
Some Ideas on the Application of Information Technology to the Freight Railway

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- Information systems are inextricably intertwined with the mission, objectives and structure of the enterprise.

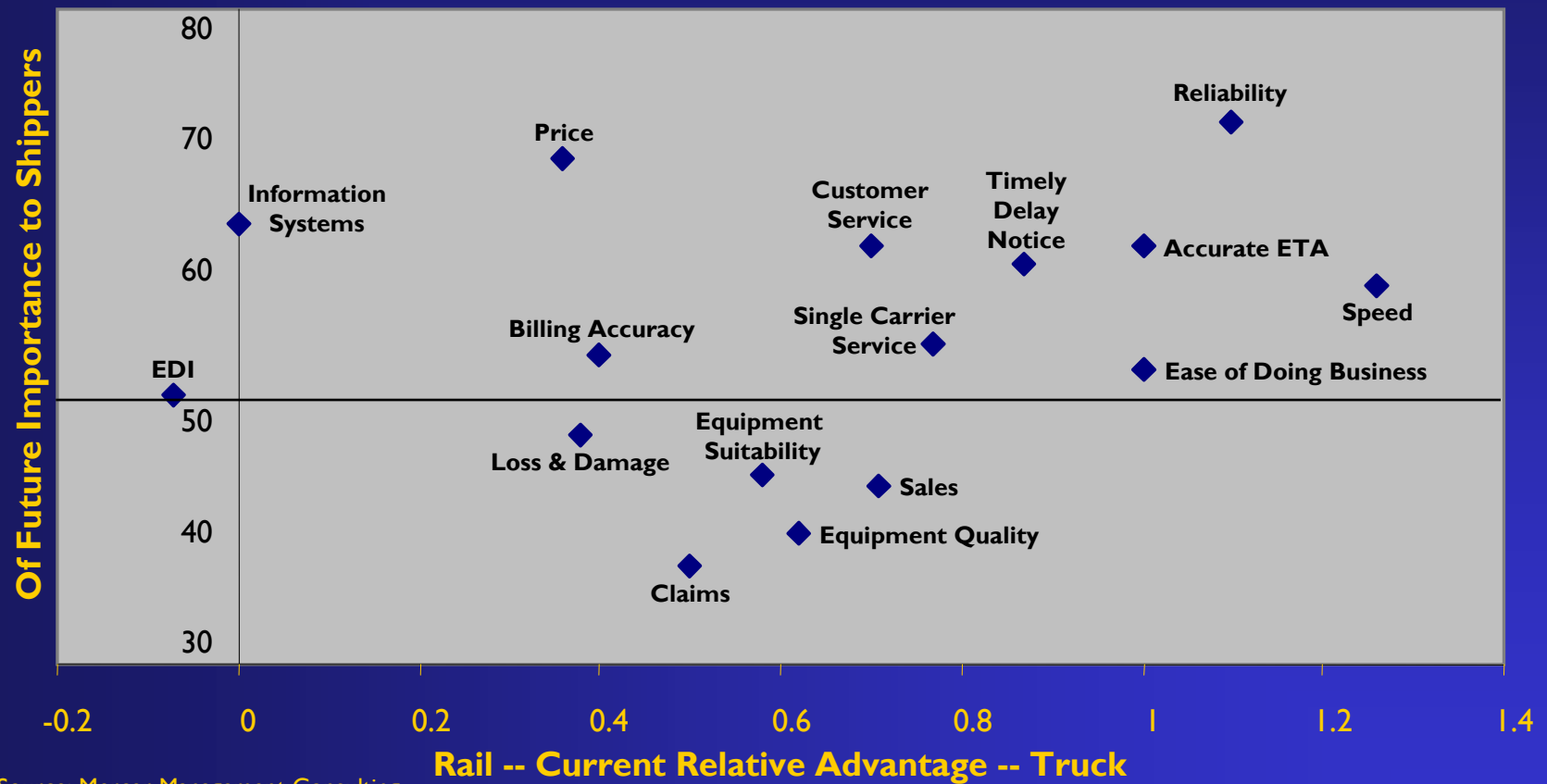
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- Information systems are inextricably intertwined with the mission, objectives and structure of the enterprise.
- Disciplined approaches to applying information systems are critical to success.
- **Information systems are technology plus process plus tools plus skills plus culture.**

Improved performance of the railway lies in understanding and responding to shippers' expectations.

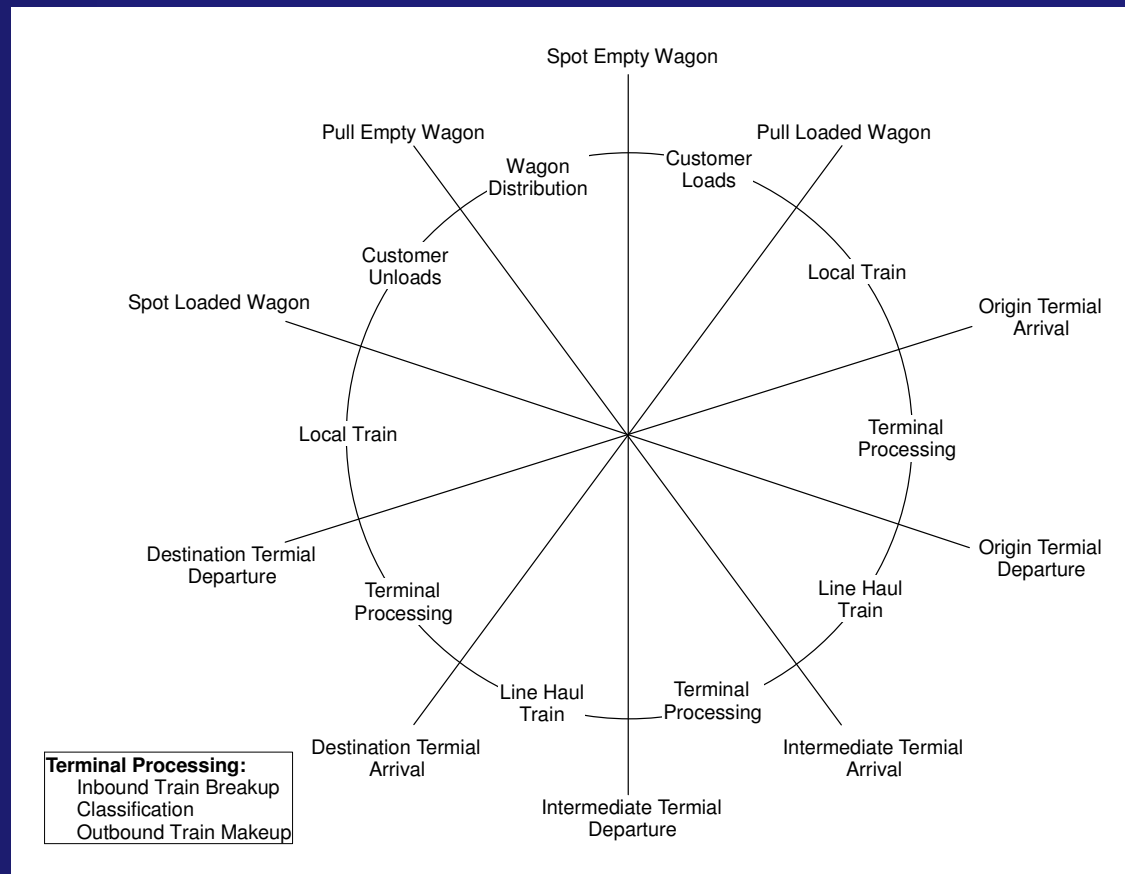


Source: Mercer Management Consulting

The primary difference between world class organizations and those viewed as average is that world class firms allocate scarce resources to those things considered most important by their customers rather than dissipating resources on those things viewed by customers to be relatively unimportant.

