IOCB 2024 Conference
The 1st International Online Conference on Biomimetics
15–17 May 2024 | Online

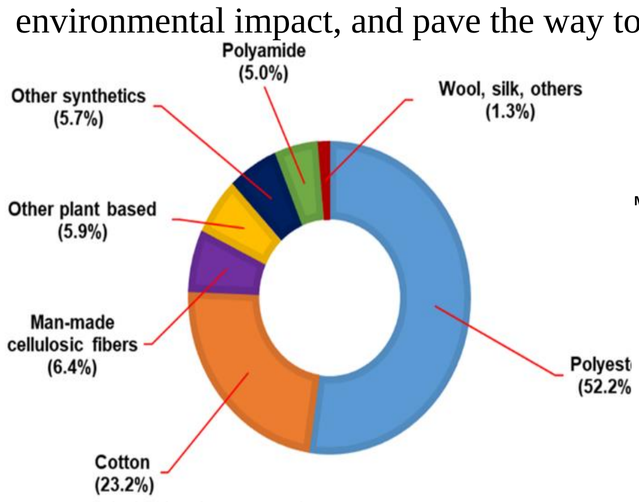
# Recycling Used Textile Waste to Achieve Biomimicry and Promote Circular Economy

**Lakshanya V Kanna[1], Vanshika Garg[2], Amit Kumar Jaglan[3*]**

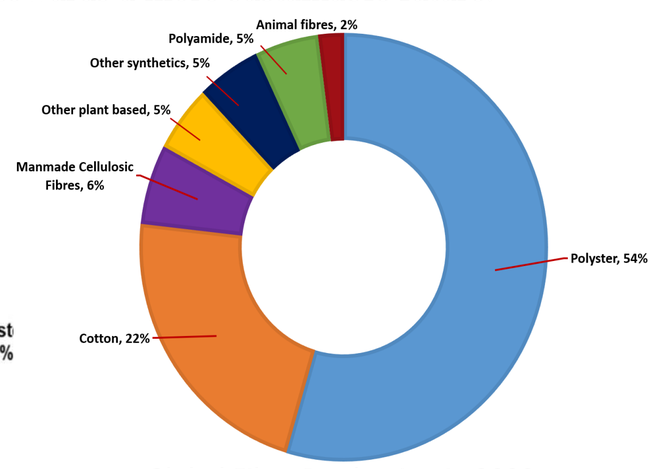
1 Department of Architecture, School of Planning and Architecture, New Delhi -110002, India; lakshanyavkanna@gmail.com
2 Department of Architecture, School of Planning and Architecture, New Delhi -110002, India; gargvanshika2505@gmail.com
3* Department of Architecture, School of Planning and Architecture, New Delhi -110002, India, footprint1109@gmail.com

## INTRODUCTION & AIM

Textile waste poses a significant environmental challenge globally, necessitating sustainable solutions. By leveraging biomimicry, which draws inspiration from natural systems, we can mimic nature's efficient recycling processes to transform discarded textiles into valuable resources. This approach not only addresses waste accumulation but also reduces reliance on virgin materials, thus mitigating environmental degradation associated with conventional textile production. Through the implementation of closed-loop systems, where waste is repurposed into new products, we can minimize the extraction of raw materials and energy consumption while curbing pollution and landfill burdens. This paper examines case studies and initiatives at the intersection of textile recycling, biomimicry, and circular economy principles to illustrate the feasibility and potential benefits of this approach. By embracing biomimicry and promoting circular economy practices within the textile industry, we can foster innovation, reduce environmental impact, and pave the way towards a more sustainable future.

