

Universität zu Köln

Seminar für Allgemeine Betriebswirtschaftslehre, Supply Chain Management und Management Science

Operations Strategy 01

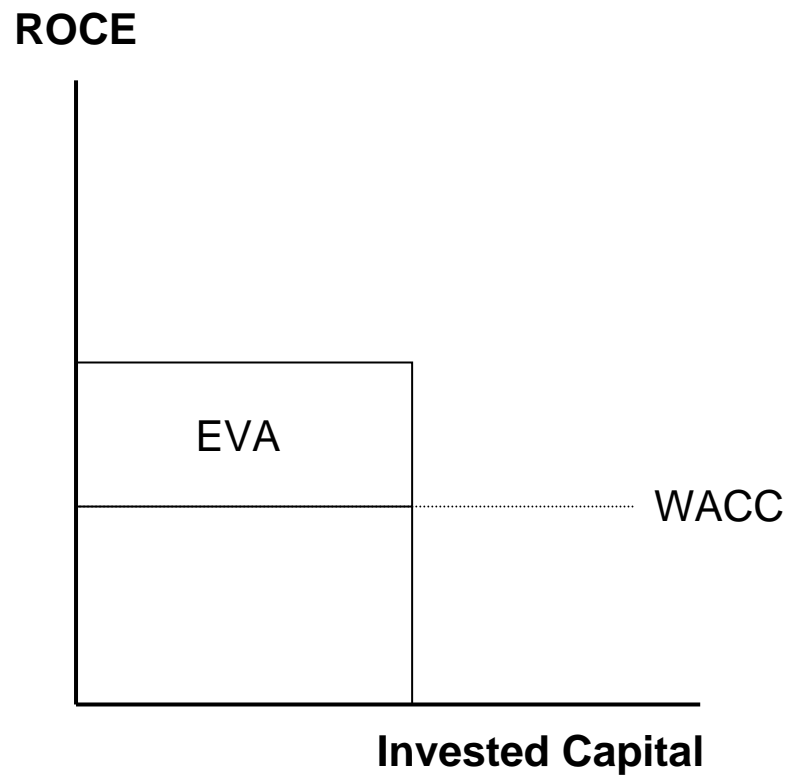
Discussion Session

EXERCISE 1: Strategy – Deutsche Telekom AG

- a) Which group of stakeholders does Mr. Ricke serve by planning to pay dividends in 2004?
- b) What are the three general approaches to improving the EVA?
- c) Draw a ROCE tree and discuss how the approaches you will cover in the courses Supply Chain Strategy and Supply Chain Planning (SCM&MS I and SCM&MS II) affect the ROCE and, thus, the EVA.
- d) How will the anticipated decision of the rating agencies to upgrade the debt rating of Telekom affect the WACC and the EVA of Telekom?

