Radio Frequency Identification (RFID) Implementation Efforts at Four Firms:
Integrating Lessons Learned and RFID-specific Survey

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- Background
- Literature review
- Methodology
- Case studies
- Survey
- Discussion
- Conclusion

Background

- Information technologies affects on supply chain management
- Today's management speak
- RFID technology

Literature Review

- RFID has been flying below the business-innovation and best practice radar.

- RFID as a new direction for supply chain management theory and practice.

- RFID not a new technology, but new spark for improving supply chain performance.

Contributing factors for RFID adoption

| Theory	Factors
IT adoption (Beatty, Shim, and Jones 2001)	• Perceived benefits • Complexity • Organizational compatibility • Top management support
Innovation theory (Beatty, Shim, and Jones 2001)	• Entry timing • Organizational readiness • External factors
Technology, organization, environment (TOE) (Zhu, Kraemer, and Xu 2003)	• Technology competence • Firm scope • Size • Consumer readiness • Partner readiness • Competitive pressure
Industrial organizational (Porter 1981)	• Firm performance is enabled or constrained by industry structure
Resource-based view (Barney 1991)	• Presence of resources that meet certain conditions, such as value, rarity, imperfect imitability and lack of substitutability

Methodology

Approach used in this study
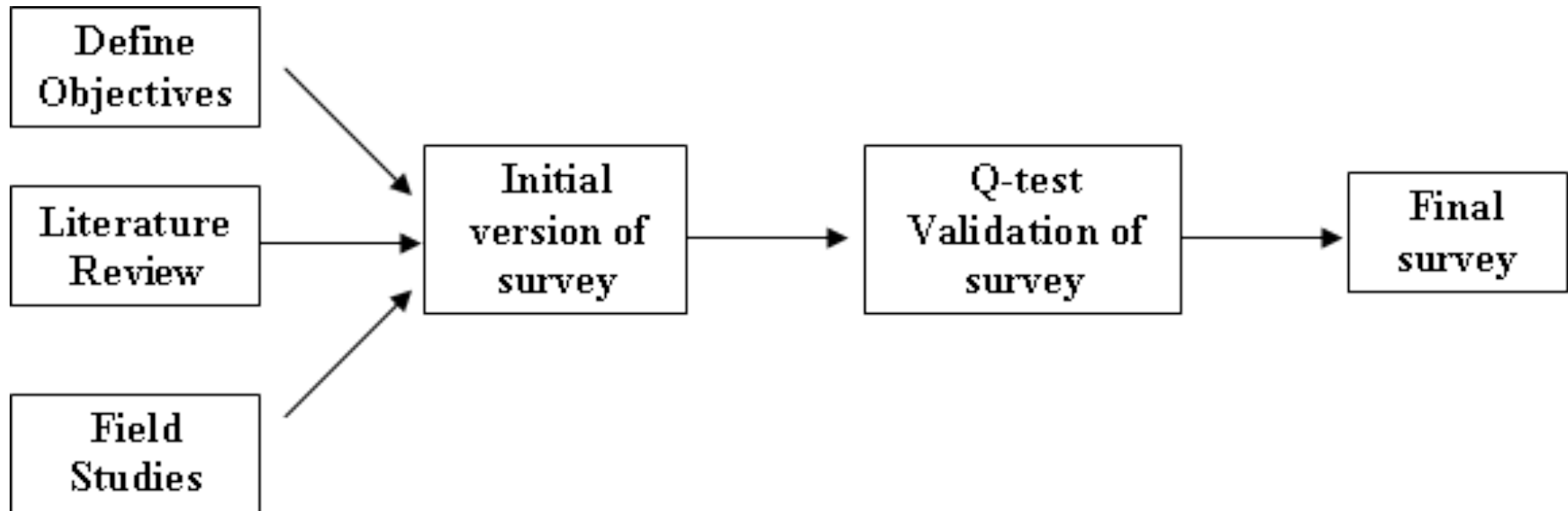
- Objectives
  - Identify and compare how firms approach RFID implementation
- Literature review
  - TAM and similar theories
- Field studies (case studies)
  - Semi-structured interviews of senior-level management

Case Studies

Four cases

Case	Industry	Extent of RFID implementation	Benefits
Firm 1:	Health Care	Tactical	■ Patient flow management ■ Improve productivity ■ Tracking key assets ■ Reduce human error ■ Reliable, accurate, and secure measures for tracking, tracing, and authentication of pharmaceuticals
Firm 2:	Health care	Tactical	■ Improve utilization of assets ■ Improve productivity ■ Improve patient satisfaction
Firm 3:	Distribution	Reactive	■ Not expecting any benefits
Firm 4:	Manufacture & distributor of perishable consumer goods	Strategic	■ Reduce order replenishment cycle time ■ Improve quality of service ■ Reduce labor costs

- Reactive implementation simply to comply with a trading partner's request.

- Tactical approach seeking to improve efficiencies to specific processes within the company.

- Strategic implementation that involves using RFID across the entire supply chain.

Case 1

- Health care industry
- Tactical implementation
- Patient flow (WIP) & turning beds
- Improve productivity
- Future plans for integrating insurance and billing

Case 3

- Distribution
- Reactive implementation (slap & ship)
- Not expecting any benefits

Case 4

- Manufacturing & distribution
- Strategic implementation
- CRM & SRM
- Reduce replenishment cycle time
- Reduce labor costs

Survey

Survey logic

Collect firm's demographics

↓

Planning to adopt RFID within next 2 years?

