E-Commerce in Agriculture

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E-Comm > Introduction

Digital IT in Agriculture

- Stand-alone computers
  - Farm records
  - Decision support

- Wide-area networks
  - Info
  - Buy & Sell
E-Commerce defined:

- "... sales of goods and services over the Internet, an extranet, Electronic Data Interchange (EDI), or other online systems. Payment may or may not be made online". (U.S. Census Bureau 2000)
- "... business occurring over networks that use the Transmission Control Protocol/Internet Protocol (TCP/IP), i.e. the Internet, intranets, and extranets". (OECD 1998, p. 9)
- "... trade that actually takes place over the Internet, usually through a buyer visiting a seller’s website and making a transaction there.” (Economist, March 2000)
E-Comm > Introduction

1. Introduction
2. E-commerce readiness
5. Whither e-commerce?
6. Close

E-commerce in Agriculture
E-Comm > Readiness

E-Readiness rankings (top 20)

1. United States
2. Sweden
3. Finland
4. Norway
5. Netherlands
6. United Kingdom
7. Canada
8. Singapore
9. Hong Kong
10. Switzerland
11. Ireland
12. Denmark
13. Germany
14. France
15. Belgium
16. Australia
17. New Zealand
18. Austria
19. Italy
20. Israel

e-readiness = f (level of connectivity, online business culture)

Total Global Internet Users by Region

- N. America: 136.9 Million
- Europe: 83.4 Million
- Asia-Pacific: 68.9 Million
- S. America: 10.7 Million
- Africa: 2.6 Million
- Middle East: 1.9 Million

Source: NUA Internet Surveys, 2000 in ITTA 2000
Asia-Pacific countries with highest number of Internet users

- Japan: 27 million
- China: 12.3 million
- S. Korea: 10 million
- Indonesia: 8 million
- Australia: 6.8 million
- Taiwan: 4.8 million

Source: Nua Internet Surveys, 2000
Japan Ministry of P&T 2000
Iamasia 2000 in ITTA 2000
E-Comm > Readiness

Costs, competition and Internet penetration

Internet charges per year, 1995

- Internet charges per year, US$, 1995, with infrastructure competition
- Internet charges per year, US$, 1995, without infrastructure competition

Internet hosts per 1000 inhabitants

- Internet hosts per 1000 inhabitants with infrastructure competition
- Internet hosts per 1000 inhabitants without infrastructure competition

Source: WTO, 1998
E-Comm > Readiness

Active Adult Internet Users in the U.S.

Source: Cyberdialogue 2000
in ITTA 2000

Source: economist.com
E-Comm > Readiness


Source: NASS July 30, 1999
Expected E-Commerce Growth, 2000 - 2004 (B2B & B2C)

US$ 6.8 trillion

US$ 657 billion

Source: Forrester Research
E-Comm > Why & How?

- **C2C**: high-tech garage sales

- **B2C**:
  - 0.64 percent of total retail sales of $821.2 billion in IV/99
  - of interest in markets for highly differentiated or standardized products
  - issues: payment, privacy, customer acquisition & retention
  - online farmers’ markets; wineries online; booking farm holidays

- **B2B**
  - "... roughly 1 of every 25 farms and ranches in the country bought or sold agricultural products on the Net" (USDA Sept. 2000)
  - 12% of total sales in 2004 (~ $123 billion) (Goldman Sachs 1999)
  - the only one of 12 industries with less than $100 billion in B2B-sales by 2005 (Jupiter Communications Oct. 2000)
E-Comm > Why & How ?

Projected B2B & B2C E-Commerce

Growth for the U.S.

Growth for Europe

Source: adapted from Forrester Research, 2000 (Europe) and eMarketer, 2000 (US) in ITTA 2000.
E-Comm > Why & How?

Properties of B2B E-Commerce

- extended market reach
- fast
- 24-7-365
- high fix and low variable costs
- open or closed, as required
- can be customized
- standardized practices
- choice of pricing institutions
- complements conventional commerce
- etc....
E-Commerce Applications in Agriculture

- **Support services**
  - Internet service providers - web site programming

- **Saving transaction costs**

- **E-Commerce intermediation**
  - Classified ads and directory services
  - Match makers
  - Market place providers
  - Auctioneers

- **Service integration**
Transaction costs = Trading costs + Transport costs

- "... it is not easy to find an actual case in which an exchange operation can be performed without any economic sacrifices at all, even if they are confined only to the loss of time."

- "Economic development tends to reduce these economic sacrifices ..."
  (Menger 1981, [1881], p. 189-190)

Even a primitive transaction includes three flows
E-Comm > Why & How > Saving Transaction Costs

Transaction cost savings of banks

<table>
<thead>
<tr>
<th></th>
<th>Bank transaction</th>
<th>Paying a bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>US$ 1.08</td>
<td>2.22 – 3.32</td>
</tr>
<tr>
<td>by telephone</td>
<td>US$ 0.54</td>
<td>n. D.</td>
</tr>
<tr>
<td>on the Internet</td>
<td>US$ 0.13</td>
<td>0.65 – 1.10</td>
</tr>
<tr>
<td>Saving</td>
<td>% 89</td>
<td>71 - 67</td>
</tr>
</tbody>
</table>

Source: OECD 1999.
The economic and social impact of electronic commerce. p. 63.