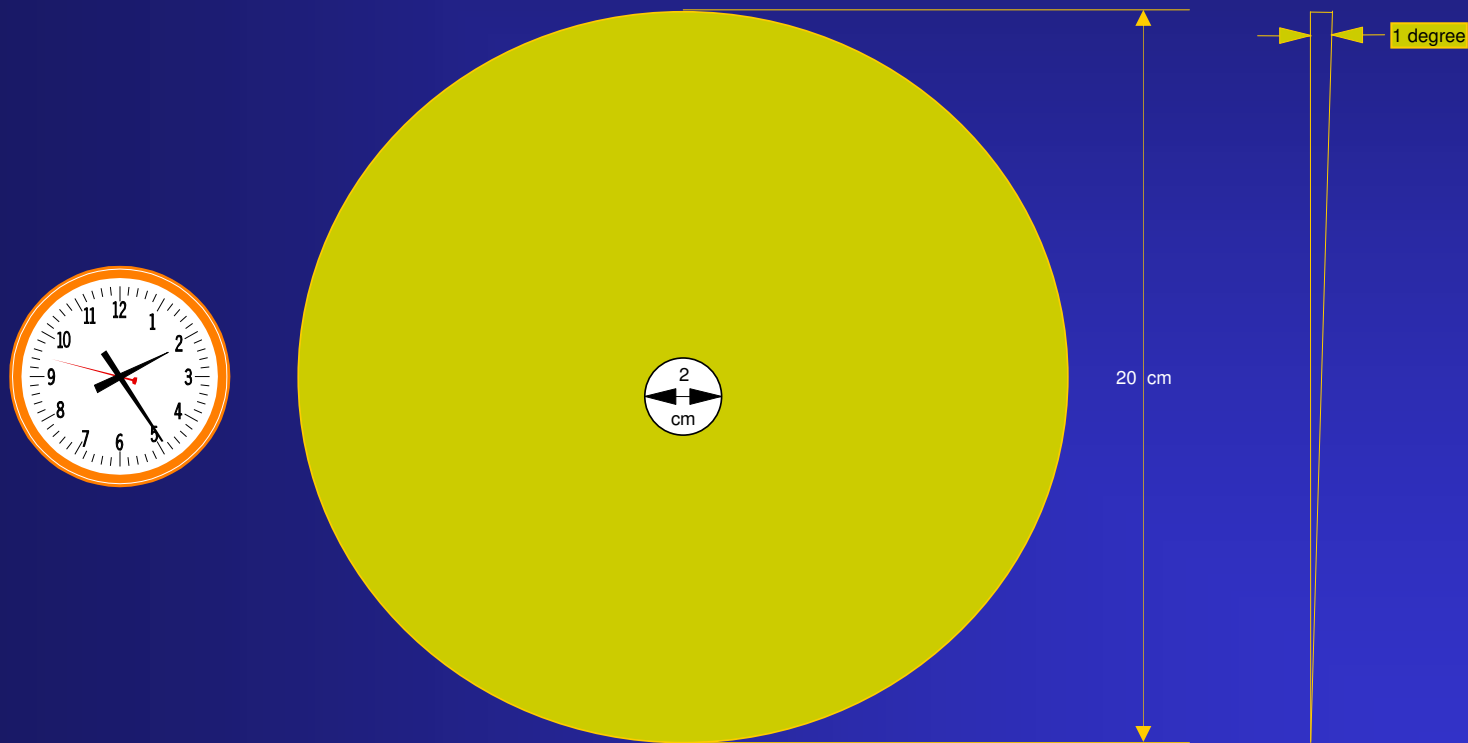
Source: Douglas M. Lambert, W. Christine Lewis, James R. Stock, *How Shippers Select and Evaluate General Commodities LTL Motor Carriers* (1991)

The place-time utility provided by the physical movement provides the most value to the shipper.



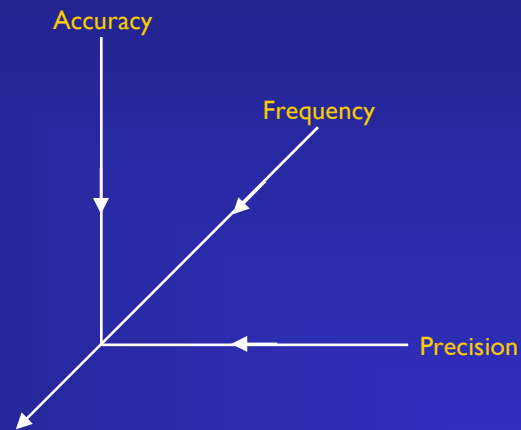
Global Positioning Systems¹

Precise positioning in the four dimensions.



Global Positioning Systems²

Beg deeper and more significant questions.



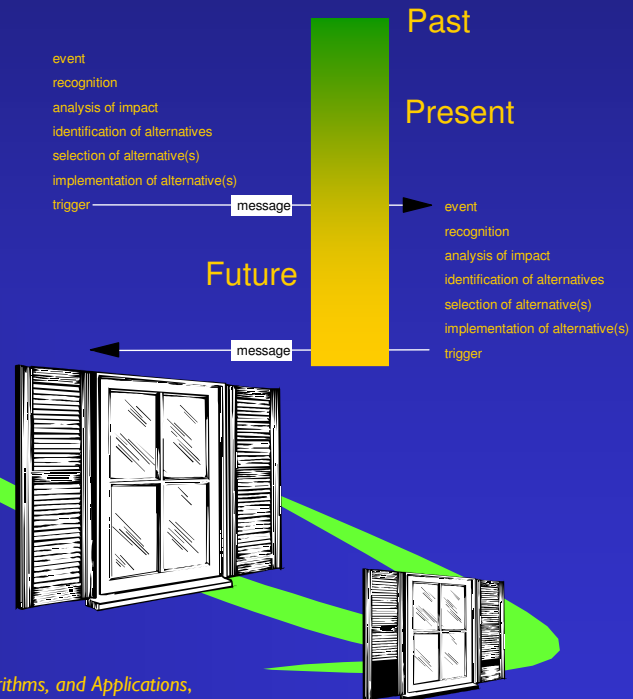
Does the increasing “fineness” of measure lead to business decisions of value?
What sort of decision support systems* are required?

* By system we mean the combination of processes, people and information technology.

Global Positioning Systems³

Sophisticated, very responsive decision support systems are required to extract value from data that is more precise, accurate and frequently collected.

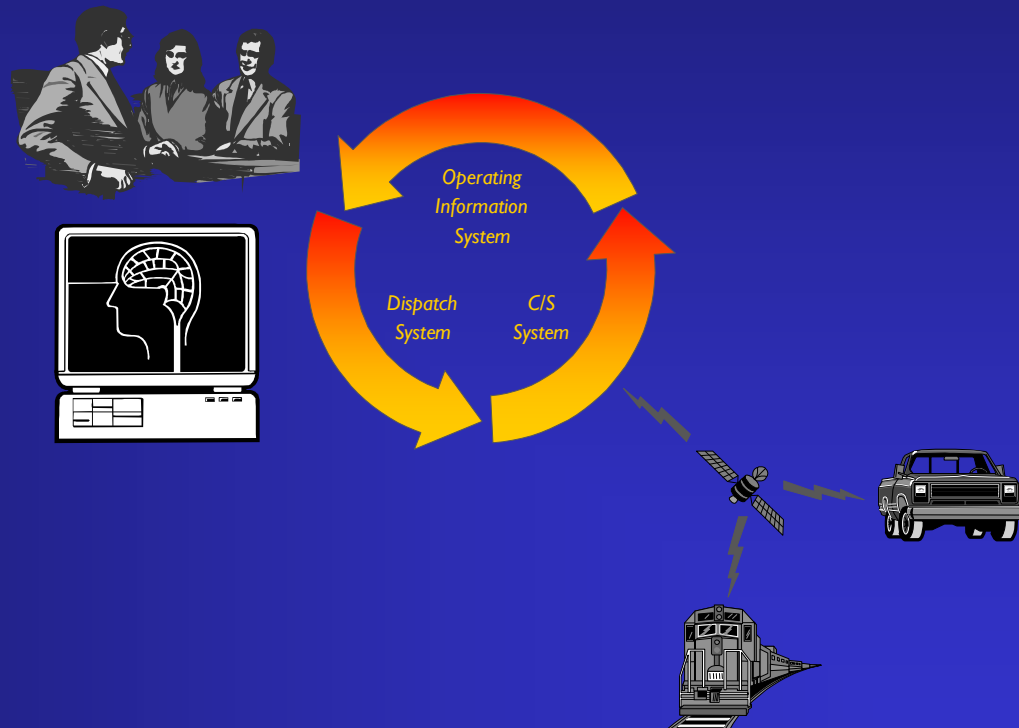
Smaller and smaller decision windows.



