Summary of issues

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Goal of course

- Identify and understand issues which are important determinants of the success or failure of new technology and technology-laden products in the computing and telecommunicaitons industries

Information economics

- Telecommunications and software products have some important characteristics:
  - Network effects, such as positive consumption externalities
  - Path-dependent effects
  - Lock-in and switching costs
- These lead to difficulties in establishing a new product, winner take all, etc.

Pricing

- Software products, chips, and networks have high fixed costs (development, capital expenditures) and low marginal costs
  - Competitive markets drive prices toward marginal costs
  - Complex pricing strategies, including versioning, price discrimination, etc, are needed

Pricing (con't)

- Network pricing options:
  - Fixed
  - Usage
  - Congestion
  - Quality

Regulation

- Government regulation is prominent in telecommunications, because
  - Traditionally viewed as “natural monopoly”
  - Desire for “universal service”, with the cross-subsidies that entails
  - Interconnection is in best interest of customers, but might be avoided as competitive strategy

Standardization

- Standardization is an common process in these industries:
  - One response to mitigating network effects
  - One option for inter-organizational design
  - One way to deal with or enable industry fragmentation
- Standardization may be increasingly avoided with Java-like approaches

Human factors

- To be most successful, technological products should minimally interfere with the user and their task
- As the cost of technology decreases, total cost of ownership issues will increasingly dominate buying decisions, including training and administration costs

Industry fragmentation

- The industry is increasingly fragmented into smaller economic entities, for several reasons:
  - Success of the venture capital model
  - Increasing system orientation, with need to integrate diverse technologies
  - Horizontal integration
- Inter-organization design becomes necessary, and takes the form of standardization, joint ventures, and consortia

Major case studies

- The home electronics market requires the convergence of the consumer electronics, computer, and telecommunications industries
- Technology-enabled remote collaboration has not been as successful as one might expect
- The network computer is a proposed paradigm shift in desktop computing

Some major inter-relationships

Human factors

Information economics

Regulation

Pricing

Industry fragmentation

Standardization

Relationships (con't)

Human factors

Information economics

Establishing a market in the presence of network effects may require subsidy, free distribution, etc.

Regulation

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Industry fragmentation

Standardization

Relationships (con't)

Human factors

Information economics

Standardization is one way to negate network effects by allowing interoperability

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Winner-take-all, lockin, etc., may encourage regulatory intervention to maintain competitive market

Regulation

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Relationships (con't)

Human factors

Information economics

Regulation

User and societal benefits accrue from free interconnection of networks

Pricing

Industry fragmentation

Standardization

Relationships (con't)

Human factors

Information economics

Universal service may require cross-subsidies and below-market pricing

Regulation

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Relationships (con't)

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Standardization is an important mechanism for interoperability among complementary products

Regulation

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Relationships (con't)

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Information economics

Regulation may dictate standards to mitigate network effects and allow interoperability and interconnection

Regulation

Pricing

Industry fragmentation

Standardization

Relationships (con't)

Human factors

Information economics

Regulation

Consistency of user interface reduces training costs and eases usability

Pricing

Industry fragmentation

Standardization

Relationships (con't)

Human factors

Information economics

Regulation to mitigate monopolistic tendancies encourages multiple service providers

Regulation

Industry fragmentation

Pricing

Standardization

Reminders

- Groups be considerate of other students and post reports as early as possible even if a work in progress
  - Instructors promise not to grade before deadline!
- Group reports finalized by 5pm Monday
- Pick up final exam Wed or Thur, return within 24 hours
  - Emphasis on integration of knowledge
  - Machine printed or email submission
  - Instructors would like to post your best answers