



# **SUPPLY CHAIN TECHNOLOGY: MANAGING INFORMATION FLOWS**

# Learning Objectives

After reading this chapter, you should be able to do the following:

- Appreciate the overall importance of information to supply chain management.
- Understand the role of information technology in the supply chain.
- Explain the key components of an integrated supply chain information system.
- Describe and differentiate between the primary types of supply chain solutions and their capabilities.

- Discuss the critical issues in technology selection and implementation processes.
- Recognize the role of emerging technologies for improving supply chain information management.

# The Role of Information in the Supply Chain

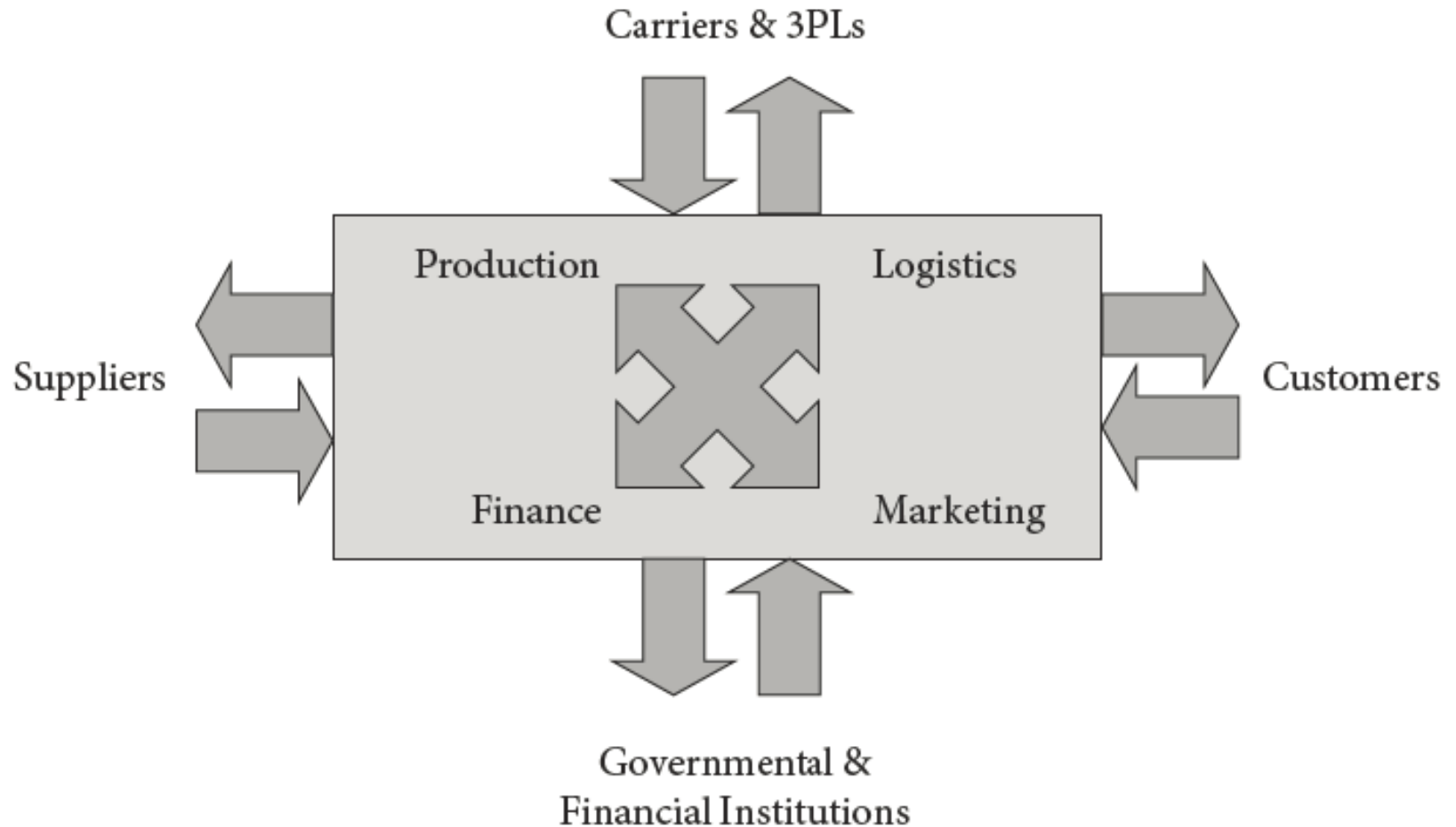
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- Information requirements
  - Accessible
  - Relevant
  - Accurate
  - Timely
  - Transferable

