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# Developing and Implementing a Successful RFID-enabled Supply Chain Strategy

## Challenges, Approaches, Solutions

*Presented at:*  
*Supply Chain World*  
*North America 2004*  
*Chicago, Illinois*



## March 31, 2004

# Agenda

**Brief introduction to Nextel and PRTM**

**RFID overview: Current state and business drivers**

**Defining a successful RFID-enabled supply chain strategy**

**Mobile RFID: a new concept**

**Conclusions**

**Questions**



# Brief Introduction to Nextel and PRTM

[www.nextel.com](http://www.nextel.com)  
[www.prtm.com](http://www.prtm.com)

# Top-tier ranking from J.D. Power and Associates

Fully integrated, all-digital wireless service

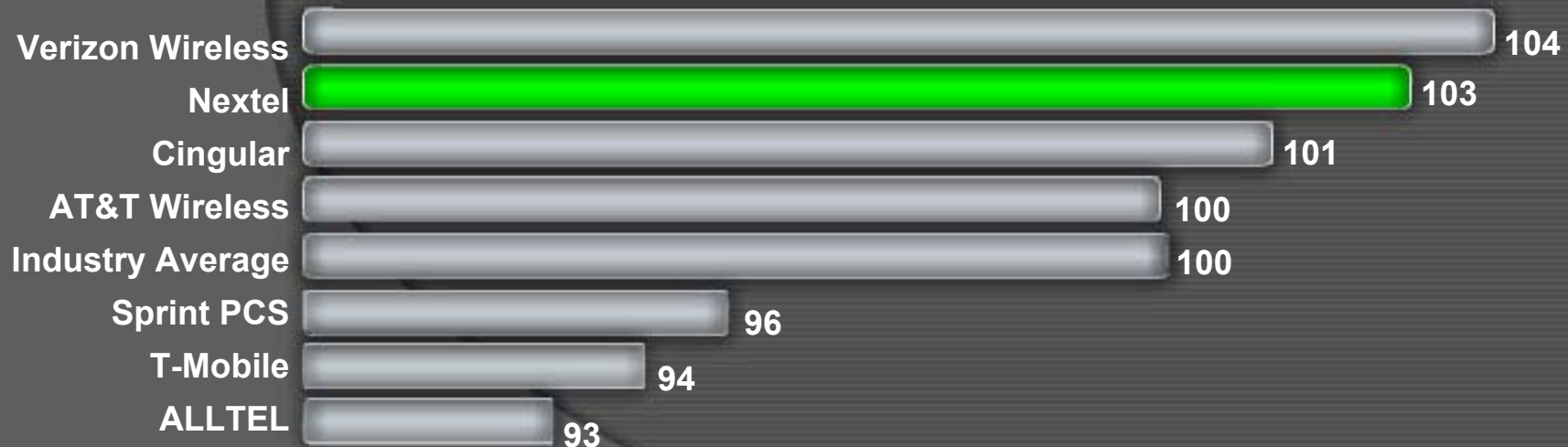
Service in 293 of the top 300 USA markets

Integrated Digital Enh Netwk (iDEN®) technology by Motorola

12.9 million subscribers, over \$10 billion in revenue

1.6% churn for 2003

Serving more than 95% of Fortune 500



Source: J.D. Power and Associates 2003 U.S. Wireless Network Quality Assessment Study

**NEXTEL. Done.™**

# Differentiation From End to End

## Wireless Products and Services

- Instant Push to Talk<sup>SM</sup> = Direct Connect<sup>®</sup>
- Highly reliable and secure packet data services
- Broadest and deepest portfolio of business applications

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## Subscribers

- Corporate and government accounts
- Small and medium businesses
- High value individuals

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## Customer Service

- Industry-leading retention rate

# PRTM helps clients achieve results by harnessing disruptive technologies and applying innovative management concepts



## Management Insight

- Top-Rated Management Books and Magazines
  - *Strategic Supply Chain Management*
  - Co-authored *Mobile Commerce: Technology, Theory and Applications*
  - *Product Strategy for Technology Companies*
  - *Insight*, PRTM's Management Journal for Technology-Driven Business

## Experience and Innovation

- More than 1,200 clients across multiple industries
  - *Over 6,000 successful projects*
  - *90% level of repeat business*
- Recent Innovations:
  - *AIM: m-Powering Productivity Through Mobility™*
  - *SCOR® – DoD endorsed best practices for Supply Chain Management*

## Staff Depth – over 400 consultants

- Technical degrees and MBAs from top schools
- Practical, hands-on, technical experience
- Low consultant to director ratio
- Technical industry leadership

## Industry Forums

- Organized Supply Chain Council and developed initial SCOR® model
- Advisory Roles for IIR, EyeforAuto, DigitalCar
- Formed CDMA Development Group

# Our services focus on defining and operationalizing strategies across core business practice areas

## *PRTM Capabilities and Experience*

### Wireless Solutions



### Strategy Formulation



### Product And Cycle-time Excellence®



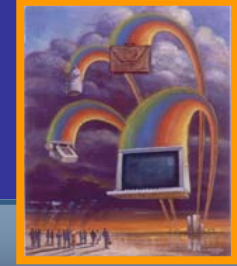
### Customer Service and Support



### Supply Chain and Operations Management



### Marketing and Sales



## *Information Technology Services*

### Industry Experience

- Industry Structure and Dynamics
- Economics and Performance Measures
- Key Success Factors:  
*“What it takes to do business well”*

### Technical Knowledge

- Information Technology Practices and Architectures
- Package and Technology Selection
- System and Technology Design and Implementation
- Systems Integrator Management

### Change Management

- Business Change
- Planning and Program Management
- Process and Organizational Design and Implementation
- Performance Management
- Analysis, Modeling, Benchmarking, and Research
- Risk Management



# RFID Overview: Current State and Business Drivers

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# What is RFID?

