23. The Transition from Products to Services

INFO 210 - 19 November 2007

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Plan for Today's Class

- The increasing importance of services for product firms
- Service strategies for product firms
- Services in the "ecosystem"
- "Smart" services
Products, Services And "Value"

It is easy to imagine that most of the value in a product is added by the processing of the materials that go into it; to build a car we process rubber to make tires, leather to make seats, steel to make the chassis and body...

But even for cars, a great deal of value comes from intangibles and services after the product is purchased.

And for many products like clothing, pharmaceuticals, and software the cost of the raw materials is a negligible component of the value.

And for many products like airplanes the customer who buys them does so in order to use them to provide services to its customers -- people who travel.
The Product Life Cycle from the Customer’s Perspective

- Determining requirements and justifying purchase of the product
- Finding a product supplier
- Financing the product
- Installing the product
- Modifying other products or processes to work with the product
- Maintaining the product and replacing parts
- Training personnel to use the product
- Upgrading the product
- Disposing of product waste
- Disposing of the product
So What’s new in the ISE?

Services have always been part of product life cycle

But the emergence of the ISE reflects:

- An increase in emphasis on services in the life cycle, and increased differentiation or granularity in the life cycle
- The increasingly global scope of the ecosystem
- The role of new information technologies in automating services, providing them with higher quality and reliability, and enabling innovative new services
Why Product Firms Are Looking to Services

Generate revenue

- Increased competition and more informed customers make it harder for firms to be profitable
- In many technology-intensive industries, Moore's Law relentlessly commoditizes products and reduces costs, so revenues decline

Satisfy customer demand for services and solutions

Stay competitive
A 1-Minute "MBA Moment" -- Profitability and Margins

Discussions about a firm's need to generate new revenue usually are focused around its profitability and margins

Profit margin (or net operating margin) is simply earnings (or profits) divided by sales

Profitability and margins differ across industries and indicate the amount of competition in the industry

Margins go up when a firm's costs decline, when it gets more efficient, or when it introduces new products for which it can charge premium prices

Margins go down when its costs go up, when it gets less efficient, or when competition drives down the prices it can charge for its products

See www.bizstats.com/corpnetincome.htm
Maximizing Margins

Within a given industry, the firms with the highest profit margins are those:

- That are best at controlling costs through operational efficiency
- That are best at inventing and bringing to market new products and services
- That are best at engineering and marketing an optimal mix of product and service offerings with a carefully controlled pricing structure
The Traditional Sales and Cash Flow Cycle

In the "good old days" companies could expect to make a lot of money on new products because the slower pace of technology innovation gave them a long time to recoup the cost of new product development.
No More Cash Cows

Rapid technology innovation shrinks product life cycles so margins from new products shrink more rapidly and there is less time to "milk the profits" from the "cash cows"
"Durable" Goods

Economists classify goods as durable if they have an expected life of longer than three years, and many goods have useful lives much longer than that.

Durable goods often require "consumables" for their operation, and in addition require services to keep them operating effectively.

The cost of these consumables and services can dominate the purchase price for the product over its lifetime.

So the "total cost of ownership" can be a far more important number to consider when purchasing a product.
Total Cost of Ownership for Personal Computers

The average company spends only about one-fifth of its annual personal-computer budget on purchasing the boxes themselves; the rest goes to technical support, administration, and other maintenance activities.

So companies care about "total cost of ownership" and why many have moved to:

- Standard configurations
- Outsourced procurement to Dell or other firms
- Software as a service
- Server virtualization
The Installed Base

The "Installed Base" of a product is the total number of units that are currently being used.

The longer the useful life of a product, the larger its installed base, especially in comparison to the sales of new products.

The installed-base-to-new-unit ratio differs across product categories:

- Automobiles: 13 to 1
- Locomotives: 22 to 1
- Tractors: 30 to 1
- Civil aircraft: 150 to 1

The higher this ratio, the more economic value is pushed "downstream," away from manufacturing and toward providing services required to operate and maintain products.
The Planned Obsolescence Dilemma

A manufacturer entering the installed base service market has to manage some tightly-coupled decisions:

- Should we increase the durability and quality of our products so that they need less service, which reduces potential service revenues?

- Should we offer some less durable and lower quality products, so that they will require more service or need to be replaced earlier?