- **Information technology capabilities**
  - Information technology has a direct positive impact on organizational performance, internal and external collaboration.
- **Information technology challenges**
  - Viewed as a solution rather than a facilitating tool.
  - People do not understand or use it properly.
  - Supply chain practices not changed to match new technological capability.
  - Patchwork quilt of technologies.
  - Poor planning and preparation.

## Figure 6.1

# Supply Chain Information Flows



Source: Brian J. Gibson, Ph.D.

# Table 6.1

## Drivers of Sustainable Supply Chain Practice

DRIVER	DEFINITION	ROLE OF TECHNOLOGY
Optimization	The alignment of global supply chain resources—both tangible and intangible, own or outsourced—to facilitate the success of supply chain members.	A variety of software is available to help maximize supply chain performance. Optimization tools analyze all possible options to find the best solution to a supply chain problem, such as finding the most cost-efficient delivery routes within a set of delivery requirement constraints.
Synchronization	The ability to coordinate, organize and manage end-to-end supply chain flows—products, services, information, and financials—in such a way that the supply chain functions as a single entity.	Technology facilitates real-time data availability and sharing between supply chain partners. The information provides common insight and facilitates collaborative decision making by the partners.
Adaptability	The degree to which respective supply chain members can change practices, processes and/or structures of systems and networks in response to unexpected events, their effects or impacts.	Supply chain tools generate actionable information by collecting vast amounts of data regarding demand, inventory flows, and orders; filtering the data; and presenting it in a form that can be readily used. That is, technology tools allow users to quickly adjust to changes in the supply chain.
Velocity	The speed at which end-to-end flows occur in the supply chain. It encompasses speed-to-market for new product introduction and execution when conditions are rapidly changing.	Properly implemented technologies help organizations rapidly respond to customer requirements for faster, more consistent flows of materials and information. Event management tools have the capability to address problems dynamically, provide recommendations, and automatically resolve the issue.
Profitability	The result of creating value through supply chain activities. Asset performance, working capital, returns on investment for infrastructure, technology, and people are some of the critical parts that create value in a global environment.	Technology tools help organizations manage inventory, transportation, and other key supply chain functions more effectively than could be accomplished manually. The outcomes are greater control of costs and enhanced customer service that generate stronger profits.

Source: Brian J. Gibson, Ph.D.