STAKEHOLDERS OF A COMPANY

WAYS TO IMPROVE EVA



Efficiency

Growth

Finance

KEY SCM LEVERS FOR VALUE CREATION

IMPACT OF DTAG DEBT RATING ON WACC

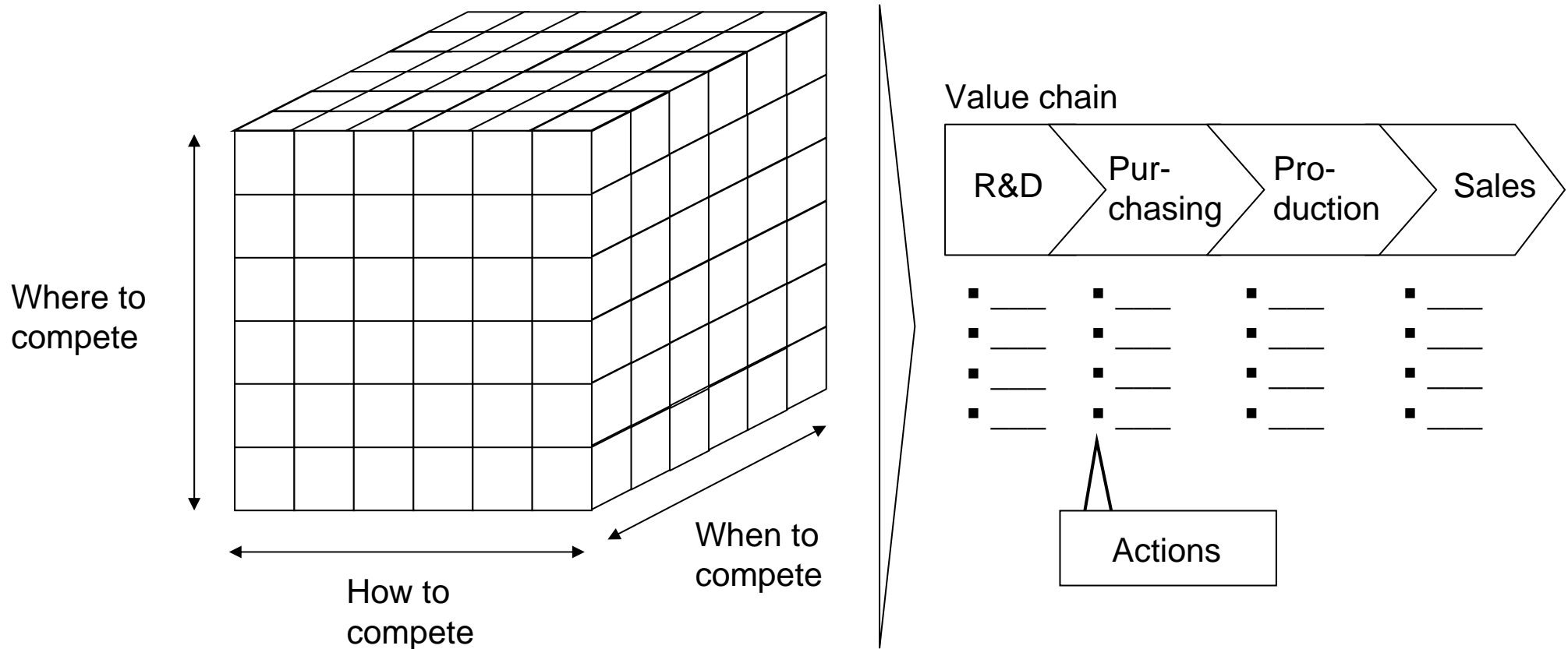
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- In 2000, Deutsche Telekom bought UMTS licenses
 - Its debt reached U.S. \$ 59 billion
 - Rating agencies downgraded Deutsche Telekom from “stable” to “negative” due to its high debt
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EXERCISE 1: Strategy – Deutsche Telekom AG

- e) Based on the text, which of the three general approaches does Mr. Ricke intend to follow over the next few years and how does he plan to do this?

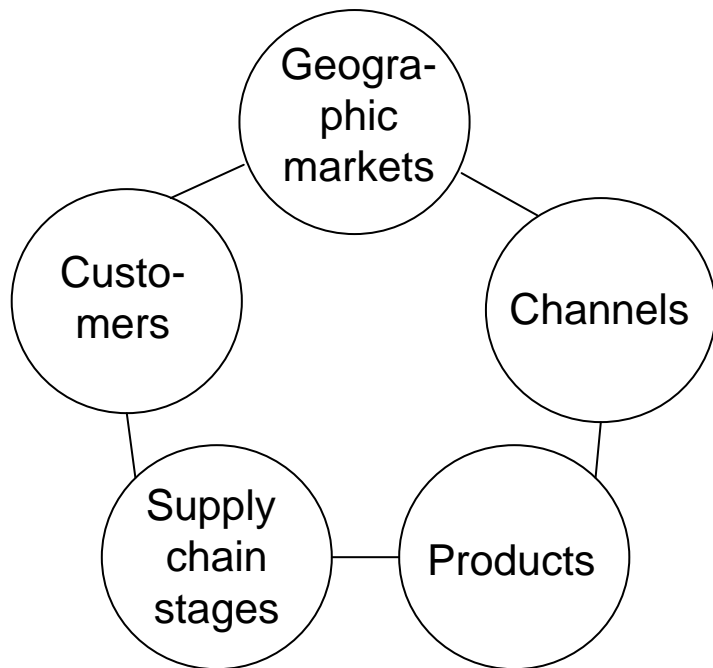
- f) Analyze Telekom's strategy along the where, how, and when dimensions of a strategy. What are the key actions that Mr. Ricke plans to implement in the future? You might also want to check the web for additional information on the strategy of Telekom.

