strategies and principles of the circular economy across various sectors. Over the years, circular economy startups have built their strengths to innovate in recycling, waste management, sustainable agriculture, renewable energy, and many other sectors, contributing significantly to environmental conservation and economic sustainability.

Globally, India has emerged as the driving force within its startup ecosystem with 1, 17,254 recognized startups by Department for Promotion of Industry & Internal Trade (DPIIT). Given the significance of circular economy, the startups working in this space are very minimal. According to an industry report, there are close to 400 active startups working in this space across the country. It is also important to note that within the Galaxy of Indian Unicorns, there is only 1 startup (ReNew Power Pvt. Ltd.) that achieved the valuation of more than \$1Bn in the year 2017. According to media & industry reports, the entire Indian startup ecosystem has received capital over \$141Bn between 2014- 2023, whereas circular economy was only able to attract investments totaling \$18 billion between 2016- 2023.

Over the last decade, startups have built their positioning as a crucial catalyst in transforming the Indian circular economy space embedded with digitization and tech-innovative solutions, that have helped in addressing challenges & fueling the growth in the society. Further, there is an increased focus on developing new materials, technologies and business models that promote sustainability and reduce the environmental impact. Startups have taken a step forward in adopting emerging technologies like artificial intelligence, managing larger volumes of wastes, that would eventually lead to cost-effective measures. As we move toward a more sustainable future, this transformative shift promises not only environmental sustainability but also economic vitality in waste management.



Startups Pioneering Circular Economy Solutions

Innovative Recycling Methods

- Startups are developing advanced recycling technologies to handle complex materials and e-waste efficiently,
- Transforming waste into valuable resources like energy and raw materials.
- Design modular products that are easy to repair, upgrade, or recycle, thereby extending their lifecycle.

Sharing and Service-Based Economies

- Startups offer products as services, encouraging maintenance and refurbishment, reducing the need for new production.
- Platforms facilitating the sharing or renting of goods contribute to resource optimization and waste reduction.

Safety equipment

- Startups use AI and blockchain for transparent, efficient circular supply chains.
- They offer marketplaces for refurbished and recycled products, and apps that educate consumers on sustainable practices.



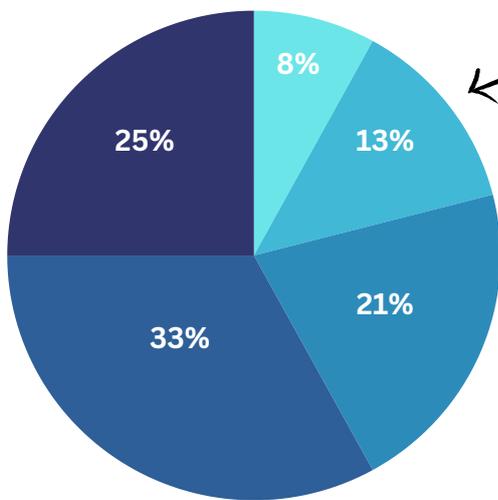
Chapter 2

SURVEY FINDINGS AND ANALYSIS



Respondent Universe

- Sustainable Product Manufacturing
- Technology Development for CE
- Agriculture ■ Recycling
- Waste Management

