Lean Manufacturing and Green Manufacturing systems co-occur in many manufacturing facilities. This study investigates the relationship between materials recycling—as an important green waste-reduction technique—and lean techniques, and their influence on lean outcomes. More specifically, this study examines 1) if a correlation exists between lean techniques and material recycling, as these two variables also influence lean outcomes; and 2) the mediating effect of materials recycling between lean techniques and lean outcomes; using exploratory factor analysis, confirmatory factor analysis, and structural equation modeling as the statistical analysis tools to explore and to confirm the lean techniques and lean outcomes constructs, to test the models’ hypotheses and to answer the research questions.

The objective was to determine if materials recycling aids lean techniques in improving lean outcomes. Results showed that the implementation of materials recycling is significantly correlated with the implementation of lean techniques. Moreover, the implementation of lean techniques associated with materials efficiency, supply chain improvement and employee participation, leads to the implementation of materials recycling. Finally, materials recycling enhances lean outcomes associated with cost reduction and improved delivery times. By explaining the specific relationship between
Lean Manufacturing and materials recycling, this research develops good theory in the realm of Lean Manufacturing and Green Manufacturing, and makes a direct contribution to the body of knowledge as well as to real world applications in the Industrial and Manufacturing Engineering field. This research differentiates between current and competing theories, and aims to clearly explain how specific relationships lead to specific events, and how these explanations are critical for good theory building.