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Additive Manufactured Recycling and composites

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- Polymer Recycling of 3d printed Waste and Custom polymer Composites for 3d printing  Filaments

Pitch Deck by :
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# Meet Our Team

**Mallavarapu Prudhvi**
Co-Founder

Designing the Mehcatronic Systems and Rheological research , Buissiness model development

**M Krishnaprasad**
Co-Founder

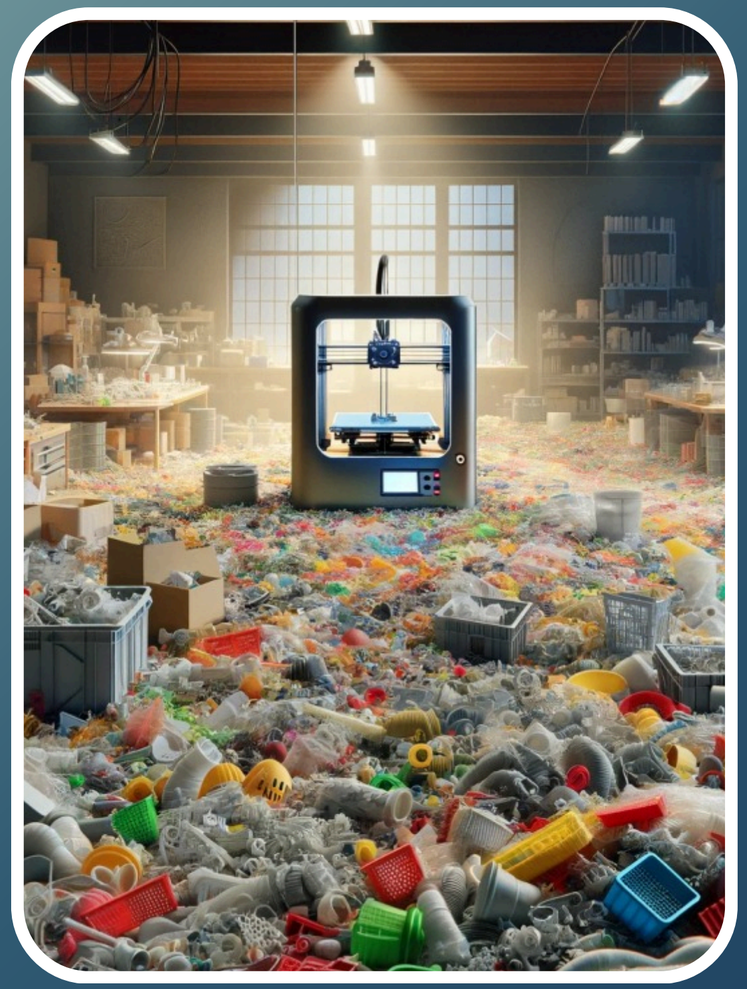
Robotic and Control Expert , Research lead for Extruders and Composites.

**Aditya Bhosale**
Founding Team member

Sensor and Iot Integration , Machine learning expert

**Ansif Jameel**
Founding Team member

Management Head and Market research expert .