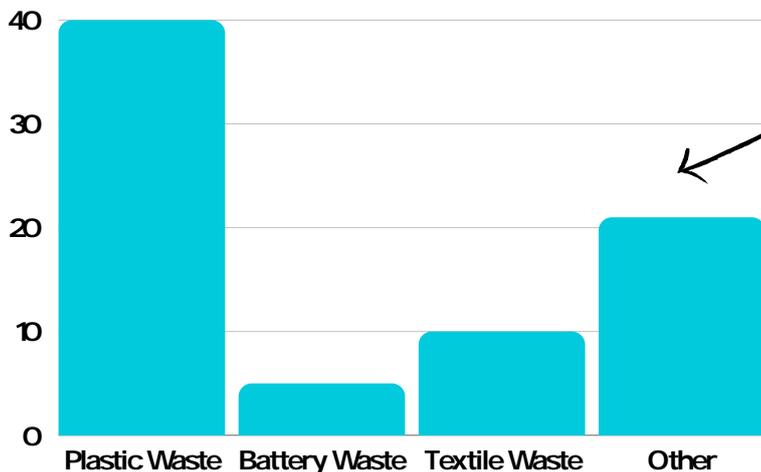
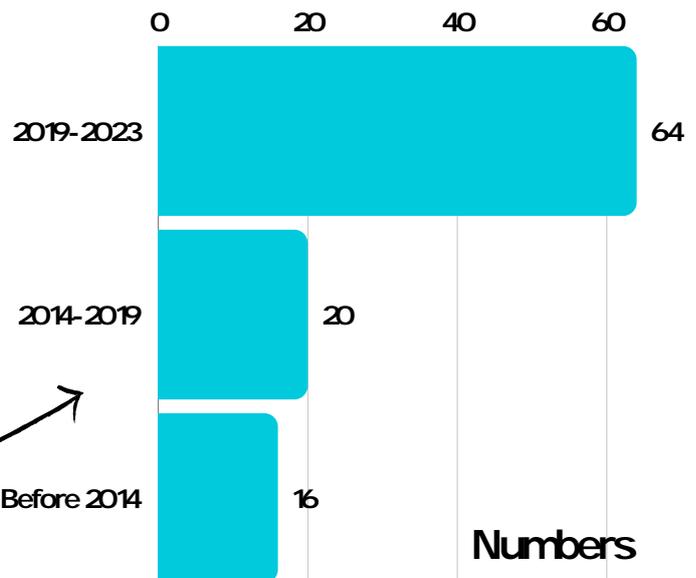


Focus sectors

- Recycling (33%) is the largest segment, indicating a strong focus on recycling initiatives.
- Followed by Waste management (25%) is critical for reducing landfill use, pollution, and recovering materials.

Year of incorporation (in %)

There has been a significant rise in circular economy startups since 2014, with 20% recognized between 2014-2019 and 64% recognized between 2019-2023.



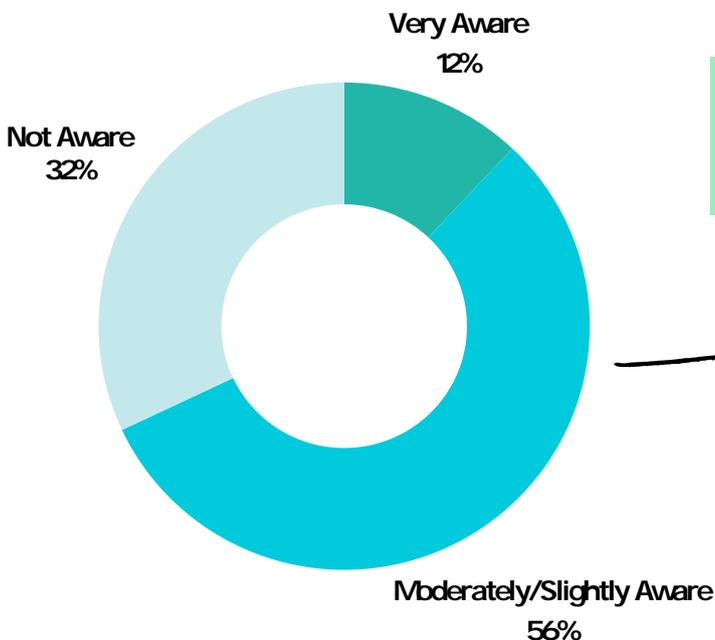
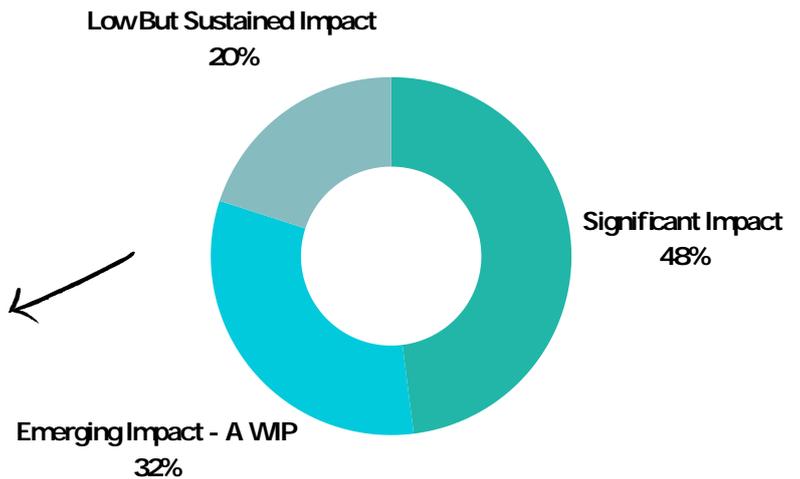
Primary waste