Source: Patrick T. Harker, *Use of Advanced Train Control Systems in Scheduling and Operating Railroads: Models, Algorithms, and Applications*, The Wharton School (1989)

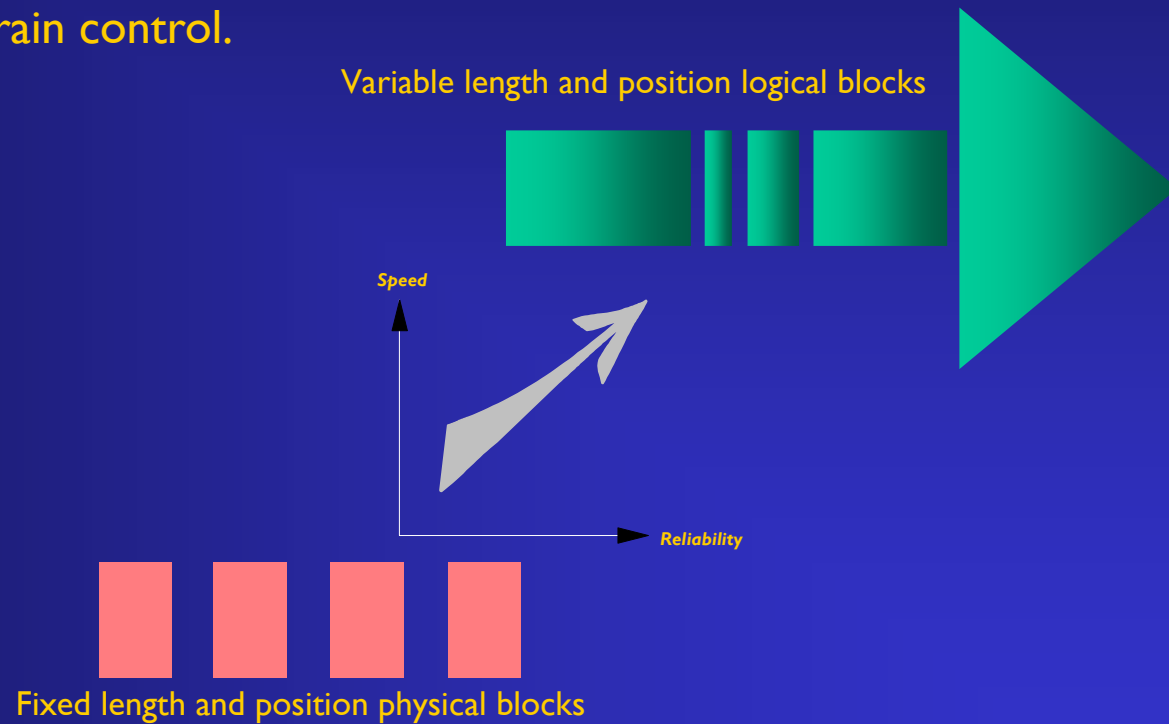
Global Positioning Systems⁴

Vertical integration of decision support systems.



Global Positioning Systems⁵

Support for the achievement of new levels of performance through momentum-based train control.



Source: GPS and Its Application to Railroad Operations, symposium held November 1996

Positive Train Separation¹

- Objective

- To improve safety, asset utilization and customer service through the use of communications and computing technology.

"A one mile per hour increase in network velocity is valued at \$105M annually."

Jeff Young, Union Pacific, April 30, 1997

- Issues

- Definition, rules, standards, interoperability, implementation
- On-board versus wayside track databases
- Decision
- Business case

Source: *A Controlling Interest in Interoperability*, Progressive Railroading, April 1998

Positive Train Separation²

- **Key Technology**
 - Technology at the wayside to provide geographic location, speed restrictions and grade changes.
 - Wireless data communications, differential GPS, computers, displays in the locomotive.

Source: A Controlling Interest in Interoperability, Progressive Railroading, April 1998

Global Positioning Systems and Positive Train Separation are motivating a new look at railway operations that focuses on delivering on commitments to the customers.

Customer Satisfaction and Asset Utilization

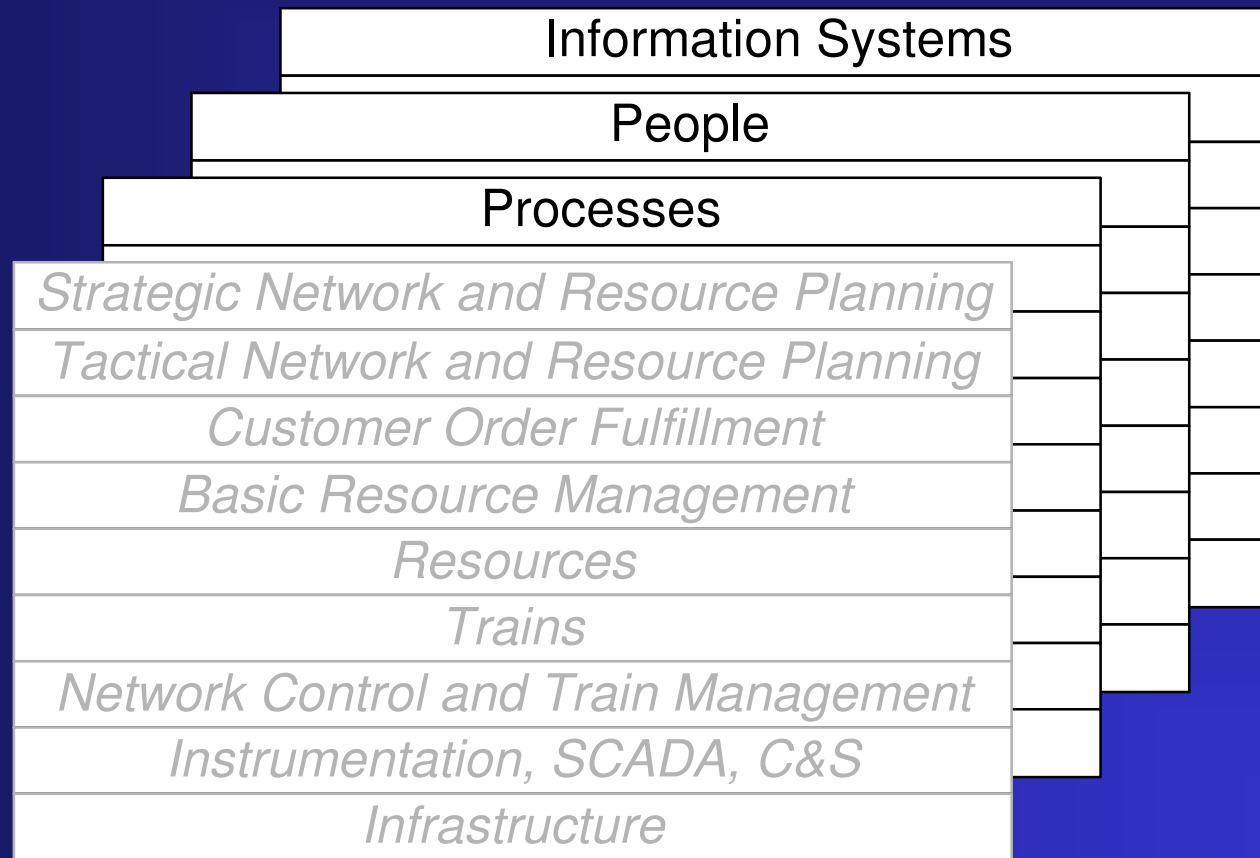
Strategic Network and Resource Planning
Tactical Network and Resource Planning
Customer Order Fulfillment
Basic Resource Management
Resources
Trains
Network Control and Train Management
Instrumentation, SCADA, C&S
Infrastructure

A Holistic Approach to Planning and Execution

- Union Pacific: Project Sunrise
- Queensland Rail: Project Impact
- Canadian National: Operating to Plan

Costs

The holistic approach has at the heart of its analysis an integrated view of the components of the new solution.

