RFID
Automating The Automotive Industry

Are you getting bogged down by the overheads involved in parts and tools tracking, asset management, product servicing, record keeping, product recall and the umpteen other processes involved in managing your supply chain and product lifecycle? Get realistic—get RFIDs!

A company assembled and sold 1000 minivans. Within a week of sales, 10 were returned with serious complaints about the brake cable. If other customers had gotten a sniff of the problem, the company would have been ruined. It would have had to suffer lawsuits too. So, the company decided to recall all the vehicles before the problem got publicised. Thousand minivans had to be recalled because of 10 complaints! If only they had installed RFIDs in the components, they could have easily identified the faulty batch, traced the vehicles with defective cables and recalled only those minivans instead of all 1000 of them.

This is only a scaled down version of the famous recall of 14.4 million Firestone tyres in 2000. The recall caused Ford a loss of approximately $ 2.6 billion. If Ford had been able to identify on which cars the faulty tyres were being used, the recall would have been faster, more precise and less controversial. Today, Ford uses RFID technology on a large scale.

Irrespective of which level of the automotive supply chain you are on, RFIDs can help your business phenomenally.

>> BUSINESS BenefITs

- RFID enable your automotive assembly line, sit back and relax
- Empower your technicians and mechanics with real-time information and get more work done faster
- Minimise your losses and maximise your gains with RFID

From cradle to grave

Whether we look at simple closed loop applications or a complete open loop infrastructure, RFIDs can prove beneficial at all levels of the supply chain: to suppliers, logistic providers, OEMs, dealers and garages.

RFID applications in a supply chain can be classified as open loop and closed loop. Open loop applications look at total integration of the supply chain from the supplier to the serviceman as one seamless unit, managed by common standards. This is currently not very common in Indian industries due to the

A Bird's View of RFID

RFIDs are like the next generation to barcodes. Radio frequency identification (RFID) is a method of storing and remotely retrieving data using devices called RFID tags, which are small objects (transponders) that can be attached to any object or even living thing. These tags contain antennas which enable them to receive and respond to radio-frequency queries from an RFID reader (transceiver) .

Passive tags have no internal power source, whereas active tags do. Active RFID tags often have longer range and larger memories than passive tags, and also have the ability to store additional information sent by the transceiver. This makes active tags bigger and more expensive than passive tags, but obviously the capabilities are higher.

To give you a rough idea about costs, passive tags may cost anywhere between Rs 5 and Rs 50 and active tags may cost Rs 100 to Rs 1000 or more per piece, when bought in bulk. And readers for simple applications (e.g. employee ID card reading) may cost Rs 25000 and upwards.

For more information on RFID technology, refer to BenefIT July 2005 or check out http://en.wikipedia.org/wiki/RFID

prohibitive costs and absence of a common standard.

But, closed loop applications, which operate within a single plant and do not require open transmission of data or supplies among internal or external business partners, are gaining popularity amongst Indian SMBs, as they offer a variety of benefits from inventory management to security at relatively lower costs.

What's in it for you?

The supplier plays an extremely crucial role in the RFID venture. The very foundation of an orchestrated RFID effort is 'source tagging' or 'direct part marking', where the supplier attaches a RFID tag to each part manufactured or, alternatively to each consignment of the part. "Usually, the tagging requirement goes hand in hand with the component (being tagged) cost, since the aim is to reduce the inventory cost. Thus, if the component is very inexpensive (say a case of screws), tagging at unit level is not justified and one would like to tag a box having, say, 100 or 1000 such components. In case of expensive components, unit level tagging may be justified. The thumb rule being that tag cost should not exceed, say, 1 per cent of the component cost. As far as the fixed cost of the RFID set up goes, in the initial phase, SMBs should have a tagging partner, so that upfront cost can be reduced to a minimum, till such time when the volume of tagging justifies a full in-house set up", Devendra Tripathi, CTO, CoVisible Solutions (India) Pvt Ltd. The tag attached to parts may store not only identification details, but also some codes giving installation instructions. With the growing need to manage end-to-end inventories, several OEMs are stipulating that suppliers tag all parts and components, and it is becoming more of a stipulation than an option.

Costs to the supplier are justified in terms of reduced inventory, better distribution and warehouse management, theft control, defect management, etc. Strategic benefits ensue as the supplier strengthens the 'data channel' with OEM.

According to TS Rangarajan, Head, RFID Solutions, TCS, "Any supplier who is dependent on IT systems to manage his day to day operations will benefit from RFID. A good way to deploy RFID for a supplier is to start deploying it right at the beginning of his own manufacturing lifecycle, e.g. during receipt of his raw materials and storage, instead of considering it to be a burden thrust by his buyer. This way he will realise the benefits of RFID within his own plant through reduction in inventories and increased inventory turnovers."

Next, at the logistic provider's level too, RFID proves beneficial as it automates data capture and simplifies track and trace of consignments. It helps overcome difficulties in optimising fleet usage, monitoring asset (containers, fleets, etc.) utilisation, theft control, security, shipment audit, reduction in waiting time, etc.