# A Framework for Managing Supply Chain Information

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- Foundation elements

- People

- *Competence of staff influences success*

- Processes

- *Must be current and aligned with Supply Chain technology*

- Technology

- *Should be based on open systems concept*

- Key requirements

- Data collection

- Data synchronization

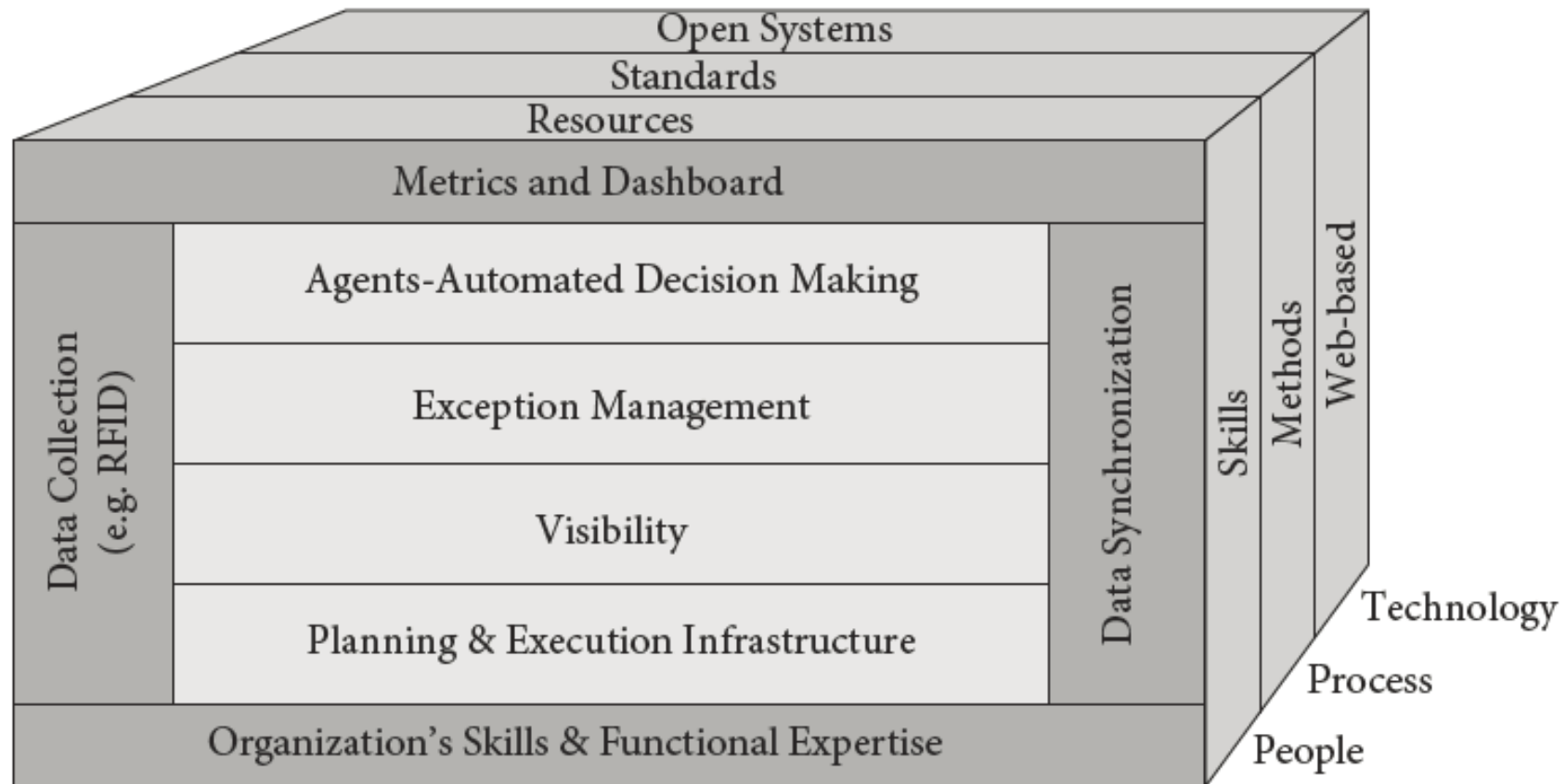


## ● Differentiating capabilities

- Visibility tools
  - *to provide seamless flow of timely important information.*
- Exception management
  - *to detect problems and alert organizations enabling rapid corrective action.*
- Automated decision making
  - *are in the future but will take input from exception management systems and develop the optimal response.*

