

# CPSC156a: The Internet Co-Evolution of Technology and Society

Lecture 10: October 7, 2003  
Online Auctions and eBay



The World's Online Marketplace™

# eBay Overview

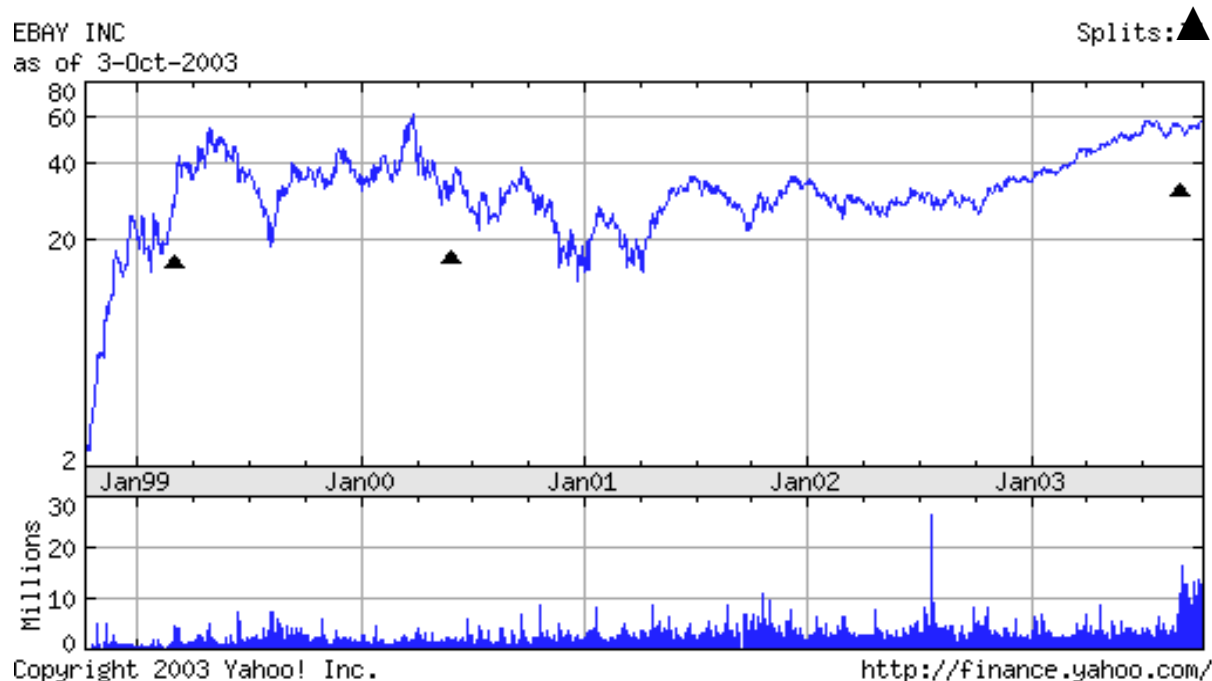
- World's largest "online trading community"
- Current number of active users:  
Approx. 34M  
(2M end of 1998; 12M middle of 2000)
- Offers a global marketplace for individuals worldwide to buy and sell from one another.

# eBay Statistics

- 5300 employees worldwide
- 638 M items listed in 2002
- Total value of goods sold in 2002: \$14.87B
- Stats as of Second Quarter, 2003:
- 75.1 M registered users, of which 34.1 M were active in the last 12 months.
- Total number of listings for the *Quarter* was 225 M. Total value of items sold: \$5.6 B

