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# SC vs. SC, Collaboration, CLV, Wiser Abuse and segue to Supply Chain Visualization

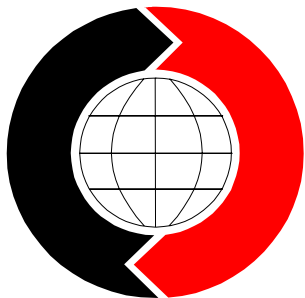
A Presentation For:

**ISCM Sponsors**

by

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February 5, 2002



# Agenda

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- Brief review of ISCM Research
  - SC vs. SC?
  - Collaboration, Alliances and Collaboration
  - CLV
  - Wise Abuse of Supply Chain Power
- Supply Chain Visualization



# Agenda (Cliff's Notes)

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- Overview SCM at MIT
  - We're doing a lot of SC research here
- Recent and Current Relevant Research
  - SC vs. SC?
    - Companies will compete on ability to integrate capabilities of suppliers & customers: so coordination & collaboration are critical
  - Coordination, Alliances and Collaboration
    - Collaborate on LIKE or LINKED activities
  - Wise Abuse of Supply Chain Power
    - If companies can collaborate, they can use power to advantage the entire chain but this requires a system mindset and ability to vision
  - Supply Chain Visualization
    - A new way to understand and redesign supply chains
- Research Implications



# SCM & Logistics Across MIT

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## Seventy+ Interdisciplinary Centers & Programs

- Center for Transportation Studies (CTS) – Home for SCM outreach & SCM research, broad research agenda (logistics to aging)
  - **Integrated Supply Chain Management (ISCM) Program**
  - **Affiliates Program In Logistics (APIL)**
- Leaders for Manufacturing Program (LFM) – Dual-degree (graduate) program (Engineering and Business) focusing on operations
- Center for Coordination Science (CCS) – Research center studying coordination across businesses with focus on SCM and eBusiness
- System Dynamics Group (SDG) – SD research spans into SCM
- Engineering Systems Division – Group of Centers with cross-functional aspects to their research (includes SCM-related work)
- Center for eBusiness (CeB) – eBusiness research spans into SCM
- Operations Research Center – Research center studying the use of operations research methodologies with many applications on SCM



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# Supply Chain vs. Supply Chain



## Popular ‘Wisdom’ About the Future....

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*“Business competition is moving away from the traditional company vs. company model in favor of a system that pits supply chain against supply chain.”\**

*“It’s a supply chain vs. supply chain world today. Companies don’t only compete with each other but with an extended web of suppliers.”\*\**

\* Academic Alliance Forum

\*\* Rob Rodin, CEO of electronics distributor Marshall Industries



# The Evidence

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- SCs compete against SCs
  - From the farm
    - Tyson & Perdue (chickens), Smithfield & IBP (beef) compete as nearly vertically-integrated competitors
  - Fashion Industry
    - The Limited competing against Levis, Zara competes against all others
  - Wool vs. Wool
    - Aussie ‘Tasmanian wool’ producers dedicated SC thru to retailer Brax
- SCs don’t compete against SCs
  - US Automotive Industry & US Aerospace/Airframe Industry
    - GM’s SC can’t literally ‘compete’ against Daimler-Chrysler’s SC because they share the same suppliers
    - Airbus vs. Boeing companies rely on the same suppliers for avionics, engines, tires, seats, and multiple other components
  - Dell, Compaq & other PC manufacturers
    - Modularity of PC components makes PC SCs overlap at multiple tiers
  - Suppliers that are simultaneously competitors
    - Common to find suppliers competing with their customers



# Evidence Consistent with SC vs. SC Claim

- From the farm
  - Tyson and Perdue compete as nearly vertically-integrated competitors
  - Smithfield and IBP compete similarly
- Fashion Industry
  - The Limited competing against Levis
  - Zara supply network competes against all others
- ‘Chains of Success’ in Australia
  - Producers, distributors & retailers along food supply chain use IT & coordination to create aligned networks & advantage via relationships
  - Industry changing from small-scale, family-based competition to larger alliances more tightly aligned across the supply chain. (Boehlje)
- Wool vs. Wool
  - Australian wool producers dedicated SN through to German retailer (Brax) for branded ‘Tasmanian Wool’
- Current State
  - Shrinking PLCs, multifaceted competition drives increased outsourcing, companies build ‘ecosystem’ in lieu of providing it all themselves

Miandetta Pty Ltd (Australian specialty asparagus and pig meat producer),  
Wood Fisheries (fish trawling and export company),  
Pacific Foods (primal and portion control meat cuts).

