
Engineers' Survival Guide to the Service Economy

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Services Revolution

Services
Revolution

Workshop One:
Designing
Services

Services Skills

Workshop Two:
Identifying Skills
for Designed
Services

Door Prize and
Wrap Up

- Who in the audience wants to be a farm worker?
- Who would like to design and develop cool products like smart phones or robots?
- U.S. Employment per *21st Century Skills Report*
 - ✓ ___% agriculture
 - ✓ ___% object products
 - ✓ ___% service products

<http://www.metiri.com/21st%20Century%20Skills/PDFtwentyfirst%20century%20skills.pdf>

Definitions of Service and Object

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- A Service is a product that
 - ✓ Is simultaneously produced and consumed
 - ✓ Is produced by a human, machine, or animal
 - ✓ Often requires direct contact between the producer and consumer
- An Object is a product that
 - ✓ Can be stored for some time
 - ✓ Can be exchanged without the producer and consumer having direct contact

Which Household Utilities are Services?

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- Electricity
- Garbage
- Internet
- Natural Gas
- Radio
- Sewer
- Telephone
- Television



Categories of Services

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- Accounting
- Computing
- Education
- Entertainment
- Finance
- Insurance
- Janitorial
- Legal
- Maintenance
- Medical care
- Personal
- Rentals/Leases
- Storage
- Support
- Telecom
- Travel

21st Century Skills White Paper

- Written for educators and policy makers
- Assumes 21st Century Workers are now children and adolescents --- only partially true
- Most Millennials, GenXers, Boomers, and Seniors will be working for decades
- Focuses primarily on information services



Productivity of the Three Sectors

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- In the USA, employment and GDP are closely aligned
 - ✓ Services are ____% of GDP
- Agriculture in India
 - ✓ 60% of employment
 - ✓ 17% of GDP
- Industrial revolution made possible in part from agricultural efficiency.
- Services Revolution made possible in part from manufacturing productivity
 - ✓ Objects less expensive
 - ✓ Services more expensive (except in deep recessions)

Awareness of Services Revolution Growing Slowly

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- Standard Industry Codes (SIC) replaced by NAIC in 1997
 - ✓ Many more Services codes
 - ✓ Some Services growth due to better counting
<http://www.insitepro.com/hedden1.htm>
- Cato Institute Policy Forum 2/10/9: A Service to the Economy: The Importance of Free Trade in Services
 - ✓ Bob Vastine, President of the U.S. Coalition of Services Industries
 - ✓ Christine Bliss, Assistant U.S. Trade Representative for Services and Investment
 - ✓ Aaditya Mattoo, World Bank
<http://www.cato.org/event.php?eventid=5722>

Two More Contributors to Services Revolution

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- Outsourcing
 - ✓ Marketing done inside Ford Motors is NAISC classified as Manufacturing
 - ✓ Marketing purchased from an outside firm is classified as a Service
- Software as a Service (SAAS)
 - ✓ Microsoft sells objects
 - ✓ Salesforce.com sells services

Social Impact of Industrial Revolution

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- Caused movement from country to cities
- Changed economic responsibility from extended family/fiefdom to factory
 - ✓ Multiple controls on the quality of work produced by front-line workers
- Changed moral responsibility from community to individual

Social Impact of Services Revolution

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- Intimacy and globalization
 - ✓ Some services require close contact
 - ✓ Other services can be produced anywhere
- Increased power of front-line worker for good or ill
 - ✓ Moment of truth
- Increased socialism
 - ✓ Means of production owned by government

Workshop One: Designing Services

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- Service products are often associated with other products: both objects and services.
- A \$75 chair can be delivered, rented, repaired, or stored.
 - ✓ Total cost of associated services often exceeds object cost.
- Services may be purchased by the owner of the original product or by others (e.g. advertising).
- Add-on services for high-tech products (objects or services) are in 2 categories
 - ✓ Break-Fix
 - ✓ Professional

Form Teams of 3-6 People



- Introduce yourselves quickly
- Choose a leader based on instructions
- Base product depends on color/design of paper
 - ✓ Blue: smart phone
 - ✓ Map: Segway
 - ✓ White: search engine

Identify and Classify Services

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- Identify 5 add-on services
- Classify as break-fix or professional
- Classify as owner-purchased or third-party purchased
- Rank the services for total \$ margin: $\% \text{ margin} * \text{volume}$
 - ✓ High % margin is unimportant if volume is low
- Choose the highest ranked add-on service

Dive Deeper into that Service

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- What is the market for the service selected by your team?
 - ✓ Location
 - ✓ Size
 - ✓ Business or consumer
- How will you price this service?
- How will you deliver this service?

