RFID STRATEGY AND IMPLICATIONS FOR A BUSINESS

We have been portraying the conflict surrounding acceptance or rejection of radio frequency identification in supply chains, taking care to point out arguments from both the advocacy and cynical camps. When a clearer picture of what is involved is mastered, and after a reasonable period of gestation, a company must make a decision on which course to accept and then build a definition of its RFID business posture into its strategic plan. We see a shortening of the time in which the decision can be forestalled, although some cynics are suggesting it is over a decade long. Forward and reverse are the possible directions, but a choice must be made and a strategy developed.

To aid the decision makers, we have promoted RFID as a tool in supply chain visibility and in a wireless technology business environment. With so many constituents seeking information in a contemporary supply chain, increased visibility in a real-time format has become essential. With communication across such an elaborate network also moving inexorably toward a wireless system, we again see a position for RFID to enhance the collaborative possibilities.

From both the positive and negative aspects, we will continue to consider how a firm involved in a supply chain and subsequently as part of an extended enterprise will find important applications for RFID, recognizing that some organizations will wait passively on the sidelines as the scenario plays out. Since we view the development as an inevitable trend, however, it is important that we position acceptance or rejection within a strategic framework.

Whether as a supplier, manufacturer, distributor, or retailer, the promises and problems surrounding RFID must be translated into a definite business strategy and operating plan — either endorsing or resisting the movement. With so much initial investment involved, this move cannot be made casually, although some firms are doing so just to meet the mandates they have received. For those firms determined to go forward, RFID implementation should be part of a controlled risk effort, within a coherent strategy that defines the position and applications for the technology.

At the same time, RFID can no longer be considered as just an experiment in progress. Once the costs and benefits are better understood, and a strong case for action is developed and accepted by senior management, it must be translated as well into a marketing plan, with the applications defined and timetables for execution established — so benefits can be achieved and a reasonable return on investment can finally be generated. This chapter will follow the emerging work in the RFID movement and show how some companies are following a game plan that meets the current demands of the large buyers while developing a strategy to provide adequate returns on the RFID investment.

GETTING BEYOND THE MANDATES TO A SENSIBLE STRATEGY

It is one thing to try and satisfy the demands of extremely large buyers, which in some cases might make the difference between survival and failure of the firm. In such a situation, the means of controlling risk is to adopt a strategy that includes meeting minimum standards while keeping costs as low as possible. With the movement toward RFID picking up steam, such a position can only be short term in nature. The number of RFID projects grows on a daily basis. More stable and uniform standards are appearing around the corner. Heavyweights, like Cisco Systems, have jumped into the picture and should help reduce the costs of entry and participation. Cisco says "RFID fits neatly into its long-term strategy to build RFID into its routers, switches, and software" (Sullivan 2005a, p. 25).

Many retailers are becoming more familiar with the technology and moving forward on their installation plans. Ace Hardware Corporation has been testing RFID and plans to deploy the technology across its 15 distribution centers by the end of 2005. Ace has the dual need to improve its supply chain costs and help with the supply chain needs of independent hardware store owners and their consumers. The company believes RFID will provide an assist. With these and more stories hitting the daily news, the reasonable approach is to begin

development of a substrategy to the current business plan, one that blends the RFID technology and use with existing strategies in a manner that controls the risk and prepares the firm to receive enough benefit to at least break even in the early stages, until a real return can be secured in the long term.

Developing such a strategy and positioning it within a supply chain effort will require attention to a number of important factors:

- Enumeration of the costs, delivery enhancements, potential savings, and effect on customer satisfaction that will be influenced by RFID applications — making at least an order-of-magnitude assessment of the costs and benefits involved with execution across an extended enterprise
- Definition of the steps necessary to execute a meaningful strategy for RFID and its relationship within the greater business strategy, operating plan, and supply chain model being pursued — explaining to key stake-holders what the firm plans to do and how it affects current business posture
- Exploration of piloting RFID-enabled processes with selected trading partners to identify shared benefits, instead of limiting RFID pilots to processes that take place within the "four walls" of the organization
- Listing the functions and services that acceptance and deployment of RFID can bring to the business and its supply chain strategy — identifying where value can be added beyond satisfying key customer mandates — including tactical and strategic issues
- Beginning documentation of the expected financial impact that will derive from an RFID deployment, starting with controlled experiments and pilot tests to provide meaningful metrics — getting your hands on what the future state might really look like and how it will affect profits

ENUMERATING POTENTIAL COSTS AND BENEFITS

E. & J. Gallo Winery offers an example of the first consideration, as this firm struggles with finding a sensible answer regarding deployment while faced with possibly conflicting needs. Gallo is pulled, on the one hand, by major retailers insisting on compliance and trying, on the other hand, to apply the RFID technology across its extensive distributor base. This California-based firm manages over 2,000 product SKUs in over 90 countries with 600 distributors/wholesalers. Gallo has been hard at work forging a plan for using RFID technology in its supply chain with an eye on both constituencies.

Since Gallo is among the roughly 200 second-wave consumer products companies required to ship its products to Wal-Mart stores with RFID tags on cases and pallets by a January 2006 deadline, the mandate is a partial driver behind action. To comply, Gallo is making a sizable initial investment and has set up a test project at its Modesto warehouse, where the firm is piloting compliance. Through this effort, the firm will most likely enhance its understanding of exactly what it will encounter as it moves forward along its path to compliance.