ELEMENTS OF BUSINESS UNIT STRATEGY

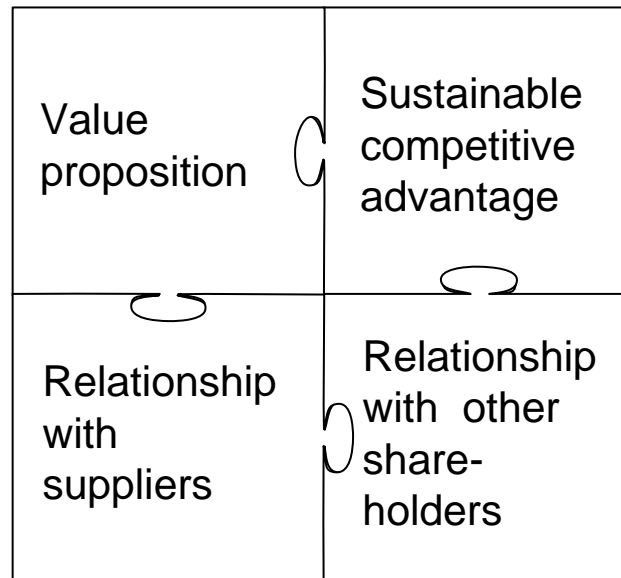


BUSINESS UNIT STRATEGY

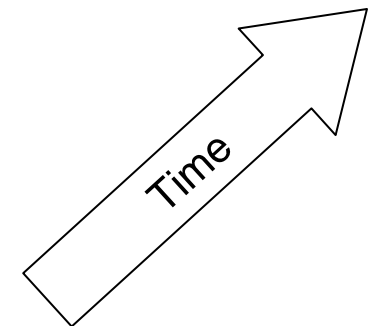
Where to compete



How to compete



When to compete



EXERCISE 2: Strategy – Logistics AG

- a) Calculate the return on equity (r_e) of the Logistics AG. Assume that the risk-free rate of interest is $r_f = 5\%$, the expected market return is $E[r_m] = 14\%$, and the sensitivity of the asset return is $\beta = 1,6$.
- b) Determine the WACC of the Logistics AG.
- c) Calculate the Return on Capital Employed (ROCE) and the EVA of the Logistics AG in 2006. Note that the company has to pay taxes on its profits.

EXERCISE 2: Strategy – Logistics AG

Weighted Average Cost of Capital (WACC)

- Cost of invested capital (in %)
- Averages return on equity and debt
- Debt has usually fixed interest rate (from bonds, ...)
- Equity does not have fixed interest rate, but shareholders have certain expectation

$$WACC = \frac{r_e \cdot E + r_d \cdot (1 - TR) \cdot D}{E + D}$$

Capital Asset Pricing Model (CAPM)

- Method to calculate expected return of shareholders (return on equity)
- Takes into account risk free interest rate and expected market return
- Special factor to show how additional risk of market leverages for individual company
- $\beta > 1$: Shareholders expect higher risk than market average and demand higher returns

$$r_e = r_f + \beta(E[r_m] - r_f)$$

EXERCISE 2: Strategy – Logistics AG

Return on equity (r_e):

$$r_e = r_f + \beta(E[r_m] - r_f) =$$

WACC:

$$WACC = \frac{r_e \cdot E + r_d \cdot (1 - TR) \cdot D}{E + D} =$$

ROCE:

$$ROCE = (1 - TR) \frac{(\text{Sales} - \text{Operating Costs})}{IC} =$$

EVA:

$$EVA = (ROCE - WACC) \cdot IC =$$

EXERCISE 2: Strategy – Logistics AG

- d) Imagine that the Logistic AG improves its production processes and, thereby, is able to reduce operating costs by EUR 90.000 in 2006. How does the EVA of the Logistics AG change?

