CPBIS

Sloan 2004 Annual Conference

Productivity in Supermarket Operations:

Have Supply Chain Initiatives Made a Difference?

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Suppliers
Scan-based trading
Computer assisted ordering
Vendor managed inventory
CPFR
B2B exchanges
Supermarket
Loyalty card programs
Cart-based self-scanning
Online shopping
Customers

Productivity in the Headlines

- Best place to look for tech-related productivity will be the supermarket

  Business Week, August 2003

- Info tech payoff is bigger than you think

  Laura D. Tyson, Business Week, March 2002

- Information technology doesn't matter
  - ✓ Essential to competition | Inconsequential to strategy

  Nicholas Carr, Harvard Business Review, October 2003

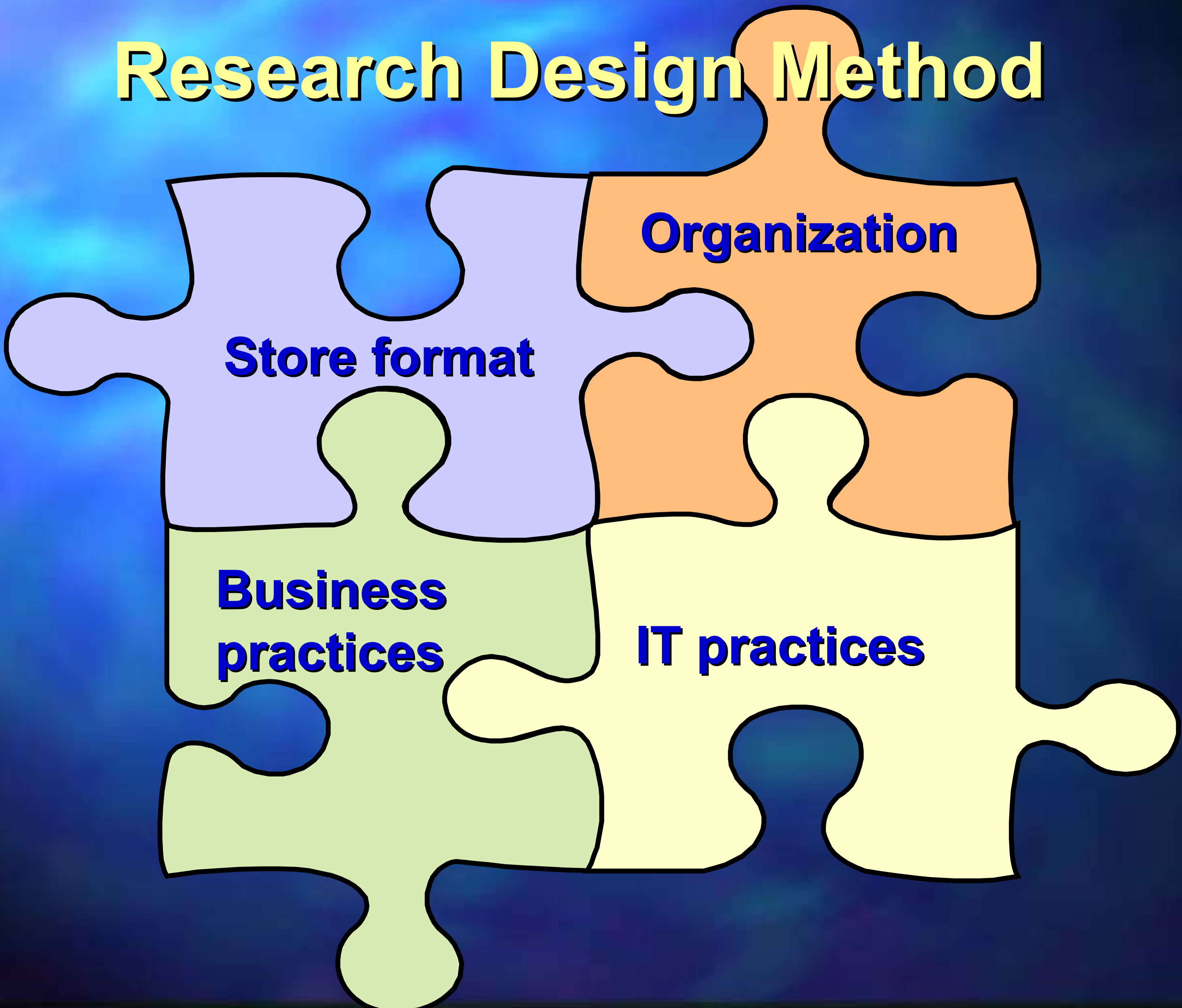
Introduction

- Significant changes in supermarkets during the 1990s
  - Larger stores … new formats and service offerings
  - Larger ownership groups … vertical integration