- 41% of startups manage plastic waste.
- 22% focus on electronic waste.
- With two emerging sectors, textile and battery waste management, at 11% and 5% respectively.
- Others manage metal scraps, agro-residue, steel waste, and organic waste.

Circular Economy Impact

Environment

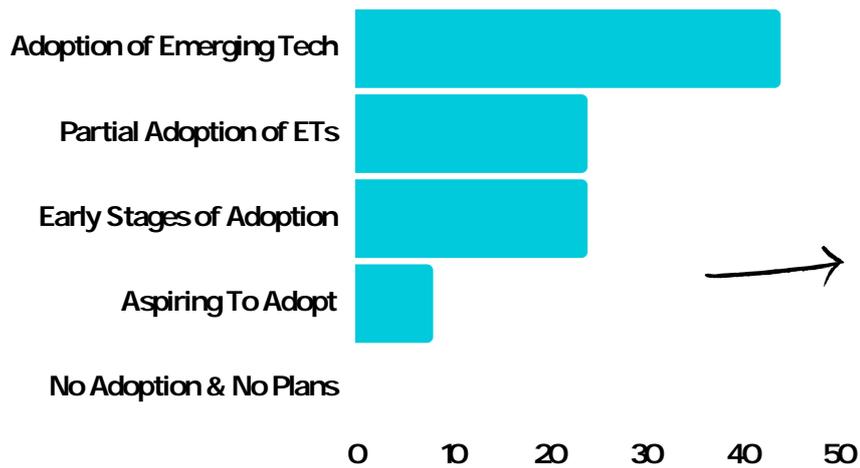
- Nearly 50% of startups report making a significant environmental impact through their practices.
- Additionally, 32% of startups observe an emerging impact, while 20% indicate a low but sustained impact on the environment.



Consumer awareness

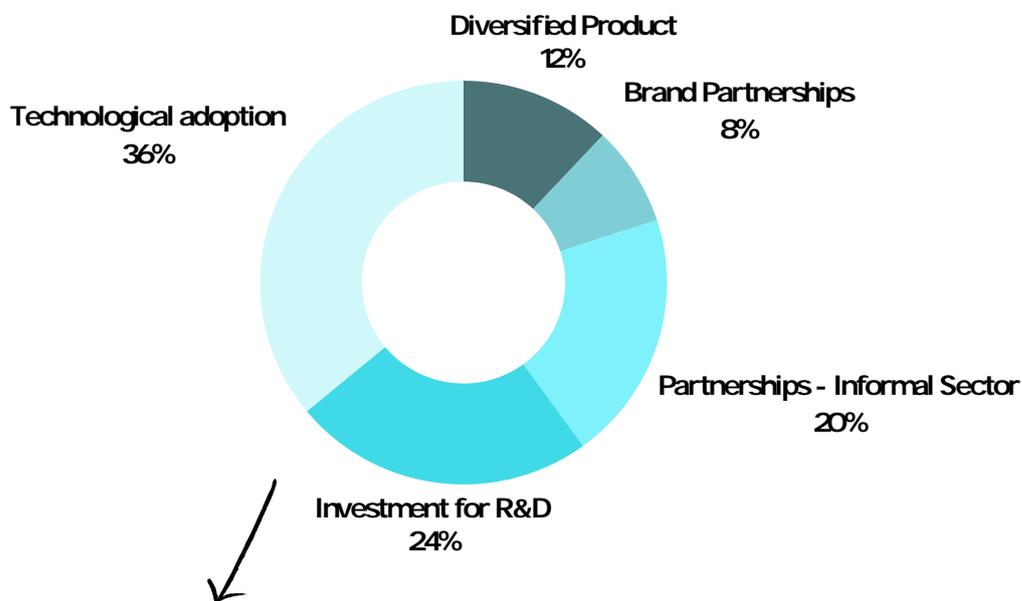
- A significant number of consumers remain largely unaware of the impact of waste and sustainability issues.
- Many consumers have a basic understanding but do not consistently make sustainable choices.
- A smaller proportion of consumers are well-informed and actively make sustainable choices.

