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**A Behavior Model to Explore Circular Economy in Manufacturing  
MSMEs of Ahmedabad District**

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## Abstract:

This research investigates the adoption of circular economy (CE) practices within manufacturing micro, small, and medium enterprises (MSMEs) in Ahmedabad District, India. The study aims to develop a model that explains the factors influencing the implementation of CE practices.

The research explores the contributions of these MSMEs to the circular economy, the challenges they face, and proposes potential policy mechanisms to support their integration. A survey questionnaire was developed and distributed to 300 MSMEs across the district. The responses provided valuable insights into the attitudes and readiness of MSMEs towards CE principles.

The analysis revealed a positive outlook and strong acceptance of CE practices among the surveyed MSMEs. The majority of respondents expressed a clear understanding of the benefits of CE and a willingness to implement them. Additionally, a high level of environmental commitment was found, indicating a strong focus on sustainability within these businesses. Notably, financial incentives emerged as a significant motivator for adopting CE practices, highlighting the importance of economic factors in driving sustainable business models.

These findings paint a promising picture of CE adoption among Ahmedabad's manufacturing MSMEs. However, the research acknowledges the need to address any existing challenges or areas where preparedness might be lacking. Further research is recommended to explore these specific hurdles and tailor interventions to overcome them. This would ultimately accelerate the successful implementation of CE principles within the district's manufacturing sector and contribute to India's broader circular economy framework.

**Keywords:** Circular Economy, Manufacturing MSMEs (Micro, Small and Medium Enterprises), Ahmedabad District, Behavior Model

## 1. Introduction

The integration and mainstreaming of the circular economy (CE) within India's economic framework is essential, particularly when considering the substantial role of micro, small, and medium enterprises (MSMEs). With MSMEs contributing nearly one-third of the nation's GDP and accounting for almost half of its exports, their involvement in CE practices is pivotal. These enterprises not only bolster economic growth



but also hold significant potential to drive sustainable development by adopting circular business models.

Eco-inclusive enterprises within the MSME sector play a crucial role in the transition to a circular economy through various upstream and downstream business models. However, they face numerous challenges and barriers that impede their ability to scale and replicate these sustainable practices. Addressing these obstacles is essential for fostering an environment where MSMEs can fully leverage the opportunities presented by a circular economy.

In response to these challenges, SEED initiated the Practitioner Labs for Policy Prototyping in mid-September 2021, focusing on the topic “Fostering the Circular Economy: Role of MSMEs.” This initiative aimed to explore the policy challenges faced by circular economy enterprises in India and to collaboratively develop prototype solutions with key stakeholders from both the public and private sectors. The culmination of these efforts was showcased at the GreenCo Summit 2021 on October 8th, where SEED discussed these challenges in detail.

This paper aims to explore a behavioral model to understand the implementation of circular economy practices in manufacturing MSMEs within the Ahmedabad district. By examining the contributions of these enterprises to the circular economy, identifying their challenges, and exploring potential policy mechanisms to support them, this research seeks to provide a comprehensive understanding of how MSMEs can be better integrated into India's circular economy framework.

## 2. Review of Literature

Singh, et al (2018) developed an extended Theory of Planned Behavior model to explore small firms' readiness for circular economy. Results from structural equation modeling suggest that environmental commitment and green economic incentives enhance the model's explanatory power, indicating their importance in promoting circular economy initiatives in MSMEs.

Guravaiah, N. (2017) delved into the motivational factors of Indian entrepreneurs, examining the significance and performance of MSMEs in the country's economy, alongside government policies towards this sector.



Srivastava et al (2016), examines challenges and opportunities for India's growth amidst global economic transition. It explores themes like "Make in India" and "Skilled India" to achieve sustainable development.

Ricardo, R., & Yandi, A. (2021), explores decision-making strategies for Micro, Small, and Medium Enterprises (MSMEs) during COVID-19. It emphasizes the importance of choosing appropriate decision types and adapting them to pandemic restrictions. The authors recommend critical problem-solving and innovation for MSMEs to navigate this challenging environment.

Gupta & Barua (2016) investigates key factors enabling technological innovation in Indian MSMEs. The authors use a novel technique to identify the most critical enablers from experts in industry and academia. They find that project resources, entrepreneur knowledge, and government policies are the most important for technological development in MSMEs.

### 3. Theoretical Framework

The Theory of Planned Behavior (TPB) by Ajzen posits that intention to perform a behavior is determined by attitude, subjective norm (perceived social pressure), and perceived behavioral control (PBC). This study extends the TPB by incorporating two additional factors:

- **Environmental Commitment:** The organization's dedication to environmental sustainability practices.
- **Green Economic Incentives:** Government policies and financial benefits promoting CE adoption.