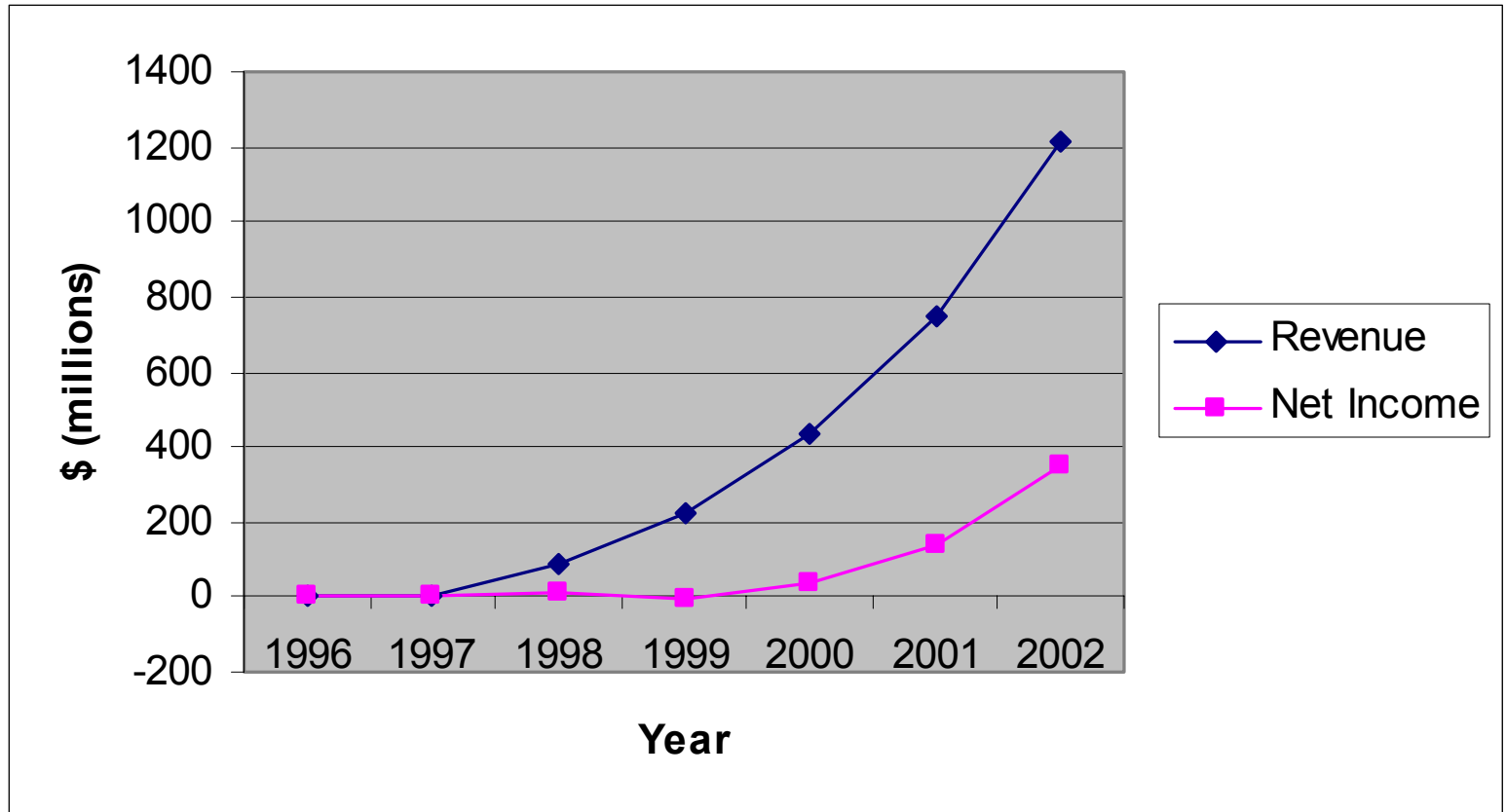
# eBay Stock Price

- stock price (2:13 pm on 10/6/03): 57.61
- P/E (2:13 pm on 10/6/03): 118.25 (? ! ?)
- 52 week range: \$25.11 to 58.93



# eBay: Quarterly Revenues

Source: eBay Earnings Releases



# eBay Business Model

- Sellers pay small fee ( $< \$2$ ) per listed item.
- eBay takes a cut ( $\sim 2.5\%$ ) of each sale.