Technology & Innovation



Stage of adoption

- Startups recognize the need to adopt cutting-edge technologies for better resource utilization and reduced environmental impact.
- 52% of startups have fully adopted these technologies.
- 24% of startups have partially adopted these technologies.
- Over 20% of startups are in the early stage of adoption.

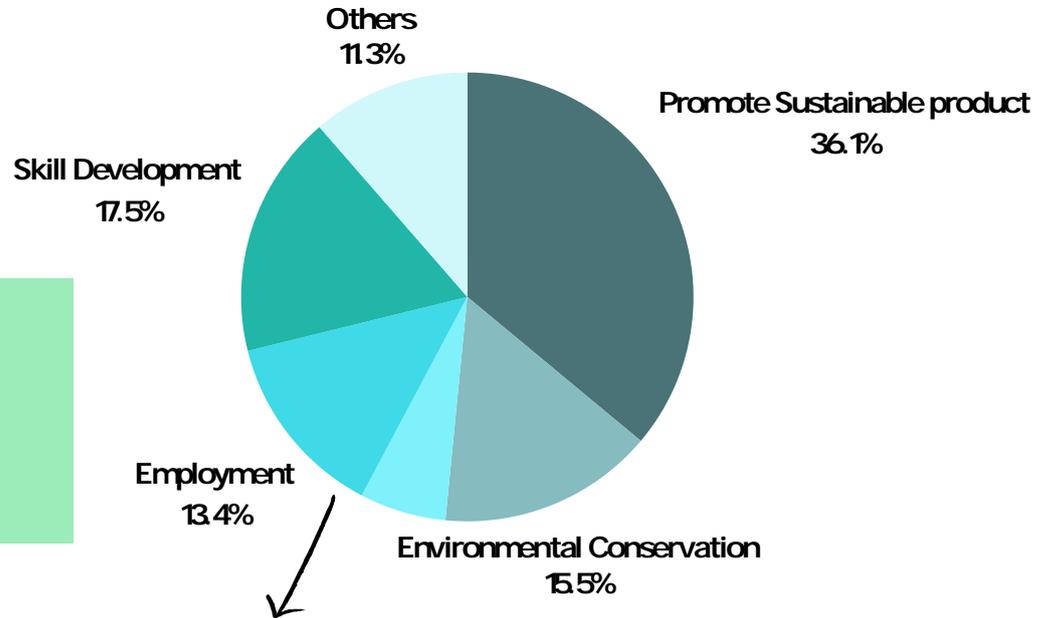


Scale of adoption

- Startups recognize that scaling up their business in the near future requires the adoption of innovative technology with over 35% of them affirming its necessity.
- Additionally, 24% of respondents emphasize the importance of increased investments in the R&D sector.

Social Upliftment

CSR promoting circularity



- 36.1% of startups believe that promoting sustainable products could be a potential focus of CSR activities
- More than 30% of startups think focus on skilling & employment is imperative.
- Additionally, 28% feel that environmental conservation should be a key area of focus.