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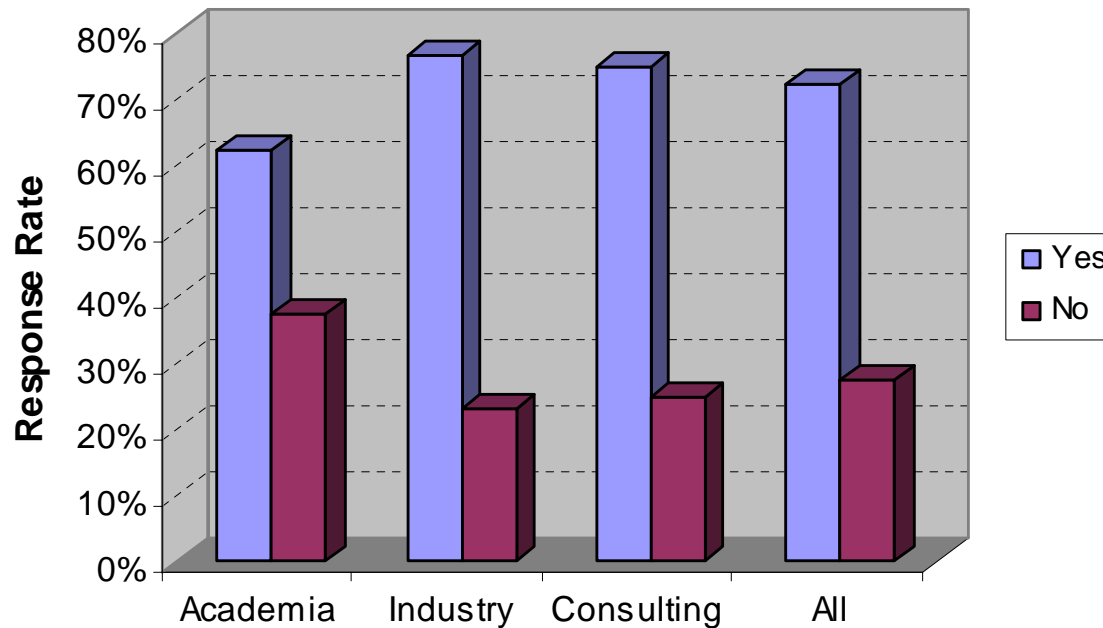
# Evidence Inconsistent with SC vs. SC Claim

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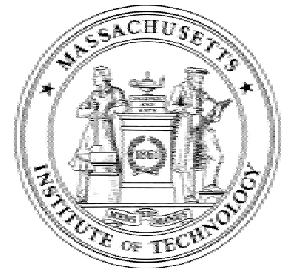
- US Automotive Industry
  - GM's SN can't literally compete against Daimler-Chrysler's SN because they share the same suppliers
- Dell, Compaq & other PC manufacturers
  - The modularity and universality of computer components makes these PC SNs overlap at multiple tiers.
- Airbus vs. Boeing
  - Both aerospace companies rely on the same suppliers for avionics, engines, tires, seats, and multiple other components
- Suppliers that are simultaneously competitors
  - Common to find suppliers competing with their customers
    - Supplier also serves an internal customer that serves the same end market
    - Retailer competes with a manufacturer for the customers' buying decision
      - Dell & Intel compete to get the consumer to buy PC based on their brand

# Delphi Study SC vs. SC Data

- ‘Will SC compete against SCs?’
  - 70% agreed



From Network Master Working Paper – Rice and Hoppe, August, 2001



# What does SC vs. SC mean?

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- Five visions of the nature of competition which can be consolidated into three scenarios.

36% Literal SC vs. SC with Formal Relationships

5% Literal SC vs. SC with Informal Relationships

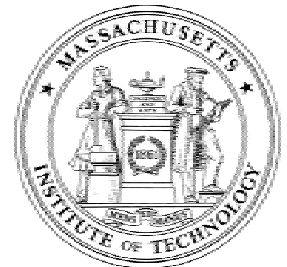
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23% Supply Network Capabilities

14% Supply Network Design

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23% Channel Master Led Supply Networks



# Three Scenarios for Competing

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- SC vs. SC Literally
  - Competition will be between groups of companies from across the supply network competing as one entity (41% of the respondents).
- SN Capabilities or Design
  - Competition will be between individual companies competing on their internal supply network capabilities (37% of respondents)
- Channel Master Led
  - Competition will entail the single, most powerful company of a supply network (Channel Master) determining the terms of trade (23% of respondents).



