PERSPECTIVE

RFID in Automotive and Aerospace
A cutting edge enabler for next generation collaboration

- Ashish Kumar Tewary, Sukanta Kumar Acharya, Bert Seegers

Collaboration between supply chain partners is not a new concept in the automotive and aerospace world. However, governance, organizational policy and culture play very important roles in building collaborative environments. So, when it comes to adoption of RFID across OEMs and their suppliers, the micro and macro dynamics of collaboration have remained largely uncertain.
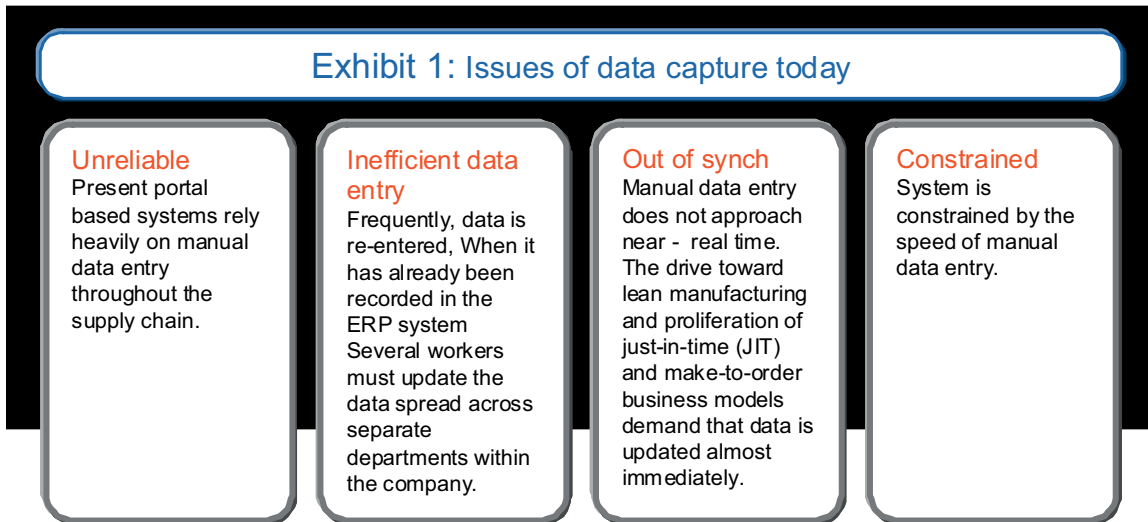
RFID has the potential to provide a solid foundation for a collaborative environment by enabling the availability of uninterrupted operations level data streams to business processes and users — thus opening the door for error-free partnering and minimizing costly delays.

However, there are a lot of unknown factors involved when working with an emerging technology such as RFID. Organizations need an implementation approach that will not only help them in identifying these unknown factors at a very early stage, but also ensure it is led by meaningful business requirements. This approach provides for a more controlled proliferation of RFID across the business processes and partner organizations, and can unleash the full potential of RFID

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Effective collaboration requires trust. One of the key factors influencing trust is the accuracy and reliability of the information being exchanged.