  - New information and communications technologies
  - New business practices and trading partner relationships

Previous Studies
IT Investment and Productivity

- Our focus is on firm level productivity
- Firm level studies
  - Significant, positive productivity impacts
  - Interactions among technologies can be important
  - Worker skills and organizational change also complement IT investments

Research Design Method



Data for this Study

- TFIC Supermarket Panel
  Annual supermarket survey
  Conducted by TFIC since 2000
- Selection from 32,000 supermarkets
- In 2002: 866 stores participated

Data for the Study

- TFIC Panel collects detailed data on
  - Store characteristics / operating practices
  - Competitive environment
  - Performance
- Data merged with U.S. Census sources
  - Population density
  - Median household income

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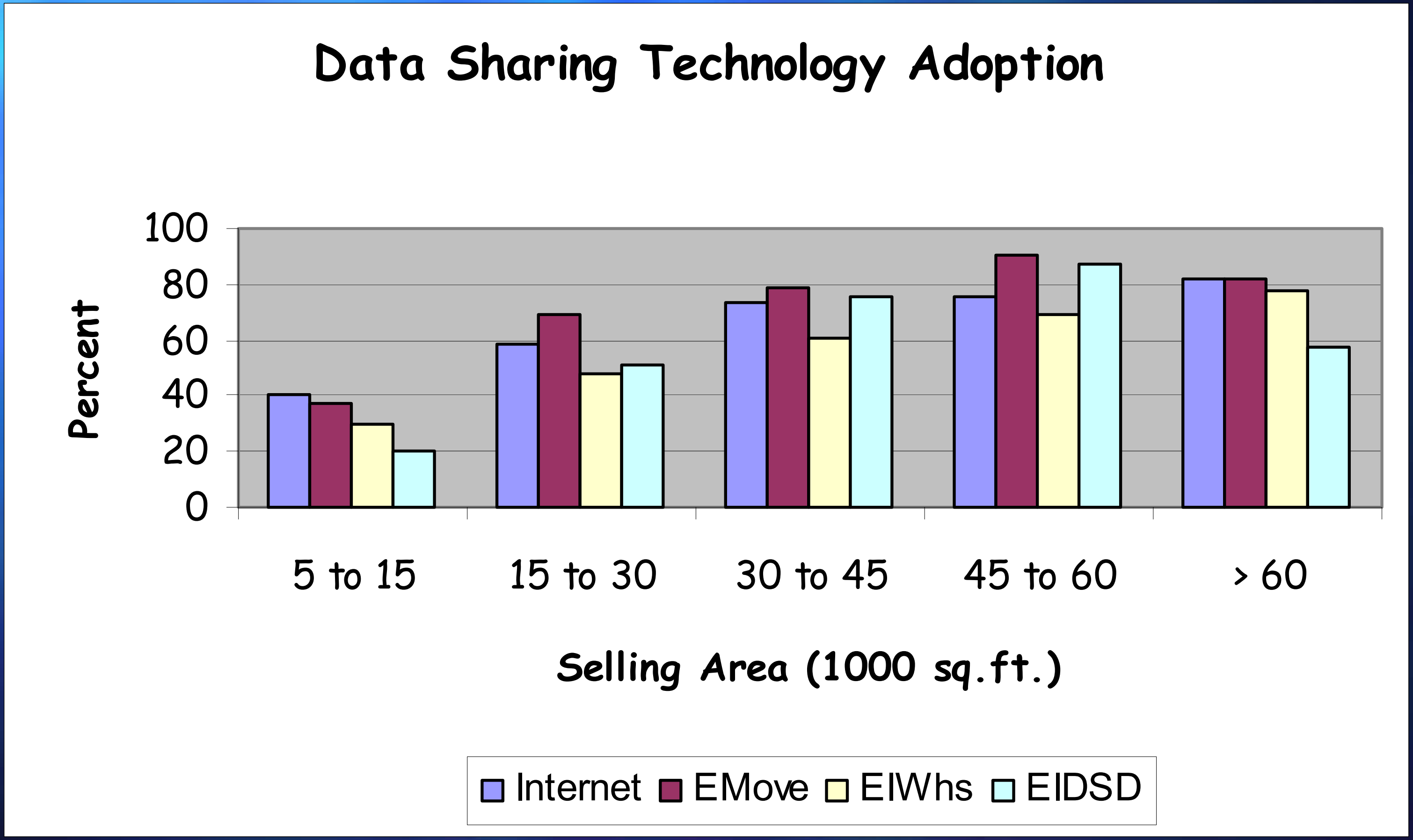
Descriptive Profile
Information Technology Adoption



