

# **Economic Development and Job Creation by Applying Optimization Methods for Scheduling Problem in Job Shops**

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The manufacturing sector earned one of the top spots in 2017 Kansas economy adding over 1,000 jobs. This developing direction is predicted to continue with 0.5% growth in 2019. Within the manufacturing sector, aviation is ranked fourth in Kansas with over 30,000 workers. 44% of Kansans work for small businesses (less than 50 employees) and this percentage is projected to increase since the annual growth of small businesses in Kansas is projected as 6%. Therefore, this research aims to study typical operations in one of these small businesses in the aviation sector. The study evaluates the scheduling problem with the objective of minimizing total earliness/tardiness cost. A new model is proposed that considers the effects of maximum allowable tardiness. In addition, the existing model in the literature is simplified to reduce computational time and enable corporate scheduling staff to use the model efficiently. The model is validated using data collected from a local job shop that manufactures aerospace parts in Wichita, Kansas. The results show the effectiveness of the proposed model since it reduces the total cost and computational time in most of the studied scenarios. As a result, decreased costs and more satisfied customers are expected to bring more business to Wichita and lead to a significant increase in economic development and job creation.