Search



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- 21st Century Skills Report
 - ✓ Thinking critically; making judgments
 - ✓ Solving complex problems
 - ✓ Thinking creatively and like an entrepreneur
 - ✓ Communicating and collaborating
 - ✓ Innovating
- Google Chief Economist Hal Varian
 - ✓ Statistics
 - ✓ <http://flowingdata.com/2009/02/25/google-chief-economist-hal-varian-on-statistics-and-data/>

Electronics Engineering Skills

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- Gone
 - ✓ Circuit design
- Going
 - ✓ Device development
 - ✓ Firmware development
- Growing
 - ✓ Problem solving and troubleshooting
 - ✓ Project management
 - ✓ Technology applied to education
 - ✓ Technology applied to energy
 - ✓ Technology applied to entertainment
 - ✓ Technology applied to health

Break/Fix Service Skills

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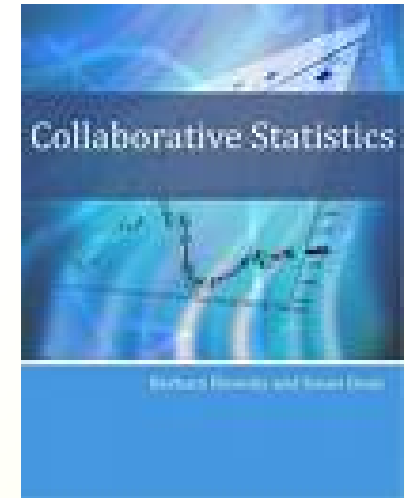
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- Process Design
- Statistics >>>>
- Logistics
- Problem Solving
 - ✓ EAR Model
- Troubleshooting
 - ✓ Binary Search/ Half-Splitting: Steve Litt
 - ✓ Last changed
 - ✓ CSI
 - ✓ Game theory



**Open
Textbook on
Connexions**

HP/Agilent/Nokia Service Process

STEP 1 – New Service Product

Ideas

- Collect data on New Service Product Ideas
 - ✓ Sales Force Input
 - ✓ Competition Data
 - ✓ Customer Feedback
 - ✓ Market Research

STEP 2 – Develop Competitive

Data

- Investigate Field and Customer Inputs
- Obtain Market Research Data

STEP 2 – Continued

- Define Competitive Offering
- Define Minimum Viable Product

STEP 3 – Build Business Case - ROI

- Define Market Segments and Size
- Complete Revenue Forecast
- Assess Delivery Costs
- Complete Cost/Benefit Analysis/ROI

HP/Agilent/Nokia Service Process

STEP 4 – Develop Service Product Marketing Plan

- Complete Service Product and Launch Plan

STEP 5 – Develop Service Delivery Readiness

- Complete Service Delivery Readiness Plan
- Define Sales Channel
- Validate Service with Trial Customers
- Develop Sales and Delivery Training Materials

STEP 6 – Launch the Service Product

- Train the Sales Channel and Delivery Team
- Launch Internal and External Communications
 - ✓ Launch via Industry Events (tradeshows, press releases)
 - ✓ Distribute Promotional Materials (customer brochures, data sheets)
- Developed by Amita Dev

Game Theory applied to Troubleshooting

- Game theory is the study of the ways in which *strategic interactions* among *rational players* produce *outcomes* with respect to the *preferences* of those players, none of which might have been intended by any of them.
 - ✓ Example: “Voters chose a minority government”
- Trust theory: approach the other party as a cooperator until that party proves to be an adversary
- Applicability to Troubleshooting: engineer, customer, and system as Cooperators

Workshop Two: Skills for Your Team's Service

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- List all the skills required to **develop** your team's service.
- List all the skills required to **deliver** your team's service.
- What skills on each list would be provided by electronics engineers?
- What skills on each list would be provided by consultants?
- What skills on each EE list do you have? Lack?
- What skills on each consultant list do you have? Lack?

Door Prize, Questions, and Suggestions

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Competing in a Service Economy



Anders Gustafsson

Michael Johnson