### 4. Objective of the Research

The main objective of this research is to develop a comprehensive behavioral model that elucidates the implementation of circular economy practices within manufacturing MSMEs in the Ahmedabad district. This study aims to assess the contributions of these enterprises to the circular economy, identify the challenges they face, and propose potential policy mechanisms to support their integration into India's circular economy framework. Through this investigation, the research seeks to provide valuable insights into how MSMEs can be effectively incorporated into the broader circular economy landscape in India.



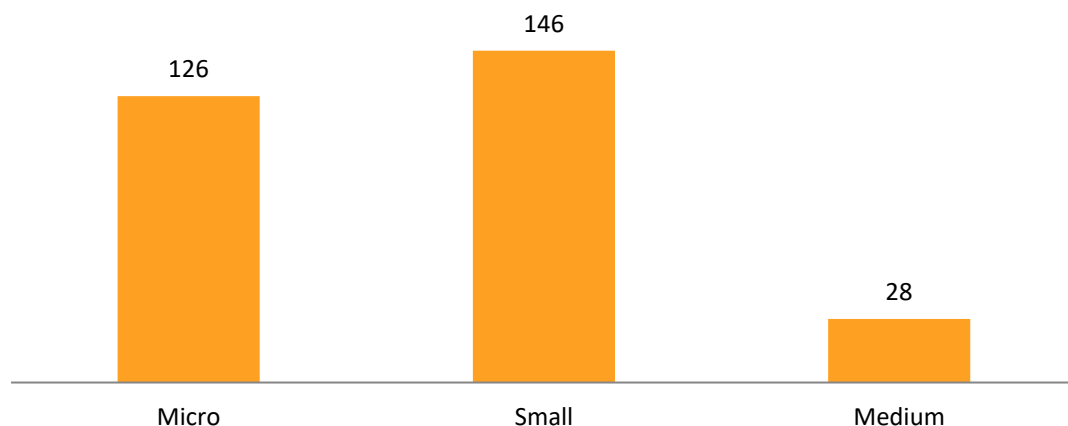
## 5. Hypotheses

- H1: Positive relationship between attitude and CE readiness.
- H2: Positive relationship between subjective norm and CE readiness.
- H3: Positive relationship between PBC and CE readiness.
- H4: Positive relationship between environmental commitment and CE readiness.
- H5: Positive relationship between green economic incentives and CE readiness.

## 6. Methodology

A survey questionnaire has been developed based on the ETPB model constructs, that has 6 sessions and 10 questions. Total 300 response has been received from the targeted population of manufacturing MSMEs in Ahmedabad District. Data will be collected through surveys and analyzed using Structural Equation Modeling (SEM) to test the hypothesized relationships.

- **Response Received**



The table indicates varying levels of responses from Micro, Small, and Medium Enterprises (MSMEs). Among the surveyed MSMEs, the majority, constituting approximately 53%, fall under the Small category, with 146 responses. Micro-enterprises follow closely, comprising around 43% of the total responses, with 126 responses. In contrast, Medium-sized enterprises constitute a smaller portion, representing approximately 4% of the responses, with only 28 entities participating in the

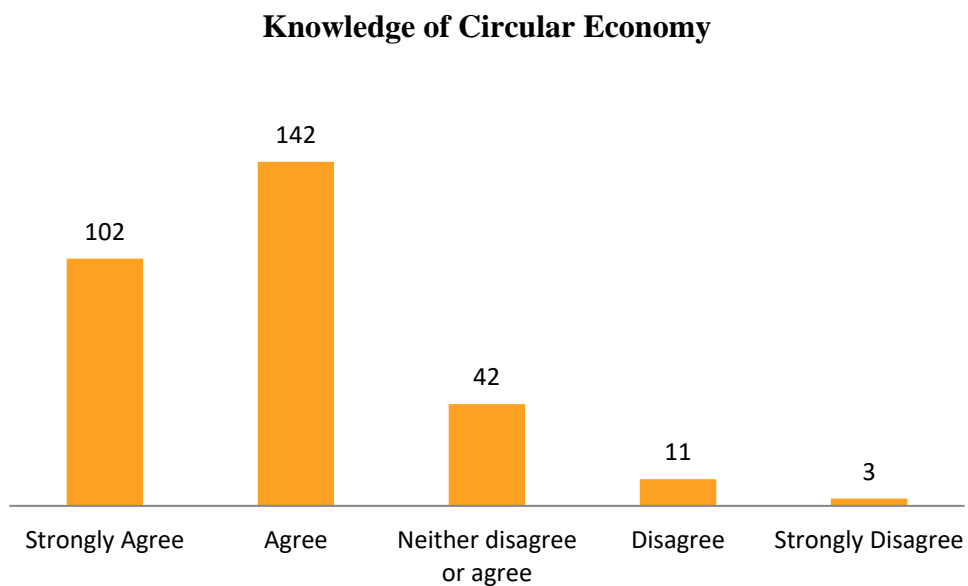
research. These percentages offer insights into the distribution of MSMEs within the research sample, highlighting the dominance of Small enterprises, followed by Micro and then Medium-sized ones.