Return on equity (re):

WACC:

ROCE:

$$ROCE = (1 - TR) \frac{(\text{Sales} - \text{Operating Costs})}{IC} =$$

EVA:

$$EVA = (ROCE - WACC) \cdot IC =$$

EXERCISE 2: Strategy – Logistics AG

- e) Imagine that the Logistic AG improves customer satisfaction by introducing a new product design. Assume that the sales volume increases by 17 %. The new product design increases operating costs by 10%. Determine the new EVA of the Logistics AG. How does the EVA change?

Return on equity (re):

WACC:

ROCE:

$$ROCE = (1 - TR) \frac{(Sales - Operating Costs)}{IC} =$$

EVA:

$$EVA = (ROCE - WACC) \cdot IC =$$

EXERCISE 2: Strategy – Logistics AG

- f) Imagine that the Logistic AG introduces a new inventory management system which reduces inventory levels by 15 %. Assume that 40 % of the working capital is used for keeping inventory and that the ratio of debt to equity remains constant. Determine the new EVA of the Logistics AG. How does the EVA change?

Return on equity (re):

WACC:

ROCE:

$$ROCE = (1 - TR) \frac{(Sales - Operating Costs)}{IC} =$$

EVA: $EVA = (ROCE - WACC) \cdot IC =$

EXERCISE 2: Strategy – Logistics AG

- g) Imagine that the Logistic AG moves its headquarters to another country. Annual labor costs will decrease by EUR 250 000. However, the tax rate is 23 % instead of 20 % and the expected market return is $E[r_m] = 18 \%$. Determine the new EVA of the Logistics AG. How does the EVA change?

Return on equity (r_e):

$$r_e = r_f + \beta(E[r_m] - r_f) =$$

WACC:

$$WACC = \frac{r_e \cdot E + r_d \cdot (1 - TR) \cdot D}{E + D} =$$

ROCE:

$$ROCE = (1 - TR) \frac{(\text{Sales} - \text{Operating Costs})}{IC} =$$

EVA:

$$EVA = (ROCE - WACC) \cdot IC =$$

EXERCISE 3: MISSION AND VISION

- a) Below you find the mission and vision statements of two companies, Nokia and Dow. Both companies are major players in their areas. Analyze their mission and vision statements. What are the positive and negative aspects of these statements? Explain your answer.

- b) Imagine that you are the owner of a company. Write a mission statement and a vision statement for your company.

MISSION AND VISION

Mission

- Asks „Why does the organization exist?“
- Provides context for all decisions
- Describes an enduring reality
- Is not subject to time
- Is useful for internal and external audiences

Vision

- Asks „What do the leaders want the organization to become?“
- Guides development of strategy
- Describes an inspiring new reality
- Is achievable within a specific time period
- Is primarily used internally

EXERCISE 3: MISSION AND VISION OF NOKIA

Mission: Connecting People

By connecting people, we help fulfill a fundamental human need for social connections and contact. Nokia builds bridges between people – both when they are far apart and face-to-face – and also bridges the gap between people and the information they need.

Our Vision: Life goes Mobile!

Ten years ago, we had a vision that seemed revolutionary for the times: Voice Goes Mobile! As history shows, this vision became reality in an incredibly short amount of time. With more than 1.6 billion mobile phone subscriptions globally – and more mobile phones than fixed-line phones in use – we see that mobility has transformed the way people live their lives.

Today, Nokia sees mobility expanding into new areas such as imaging, games, entertainment, media and enterprises. There are new mobile services already taking our industry forward and creating new opportunities. At the same time, major opportunities still exist in bringing mobile voice to completely new users.

If it can go mobile – it will!

EXERCISE 3: MISSION OF DOW

Mission - Why We're Here

To constantly improve what is essential to human progress by mastering science and technology.

Dow's mission represents our greater purpose in society.

Constantly improve ... This concept is and has been the bedrock of Dow's culture since H.H. Dow first said, "If you can't do it better, why do it?" It underscores our drive to continually seek the best in everything we do, and an unwillingness to settle for anything less.

Essential to Human Progress ... The products we make find their way into products that provide people the world over with improved lifestyles. All of us at Dow understand and take pride in this contribution. We also use this concept to connect Dow with the external markets we serve. When we think in terms of the markets we serve, we become more outside-in focused and we seek growth opportunities.

