IBM Almaden Services Research

Productivity and Innovation

The Productivity Paradox

Version 1.0

Unit objectives

- Gain a frame of reference about productivity conundrums, develop a point of view and be able to discuss this with others.
- Consider how services measurements might be developed to be useful.
- Think about the “new economy” and these questions:
  - Why do services resist productivity gains?
  - Is services productivity an oxymoron?
  - What are some relationships between innovation and productivity?

The paradox

- What is productivity anyway?
  - Measure of economic efficiency
  - Advances are a big source of increased potential income
- Baumol's disease and productivity in Services
  - *"it still takes four musicians to play a string quartet".*
  - As consumption shifts more and more toward services
    - *If productivity growth in services is inherently sluggish, economic growth must inevitably slow*.
- **BUT** productivity in Services is up!

Economics

- Global services based economies
  - Increasing ever faster
- Measuring services is a problem
  - Data biases
  - Inaccuracies
  - Challenges
- New economy requires new economics?

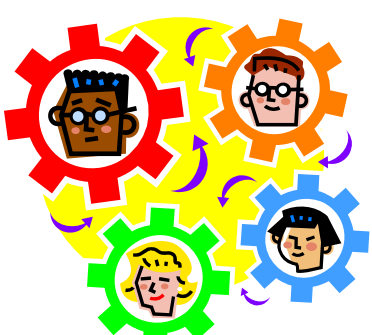
Productivity

Labor productivity = (Output / Labor input*)

***Where labor input = people or hours**

Multi-factor productivity = (Output / Labor input)**

****Where labor input = expanded to include multiple forms**

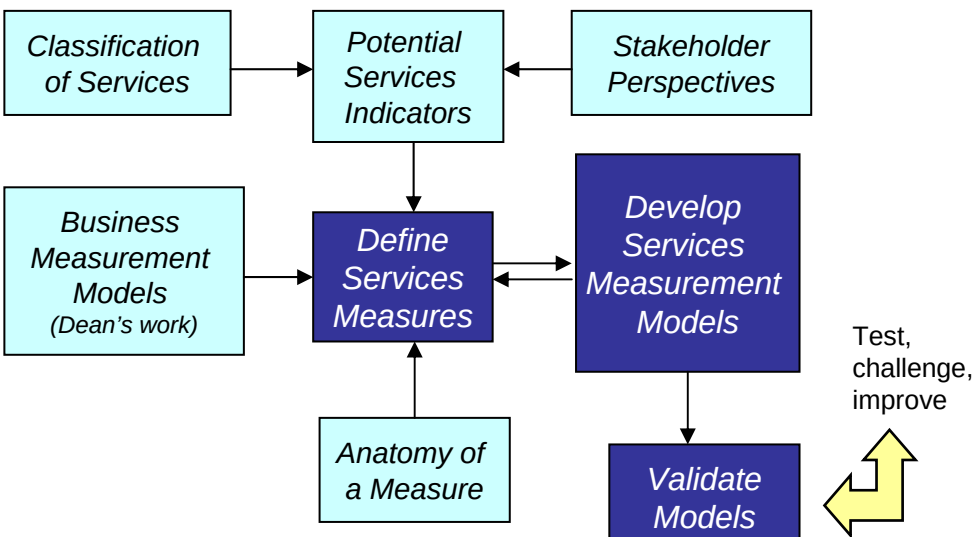


Measuring services is a challenge

- History
- Productivity
- Quality
- Innovation

- New approach
  - Although productivity measurement should be part of services measurement, it should not be the major focus
    - Proposed: create a holistic multiple indicator/multiple stakeholder approach to services measurement

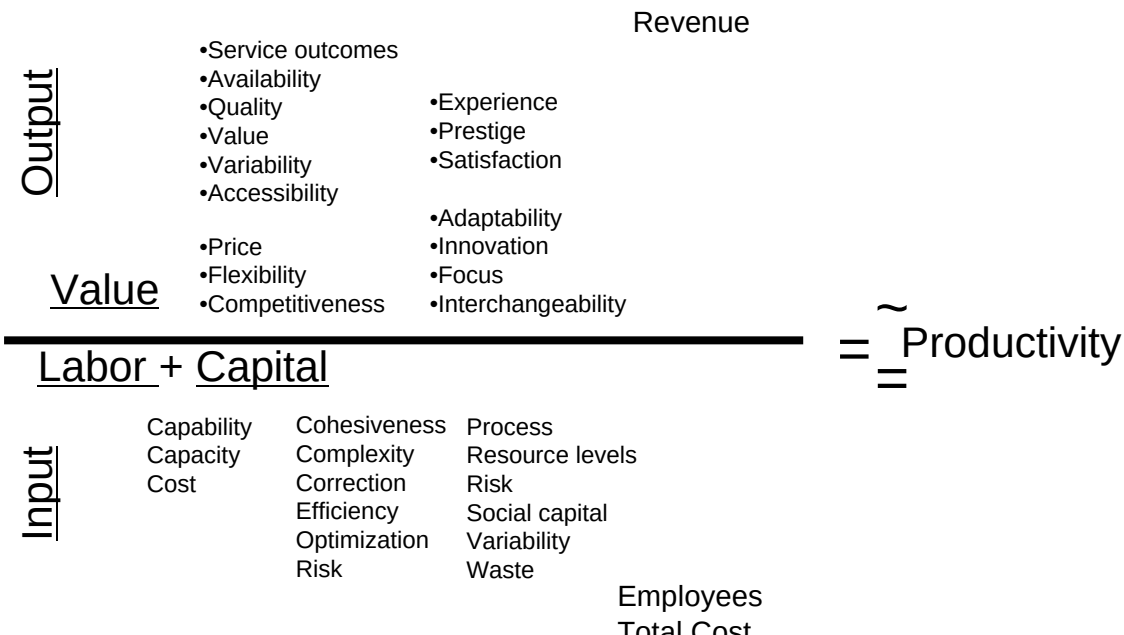
Many factors must combine to create a viable services measurement model