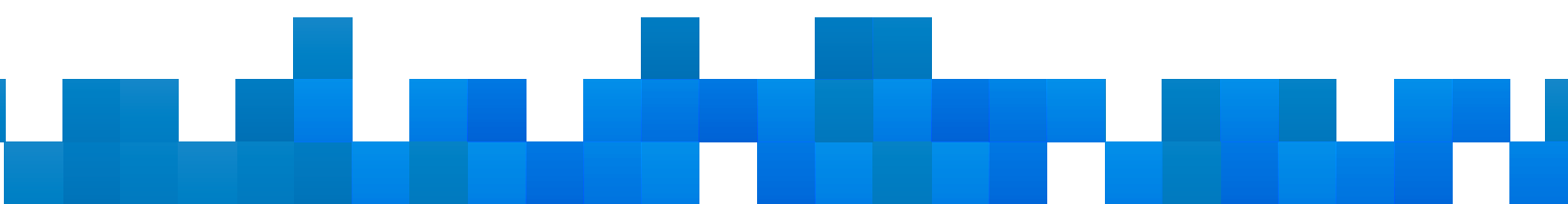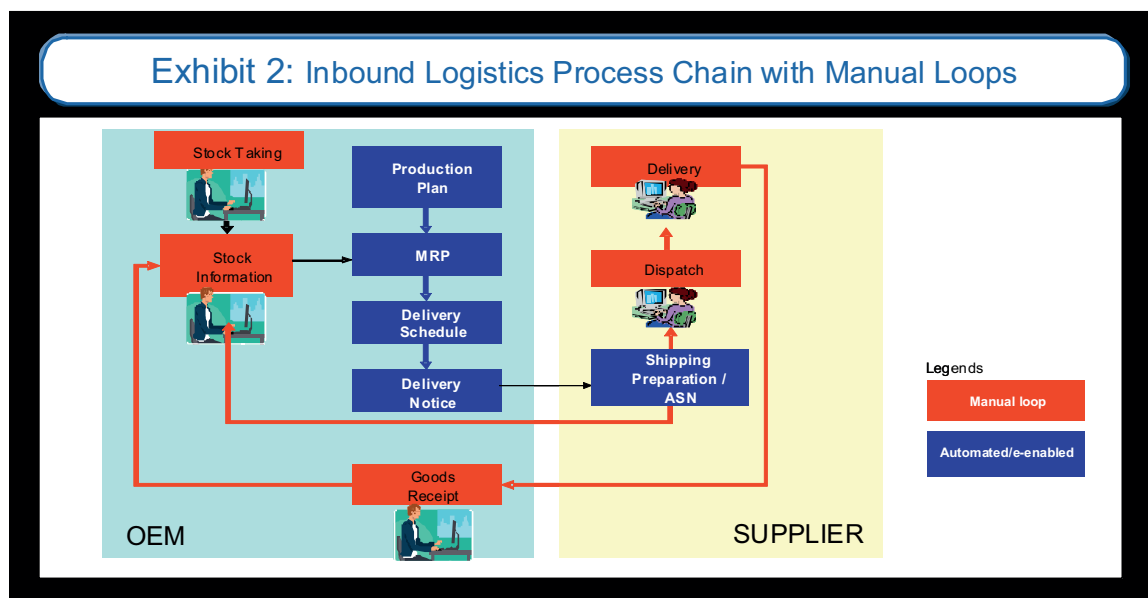While currently widespread Web-based technology solutions provide faster communication and information-sharing, their effectiveness diminishes at the point where manual interfaces record discrete activities. Data capture mechanisms for such operational data are unreliable, inefficient and not real-time (Exhibit 1).

Exhibit 1: Issues of data capture today

Unreliable
Present portal based systems rely heavily on manual data entry throughout the supply chain.

Inefficient data entry
Frequently, data is re-entered, When it has already been recorded in the ERP system Several workers must update the data spread across separate departments within the company.

Out of synch
Manual data entry does not approach near - real time. The drive toward lean manufacturing and proliferation of just-in-time (JIT) and make-to-order business models demand that data is updated almost immediately.

Constrained
System is constrained by the speed of manual data entry.

This negatively impacts the overall benefit of utilizing technology. A high degree of manual intervention hampers visibility into the business events, leading to inaccurate interpretation and uninformed decision making (Exhibit 2).

This has a cascading effect that erodes the benefits of the traditional collaboration model.

Exhibit 2: Inbound Logistics Process Chain with Manual Loops

Stock Taking

Production Plan

Stock Information

MRP

Delivery Schedule

Delivery Notice

Delivery

Dispatch

Shipping Preparation / ASN

Goods Receipt

Legends
Manual loop
Automated/e-enabled

OEM

SUPPLIER

RFID has the potential to enable next generation collaboration by focusing on these discrete elements. It is not about just sharing the information rapidly and efficiently, it is about ensuring that the information is reliable, accurate and timely, in a cost-effective and a light-weight manner.