Mastering Science and Technology ... We put our science and technology to work to create solutions for our customers and for society.

EXERCISE 3: VISION OF DOW

Vision - What We Seek to Become

To be the largest, most profitable, most respected chemical company in the world.

Dow's vision describes our aspiration for the future.

To be the largest means we have the scale and scope to do things others cannot. Our size allows us to operate more efficiently, and leverage resources and technologies across the globe. It also gives us the global infrastructure to operate in regions that are not accessible to smaller companies, as well as stronger relationships with customers and suppliers. The company's size gives us competitive advantage.

Most profitable begins with offering great shareholder value. Beyond that, for Dow, profitability is achieved by operational intelligence. It means we work safely, grow wisely, maintain our margins through business cycles, and through it all, offer quality products and services to our customers that others cannot.

Most respected means our stakeholders see our industry leadership through our focus on economic success, innovation, and environmental, health and safety performance. As the most respected chemical company in the world, our actions will be driven by our values of Integrity and Respect for People. Our commitment to sustainability, transparency and ethical behavior will be clear, as will our long-term commitment to the interests of all of our stakeholders.

EXERCISE 4: LEARNING CURVE

Consider the Stanford Case Study “The Growth of Intel and the Learning Curve”, which can be found in the literature folder. Please answer the following questions:

- What is your estimate of the learning rate for the data given in Table 2 (p. 4)? Assume that the number of bits sold equals the number of bits produced. (Hint: Use Excel or similar software)
- What is the meaning of the learning rate (in one sentence)?
- Let’s say you had taken this class in 1977, and thereby became aware of the learning curve principle. Would this knowledge have been useful in analyzing Intel’s investment potential? (Hint: Go to quote.yahoo.com to find the stock data of Intel starting from 1986)

LEARNING CURVE – FORMULA

Notation

c_0 Cost of producing the first unit

$c(x)$ Unit cost of the x^{th} unit

α Rate at which cost declines (**not** learning rate)

Learning curve

$$c(x) = c_0 \cdot x^{-\alpha}$$

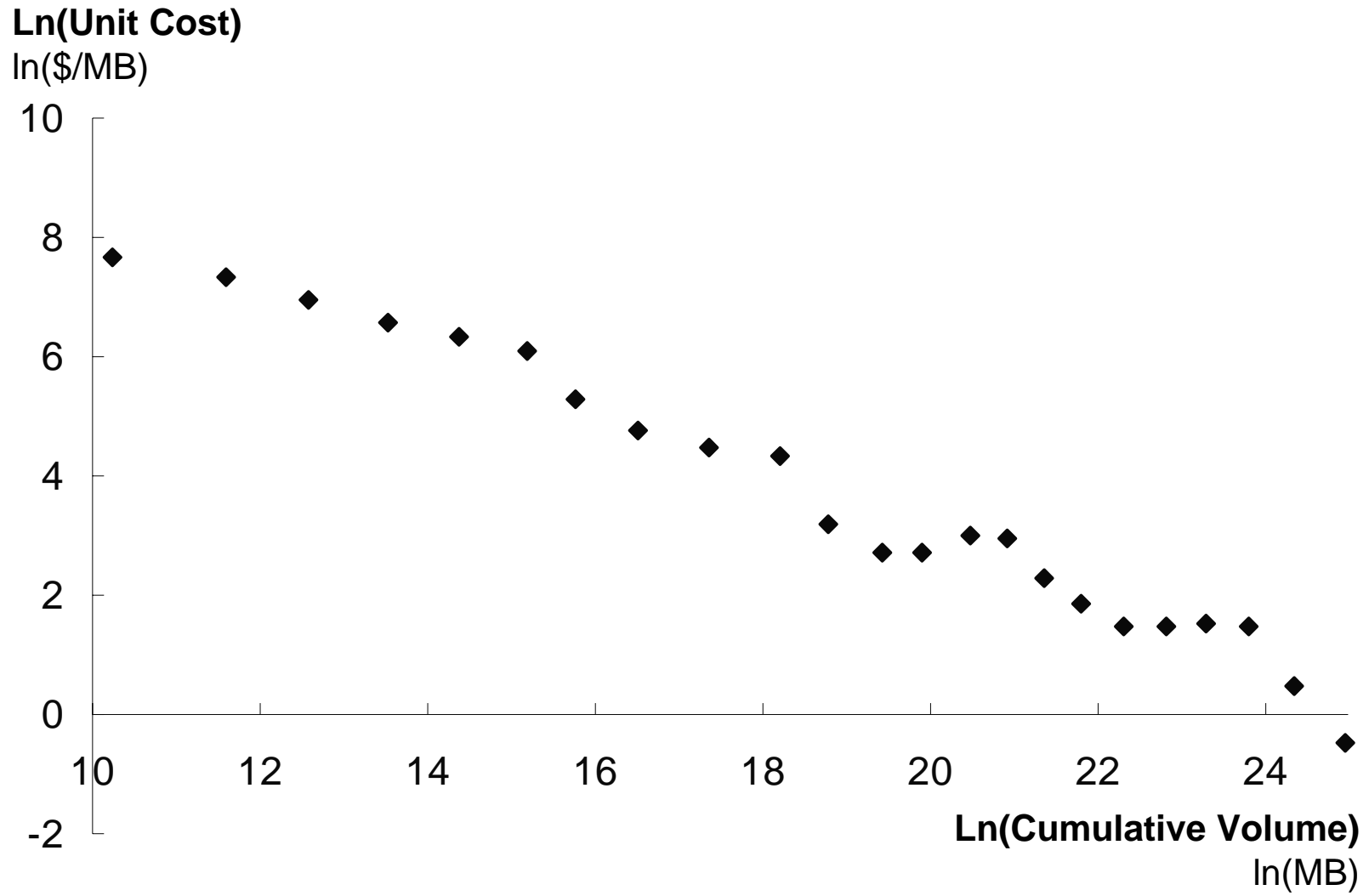
Computation of learning curve parameters