# So will the future be SC vs. SC?

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- SC vs. SC not likely
  - Limited validity
    - Most SCs are not able to truly compete as a unique group
    - Suppliers compete with their customers
  - Limited utility
    - Benefits are not clear
    - Difficult to use data beyond one tier
- Limited examples of SC vs. SC today
  - Fragmented industries
  - Vertically integrated companies
  - Sole source relationships throughout the supply network



# Why is SC vs. SC of limited validity?

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- SC vs. SC is not valid in most cases as there are significant limitations in the ability to compete as a group
  - Common (overlapping) suppliers make it difficult for SC to compete as unit
    - Limits the ability to source unique capabilities (products or services).
    - Limits the customer's ability to foster and develop unique capabilities in that supplier – investment in supplier will provide 'free' benefit to competitors
    - Supporting multiple customers may expose their proprietary plans
  - Suppliers often compete with customers
    - Dell competing with Intel, P&G competing with Wal-Mart



# Why is SC vs. SC of limited utility?

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- SC vs. SC has limited utility, not fully practical
  - Benefit of coordinating across multiple tiers is not clear
    - Utility for each party not clear
  - Difficult to use data from a distant tier as BOM is complex & changing (translating BOM into use requires decisions and constant updates)
    - Requires relatively-fixed BOM, inconsistent with continuous improvement & frequently changing BOM as costs are driven out
    - Requires one central control point or organization to coordinate
  - High sunk costs (technology investments dedicated to one SC) reduces the possibility of leveraging investments over sales to multiple customers
    - Worse if there is high asset specificity required in order to service one particular SN



# SC vs. SC Sum

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- SC vs. SC not valid or practical for broad application
- In the future.....
  - Chains of companies will not compete against other chains of companies (except in rare situations)
  - Companies will compete against other companies based on their respective supply network capabilities
    - Capabilities will include capabilities 'integrated' from suppliers and customers
  - Meaningful benefits will come from working with immediate customers and suppliers rather than distant upstream or downstream parties
- Coordination between parties required!





# Competing on Supply Network Capability

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“A company is its chain of continually evolving capabilities – that is, its own capabilities plus the capabilities of everyone it does business with.”

Professor Charlie Fine of MIT  
“Clockspeed” (1998)



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# Coordination, Alliances and Collaboration



# Coordination & Alliances

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- Historically, economists\* defined two fundamental methods for coordinating among organizations
  - Markets mechanisms (coordinate through markets for efficient resource allocation)
  - Hierarchies (coordinate through ownership control)
- A third method has evolved which is a hybrid of markets and hierarchies – Alliances
  - Long-term contracts and relationships
    - Provide the control of hierarchies and the efficiency of markets
  - Alliances enable separate entities to approximate the potential benefits of vertical and/or horizontal integration without the long term commitment of acquisition

\* Based on Williamson – markets, hierarchies & hybrids

# Coordination Spectrum

Markets		Hierarchies	
Transactions	Alliances (collaboration, long-term contracts)	Partnerships (multiple owners)	Vertical Integration (one owner)

Partnerships  $\neq$  Alliances

Partnerships  $\neq$  Collaboration

From Collaboration, Alliances and the  
Coordination Spectrum Working Paper  
Rice and Ronchi, September, 2001

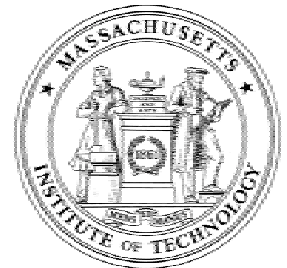
# Explaining Coordination Options

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- Markets
  - Coordinate using markets between entities, short-term transactions
  - Buying and selling through auctions
  - Public bids
- Alliances – firms collaborate with agreements
  - Long-term sales and supply agreements open-ended or over defined period of time
  - Outsourcing agreements that entail working together, sharing information, coordinating operations or optimizing the network
- Hierarchies
  - Coordinate using ownership for control, single entity
  - Vertically or horizontally integrate
  - ‘Partnerships’ – Suggests a legal relationship between two or more entities, some shared ownership and hierarchy, joint-ventures

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# Understanding Collaboration



# What is collaboration?

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- Collaboration is an abused term....
  - In vogue, not understood, many uses & definitions
  - Per Merriam Webster, collaboration definition is
    - ‘to work jointly with others’ and ‘to cooperate with’
  - But there are a lot of different ways ‘to work jointly with others’
    - Alliances, ad-hoc opportunities, short-term project-oriented activities
  - Use it to mean when firms actively work together