**Radio Frequency Identification, or RFID, is a broad term referring to a host of technologies that can track assets and capture associated data automatically**

- Similar to an electronic bar code, RFID enables the electronic labeling and identification of objects through wireless radio frequency communications
  - Tags containing a unique identifier are placed on individual parts, bags, paperwork, cribs, totes, pallets, or other containers
  - Readers communicate with the tags through radio frequency (RF) waves
- Software applications manage the collection, synchronization, and communication of the data with warehouse management, ERP, and supply chain planning systems

# An RFID solution consists of four major components

## RFID Tag (Transponder)



*Wireless  
Communication  
"Air-Interface"*



## RFID Reader

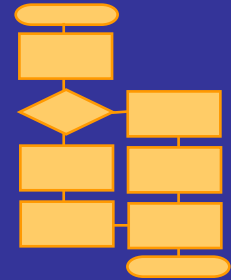


## Communication network



*Communication  
Hardware  
(Controllers, cable, or  
Wireless network)*

## RFID Software Application



*Tags consist of a chip and an antenna for wireless communication*

### Key tasks:

- Communicate with reader
- Store information
- Send information
- Write information
- Erase information

### Tags can be:

- Read-only
- Read/write
- Active (battery powered)
- Semi-active (dormant until activated by a signal)
- Passive (no battery, powered by RF signal)

*Readers are similar to a mobile basestation for wireless communication*

### Key tasks:

- Communicate with tag and application
- Read information
- Send information
- Write information
- Erase information

### Readers can be:

- Handheld
- Stationary

*The communication network connects the readers to the enterprise information system*

### Key tasks:

- Transmit information
- Distribute information

### The communication network can be:

- Local Area Network
- Wireless Local Area Network
- Wireless Wide Area Network

*Software applications are needed to integrate the data from RFID tags into applications*

### Key tasks:

- Communicate with reader or other information systems
- Calculate information
- Store information in database

### Software applications can be:

- Mainframe
- Distributed
- PC

# RFID offers more than just a “superior bar code” capability

<b>RFID Unique Attributes</b>	<b>Application Benefits</b>
<b>1. Identification without visual contact (wireless)</b>	<b>Identify data objects easier and quicker at point of origin</b>
<b>2. Read/write (multiple times)</b>	<b>Store and renew information in the RFID tag as the tag comes close to the interrogator, with no manual recording needed</b>
<b>3. Cluster reading</b>	<b>Design a system that purposely presents more than one item at a time for identification to increase efficiency</b>
<b>4. Secure</b>	<b>Encrypt the information in the tag for secure business processes</b>
<b>5. Withstand harsh industrial environments</b>	<b>Allow the tag to be packaged in any form to suit the application and environment</b>
<b>6. Reliability and speed</b>	<b>Improved reliability and speed means faster business operations</b>
<b>7. Re-usable</b>	<b>Re-use of RFID tags to save cost</b>
<b>8. Data storage at point-of-origin</b>	<b>Store information on demand, without heavy investments in information technology</b>

Source: [www.rfidasia.com](http://www.rfidasia.com)

# Trends indicate a strong push to spread RFID application widely and to accelerate its growth...



## Customers

- Customers have focused on RFID re-use applications
- Several large customers (Wal-Mart, DoD) intend to begin tracking at the pallet level in 2005
- Early adopters have developed detailed technical know-how, gained experience, and achieved major benefits
- Next-wave customers will focus on economic benefits rather than technical details



## Suppliers

- Fast growth of number of companies providing RFID solution
- Highly fragmented industry, which has not reached an expected maturity level
- Growing number of vertical partnerships, based on niche markets and applications
- Dominated by big IC manufacturers (TI, Philips) and other RFID Tag specialists (Matrics, Savi, Zebra)
- Service providers are very fragmented



## Technology

- RFID technology has achieved maturity
- Interoperability challenges persists, as companies have developed proprietary solutions
- Standards for data communication will emerge before standards for content
- Companies start to combine RFID with sensors (especially temperature and location)



## Competition

- Barcode is still main competitor on auto identification technology
- Intelligent service concepts are starting to appear
- Manufacturer will implement RFID labels based on request



## Market

- The market is waiting for the first key volume application to drive cost for supply chain applications down
- Market growth is expected to lead to U.S.\$0.05 passive tags and U.S.\$200 readers by 2006
- Market consolidation and solution offering is expected in the next years since today many companies with different product offerings are competing across different market segments

# ...and RFID is currently being deployed in a range of applications

## Partial list of today's RFID applications in supply and value chain



### Individuals

- Asset tracking
- Electronic purse
- Payphones



### Entertainment

- Gambling
- Membership cards
- Ski tickets
- Sports (marathon tracking)



### Access/Protection

- Access control (general)
- Anti-theft (any)
- Car immobilizer
- Counterfeit protection
- Electronic keys (hotel, etc.)
- Security areas
- Vehicle access control
- University cards