Does the Internet increase or decrease customers' transaction costs?

- Farmpartner.com expects "process costs" savings of 3-7%
- Suedzucker expects to reduce purchasing costs from 350 DM to 50-100 DM per transaction
Delivery of digitized information products

- **Information**
  - weather forecasts
  - market news & forecasts

- **Management and consulting services**
  - data management & analysis
  - decision support
Ideally, in e-commerce all flows are in bits
(agriculture is not ideal)

Number of bi-directional info-links:
Without infomediary: \( \frac{1}{2}n(n-1) \)
With infomediary: \( n \)
Causes of disintermediation

- **conventional:**
  - more reach for less richness
    - catalog-business
    - telephone broker

- **new:**
  - shifting the R-R-frontier
    - photos & video on the web
    - interactive auctions

- **critical constraint:**
  - the "human interface"

Source: Evans & Wurster 2000
E-Comm > Why & How > Intermediaries

**Classified ads and directory services**
- facilitate search & save time
- often specialized in product categories (one or several)

**Match makers**
- connect buyers and sellers
- interactive price quote requests
Detaching information from products

- Natural: Info about reality
- Cultural: Info for reality
- Technological: Info as reality

E-Comm > Why & How > Intermediaries
Market place providers
- allow buyers and sellers to meet & communicate
- specify and enforce rules for trading
- mostly several commodities and inputs
- hope for large and liquid market
- variation w.r.t.
  - access to logistics services
  - access to transaction information
  - accept title & risk
Auctioneers

- also provide a market place
- and detailed rules for price determination
- hope to increase market liquidity
- various bidding rules
- often combined with additional services
- long tradition in electronic markets
Service integrators ~ Portals
- serve as entry points for users on the web
- two part business model
  - business with the portal
  - satisfy users' information needs
- balance between
  - keeping users at the portal
  - leading users to other sites
E-Comm > What?

Goods traded

- **Inputs**
  - ag. chemicals - seed - machinery parts - etc.
- **Outputs**
  - produce - livestock - used machinery - etc.
- **Rights and obligations**
  - water - insurance - quotas
- **Information**
- **Management services**
E-Comm > Whither?

- **Moore's Law of computer power**
  - Computer capacity on a chip doubles every 18 months
  - the capacity to carry out 1000 calculations per second cost about $180 in 1980 and $0.0075 by 1998; **-43% p.a.** (Kurzweil, 1999)

- **Hard disk capacity growth**
  - density of data stored on hard disks increased $1.3 \times 10^6$ since 1957
  - disk capacities are recently doubling every nine months
  - price per megabyte for hard disk drives has fallen from $11+$ in 1988 to $0.02$ in 1999 and $0.003$ in 2002; **-45% p.a.** (Toigo 2000)

- **Agents or Bots**
  - information management
  - price search
  - customize
  - negotiate
Growth in microprocessor capacity will continue but trend in hard disk capacity is in doubt.
Gilder's Law of (fiber) Bandwidth
- Communication power doubles every 6 months (3x-computer power)
  ➔ Use bandwidth to simplify everything else!

Metcalf's Law
- The value of a network to its users is approximately proportional to the square of the number of its users ➔ increasing network effect!

de Long's Law
- In building a network, you tend to do the most valuable connections first ➔ it is not clear whether the network effect goes up or down!
  (P. Krugman)

Zipf's Law (as applied to the Web)
- Traffic at a site ~ 1/ rank number of the site
- Some will be very big, most will be minute, a few in between
E-Comm > Whither?

Zipf’s Law:
AOL users' visits to various sites on a day in December 1997
red line: ideal Zipf; black dots: observed; most popular site: Yahoo, 129,641 visits

Source: Adamic, L.A. 2000
Zipf, power-laws, and Pareto
- a ranking tutorial.
www.parc.xerox.com
E-Comm > Whither?

A small number of sites attracts most of the visits
AOL users' visits to various sites on a day in December 1997

Number of sites by number of users

The same on a log-log-scale

E-Comm > Whither?

Zipf's Law:
Requests for web pages at Sun's web site during a month

Nielsen, J. 1997.
Zipf curves and website popularity.
www.useit.com/alertbox/zipf.html
E-Comm > Whither?

Regulatory environment
- Security
- Authenticity
- Market intelligence
- Taxes
- Industry regulation

Internal dynamics
- Standards
- Entrepreneurs and infomediaries
- Competition
- Finance
Who will be the winners and losers?
What impact on farms, markets, consumers?
How to harness e-commerce?

*We cannot cry 'FULL SPEED AHEAD' and trust that the outcome will be desirable.*

*Brown & Duguit 2000, p. 41*