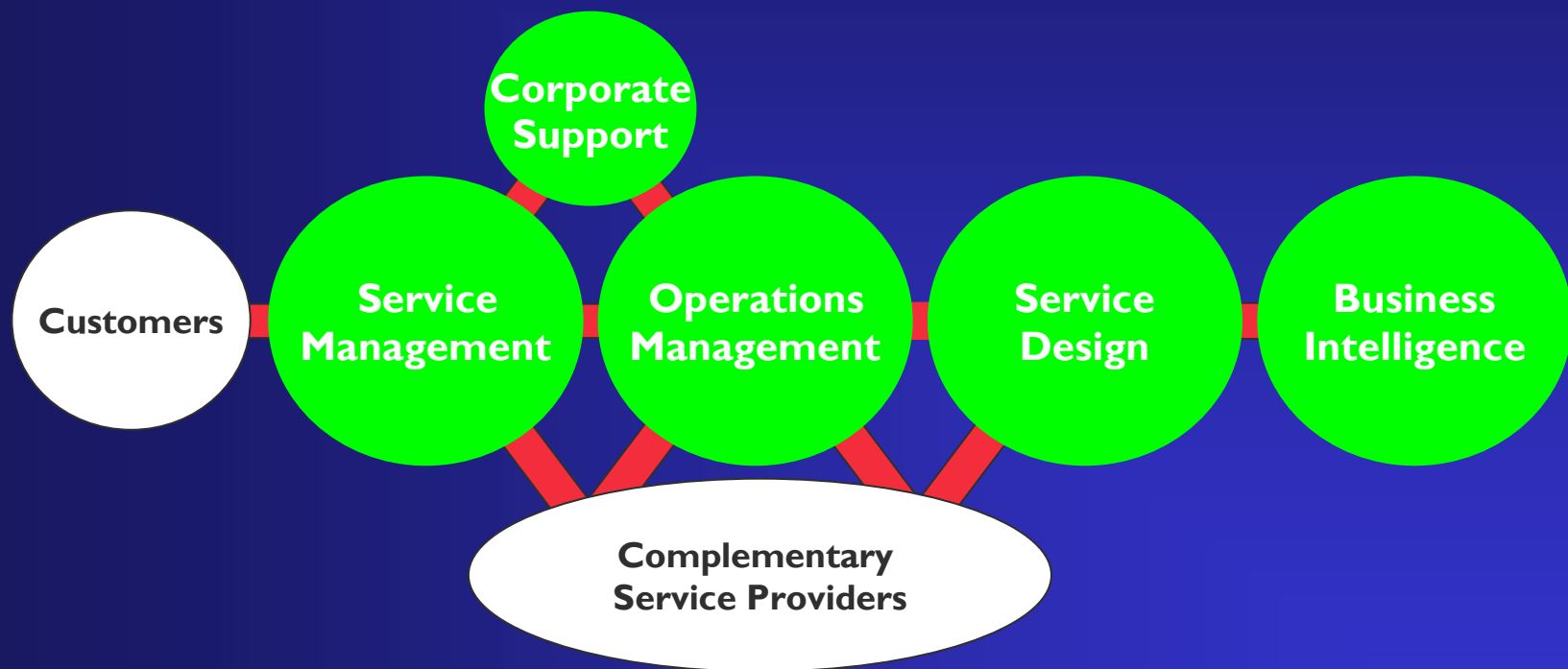


Perhaps this isn't enough.

There is beginning to be consideration of a Future Business Model for the railways that is distinguished by the following characteristics.

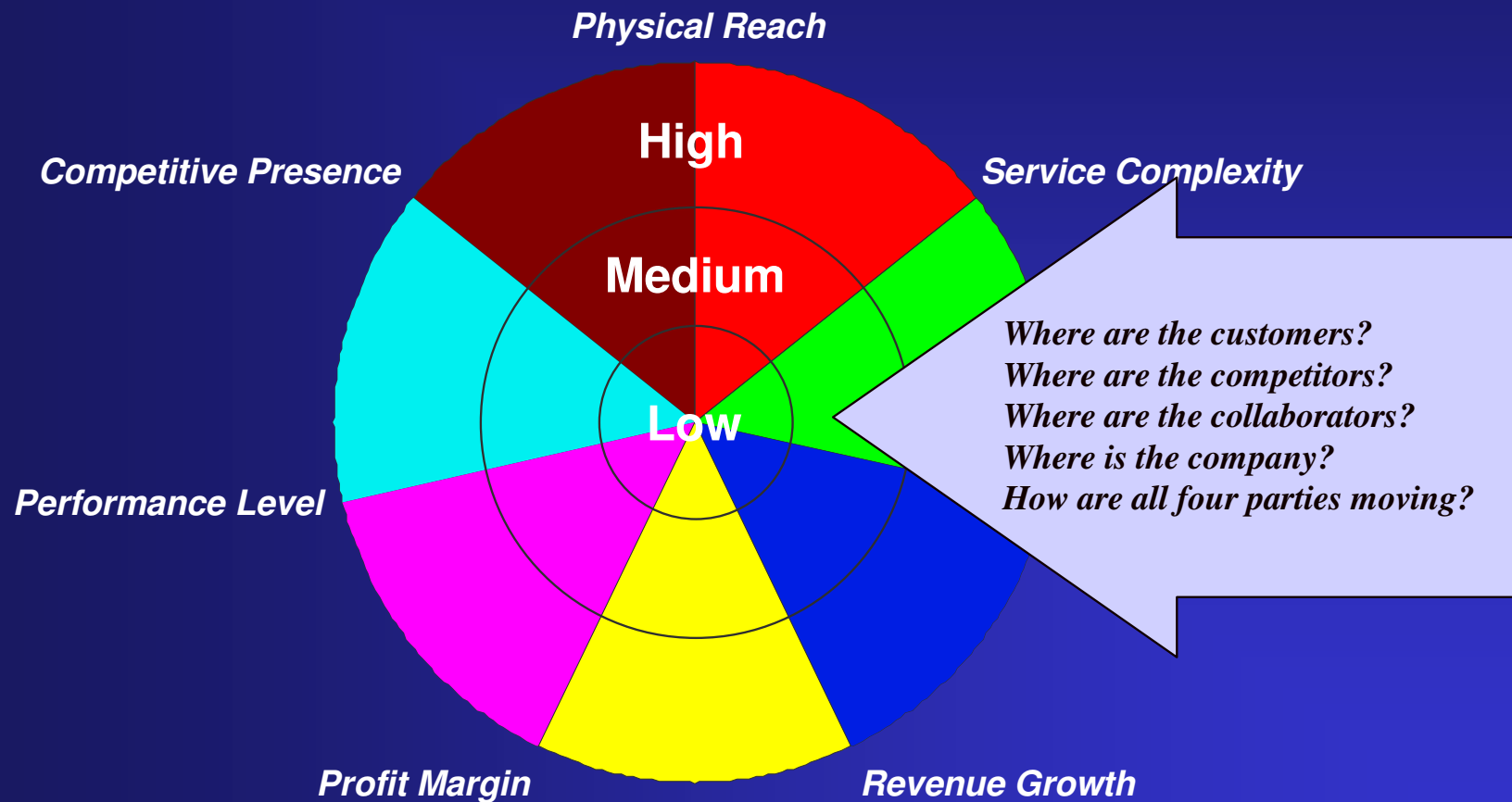
- The Future Business Model represents a clear understanding of what shapes the views of its constituencies; tunes the innovations to evoke the desired response.
- The customer linkage is enabled and streamlined through a One-Click Shipping concept.
 - This implies short process cycles esp. for the design and proposal of service offerings.
- Customer value is dominant in transportation planning and execution decisions.
 - Service management and operations management are linked through customer value.
- The customers and collaborative service providers are managed as a portfolio of value.
- Customer service matures into customer success.

The Future Business Model comprises five fundamental business processes and relationships with two key external parties.

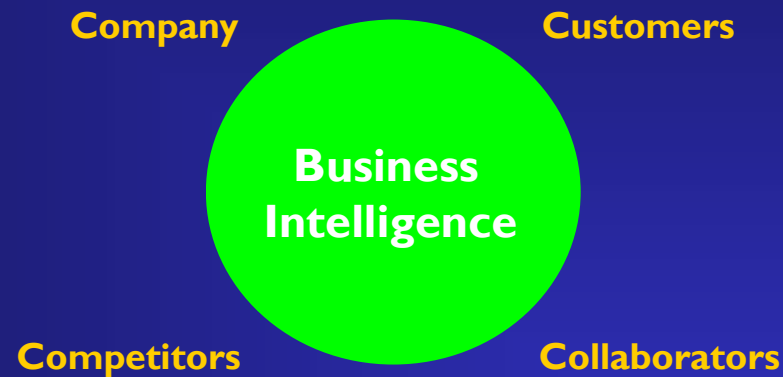


Source: The Freight Operating Company ITSP, 1998

The vision is one of being able to move at will in the marketplace.



Moving at will is about knowing what you need to know when you need to know it in order to take a market position of maximum advantage.