### Medical

- Medical devices
- Healthcare



### Transportation/Travel

- Automatic Fare Collection (AFC)
- Automatic retail fuelling
- Automatic fleet fuelling
- Airline ticketing
- Automotive (any)
- Baggage tags
- Logistics
- Park and ride metering
- Road toll collection
- Traffic management
- Truck fleet tracking



### Location/Tracking

- Animal ID
- AGV positioning
- Baggage tags
- People locating
- Pigeon races
- Time and attendance
- Vehicle movement



### Industrial/Shipping

- Assembly line ID
- Car manufacturing
- Configuration mgmt.
- Container
- Express parcel tracking
- Factory automation
- Fleet management
- Forklift positioning
- Gas cylinder
- Industrial ID
- Maintenance logs
- Mining
- Pallet tagging
- Process control



### Retail

- Conveyor belt clothes hangers
- Laundry tracking
- Loyalty schemes
- Paint shop
- Retail store applications

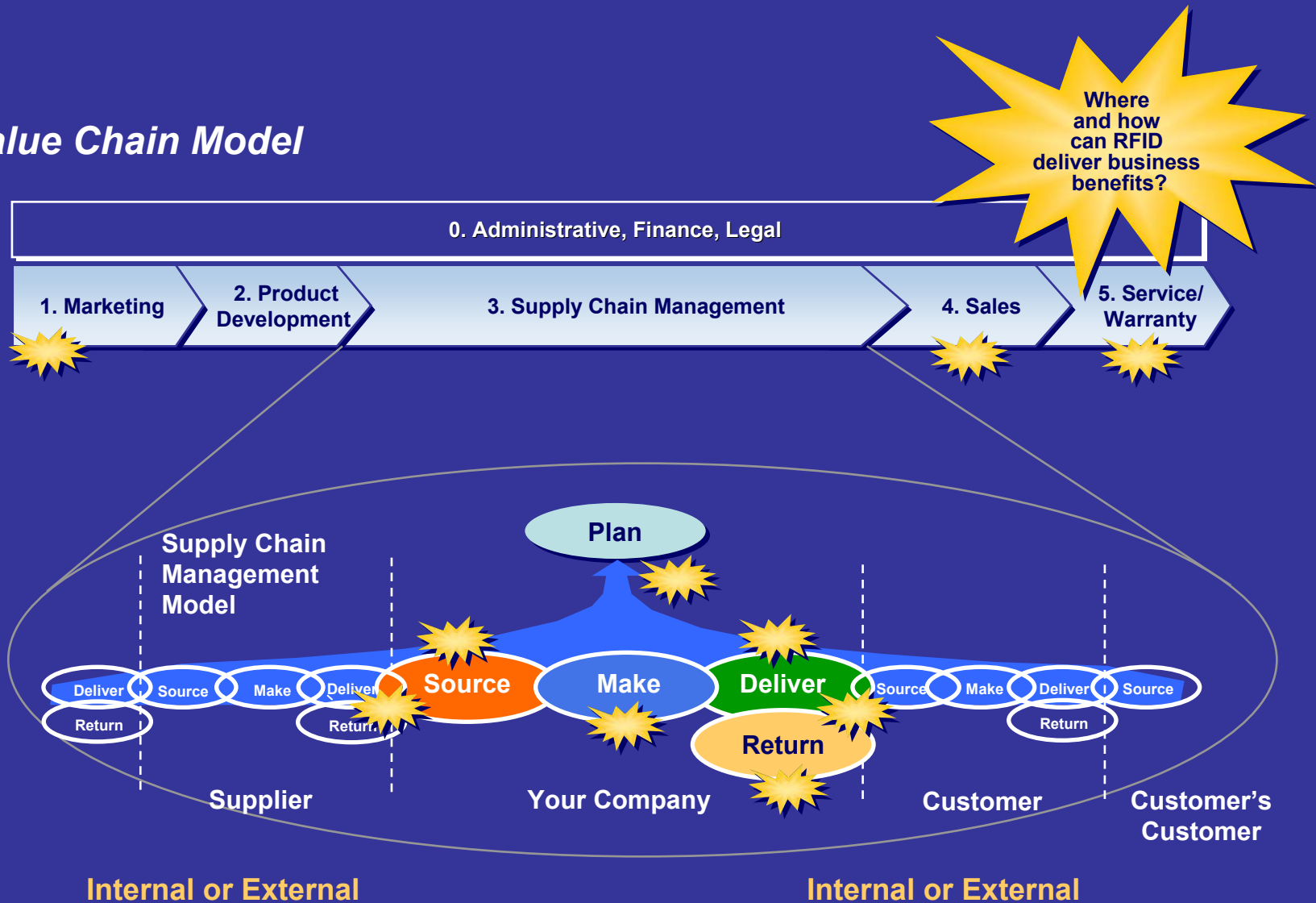


# Defining a Successful RFID-Enabled Supply Chain Strategy

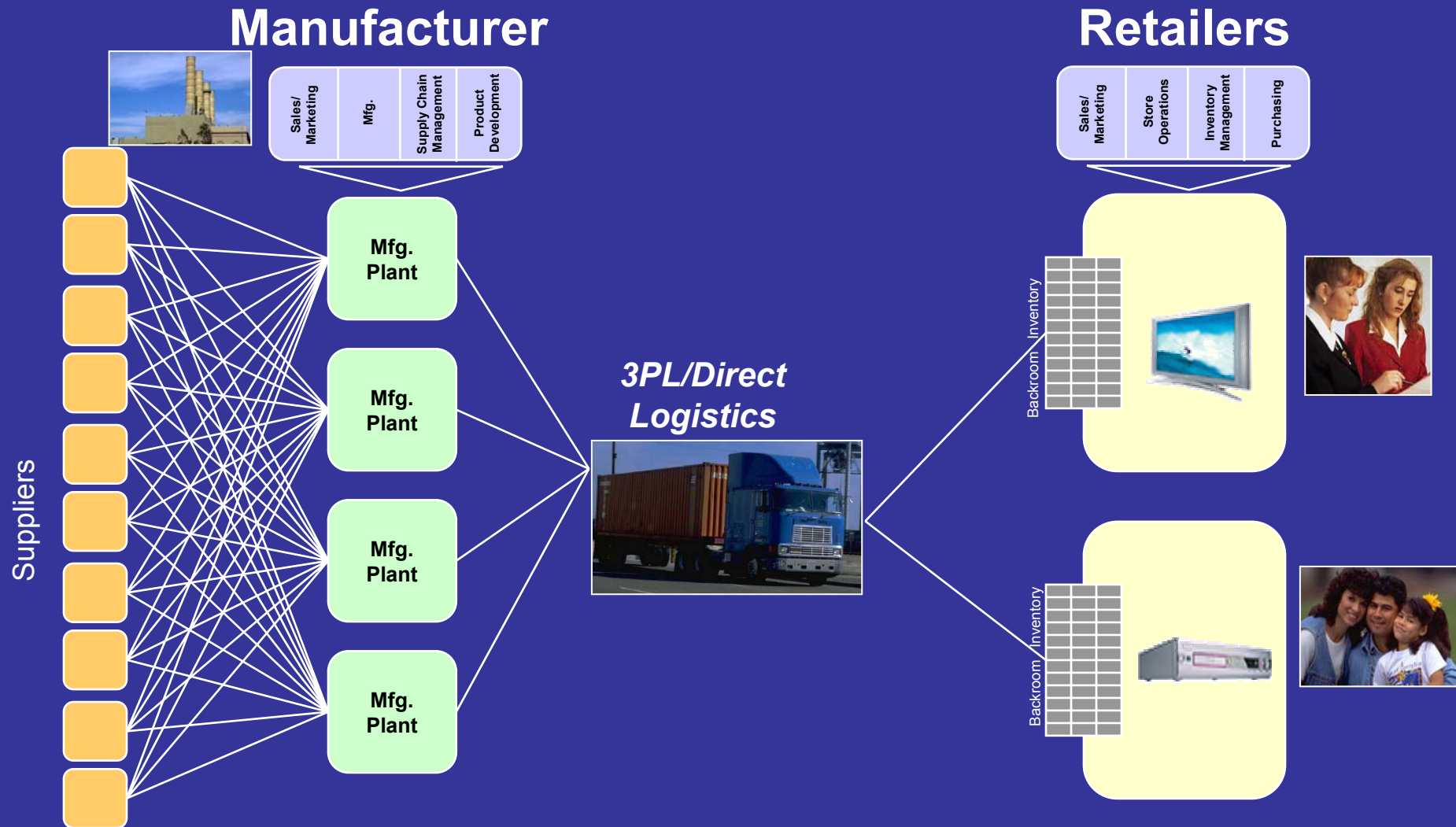
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# RFID applications can solve business problems if integrated into business processes

