Chapter 2
Economies of Scale and Scope

Economies of Scale

- Can create cost advantages
- Can determine market structure and entry
- Can affect the internal organization of firms
- Can determine the horizontal boundaries of firms
Economies of Scale

- When the marginal cost is less than average cost, there are *economies of scale*
- Average cost declines with output
- If average cost increases with output we have *diseconomies of scale*

U-Shaped Cost Curve

- Average cost declines as fixed costs are spread over larger volumes
- Average cost eventually starts increasing as capacity constraints kick in
- U-shape implies cost disadvantage for very small and very large firms
- Unique optimum size for a firm
In reality, cost curves are closer to being L-shaped than U-shaped (Johnston).

- Large firms are rarely at a cost disadvantage relative to smaller firms.
- A minimum efficient size (MES) beyond which average costs are identical across firms.
Economies of Scope

- Firm A produces two products: X and Y
- Firm B produces only X
- When the cost of producing X is smaller for Firm A than for Firm B, there are economies of scope
Economies of Scope

- It is cheaper for one firm to produce both X and Y than for two different firms to specialize in X and Y each
  \[ \text{TC}(Q_X, Q_Y) < \text{TC}(Q_X, 0) + \text{TC}(0, Q_Y) \]
  \[ \text{TC}(Q_X, Q_Y) - \text{TC}(0, Q_Y) < \text{TC}(Q_X, 0) \]
- Production of Y reduces the incremental cost of producing X

Economies of Scope

- Common expressions that describe strategies that exploit the economies of scope
  - “Leveraging core competences”
  - “Competing on capabilities”
  - “Mobilizing invisible assets”
  - Diversification into related products
Economies of Scope

- The terms “Economies of Scale” and “Economies of Scope” are sometimes used interchangeably.
- Managers may cite economies of scale and scope (even when they do not exist) to justify investment in growth.

Some Sources of Economies of Scale/Scope

- Spreading of fixed costs
- Increased productivity of variable inputs
- Saving on inventories
- The cube-square rule
Fixed Costs

- *Indivisibilities*: Certain inputs can not be scaled down below a minimum
- Indivisibilities lead to fixed costs and thus economies of scale and scope
- Scale and scope economies may obtain at various levels
  - Product level
  - Plant level
  - Multi plant level

Product Specific Fixed Costs

- Research and development
- Specialized equipment for production
- Set up costs for production
- Training expenses
Tradeoff Among Technologies

- Long run economies of scale due to choice of production technologies
- Capital intensive technologies offer scale economies due to indivisibilities in productive capital
- The “lower envelope” of the two cost curves is the long run average cost curve
Tradeoff Among Technologies

Long Run and Short Run

- Cost reduction through better capacity utilization
  - (short run economies of scale)
- Cost reduction by switching to high fixed cost technology
  - (long run economies of scale)
Economies of Scale and Specialization

• “The division of labor is limited to the extent of the market”
• As markets increase in size, economies of scale enables specialization
• Larger markets support an array of specialized activities

Inventories

• Firms carry inventory to avoid stock-outs
• In addition to lost sales, stock-outs can adversely affect customer loyalty
• Bigger firms can afford to keep smaller inventories (relative to sales volume) compared with smaller firms
Inventories

- Two firms may not experience stock-outs at the same time
- Merging the two firms will reduce the probability of stock out, given the level of inventory
- The combined firm can maintain a lower level of inventory for the same probability of stock-out as before

Cube-Square Rule

- Doubling the diameter of a hollow sphere increases its volume eightfold, but the surface area only fourfold
- In production processes, the cost of a vessel may vary with surface area and its capacity with volume
Cube-Square Rule

- Examples of Scale Economies due to the Cube-Square Rule
  - Oil pipelines
  - Warehousing
  - Brewing tanks

Other Sources of Economies of Scale/Scope

- Purchasing
- Advertising
- Research and development
Economies of Scale in Purchasing

- It is less costly to sell to a single buyer (Example: Group insurance is cheaper than individual insurance)
- Big buyers will be more price sensitive and may drive hard bargains with the suppliers
- Supplier may dislike disruption and may offer better deals to bigger buyers

Economies of Scale in Purchasing

- Small firms can act to overcome diseconomies of scale in purchasing
- Small firms can join purchasing alliances
- Price sensitive firms may get better bargains even when they are small
Economies of Scale and Scope in Advertising

- Cost per consumer = (Cost per potential consumer) ÷ (Proportion of potential consumers who become actual consumers)
- Large firms have lower cost of reaching a potential customer (First Term)
- Large firms also have a better reach (Second Term)

Economies of Scale in Advertising

- Large national firms may experience lower cost per potential customer when compared with small regional firms
- Cost of production of the advertisement and the cost of negotiations with the media can be spread over different markets
Umbrella Branding and Economies of Scope

- A well known brand like Samsung covers different products
- There are economies of scope in developing and maintaining these brands
- New products are easier to introduce when there is an established brand with the desired image.