Sellers are willing to pay this fee, because it's a very small price to pay compared to the global exposure they get.
- Although the percentage earned on any given item is small, this is profitable for eBay precisely because the market is global: over 2.5 M new items are added to the site everyday.

# Business Model (continued)

- Buyers and sellers handle exchange and payment (but, eBay offers support for PayPal exchanges).
- eBay has no inventory, no transportation, *no costs at all except website operation.*

**Conventional wisdom:** Service is *technically* commoditizable, but strong network effects favor eBay.

# Terminology

- A product or service is **technically commoditizable** if it is built using standard parts or protocols (*i.e.*, “commodities”), and its functionality can easily be reproduced by competitors. Examples:
  - eBay
  - Netscape
- A product or service that requires significant proprietary or specialized knowledge to produce, deliver, or maintain is **not technically commoditizable**. Examples:
  - Windows
  - Mac OS



# Market Characteristics

- eBay was rather unique at its inception in 1995, but many alternatives exist today including [www.epier.com](http://www.epier.com), [www.ubid.com](http://www.ubid.com), and recently [www.amazon.com](http://www.amazon.com).
- eBay's original dominance causes a network effect and perpetuates its continued dominance:
  - 1) Sellers want to sell their item on the auction service with the most buyers, so they put their items up for sale on eBay.
  - 2) Buyers want to find the best prices with many sellers, so they go to eBay.
  - 3) Because of (1) and (2), eBay is even bigger than it was before. Repeat from (1).

# "eBay is a Venue"

Source: eBay User Agreement

- "We are not involved in the actual transaction between buyers and sellers. As a result, we have no control over the quality, safety or legality of the items advertised, the truth or accuracy of the listings, the ability of sellers to sell items or the ability of buyers to buy items. We cannot ensure that a buyer or seller will actually complete a transaction." (Sec. 3.1)
- "... because user verification on the Internet is difficult, eBay cannot and does not confirm each user's purported identity. Thus, we have established a user-initiated feedback system to help you evaluate with whom you are dealing..." (Sec. 3.3)

# The eBay Rating System

- Every registered user ID has a public feedback profile attached to it.
- eBay members can fill out a feedback form to voice comments about a user:
  - to indicate a successful transaction
  - to express unusually good qualities
  - to make complaints
- Members receive points based on the rank (positive or negative) of comments. Feedback cannot be erased.

# eBay History

- 1995: Founded by Pierre Omidyar on Labor Day
- 1998: IPO in September at \$18/share
- 2000: All-time high stock price of \$127/share in March. Value of goods traded on eBay in 2000 is over \$5B.
- 2001-02: Expand with new features and buyer & seller tools. Invest in foreign communities (like MercadoLibre in Latin America).

# Buy-It-Now Feature

- The seller can specify a price at which he would be willing to sell the item to any buyer who meets that price.
- This gives buyers the option of buying the item instantly for a known price, without waiting for the auction to end.
- Sellers are presented with options when listing an item: fixed-price, online auction only, and online auction + Buy-It-Now.

# Acquisition of PayPal

- PayPal uses existing electronic infrastructure of bank accounts and credit cards to allow "small" monetary exchanges online.
- PayPal is convenient for small businesses and individuals, because they can collect online payments without difficult set-up.
- eBay acquired PayPal in 2002 and has integrated it throughout its website as a payment option for auctions.

# eBay Branches Out

- Acquired Half.com, a fixed-price online marketplace, in July, 2000.
  - Identical to eBay in all respects except that prices are fixed.
  - It has since grown tremendously and is doing very well, listing over 100 million items today. eBay sellers are offered fixed-price option up front.
- Sale of "distressed inventory" from companies through eBay stores.

