MIT SCALE RESEARCH REPORT

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The Global SCALE Network allows faculty, researchers, students, and affiliated companies from all six centers around the world to pool their expertise and collaborate on projects that will create supply chain and logistics innovations with global applications.

This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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Research Report: ZLC-2006-3
How Improving Read Rates in the Retail Supply Chain Effects Supplier Value
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Executive Summary

Since Wal*Mart’s first mandate requiring the use of radio frequency identification (RFID) tags, consumer products suppliers have been scrambling to meet the RFID requirements of major retailers, which meant spending millions of dollars to comply. Meeting the stipulations of these mandates from retailers, who represent up a very large portion of a supplier’s sales, is seen as a cost of doing business. Now, suppliers are looking for value out of their investment, and wondering if additional investment is warranted.

In obtaining a return on investment from RFID, manufacturers and suppliers have turned to three primary sources of benefits:

- **Proof of Delivery**: By using the data gained from having RFID tags on every case, suppliers can quickly prove that deliveries have occurred in full. Resolving disputed shipments has been an expensive process for suppliers for a long time.
- **Reduction in Out of Stocks**: The use of RFID in the retail store has enabled retailers to reduce the number of out of stock situations that occur. The resultant increase in sales benefits both the suppliers and the retailers.
- **Improvement in Promotional Compliance**: By examining the data gathered from having RFID tags on special promotional displays, a supplier can drive better store-level execution of those promotions. As more stores comply with a promotion the more sales a supplier achieves from each promotion they run.

After establishing these three areas of benefits, suppliers are now turning their focus towards obtaining more value from their RFID investments. One problem preventing maximum value being extracted from these investments is a poor level of accuracy in RFID tag read rates. Initially when implementing RFID, many suppliers choose lowest cost solutions and placed tags on every case with little thought to the read rate further along the supply chain. Manufacturers now need to understand the affect read rates have on the benefits they are receiving from having RFID enabled processes.
To do this, the effects of read rates on the benefits received by suppliers must be calculated. We have introduced three models corresponding to the three areas of benefits for manufacturers. Each model is a probability based event tree that takes into account the read rates throughout the supply chain to determine the amount of value a supplier is receiving from an area at the current level of RFID accuracy.

With the present amount of return in hand, we are then able to see the additional gains that are possible if the read rates were higher. This is weighed against the incremental investment costs of achieving higher read rates using a net present value approach. Depending on the characteristics of a product, supplier, and retailer, different additional investments in RFID are justified. We believe the following recommendations will help companies in deciding which type of read rate improvement projects they should pursue:

- **Higher Value Density, Higher Investment**: The more value contained in each case of goods being shipped to a retailer, the more incentive a supplier has to increase their RFID investment.

- **Higher Read Rates for Promotional Execution**: The majority of benefits coming from promotional execution are achieved at high read rates under most scenarios.

- **Mid-Range Read Rates for Proof of Delivery**: Most of the value a supplier can receive from RFID enabled proof of delivery is obtained without needing very high read rates.

- **Any Range for Out of Stocks**: Incremental value received from reducing out of stocks through improved RFID readability is achievable at a near-constant rate across the full spectrum of possible read rates. Since incremental value from read rates is constant, the decision to invest money to improve RFID accuracy depends less on the current read rate and more on other factors such as gross margin or customer response to a stock out.

Although most retail suppliers are hesitant to make additional investments in an imperfect and unproven technology, these models quantifiably demonstrate the incremental returns that are achievable through focused projects that increase the reliability of RFID data.