Economic Globalization and the Information Technology Revolution

Lawrence J. Lau, Ph. D., D. Soc. Sc. (hon.)

Kwoh-Ting Li Professor of Economic Development
Department of Economics
Stanford University
Stanford, CA 94305-6072, U.S.A.
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Phone: 1-650-723-3708; Fax: 1-650-723-7145
Email: ljlau@stanford.edu; Website: www.stanford.edu/~ljlau
1. The Information Technology (IT) Revolution

- The widespread access to, sharing of, and use of information (knowledge) in economic activities through technology
- It is greatly facilitated by the “Internet”
  - The communication, transmission and distribution of information are no longer limited by space and time
  - Information is accessed and transmitted in real time and at low marginal cost
  - Information flow can be targeted to specific individuals and audiences
- Complementarity of information with tangible and intangible capital
  - The increased flow of information greatly enhances and multiplies the benefits of tangible as well as intangible capital, such as human capital, R&D capital, and knowledge capital, and vice versa--complementarity
  - Example: the installation of new software or new database on existing computers
2. Implications of the IT Revolution

- “Internet” time
  - Real time information transmission and retrieval
    - What used to take days and weeks of research is now available with a few clicks of the “mouse”
  - Real time monitoring and communication
  - Capacity for real time response

- “Internet” distance
  - Proximity and geographical location are no longer as important
3. Impacts on the Microeconomy

- The shortening of the “Product Cycle”--reduction in “time to market”--mandates a reduction in fixed costs as well as timely responses, and hence de-verticalization and out-sourcing
  - The average product cycle has shortened from 5 years to between 12 and 18 months
- Significant reductions in transactions costs
  - The costs of internal management, monitoring and control
  - The costs of inter-firm coordination
    - The IT revolution enhances predictability and reliability of division of labor across firms and thus shifts the advantage to “De-verticalization”, “Out-sourcing”, and “Globalization” of supply chains
  - Reduction in transactions costs enables the exploitation of efficiencies in specific segments of the design, manufacturing, marketing and distribution process
  - Many services have become highly tradable or potentially highly tradable
    - e.g., software, back-office paper work, design, quality assurance, entertainment
  - The reductions in transactions costs more than offset the increased costs of transportation and communication due to globalization
Impacts on the Microeconomy

- De-verticalization and out-sourcing permit efficient sharing of resources and thus enable the realization of economies of scale and learning-by-doing effects in particular tasks
  - e.g., firms do not typically generate their own electricity; the semiconductor foundry business; delivery services such as United Parcel Post (UPS) and Federal Express
- Realization of the benefits of targeted incentives in specific tasks or segments of the traditional business
- Significant reductions in the costs of market creation, expansion differentiation, and segmentation -- a market without geographical boundaries
  - Aggregation of users/consumers to create new and diverse markets consisting of consumers who may be geographically dispersed
    - e.g. vegemite; vegetarians; exceptionally large and small sizes of clothing
The Product Cycle under the IT Revolution

- The product cycle will continue to shrink (time to market) because
  - More and more timely information is available
  - There is less vested interest (e.g., fixed costs, inventory, labor contracts) in prolonging a product’s life time and because of competition; these fixed and quasi-fixed costs are reduced by de-verticalization and out-sourcing
  - The ease of customization
  - Product cycle as substitutions and rearrangements of the supply chain, e.g., shifting from metal to plastics
  - Strategic alliances of the moment made possible by timely and accurate exchange of information
  - Traditional life-time employment in the same industry and product segment is no longer possible
4. De-Verticalization or Fragmentation of Production

- De-Verticalization or “Fragmentation” -- Vertical division of labor -- Separation of design, manufacturing, marketing, inventory and distribution functions (generalized out-sourcing)
- Logistics and supply chain management -- managing a production process not all of which lies within a single firm
- Emphasis on “core competence”
- Focus on adding value
- Aligns incentives within the different supply segments
- Facilitates competition through lowering the barriers to entry (lower capital requirements)
  - e.g., semiconductor design firms
The Concept of De-Verticalization Is Not New

- Vertical division of labor--subcontracting
  - e.g., the construction industry in developed market economies--all the “trades” (services) are traditionally performed by specialist subcontractors

- “Original Equipment Manufacture” (OEMs) in developing economies
  - Nike, Polo, Dell, Compaq, brand name products

- “Fabless” semiconductor companies and contract manufacturing
  - e.g., Taiwan Semiconductor Manufacturing Corporation, Solectron, Flextron