There are basically three models of RFID-enabled collaboration based on the tradeoffs between the benefits perceived by suppliers and OEMs (Exhibit 3). Today, suppliers and OEMs are individually piloting RFID; each with a focus on achieving their own, unique benefits.

Exhibit 3: RFID Collaboration Matrix
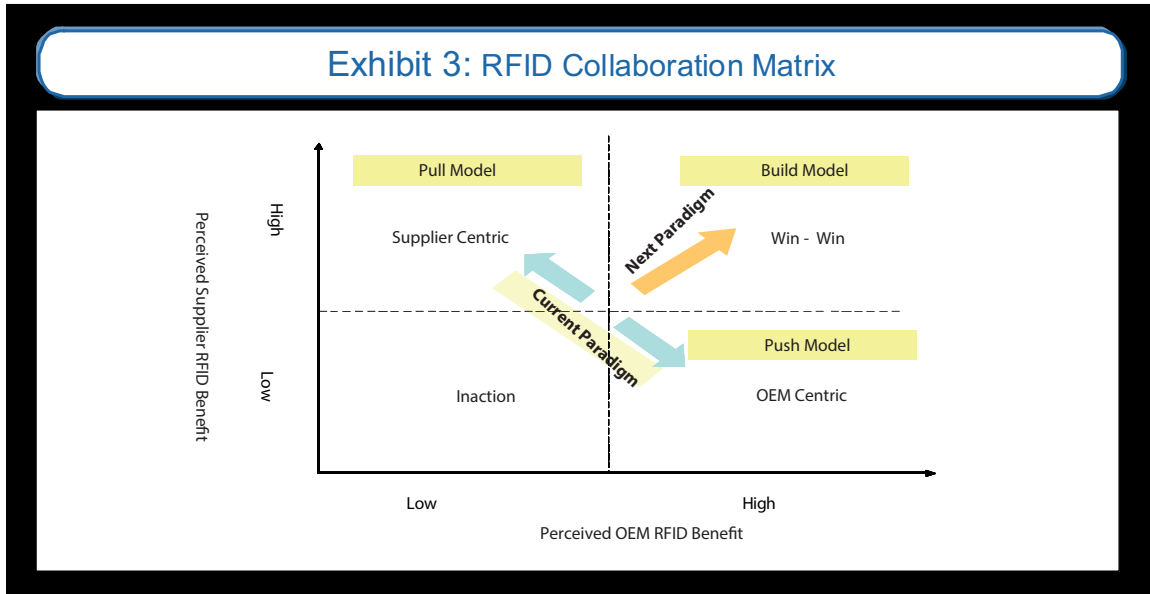
In the Pull model, the supplier takes the lead in standardization and drives RFID adoption across OEMs. It is not a very common model, as it has inherent challenges. Bringing several OEMs into alignment for a single supplier is very difficult to achieve.

Elsewhere, OEMs have adopted a Push model. They request that their suppliers put RFID tags on all deliveries in order to improve in-bound inventory visibility. The supplier prints and attaches RFID tags to shipments prior to dispatch. The information embedded in the tags is used predominantly by the OEM to track and trace the material movement inside the OEM stores or shop floor.

Any RFID implementation leads to extra costs — tags and associated RFID infrastructure and the associated process overheads of tag printing and attachment. However, as the information on RFID tags is usually either OEM-centric or supplier-centric only, it does not provide opportunities to explore the benefits that may be derived from the same investment through win-win collaboration with value-chain partners.

This leaves OEMs and Suppliers with an incomplete understanding of both the consequences (intended and unintended) of introducing RFID technology as well as its potential to enhance collaboration and efficiency.