Good way for companies to recover costs from older and/or excess equipment. The most prominent example is IBM (<http://www.ebaystores.com/ibm>).
- Auction of art and/or luxury goods, through online partnership with [sothebys.com](http://sothebys.com).

# Technical Foundations of Internet C2C Commerce

- Market Design (*e.g.*, Auction Types)
- Payment Systems (can't always use credit cards)
- E-Market Operations
  - Website Design Issues (*e.g.*, UI)
  - ★ System Reliability and Availability



# Massive Scale Commercial-Website Operation

eBay scale:

- Approximately 34M active users.

- About 2.5M items added each day.

Massive strain on website reliability and availability.

Major issue for high-traffic B2C sites, too.

# June 1999: Three eBay Crashes

- eBay service unavailable for "prolonged" periods of time.
  - Revenue-loss estimates: \$3M to \$5M
  - Stock-price fall: 20%
  - Blamed on ISP router failure and SUN OS "memory bugs."
- eBay started outsourcing (using Exodus, before its bankruptcy).

# Auction Types

- Ascending bid structure
- Descending bid structure
- First-price, sealed bid

Second-price, sealed bid (Vickrey):

- ★ Highest bidder gets item
  - Pays second-highest bid price
  - Advantages: "Strategyproof," user-friendly

# Auction Design in C2C Commerce

## Why Auctions?

Hard for typical C2C seller to do market research and set optimal fixed price. Auctions allow seller to maximize revenue.

eBay ascending-bid auctions include:

- Starting Price
- Ending Time
- Bid Increment
- (Sometimes) reservation price
- "Proxy bidding agents"

# eBay Ascending-Bid Auctions (continued)

- Technically equivalent to 2<sup>nd</sup>-price Vickrey
- Importance of "strategyproofness":
  - Buyers, like sellers, will have little or no information about others' valuations of the items; so "dominant-strategy solution concept" is appropriate.
  - "Truth telling is a dominant strategy" helps sellers maximize revenue.
- Seller can choose to use a descending bid structure ("Dutch Auction").

# Auctions for Unlimited-Supply (Digital) Goods

- “Optimal Fixed Pricing” (OFP)
  - No truthful auction (even multi-price) can beat OFP revenue
  - “Competitive” =  $W$  (OFP revenue)
  - No truthful, deterministic auction is competitive.
  - There exists truthful, randomized auctions that are competitive.
- [Goldberg, Hartline, Wright '99]

# eBay vs. Bidders Edge

- Bidders Edge was a company that used **web bots** to scour Internet auction sites and collect information.
- Bidders Edge would post, on its website, product and price information for goods found on eBay and its rivals.
- eBay sued Bidders Edge, claiming that the company **trespassed** - that the bots were an unauthorized and intentional misuse of the eBay site.
- Bidders Edge was stopped: The judge decided that it did **trespass**, because the search bots could disrupt eBay's system capacity. Showing that eBay was harmed was enough to justify an injunction.
- However, the injunction did not prevent Bidders Edge from accessing eBay information using different means.

# Failed Sale of Monroe Photos and Release

Auctioneer: eBay Premier and Butterfields of SF (eBay acquired Butterfields in 1999)

Seller: Tom Kelley Studios of Ventura, CA

Item: Five outtakes of Marilyn Monroe's 1949 "Red Velvet" photo shoot *and the negatives and the "model's release form"*

Expected price: \$700K to \$1M

Resolution: Photos never sold, because the five bidders failed to reach the reserve price.

Moral: Questions raised about the viability of auctioning big ticket items online.



# Implications for Internet-Based Business

- Intellectual-Property Rights Questions Inescapable
  - Butterfield's auction catalog: Right to use name and likeness for "trade and advertising purposes"
  - CMG Worldwide (which represents Monroe estate): Will go after anyone who uses "those images in a commercial fashion"
- Potential limits to eBay scope
  - Previous sales of high-end photos, prints, and art have "fallen flat."
  - Can eBay be more than a "hugely successful ... online flea market"?