# Why collaborate?

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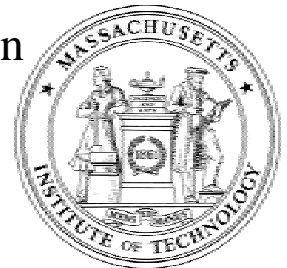
- Because there are benefits one entity cannot create without the help of another
  - Modifying a product specification slightly to allow a supplier to use standard materials and therefore reduce material cost, inventory and complexity
- Because benefits can be created when two or more entities coordinate
  - Consolidating purchases volume for greater leverage and economies of scale
  - Coordinating transportation and logistics for higher utilization of transportation vehicles and reducing use of high-cost (LTL) transportation
  - Improved service to a common customer through connected processes
- Because risk can be reduced or eliminated in the system
  - Relocating inventories in best location for the system rather than where the most powerful party instructs
  - Risk pooling by consolidating demand and having single inventories serve multiple risks
- Because working together helps uncover and eliminate redundancies
  - Internally using shared services for economies of scale through use of shared resources (Warehouses, Transportation, Finance, Human Resources, etc.)
  - Leverage common assets



# Which Benefits are Possible for You?

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- Many different benefits but these are not available to all organizations at the same time
- Potential depends on several dimensions of the collaboration
  - Type of Collaboration
    - Which processes are involved?
  - Level of Collaboration
    - How intimate is the collaboration, how much is being shared?
  - Scale/Scope of Collaboration
    - How many entities are involved? How broad is the process or function being worked?
  - Time frame of Collaboration
    - How long is the collaborative work expected?
    - Is it a project-oriented or limited-term set of work or is it part of an ongoing process?



# 3 Types of Collaboration

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## Like, Linked and Complex

*LIKE processes collaborate* when organizations with the same or LIKE processes work together, often to eliminate redundant resources and attain economies of scale.

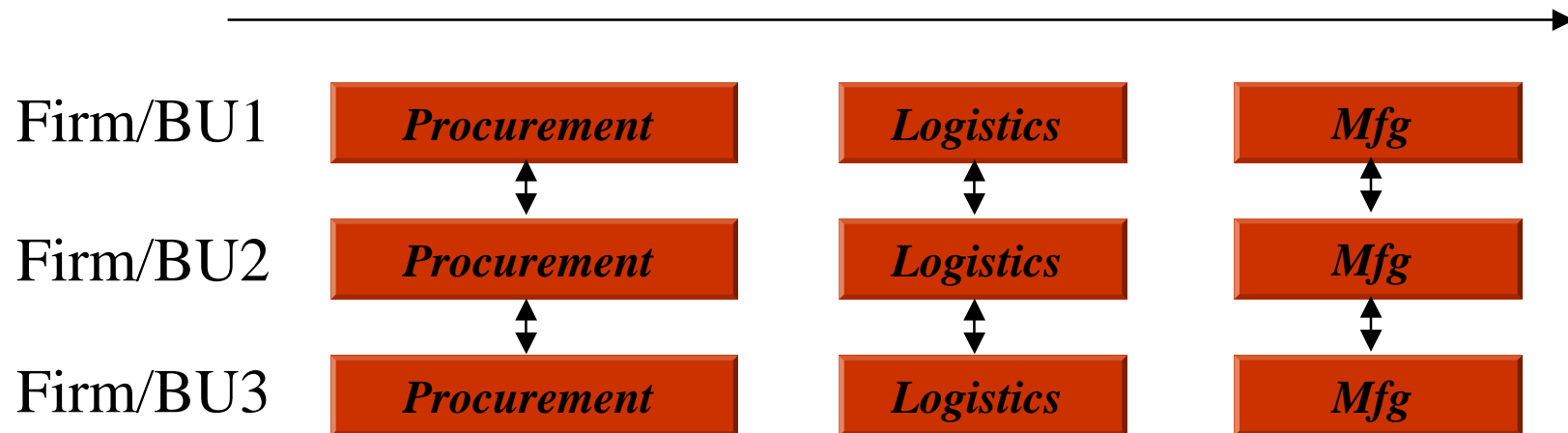
*LINKED processes collaborate* when organizations with processes that are LINKED (a supply chain) work together, often to improve the flows through the organizations and to attain economies of scope.

*COMPLEX* - when an organization has both LIKE processes and LINKED processes collaborating.



# Like Processes

Traditional Flows Across Functions of Each Business Unit (BU) or Firm



Procurement groups consolidate volume across BUs or firms.

