

# Parametric Cost Estimation Model for Li-ion Battery Pack of E-motorcycle Conversion Based on Activity-based Costing

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## Abstract

Universitas Sebelas Maret (UNS) through SMART UNS Company has conducted research and development of e-motorcycle conversion using Li-ion battery pack as a substitute for ICE energy source from the conventional motorcycle. Currently, the battery-pack that used for e-motorcycle conversion is in the development phase towards commercialization. The challenge of estimating production costs is the complicated production process and storing hidden expenses that can be a problem. This hidden cost is often a missing or varied factor that costs less or more expensive. This study presents an integrated parametric cost estimation model with activity-based cost assignments to estimate production costs through cost calculations for each activity. Activity-based costs break the production process into a specific cost element for each step. Each activity's cost is put into a parametric cost estimation model to calculate the cost of each activity into the total cost of production. Cost estimation results will be analyzed using a regression method to determine which variables most affect the production cost of Li-ion battery packs for the conversion of e-motorcycles in the SMART UNS company

## Keywords

Activity-based costing, Battery pack, E-motorcycle conversion

## Biographies

**Sofi Desi Susanti** is an Alumni of the Industrial Engineering Undergraduate Program of Universitas Sebelas Maret, Surakarta. Her research interests are in the supply chain, logistics, business, and techno economy.

**Wahyudi Sutopo** is a Professor in Industrial Engineering and Head of Industrial Engineering and Techno-Economics Research Group (RG-RITE) of Faculty Engineering, Universitas Sebelas Maret (UNS), Indonesia. He earned his Ph.D. in Industrial Engineering & Management from Institut Teknologi Bandung in 2011. He has done projects with Indonesia endowment fund for education (LPDP), sustainable higher education research alliances (SHERA), MIT-Indonesia research alliance (MIRA), PT Pertamina (Persero), PT Toyota Motor Manufacturing Indonesia, and various other companies. He has published more than 160 articles indexed Scopus, and his research interests include logistics & supply chain management, engineering economy, cost analysis & estimation, and technology commercialization. He is a member of the board of industrial engineering chapter - the institute of Indonesian engineers (BKTI-PII), Indonesian Supply Chain & Logistics Institute (ISLI), Society of Industrial Engineering, and Operations Management (IEOM), and Institute of Industrial & Systems Engineers (IISE).

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**Rina Wiji Astuti** is an Alumnus of Industrial Engineering Master's Program at Sebelas Maret University, Surakarta, Indonesia. She also focused on research in the field of Logistics and Business Systems. Now she is the CEO of PT Batex Energi Mandiri.