Hence, the open question remains — "How do we distribute both the costs as well as the benefits between the OEM and its partners?"
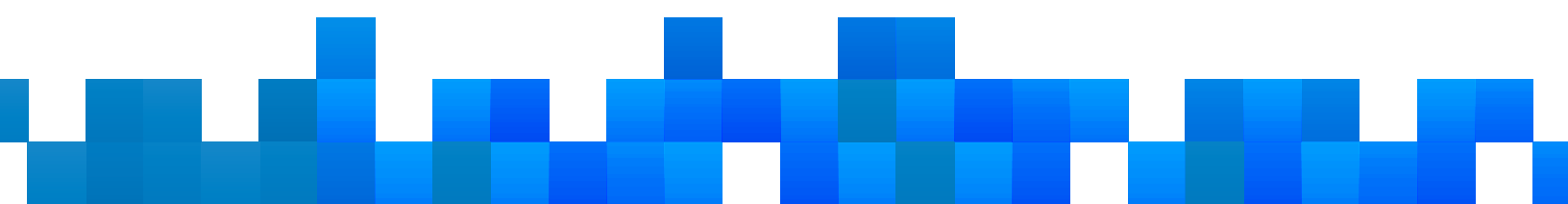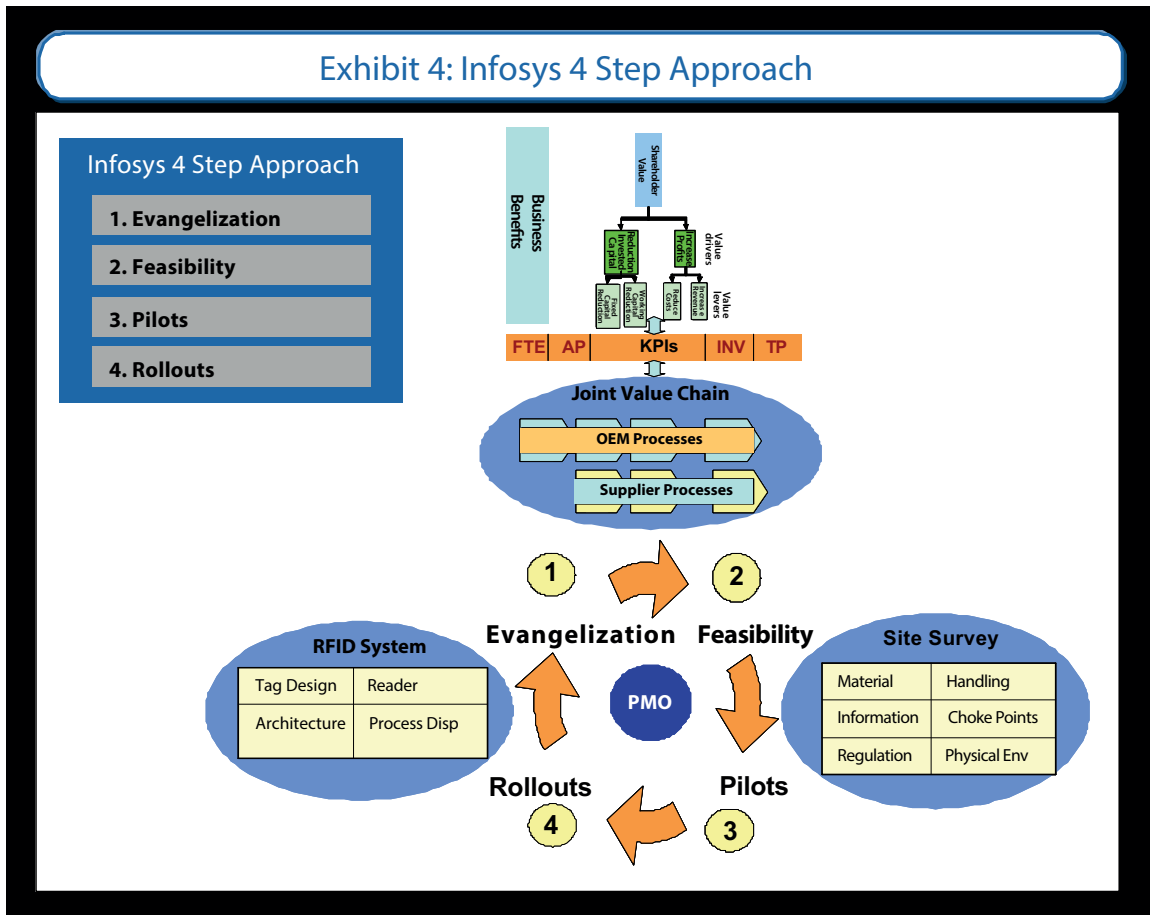
Build Model: The Infosys 4-Step Approach