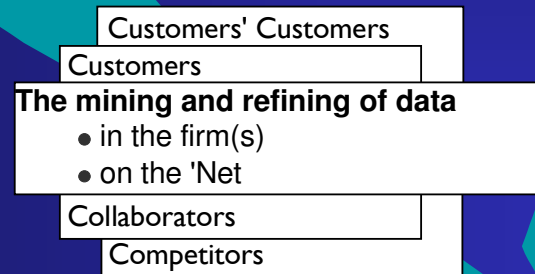


- Cost - price (*an internal focus*)
- Scope - offering
- Speed - ability to change (*an external focus*)

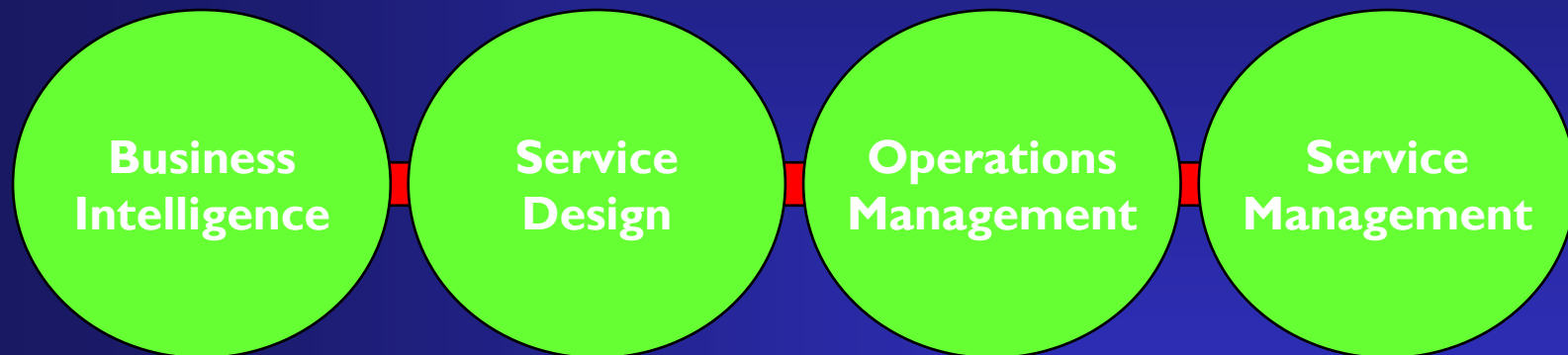
Business intelligence is about a deeper understanding of value chains and how actions you might take to change the configuration of the value chain and the parties' participation therein.

Key Issues

- Shipper segmentation
- Optimizing mutual value
- Strategic partnerships
- Shipper-centric business systems
- Portfolio management

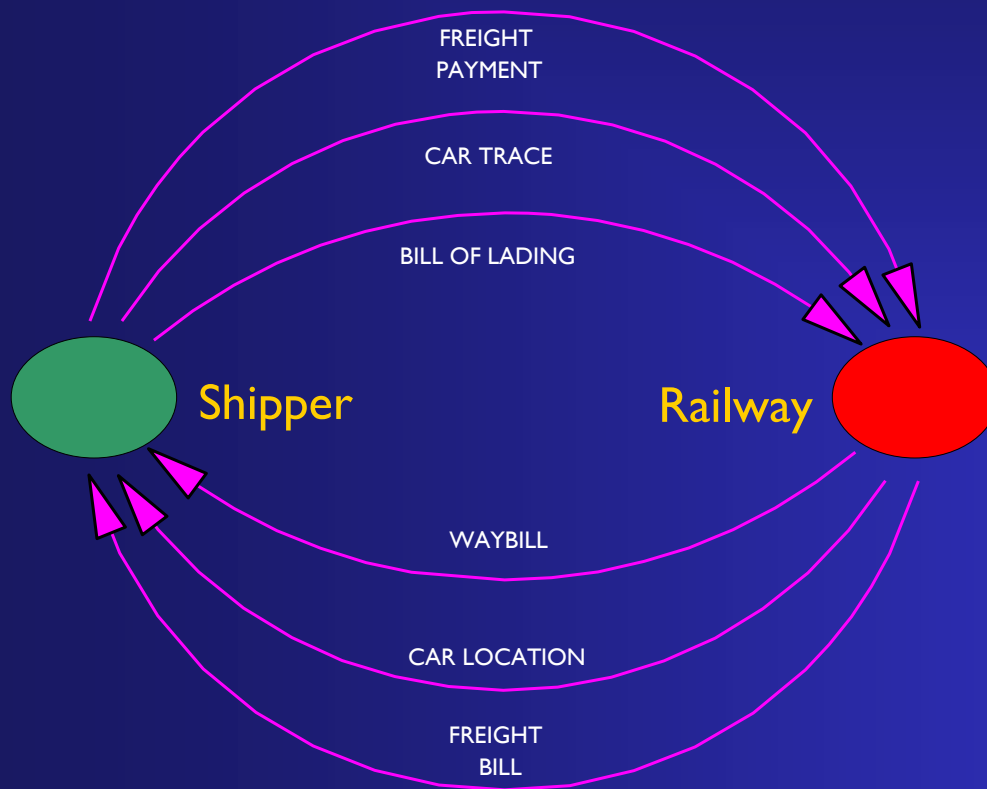


Business intelligence is of value when associated with complementary mechanisms that implement and measure change.



Competitive advantage comes from implementing management initiatives faster than the competition.

On the other end of the interconnected business processes is a mechanism that makes it very easy, even delightful, to deal with the railway.



Enter **ODC** and release or delivery time.

One Click Initiation.

Automatically issue car order, distribute cars, price and schedule the service.

Return details to shipper.

One Click Acceptance.

Execute.

Automatically initiate billing upon receipt of placement and notify shipper.

One Click Acceptance.

The implications of the Future Business Model are significant. Information technology needs to...

- provide easy access anywhere and anytime to people, processes, and information -- the promise is lower interaction costs and faster decisions
 - which means
- companies are opened to scrutiny in a new fashion -- access and speed rapidly reveal bottlenecks in organizations
 - which means
- organizations are tuning up, or more frequently transforming their existing business operations
 - which means

The implications of the Future Business Model are significant. Information technology needs to...

- more speed
 - which means
- implementation of management initiatives faster than the competition
 - which means
- less predictable future.

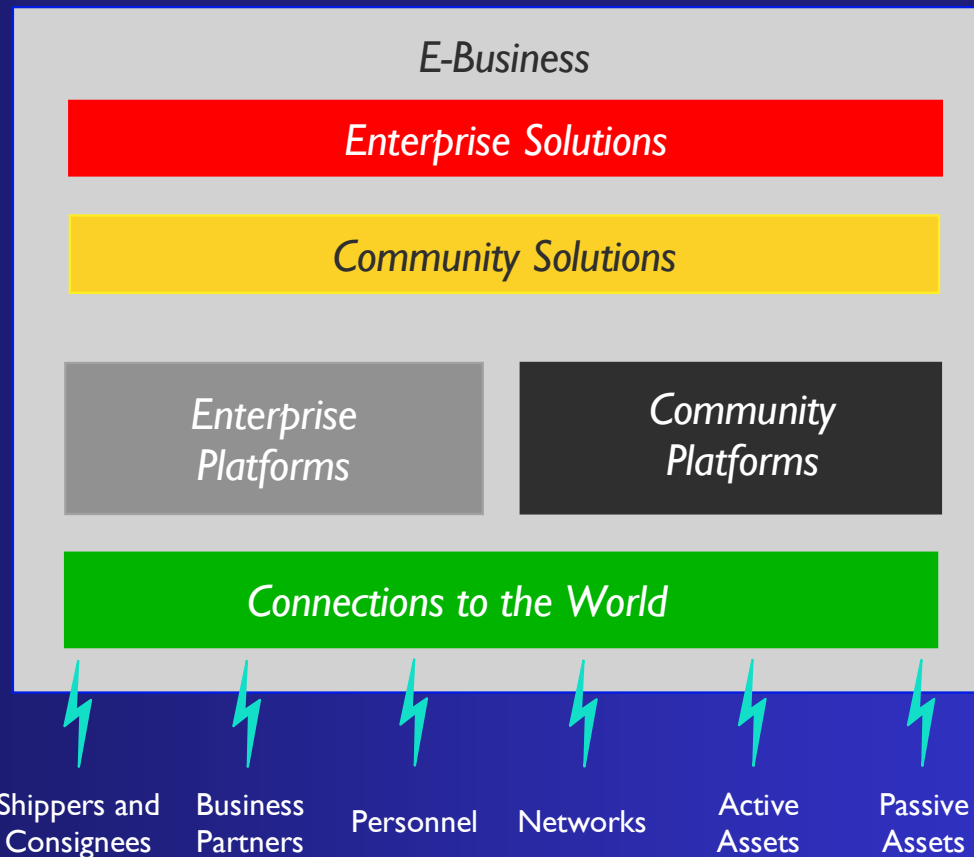
Therefore...

- existing forms of organizational structure, skills, processes (esp. such things as strategic planning and budget cycles), built on the premise of predictability could well prove a hindrance in the marketplace
 - which means
- that an organization with the ability to sense key changes in the environment, and respond to these more quickly than the competition, may be in order;
- that information technology puts a premium on establishing and managing relationships between organizations for mutual benefit; and
- speed gives new meaning to switching costs.