- Should we increase the quality and scope of our services, which might extend the useful life of the product, which reduces replacement sales of new products?
The "Installed Base Service Space"

<table>
<thead>
<tr>
<th>Transaction-based services</th>
<th>Product-oriented services</th>
<th>End-user's process-oriented services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic installed base services</td>
<td>Documentation</td>
<td>Professional services</td>
</tr>
<tr>
<td></td>
<td>Transport to client</td>
<td>Process-oriented engineering</td>
</tr>
<tr>
<td></td>
<td>Installation/commissioning</td>
<td>(tests, optimization, simulation)</td>
</tr>
<tr>
<td></td>
<td>Product-oriented training</td>
<td>Process-oriented R&amp;D</td>
</tr>
<tr>
<td></td>
<td>Hot line/help desk</td>
<td>Spare parts management</td>
</tr>
<tr>
<td></td>
<td>Inspection/diagnosis</td>
<td>Process-oriented training</td>
</tr>
<tr>
<td></td>
<td>Repair/replace parts</td>
<td>Business-oriented training</td>
</tr>
<tr>
<td></td>
<td>Product updates/upgrades</td>
<td>Process-oriented consulting</td>
</tr>
<tr>
<td></td>
<td>Refurbishing</td>
<td>Business-oriented consulting</td>
</tr>
<tr>
<td></td>
<td>Recycling/machine brokering</td>
<td></td>
</tr>
<tr>
<td>Relationship-based services</td>
<td>Maintenance services</td>
<td>Operational services</td>
</tr>
<tr>
<td></td>
<td>Preventive maintenance</td>
<td>Managing maintenance function</td>
</tr>
<tr>
<td></td>
<td>Condition monitoring</td>
<td>Managing operations</td>
</tr>
<tr>
<td></td>
<td>Spare parts management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full maintenance contracts</td>
<td></td>
</tr>
</tbody>
</table>
Making the Transition from Products to (More) Services -- Advantages

Lower customer acquisition costs

- It is always more expensive to get a new customer than keep an existing one
- But most manufacturers sell through distribution channels, and this may prevent them from knowing their customers... which can tempt them to sell direct as well

Lower knowledge acquisition costs -- a third party service provider has to learn about the product and how it is used, while the manufacturer obviously knows a lot about it

Lower capital investment requirements - and most of them are "asset-specific" and might be hard to justify for third party service providers
Making the Transition from Products to (More) Services -- Disadvantages and Challenges

Conflicts between service and product sales

Chicken and egg issues; when do you build the service capacity?

The planned obsolescence dilemma

Making the case for intangible investments
## Product vs Customer-Centricity (Shah et al.)

<table>
<thead>
<tr>
<th></th>
<th><strong>Product-Centric Approach</strong></th>
<th><strong>Customer-Centric Approach</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic philosophy</strong></td>
<td>Sell products; we'll sell to whoever will buy</td>
<td>Serve customers; all decisions start with the customer and opportunities for advantage</td>
</tr>
<tr>
<td><strong>Business orientation</strong></td>
<td>Transaction-oriented</td>
<td>Relationship-oriented</td>
</tr>
<tr>
<td><strong>Product positioning</strong></td>
<td>Highlight product features and advantages</td>
<td>Highlight product's benefits in terms of meeting individual customer needs</td>
</tr>
<tr>
<td><strong>Organizational structure</strong></td>
<td>Product profit centers, product managers, product sales team</td>
<td>Customer segment centers, customer relationship managers, customer segment sales team</td>
</tr>
<tr>
<td><strong>Organizational focus</strong></td>
<td>Internally focused, new product development, new account development, market share growth;</td>
<td>Externally focused, customer relationship development, profitability through customer loyalty; employees are customer advocates</td>
</tr>
<tr>
<td></td>
<td>customer relations are issues for the marketing department</td>
<td></td>
</tr>
<tr>
<td><strong>Performance metrics</strong></td>
<td>Number of new products, profitability per product, market share by product/subbrands</td>
<td>Share of wallet of customers, customer satisfaction, customer lifetime value, customer equity</td>
</tr>
<tr>
<td><strong>Management criteria</strong></td>
<td>Portfolio of products</td>
<td>Portfolio of customers</td>
</tr>
<tr>
<td><strong>Selling approach</strong></td>
<td>How many customers can we sell this product to?</td>
<td>How many products can we sell this customer?</td>
</tr>
<tr>
<td><strong>Customer knowledge</strong></td>
<td>Customer data are a control mechanism</td>
<td>Customer knowledge is valuable asset</td>
</tr>
</tbody>
</table>
Lock-In

When competition exists in a product category, buyers can get good deals and the manufacturer's profits are low.

But after the purchase, especially for products whose useful life is long, the manufacturer has much more pricing power over the purchaser.

Especially for consumables, which can be made to have proprietary interfaces.