## Figure 6.2

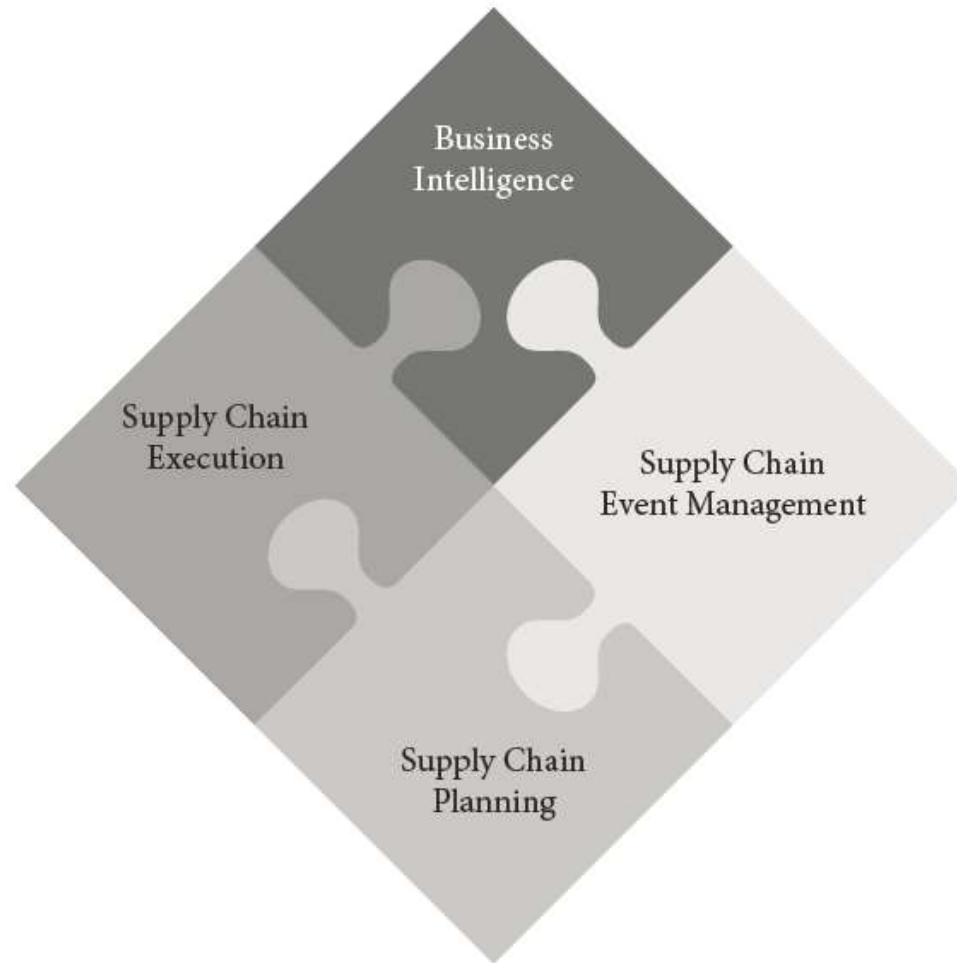
# Master Model of Supply Chain Excellence



Source: Moore, Manrodt, and Holcomb, *Collaboration: Enabling synchronized supply chains*, 2005 report on Trends and Issues in Logistics and Transportation, Capgemini 2005

## Figure 6.3

# Supply Chain Software Categories



Source: Brian J. Gibson, Ph.D.

# SCM Software

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- Planning
- Execution
  - Supply chain execution tools and suites carry out key tasks from the time an order is placed until it is fulfilled. This order-driven category of software focuses on the day-to-day activities required to buy, make, and deliver the materials that flow through the supply chain.

## ● Event Management

- Supply chain event management tools collect data in real time from multiple sources across the supply chain and convert them into information that gives business managers a clear picture of how their supply chain is performing.