We strongly believe that a myopic approach on implementing RFID in the supply chain is not sustainable, and it limits the ability to identify key factors for successful RFID adoption across the value-chain. At the outset it looks very simple — a tag is attached to the item and the item is then tracked as it moves across various readers. However, adopters should exercise caution. The bottom line is to find an appropriate business model or application — the "way it is to be used" — by appropriately addressing the cost and benefit distribution amongst the partners involved.

The Infosys 4-step approach to controlled RFID proliferation helps organizations to better manage the uncertainties and associated changes in important factors like business requirements, KPIs, cost sharing models and technological advancement across partners (Exhibit 4).

Exhibit 4: Infosys 4 Step Approach

Infosys 4 Step Approach

1. Evangelization
2. Feasibility
3. Pilots
4. Rollouts

Business Benefits

Shareholder Value

Value drivers

Reduction Invested Capital | Increase Profits

Fixed Capital Reduction | Working Capital Reduction | Reduce Costs | Increase Revenue

Value levers

| FTE | AP | KPIs | INV | TP |

Joint Value Chain

OEM Processes

Supplier Processes

1 → 2

Evangelization   **Feasibility**

RFID System

Tag Design	Reader
Architecture	Process Disp

PMO

Site Survey

Material	Handling
Information	Choke Points
Regulation	Physical Env

Rollouts   **Pilots**

4   3

Each step reveals relevant information for the next step. It starts with identification of strategic benefits of employing RFID, followed by business case development and solution blue print.

Next, depending upon the client's situation and organizational readiness, either a pilot is conducted or full deployment is planned and implemented. With this approach, organizations are able to "Build" the appropriate business model or application ("way it is to be used"), in the underlying business scenario by defining the cost and benefit distribution amongst partners.

Step 1: Evangelization

Before going ahead with any RFID implementation, it is important to develop a common understanding of the vision and goals of the stakeholders for the RFID initiative, so that individual RFID initiatives are properly prioritized and aligned. Normally this should be managed by forming an extended steering committee with representation from all the participating entities. This enables the development of a global business case that makes RFID investment justifiable.

Infosys, with its understanding of RFID impact on business processes, advises and enables steering committees in the identification of requirements and their prioritization. Prioritization is done while keeping in mind the vision and goals, technology capability and organizational readiness. This approach enables organizations to develop a roadmap for planned RFID proliferation. It also enables better utilization of non-recurring and reusable investments in other RFID implementations across the organizations involved.

Step 2: Feasibility

The benefits and implementation challenges of a relatively new technology like RFID are not well understood, especially in the automobile and aerospace industries. Understanding RFID physics, and the associated program risks, is vital for realizing the expected benefits in the areas of its application once they are identified.

RFID technology in its present maturity demands full attention to all the variables involved. Feasibility is determined by an assessment around multiple parameters:

Infosys has well developed methodologies to carry out a site survey and feasibility study

Process readiness	Material physics
Material handling readiness	Information needs
Integration needs	Physical environment
Country-specific regulation	Technology related risks
Value assessment/business case	

Step 3: Pilot

Determining how RFID will be deployed within a business is necessary in initiating an RFID program. A pilot is a proactive approach to solving issues and creating solutions unique to individual organization's environments. It provides data to further evaluate the suitability and viability of an RFID solution. Pilot data is used to derive RFID infrastructure cost and business benefits for future roll outs. A pilot provides answers to number of questions:

- What are the real cost drivers?
- What are the real business benefit drivers?
- What is the achievable read reliability?
- How reliable are different components of RFID infrastructure?
- Should RFID be deployed in all locations right away?
- Should RFID be rolled out in phases?

