**Chapter Three: Methodology**

**3.1 Research Design**

This study will adopt a **mixed-methods approach** involving both qualitative and quantitative techniques. This design ensures a comprehensive understanding of the environmental impacts of tyre waste and the operational challenges within the Jua Kali sector.

**3.2 Data Collection Methods**

* **Field Surveys & Semi-Structured Interviews:**
  + Conduct surveys with local farmers, workshop owners, and tyre dealers to understand the quantity and disposal practices of used tyres.
  + Perform semi-structured interviews with Jua Kali artisans, local government officials, and environmental experts to gather qualitative insights into challenges and opportunities.
* **Experimental Recycling Trials:**
  + Implement pilot projects in collaboration with local universities to test various recycling methods (cleaning, cutting, and molding) on collected tyres.
  + Document the efficiency, cost-effectiveness, and market viability of each recycling technique.
* **Market Analysis:**
  + Perform a comprehensive analysis of consumer demand for recycled products.
  + Survey local businesses and export partners to evaluate market potential and expectations.

**3.3 Data Analysis**

* **Quantitative Analysis:**
  + Statistical tools will assess the trends in tyre waste volumes, employment changes among artisans, and revenue generated from recycled products.
  + Data will be analysed using software such as SPSS to ensure reliability and validity.
* **Qualitative Analysis:**
  + Thematic analysis will be employed to interpret interview data and open-ended survey responses.
  + Findings will be triangulated with quantitative data to provide a robust and multifaceted understanding of the recycling ecosystem.

**3.4 Ethical Considerations**

* **Informed Consent:**
  + All participants will receive informed consent forms detailing the purpose of the study, their rights, and confidentiality protocols.
* **Transparency and Integrity:**
  + The research will adhere to ethical guidelines set forth by affiliated research institutions and the local authorities.
* **Environmental Compliance:**
  + All pilot recycling projects will conform to environmental regulations to ensure safe and sustainable practices (Kenya Bureau of Standards, 2023).