## ● Business Intelligence

## ● Related Tools

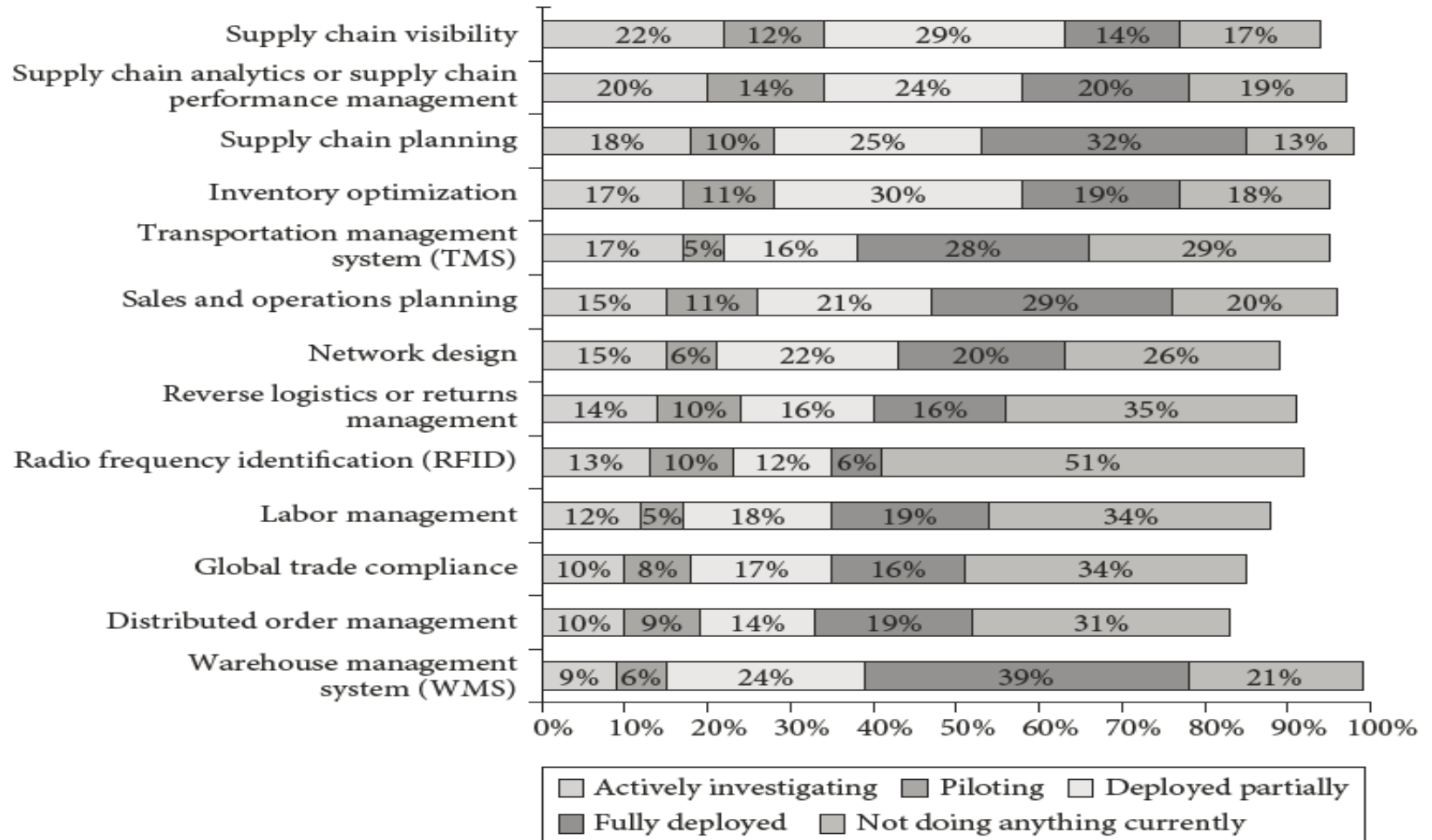
- Supply chain collaboration
- Data synchronization
- Spreadsheets and database software

## ● Enterprise Resource Planning

- ERP systems are multi-module application software platforms that help organizations manage the important parts of their businesses.
- ERP systems branch out to include supplier relationship management, customer relationship management, and other supply chain components, the connections between SCIS and ERP grow stronger.
- ERP system provides a mechanism for supply chain members to efficiently share information.

