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Bottom-Up Kaizen Implementation in Malaysian Automotive Industry: A Conceptual Model

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ABSTRACT

This study aimed to identify the factors that influence the implementation of bottom-up Kaizen models in the Malaysian top manufacturers (Proton, Perodua, Honda, Toyota). The study was conducted in three phases. To identify the need for a model, two instruments were used. In phase one, a panel of 11 experts used the Fuzzy Delphi Method (FDM) to develop the model based on expert feedback on a 5-point Likert scale survey questionnaire. A Partial Least Square Structural Equation Model (PLS-SEM) approach was used to evaluate the model in phase two. An evaluation was carried out through 300 employees in the automotive manufacturing sector. Findings from phase one resulted in the development of a model consisting of eight constructs with 41 items as a bottom-up Kaizen activity for the Malaysian automotive industry. Furthermore, the findings from phase two showed that the bottom-up Kaizen activity model consists of seven constructs and only significant and positive influencing factors for both direct and mediated paths were considered. In phase three, the results of this study have created a structural relationship model for Bottom-up Kaizen criteria. Hence, this research has the potential to provide great benefits and become a useful reference for the Malaysian automotive industry.

Keywords: *Bottom-Up; Kaizen; Development Design Research; Fuzzy Delphi Method; Partial Least Squares*

RESEARCH HIGHLIGHTS

The findings show that all twenty-two hypotheses are supported. The training of kaizen and the cross-functional team were found to directly predict the successful implementation of the bottom-up kaizen amongst employees in the Malaysian automotive industry. In comparison, the training of bottom-up kaizen (β=.23) was considered a better predictor than the cross-functional team (β=.09). Employee motivation partially mediates the link between bottom-up kaizen training and its successful implementation in the Malaysian automotive industry. Meanwhile, kaizen management action, training, employee awareness of bottom-up kaizen, and cross-functional teams directly contribute to successful teamwork among employees. In comparison, awareness of bottom-up kaizen (β=.39) is considered the best predictor towards successful teamwork amongst employees, followed by the cross-functional team by employees (β=.36), the action of kaizen by the management (β=.29), and training of bottom-up kaizen (β=.15). The figure model below demonstrates the successful implementation of bottom-up Kaizen and teamwork among employees in the Malaysian automotive industry.

GRAPHICAL ABSTRACT

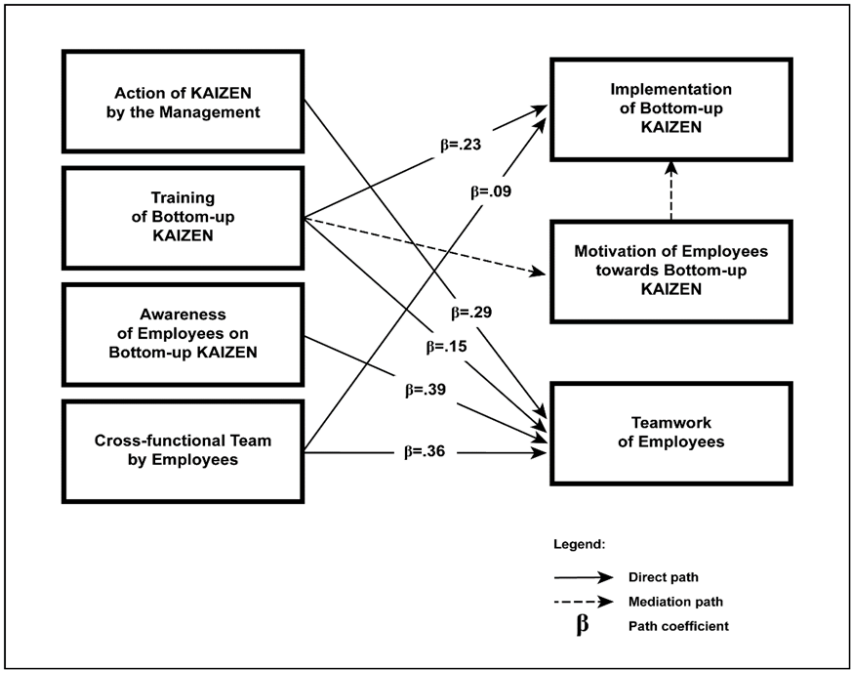

Fig. 1. Proposed model for the successful implementation of bottom-up Kaizen and teamwork amongst employees in the Malaysian automotive industry