Indirect Employment

- Startups employing up to 100 indirect employees make up 14%,
- While over 5% employ between 500 and 1,000, highlighting the urgent need to formalize the informal sector.

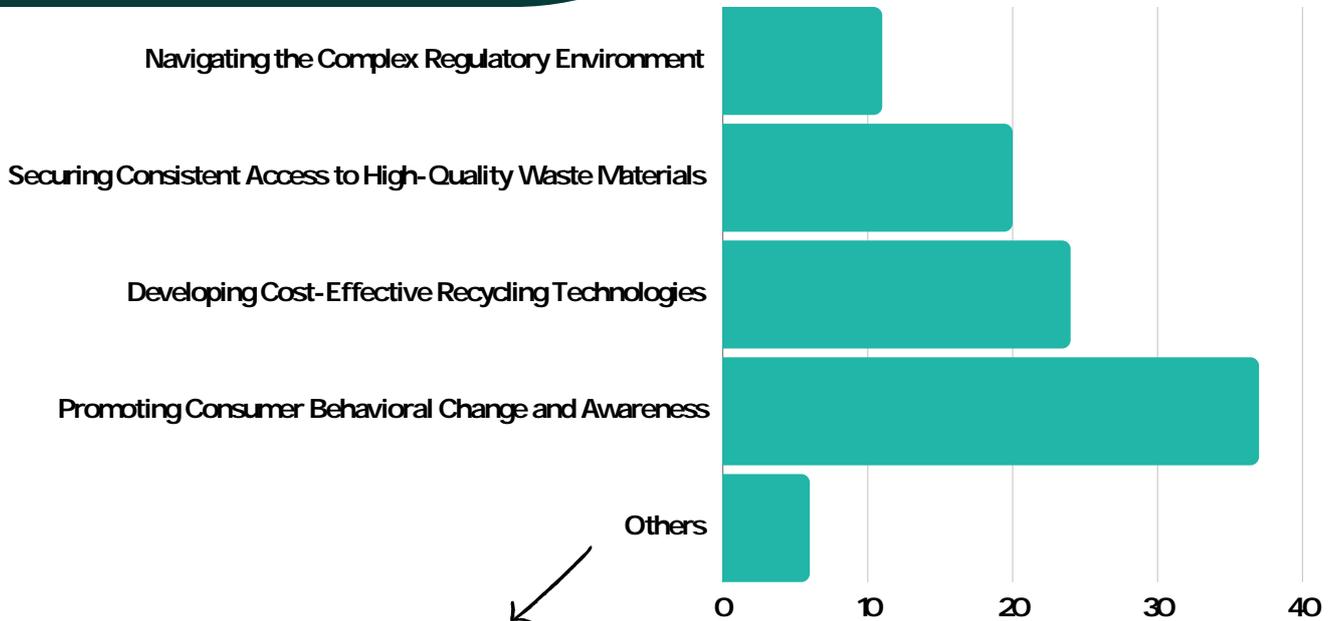


Women Employment

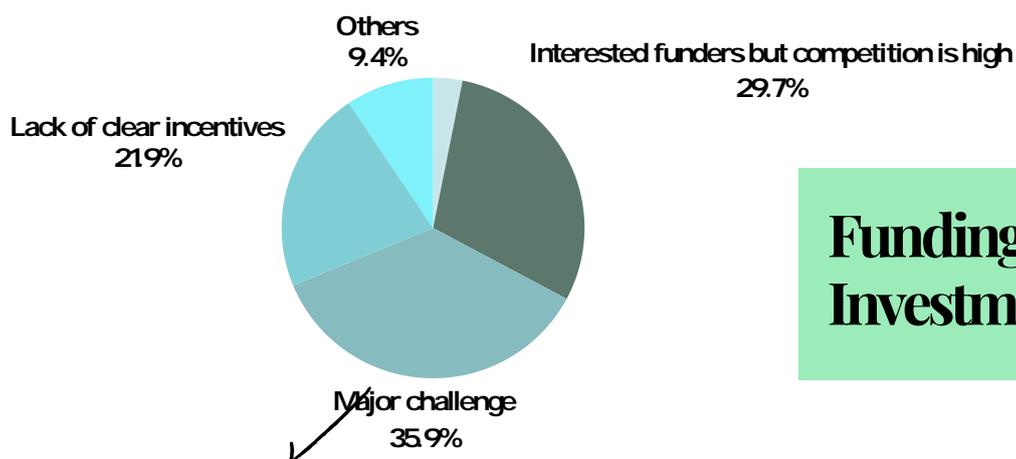
- The survey shows startups significantly contribute to women's employment.
- Notably, 5% of startups have over 50% women employed, both directly and indirectly.