No   Yes

↓   ↓

Why not?   Reasons for adopting

↓

Expected hurdles

↓

If already implemented:
Assessment of realized improvements

↓

Advice for interested companies
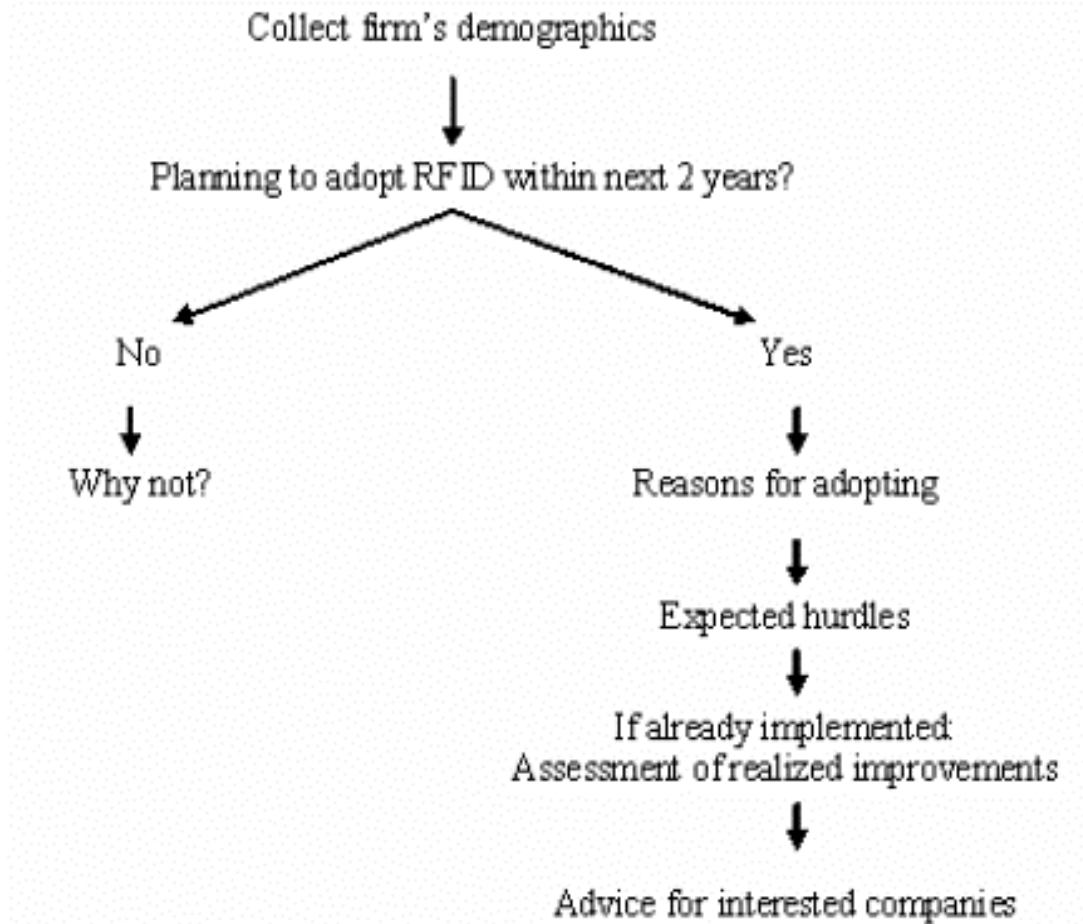
The current status of companies' adoption plans for RFID tags

We do not plan to implement RFID tags in the next two years	510	76.9%
We are seriously considering implementation of RFID tags in the next 1-2 years	86	13.0%
We are in the process of implementing RFID tags	46	6.9%
We have completed implementation of RFID tags	21	3.2%
Total:	663	

Initial use of RFID tags

Individual product	61	48.4%
Case	27	21.4%
Pallet	25	19.8%
Container	9	7.1%
Other	4	3.2%
Total:	126	

Planned use of RFID tags

Track parts at case/pallet/container level	66	65.3%
Help automate inventory replenishment	53	52.5%
Track parts at individual part unit level	52	51.5%
Help monitor inventory usage	50	49.5%
Conduct inventory counts of items in storage	48	47.5%
Locate parts or equipment within facility	43	42.6%
Track equipment (pallets, carts, trailers, etc.)	24	23.8%
Other	13	12.9%

Note: The second column is the number of responses. Respondents were allowed to respond to multiple items. The percentage in the last column is based on the number of respondents who answered this question (n=101).

Perceived rankings of channel members benefiting from RFID tags

	Most	Middle	Least
Customer	44	28	50
Company	44	55	22
Supplier	38	36	46

Realized improvements

Variables	Mean
Accuracy and availability of information	5.23
Level of process automation	4.96
Level of customer service	4.80
Operations capabilities	4.76
Inventory levels	4.69
Lead time	4.65
Overall operating costs	4.46
Labor cost	4.26

Note: Values greater than 4.00 indicate improved performance.

Reasons for not planning to implement RFID

Not applicable in our business	187
Initial costs are too high	140
Expected benefits are not enough	138
Our system works fine	97
Technology too new or standards not set	79
Too busy to consider it	64
Security or reliability issues	20
Other	62

Discussion
& Managerial Implications

- The fallacy of first-mover advantage
  - 1
  - 2
  - 1 ½ ?

- The fallacy of in-store inventory uses
  - Silver bullet?
  - Management practice?

Conclusions