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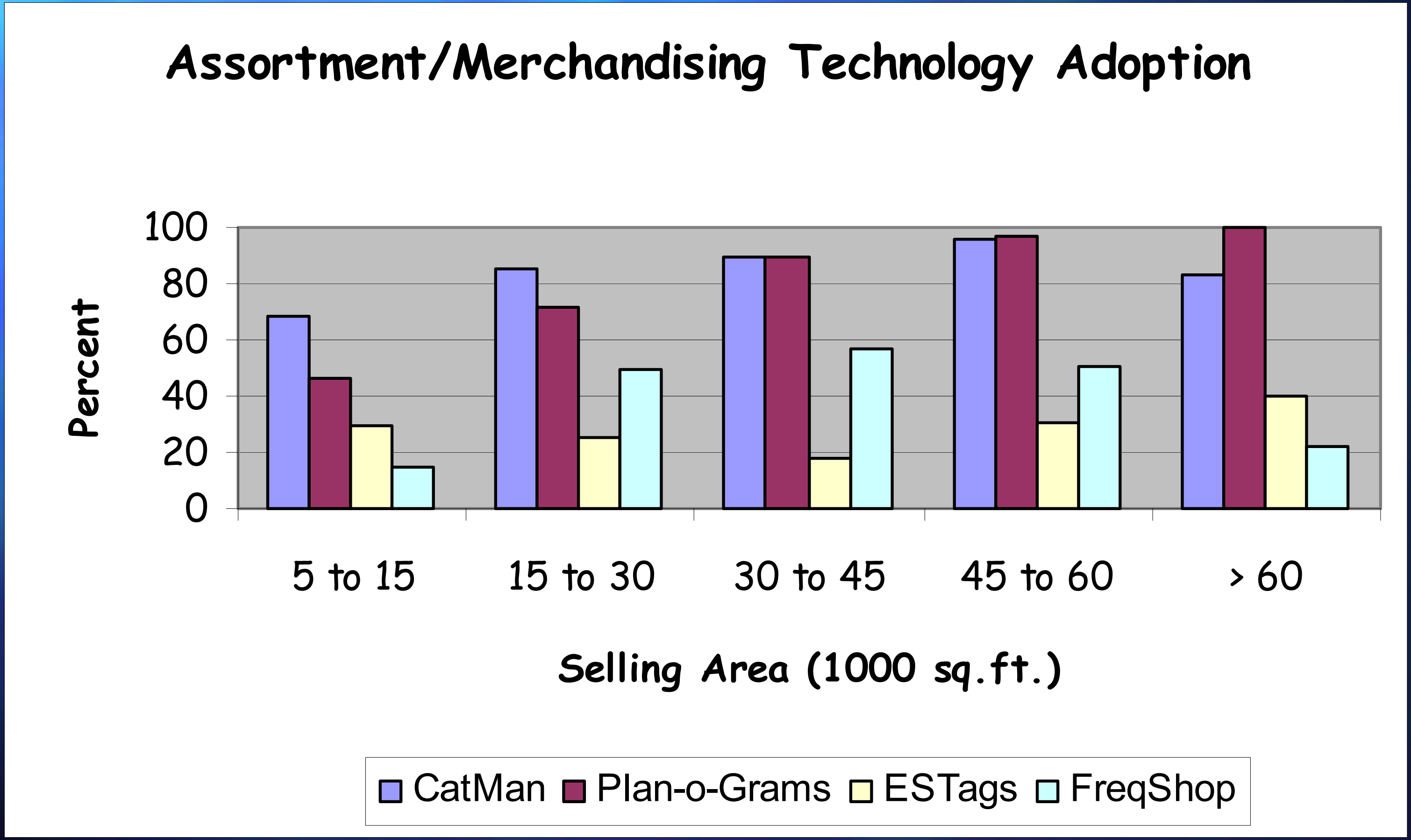
Descriptive Profile
Information Technology Adoption



