Research Methodologies in Electronic Commerce

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Electronic Commerce Research

- Electronic commerce is an inter-disciplinary field
- Many different research methodologies have been used in e-commerce research
  - For example:
  - Economics-oriented research (e.g., game theory, econometrics, etc.)
  - Behavioral-oriented research (e.g., structure equation model, etc.)

Relevant Situations for Different Research Strategies

Strategy	Form of Research Questions	Requires Control of Behavioral Events?	Focuses on Contemporary Events?
Experiment	how, why?	Yes	Yes
Survey	who, what, where, how many, how much?	No	Yes
Archival Analysis	who, what, where, how many, how much?	No	Yes/No
History	how, why?	No	No
Case Study	how, why?	No	Yes

Source: Yin, Robert K. 2003. Case Study Research: Design and Methods (Third Edition). Thousand Oaks, California: Sage Publications.

Experiment Example

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How Effective Are Electronic Reputation Mechanisms? An Experimental Investigation

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Experiment Example (cont'd)

- **Author's State Purpose**
  - Reputation systems have positive economic effect in online market, but there is also evidence of room for improvement. This paper focused on measuring the effectiveness of online reputation mechanisms and provides some insight into the seller and buyer behavior that they induce.

- **Guiding theory/framework**
  - Game theory

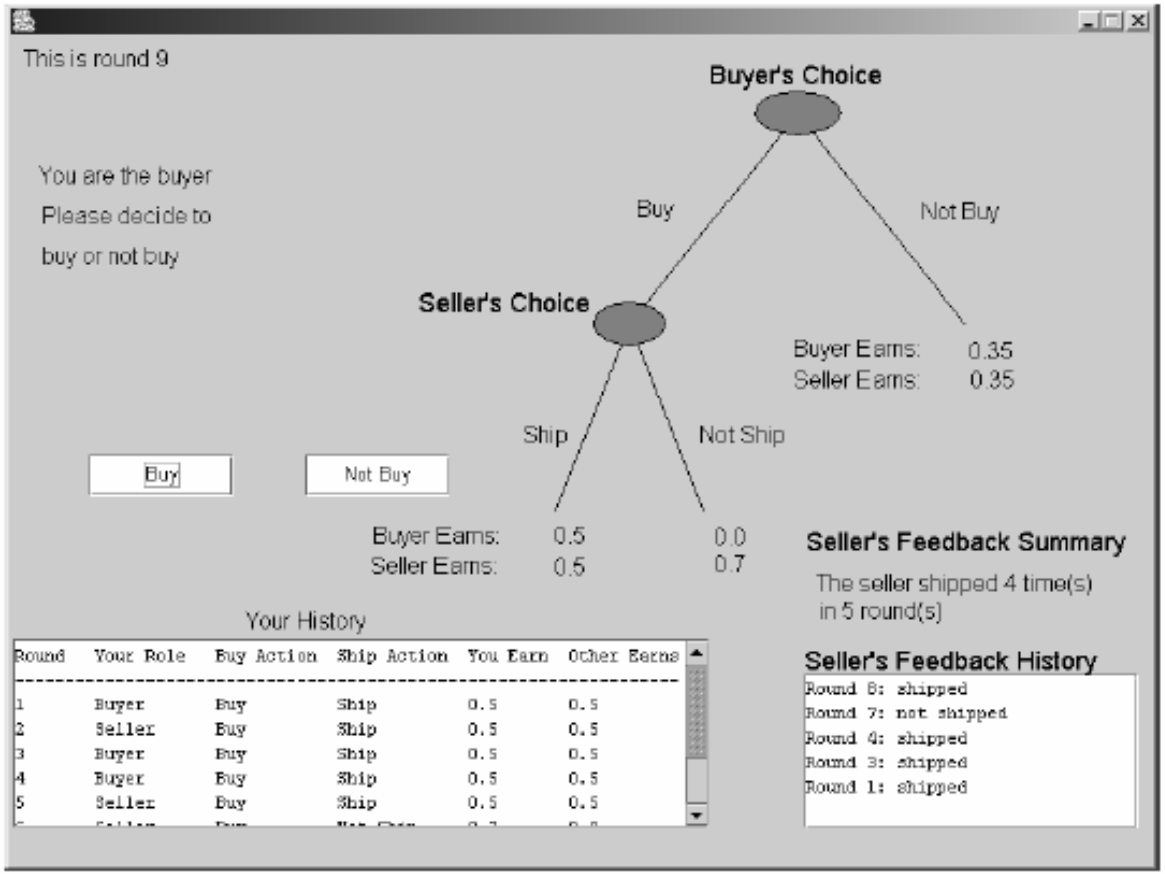
- **Methodology**
  - Data is collected through controlled laboratory experiment.