Anatomy of a measure

- What is measured
- Purpose of the measure
- Validity
- Reliability
- Instrumentation
- Precision
- Role relations to measure
- Time periods

Measurement of services



The role of measurement in services sciences

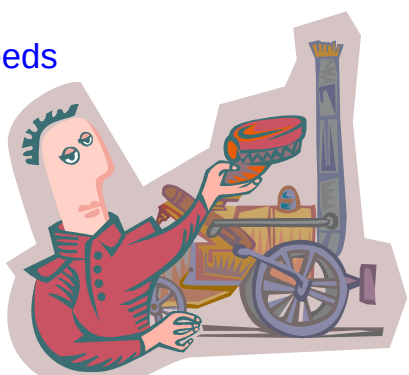
- Measurements will
  - Help define the new discipline
  - Identify innovations in Services Science
- Validity of a measure
  - Right purpose?
  - Affected by other factors?
  - Affected by the quality of the service?
  - Effect on profit?

Innovation and productivity

- Technology key to eliminate repetitive work
  - Free people up to be creative
- What can we learn from manufacturing?
  - Are there well known frameworks we can use to increase productivity in services?

Engineering model versus interpretive model for enhancing productivity

- Engineering model
  - Product design comes before process design
  - Process predictable, repeatable
- For services, sometimes the engineering model works but has limitations.
  - Human judgment required
- Interpretive model
  - Skills in understanding customer wants and needs
  - Process continuously adaptive

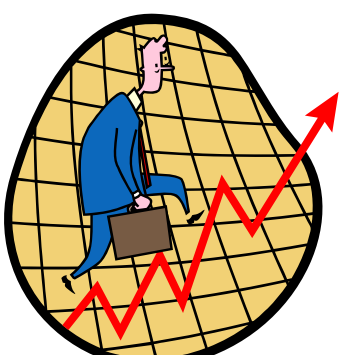


The two models have different implications for performance improvement

Engineering model	Interpretive model
Design comes before process	Product and process intertwined, Product design emerges from the process, not specified in advance
Workers execute tasks	Workers interpret needs and execute tasks
Improvements come from changes to design or process	Improvements follow from improving worker's ability to elicit and interpret, respond to the situation to select work practices from repertoire or learn or invent new services

Devolving

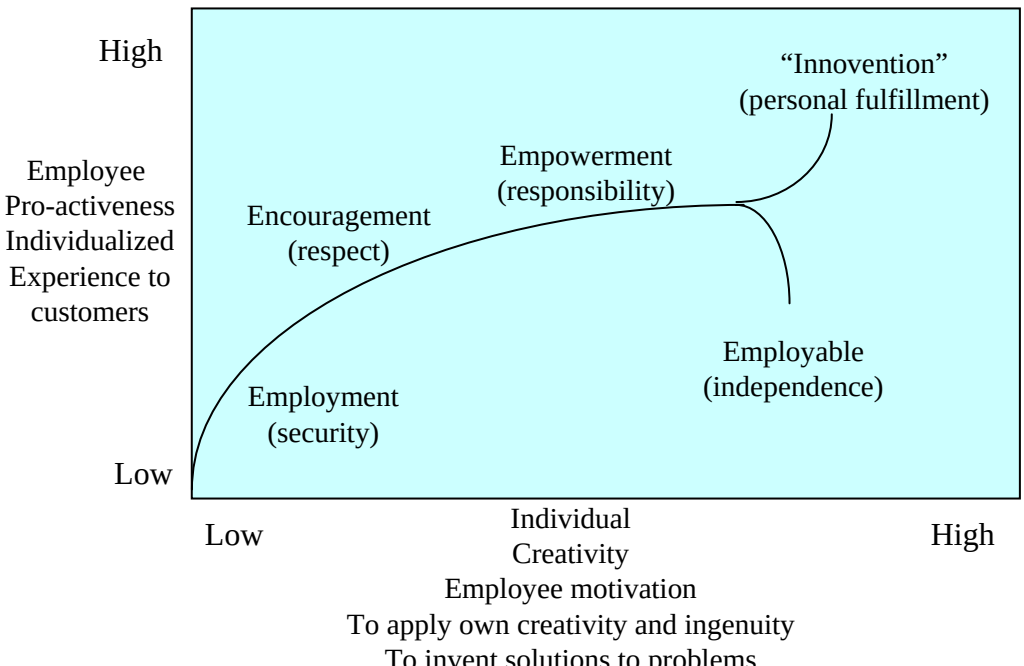
- Stuck at the top?
- To reach next peak requires
  - Going down!
- Change perspective
- Not a natural human inclination



Move away from studying manufacturing

- Another point of view
  - Service associated with goods
  - Knowledge
- Study services innovation

Phases of a company's view toward its people



Adapted from Terrill and Middlebrooks, p 184

Bonus topic

Company	2003 profit ($M)	Employees	Revenue per employee	Profit per employee
AT&T	1,865	61,600	560,536	30,276
Apple	140	10,912	617,760	12,830
Cisco	3,779	34,000	582,912	111,147
HP	2,754	142,000	526,042	19,394
IBM	7,583	355,167	250,955	21,351
Microsoft	8,878	55,000	623,109	161,418
SBC	8,505	168,000	243,113	50,625
Sun	-1,446	36,100	310,139	-40,055

Source: Network World website