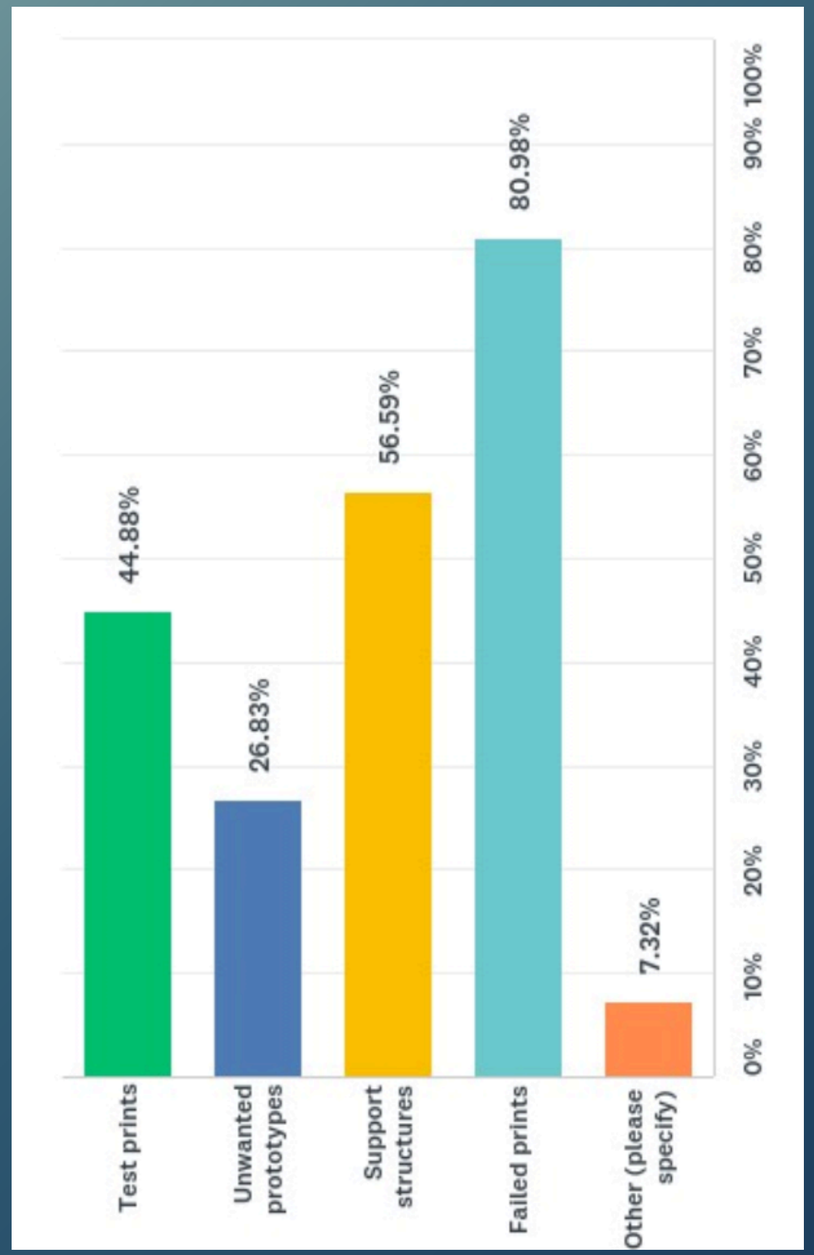


# Problem

- The use of additive manufacturing, specifically fused filament fabrication, has grown rapidly for prototyping and complex structure production. PLA and TPU polymers are widely used in academia, research, and industries like automotive for their versatility and ease of use. However, once 3D printed components like PLA have served their purpose or degraded, they are typically discarded, highlighting a need for sustainable disposal or recycling solutions.

- However, extracting filament from these discarded PLA/TPU components at a minimal cost could be beneficial. This approach not only promotes sustainability by enabling continuous material reuse in additive manufacturing processes but also helps reduce environmental impact by diverting plastic waste from landfills.

- Moreover, recycled PLA and TPU filaments can offer cost advantages, making them a viable alternative to virgin materials for 3D printing. By integrating recycled filaments into production, businesses can potentially lower production costs and enhance the




# ADVANTAGES OF USING RECYCLED MATERIALS

- 3D Printing with recycled materials minimizes the creation of new waste by reutilizing existing materials.
- Recycled Materials help preserve Natural Resources - It is estimated that we need 1.75 planets to provide the resources for our consumption and manage the associated waste. The demand for new, raw materials has far-reaching impacts, including habitat destruction and pollution. Recycled filaments offer a respite from this demand.
- Reducing Carbon Footprint with Recycled Filament - Greenhouse gas emissions – such as CO2 – are the leading contributor to climate change. The use of recycled materials for 3D printing has a tangible impact on reducing carbon emissions
- Using Recycled Filament Diverts Waste from Landfill - The main problem with landfill is their release of methane gas, which again, is a direct contributor to climate change
- The Energy Efficiency of Recycled Materials - Energy consumption in the 3D printing process is a critical factor. The production of virgin plastic filaments demands a high energy expenditure. In contrast, recycled materials are less energy-intensive