The OEM who assembles the component/product benefits the most from RFID, with advantages in almost every operation from inventory management, theft control, brand authorisation, faultless assembly and distribution to easier recalls and recycling.

At the dealer level, RFIDs can enable better distribution, theft control and brand authorisation. Further, at the garages and servicing stations, integration of RFIDs with the manufacturers' product lifecycle management system can enable easier maintenance, support design improvements, ensure brand authorisation and simplify part identification, servicing, dismantling, scrapping and recycling.

To see complete benefits, the RFID installation needs to be a concerted effort, with integration of databases, common standards and codes for updating active tags, etc. From the suppliers to the garages, it must work

T S RANGARAJAN
Head, RFID Solutions,
Tata Consultancy Services

"The key value proposition of RFID is that it completes the last mile link of connecting a physical object with the IT system, thus paving the way for a fully automated track and trace of objects with corresponding benefits of inventory management and supply chain efficiency."

SAMPATH MANI
COO, Analytica India Pvt Ltd

"If there is a particular pain point for an SMB which can be eliminated by RFID viably, and thereby open up avenues of competitive growth through better customer service, the cost of an RFID deployment might well be justified. Companies will have to have a strategy whereby they can identify the right areas based on the limitations of technology, conduct trials, deploy pilots, and assess the success of the pilots fully before going in for large scale adoption."

as one seamless unit.

In the following sections, let's look at the various problem areas where RFID solutions can help along with and the benefits of this technology.

Experience the power of information

RFIDs enable a single consistent view of information across the whole supply network, including inventories, committed orders, returns and forward production schedules. With strategically placed readers, you will know when the RFID tagged components enter the warehouse, when they leave, when they enter the assembly line, when they move to the dealers, when they are sold, when a car comes in for service, when a car leaves the garage… quite close to being Big Brother!

13,000 parts in your car

Considering the large number of parts that go into automotive assemblies, imagine the overheads involved in identifying stock and maintaining proper inventory levels. Lack of coordination between material and information flow can result in the bullwhip effect—excess production, stock-outs, maintenance of costly safety stock, etc.

Tagging parts could solve these problems by improving supply chain visibility, weeding out inefficiencies and wastage, enabling collaborative forecasting, planning and just-in-time production. Accurately knowing the on-shelf inventory of products will enable replenishment of the shelf stock in an on-demand manner, thereby allowing the company to reduce the overall average stored inventory without sacrificing product availability to customers.

The product is the sum of what goes in

One of your customers wants the car with a music system, the other without it; one wants it with the A/C, the other without it. The scope for customisation in the automotive industry is vast, from components to end products.

Manufacturing operations that require sequencing or build-to-order production rely on item-level identification to ensure that the right components are added to assemblies. In the automotive industry, where just-in-time, just-in-sequence delivery requirements are common, automakers and their suppliers need to identify sub assemblies to ensure that they are installed in the correct chassis. By preventing sequence loading and installation errors, the company can avoid the high cost of product rework.

RFIDs can simplify such built-to-order situations. Every component is fixed with a tag that stores its identification details as well as details of the final assembly into which they are to be fitted. If the RFID reader can read the tag ID from the assembly as well as the components in the assembly line, then it becomes easy for the back end system to check both the numbers and ensure that the right component is on the assembly line. Otherwise it will set off an alarm.

This ensures that the right components get to the right place, in the right quantity and at the right time.

When the creator changes his mind

With shrinking design-to-market

timeframes, one needs to handle design changes swiftly. Such design changes may be warranted by the discovery of faults in earlier designs, potential product failures or simply to delight customers.

Installing RFIDs in the assembly line will make it easier to transmit information about such last minute design changes throughout the system and to receive the operator's response to such changes.

There are thieves everywhere, but relax

Thefts occur everywhere: during transport and distribution, on the dealers side, even internal thefts while inventorying.

Real time locating/ monitoring systems using RFID help reduce thefts to a large extent, as these enable identification of shrinkage areas and weak points in the supply chain.

Tinkering with problems

If the technicians working at your garages and workshops didn't have to spend so much time looking up and updating records and dismantling the frame just to identify all the components, they could use the time to service more components. RFID could be that little helper your technicians need to increase efficiency in after-sales service and maintenance.

With readers installed at all workshops and integration with the OEM's PLM database, as soon as a vehicle comes in for service, technicians will immediately know the history of all parts without disassembling the vehicle. This will help in better servicing and maintenance of the vehicle and also make it easier to service different models of the same automobile.

The market is swarming with impostors

Suppose you produce quality clutch wires, which are recommended by a motorbike manufacturer. There's a large market for clutch wires as this is a spare part that's frequently changed. Unfortunately, there are several counterfeits available in the market and your buyers get misled. You spend enormously in marketing your product and an impostor with the same name benefits! Worse still, your reputation may go down if the counterfeit is of poor quality. Counterfeits can cost you terribly in unimaginable ways.