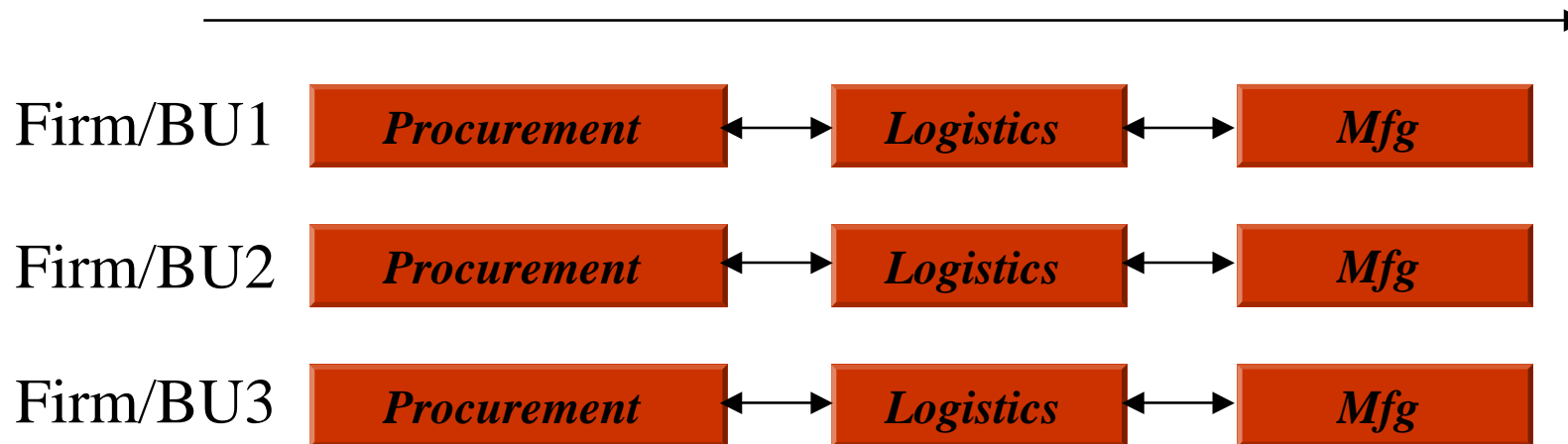
Logistics groups coordinate shipments across BUs or firms.

Manufacturing groups coordinate quality standards across BUs or firms.



# Linked Processes

Traditional Flows Across Functions of Each Business Unit (BU)



Procurement coordinates with logistics to improve the flow of materials into the manufacturing operation within the BU or between firms.

Manufacturing coordinates with logistics and procurement to optimize finished goods inventory placement and movement within the BU or between firms.



# Benefits by Type

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- **LIKE**
  - Economies of Scale
    - Consolidating volume for discounts, longer production runs
    - Networks easier to optimize with more transportation legs
  - Consistency
- **LINKED**
  - Economies of Scope
  - Faster cycle times
  - Risk balancing
  - Reduced risk, increased flexibility
    - Risk pooling as described by David Simchi-Levi



# Examples – Linked (SC) Collaboration

<b>Company</b>	<b>Industry</b>	<b>Collaboration</b>
Dell Computer	Computer	With vendors for high service, SLAs and nearby supply facilities
Calyx & Corolla	Flower Retailing	With growers to pack & ship direct, with shipper (FedEx) for support
Monorail	Computer	With FedEx on PC design
Pentacon	Fastener Distribution	With Cummins on parts needs & consolidation
Sara Lee, Nike	Food, Shoes, Autos	With mfrs to make products they market
Zara	Fashion clothing	Within to respond to demand in 3 wks



# Like: Examples

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- Knowledge Management
  - Expertise in a functional area, information about a customer's needs
- Order Entry across Business Units (for internal collaboration)
  - Coordinating order entry processes
- Sharing product data
- Common invoices (for internal collaboration)
  - Coordinating invoices into one versus multiple from one company
  - How many AT&T bills do you receive?
- Transportation planning
- MRO Procurement
  - Consolidate volumes