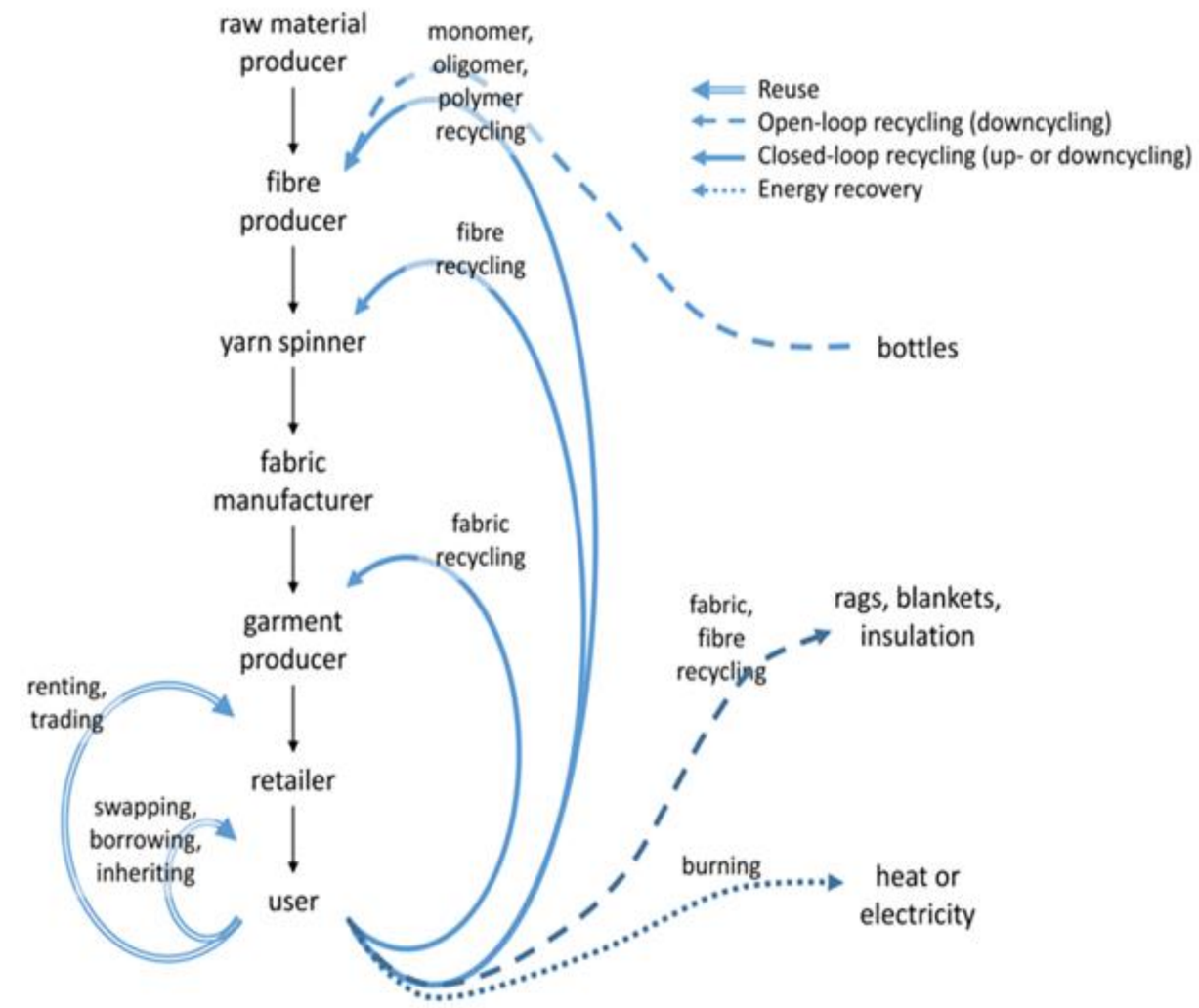


Global Fiber Production in 2019



Global Fiber Production in 2022

## METHOD




**A classification of textile reuse and recycling routes**

- The methodology emphasizes learning from nature's design strategies and adapting them to create more efficient and eco-friendly recycling processes. Through biomimicry-inspired innovation, textile waste can be transformed into valuable resources, contributing to a more sustainable and resilient future.
- Initial exploration highlighted digital and circular business model innovation as pivotal factors in achieving a circular economy.

## RESULTS & DISCUSSION

| TITLE | TYPE | SOURCE | YEAR | BUSINESS MODEL INNOVATION | CIRCULAR ECONOMY | DIGITAL INNOVATION |
|---|---|---|---|---|---|---|
| A literature and practice review to develop sustainable BM archetypes(Rosa et al., 2019) | Scientific article | Science Direct | 2019 | Yes | No | No |
| Sustainable design and business models in textile and fashion industry(Pal, 2017) | Book Chapter | Google Scholar | 2017 | Yes | No | No |
| Sustainable business model innovation: A review(Geissdoerfer et al., 2018) | Scientific article | Science Direct | 2018 | Yes | No | No |
| Business model innovation for circular economy and sustainability: A review of approaches(Pieroni et al., 2019) | Scientific article | Science Direct | 2019 | Yes | Yes | No |
| Business model transformation toward sustainability: The impact of legitimation(Biloslavo et al., 2020) | Scientific article | Google Scholar | 2020 | Yes | No | No |
| Enabling circular business models in the fashion industry: The role of digital innovation.(Huynh, 2022) | Scientific article | Google Scholar | 2022 | Yes | Yes | Yes |
| Enablers, levers and benefits of circular economy in the electrical and electronic equipment supply chain: A literature review.(Bressanelli et al., 2021) | Scientific article | Science Direct | 2021 | No | Yes | Yes |
| Digital technologies catalysing business model innovation for circular economy—Multiple case study(Ranta et al., 2021) | Scientific article | Google Scholar | 2021 | Yes | Yes | Yes |
| Sustainability benefits of RFID technology in Vietnamese fashion supply chain.(Nayak et al., 2022) | Scientific article | Science Direct | 2022 | No | No | Yes |
| How digitalization supports a sustainable business model: A literature review(Broccardo et al., 2022) | Scientific article | Science Direct | 2022 | Yes | No | Yes |

**Study of initiatives that support the transition to a circular economy model within the textile and apparel sector along with the comparison of different papers based on the type of innovation.**

## CONCLUSION

- Integrating biomimicry principles and recycling textile waste present a promising pathway towards a more sustainable and circular future for the industry.
- Research, innovation, and strategic collaborations will be essential to unlock the full potential of this paradigm shift and contribute to an eco-friendlier and nature-inspired approach to textile production and consumption.
- Innovative solutions can be developed to address environmental challenges and promote sustainability in the textile industry by applying biomimicry principles to textile waste recycling.

## FUTURE WORK / REFERENCES

Roos, S., Sandin, G., Peters, G., Spak, B., Schwarz Bour, L., Perzon, E., & Jönsson, C. (n.d.). white paper on textile recycling. www.mistrafuturefashion.com

Juanga-Labayen, J. P., Labayen, I. V., & Yuan, Q. (2022). A Review on Textile Recycling Practices and Challenges. Textiles, 2(1), 174–188. https://doi.org/10.3390/textiles2010010