Experiment Example (cont'd)

- **Summary of key results**
  - Reputation market performs better than stranger market, and partner market performs better than reputation market with respect to measures of efficiency, trust, trustworthiness and stability.
  - Strategic incentives to trade in reputation market are weaker than the incentives in partner market.
  - Buyers put more weight on negative than positive feedback, and more on recent than old feedback.

Experiment Example (cont'd)

Figure A1 A Typical Buyer Screen



Experiment Example (cont'd)

- There were 16 subjects per session (48 per market) for a total of 144 participants in the experiment.
- All sessions were conducted in March and April of 2002 at the Laboratory for Economic Management and Auctions (LEMA) in the Smeal College of Business, Penn State University.
- Subjects were Penn State University students, mostly undergraduates, from various fields of study who volunteered through an online recruitment system.
- Cash was the only incentive to participate.

Survey Example

Customer Satisfaction in Virtual Environments: A Study of Online Investing

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Survey Example (cont'd)

- **Author's State Purpose**
  - A model is developed to quantify the components leading to on-line trust. On-line investing is used for empirical validation.

- **Guiding Theory/Framework**
  - A series of hypotheses are developed leading to a conceptual model. The model is then tested using empirical data.

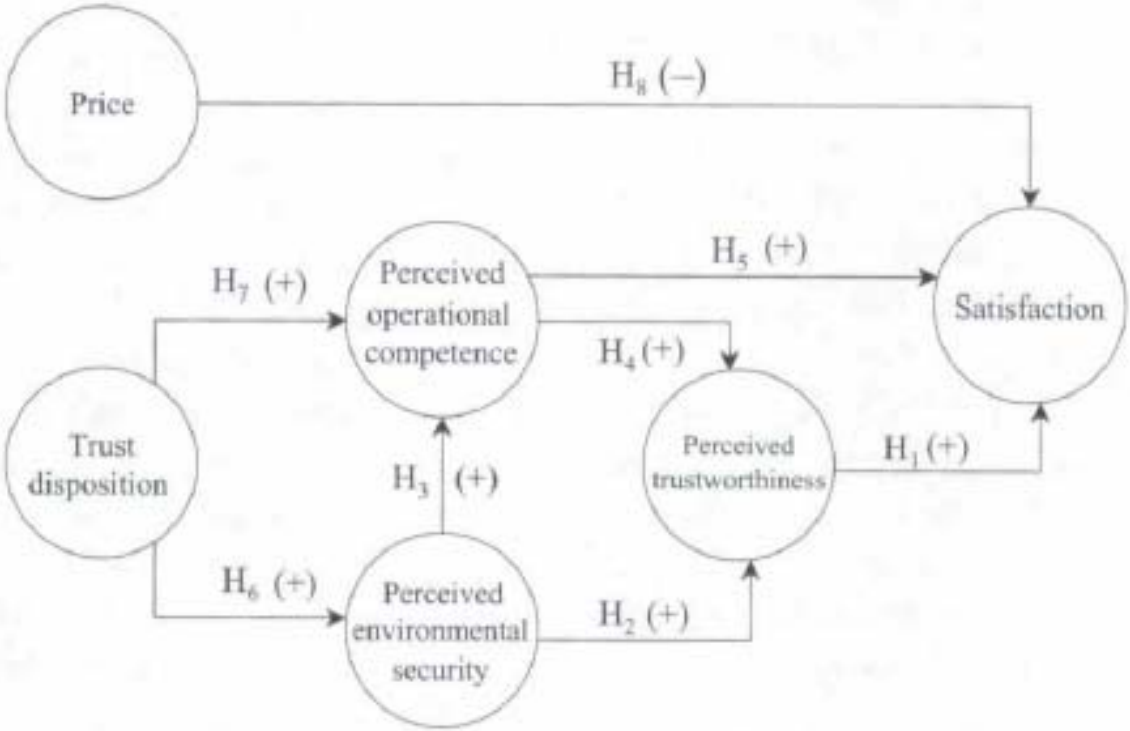
- **Methodology**
  - A survey was conducted. The model is validated using two samples – one comprising 225 online investors of a large online broker, and the other comprising 203 members of the American Association of Individual Investors (AAII).

