

Benefits of RFID-Enabled Supply Chain



Supply chain management objective is to increase the long-term performance of individual companies and the overall supply chain by maximizing customer value and minimizing costs. Not all companies achieve these goals with the same strategy. A supply chain is either agile or lean and given this, a different approach to increase the efficiency and effectiveness is adopted. Companies such as Wal-Mart and Dell have gained efficiencies by having a clear understanding and a tight commitment to deliver customer value by maximizing not only the value provided by their companies but also aligning their partner's interest to create unique supply chains.

Information systems are the backbone of every supply chain and they are based on automatic data acquisition techniques to meet the goal of collecting information. RFID is a technology with unique characteristics that make it suitable to enhance data collection processes along the supply chain.

EPC Global, the standards body sets the standards for how basic product information is encoded in the RFID chips. The vision that drives the developments of standards is the universal unique identification of individual items. The unique number, called EPC (electronic product code) is encoded in a Radio Frequency Identification (RFID) tag. There are three types of RFID tags, all of which can either be read-write or read only.

Passive Tags - simply store data and draw power from a reader whose electromagnetic wave induces a current in the tag's antenna for short-range communication (up to 10 m).

Semi-passive Tags - use an integral battery to run the chip's circuitry but draw power from the reader to communicate.

Active Tags - are capable of communicating over greater distances (up to 100m) but are currently far more expensive.

The EPC Network also capture and make available (via Internet and for authorized requests) other information that pertains to a given item to authorized requestors.

The benefit of an EPC code is primarily derived from the ability to automatically pin-point the exact location of goods and documents anywhere within an extended enterprise. Such ability leads to the following benefits:

- Enhance supply-chain control. As the location of a part can be identified at every transfer point with accuracy, the whole supply-chain can be controlled with close to 100% accuracy.
- Security and authentication. A RFID tag can be written with an identifier chosen by the enterprise. This unique identifier can be used to authenticate a part or a document. The RFID technology also supports

encryption and other security models so that a tag cannot be easily duplicated or forged.

- Enhanced customer service. The RFID technology can promote customer service by allowing faster check-outs, returns, and personalization of service.

RFID will have a significant impact on every facet of supply chain management—from the simple tasks, such as moving goods through loading docks, to the complex, such as managing terabytes of data as information about goods on hand is collected in real time. It has a potential to dramatically improve supply chain by reducing costs, inventory levels, lead times, stock outs and shrinkage rates; increasing throughput, quality, manufacturing flexibility, inventory visibility, inventory record accuracy, order accuracy, customer service, and the collaboration among supply chain members.

The applications fall in the manufacturing, warehousing/distribution centers, logistics and retailing environments.

To understand the impact of RFID in the manufacturing floor environment you have calculate the return of investment (ROI) achieved by increase of visibility and work-in-process (WIP) inventory accuracy. This reduces the operating cost and thus increases the profit. Lead times and the total cycle times are shortened as a result of the increased manufacturing speeds and reduced inefficiencies of the manufacturing line.

The automatic identification of products with RFID in the warehousing and distribution center environments has a consequence: increased visibility and accuracy of the inventory. This increases the warehousing efficiency and order accuracy. At the same time it reduces shrinkage, stock outs and inventory levels. The increased warehousing efficiency has as a consequence a reduction in the operation costs, which translates into increased profits and also a reduction in lead times. Reduced lead times means increased customer service as well as decreased inventories along the supply chain. Ultimately, reduced inventories increase ROI.

The use of RFID systems to track asset provide a distinctive set of benefits. RFID tags enable an increased visibility and accuracy of the asset pool. This visibility and accuracy impacts six main areas: operating costs, shrinkage, lead times, inventory visibility and accuracy, customer service and integration among parents. RFID streamline the management of assets (such as machinery or containers) and increase the efficiency by reducing the equipment needed or reducing labor, thus translating into higher profits. Reduced assets shrinkage, increase ROI. Lead times (total cycle time) are reduced with the increased efficiency to handle the assets.

The automatic identification of products inside the store would increase the inventory visibility and its accuracy. This will have an impact in four fronts: shrinkage, customer service, stock outs and inventory levels. Decrease shrinkage levels, increase profits. Customer service and the shopping experience can be enhanced by providing complementary applications enabled by RFID. Stock out levels can be decreased as consequences of the increased inventory visibility. Decreased stock outs increase sales and ultimately, increase profits. Decreased stock outs levels also increase the customer service. Finally, inventory levels can be reduced, increasing the ROI.

The projected benefits and impacts of the RFID implementation are summarized in the following table:

Supply-chain factor	Current state	RFID opportunity and challenges
Type of demand	predictable	improve leanness capabilities
Contribution margin	5 to 20%	early adopters can increase the margin, need cheap tags
Product variety	Low (10 to 20 variants per category)	Suitable to track products by pallets or cases
Average margin of error in demand forecast	10%	Room to improve forecasting through visibility of inventory and demand.
Average stock out rate	1 to 2%	opportunities for reducing stock out and increase margin significantly

The prototype system developed by eSmartSource in a supply chain RFID pilot showed the following benefits:

- Data accuracy in the supply-chain. The project resulted in 99.9% accuracy of inventory where all the links of the supply-chain were RFID enabled. As a result the stock-out rate in those stores was reduced to less than 0.1% over a period of several months.
- Profit margin. Preliminary analysis shows that the product line profit margin is expected to increase by over 20%.

RFID technology has been available for many years. Recently, its application to improve visibility in supply chain has demonstrated significant value for companies. The amount of research and development dollars being invested will

enhance capability and reduce cost continually going forward. RFID as a major component of supply chain solutions is here in force.

Those companies implementing RFID early will gain competitive advantage. However, implementation must be undertaken correctly by defining clearly the process and ensuring the right technology is applied to the opportunity.

RFID4U is the partner of choice for suppliers of Wal-Mart, Best Buy, Albertsons, and the Department of Defense, among others. Headquartered in California, RFID4U has assembled a full curriculum of courses to help companies and individuals align technology with business objectives. Vendor-neutral classroom courses, online e-courses, customized on-site trainings, and vendor-authorized courses allow each professional to choose the training that best suits his or her schedule, budget, learning style, and skill level. All courses are taught by senior RFID practitioners/trainers with practicality in mind, offering the techniques and tips that ensure rapid RFID evaluation and deployment. Classes are highly interactive, and participants receive individual attention as well as follow-up assistance in applying the new skills in the real world. RFID4U is a cornerstone member of the CompTIA's Advisory Committee for RFID Certification, EPCglobal member, AIM Global member, Microsoft RFID Council member as well as TI Tag-it member.