# Linked: Examples

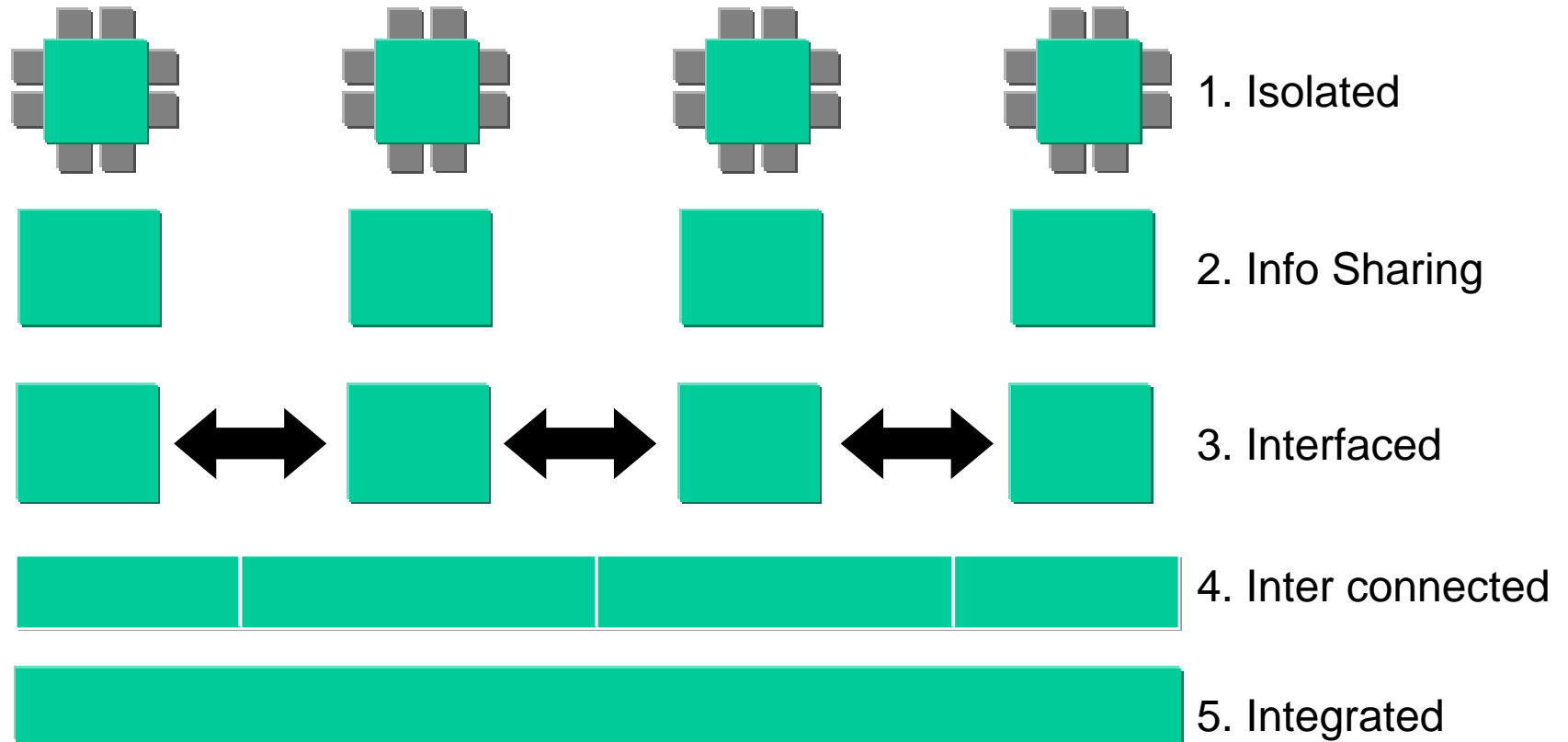
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- Network optimization
  - Upstream and downstream relocate and reduce inventories across firms
- ERP and ERP Systems
- Customer Relationship Management (CRM)
  - Coordinate all contributing activities to serve end customer
- Consolidate volumes
- New Product Development/Manufacturability
  - Design for logistics