Umbrella Branding - Limitations

- Umbrella branding may not always help
  - Example: In the U.S. Lexus is a separate brand from Toyota
- Conflicting brand images may cause diseconomies of scope
- Corporate brand name may be less important than the individual product’s brand as in pharmaceuticals
Economies of Scale in R & D

- Minimum feasible size for R & D projects and R & D departments
- Economies of scope in R & D; ideas from one project can help another project

Innovation and Size

- Are big firms better at innovating compared to small firms?
- Size reduces the average cost of innovations
- Large firms may pursue a narrow agenda more aggressively
- Smallness may be more suitable for pursuing a variety of approaches to research problems
**Strategic Fit**

- Strategic fit is complementarity that yields economies of scope
- Strategic fit renders piece-meal copying of corporate strategy by rivals unproductive
- Strategic fit is essential for long term competitive advantage

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**Diseconomies of Scale**

- Beyond a certain size, bigger may not always be better
- The sources of such diseconomies
  - Increasing labor costs
  - Spreading specialized resources too thin
  - “Conflicting out”
  - Incentive and coordination effects
Firm Size and Labor Cost

- Workers in large firms tend to get paid more than workers in small firms
- Possible reasons
  - Unionization is more likely in large firms
  - Work may be more enjoyable in small firms
  - Large firms may have to attract workers from far away places

Firm Size and Labor Cost

- Large firms experience lower worker turnover compared to small firms
- Savings in recruitment and training costs due to lower turnover may partially offset the higher labor cost
Specialized Resources

- Certain resources may be limited in availability (Examples: The chef in a restaurant that is considering expanding)
- Other limited resources may be
  - desirable locations
  - specialized capital inputs
  - talented managers

“Conflicting Out”

- Professional services firms may find it difficult to sign up a client if a competitor is already a client of the firm
- When sensitive information has to be shared, such conflicts may impose a limit to the growth of the firm
Incentive and Coordination Effects

- When a firm gets large
  - it is difficult to monitor and communicate with workers
  - it is difficult to evaluate and reward individual performance
  - detailed work rules may stifle the creativity of the workers

The Learning Curve

- Learning economies are distinct from economies of scale
- Learning economies depend on cumulative output rather than the rate of output
- Learning leads to lower costs, higher quality and more effective pricing and marketing
The Learning Curve

The Slope as a Measure of Learning Benefits

- The *slope* of a process is the relative size of the average cost when cumulative output doubles.
- A slope of 0.8 (the observed median) indicates that the average cost will decline by 20% when the cumulative output doubles.
- Learning flattens out over time and the slope eventually becomes 1.0.
Learning Curve Strategy

- Expand output rapidly to benefit from the learning curve and achieve a cost advantage
- May lead to losses in the short term but ensure long term profitability
- Rewards based of short term profits may discourage the exploitation of the learning curve

BCG’s Growth/Share Paradigm

- Product life cycle model combined with an internal capital market, with the firm serving as a banker
- Use the cash generated by “cash cows” to exploit the learning economies of “rising stars” and “problem children”
BCG’s Growth/Share Matrix

<table>
<thead>
<tr>
<th>Relative Market Share</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Rising star</td>
<td>Problem child</td>
</tr>
<tr>
<td>Low</td>
<td>Cash cow</td>
<td>Dog</td>
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</tbody>
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The Product Life Cycle
Individual Learning & Organizational Learning

- Learning resides with individuals
- Organizational learning includes expertise that individuals have and the way they complement each other
- Worker mobility can lead to loss of expertise in the organization
- On the other hand, codifying work rules and reducing job turnover may stifle creativity

Learning Curve and Scale Economies

- Learning reduces unit cost through experience
- Capital intensive technologies can offer scale economies even if there is no learning
- Complex labor intensive processes may offer learning economies without scale economies
Learning Curve and Scale Economies

Learning Economies When Scale Economies are Absent

![Graph showing Learning Curve and Average Cost Curve](image)