From another aspect, Gallo has an eye on some traditional supply chain issues in its business environment. Because of the particular requirements in its business, the wine maker needs to include its U.S. distributors in any Auto-ID picture, because state laws generally require that wine and spirits be sold to retailers through in-state distributors. Without the involvement of these distributors, the effort could be wasted. "This opens a discussion on who really owns the responsibility of the identification for the case and the mixed pallets," according to Ernie Chachere, Gallo's VP of supply chain. "There's a lot of discovery left to do," he states (Sullivan 2005a, p. 24). Gallo is well advised to use its pilot operation to determine what other costs and potential benefits might be involved as it completes its delivery of products through its necessary intermediaries. It can also use the experiment to determine the benefits or lack thereof to its vast distributor base.

Up to now, most suppliers and manufacturers have been keeping a close eye on the first wave of 137 Wal-Mart suppliers, committed to meeting a 2005 deadline. Large companies like Gillette, Procter & Gamble, and Unilever have already begun to ship pallets and cases to a number of Wal-Mart distribution centers in Texas, as part of the shorter term mandate. At the same time, German retailer Metro Group AG has gone further, with 20 suppliers shipping goods to 20 locations with RFID tags. Unfortunately, actual cost information is so far sparse at best. As these efforts continue to develop, a company caught in the web of compliance must enumerate the costs it will encounter, capture any potential savings it might find, determine how delivery might be enhanced, and postulate how the customer experience might be improved. This exercise begins with a rough estimate of start-up costs.

In our work, as of the publication of this book, we use the following budgetary figures (the low to high ranges are driven primarily by quantity, functionality, and feature) to determine an order of magnitude of the costs involved with RFID implementation:

- Passive RFID tags, passive 915-MHz Electronic Product Code (EPC) Gen 1 and 2 — $0.20 to $0.45 each

- RFID label printers (EPC Gen 1 or 2) — $5,000 to $8,000 each
- RFID high-speed label applicators — $15,000 to $25,000 each
- EPC-compliant antennas — $250 to $600 each
- EPC-compliant readers — $500 to $2,500 each

If a firm is planning its first pilot, in many cases purchasing a vendor's evaluation kit (which typically contains 100 tags, one reader, two antennas, power supply, data capture software, and associated cabling) for approximately $5,000 is a good first step. Also, in order to provide for reasonable budgetary estimates when calculating first-year deployment costs, we suggest using the higher end of the estimates provided above.

Estimating the cost of the middleware to commission, capture, and manage the data provided by RFID is perhaps the most difficult area at this time. Simple one- or two-point applications (where a read point would be one reader) can be run using the software that is delivered with the RFID label printer, such as those provided by Monarch/Paxar or Zebra Technologies. This software, when used with Microsoft Excel, is adequate for capturing and storing RFID tag data. If your deployment strategy calls for adding several read points over a short period of time, coupled with using multiple label printers, serious consideration should be given to using one of the RFID middleware packages designed for more extensive deployments. These applications range in price from $15,000 to $100,000 depending on functionality, number of instances installed, and degree of integration.

When considering the purchase of RFID middleware, attention needs to be given to what you want the middleware to accomplish. Middleware application functionality varies from the simple (commission and record EPC number assignment) to middleware that can manage EPC number assignment as well as manage your RFID hardware infrastructure to the more complex arrangements that provide integration into your enterprise resource planning system. Also, almost all warehouse management systems now include RFID as an extension of their current solution offering. Matching the data management requirements to your deployment schedule and degree of integration will help determine what type of middleware is appropriate for your organization.

STEPS TOWARD AN RFID STRATEGY

With a rough cut on the costs and benefits, Figure 4.1 can be used as a beginning point in the strategy development we are espousing. A company embarks with the understanding that the first step in developing a strategy that impacts supply
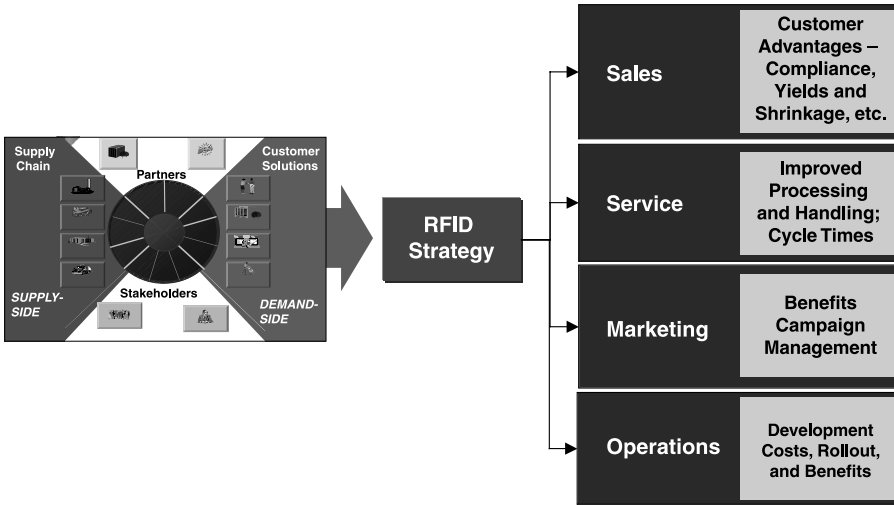
Figure 4.1. RFID Strategy Must Satisfy Stakeholder Needs: RFID Strategy Is Only a Part of the Greater Business and Supply Chain Strategy and Should Reflect the Impact on Key Elements of the Business