## 7. Outcomes

The developed a ETPB model to assess CE readiness in manufacturing MSMEs to identify key factors influencing CE adoption in this sector, as following:

- **Knowledge of Circular Economy**

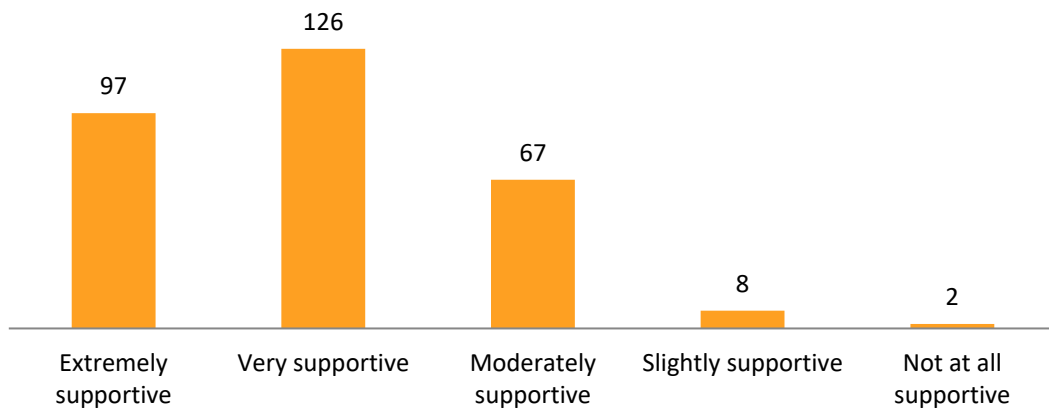
Research questioned to MEMEs that How positively do you perceive the concept of Circular Economy? The responses as following:



As per the chart, a significant majority of respondents hold a positive view towards the concept of Circular Economy. A notable 51% strongly agree with its principles, while a further 35.5% express agreement, indicating a combined total of approximately 86.5% in favor. Moreover, 10.5% neither disagree nor agree, suggesting a moderate level of neutrality. Conversely, only 5.5% of respondents either disagree or strongly disagree with the concept, demonstrating a comparatively minor dissent.

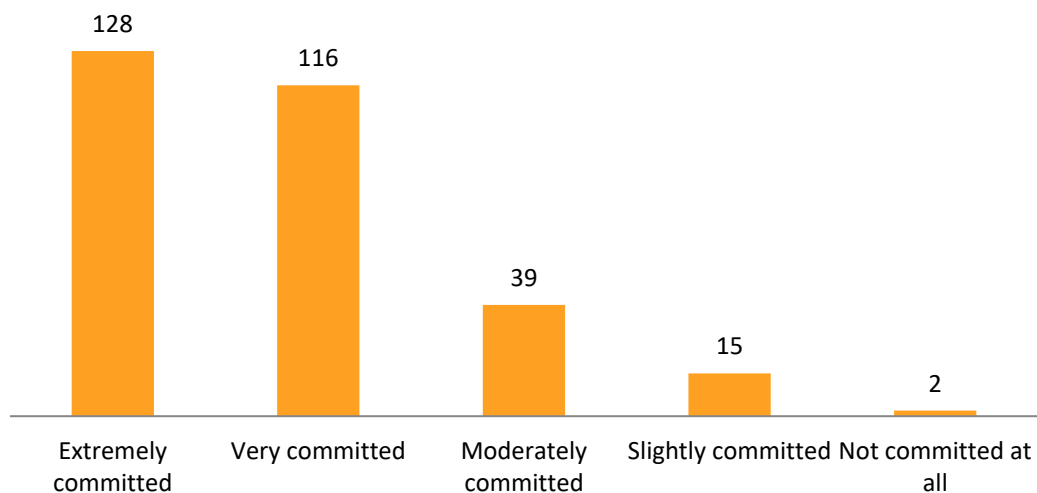


- **Support the Adoption of Circular Economy practices**



The chart appears that there is a substantial level of support for the adoption of Circular Economy practices within the industry. The majority of respondents express either extreme (45.5%) or very (37.5%) levels of support, indicating a combined total of 83% who are highly supportive. Additionally, a considerable portion of respondents (12.5%) report moderate support. However, a smaller percentage of respondents indicate slight support (1.5%), while an even smaller proportion express no support at all (0.3%).