This is the classic "razors and razor blades" strategy, or the "printer and toner cartridge" one -- Manufacturers price very low for the product or "platform," expecting to recoup it in aftermarket product and service revenue.

This very profitable aftermarket encourages other product and service vendors to go after the installed base.
# The "Downstream" Opportunity for Product Firms

## Personal Computers
- **annual cost of PC use:** $6,259

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>network administration</td>
<td>100%</td>
</tr>
<tr>
<td>network technical support</td>
<td>80%</td>
</tr>
<tr>
<td>network equipment</td>
<td>60%</td>
</tr>
<tr>
<td>nonproductive operations by end user (downtime, fire management, etc.)</td>
<td>40%</td>
</tr>
<tr>
<td>administration</td>
<td>0%</td>
</tr>
<tr>
<td>technical support</td>
<td>0%</td>
</tr>
<tr>
<td>desktop hardware</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **total expenditure:** 5X product costs

## Locomotives
- **total annual cost of rail operations:** $20 billion

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yard operations, railroad administration, other</td>
<td>100%</td>
</tr>
<tr>
<td>train operations</td>
<td>80%</td>
</tr>
<tr>
<td>infrastructure</td>
<td>60%</td>
</tr>
<tr>
<td>freight car services</td>
<td>40%</td>
</tr>
<tr>
<td>locomotive services</td>
<td>0%</td>
</tr>
<tr>
<td>locomotives</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **total expenditure:** 21X product costs

## Automobiles
- **average annual household expenditure:** $6,064

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>other</td>
<td>100%</td>
</tr>
<tr>
<td>finance</td>
<td>80%</td>
</tr>
<tr>
<td>repair</td>
<td>60%</td>
</tr>
<tr>
<td>insurance</td>
<td>40%</td>
</tr>
<tr>
<td>gas</td>
<td>0%</td>
</tr>
<tr>
<td>used car purchase</td>
<td>0%</td>
</tr>
<tr>
<td>new car purchase</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **total expenditure:** 5X product costs
More Services from Software Firms
More Services from Hardware Firms
Services Mix x Profitability for Technology Firms -- 1994
Services Mix x Profitability for Technology Firms -- 2006
Trends in Services Mix and Profitability
Often a large "ecosystem" of other service providers grows up around a successful product or product category. This ecosystem spans the entire product life cycle and all its niches. This ecosystem is many times larger than the supply and distribution chains for the product.

Like an individual species in a biological ecosystem, each member of a business ecosystem shares the fate of the network as a whole, regardless of the that member's apparent strength.

The success of a firm can depend heavily on how much it can balance its strategies for pursuing its own interests with those that promote their ecosystems' overall health.
Automotive Ecosystem Member
## Microsoft's Ecosystem

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Subcategory</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems integrators</td>
<td>7,752</td>
<td>Outbound software firms</td>
<td>160</td>
</tr>
<tr>
<td>Development services companies</td>
<td>5,747</td>
<td>Computer superstores</td>
<td>51</td>
</tr>
<tr>
<td>Campus resellers</td>
<td>4,743</td>
<td>Application service provider aggregators</td>
<td>50</td>
</tr>
<tr>
<td>Independent software vendors</td>
<td>3,817</td>
<td>E-tailers</td>
<td>46</td>
</tr>
<tr>
<td>Trainers</td>
<td>2,717</td>
<td>Office superstores</td>
<td>13</td>
</tr>
<tr>
<td>Breadth value-added resellers</td>
<td>2,580</td>
<td>General aggregators</td>
<td>7</td>
</tr>
<tr>
<td>Small specialty firms</td>
<td>2,252</td>
<td>Warehouse club stores</td>
<td>7</td>
</tr>
<tr>
<td>Top value-added resellers</td>
<td>2,156</td>
<td>Niche specialty stores</td>
<td>6</td>
</tr>
<tr>
<td>Hosting service providers</td>
<td>1,379</td>
<td>Subdistributors</td>
<td>6</td>
</tr>
<tr>
<td>Internet service providers</td>
<td>1,253</td>
<td>Applications integrators</td>
<td>5</td>
</tr>
<tr>
<td>Business consultants</td>
<td>938</td>
<td>Microsoft Direct resellers</td>
<td>2</td>
</tr>
<tr>
<td>Software support companies</td>
<td>675</td>
<td>Microsoft Direct outlets</td>
<td>1</td>
</tr>
<tr>
<td>Outbound hardware firms</td>
<td>653</td>
<td>Network equipment providers</td>
<td>1</td>
</tr>
<tr>
<td>Consumer electronics companies</td>
<td>467</td>
<td>Network service providers</td>
<td>1</td>
</tr>
<tr>
<td>Unsegmented resellers</td>
<td>290</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media stores</td>
<td>238</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass merchants</td>
<td>220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WalMart's Ecosystem Advantage