Survey Example (cont'd)

- **Key results**
  - perceived trustworthiness of an online broker is a significant antecedent to investors' satisfaction, and that perceived environmental security and perceived operational competence impact the formation of trust.

Survey Example (cont'd)

Figure 1 **Conceptual Model**



Survey Example (cont'd)

Construct and question/item	Variable
Satisfaction	
1. Overall, I am satisfied with my online broker.	OVERALLSAT
2. How likely are you to recommend your online broker to your friends?	RECOMMEND
Perceived trustworthiness	
3. My online broker is truthful and open about the costs of trading.	TRUTHFUL
4. My online broker has the best interests of investors in mind.	INTEREST
5. My online broker has a reputation for fair practices.	FAIR
6. My online broker always provides the best price for my orders.	BESTPRICE
Perceived environmental security	
7. Generally, I believe that online brokerages provide the service and quality they promise to deliver.	PROMISE
8. Online brokerages make sufficient investments in technology to handle large volumes of orders from investors.	TECH
9. Generally, I believe that online brokerages have the best interests of customers at heart.	HEART
10. Online brokerages usually resolve problems honestly.	HONEST
11. The existing regulatory control of online brokerages is sufficient to ensure that consumers are protected.	REGULATE
12. Online brokerages are willing and available to resolve problems.	ACCESS
13. Online brokers find the best available prices for investors.	PRICES
Perceived operational competence	
14. My online broker provides timely and accurate stock market information on its websites.	ACCURATE
15. The quality of stock market research available from my online broker is excellent.	QUALITY
16. My online broker executes my transactions in a timely manner.	TIMELY
17. My online broker provides a wide range of services.	WIDERANGE
18. The web pages at my online broker are easy to use.	EASYTOUSE
19. The number of steps required to execute a trade at my online broker is low.	STEPS
Trust disposition	
20. I believe that human beings are helpful and caring.	CARING
21. The average person, in general, is honest.	HONEST2
Price perceptions	
22. The overall commission rates charges by my broker are high.	COMMISSION

Archival Analysis

THE JOURNAL OF INDUSTRIAL ECONOMICS 0022-1821
Volume XLIX December 2001 No. 4

CONSUMER DECISION-MAKING AT AN INTERNET SHOPBOT: BRAND STILL MATTERS*

MICHAEL D. SMITH† AND ERIK BRYNJOLFSSON‡

Archival Analysis (cont'd)

- Author's Stated Purpose:
  - Specifically, the authors address three questions
    - How important is retailer brand in determining consumer choice?
    - Is brand more important to some types of customers than to others?
    - How do consumers react to the allocation of total price among components such as tax and shipping cost?

Archival Analysis (cont'd)

- Guiding Theory/Framework
  - Because shopbots drastically reduce search costs, they provide an opportunity for researchers to observe how customers select among listed alternatives.