chain should define, confirm, and refine the common set of business requirements that the firm must satisfy. The second step is to develop a conceptual framework depicting a possible improved future state. Figure 4.2 was drawn for a pharmaceutical manufacturer seeking an improved delivery system and used as the firm developed its RFID/supply chain strategy. The improved state, of course, can be far more detailed, but it should identify the product flows and inventories to be positively affected by the RFID technology.

From this information, again using Figure 4.1, the company should identify the key stakeholders to be impacted by adoption of the RFID technology and decide how success will be defined and measured. In many cases, these constituents will be similar to those previously affected by bar coding or other auto-ID systems. Starting on the demand side of the illustration, but eventually expanding to the supply side, the firm creates a list of the key areas to be considered, like those in the figure. Each part of the developing matrix should include pluses and minuses, as the analysis must provide an honest and frank evaluation of what adopting an RFID strategy will mean to the business and its important stakeholders.

For each of the constituents chosen, the resulting in-depth analysis should generate a point of view on what is intended to be accomplished and what the

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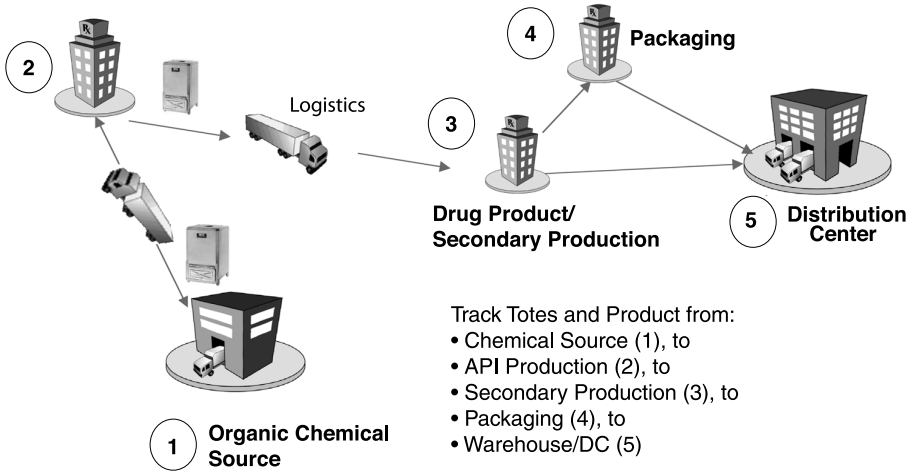
Figure 4.2.   Pharmaceutical Manufacturer's World

basic implementation plan might include. Fitting any plan within the greater context of the overall company strategy and business plan will serve to assure these stakeholders that the adoption of RFID does not change the current business posture, but reinforces the basic tenets. Eventually, each of these stakeholders should find extra values as a return on the effort.

Figure 4.3 goes to the next step and illustrates the processes involved in forming a specific RFID strategy. It begins with a market analysis that reviews the industry imperatives, as understood at the moment and as anticipated in a near-term and long-term time frame. That should include the positives and negatives. A review of what competitors might be doing or planning should be included, with an assessment of what impacts can safely be anticipated from the technology adoption. A few of the most important customers and samples from other parts of the segmented customer base should be analyzed to develop a picture of the expected customer reaction. A projection of RFID hardware costs (tags, antennas, readers, etc.) must be made in order to understand at what point an acceptable return on investment can be achieved. Also, a survey of potential government regulations (e.g., food or pharmaceutical tracing) that could affect the business process of the organization must be incorporated as part of the strategy. Other factors of importance to a specific situation can be included, but the market analysis must reflect an honest assessment of what is going to be a part of the business future.
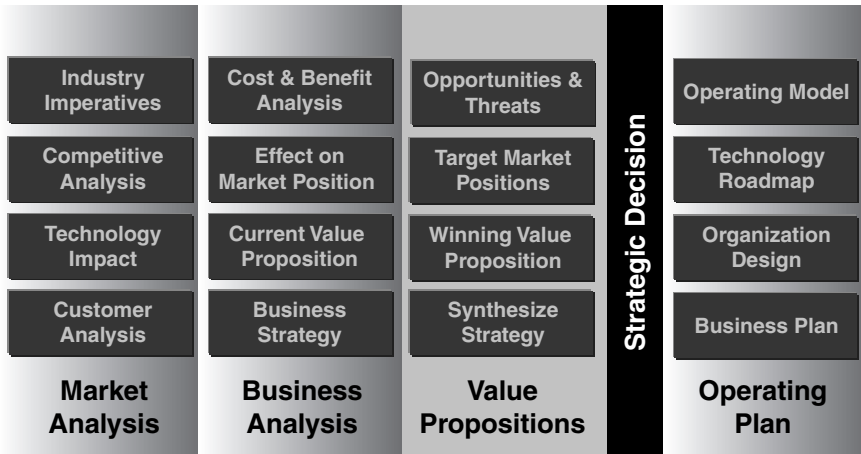
Figure 4.3. RFID Strategy Process

While this book contrasts the arguments for and against RFID adoption, our premise is that RFID will be an effective tool in supply chain management. Our recent experience has shown that any organization, whether it is under a mandate or not, should evaluate the potential benefits, opportunities, and challenges of RFID as part of its overall supply chain management strategy. In fact, a review of the case study material available to date indicates that early adopters are uncovering real bottom-line benefits from the use of RFID within their own operations and that further benefits arise when incorporating applications with their trading partners.