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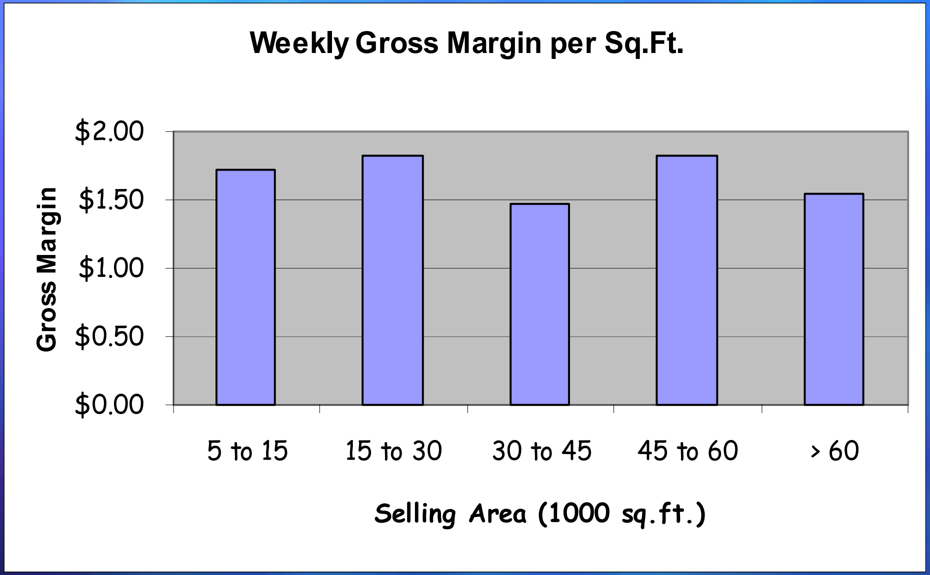
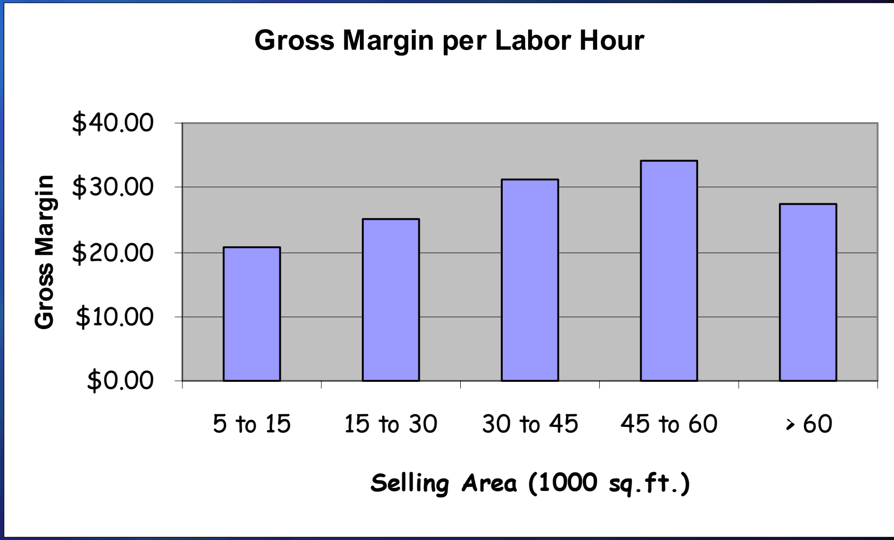
Descriptive Profile
Performance Measures