To be effective, the pilot environment should strive to represent all possible scenarios of the organizations involved. Infosys has developed pre-built solution components to support rapid and efficient solution design, configuration, and implementation, which enable faster Pilot implementations. The Infosys solution is further supported by KPI design, data gathering and business benefit calculation to assess the business case for roll-outs. For example, Infosys' pilot with an aerospace major in Europe has demonstrated a saving of more than 80% in the area of logistics cycle time, inventory carrying cost and data entry manpower. Pilot results also showed 100% data accuracy and an increase in throughput due to the complete elimination of manual data entry.

Step 4. Roll-outs

Roll-outs are carried out after the technical feasibility and business benefits are established through a Pilot. Roll-outs are planned in accordance with the prioritized requirements identified during the Evangelization step. It is required that the entire organization is mobilized in order to make the roll-out a success. Regular communication and training sessions are needed to manage organizational changes and facilitate business acceptance. In a multi-organizational rollout, partners prepare their sites for RFID hardware and software commissioning. This has to be well planned to minimize any impact on regular operations. Appropriate operation and support models are needed for the usually followed multi-vendor RFID implementation along with preparation for fallback options and recovery. A project management office (PMO) plans different roll-outs based on the resource availability and the pace of organizational changes. KPIs are tracked at regular intervals to ensure that the solution is meeting the requirements.

Further, importance is given to achieving integration in order to realize true business benefits. RFID automates the data collection process but wider business benefits can only be achieved if the data collection layer is integrated with business applications such as ERP, etc.

Exhibit 5: Infosys RFID Integration Platform
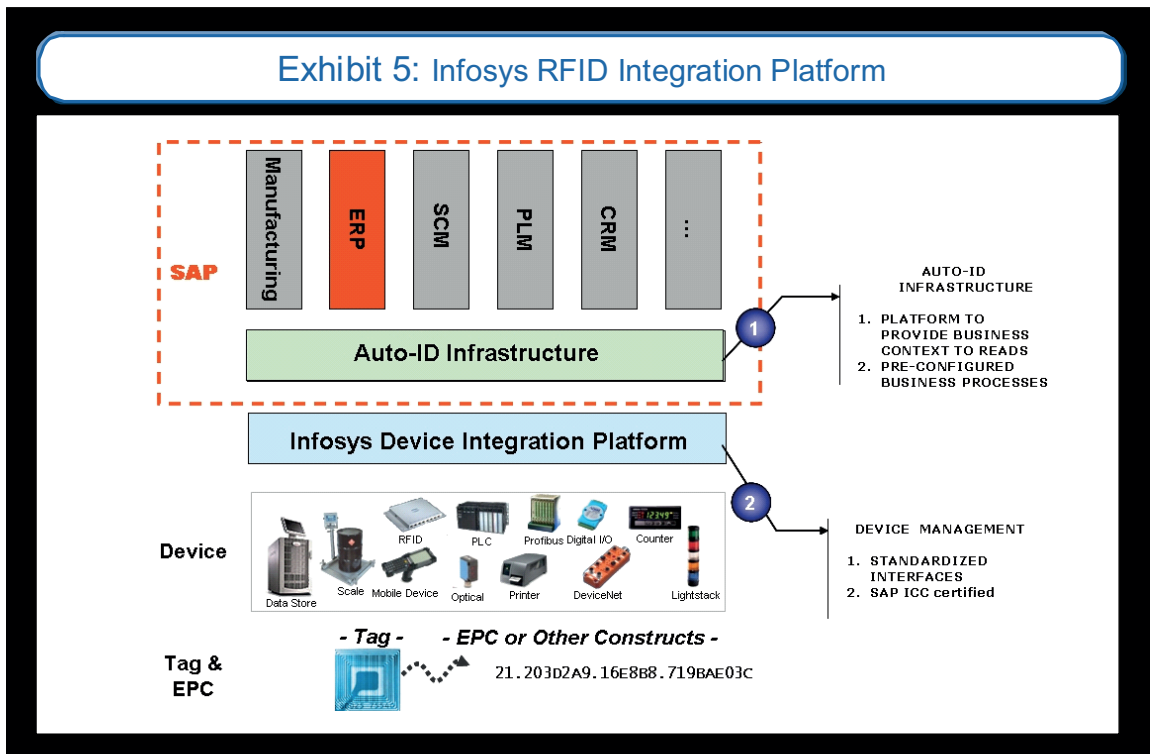
Infosys, with its proprietary seven layer RFID architecture (Exhibit 5), is well placed to support wider roll-outs with backward integration with business applications. The RFID Edge Server based integration platform (for both J2EE and .NET) is light weight, easy to install and modular in design and our alliances with a number of RFID vendors ensures a successful solution.