Every business seeking to resolve an RFID strategy needs to answer five critical questions here and for the balance of the strategy development process:

■ How sustainable is the business or how much and what part might be at risk if RFID becomes an accepted business practice in our industry or market?
■ How capable are our existing processes to accept the changes, meet the expected needs and demands of the market, and satisfy key customers with RFID as an enabler?
■ What is the cost/benefit of noncompliance?
■ How can the technology be used beyond compliance to enhance other processes within the supply chain?
■ What is the best strategy to succeed and add value for all constituents?

The answers to these queries will help establish the background against which any decisions will be made. Now the second step in creating an RFID strategy is to develop a business analysis that applies the answers to the questions and begins to fit the emerging concepts with market conditions, without bankrupting the firm. In the business analysis sector of the process diagram, the firm starts with an outline of whatever is known about costs and benefits, drawing on what came out of the first step. Consideration must be given to the anticipated effect on market position of having or not having RFID capability. Then a look is given at the current value proposition being brought to the market to determine if it needs modification or, more correctly, how the RFID strategy can be successfully harmonized to appear as a logical extension of the current approach. Then the business strategy starts to unfold — as an extension of the current strategy and business plan.

When value propositions are considered, the effort moves to another level, and a deep and frank review is made of the opportunities and threats posed by adoption or rejection of the RFID technology. Now the firm considers target market positions and how the opportunities and threats will directly impact important segments. The hardest part of the exercise is to then develop winning value propositions that not only secure the desired market positions but provide a reasonable return on the effort. With these values in hand, the firm then synthesizes the strategy into sellable bullet points, understandable across the business, and begins co-development of an execution plan with key network constituents. Upon thorough review of what has been developed and most likely many iterations, a set of strategic decisions are then made to guide the rollout and deployment — hopefully through risk-mitigating pilots and test to prove the value of the chosen concepts.

Upon verification of these decisions through positive test results, a modified business plan is created, reflecting the new operating model (as an adaptation to the existing model), with a technology roadmap to guide implementation of the RFID strategy. Whatever changes are needed to organizational design are documented and explained, and a final business plan is blessed by all key stakeholders, so execution can begin in earnest. However, it is important to accept early in the planning process that this is a plan that must be constantly updated with new information gathered from pilot tests, proof-of-concepts, new RFID market data, customer requirements, and legislative activity.

Once the operating model has been developed, the firm should determine how the supply chain will be better enabled. That requirement sets up the need to document the enablement options, as described in a generalized case in Figure 4.4. Here we see many of the supply chain constituents arrayed against
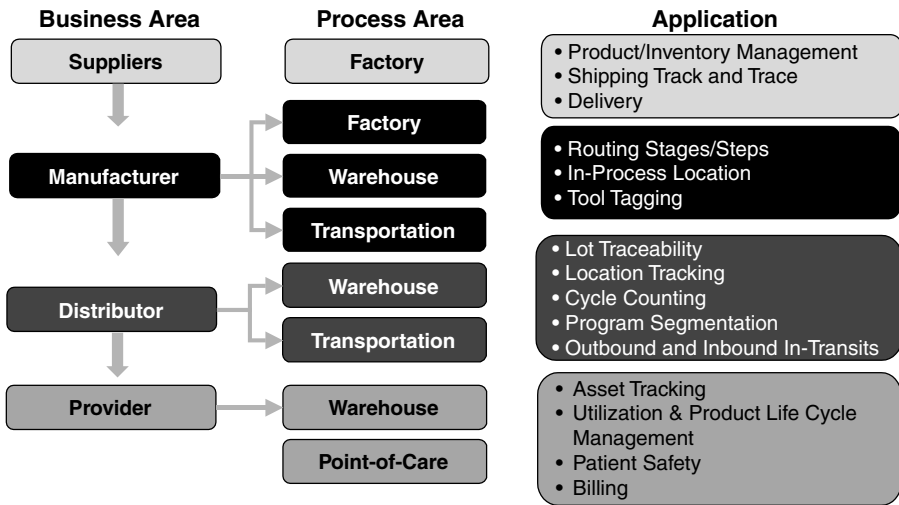
Business Area	Process Area	Application
Suppliers	**Factory**	• Product/Inventory Management • Shipping Track and Trace • Delivery
Manufacturer	**Factory** **Warehouse** **Transportation**	• Routing Stages/Steps • In-Process Location • Tool Tagging
Distributor	**Warehouse** **Transportation**	• Lot Traceability • Location Tracking • Cycle Counting • Program Segmentation • Outbound and Inbound In-Transits
Provider	**Warehouse** **Point-of-Care**	• Asset Tracking • Utilization & Product Life Cycle Management • Patient Safety • Billing

Figure 4.4. Document RFID Enablement

the affected process areas and some possible RFID applications. Again, this model must be customized for the specific firm and industry.