1. Plot $\ln(c(x))$ vs. $\ln(x)$
2. Fit a straight line through the data points (eyeballing or regression)
3. Determine the slope α of the line
4. Compute c_0

EXERCISE 4: INTEL CASE

| Year | Sales GB | Cum. Volume MB | Sales Mio. \$ | Unit Cost \$/MB | LN (Cum. Vol.) | LN (unit Cost) |
|-------|-------------|----------------------|------------------|--------------------|-------------------|-------------------|
| Prior | | 10240 | | | | |
| 1974 | 2 | | 10 | | | |
| 1975 | 15 | | 33 | | | |
| 1976 | 78 | | 124 | | | |
| ... | ... | ... | ... | ... | ... | ... |

EXERCISE 4: INTEL CASE



EXERCISE 4: INTEL CASE

Rate at which cost declines

$$\alpha =$$

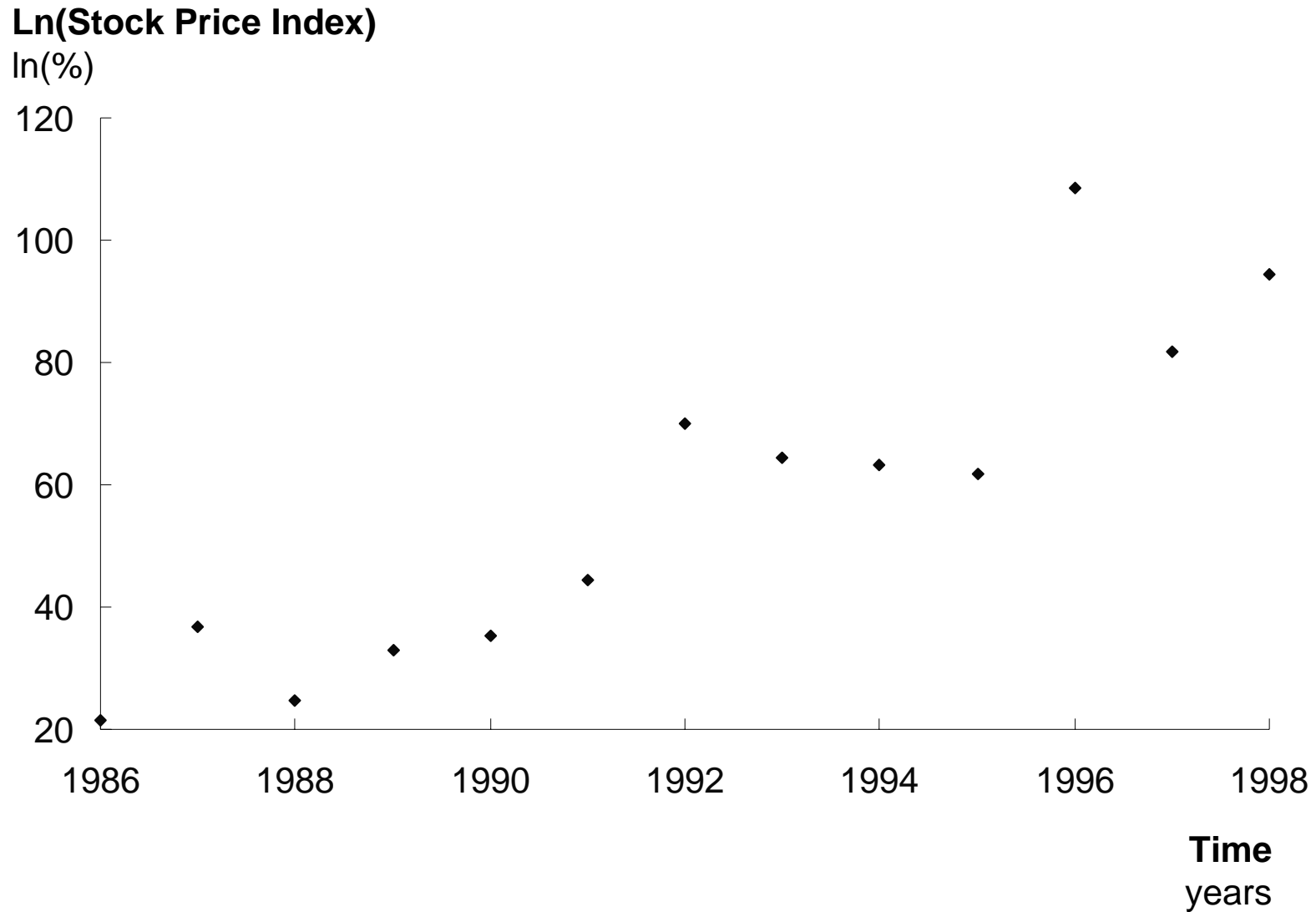
Learning Rate:

The learning rate describes the ratio of unit costs now and after having doubled the production volume

Cost of producing the first unit:

$$C_0 =$$

EXERCISE 4: INTEL CASE – STOCK PERFORMANCE OF INTEL

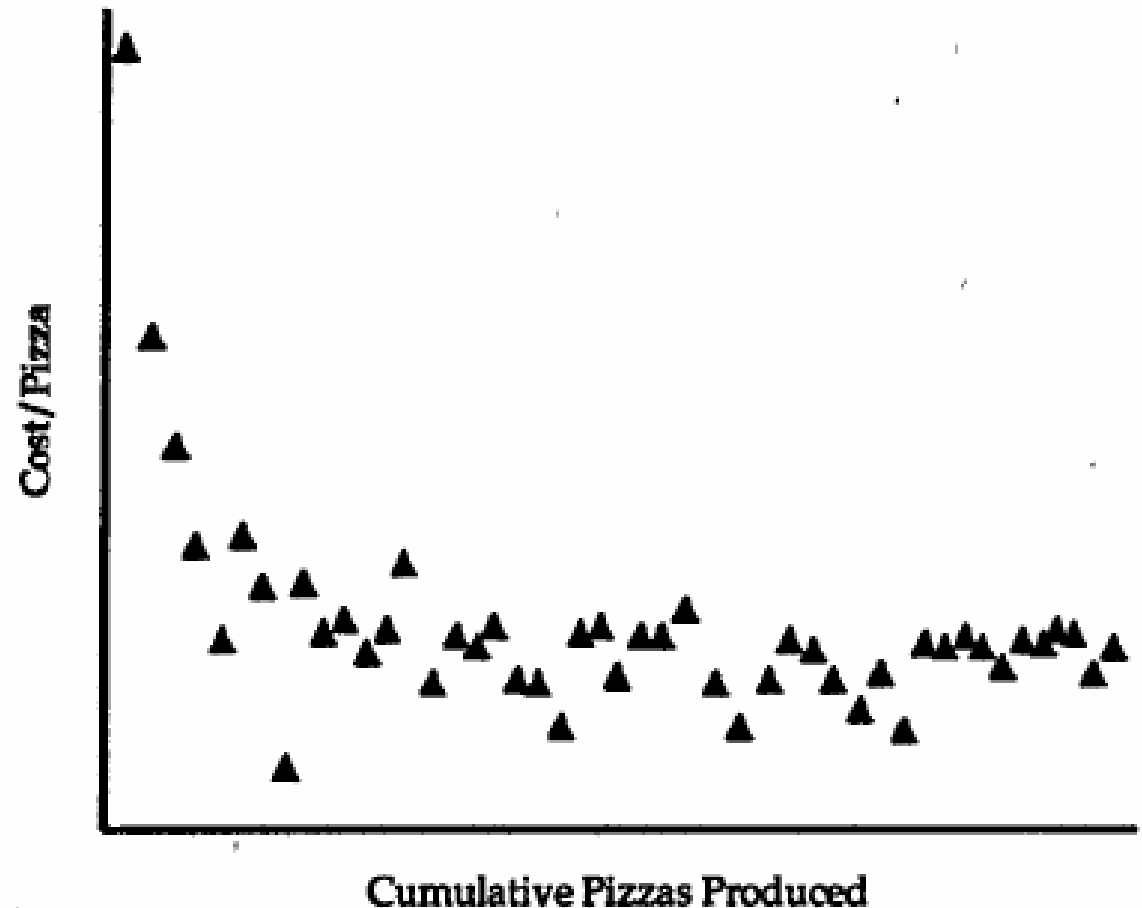


LEARNING RATE: PIZZA CASE

Darr's model

- Darr et al. analyzed production costs at 36 pizza stores in Pennsylvania, U.S.A
- Darr et al. found that costs decline with production volume with a learning rate of 93%
- The researchers also found that production costs increase over time due to depreciation of knowledge. The depreciation rate was estimated at 47% per month (i.e. after one month without production only 47% of the knowledge will be left).
- Darr et al. suggested that the high employee turnover at pizza stores can explain the high rate of depreciation.

Figure 1 Relation Between Total Cost per Pizza and Cumulative Number of Pizzas Produced



EXERCISE 5: BASS DIFFUSION MODEL

- a.) What is the meaning of the parameters p , q , and M in the Bass Diffusion Model?
- b.) What is your estimate of p , q , and M for the new product?
- c.) How many units will be sold until periods $t=4$, $t=5$, and $t=6$?

MODELING THE PRODUCT LIFE CYCLE – THE BASS DIFFUSION MODEL

$$X_t = X_{t-1} + p(M - X_{t-1}) + q \frac{X_{t-1}}{M} (M - X_{t-1})$$

$$x_t = p(M - X_{t-1}) + q \frac{X_{t-1}}{M} (M - X_{t-1})$$

Notation

- p The coefficient of external influence; the likelihood that somebody who is not yet using the product will start using it because of mass media coverage or other external factors
- q The coefficient of internal influence; the likelihood that somebody who is not yet using the product will start using it because of word-of-mouth and other internal factors
- M The market potential; the number of people who will eventually use the product
- X_t Products sold up to period t
- x_t Products sold in period t

EXERCISE 5: BASS DIFFUSION MODEL

Annual Sales Volume x_t :

$$x_t = p(M - X_{t-1}) + q \frac{X_{t-1}}{M} (M - X_{t-1})$$

EXERCISE 5: BASS DIFFUSION MODEL

Parameters:

$a = 5000$

$c =$

$b =$

$p =$

$q =$

$M =$

EXERCISE 5: BASS DIFFUSION MODEL

Total Sales in $t=4$, $t=5$, and $t=6$

$$X_4 =$$

$$X_5 =$$

$$X_6 =$$