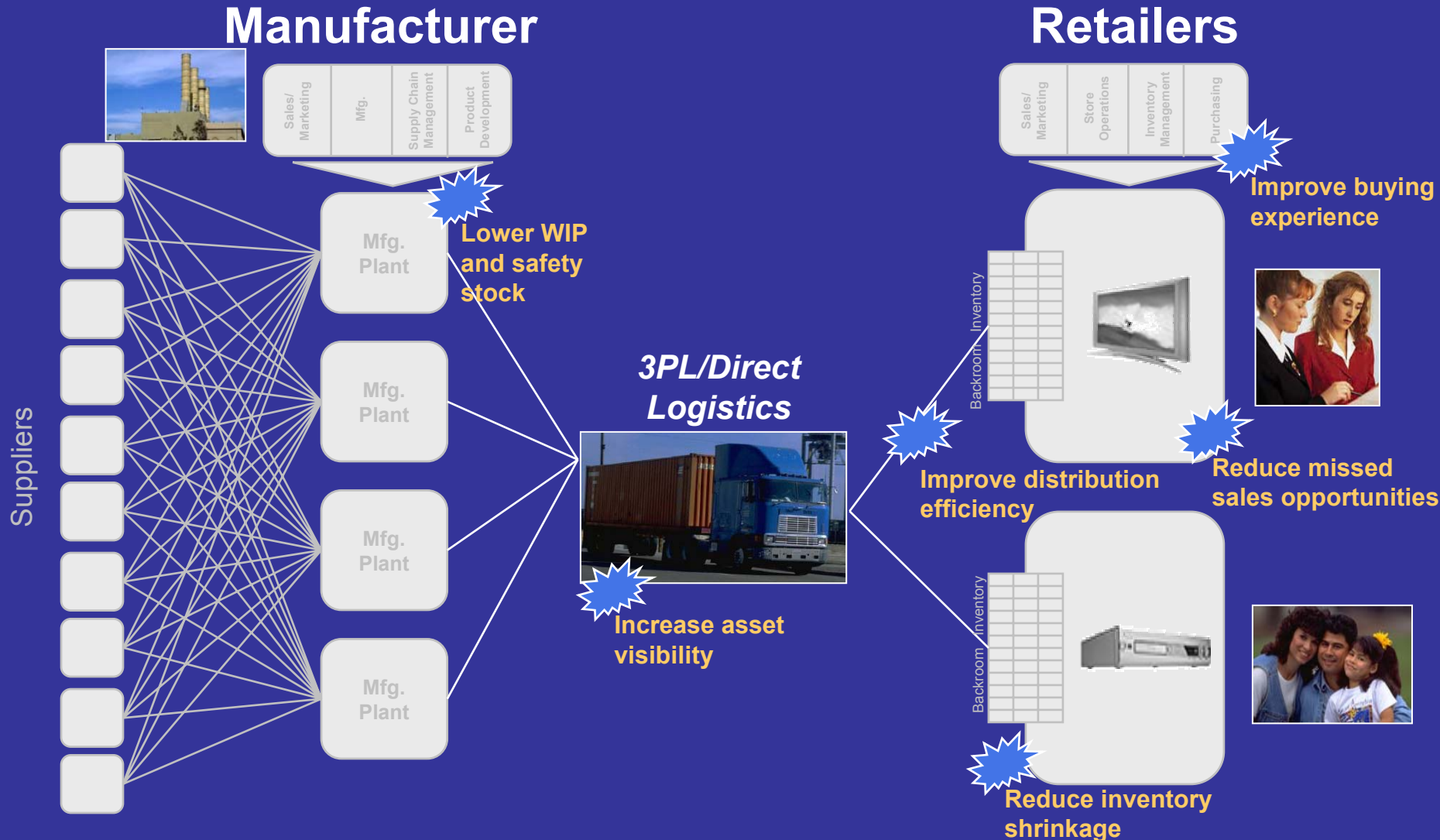
## Value Chain Model



# Establishing Context: What business problems are companies trying to address?



# Establishing Context: What business objectives are companies trying to address?



# Fulfilling these objectives requires overcoming specific challenges...



Customer



Retailer



Logistics Provider



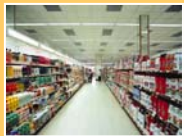
Manufacturer

Business Objectives	Current Challenges
<ul style="list-style-type: none"> <li>■ Improve in-store buying experience</li> </ul>	<ul style="list-style-type: none"> <li>■ Ensuring the right products and support collateral are stocked</li> <li>■ Improving check out experience</li> <li>■ Maintaining product freshness</li> </ul>
<ul style="list-style-type: none"> <li>■ Reduce missed sales opportunities</li> </ul>	<ul style="list-style-type: none"> <li>■ Maintaining stocked shelves</li> <li>■ Recovering inventory misplaced on the store floor</li> </ul>
<ul style="list-style-type: none"> <li>■ Improve distribution efficiency</li> </ul>	<ul style="list-style-type: none"> <li>■ Moving beyond “assumed receipt” for received inventory</li> <li>■ Recovering inventory misplaced in the stock room</li> <li>■ Eliminating need for manual physical counting</li> <li>■ Reducing time and cost associated with product recalls</li> </ul>
<ul style="list-style-type: none"> <li>■ Reduce inventory shrinkage</li> </ul>	<ul style="list-style-type: none"> <li>■ Lowering inventory write-offs</li> <li>■ Reducing return fraud</li> <li>■ Enhancing loss and theft prevention</li> </ul>
<ul style="list-style-type: none"> <li>■ Improve distribution efficiency</li> </ul>	<ul style="list-style-type: none"> <li>■ Receiving in-transit inventory status (within internal supply chain)</li> <li>■ Receiving in-transit inventory status (across external supply chain)</li> <li>■ Recovering misplaced inventory</li> <li>■ Reducing inventory obsolescence</li> <li>■ Improving cross-docking and other distribution processes</li> <li>■ Improving asset utilization</li> </ul>
<ul style="list-style-type: none"> <li>■ Lower WIP and safety stock</li> </ul>	<ul style="list-style-type: none"> <li>■ Increasing “certainty” in demand planning</li> <li>■ Increasing visibility through the supply chain—supplier’s supplier</li> </ul>