Benefits attributable to ecosystem management

Wal-Mart's total margin advantage in retail groceries 22%

- Global procurement: 0.5%
- Centralized buying: 2%
- Optimized product mix: 2%
- Distribution efficiencies: 2%
- Other operating efficiencies: 2%

Lower shrinkage rates: 0.5%
- Preferred real estate: 2%
- Lower labor costs: 5%
New Service Concepts with "Connected Devices"

- Remote monitoring (of environments or products)
- Vendor-managed inventory ("remote monitoring" of retail shelf space)
- Monitoring + capability upgrading (like "software as a service")
- Location information as a service
- Remote monitoring + Location Information
- Remote monitoring + Interactive control
Otis Remote Elevator Monitoring

A Diagnostic software monitors elevators continuously and sends data to the REM unit located in the machine room.

B The REM unit sends this information to the OTISLINE center.

C Data is categorized by urgency and reviewed by OTISLINE representatives.

D An OTISLINE representative alerts the field mechanic, if necessary.

E The mechanic arrives at the job site with specific information, tools and parts to work on the elevator.
GM Onstar (onstar.com)
GM Onstar [2]

Air Bag System
- Diagnostic: Completed. No action needed.
  More information

Antilock Braking System
- Diagnostic: Completed. No action needed.
  More information

XM Satellite Radio
- Radio ID #: 12345678
- Trial period ends: 09/25/2006
  → SUBSCRIBE TO XM

OnStar System
- Diagnostic: Completed. No action needed.
  More information

MAINTENANCE INFORMATION

Remaining Oil Life: 16%
- Next oil change recommended at 8,000 kilometers.
- Schedule a service visit with your GM dealer or Saturn retailer at your earliest convenience.
  how to reset your vehicle's oil life

Selling Dealer
ANYTOWN MOTORS
1234 STREET
TOWN, PROVINCE, N8WSV9
(555) 123-4567
Dealer Website
"Smart Devices"

"Virtually any product that uses electricity -- toys, coffeemakers, cars, medical diagnostic machines -- possesses inherent data processing capabilities. Each has a wealth of information about its current status, usage history, and performance"

"The necessary technologies, while critical to the task, are well-enough established at this point"

- Microprocessors
- GPS
- RFID
- Wireless networking
"Smart Services" -- Opportunities

When a device or system failure is catastrophic
When the device provides information that trades off against inventory
When maintenance is expensive (i.e. remote devices)
When information about the location, performance, etc. of a device -- by person or by type of user -- can be used to design better products or services or to improve the marketing of existing ones
"Smart Services" -- Challenges and Limitations

Some devices or products are so simple and inexpensive that adding networking and computation capabilities to them isn't worth the investment.

Some don't or can't have any information worth sharing.

Some have very short or very long useful lives.

Some don't have reliable network access.

Customers care about value and won't pay for anything else, so remote monitoring can usually be sold only as part of a shift from "pay for transaction" to "pay for performance" - i.e., the service being delivered in greater "uptime".

There may be a "torrent" of information, little of which represents important events.
The "Open Building Information Exchange" Standard -- oBIX

Embedded software systems and devices have usually been built with proprietary protocols and data formats, which made integration and data aggregation difficult.

But now the rapid increase in ubiquitous networking and the availability of powerful microprocessors for low cost embedded devices is weaving these systems into the very fabric of the Internet -- "an internet of things".

oBIX is designed to provide standardized access to these sensing and control systems by providing a normalized representation for:

- Points: representing a single scalar value and its status – typically these map to sensors, actuators, or configuration variables like a thermostat's setpoint
- Histories: modeling and querying of time sampled point data
oBIX Examples

```xml
<obj href="http://myhome/thermostat/">
  <real name="spaceTemp" is="obix:Point"
    val="67.2"
    units="obix:units/fahrenheit"/>
  <real name="setpoint" is="obix:Point"
    val="72.0"
    unit="obix:units/fahrenheit"/>
  <bool name="furnaceOn" is="obix:Point" val="true"/>
</obj>

<obj href="http://myhome/thermostat/">
  <real name="spaceTemp" is="obix:Point"
    val="-412.0" status="fault"
    unit="obix:units/fahrenheit"/>
  ...
```
For November 21