DOCUMENT VALUES TO BE ADDED WITH RFID

With so much controversy present, the advocates and cynics will be busy delivering opinions on the model and strategy, during the development process and as the final strategy is revealed. As a supplement to the previous step, the go-forward firm should begin listing the functions and services that an RFID deployment can bring to the business and how it will augment the supply chain strategy. We recommend beginning with the functions and process steps in the supply chain that will be most affected by having greater visibility. A review of the current process map for the business provides a valuable assist in this regard, from which the firm can select its starter kit of potential improvements. We like to include:

- **The customer order management process** — where RFID can improve the accuracy of incoming data and enhance the transfer of data from point to point
- **Inventory planning and management** — where RFID can result in the need for less inventories (raw materials, work in process, subparts, and

finished goods) by virtue of being able to quickly identify the quantity and location of all goods in the end-to-end supply chain network

- **Purchasing, procurement, and strategic sourcing** — through lower costs generated through less embedded scanning, locating, expediting, and tracking costs on the part of suppliers
- **Manufacturing, fabricating, and production** — because of lower handling costs, better tracking of supplies without calling for duplicates, and greater ability to perform under a kanban or advanced just-in-time delivery system
- **Warehousing and distribution** — with significantly lower cost to verify contents, locations, and availability of needed supplies and finished goods
- **Transportation management** — because of fewer emergency shipments, better cross-docking, and fuller loads by virtue of knowing exact locations and readiness for pickup
- **Customer response and calls for service** — through elimination of the bulk of requests to find missing products or to better match actual demand with what is in the supply chain
- **Customer billing and accounts payable** — to improve the speed of collections and to reduce some of the current deductions and invoice reconcilement process

As an example of the last function, consider an opportunity to use RFID to enable more accurate Advance Shipping Notices (ASNs), to reduce discrepancies and invoice deductions. According to one system analyst and supply chain expert, consumer products manufacturers lose as much as 10 percent of their total annual sales due to invoice deductions by retailers, with only about 14 percent being recovered. If that amount could be improved by half through revised ASN processes, these manufacturers could regain three-quarters of a point of profit on the bottom line — in addition to savings in operations and customer service.

One expert, Joe McKinney, advises: "Even manufacturers choosing a 'slap and ship' strategy for RFID compliance can attack the [invoice deduction] problem by RFID-enabling one door shipping to the RFID-requesting retailer. By providing a point of shipment ASN to their customers, rather than a picklist based ASN, and by requiring a matching point of receipt proof of delivery from their customers, manufacturers drive up ASN accuracy while driving down invoice deductions" (McKinney 2005, p. 29).

It should be kept in mind that the RFID technology field is still in a development stage, and new innovations and ideas will mold its eventual full capability, the benefits of which may be hard to initially define. As implementation

grows, some very interesting applications appear. NASA has completed a successful test of RFID tags as part of an effort to create a real-time network that "would continuously monitor hazardous chemicals stored in five National Aeronautics and Space Administration facilities at Edwards Air Force Base in Southern California." The purpose is to "detect and react to break-ins, chemical thefts, and dangerous spills" (Sullivan 2005b).

On occasion, a strategy will move forward without the traditional clear return on investment. However, couldn't such a system be used by any organization that needs to monitor, manage, and report the status of OSHA-designated hazardous chemicals in use within its own operations? Couldn't a case for return on investment be made by improving worker safety and reducing insurance liability? Answers to these queries broaden the scope for finding returns on the effort.

RFID-powered global networks continue to take shape as well. The U.S. Department of Defense (DOD) is deploying such a system to capture benefits in its supply chain, which will be described in Chapter 6. RFID has already been credited with saving DOD "$300 to $500 million, reducing required support containers by 90% and shortening critical supply cycle time in the current Operation Iraqi Freedom campaign." The federal agency will continue to use bar codes, but views "RFID as a critical enabling technology for DOD Logistics Transformation, a program to facilitate hands-free capture for an integrated DOD supply chain enterprise" (Sarma 2005, p. 1).

From a general viewpoint, among the more obvious potential values to be brought to these functions and services, we suggest:

■ Definition of what values can be added to core competencies that will result in sustained or increased revenues and enhancements to desired supply chain results — such as visibility into the processing so goods can be identified anywhere in the supply chain and duplicate or redundant steps or inventories avoided and customers no longer guess at what is being delivered and can make changes without disrupting the supply chain.

■ Alignment of the supply chain effort, using RFID as an enabler with the company's business objectives — so the key customers do not feel threatened during the transformation and develop additional backup sources of supply. By sensing the change as an extension of previously successful systems of identification and response rather than a potentially irresponsible gamble, most customers will exhibit more patience during the inevitable ramp-up curve of execution.

■ Establishment of a consistent communication message that drives successful implementation and elicits further development of payback fea-

tures, by making everyone aware of the strategy, expected impacts, timetables, and elements of risk. In that way, each party affected can do its planning as well, with the understanding of what might or might not develop as deliverables.

