

# **A cost-based pre-assembly recommendation system**

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## **ABSTRACT**

Under the circumstance of intense market competition, the large amount of standardized products cannot satisfy diversified customer needs. In order to fulfil customer's needs, the strategy of "Mass Customization" had been proposed. ATO (assemble-to-order), one of the well-known mass customization strategies, combines the advantage of push and pull supply chain and decreases the amount of stocking. However, many problems have revealed that company have been when the production processing comes to the assemble sessions. To solve the previous difficulties, this research provided a creative method, called PRS (Pre-assembly Recommendation System), for assembling process. The aims of this study want to find out components that could be pre-assembled from existing product structures to simplify the assembling complexity of, and to delay the product differentiation. In this study, PRS decomposes products into many SLT (Single Level tree) structures, and produce the possible pre-assemble components by applying closed frequent itemsets mining approach. Then, unsuitable pre-assemble components are deleted by a set of predefined assemble limitations. Lastly, the most suitable project will be suggested by cost analysis. In this study, simulation approach is used to evaluate the inventory cost of economic production quantity (EPQ) when the proposed pre-assembled recommendation system is adopted. The experiment result indicates that inventory cost can be reduced up to 50%. In addition, the pre-assembled components simplify the complexity of the whole assembly, delay product differentiation, and reduce the delivery time. After a series of experiments analysis, PRS recommended project shows that it can bring many benefits for companies.

Keyword: Assemble-to-order 、 Closed frequent itemset 、 Recommendation system 、 Pre-assembly 、 Safety stock