

Abstract

Aly M Owida

Investigating the Effectiveness of Implementing Radio Frequency Identification Technology for Product Tracking in Job Shop Production

Radio frequency identification (RFID) technology has significant impact on product tracking and identification in manufacturing systems. Most of the business cases that implement the RFID technology in their operations have reduced their operating costs such as labour and inventory costs. Also, it minimizes the operating errors that affect the efficiency of the operations which appears in some key performance indicators such as cycle time, work in process, and resources utilization. In addition, several benefits such as better items monitoring, shorter lead times, higher customer satisfaction, and better inventory control can be achieved by introducing RFID technology in the different phases of production. In particular, recent developments in RFID technology and other supporting technologies have created opportunities for real-time traceability and better visibility of shop floor operations. This work investigates the effectiveness of introducing RFID technology in tracking and identification processes for products flow on a shop floor of a job shop manufacturing facility that produces a large number of customized furniture products in order to improve products' tracking and identification. The current identification system depends on metal tags and will be replaced by radio frequency tags. Simulation is used to assess the impact of introducing the RFID technology on a number of performance measures to that manufacturing setting which are output, throughput, cycle time, work in process, resources utilization, and average waiting time in queues. Analysis and comparison of simulation results for the base and proposed models show that RFID implementation maintains the value of most of the measures while improving the remaining measures. In addition, a cost analysis is conducted to estimate the required investments accompanied with the RFID technology adoption, the operating costs of this technology compared to that of the current identification system, and whether the firm could return this investment could not. The study shows that RFID technology can improve most of the Selected performance measures of the system at the shop floor level with an acceptable cost.