It provides basic device monitoring, management and administration functionalities.

Infosys' RFID Integration platform has the capabilities to handle process and business exceptions flows in a configurable manner to provide alerts in one or more ways - alerts on handhelds/PDAs, Light Stacks Sensors, Alarms, Buzzers, etc. It also provides hooks and interfaces to external applications (i.e.; business middleware, business activity monitoring system, etc.) for enterprise monitoring and management. The Integration platform has been certified by SAP under ICC (Integration Certification Center).

Conclusion

Infosys' view is that the next steps for companies involved in the Push or Pull model is to re-engineer business processes based on "what is required by the business as a whole" rather than focusing on "what can be achieved by applying new technologies." Although popular belief suggests otherwise, companies still have time to re-engineer their supply chain in order to arrive at a business model that is sustainable for both the OEM and the supplier.

For companies which are still planning to experiment with RFID, it makes sense to utilize the experiences of experts in this area rather than re-inventing the wheel. Peter Abell of AMR Research estimates that it takes most firms a year before they obtain funding for a pilot project. This may prove too long for those companies that need immediate RFID readiness in response to trading partner mandates. However, the good news is that with ongoing standardization and maturation of the required software, these companies have the ability to align with a vendor who has a proof-of-concept (POC) kit. The POC kit provides companies with the opportunity to explore what can be accomplished with the technology, without losing too much time in the pilot process. The next step for these companies would be to re-engineer the supply chain to reap the full benefit of RFID investments by arriving at a sustainable business model for the parties involved.

About the Authors

Dr. Ashish Kumar Tewary leads the SAP RFID solution practice in Infosys. Ashish has more than 12 years of consulting and industry experience in the areas of Product life cycle management, supply chain management and RFID with leading automotive and aerospace companies. Email ID: ashish_tewary@infosys.com

Sukanta Kumar Acharya is a Senior Principal in Automotive & Aerospace Solutions Consulting and earlier led the RFID solution practice for the industry vertical for Infosys. Sukanta has more than 13 years of management consulting and industry experience. Email ID: sukanta_acharya@infosys.com

Bert Seegers is Practice Leader of the Automotive & Aerospace Consulting Group in Europe for Infosys. Bert has 20 years of industry experience and has specialized in Supply Chain Management. Email ID: bert_seegers@infosys.com
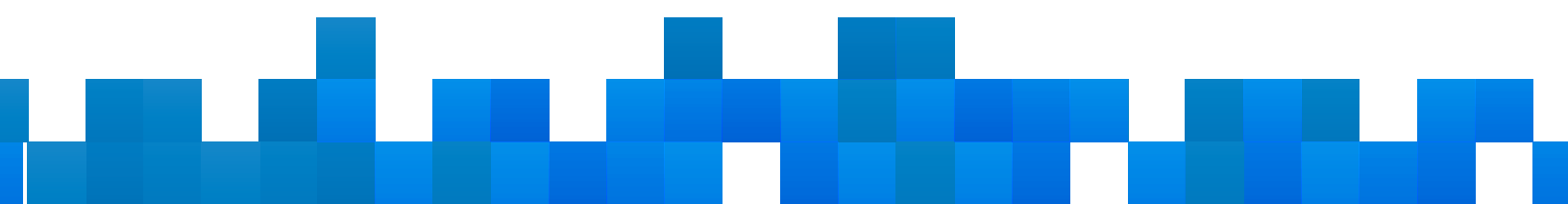
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