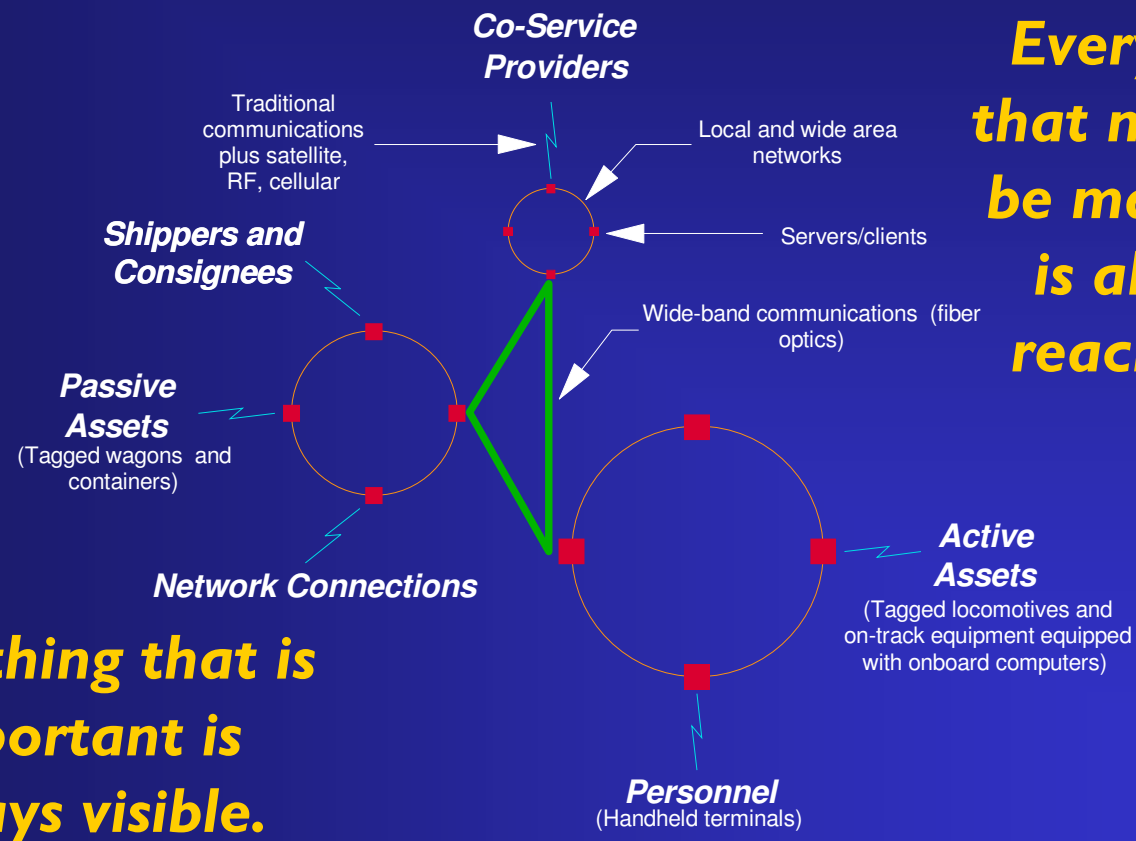
Therefore...

- Information technology, then, is least of all about technology and most of all about fundamental transformation in order to gain both speed and adaptability.
- This transformation resonates through the whole of the organization.

The Future Business Model is enabled by an integration of capabilities that allows for economies of scale while providing for individual railway needs.



Fundamental to success will be a network providing two essential qualities.



Everything that needs to be managed is always reachable.

Everything that is important is always visible.

Getting There

Getting there requires establishing goals and executing strategies across three phases. First, Phase I - Renewal

- **Goal**

- Business and Technology establish a relationship of trust based upon common commitment, collaboration, and a sustained level of high performance.
- Together, Business and Technology pursue
 - Sustained performance at pre-merger levels.
 - Organizational stability.

- **Strategies**

- Substantial, sustainable improvement in the price and performance of the infrastructure. Technology retains and reinvests the benefits.
- Governance that works - communication, collaboration, shared commitments to and management of initiatives.
- Development mechanism that provides for the rapid realization of management initiatives. Increase the amount of funding devoted to new product development.

Phase 2 - Growth

- **Goal**

- Discover and invent new ways for technology to deliver value to the business.
- Together, Business and Technology pursue
 - Significant and constant improvements in customer satisfaction.
 - Share of customers spending on transportation and logistics continually increases.

- **Strategies**

- Continual increase in the amount of funding dedicated to new product development.
- Utilize cross-functional Business and Technology teams to discover, invent, realize, exploit, and enhance new products.

Phase 3 - Leadership

- **Goal**
 - Define and implement a new business model for the corporation.
 - Together, Business and Technology pursue becoming
 - First or second in share in markets the railway chooses to serve.
 - Distinguished from the competition by the superior quality of all elements of its service.
- **Strategy**
 - Establish a new business model team comprising the next generation of leadership.

Cross Phase

- **Goals**

- Identify, and develop to a world-class level, those competencies that must be retained in order to assure competitive distinction.
- Outsource those competencies which, will required for operation, do not directly provide competitive distinction and which others can perform better.
- Establish a formal change management program across the organization.
- Establish the management of data/information/knowledge as a critical success factor for the corporation.
- Establish a culture where the dynamics of change are considered a competitive ally.
- Establish an adaptive enterprise to exploit the culture.

“Success takes a balance of forces, but technology is not always necessary and is almost never sufficient.”

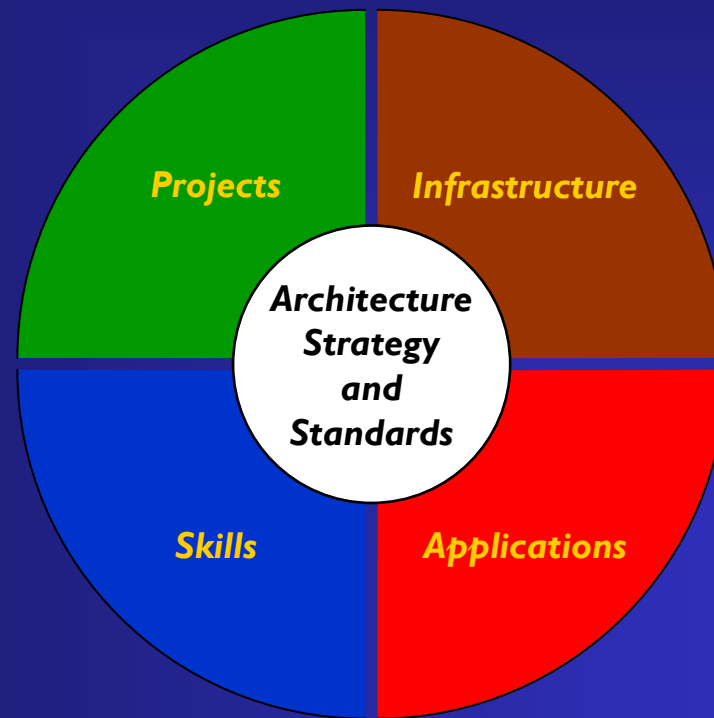
Source: Michael Scott Morton, MIT, *Inventing the Organization of the 21st Century Project*, Co-Director, The MIT Report, December/January 2000, p. 5.

The most important thing to do is act.

Speed trumps all!

And what about me?

The levers that information technology can adjust are much more dynamic than ever, and the expectations of the business for the delivery of value are higher than ever.



Business and technology must manage the technology investment portfolio together.