# Figure 6.4

## SCM Application Adoption Phase



Source: Dan Gilmore, "Annual Gartner Supply Chain Study Highlights", *Supply Chain Digest*, 6/18 2010

# Supply Chain Technology Implementation

- Needs assessment
- Software selection
  - Develop alternatives
  - Solutions packages
  - Purchase options
- Technical issues
  - Data standardization
  - Application integration
- Asking the right questions
  - Who will lead the implementation effort?
  - How will technology support business needs and processes?
  - What is the status of our existing data?
  - How well does the current system integrate with suppliers and customers?
  - What external issues must our systems address?



# Supply Chain Technology Innovation

- Radio frequency Identification (RFID)
  - RFID is an automatic identification method. RFID tags consist of a microchip and a printed antenna that can be packaged into many forms, such as a label, or imbedded in between the cardboard layers in a carton or product packaging.
  - RFID technology costs must continue to decline to make product tagging economically feasible; equipment issues such as reader range, sensitivity, and durability must improve; the case for supplier return on investment of RFID mandates must be made; and consumer privacy issues must be resolved.

## ● Cloud Computing

- Is based on its economic, architectural, and strategic value.
- Allows companies to focus on core competence while allowing a third party expert to manage technical elements at a competitive price.
- Is an extension of **on-demand** computing. The next level enables economies through shared resources. At the highest level, which is not yet recognized, it allows the automation of hundreds of processes throughout the supply chain.

## ● Mobile Computing

- Supply chain execution and event management is going mobile with basic visibility and traceability.

- Use of 3<sup>rd</sup> Party Logistics (3 PL) as Technology Providers
  - It could be more cost effective, as 3PLs can offer scale economies
  - If not entirely outsourced, companies are more likely to outsource information services in
    - *transportation management,*
    - *warehouse operations, and*
    - *global trade management.*

## Table 6.2

# Sources of Additional Information

<b>Aberdeen Group</b>	<a href="http://www.aberdeen.com">www.aberdeen.com</a>	Provides fact-based research and insights focused on the global, technology-driven value chain.	<a href="http://www.arcweb.com">www.arcweb.com</a> <a href="http://www.forrester.com">www.forrester.com</a> <a href="http://www.gartner.com">www.gartner.com</a>
<b>Logistics Viewpoints</b>	<a href="http://www.logisticsviewpoints.com">www.logisticsviewpoints.com</a>	Provides logistics professionals with clear and concise analyses of logistics trends, technologies, and services.	<a href="http://www.scdigest.com">www.scdigest.com</a> <a href="http://www.scmr.com">www.scmr.com</a> <a href="http://www.supplychainbrain.com">www.supplychainbrain.com</a>
<b>RFID Update</b>	<a href="http://www.rfidupdate.com">www.rfidupdate.com</a>	Newsletter highlighting breaking news and analysis pertinent to RFID technology and implementations.	<a href="http://www.discoverrfid.org">www.discoverrfid.org</a> <a href="http://www.rfidjournal.com">www.rfidjournal.com</a> <a href="http://www.rfid24-7.com">www.rfid24-7.com</a>

Source: Brian J. Gibson, Ph.D.

# Summary

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- In order for supply chain managers to utilize information, it must be readily accessible, relevant to their decision making needs, accurate, timely, and in a format that can be shared.
- When properly implemented, information technology supports critical supply chain capabilities and strategies, including supply chain connectivity, product visibility, partner collaboration, and process optimization.
- A well-designed SCIS framework links people, processes, and technology in a manner that provides actionable information and enhances decision making.

## *Summary, continued*

- Timely data collection and synchronization support supply chain visibility, exception management, and effective response to changing customer requirements.
- Supply chain software falls into four general categories: planning tools for forecasting and related activities, execution systems for management of day-to-day processes, event management tools to monitor supply chain flows, and business intelligence applications that help organizations analyze performance.
- Given the potential stumbling blocks, software selection and implementation are not a minor undertaking. Needs must be assessed, software options studied, technical issues addressed, and important questions asked before major SCIS investments are made.

## *Summary, continued*

- Change is the norm when it comes to supply chain technologies. It is critical that developments related to RFID and other innovations are understood so that organizations can take full advantage of worthwhile technologies.