The “New” Economy

- New technological advances everyday
- New and faster communication technologies
- The public gains access to these technologies
- Unprecedented economies of scale
- Empires rise, fortunes made
- Government demands accountability under antitrust laws
- The old business models seem to no longer apply. Is it time to throw them out?

- This sounds familiar…
The “New” Economy

- We could be describing the current technological revolution and its impact
  - Entrepreneurs using the computer and communications infrastructure to transform the economy

- We could just as well be talking about what happened a century ago with the emergence of the industrial giants
  - Industrialists capitalizing on the emerging electricity and telephone networks
The “New” Economy

“Technology changes. Economic laws do not.”

- Shapiro and Varian insist that we don’t need a “New Economics” – a new set of principles to guide business strategy and public policy

- Existing literature on:
  - Differential pricing
  - Bundling
  - Signaling
  - Lock-in
  - Network economics . . .
The Information Economy

- **Information** – anything that can be digitized, i.e. encoded as a stream of bits
- Certain types of information have different value to different people, for e.g., entertainment or business
- Regardless of what kind of value is placed, people are willing to pay for information
- Examples of **information goods**:  
  - Books, databases, magazines, movies, music, stock quotes, sports scores, news, Web pages, …
The Information Economy

- Information is expensive to produce but cheap to reproduce
- In economics terms, production involves high fixed costs but low marginal costs
  - Cost of producing the first copy may be substantial but for later copies essentially negligible
  - No capacity constraints
- Cost-based pricing makes little sense
  - E.g. 10% markup on unit cost, when unit cost ~$0
- Information goods should be priced according to consumer value, not production cost
Value-based pricing leads to differential pricing, since consumers have different willingness to pay for information.

Pricing your product – an example:

<table>
<thead>
<tr>
<th>Quantity (Millions)</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 million w.t.p. $60</td>
</tr>
<tr>
<td>2</td>
<td>2 million w.t.p. $20</td>
</tr>
</tbody>
</table>
Differential Pricing

- Some problems
  - How does seller know customers’ willingness to pay?
  - How to prevent arbitrage?
- In the extreme case, charging each customer exactly what he or she is willing to pay is **perfect price discrimination**
- Some reasons why it is hard to approximate, let alone achieve
  - Hard to determine maximum price someone is w.t.p.
  - Hard to offer product at a lower price to those less willing to pay without providing others the same offer
Differential Pricing

- With the Internet, it’s easier to arrange for differential pricing using “point-to-point” technology.
- Strategy is currently referred to as “one-to-one marketing”.
- But first described by A.C. Pigou in 1920 as “first-degree price discrimination”.

Forms of differential pricing:
- 1st: Personalized pricing – sell to each user at a different price.
- 2nd: Versioning – offer a product line and let users choose.
- 3rd: Group pricing – based on group membership/identity.
Personalized Pricing

- Traditional industries
  - Print media, mail-order catalogs with “special offers”
    - May be a form of market research to discover price responsiveness
  - Airlines have different fare classes on a single flight
    - Dependent on when you book, what restrictions you are willing to accept, travel history, etc.
  - “Smart” cash registers in supermarkets
    - Customized coupons
    - Discount for those buying a competitor’s product
  - May need to invest heavily in expensive infrastructure for gathering and analyzing data
Personalized Pricing

- On the Internet
  - More individualized and interactive
  - Information can be processed quickly
  - Amazon.com tracks purchases of each consumer and recommends related items the next time he/she logs on
  - Prices can be adjusted quickly and excess supply marked down
  - More than moving product, promotional pricing can estimate market response to price changes, discover price points that sell

- Key points
  - Personalize product and personalize pricing
  - Know your customer
  - Differentiate prices when possible
  - Use promotions to measure demand
Group Pricing

- Base prices directly on group identity
- Why sell to groups rather than end users?
  - Price sensitivity – systematic difference in
  - Networks effects – externalities, value to individual depends on number of users
  - Lock-in – increase switching costs for organization
  - Sharing – site licenses, selling to end user or rental market
- Key points
  - Consider price sensitivity, desire for standardization, repeat use, and market segmentation of groups
Versioning Information

- We considered the approach of personalized pricing, which requires knowledge about individual consumers.
- With **versioning**, we don’t need to price by identity.
- Offer a product line (menu) of different versions, and observe choices.
  - Target different market segments
  - Price accordingly to different segments, design versions that emphasize needs of different groups, emphasizing differences of groups (self-selection).
- Customer reveals value through version selected.
Case study: Mathematica by Wolfram Research
A computer program that does symbolic, graphical, and numerical mathematics
Professional users:
- Economics, Medical sciences, Engineering, Statistics
- Speed is critical and thus commands a high value
Student users
- Speed is less important but not functionality
Market segments naturally
Versioning Information