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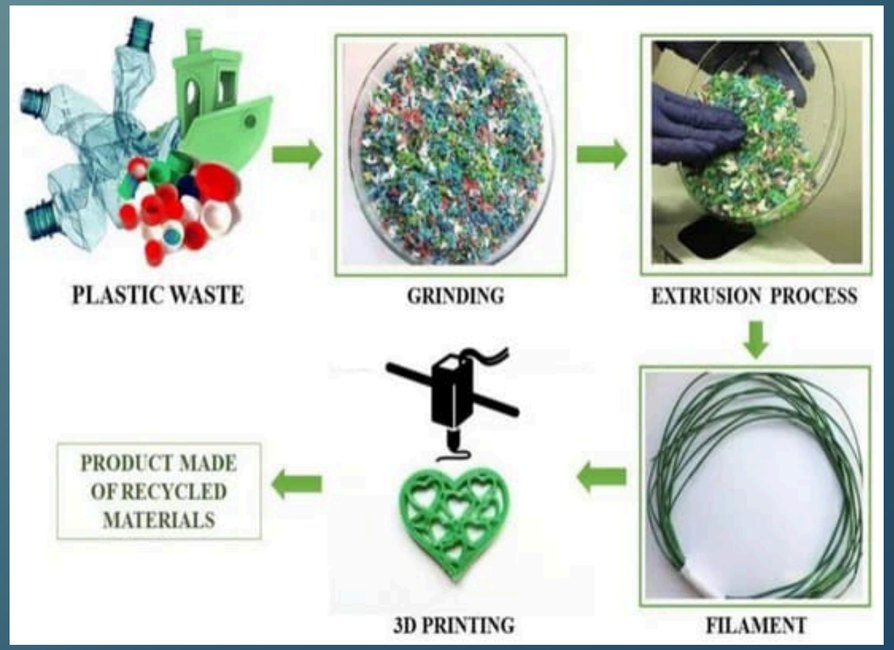


# Solution Proposed

- In the rapidly expanding manufacturing industry, the disposal of used 3D printing waste poses a significant environmental challenge. PLA and TPU filaments dominate the market with high prices and limited polymer compositions, restricting their adaptability to specific requirements. At Filament Recycling Printer, we capitalize on these market challenges by offering customized filaments at competitive prices. Our innovative recycling process transforms 3D printed parts into filaments that replicate the properties of original materials. Moreover, our technology enables precise mixing of different polymer pellets to create composite filaments with tailored compositions, providing versatility for diverse printing needs

# BUSINESS MODEL

- Business Name:  AMRC
- Mission Statement: To promote sustainability in 3D printing by recycling waste into high-quality filament and providing custom composite solutions.
- Target Customers: Research institutes, R&D sectors of design and manufacturing companies, and 3D printing service providers.

# Services Offered

## Waste Collection Service

- Objective: Collect 3D printed waste from customers.
- Incentive: Pay customers for the waste collected.
- Details:
  - Regular or on-demand pickup services.
  - Segregation and handling of different types of polymer waste.
- Logistics Costs:
  - Payment to customers for waste.
  - Transportation and logistics.
  - Waste handling and processing.

## Filament Recycling Service

- Objective: Recycle collected 3D printed waste into usable filament.
- Service Details:
  - Customers receive filament equivalent to the waste they provide if they supply enough waste.
  - Include service charges for pickup and delivery of recycled filament.
- Processes:
  - Sorting and cleaning collected waste.
  - Processing waste into new filament.
  - Quality control to ensure high standards.
- Revenue Streams:
  - Service charges for recycling and logistics.
  - Potential markup on filament if customers need more than their waste produces.

# BUSINESS MODEL

# Services Offered

## E-Commerce Sales of 3D Recycled Filaments

Objective: Sell high-quality recycled filaments through online platforms.

Sales Channels:

- Company website.
- Major e-commerce platforms (e.g., Amazon, eBay).
- Specialized 3D printing marketplaces.

Product Range:

- Standard recycled filaments.
- Custom composite filaments.

Marketing Strategy:

- Online advertising and social media campaigns.
- SEO and content marketing to drive organic traffic.
- Promotions and discounts for first-time buyers and bulk purchases.
- Revenue Streams:
- Direct sales of recycled filaments.
- Subscription services for regular deliveries.

## Custom Polymer Composite Filaments

- Objective: Provide customized polymer composite filaments tailored to customer needs.
- Service Details:
- Design and produce custom composite filaments based on specific requirements.
- No delivery or pickup charges for composite filaments.
- Customization Options:
- Different polymer blends.
- Additives for specific properties (e.g., strength, flexibility, thermal resistance).
- Revenue Streams:
- Premium pricing for custom composite filaments.
- Consulting services for large-scale or specialized projects.

# MARKET ANALYSIS

Market Needs:

- Sustainable solutions for 3D printing waste.
- High-quality recycled and custom composite filaments.
- Convenient and reliable pickup and delivery services.

Target Customers:

- Research Institutes.
- R&D sectors of design and manufacturing companies.
- 3D printing service providers.