- Methodology
  - Use data from Evenbetter, an Internet shopbot (Evenbetter was bought by DealTime in 2000 and now shopping.com)
  - They analyze 20,268 shopbot consumers who select various books from 33 retailers over 69 days

Archival Analysis (cont'd)

- Summary of Key Results:
  - Customers care a great deal about retailer brand, possibly because it engenders trust;
  - Customers are more sensitive to price changes in tax and shipping than actual item price;
  - Shopbot data does enable analysis of the drivers of dispersion;
  - Positioning of offer on the results table is important

Archival Analysis (cont'd)

TABLE I
SHOPBOT DATA COLLECTED

	Offer Data
Total Price	Item Price plus Shipping Cost plus Sales Tax
Item Price	The price for the item
Shipping Price	The price for shipping
State Sales Tax	Sales tax (if applicable)
Weighted Sales Tax	State sales tax plus city/county taxes weighted by Internet population (1998)
Retailer	Retailer Name (used to create dummy variables for each retailer)
Shipping Time	Average of the minimum and maximum shipping range quoted by retailer
Acquisition Time	Average of the minimum and maximum acquisition range quoted by retailer
Delivery Time	Shipping Time plus Acquisition Time
Shipping Method	Dummy variables for shipping alternatives offered by retailer
Delivery NA	= 1 if retailer can't quote an acquisition time (time to get book from distributor)
First Offer	Dummy variable for the first offer listed in the price comparison table
First Screen	Dummy variable for whether offer appears in the first screen (10 offers)
	Session Data
Date/Time	Date and time search occurred
ISBN	ISBN number of book searched for (used to calculate book type)
Sort Column	Identifies which column the consumer sorted on (default is total price)
	Consumer Data
Cookie Number	Unique identifier for consumers who leave their cookies on
Cookies On	= 1 if the consumer leaves cookies on (97.1% of customers leave cookies on)
	Choice Data
Last Click-Through	= 1 if the consumer's last click through was on this offer

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Case Study Example

Transforming Work Through Information Technology: A Comparative Case Study of Geographic Information Systems in County Government

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INFORMATION SYSTEMS RESEARCH
Vol. 7, No. 1, March 1996

Case Study Example (cont'd)

- Authors' Stated Purpose
  - To examine and analyze the implementation of geographic information systems in two local county governments in the United States.

- Guiding Theory/Framework
  - Information technologies are socially constructed, and shared meanings within a particular social context influence their organizational consequences.

- Methodology
  - Conducted surveys with managers and employees within each county organization to ascertain their personal and shared experiences with the integration of geographic information software into their work processes. Responses were coded and tabulated, and an application was written to group responses into themes.

Case Study Example (cont'd)

- Summary of Key Results
  - North County had a positive transformation experience in connection with implementing GIS.
    - de-centralized, high-level (strategic) learning
    - the GIS implementation was part of a long-term IT organization-wide transformation, thus laying the foundation for an easier transition.
  - South County had a negative transformation experience
    - training centered around data entry and coding rather than conceptual, objective-based learning
    - failure to articulate and sell the organization wide goals for the new system.

Modeling Example

ELSEVIER

Decision Support Systems 35 (2003) 273–286

Decision Support Systems

www.elsevier.com/locate/dsw

Building trust in online auction markets through an economic incentive mechanism

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Modeling Example (cont'd)

- **Author's Stated Purpose**
  - How to design mechanisms (trusted third parties) to promote trust in online auction markets when individuals have short run temptations to cheat?
  - What are the conditions under which such a mechanism would work?

- **Guiding Theory/Framework:**
  - Game theory, repeated games and Prisoner's Dilemma game,

- **Methodology:**
  - Game theoretic approach is used to analyze online transactions and to explain why a new economic incentive mechanism is needed. The detail design of a trusted third party and the corresponding theoretical justification are also based on game theoretical modeling.

Modeling Example (cont'd)

- **Key results:**
  - Based on the proposed Trusted Third Party system stage game, two conditions under which TTP System Strategy (TTPSS) is the sequential equilibrium are found.

Modeling Example (cont'd)

Table 1
The payoff structure of the stage game

		Buyer	
		Honest	Cheat
Seller	Honest	π_t, π_t	$-l\pi_t, (1+g)\pi_t$
	Cheat	$(1+g)\pi_t, -l\pi_t$	0, 0

Some Suggestions

- Choose a research methodology that fits your background
- Stick to the research methodology and use it well
- Topic vs. research methodology: which is first?
  - Choose your research methodology first
- Learn new research methodology from your colleagues/co-authors by doing research projects