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Research Objectives

Due to rapid business expansion, the automotive company quickly onboarded many new employees and suppliers, leading to an *industrial gap*. However, these recent additions to the workforce and vendor network lacked sufficient training in kaizen, which focuses on continuous improvement, which costs Malaysian automotive manufacturers producing cars at higher costs and lower quality. For the objective, this research has six main objectives, which are as follows:

1. To identify the factors influencing the bottom-up kaizen implementation in the Malaysian automotive industry.
2. To investigate the factors influencing the bottom-up kaizen implementation in the Malaysian automotive industry.
3. To investigate the factors influencing the bottom-up kaizen teamwork in the Malaysian automotive industry.
4. To investigate the mediation effects of employee motivation between the relationship of influencing factors and the implementation of bottom-up kaizen in the Malaysian automotive industry.
5. To investigate the mediation effects of employee motivation between the relationship of influencing factors and teamwork amongst employees in the Malaysian automotive industry
6. Proposes a model for the successful implementation of bottom-up kaizen and teamwork amongst employees in the Malaysian automotive industry.

Methodology

This study aims to outline the techniques and procedures utilized in the research. It is crucial as it deals with the knowledge of the research methodology. The study commences with the three phases of the design and development research (DDR) method and discusses the overall framework of the research methodology and survey methodology. Phase 1: Overall Research Design & Need Analysis, Phase 2: FDM and Phase 3: Data Analysis and Hypothesis Testing. The study design, as well as population and sampling design, data collection, and management, are discussed in this research. Furthermore, this study addresses data analysis, instruments employed, and validity and reliability studies. The survey methods section includes an in-depth description of the questionnaire development process using the FDM, expert validation, pilot study, population and sampling techniques, reliability, validity, and Partial Least Squares Structural Equation Model (PLS-SEM) for usability evaluation. The objective of this study is to devise and establish the research model and fulfil the research hypotheses employed in this study.

Results

An overview of the key elements and their significance in the context of fostering a culture of continuous improvement and innovation. these constructs and items represent a comprehensive set of factors that influence the success of Bottom-Up Kaizen activities in the Malaysian automotive industry. Which cover aspects of knowledge, action, training, system awareness, teamwork, motivation, and potential barriers.

The results of the Fuzzy Delphi Method analysis provide valuable insights into the priorities and challenges associated with implementing Bottom-Up Kaizen activities in the Malaysian automotive industry. Key takeaways include the critical importance of knowledge, action, and effective implementation.

The training of kaizen and the cross-functional team were found to directly predict the successful implementation of the bottom-up kaizen amongst employees in the Malaysian automotive industry. moreover, the motivation of employees towards bottom-up kaizen was found to partially predict the relationship between the training of bottom-up kaizen and success. implementation of the bottom-up kaizen amongst employees in the Malaysian automotive industry.

On the other hand, the action of kaizen by the management, training of bottom-up kaizen, awareness of employees on bottom-up kaizen and cross-functional team by employees were found to directly predict the successful teamwork amongst employees.

Findings

The research findings culminate in a comprehensive model for successful bottom-up kaizen implementation and teamwork in the Malaysian automotive industry. The study profiles top manufacturers (Proton, Perodua, Honda, Toyota) engaging in daily bottom-up kaizen activities. Expert evaluations identify influential factors, emphasizing knowledge (Macpherson et al., 2018), action (Ocello, 2019), motivation (Topuz & Arasan, 2013),

implementation (Susanto & Sulistyowati, 2020), cross-functional teams (Stone, 2010), training (Bekele, 2023), awareness (Topuz & Arasan, 2013), and teamwork (Liu et al., 2015). The study empirically validates hypotheses, revealing the varying impact of these factors. Knowledge, action, training, awareness, cross-functional teams, and employee motivation significantly influence bottom-up kaizen implementation and teamwork, while motivation plays a mediating role in certain relationships. Notably, the study unveils the critical role of knowledge, action, and effective implementation in successful kaizen initiatives. The proposed research model underscores the direct predictability of training and cross-functional teams for successful bottom-up kaizen implementation. Ultimately, the study contributes a robust foundation for enhancing continuous improvement practices and teamwork in the Malaysian automotive sector, emphasizing practical implications for industry stakeholders.

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