# Levels of Collaboration



***These describe both Like and Linked***

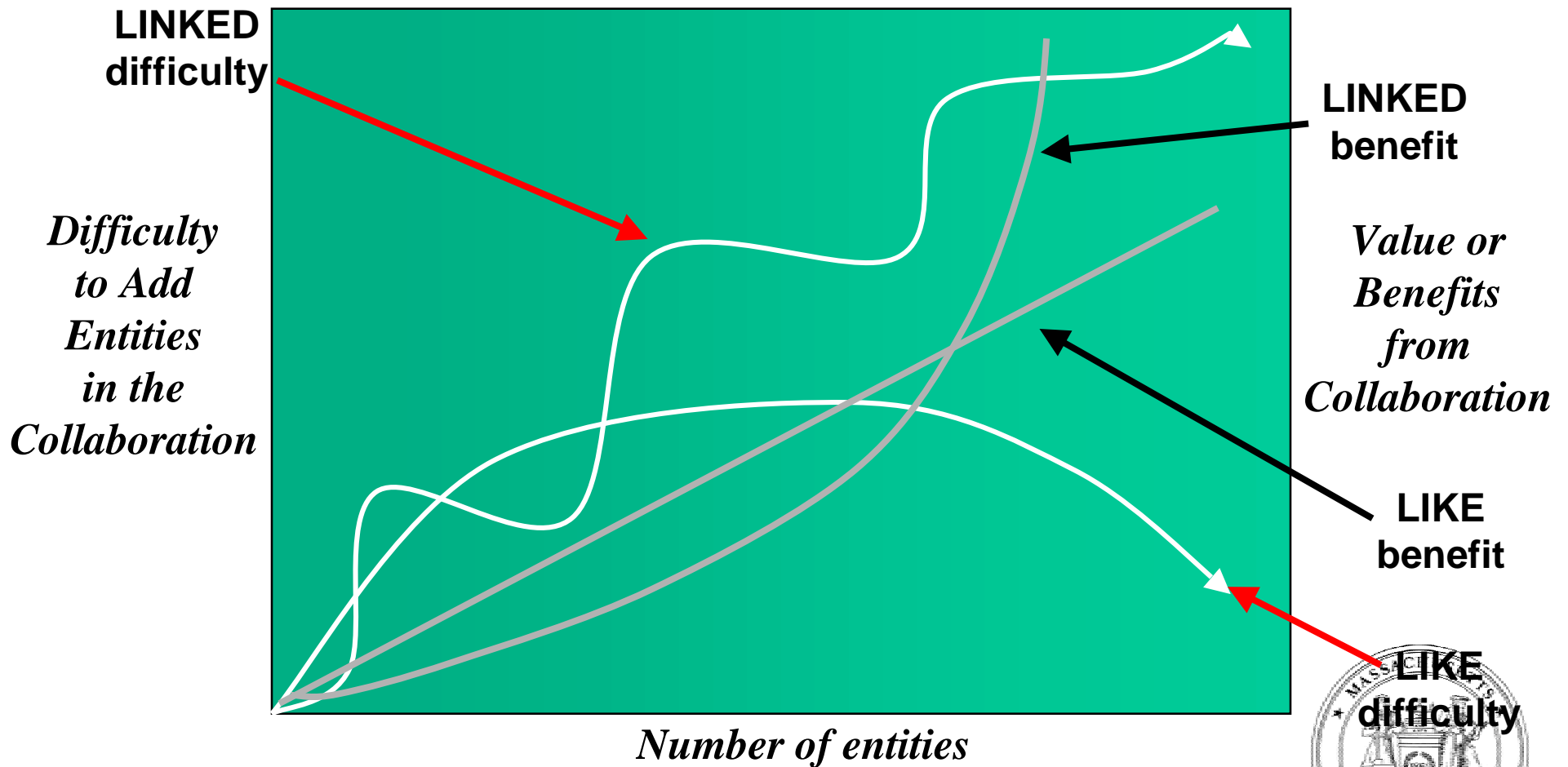


# Differences

	<i>Metaphor</i>	<i>Governance</i>	<i>Optimization</i>	<i>Typical Structures</i>
<i>Isolated</i>	Alone	Independent	Local optimization	Conglomerates
<i>Info Sharing</i>	1 Date	Meetings	↑ ↓	Functional
<i>Interfaced</i>	Dating	Councils, Cross-functional teams, Projects		Local optimization
<i>Inter connected</i>	Going Steady	Weak Process Owner (Matrix)	<i>Linked</i> – process optimization <i>Like</i> – mix	Federated
<i>Integrated</i>	Married	Strong Process Owner	<i>Linked</i> – mega process optimization <i>Like</i> – enterprise optimization	Global



# Different Paths – Difficulty and Benefits Anticipated



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# Creating Lasting Value Through SC Collaboration



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# Wise Abuse of Dominant Supply Chain Power



# Pop Quiz!

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- Does a dominant firm (almost) always benefit from exercising its power?
- To combat the negatives of chain power, should we try to make the powerful firm behave more competitively?
- Is the use of chain power basically about squeezing people upstream and downstream?
- Does it matter whether a dominant firm pushes its inventory on its suppliers vs. its customers?
- Does all the inventory risk shift to supplier when the dominant firm pushes inventory to supplier?