Model Specification

- Weekly gross margin is the output measure for our analysis
  - Weekly sales – COGS
- Input measures
  - Store selling area
  - Weekly labor hours
- Future work - incorporate service measures

Empirical Model

$$\ln GM_i = \alpha_0 + \alpha_1 \ln SSize + \alpha_2 \ln TotHr + \beta DS_i + \gamma SMC_i + \delta IT_i + u_i$$

- Data weighted with sampling weights
- MLE with multiplicative heteroscedasticity

Model Specification

- Relationships with key suppliers
  - Ownership group size (GSize)
  - Self-distributing (SDist)
- IT and business practice adoption
  - Data sharing (Internet, EMove, EIWH)
  - Decision sharing (VMI, SBT)
  - Assortment/merchandising (CatMan, FqtShop)
- Practice adopted 1 year prior to survey date

Results

- Union effect: positive
  - Higher productivity
  - Higher higher margins
  - Implications for emerging strategies
- Store group size : positive
- Self distributing stores: not significant
- Multistore economies >>> Vertical integration

Results

- Data sharing technologies
  - Internet, EMove, EIWH
  - No significant impact on gross margin
  - The role of enabling technologies
  - Benefits may be realized at DC level
- Challenge facing independent wholesalers
  - Identify incentives for store-level adoption
  - Decision sharing technologies

Interpretation of Results

- Decision sharing technologies
  - VMI: vendor managed inventory : positive
  - SBT: scan based trading : negative
- In-store management strategies
  - Category management : positive
  - Frequent shopper programs : positive
  - Improvement in data analysis
  - Expanded role for loyalty card programs

Discussion

- Productivity higher for stores in larger ownership groups

- Basis for productivity gains is multifaceted
  - Knowledge management
  - Advertising … store branding
  - Bargaining power with suppliers
  - Supply chain technology adoption

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TIP

Discussion

- Mixed results for IT adoption
  - Adoption vs effective implementation
  - Productivity gains at the distribution center
  - GSize capturing technology adoption
- Challenges for wholesalers / independent retailers
  - Sharing investment costs
  - Net margin gains

Supermarket-Customer Linkages

- Supply chain initiatives
  - Focused on retailer-supplier relationships
  - No impact on retailer-customer links
  - Little change in shopping experience
- Emerging information technology-based
- Design to change customer view of shopping

Loyalty Card Programs

- Customer segmentation / special offers
- Connect with customer

Cart-Based Self-Scanning

- Reduce store labor and shopping time
- Integration with loyalty card data

Online Shopping

- Alters location of shopping for customer
- Opportunities for customization
- Needed: a cost effective business model

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