# ...and a business case based on a detailed operational analysis, not just quoted benefits



**Customer**



**Retailer**



**Logistics Provider**

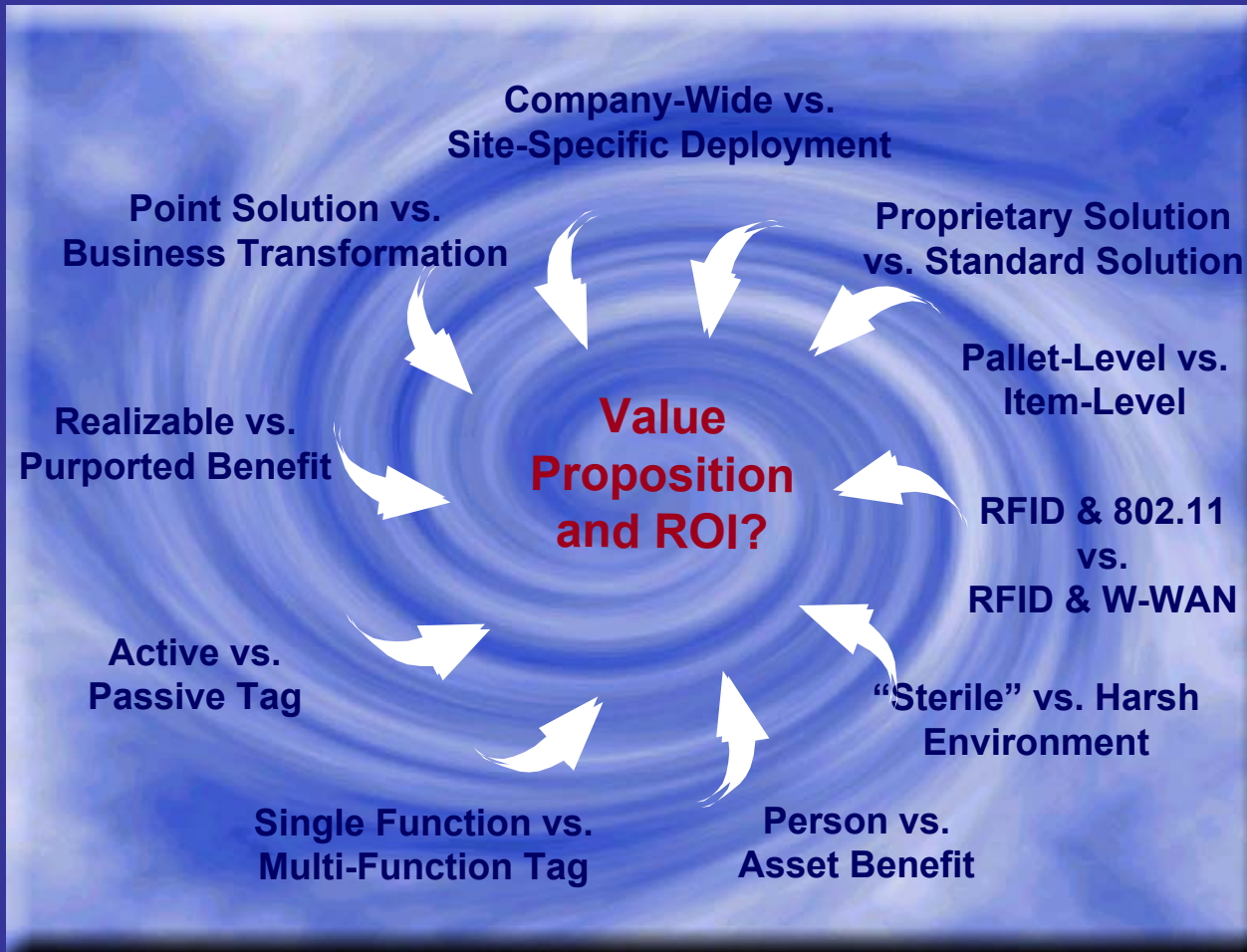


**Manufacturer**

Business Objectives	Current Challenges	Quoted RFID Benefits*
<ul style="list-style-type: none"> <li>Improve in-store buying experience</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring the right products and support collateral are stocked</li> <li>Improving check out experience</li> <li>Maintaining product freshness</li> </ul>	<ul style="list-style-type: none"> <li>The jury's still out!</li> </ul>
<ul style="list-style-type: none"> <li>Reduce missed sales opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining stocked shelves</li> <li>Recovering inventory misplaced on the store floor</li> </ul>	<ul style="list-style-type: none"> <li>2% to 10% higher sales</li> <li>5% to 8% improvement in store shelf stock rate</li> <li>5% to 10% lower inventory levels</li> <li>1% reduction in inventory shrinkage</li> </ul>
<ul style="list-style-type: none"> <li>Improve distribution efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Moving beyond "assumed receipt" for received inventory</li> <li>Recovering inventory misplaced in the stock room</li> <li>Eliminating need for manual physical counting</li> <li>Reducing time and cost associated with product recalls</li> </ul>	
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<ul style="list-style-type: none"> <li>Improve distribution efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Receiving in-transit inventory status (within internal supply chain)</li> <li>Receiving in-transit inventory status (across external supply chain)</li> <li>Recovering misplaced inventory</li> <li>Reducing inventory obsolescence</li> <li>Improving cross-docking and other distribution processes</li> <li>Improving asset utilization</li> </ul>	<ul style="list-style-type: none"> <li>1% to 5% higher sales</li> <li>2% to 13% lower warehouse and transportation costs</li> <li>5% to 10% lower inventory</li> <li>10% to 15% reduction in lead times</li> </ul>
<ul style="list-style-type: none"> <li>Lower WIP and safety stock</li> </ul>	<ul style="list-style-type: none"> <li>Increasing "certainty" in demand planning</li> <li>Increasing visibility through the supply chain – supplier's supplier to customer's customer</li> </ul>	

\* Sources: National Retail Federation, Grocery Manufacturers Association, Food Marketing Institute reports, studies and publications pertaining to RFID