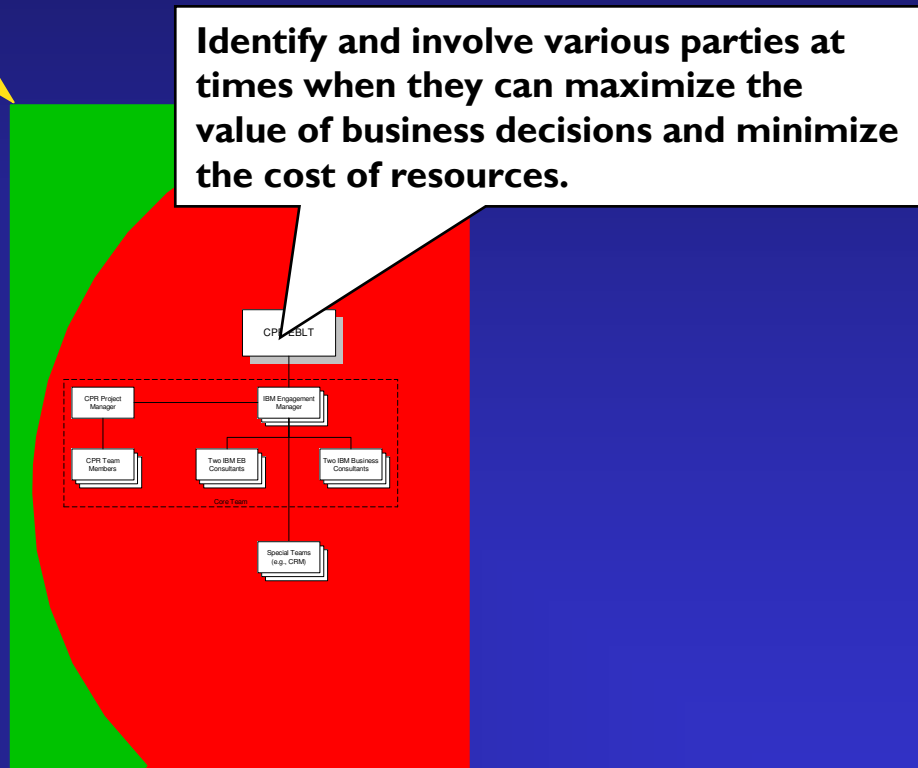


The approach to managing the life cycle will involve more partnership with outside parties, but not necessarily more parties.

value of business decisions

- Business Strategy
- IT Strategy
- IT Planning
- Requirements Gathering
- Analysis
- Design
- Build
- Implement
- Exploit and Enhance

Identify and involve various parties at times when they can maximize the value of business decisions and minimize the cost of resources.



cost of resource

“I believe that we’re about to witness what may turn out to be the last competitive frontier business will see. It’s going to be a war over the one priceless resource. Time. And when it comes, trust may turn out to be the best investment anyone’s made.”

Source: Jim Kelly, CEO of UPS, Remarks to the Commonwealth Club of San Francisco & Oakland Chamber of Commerce, February 23, 2000.

Something to Think About Five-Year Evolutionary Impacts of the Next Generation Internet

Next Generation e-business
Five-Year Evolutionary Impacts on the Next Generation Internet
IBM Global Services
December 6, 1999

- **Finding**
 - The Next Generation Internet is a multi-layered, globally available, networked environment comprising advanced technologies, access devices, enabling applications, and solutions.
- **Implication**
 - The Next Generation Internet environment provides a modular, compatible "lego building blocks" of business functionality that firms can use to build strategic business capability. It will require a different business mindset as to how businesses, and business value, are created.

- **Finding**
 - Firms don't want to think about how to manage the Next Generation Internet, they want to think about how the Next Generation Internet can be used to address customer needs.
- **Implication**
 - Next Generation Customers will want "adaptive offers", (i.e., many options but with only a few choices which are specifically targeted to their requirements). This will require firms to build "meaningful" relationships, as defined by the customer.

- **Finding**
 - The Next Generation Internet will drive the need for innovative and adaptive business models, as well as enable firms in the creation of those business models.
- **Implication**
 - The Next Generation Internet will shorten the feedback cycle between business transactions and marketplace responses. Firms must develop a refinable business model, mindset and mix of integrated solutions to bring new levels of value to customer relationships, experiences, and customized offerings.

- **Finding**
 - The Next Generation Internet will require Senior Executives to continually, and consciously, balance physical and virtual assets.
- **Implication**
 - Changes in customer wants and needs will require Senior Executives to understand the sources of the firms' value and control, and the inventory and value of firms' information (i.e., the historic cost, replacement cost and market value).

- **Finding**
 - The primary value is in enabling firms to become customer-centric organizations by participating in adaptive networks, and balancing physical & virtual assets.
 - This secondary value of the Next Generation Internet will be in external facing shareholder values, and in internal orientation to firm value.
- **Implication**
 - In total, the value of the Next Generation Internet to Sr. Executives will be in its potential to allow the manipulation of business value components (i.e., to innovate), rather than simply satisfy constraints.

Forces for Change

Railways are under a set increasing business pressures.

Political, Socioeconomic

Reregulation
Environmental Concerns
Capital/Financial Markets
The Internet
Labor

Marketplace

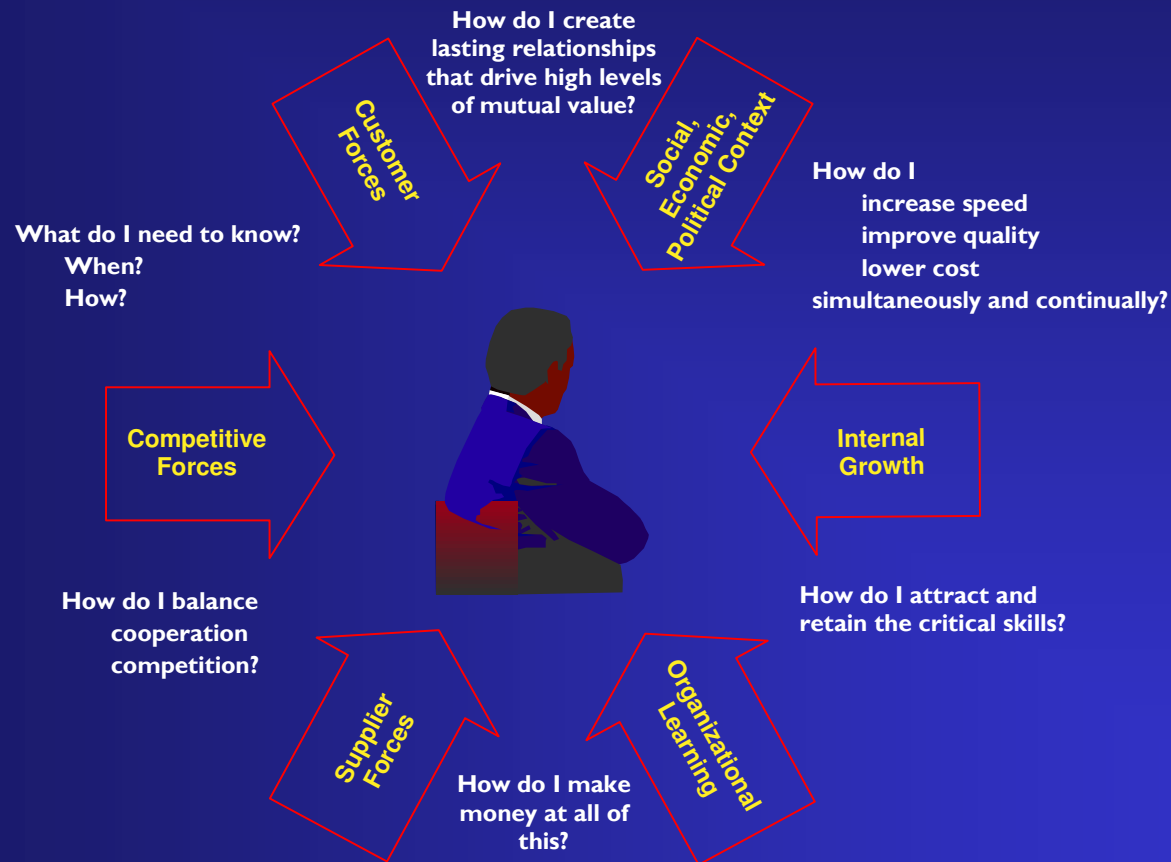
Globalization/NAFTA
Consolidations/Mergers
Alliances
Customer Sensitivity for Cost, Quality, Service, Speed
Increasing Competition
Decreasing Predictability