Challenges

Factors hindering growth



- A key challenge in accelerating the circular economy (CE) is low consumer awareness about sustainability.
- Moreover, limited access to advanced technology and infrastructure stifles growth.
- Furthermore, effective segregation of critical materials poses a challenge, impacting the quality of recycled materials.



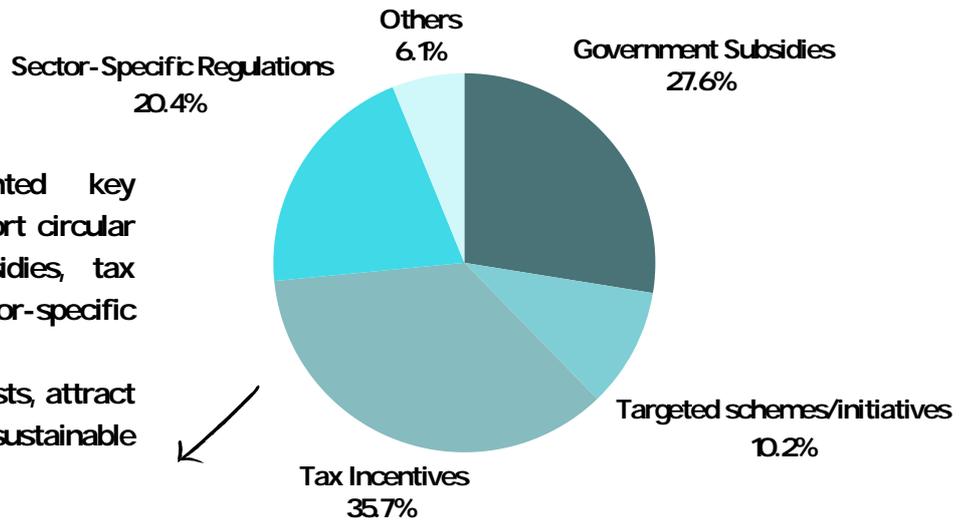
Funding & Investments

- Investments in circular economy (CE) startups remains low. Despite interest from investors, the limited number of CE startups creates competition due to their access to infrastructure and technology.
- Additionally, the lack of incentives makes the CE sector less attractive to investors.