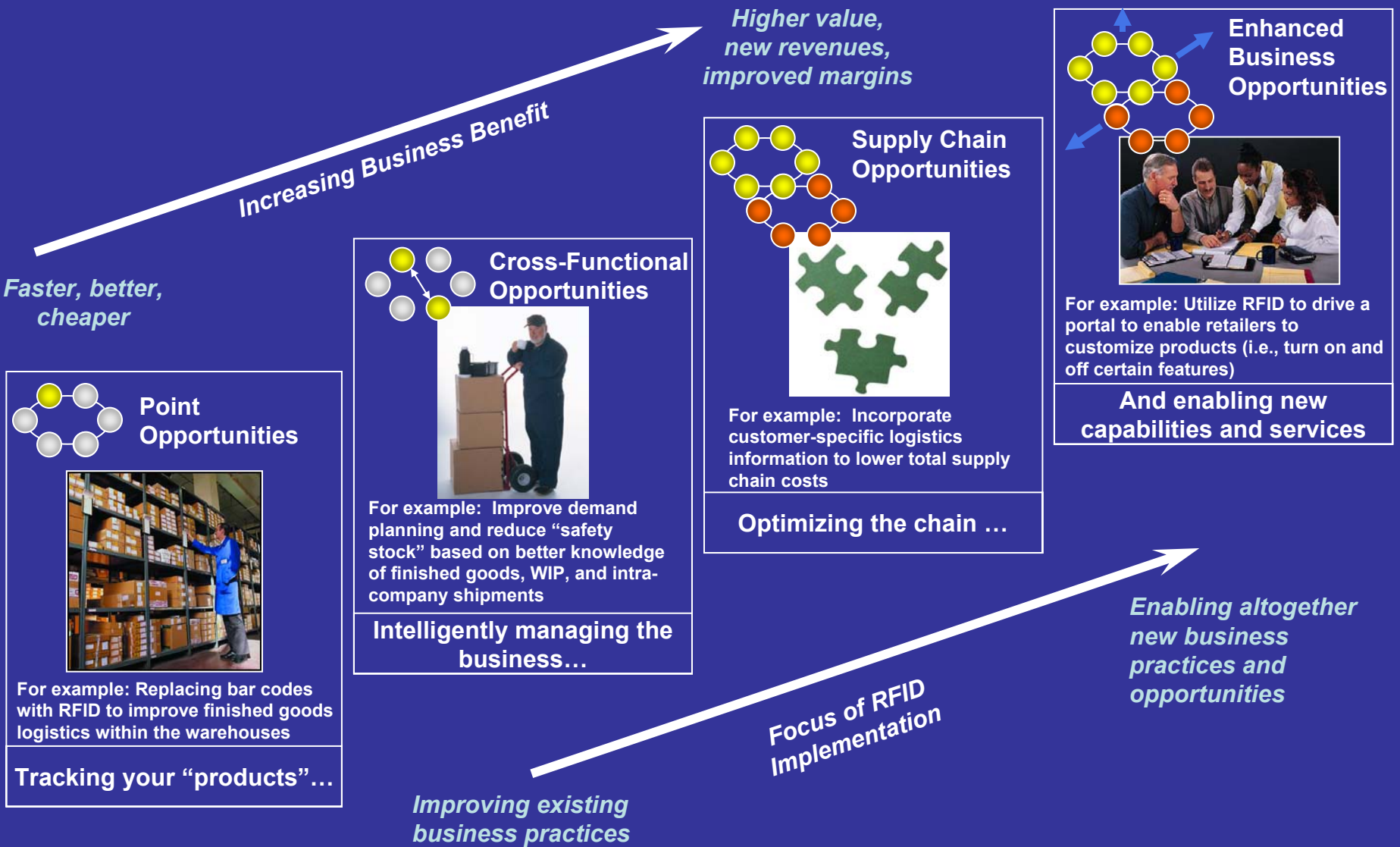
# In fact, success hinges on the ability to manage the complexity of business and technology considerations



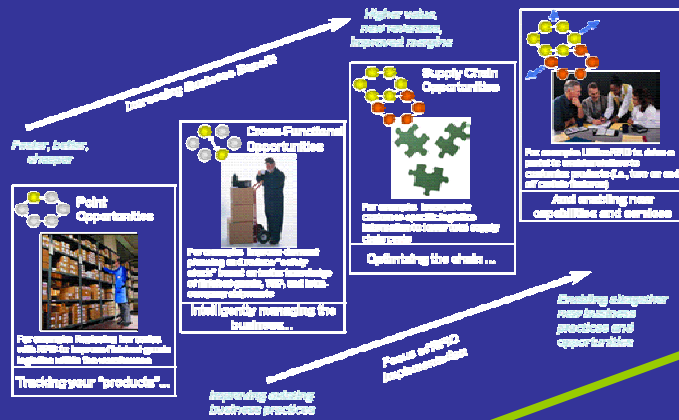
**Our problem statement is quite simple:**

***How can we plan, develop, and implement RFID-enabled solutions to optimize enterprise benefits?***

# RFID has the potential to provide multiple levels of benefits



# Lessons learned: What's common across pilots that are succeeding?



Clearly identified internal and external stakeholders...

With a well-articulated application roadmap (across segments, time)...

That is aligned to a *realistic* evolution in technical capability and feasibility, and...

That integrates into a core set of business processes, systems, databases...

With an organization that's aware, trained, and ready to take advantage of the value proposition...