- Reduction of any potential gaps in expected performance that could radically erode market position or put the firm at risk versus more adept competitors. Since the effort is not going away, the firm is well advised to create a strategy and get it tested, so any shortcomings are quickly addressed and removed.
- Development of a go-forward framework or roadmap that will minimize the inherent risks and eventually justify the trip — completed through enough actual pilots, tests, and direct experiences to show the actual costs and benefits and a roadmap to a successful future state.

At a more generic level, some of the reasons that support becoming involved with RFID include:

- Improved return on assets and capital employed through less working capital tied up in obsolete or redundant inventories
- Facilitation of product recall and traceability of damaged or disputed goods
- Increased asset accuracy through the presence of an invisible asset tag that is permanent
- Reduced data capture labor and back office functions
- Improved planning and delivery systems enabled through more accurate real-time data
- Improved compliance to Sarbanes-Oxley reporting requirements

BUILD A FINANCIAL CASE FOR ACTION

The next step is to go beyond order-of-magnitude cost and benefit estimates, and the estimated benefits described, to develop an actual financial case for action. The question being answered at this point is: Why are we going through the proposed set of activities supporting this RFID strategy? The answer must provide a reason for developing, selling, and delivering an RFID-based solution or system to customers — those demanding compliance and those unsure of the overall benefits. Where costs are still unknown and new technologies expected to have an impact, reliable ranges can be used, but the purpose is to document what will be encountered, so the risks can be evaluated and kept under control. Pilots and tests, of course, can be a part of this effort, as the mysterious becomes more concrete.

During this part of the effort, the focus should be kept on business process improvement rather than technology, using the former to get the processing correct and the latter to enhance the processing. As the RFID strategy progresses and alignment around its concepts takes place, it is extremely important to keep the focus on improving the business processes in need of change, rather than adopting the technology and developing its use. A firm should take a holistic look at its business operations to identify the most significant threats and opportunities. RFID should play a role in completing and enhancing the business processes involved and helping to create a leading system. The best advice is to create self-funding opportunities early that meet the normal return on investment guidelines applied to other investments, but generate short-term paybacks through labor cost reductions, capital avoidance, better asset management, inventory shrinkage, less out-of-stock costs, and customer service improvements. Some firms have found the way to modify their drive for compliance to include some internal improvement features and create better solutions.

Surveys conducted among a sizeable number of industries and companies have identified the following categories of business problems for which the companies believe RFID will help provide solutions:

- Shipping and receiving costs and time
- Inventory management and reductions to shrink and obsolescence
- Data quality across many supply chain links
- Greater visibility into the supply chain network
- Reduced out-of-stocks at the store level and moment of purchase
- Potential to share meaningful data and collaborate with supply chain partners
- Better production control — through more accurate matching of supply with demand
- Reduced theft
- Lower warranty and repair costs

THE ENDGAME BECOMES WIRELESS INVENTORY TRACKING

Thanks to the mandates issued by Wal-Mart, the DOD, and many others, deployment of wireless inventory-tracking systems is moving at a fast pace. At the same time, the field of wireless technology is making great strides, indicative of an emerging trend and the importance of having ubiquitous access to all constituents of a supply chain network. Through wireless technology,

suppliers, manufacturers, distributors, retailers, and any necessary third party or intermediary can have untethered access to exactly what is happening within a total system. With the expected removal of constraints to the adoption of wireless technology, such as disparate standards, low bandwidths, and high infrastructure costs, wireless is being adopted for a host of applications — voice and messaging, handheld devices, Internet-enabled equipment, and data networking.

Computers are being connected to allow remote monitoring and data acquisition, to provide access control and security, and to introduce a solution for environments where wires may not be appropriate. Cellular phones, pagers, and two-way business radios can now provide voice and messaging services. Internet-enabled cell phones and personal digital assistants have appeared to connect users to the Internet across a wireless system. New protocols have been introduced just for these devices. Wireless local area networks, for example, can provide the final few feet of access to mobile users and wired systems within a building, restaurant, store, or home.

Broadband wireless is another emerging technology that allows simultaneous delivery of voice, data, and video and could become a competitor to digital subscriber lines. It can enable high-speed connections directly to the key supply chain participants and information they seek, whenever they choose. Ultra-wideband technologies are also being used, to bring the convenience and mobility of wireless communications to high-speed connections in devices appearing throughout the business world.

Bluetooth has come on the scene as a technology specification for low-cost, short-range (up to ten meters) links between mobile PCs, phones, and other handheld devices, with connectivity to the Internet. The Bluetooth wireless technology comprises hardware, software, and interoperability requirements, providing a bridge to existing data networks. Companies promoting this technology include some impressive names: 3Com, Ericsson, IBM, Intel, Lucent, Motorola, and Nokia. Consider a call of importance somewhere in the supply chain that can jump directly to the Internet, bypassing conventional telephone lines and avoiding typical tolls, high costs, and fees. The call can be transferred anywhere in the world, easily covering the extremities of the supply network.