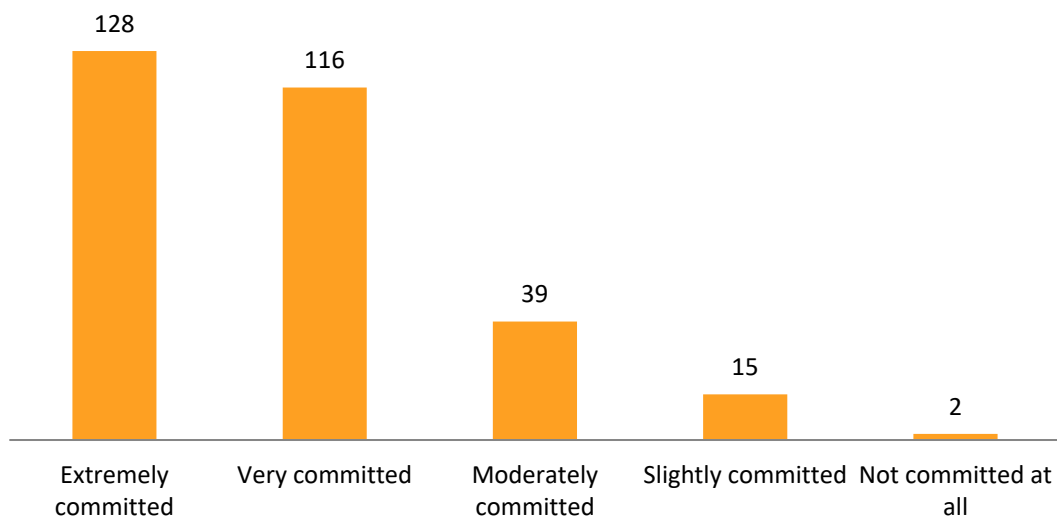
- **Implement Circular Economy Practices within Business**





The chart clears that there is a significant level of confidence among the participants regarding their ability to implement Circular Economy practices within their businesses. A large portion, constituting approximately 49%, expressed being extremely or very confident. This indicates a robust belief in their capacity to integrate circularity into their operations effectively. Additionally, around 17% reported being moderately confident, suggesting a reasonable level of assurance in their capabilities. However, a smaller percentage, about 7%, conveyed only slight or no confidence at all, indicating potential areas for improvement or further support in embracing Circular Economy principles.

- **Environmental Commitment**

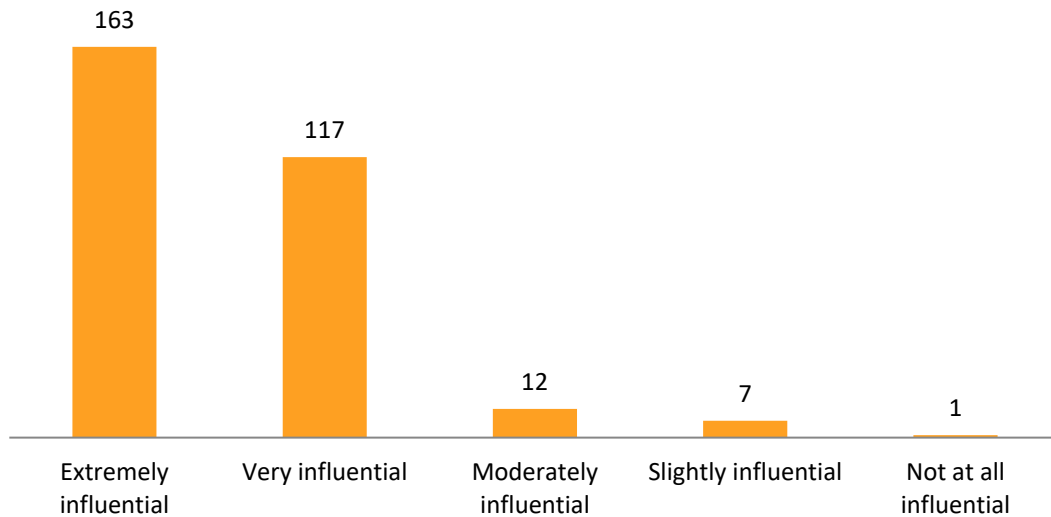


As per the chart, there is a notable dedication to environmental sustainability within the company surveyed. A significant portion, constituting approximately 43.2%, expressed an "Extremely committed" stance, while an additional 39.2% voiced being "Very committed." Moderately committed responses accounted for about 13.2% of the total, indicating a substantial but somewhat less fervent commitment. A smaller fraction, around 4.6%, reported feeling "Slightly committed." Remarkably, only a negligible 0.6% of respondents indicated "Not committed at all," suggesting a strong overall inclination towards environmental sustainability initiatives within the organization.