Here again, RFIDs help in identification, as they can be more effective than barcodes and holograms in greasy and dusty environments, such as workshops and garages. Source tagging and installation of readers at the

Towards standardisation

RAVI MATHUR
CEO, EPCglobal India

One integral and interactive information sharing infrastructure from supplier to logistics provider to OEM to dealer to serviceman - will such a completely seamless supply chain ever become a reality? With suitable standards in place, the answer would be 'yes'.

Here are valuable insights shared by Ravi Mathur, CEO, EPCglobal India…

The RFID technology as such has been around for the past 50 years. But the recent increase in its usage and scope is because it is now moving towards standardisation. The standard behind RFID is what is called the EPC (Electronic Product Code) Standard.

This EPC standard can be seen as comprising two things: the Electronic Product Code (EPC) that can uniquely identify any item (this is stored in an RFID chip), and the EPC Network that can be seen as an 'Internet of Things', a network protected by six levels of security and providing information about all these coded products to authorised parties alone. By itself, an EPC would be meaningless. It's the EPC Network that lends meaning to the code.

Such an open, interoperable, global standard makes it possible for various parties in a supply chain to effortlessly understand and interact with each other and makes their systems interoperable.

The fact that such EPC standards were first used for consumer products and adopted by retail industry giants, like Wal-Mart, Metro AG and Target, has given rise to the misunderstanding that EPCs are only for retailers. This is not so. The very fact that the US Department of Defence is moving towards the use of EPC standards is proof enough that EPCs lend themselves to any sector.

The adoption of EPC standards by the automobile industry is imminent. Industry majors, like Toyota and General Motors are already working towards this. Soon, they will be demanding that their part manufacturers adopt the standard to code parts. Suppliers need to develop a greater awareness about EPCs today, so that they can comply with the OEM's stipulations tomorrow.

RFIDs are being adopted very fast by the automobile industry. Engines, chassis, tyres… they are all getting tagged. With EPC standards also in place, the scope will increase manifold and interoperability in the supply chain will really become possible.

For more information visit www.eanindia.com

SUNIL AVHAD
Sr Manager (EAS)–RFID Practice Leader, Patni Computer System Limited

"Closed loop applications, like identification and asset tracking, are areas in which RFID can definitely show returns and prove advantageous even for small and medium sized businesses. The manufacturing industry has been using RFID for such applications since the last 10-15 years, with proven results."

dealers' places and garages can prove to be an efficient move against counterfeits.

When hell breaks loose

Keep in mind the Ford and Firestone case. We sure don't want such a thing to happen to you. With RFID, it becomes possible to trace the entire path of raw materials, parts, components, etc. This makes it possible to identify the faulty batch in case of a mishap and to recall only those vehicles discreetly from the end user population.

The little chip clings on

Today, RFID tags are attached to the end products too. This not only helps in identification, record keeping, assembly, inventorying and after sales service, but also in holding description data and monitoring critical values.

For, example, having RFIDs fitted into your car helps in easy identification at service stations, in monitoring tyre pressure and in vehicle identification for remote controlled access and immobilisation in case of unauthorised access.

Overcoming the hurdles

RFID is one of the most powerful technologies of our age. Cost is still a prohibiting factor, but with mass usage and production of tags, the price is bound to go down. Further, in the automobile industry, the use of RFIDs is clearly justified by the advantages.

According to Sunil Avhad who leads the RFID practice at Patni Computer Systems, two factors need a little consideration. First, the use of RFIDs may be difficult in some parts of the supply and assembly line due to high metallic content in automotive components, heat generated during some operations and other prohibitive environmental factors.

So, use of RFID in the automobile industry needs careful planning, and one needs to decide which components and assembly operations are amenable to tagging, and also decide on the appropriate type of RFID chip for each application. There are various types of tags at varying costs that lend themselves to various environments and applications. Expensive tags are available that can stand lot of wear and tear.

The other insight provided by Sunil Avhad is that, like the Consumer Packaged Goods Industry, the Manufacturing Sector must also work towards EPC standards, which can greatly increase the spectrum of RFID applications and advantages and simplify open loop applications too.

Keeping these factors in mind will help you plan your RFID infrastructure carefully. The best way is to start experimenting with RFID on a small scale, first deploying closed loop applications and then slowly expanding to open loop.

In the final analysis, the automobile industry has always been an early adopter of technologies. In fact, according to a 2003 report by Allied Business International, RFID has received the warmest welcome in the auto-industry.

So, go ahead… prove your mettle… the technology is here to stay, so why not be an early adopter. ■

—Janani Gopalakrishnan.
Janani Gopalakrishnan is a freelance writer and columnist based in Chennai. She writes on a variety of topics, her forte being business and technology. She can be contacted at gjanani@gmail.com

RFID solutions in India

Check out some of India's capable RFID solution providers:

- Patni Computer Systems
  http://www.patni.com
- Tata Consultancy Services
  Website!
- CoVisible India
  http://www.covisible.com
- Analytica India
  http://www.analytica-india.com
- Bartronics
  http://bartronicsindia.com
- BIGSquid
  http://www.bigsquid.org
- Avaana
  http://www.avaana.com
- Wipro Infotech India
  http://www.wipro.co.in