All of these developments, with more to come, are introducing businesses to a world without wires. Today, most communication systems require wires to record, play, or exchange data. The wireless technologies will allow people to dewire their offices and create virtual global systems of connectivity. A supplier that wants to alert a system regarding a pending shortage could put a mobile PC on a desk and instantly connect to a customer's printer, scanner, or Voice over Internet Protocol (VoIP) headset. A mobile computer user who

needs to transfer this knowledge could wirelessly connect to a digital projector in a conference room to deliver the message.

Now fit RFID into this scenario. RFID simply connects your assets and inventory to the Internet — wirelessly and at the unique item level. Instead of speculation or interpretation of actual events, you gain real-time visibility into location and condition. More importantly, you gain the ability to act on real-time information. Imagine a five-store promotion of a new product introduction. Even with RFID at the case level, you can view product movement and adjust product availability to meet real-time demand. For example, Wal-Mart is posting product movement data through its RFID read points within its supply chain 30 minutes after the read event has occurred. Supply chain execution management software at the supplier can use this information to adjust and manage product to where it is needed most.

THE EXECUTION PLAN ESTABLISHES THE PILOTS AND ROLLOUT

When all of these factors are considered and the strategy is formalized, as a vital link in the greater business strategy and operating plans, the firm is ready to begin implementation. The execution plan that supports this phase should include setting up pilots for testing and verification. This technique will be covered in detail in Chapter 10. However, we advise that these pilots be well defined and relatively quick. Three months is usually more than adequate to test the pilot hypothesis and gain enough information to make adjusts to the deployment plan. To minimize the risk, these pilots could also include simulations of actual conditions, so real values can be determined before putting too much at stake. Acceptance or rejection will depend on documented results. With the accumulation of the test results, acceptance and rejection will be based far less on simple compliance and speculation and more on elements that support the new strategy and guarantee a reasonable return on investment.

CASE ILLUSTRATION

A case study will help illustrate how a firm moves through an analysis of the potential of RFID and first establishes a vision of where it wants to go with applications and then builds a solid model and strategy for execution. Our case firm is Marks & Spencer, a British retailer selling entirely proprietary-branded products, with annual turnover of $15 billion. Its food division sells almost $7

billion of merchandise per year, equating to 150 million cases of annual through-put. Marks & Spencer Foods has 200 suppliers, many of which are fully dedicated to the firm. The company operates six stockless regional distribution centers that service 400 stores, replenishing stores twice per day without having to carry back room inventories. It is a very fast supply chain that operates with 24-hour supplier-order-to-shelf lead time for key categories of product. Many stores receive daily deliveries, with a delivery window of 15 minutes.

The Opportunity

Marks & Spencer Foods utilizes reusable plastic trays to transport a significant percentage of merchandise through its supply chain. In 2001, the organization decided to replace the tray pool, moving from an imperial to a metric footprint. A compelling business case existed, based on improved vehicle and warehouse utilization. This program necessitated the removal and replacement of all trays and presented Marks & Spencer with a unique opportunity to embrace RFID technology. The decision was taken to "tag" all trays prior to their release into the network at a cost of $0.75 per tray.

Marks & Spencer developed a pragmatic business case for an RFID-enabled food supply chain. The model was based upon a reduction in operating costs and an improvement in business process execution. It is worth noting that RFID potentially provides a significantly greater opportunity in the form of reduced waste, increased availability, and thus, improved sales. However, while there is little doubt such benefits will be enjoyed, these metrics are notoriously difficult to isolate and attribute to a single factor, thus endangering the robustness of the business case.

The Early Stages

The company performed extensive testing of the robustness and applicability of RFID technology under live conditions, focusing on the impact of environmental conditions and operator behavior on read accuracy and speed. With a "clean bill of health," the program moved through to pilot stage, where RFID could be applied within an operational environment. This process enabled Marks & Spencer to evolve the hardware, software, and business processes to maximize potential benefits. For example, the tag readers installed at retail distribution centers (RDCs) evolved through four iterations before a truly ergonomic design was successfully developed. Once a deployable solution had been signed off on, the supply base was engaged and rollout commenced in earnest.

The Solution

Prior to RFID implementation, Marks & Spencer Foods used single-trip bar-coded labels to capture and communicate tray-level information. However, due to the fast-moving nature of the operation and the need for tray-level scanning, the only point at which stock could be scanned was at RDC receipt. This condition caused conflict with suppliers over order accuracy. Similarly, no auditable control existed to ensure pick and dispatch accuracy from RDC to store. Consequently, future supplier orders and store replenishments were derived from inaccurate system stock positions, thus impacting availability and waste.

The RFID strategy, as illustrated in Figure 4.5, involved equipping all supplier premises and Marks & Spencer RDCs with RFID readers/writers. The speed with which RFID technology transmits data ensured that suppliers could write product data to the tag at the point of production (overwriting any previous data) and generate an accurate dispatch manifest without adversely impacting delivery timeliness. RDCs could likewise capture dispatch details for store deliveries, ensuring store stock file integrity. The tray-level bar code scan on RDC intake was naturally replaced by an RFID bulk data capture, which generated significant savings in direct labor costs.

The high-level process clearly illustrates a robust commercial handoff between supplier and retailer, improving collaborative working practices. Although the solution requires suppliers to invest capital in RFID reading/writing technology, Marks & Spencer can point to numerous examples where suppliers have seized the opportunity and, through improved efficiency and reduced punitive charges, realized payback on investment in less than six months.