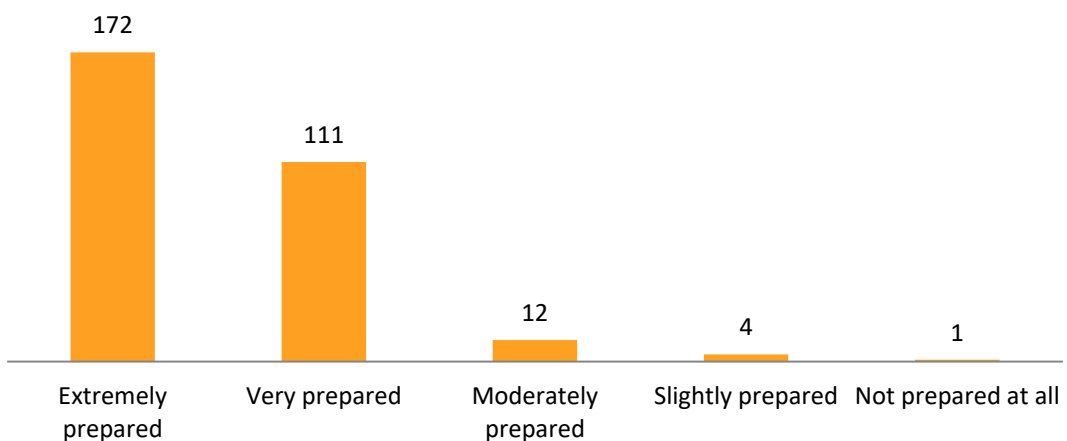


- **Green Economic Incentives**



The chart indicates that financial incentives play a significant role in influencing decisions regarding the adoption of Circular Economy principles. A considerable majority, comprising 57.5% of respondents, reported that financial incentives are either extremely influential (38.8%) or very influential (27.9%). A smaller proportion, accounting for 10.3% of respondents, viewed financial incentives as moderately influential. Only a minimal percentage, totaling 3.5% of respondents, considered financial incentives to be slightly influential. Surprisingly, just one respondent, constituting a mere 0.3%, stated that financial incentives were not at all influential.

- **Circular Economy Readiness**





The chart appears that the majority of participants feel their company is well-prepared to transition towards a Circular Economy model. Approximately 54% of respondents indicated feeling either "Extremely prepared" or "Very prepared." Another 4% expressed moderate preparedness, while only a small fraction, roughly 1%, stated feeling slightly or not prepared at all. These findings suggest a significant level of confidence within the surveyed companies regarding their readiness to embrace Circular Economy principles.

## 8. Limitations and Future Research

This study acknowledges potential limitations like self-reported data bias and the specific context of Ahmedabad. Future research could explore longitudinal studies, case studies of successful CE implementation in MSMEs, and the role of specific CE practices in different manufacturing sectors.

## 9. Conclusion

This study investigated the adoption of Circular Economy (CE) practices among manufacturing MSMEs in Ahmedabad District using the ETPB model. The findings from the survey of 300 MSMEs reveal a positive outlook and strong acceptance towards CE principles.

- A significant majority of respondents endorse the merits of CE, indicating a prevailing optimism and a strong inclination to embrace CE practices.
- The data suggests a high level of preparedness among industry professionals, with minimal resistance towards implementing CE principles.
- This positive outlook extends to environmental responsibility, with a high percentage of respondents demonstrating a strong commitment to sustainable practices within their businesses.
- Financial incentives appear to be a significant motivator for MSMEs to adopt CE practices, highlighting the importance of economic factors in driving sustainability initiatives.

These findings paint a promising picture of CE adoption among Ahmedabad's manufacturing MSMEs. However, it is crucial to address any existing concerns or areas lacking preparedness to ensure a smooth transition towards more sustainable business practices. Further research could explore these specific challenges and tailor interventions to address them, ultimately accelerating the implementation of CE principles within the district's manufacturing sector.



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