- “Original Design and Manufacture” (ODMs)

- Outsourcing of services
  - e.g., processing of credit cards (many credit card issuers are nominal issuers only); information processing for financial institutions

- Can the design and marketing and manufacturing of the automobile be separated in the future?
Logistics Revolution and the Supply Chain

- Just-in-time inventory system has been used by Japanese manufacturers (mostly captive suppliers)
- Quality assurance, possibly by third parties, is required
- Standardization, uniform grading, and a common platform (wafer size, resolution of equipment, software) are also needed
- Savings from consolidation of transportation, inventory and warehousing, reduction in the transactions cost of communication, and increased timeliness of delivery, it also reduces the transactions cost of marketing and distribution
- Competition among suppliers and potential suppliers
The Story of a Super-Market

- Scanner at the checkout stand
- Direct and instantaneous communication with the supplier
- Just-in-time delivery by the supplier
- Efficient inventory maintained by the supplier
- Coordination of inventory and production by the supplier
- Savings realized by the super-market--no paper-work, no inventory, no warehouse, no trucks
5. Economic Globalization under the IT Revolution

- Products and firms can no longer last forever
- Specialization of firms in “Tasks” rather than “Products”
  - Global vertical division of labor--global supply chains
- Trade in “Intermediate Inputs” and “Services” rather than finished “Products”
  - A substantial proportion of world trade is intra-company trade
- Realignment of the traditional industrial structure
- Down-sizing as well as proliferation of firms
  - Outsourcing
  - Reduction of middle management
  - Small and medium-sized firms can have access to high quality services previously unavailable on the market
  - Small and medium-sized firms can specialize in niche markets
- Specialization results in lower prices, greater output, and more new varieties of products and services
6. Impacts on the Macroeconomy

- Increases in productivity lower the cost of production and hence reduce the upward pressure on prices and keep the rate of inflation low.

- Existing demands for goods and services are supplied by new entrants into the businesses, most of them small and medium-sized start-up firms, using new technology.
  - e.g., internet bookstores wipe out real brick and mortar bookstores; internet securities trading knock out traditional stock brokerages (however, there is still a role to play--assurance of fulfillment, assumption of credit and performance risks--reputation and brand name are still important).
  - The new firms will take away the business from the old firms--”Creative Destruction”

- An environment that encourage new businesses must be created and maintained, so that new jobs are created faster than old jobs are destroyed.
Impacts on the Macroeconomy

- The rise of completely new businesses
  - “Cuusoo” (Japan)--consumer participation in the design of new products
  - e.g., special suppliers of tools for left-handed individuals
- The concept of national origin of a product or a service becomes fuzzy
7. Implications for Developing Countries

- Globalization is here to stay
- Globalization facilitates and encourages worldwide search for sources of supply--hence new opportunities but also competitive challenges
- Globalization under the IT revolution facilitates and encourages “de-verticalization” or “fragmentation”--the need to identify, improve and sharpen “core competence” in order to survive; productivity can actually be enhanced by taking advantage of the opportunities for “de-verticalization” and “out-sourcing”
- Uncertainty created by globalization of supply chains--competition
  - Social safety net, nimble businesses and flexible workers
  - Hospitable legal, tax and competitive environment for start-up firms
  - Promotion of a culture of open communication and mobility; acceptance of risk and failures; network externalities and the benefits of networking
Implications for Developing Countries

- One-time permanent increase in potential output
- Developing countries have the ability to leap-frog--there are no vested interests to protect; no existing business to be cannibalized; there can be creation without destruction
  - e.g., mobile and wireless telephones; debit and credit cards instead of checks
- Investment in intangible capital is needed to exploit this potential
  - Human capital; Firm-specificity versus worker-specificity (flexibility, adaptability and re-employability)
  - R&D capital--learning and diffusion
Implications for Developing Countries

- Investment in the Infrastructure
  - Traditional economy requires physical infrastructure—railroads, roads, ports, airports, power, etc.
  - New economy requires, in addition, virtual infrastructure
    - United Parcel Service (UPS), Federal Express; Trading platforms; Telecommunication (Fiber optic links); Enabling technologies
- The legal infrastructure
  - Enforcement of contracts; prevention and prosecution of fraud
  - Intellectual property rights
- The possibility of local adaptation—taking advantage of local conditions
  - e.g., the Legend story
    - language
    - local supply and demand conditions, e.g., stability of the voltage of the electric power supply