And a business architecture that allows value to be created and re-distributed in the supply chain

## Critical Observation

If the business case for the "bottom left" cannot stand on its own (and requires future suites to achieve the required ROI), then either the reasons for implementing have to be strategic, or the answer is simply "don't do it"

# A robust framework to systematically determine if and where RFID makes sense is essential to defining and implementing a successful strategy

A systematic method that begins with users, their applications, and needs

- Users need not be “people”
- RFID enables P2D and D2D communications

Understand environmental constraints

- Noise, vibration, RF, temperature, etc.
- Regulatory

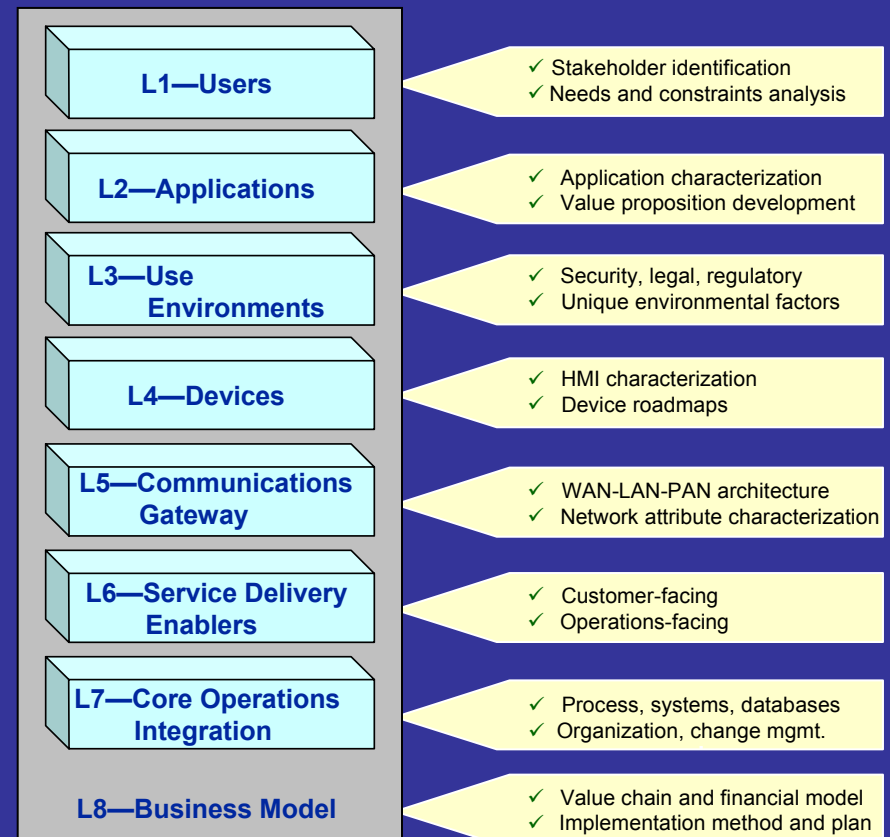
Understand the technologies that are required

- RFID is a means, not an end
- Other wireless/wired complementary technologies will be required

Understand the economics and the implementation model

- Partnering for technology, business process configuration, stakeholder buy-in is critical

## PRTM's AIM<sup>®</sup>: *m-Powering Enterprise*<sup>™</sup>



# Mobile RFID



**From Bar Code Scanner to RFID**

**Custom Network Solutions -  
seamless movement from WLAN to  
nationwide voice/data network**

**Increased visibility to supply chain**

**Mobilize workers**

**Manage workers**



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# Supply Chain Possibilities



“Mobile RFID” – inventory tracking during transport

Combine with GPS location tracking

Increased visibility to supply chain

Reduce shrinkage during transit



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# Conclusions



**“Mobile RFID” combined with GPS location tracking, and Direct Connect instant communication can yield the most powerful supply chain visibility yet!**

**Business cases will vary significantly by customer.**

**The most clearly articulated need to date is reduction of shrinkage.**

**Marketing opportunity timing for solution sets is not yet clear.**

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# Conclusions

## RFID is technologically viable

- A broad array of solutions are currently available, although standards are still settling

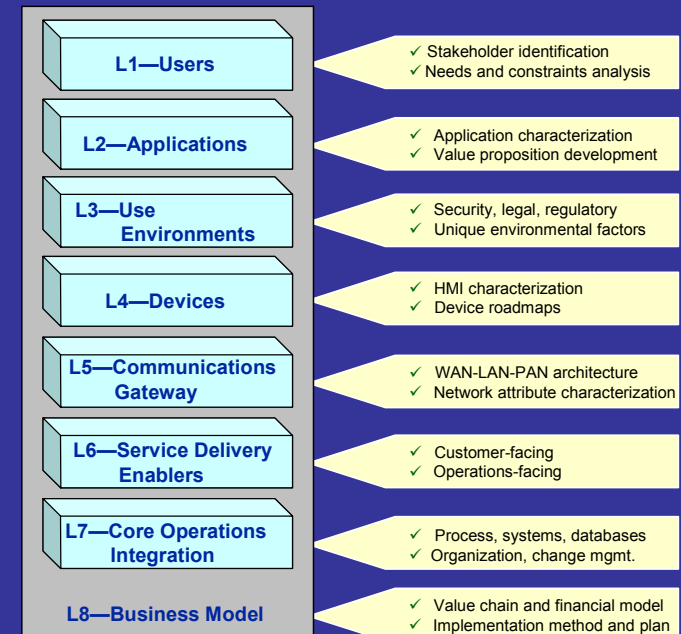
## RFID is economically viable

- Cost points have improved and are continuing to do so

## Realizing the business value proposition of RFID requires integrating technology, economics, and other factors in a systematic framework that ensures delivery of enterprise value

- Thoughtful planning allows for growth, but the business case should be solidly grounded in the immediate application
- Partnering for technology, business process configuration, stakeholder buy-in is critical

## PRTM's AIM®: *m-Powering Enterprise™*





**For more information, please visit:**

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