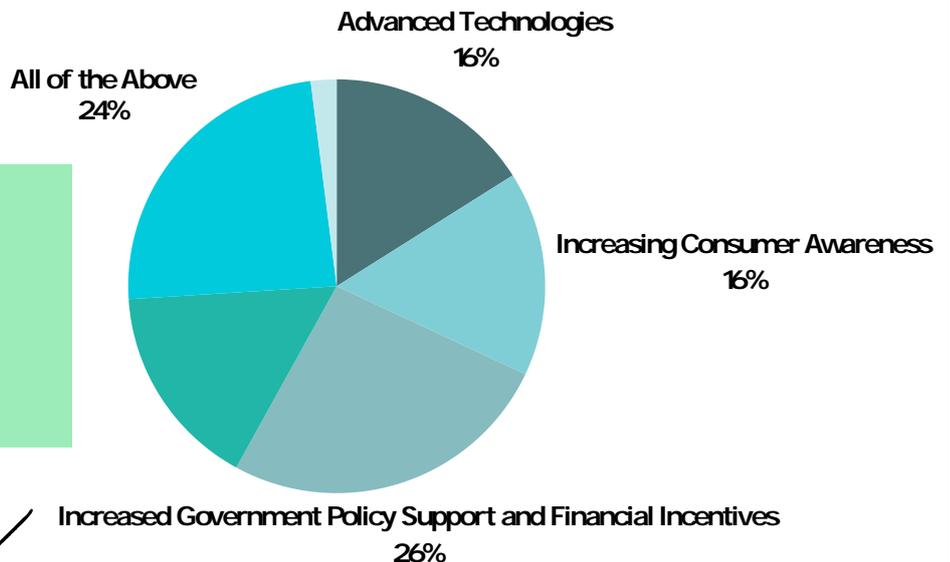
Policy, Regulatory & Government

Role of Govt.

- Startups have highlighted key government roles to support circular economy: exclusive subsidies, tax incentives, and clear sector-specific regulations.
- These measures reduce costs, attract investments, and foster a sustainable business environment.



Sustainable Development Goals - 2030



- To promote circular economy in India and achieve the SDG Goals by 2030, several foundational factors are crucial.
- The emergence of new technologies and increasing consumer awareness along with a growing interest in sustainable living are vital.
- Additionally, enhanced government policy support and financial incentives would play a significant role.

Sector-based policy and regulatory framework

More than 60% of the respondents highlighted the need for enhanced policy & regulatory support for startups working in a circular economy. The government may consider formulating clear guidelines of operations for different sectors highlighting certain processes and compliances pertaining to recycling, reprocessing, refurbishing, etc. This could be similar to EPR guidelines which at present is only limited to sectors like batteries, e-waste, used-oil, tyres, and plastic.

Additionally, the government could consider coming up with policies principally aligning with initiatives like PLI, which could be focused on incentivizing business models promoting circular economy and sustainability.

Increased Government incentives

Half of the respondents from the above point highlighted the need for more tax incentives and fiscal benefits to be extended to startups. Government could proactively support such startups that are making efforts to uplift the informal sector in building their digital capacities, creating employment opportunities and upskilling with new-age recycling/reprocessing methods.

Enhanced role of State Government

Given the growing population, development of industries, and increased consumption patterns, each state government might consider allocating or setting-up a dedicated fund for promoting circular economy, and not limiting to state waste management rules & guidelines.

For example, Government of Tamil Nadu has created a Rs 1000-crore Green Fund to invest in circular economy, renewable energy and other projects aimed at mitigating climate change impact.

Encourage adoption of technology & innovation

Technology & innovations has been one prominent factor that most startups believe shall enhance efficiency and enable them to scale their businesses. Aiming to enhance technology developments and innovative solutions, governments may adopt tools like hackathons and invite innovators to address the challenges of circular economy. These hackathons could be done in collaboration with the industry and nodal ministries suggestive to be organized every six months.

Infrastructure development to promote circularity

In alignment with the PPP model, government and industry could collaboratively identify Circular & Sustainable Corridors (CSCs) in relevant geographies of the country and create the required infrastructure that supports circularity and sustainable practices.

Establishing dedicated zones or hubs where circular economy startups can collaborate, share resources, and access necessary infrastructure that can foster innovation.

Attracting investments under CSR

Currently schedule 7, CSR Policies, under Companies Act 2013 focuses on overall aspects of social development, empowerment and sustainability, but does not have any mention of circular economy. The government may want to include circular economy within the said schedule of the Companies Act, which might accelerate circular economy.

Consumer awareness

MEITY's initiative GREENE that aims to create effective awareness at various levels (of society) to reduce the adverse impact on environment. Inspired through such initiatives - start-ups, industry, and governments (union & states) could collaborate at the District level to undertake awareness & educational campaigns on promoting circular economy practices. Each state government could create a Circular Economy District Education [CEDE (that could be pronounced as SEED)] Campaign under which citizens could be educated on basic strategies of sustainability and circular economy.