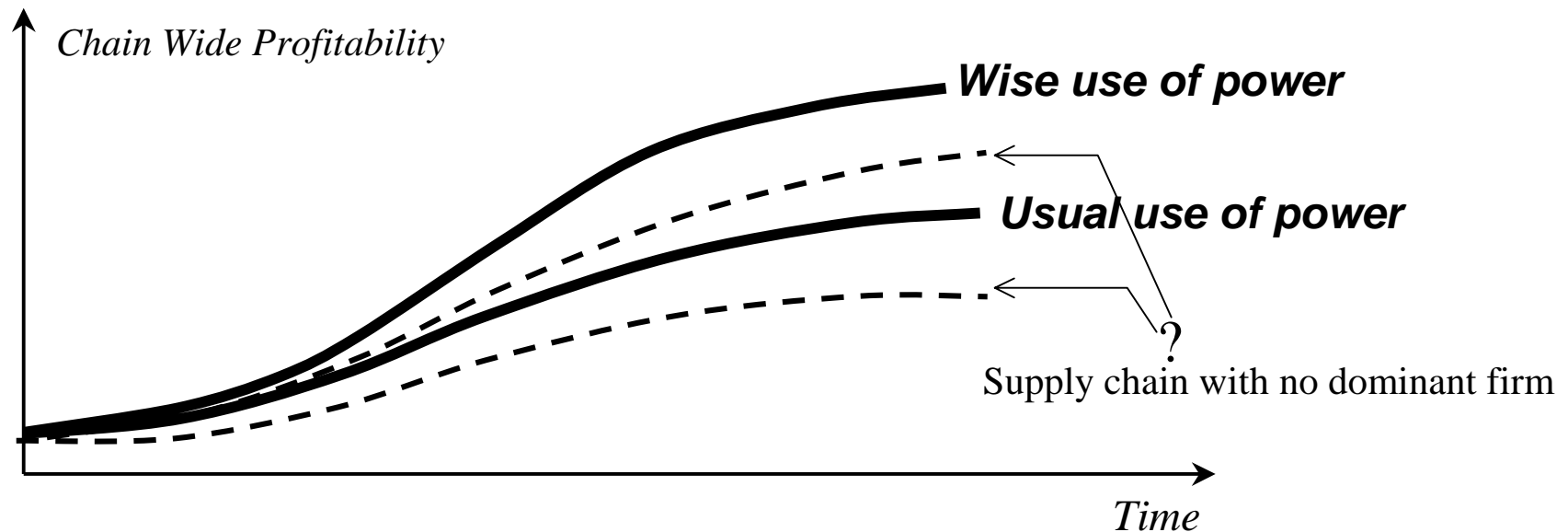


# Issues and the Wise-Abuse View

Issue	Wise-Abuse View
Does dominant firm always benefit from power use?	Maybe not: The slice vs. pie size problem
Make dominant firm behave “competitively”?	Dominant firm is a leverage point to improve chain perf.
Is use of chain power about squeezing costs?	There are many ways of using power
Pushing inventory to customers vs. suppliers?	Pushing to customers adds risk, pushing to suppliers may benefit whole chain
Does all inventory risk shift to suppliers?	Only where dominant firm is located near supplier

# Problem Statement

- A chain with a dominant firm could perform better than a chain without one.
- But, chains with dominant firms currently perform no better than chains without one.





# Problem Statement

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We suspect that most dominant firms don't use their chain power to their best advantage, although they may abuse their power to provide some advantage.

They don't understand the chain dynamics, and so they **\*\*can't\*\*** exercise their power wisely.



# Wise and Unwise Abuse

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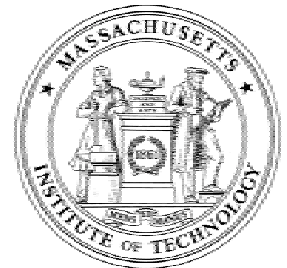
- Unwise Abuse of Dominant Firm Chain Power
  - Use dominant firm power to exact short-term gains for the dominant firm at the expense of the chain
  - Zero-sum game
- Wise Abuse of Dominant Firm Chain Power
  - Use dominant firm power to so that the whole chain benefits & so the dominant firm benefits more than unwise use of power
  - Not zero-sum game, potential for growth



# Understanding Abuses of Chain Power

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- Multiple uses of dominant chain power
  - Beyond traditional ‘cost’ squeezing
- From abstraction to concrete: Categories of abuse
  - 1: Shift inventory costs along supply chain
  - 2: Constrain or direct supply and demand
  - 3: Set standards and technology
  - 4: Maintain standards and technology
  - 5: Force others to improve our process
  - 6: Take greater share of industry profit
  - 7: Extend power outside core domain
  - 8: Create demand



# Analyzing One Category of Abuse

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- Shift inventory costs along supply chain
  - Dominant firm operates as
    - a ‘pull’ customer – requiring supplier to hold invty
    - a ‘push’ supplier – requiring customer to hold invty
  - Dominant firm demands that local inventory be owned by others in the supply chain
  - Dominant firm
    - Demands immediate payment from customers
    - Delays payments to suppliers
- Impact
  - Pushing inventory to suppliers increases risk, obsolescence and transportation costs

# Some “Shifting Inventory” Insights

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- Normal Abuse vs. Wise Abuse: Don’t just shift costs, shift physical inventory.
- But, only if dominant firm is the customer
- Shifting inventory to supplier reduces obsolescence
- Shifting inventory to supplier reduces risk
  - Only to extent transportation risk is low relative relative to mfg risk
  - Only to extent transportation risk is more correlated with demand risk than is mfg risk
- Use e-tools to minimize cost of monitoring supplier, increase negative correlation between mfg and demand risk



# So what?

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- For best chain capability, its important to coordinate the entire chain
- It is important to develop ways to understand the entire chain as a system
- It is important to develop a common understanding of the complexity of the supply chain in simple ways

