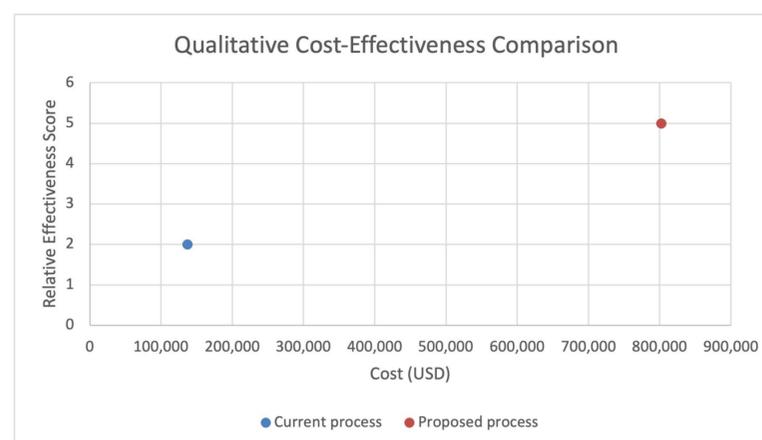
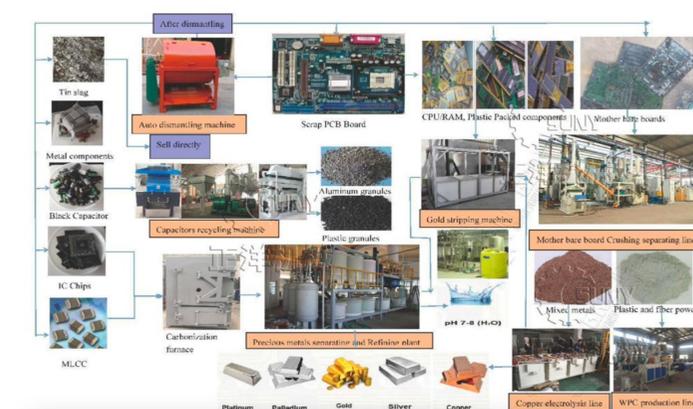
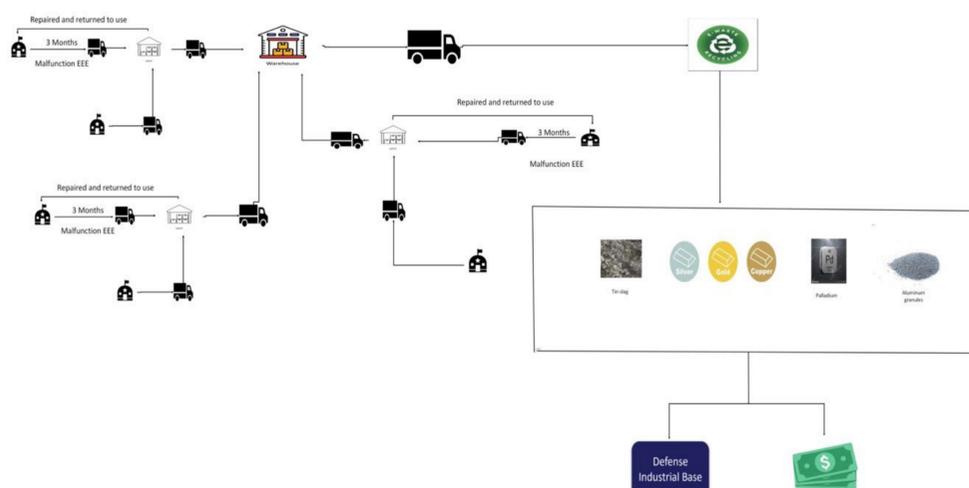


Abstract

This thesis analyzes the E-waste management process of the Egyptian Ministry of Defense (MOD) and identifies ways to enhance efficiency and economic benefits. Currently, E-waste is stored and sold quarterly to private buyers, which underutilizes the valuable resources in discarded electronics. By implementing urban mining to extract metals like gold, silver, copper, and palladium, the MOD could recover resources internally and promote sustainability. Establishing in-house recycling facilities would allow for better control over E-waste processing, increase revenue, and reduce environmental risks from improper disposal. The study includes a cost-effectiveness analysis and process mapping of current versus proposed systems, revealing that while initial investments in internal recycling are higher, they yield greater financial returns and strengthen regulatory compliance, material flow, and alignment with national sustainability and defense goals.

Methods

- Process mapping: Analyzed current vs. proposed system.
- Cost-Effectiveness Analysis: Compared models based on cost, profit, environmental impact, regulatory compliance, and supplying DIB.



Results & Impact

- Shifting from selling to internally recycling E-waste the MOD will generate substantially higher financial returns while also contributing to environmental protection and strategic autonomy.
- Internal recycling can serve the Egyptian DIB by supplying critical raw materials, reducing dependency on foreign inputs, and enhancing operational readiness.

Future Research

- Researchers are encouraged to develop a fully quantitative framework for measuring the MOEs, allowing for clearer comparisons between alternatives.
- Once the proposed system is implemented and operational data becomes available, future studies can also apply lean thinking principles more rigorously.