Capacity building programs

Industry/startups are recommended to increase/enhance government collaboration with the government entities and agencies like National Institute for Micro, Small and Medium Enterprises for undertaking capacity building programs focused on imparting knowledge and building digital capabilities of smaller enterprises associated with recycling, waste collection and processing sustainable products. These programs would have a positive impact on creating an inclusive circular economy ecosystem by incorporating the informal sector.

Conclusion

The circular economy promotes the design and production of durable products using minimal resources, with an emphasis on reuse, recycling, and reducing waste. Startups play a crucial role in this by fostering innovation, generating jobs, and contributing to the GDP. In India, startups are transforming waste into valuable products, such as decorative items from scrap metal or incense from floral waste.

Startups are also driving sustainability by developing organic products, reducing plastic usage, and promoting alternative energy solutions like rooftop solar installations. They are pivotal in environmental protection through waste segregation and recycling efforts. These efforts contribute to economic and environmental sustainability, reduce migration to urban areas, and relieve pressure on city infrastructures.

Aligning with the objective of Accelerating Circular Economy for a Sustainable Bharat, the growth of circular economy startups is imperative. The survey findings help identify the range of comprehensive recommendations focusing on incentivizing circular innovations, encouraging technology development and innovative solutions, simplifying regulations and guidelines, establishing dedicated funds, facilitating access to funding & investments, developing recycling and upcycling facilities, creating circular economy corridors, launching public awareness campaigns, providing training programs, and supporting market access.

With the implementation of these suggestions, we believe that India shall drive innovation, sustainability, and economic growth, position itself as a leader in the global circular economy movement and achieve Sustainable Development Goals (SDGs) by 2030.

"India is making the circular economy a major tool for urban development."

- Hon'ble Prime Minister Narendra Modi, Post-budget webinar speech, 2023

Methodology

The survey exercise and the findings emerging from it have some inherent limitations. These are listed below.

- **Limited scope and depth:** The limited scope and depth of certain questions made it difficult to capture nuances of user responses, with respect to reasons behind the responses.
- **Validity of responses:** The validity of the responses cannot be confirmed, since they are influenced by respondent biases and driven by perceptions towards the subject, i.e., the survey relied upon stated preferences and perceptions of respondents.
- **Data accuracy:** While efforts were made to maintain data accuracy, any errors that may have occurred in data analysis remain solely ours.
- **Interpretations:** Despite testing and piloting the questionnaire, as well as surveyor trainings, it is possible that certain questions may have been interpreted differently by different enumerators/ respondents.

This report utilizes a combination of both primary and secondary research methodologies to gather comprehensive data and insights. The primary research involved collecting fresh data through Knowledge, Attitudes, and Practices (KAP) surveys and purposive sampling. This approach enabled us to gather direct and specific information from a targeted group of respondents, ensuring relevance and depth in the findings. Additionally, secondary research was conducted by analyzing existing data and information available in the public domain. This included reviewing previous studies, reports, and other publicly accessible sources to provide a broader context and support for the primary data collected. The integration of these methods allowed for a robust and multi-faceted understanding of the subject matter.

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ABOUT ICCE - INTERNATIONAL COUNCIL FOR CIRCULAR ECONOMY

ICCE, the International Council for Circular Economy, stands as the premier and largest international network for professionals, corporates, and organizations engaged in advancing the Circular Economy. With a resolute mission, ICCE is dedicated to expediting the transition to a restorative and regenerative economic model that emphasizes circularity at its core. By harnessing expertise and strategic guidance, ICCE endeavors to cultivate a resilient and thriving local network that drives circularity from the grassroots level. Embracing a global perspective, ICCE is a thought leader in the global south and is spearheading transformative change on a global scale. Established in 2020, ICCE has made significant strides in propelling the Circular Economy movement in India. As a pioneer think tank, ICCE has successfully placed the circular economy on the agendas of decision-makers across various sectors including business, government, and academia.

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