

Information Rules

A Strategic Guide to the Network Economy

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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

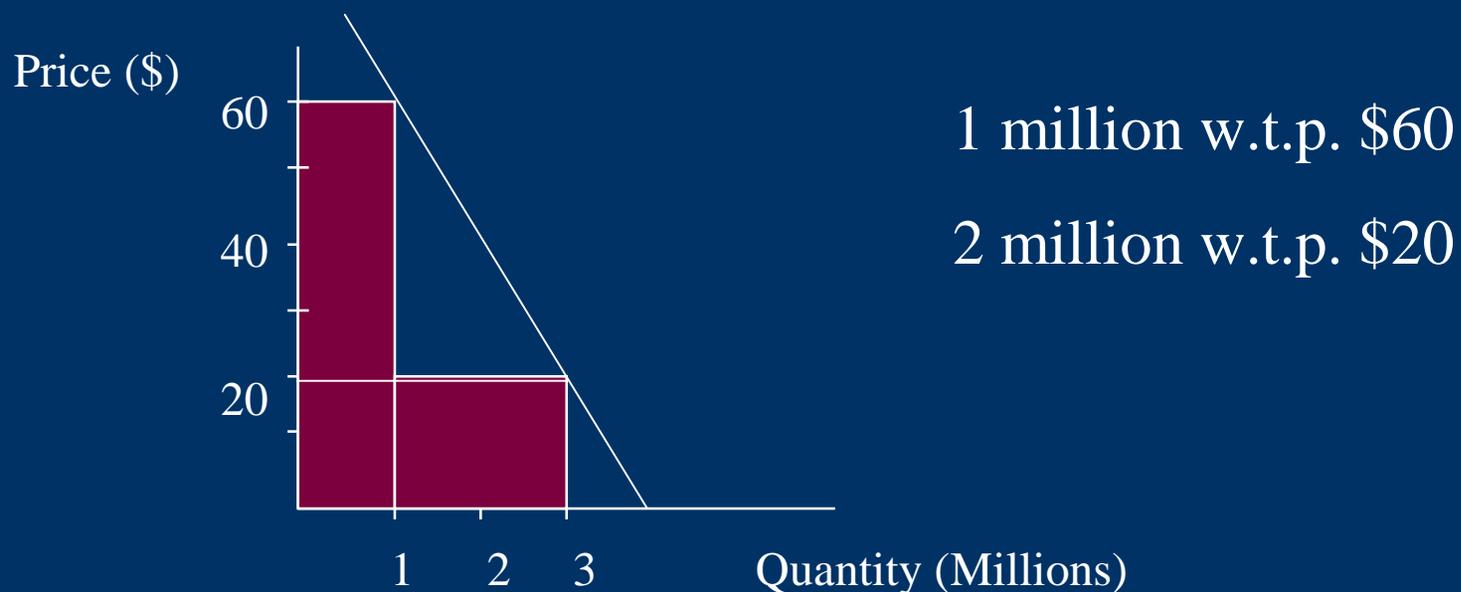
- ◆ Information – anything that can be digitized, i.e. encoded as a stream of bits
- ◆ Certain types of information have different value to different people, for e.g., entertainment or business
- ◆ Regardless of what kind of value is placed, people are willing to pay for information
- ◆ Examples of **information 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

The Information Economy

- ◆ Value-based pricing leads to differential pricing, since consumers have different *willingness to pay* for information
- ◆ Pricing your product – an example:



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

Versioning Information

- ◆ 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

	Word processor	Spreadsheet
Carl	\$120	\$100
Hal	\$100	\$120

- Profits: \$400 sold separately
\$440 bundled (\$220 / bundle)
- ◆ Reducing dispersion in willingness to pay tends to increase revenue
- ◆ Other considerations – option value, product introduction

Versioning - Example

	Impatient customer's value	Patient customer's value
Immediate version	\$100	\$50
Delayed version	\$40	\$30
# of customers	40	60

- ◆ 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

	Impatient customer's value	Patient customer's value
Immediate version	\$100	\$50
Delayed version	\$40	\$30
# of customers	40	60

- ◆ 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

Versioning - Example

	Impatient customer's value	Patient customer's value
Immediate version	\$100	\$50
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- ◆ 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 = $\$30 * 100 = \$3,000$

Versioning - Example

	Impatient customer's value	Patient customer's value
Immediate version	\$100	\$50
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# of customers	40	60

- ◆ 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