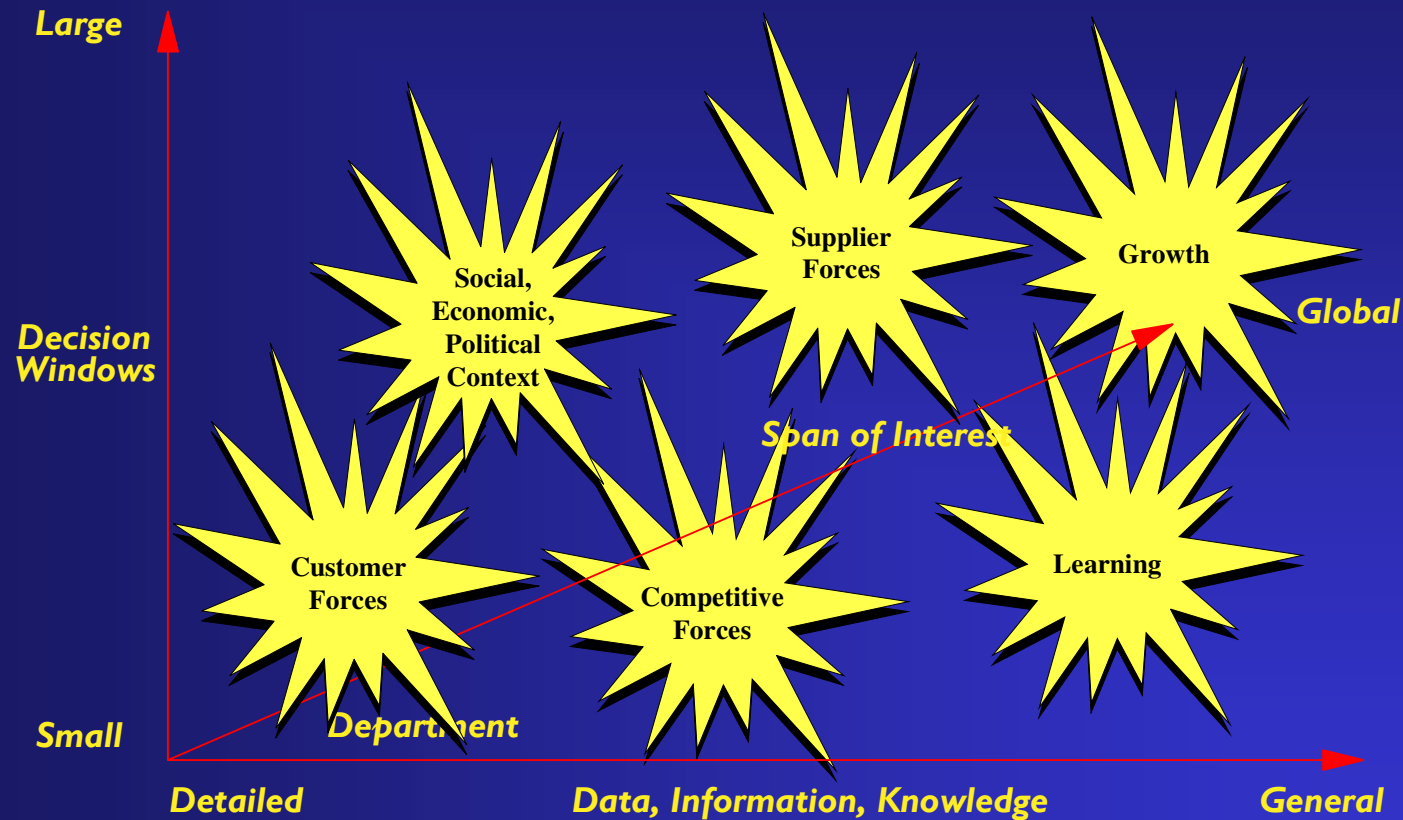
Enterprise

Stakeholder Expectations
Learning
Growth
Core Process and Competency
Asset Utilization/Capacity
Service Quality
Safety
Organization/Skills
Mobility of Talent

These pressures generate serious challenges to senior management.

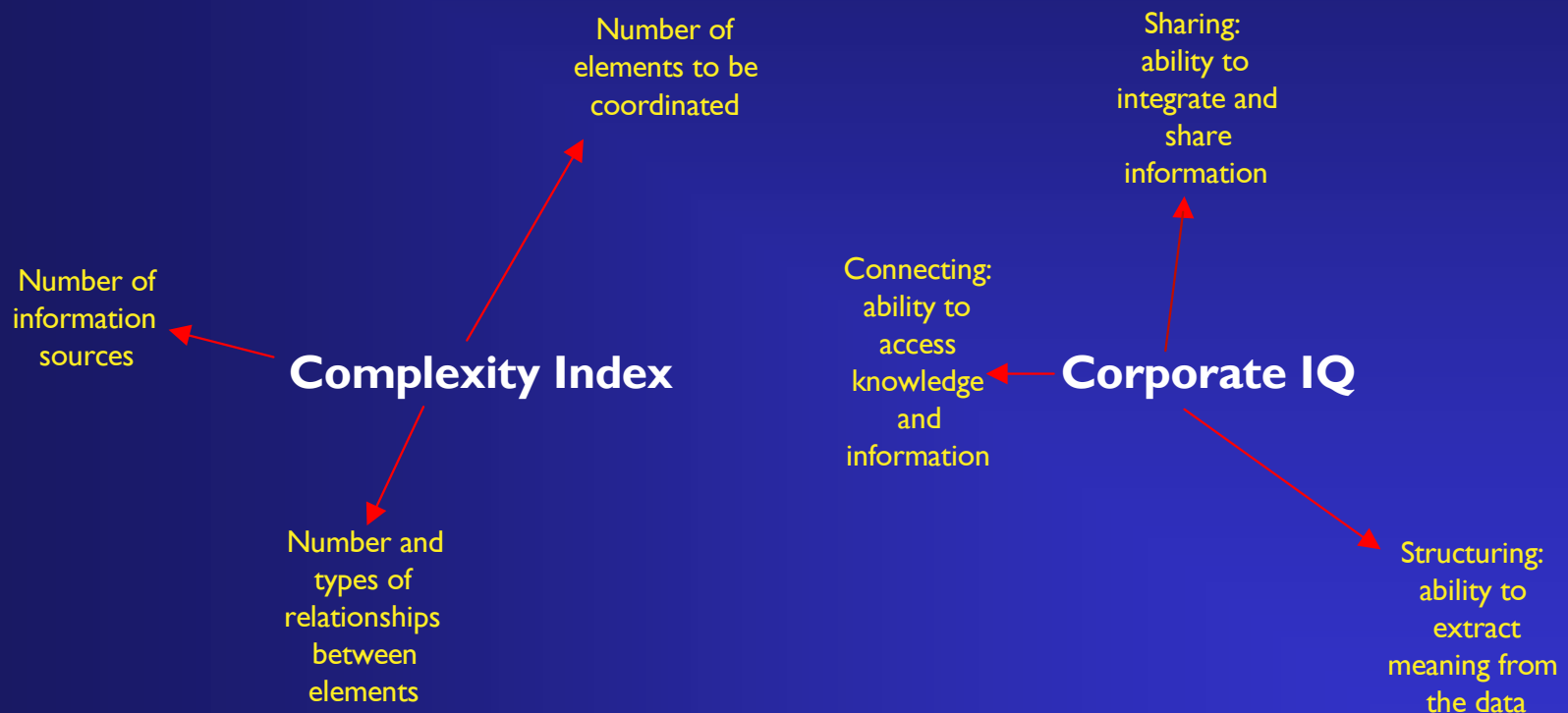


The future looks to be one marked by increasing speed, complexity, and uncertainty along three dimensions.



Source: IBM, *Sense and Respond* (1998)

Under these circumstances, a major question becomes “How smart is a company in a complex world?”



Source: Haeckel and Nolan, *Managing by Wire*, Harvard Business Review (September-October 1993)

The primary difference between world class organizations and those viewed as average is that world class firms allocate scarce resources to those things considered most important by their customers rather than dissipating resources on those things viewed by customers to be relatively unimportant.

Source: Douglas M. Lambert, W. Christine Lewis, James R. Stock, *How Shippers Select and Evaluate General Commodities LTL Motor Carriers* (1991)

We've been in business since 1907, for 92-93 years, so we've really had to reinvent this company five or six times, from a delivery business to a consolidator for retail stores, to the common carrier business, to creating an airline and delivering the next day, and to going international. This becomes an extension of that, and what we try to do is listen to where our customers are going. And we have three or four things in place and we do that with a great sense of urgency. And if we understand where their businesses are going, it gives us the opportunity to put in place the things that are necessary to serve them, whether it's package delivery or whether it's moving goods, information and funds. That's what we try to do. UPS is not one person's vision or it's not one person's implementing a new, or getting a way of changing, a paradigm. It's really a group thing and a teamwork thing. We all work hard here and what we get accomplished, we get accomplished as a team.

Source: CEO of UPS Discusses UPS's Transformation into an e-Business Powerhouse, Business Wire, February 24, 2000

Today, for the first time in the history of modern business, it's possible to be in interactive relationship with each of millions of customers. The deeper the relationship, the greater the likelihood that the customers will stick around.

Source: *The Source of Value in the E-Economy: Interactive Customer Relationships*, Patricia B. Seybold, January 13, 2000

Hence,

- What is important to your customers?
- What can you do about it?
- What is the role of information technology?

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