- Wolfram sold the professional version of Mathematica and a student version
- At one time, the student version had essentially all the functionality of the professional version, but had the floating-point coprocessor disabled
  - Slowed down mathematical and graphical calculations
  - To implement strategy, a floating-point library was created at additional cost
Versioning Information

Observations

- Quality deliberately cut at low end (or to create low end product)
- Value-subtracted versions may cost more to produce than higher-quality version
- When designing product, it is useful to be able to turn features off
  - Design with a top-down approach
- Low-end version could be a way to “advertise” the high-end product
  - Information goods are “experience” goods
  - Users get locked-in to product format
Versioning - Examples

- Other examples from hardware:
  - IBM LaserPrinter Series E
    - Functionally identical to standard LaserPrinter
    - Printed 5 ppm rather than 10 ppm due to a chip that inserted wait states
  - Intel 486SX chip
    - At the time, Intel had a virtual monopoly on computer chips
    - Had integrated math coprocessor that was disabled ($333 in 1991)
    - Original chip with coprocessor enabled was 486DX ($588 in 1991)
Versioning - Examples

- Does this strategy always work?
  - By offering a lower end product, the potential market is expanded
    - Some users who would not have bought the higher end will buy the lower end
  - But some people who would have bought the high end will buy the low end instead – “cannibalization” of high end
    - Want to avoid since profit margins are higher for high end (higher prices, lower cost)
  - To minimize this, may need to cut price of high end and/or cut quality at low end
  - Success depends on there not being too many who switch
Versioning - Pitfalls

- **Arbitrage**
  - Make sure users can’t easily convert the low-end version into the high-end
  - Windows NT Workstation ($260 in 1998) could run a server and accept 10 simultaneous sessions
  - Windows NT Server ($730 - $1,080)
  - A few tweaks turn Workstation into Server

- **Resentment**
Versioning - Dimensions

- Designing product line – identify dimensions highly valued by some and of little importance to others
  - Speed of operation (Mathematica, 486SX)
  - Delay (Fed Ex, stock quotes)
  - User Interface (complicated, more powerful or simple)
  - Image Resolution
  - Features and functions
  - Annoyance (nagware)
  - Tech support
  - …
Versioning - Considerations

- How many versions?
  - It really depends, but there are some guidelines
  - One is too few
  - Too many versions
    - Costs of maintaining too many products on supply side
    - User confusion on demand side
  - Analyze your market – natural segmentation? Different behaviors?
  - Analyze your product – consider dimensions with eye on market

- Goldilocks pricing
  - Extremeness aversion
  - Small, Large, and Jumbo
Versioning - Considerations

- **Bundling** – two or more distinct products are offered as a package at a single price

<table>
<thead>
<tr>
<th></th>
<th>Word processor</th>
<th>Spreadsheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carl</td>
<td>$120</td>
<td>$100</td>
</tr>
<tr>
<td>Hal</td>
<td>$100</td>
<td>$120</td>
</tr>
</tbody>
</table>

- Profits: $400 sold separately
  $440 bundled ($220 / bundle)

- Reducing dispersion in willingness to pay tends to increase revenue

- Other considerations – option value, product introduction
If offering just 1 version, the best approach is to sell the immediate version, to all customers, at a price of $50

- Total revenue = $50 (40 + 60) = $5,000
- Better than setting a price of $100 and only selling to 40 customers
  - Total revenue = $4,000

Offering only a delayed version is worse
Versioning - Example

<table>
<thead>
<tr>
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<th>Impatient customer's value</th>
<th>Patient customer's value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate version</td>
<td>$100</td>
<td>$50</td>
</tr>
<tr>
<td>Delayed version</td>
<td>$40</td>
<td>$30</td>
</tr>
<tr>
<td># of customers</td>
<td>40</td>
<td>60</td>
</tr>
</tbody>
</table>

- Ideally we would like to sell the immediate version to everyone, at $100 to the impatient and $50 to the patient
  - Total revenue = $100 * 40 + $50 * 60 = $7,000
  - This is perfect price discrimination and the maximum revenue possible
  - However, we may not be able to identify who is impatient/patient
Let’s try targeting each version at one group, for a price equal to that group’s w.t.p.

- Price immediate version at $100, delayed at $30
- Impatient consumers may switch to delayed version since their net benefit is $40 - $30 = $10 as opposed to $0 with immediate version
- Cannibalization
- Total revenue = $30 * 100 = $3,000
Discount the immediate version sufficiently so that impatient customers have a net benefit with buying it, that at least matches that of the delayed version:

- $90 (or $89.99) for immediate version, $30 for delayed
- Total revenue = $90 * 40 + $30 * 60 = $5,400
- Less than $7,000 with identity pricing, but more than 1 version only

We could also discount the quality of the delayed version.
Questions / Comments