# DATA ON VOLUME OF FILAMENT WASTE

- Annual filament waste produced: 1,000 tons
- Projected increase in waste: 15% per year
- Market Research on Savings from Recycling:
  - Cost of producing new filament: $20/k
  - Cost of recycled filament: $10/kg
- Potential savings: 50% per kg of filament

## Current Traction :

- Literature Survey and Ideation stage
- Rheological study on Composites
- Designing of Mechatronic System

## Market Opportunity Analysis :

### India Market Opportunity :

- Target Customers: Research institutes, R&D sectors of design and manufacturing companies, 3D printing service providers.
- Estimated Number of Target Customers: 500 organizations.
- Average Annual Spend per Customer: ₹5,00,000

## Competitive Landscape :

### Direct Competitors

- 3D Printing Filament Manufacturers: Filabot, ReDeTec
  - Advantages: Established customer base, quality track record, distribution networks.
- 3D Printing Service Providers with Recycling: 3D Systems, Stratasys
  - Advantages: Broad service range, industry expertise, brand recognition.

### Indirect Competitors

- Traditional Recycling Companies: TerraCycle, Plastic Bank
  - Advantages: Established infrastructure, waste handling experience, large partnerships.
- Non-Recycling Filament Manufacturers: MatterHackers, ColorFabb
  - Advantages: Wide filament range, strong R&D, market presence

### Emerging Competitors

- Sustainability-Focused Startups: Reflow, GreenGate3D
  - Advantages: Focus on eco-friendly practices, innovative recycling technologies, agile models.

# Rough Profit Analysis :

Assumptions and Estimates:

- Estimated 3D Printing Waste in India: According to industry reports, the waste generated by 3D printing can range from 10% to 30% of the total filament used. Let's assume an average value of 20%.
- Annual Filament Consumption in India: Assume the 3D printing industry in India uses approximately 500,000 kg of filament annually.
- Waste Generated:  20 % Of 500,000 = 100,000 Kg

## Financial Calculations:

Revenue Potential:

- Recycled Filament Price: ₹450 per kg
- Total Revenue from Waste: 100,000 kg×₹450 per kg = ₹4,50,00,000
- Cost Calculations:
- Setup Cost: ₹10,00,000 (one-time)
- Monthly Distribution and Variable Costs: ₹5,00,000
- Annual Distribution and Variable Costs: ₹5,00,000 per month×12= ₹60,00,000

# Rough Profit Analysis :

## Financial Calculations:

Total Costs in the First Year:

- Total Costs: ₹10,00,000 (setup) + ₹60,00,000 (annual variable) = ₹70,00,000

Profit Calculation:

- Total Revenue in the First Year: ₹4,50,00,000
- Total Costs in the First Year: ₹70,00,000
- Net Profit in the First Year: ₹4,50,00,000 − ₹70,00,000 = ₹3,80,00,000

# Current Equity Structure, Fundraising History and Investors :

| Shareholder | Percentage |
|---|---|
| Founders | 70 |
| Early Investors | 20 |
| Employee Stock Option Pool (ESOP) | 10 |

# Rough Investment Analysis :

| Component | Quantity | Price per Unit (INR) | Total Price (INR) |
|---|---|---|---|
| Aluminium Extrusions 500 mm | 6 | 1500 | 9000 |
| Twin Screw Extruder | 2 | 20000 | 40000 |
| Heating Element for 3D Printer | 1 | 3000 | 3000 |
| Heating Sensor | 1 | 1000 | 1000 |
| LED Screen | 1 | 5000 | 5000 |
| Raspberry Pi | 2 | 3500 | 7000 |
| Grinder | 2 | 15000 | 30000 |
| Air Oven | 1 | 10000 | 10000 |
| Miscellaneous | 1 | 20000 | 20000 |
| Grand Total | | | 125000 |

# Co- Investors :

Institute Funding for Student Innovative Project

Range of funding : 60 - 70 k Rupees

Status : Not yet Intiated

# Exit Options

## Potential Exit Strategies:

- Acquisition: Likely acquirers could be larger 3D printing companies or sustainability-focused manufacturing firms.
- IPO: Consideration for a public offering as the company scales and gains market traction.

Comparable Exits:

1. Markforged Acquires Teton Simulation Software
   - Year: 2021
   - Details: Markforged, a leader in metal and carbon fiber 3D printing, acquired Teton Simulation Software, a company specializing in advanced simulation software for additive manufacturing. This acquisition enabled Markforged to enhance its software offerings and provide better simulation tools for its users.
2. Ultimaker Merges with MakerBot
   - Year: 2022
   - Details: Ultimaker, a leading manufacturer of desktop 3D printers, merged with MakerBot, another prominent player in the desktop 3D printing market. The merger aimed to combine the strengths of both companies and create a more comprehensive product offering for consumers and professionals alike.

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# THANK YOU