The schematic also illustrates the positive impact of RFID on stock replenishment. By crediting the store stock file with accurate delivery data, a foundation is created for replenishment systems to generate accurate supplier orders and effectively allocate stock to stores. Such a process prevents the cycle of deterioration created by basing decisions on increasingly inaccurate stock positions.

Conclusion

Unlike many early adopters of RFID in a supply chain environment, Marks & Spencer has progressed well beyond the pilot phase. The metrication program and closed-loop supply chain have been key enablers of the rapid success of the project. Marks & Spencer can today directly attribute significant bottom-line savings to its RFID implementation and has fully justified its original business case for investment in an RFID-enabled supply chain.
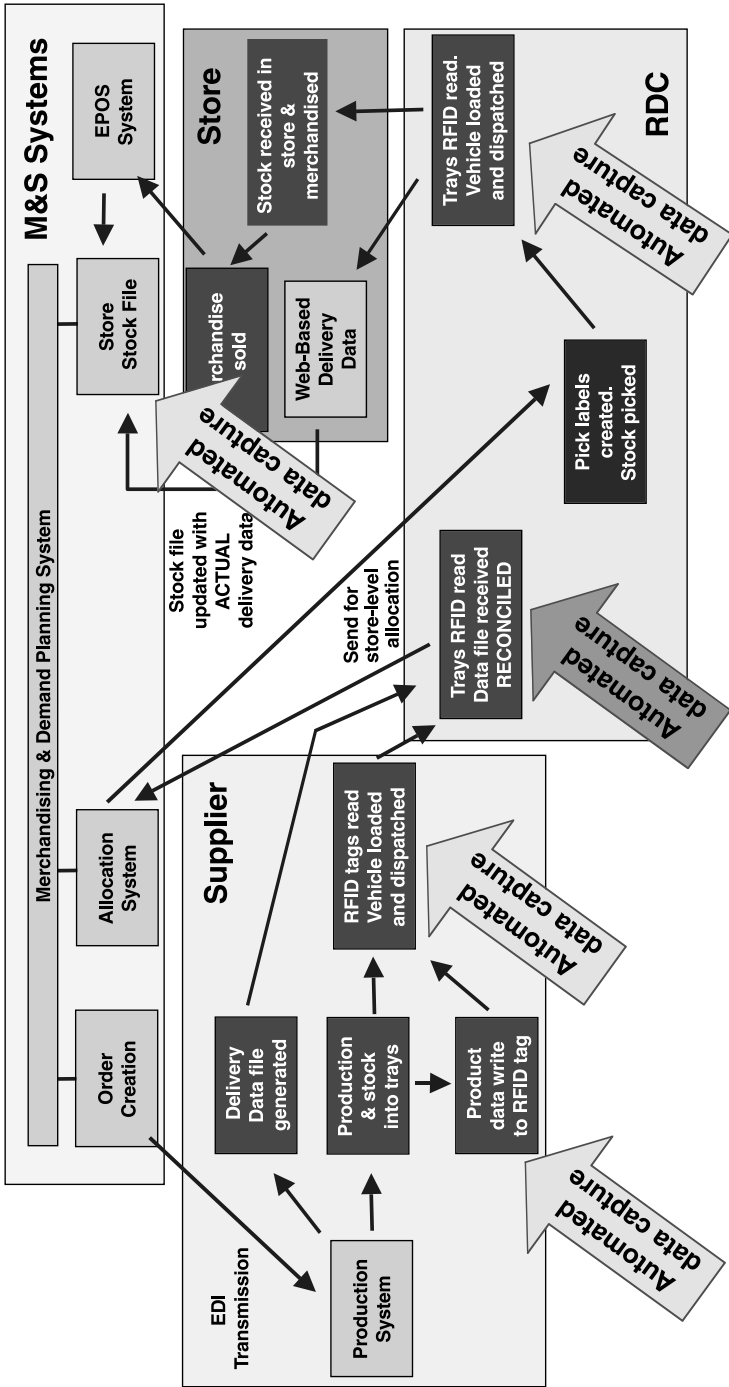
M&S Systems

EPOS System

Store

Stock received in store & merchandised

Trays RFID read. Vehicle loaded and dispatched

RDC

Store Stock File

rchandise sold

Web-Based Delivery Data

Automated data capture

Merchandising & Demand Planning System

Pick labels created. Stock picked

Stock file updated with ACTUAL delivery data

Automated data capture

Send for store-level allocation

Trays RFID read Data file received RECONCILED

Automated data capture

Allocation System

Supplier

RFID tags read Vehicle loaded and dispatched

Automated data capture

Order Creation

Delivery Data file generated

Production & stock into trays

Product data write to RFID tag

EDI Transmission

Production System

Automated data capture

Figure 4.5. Case Study: Marks & Spencer Foods RFID-Enabled Supply Chain Vision

SUMMARY

Promises and problems are included in the continuing debate surrounding acceptance or denial of the RFID technology. Our analysis favors the advocates in this situation, and we have outlined a methodology for developing an RFID strategy, as an adjunct to an existing strategy and business plan. Analyzing all of the factors involved and the potential impact on the key stakeholders will help determine whether the path forward should include acceptance or rejection of RFID.