

Business Economics



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# Business Definition

## The procedure for founding a business

When an entrepreneur decides to found a business, he / she must (in accordance with applicable legislation) comply with certain formal requirements. Both in case of an entrepreneur – natural person and an entrepreneur – legal entity, the business must comply with the Trades Licensing Act.

A trade (business) under The Trades Licensing Act (No 455/1991) shall mean a systematic activity carried out independently under the conditions laid down in this Act, under a person’s own name and liability, with a view to making a profit.

 The following shall not constitute a trade:

a) the performance of an activity statutorily reserved for the State or for a designated legal person,

b) the use of the results of intellectual creativity protected by specific laws, their originators or authors2),

c) the collective administration of copyright and rights related to copyright in accordance with specific legislation2a),

d) the restoration of cultural monuments.

The Trade Licensing Act sets out the general conditions for pursuing a trade that are common to all types of trade:

Unless otherwise provided in this Act, the general conditions to be met by natural persons in order to carry on a trade shall be:

a) full legal capacity,

b) good character.

Special conditions for carrying on a trade Professional or other competence,

Trades are classified as:

a) notifiable trades, which may be carried on once they have been notified, provided that the stated conditions are met,

b) permitted trades, which may be carried on pursuant to a concession. The trades listed in Annex No 3 to The Trades Licensing Act are permitted trades.

The notifiable trades are:

a) vocational trades, where a condition for carrying on the trade is the professional competence referred, The trades listed in Annex No 1 to The Trades Licensing Act

b) professional trades, where a condition for carrying on the trade is the professional competence referred to in Annex No 2 to The Trades Licensing Act,

c) unqualified trades, where no professional competence is set as a condition for carrying on the trade. Unqualified trades and the areas of activity pertaining to unqualified trades are listed in Annex No 4 to The Trades Licensing Act.

## Choice of legal form of business

The choice of legal form of business is among the most important issues facing an entrepreneur in founding a business. This decision affects the nature of the business in the long term.

The procedure for choosing legal form of business is as follows:

1. devising a business plan;

2. ascertaining the terms of different legal forms, eliminating entirely inappropriate ones;

3. devising criteria for making a decision;

4. evaluating possible options;

5. choosing the legal form of business itself.

Classification of legal entities is defined in the Civil Code (Act No 89/2012). Establishing Business corporations is regulated by Act No 90/2012 Coll. on Commercial Companies and Cooperatives (Business Corporations Act).

ACT on Commercial Companies and Cooperatives (Business Corporations Act), the Civil Code and other legal norms offer entrepreneurs various legal forms of business. Choosing the legal form of business is the entrepreneur’s affair. However, every legal form of business is subject to other legal norms which also have an influence on the entrepreneur’s decision.

## The private legal forms

**The most important** private **legal forms of business are**:

⮚ **Businessman alone** (a natural person – self-employed, a tradesman);

⮚ **Business corporations** (commercial companies (“companies”) and cooperatives):

* companies are:
* partnerships - **an unlimited partnership (v.o.s.),**

 **- a limited partnership (k.s.);**

* capital companies - **a limited-liability company (s.r.o.),**

 **- a joint-stock company (a.s.);**

* a European Company and a European Economic Interest Grouping;
* Cooperatives are:
* **a cooperative**
* European Cooperative Society.

A partnership can only be established for the purpose of doing business or for the purpose of managing its own assets.

A European Company, a European Economic Interest Grouping or a European Cooperative Society are governed by EU regulations.

The choice of legal form of business is a long-term decision. The choice of appropriate legal form is an issue not only in founding a new business, but occasionally also in case of an already existing and operating business. This means a change of legal form of business which we call transformation process.

## Characteristics of basic legal forms of business

Basic criteria for choosing appropriate legal form of business are:

1. **Liability** (business risk),
2. **Authorization to manage the company** (i.e. representing the company externally, managing the company, participation in the decision-making etc.),
3. **Number of co**mpany founders,
4. Registered capital,
5. **Establishment of a business corporation** - administrative demands, expenditure,
6. **Profit sh**are,
7. **Financial possibilities**, he possibility of external sources,
8. **The tax burden** (Legal form of business decides only whether the income tax of private persons or the income tax of legal persons applies, Application of other taxes is unrelated to legal form of business, depends on other circumstances).
9. **The disclosure obligation**.

It is necessary to assess and consider the above mentioned criteria while founding a business or changing the legal form of business.

 **Overview of the most important characteristics of basic legal forms of business:**

**Liability**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | unlimited |
| an unlimited partnership (v.o.s.) | company unlimited,the members have unlimited liability  |
| a limited partnership (k.s.) | company unlimited,at least one member has limited liability (the “limited partner”) and at least one member has unlimited liability (the “general partner “) |
| a limited-liability company (s.r.o.) | company unlimited,The members are jointly and severally liable for the company’s debts up to the amount at which they have not fulfilled their contribution obligation |
| a joint-stock company (a.s.) | company unlimited,The shareholders are not liable for the company's liability |
| a cooperative  | Cooperative unlimited, Members are not liable for the cooperative's liability |

**Authorization to manage the company**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | manage alone |
| an unlimited partnership (v.o.s.) | The company’s statutory body shall be all members |
| a limited partnership (k.s.) | The company’s statutory body shall be all general partners. |
| a limited-liability company (s.r.o.) | The highest authority is the general meeting. One or more executives shall constitute the statutory body of a company, supervisory board may be. |
| a joint-stock company (a.s.) | The highest authority is the general meeting. An internal structure system of a company, in which a board of directors and a supervisory board are established, is a dualistic system. An internal structure system of a company, in which an administrative board and a statutory manager are established, is a monistic system. |
| a cooperative  | The highest authority is the members’ meeting,A cooperative shall have the board of directors (the statutory body of a cooperative), an auditing committee In a cooperative having less than 50 members, the articles of association may provide that the board of directors shall not be established and that the president of the cooperative shall be the statutory body. |

**Number of company founders**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | 1 natural person |
| an unlimited partnership (v.o.s.) | at least two persons participating (natural or legal persons) |
| a limited partnership (k.s.) | at least two persons participating (natural or legal persons), at least one „general partner “and at least one „limited partner “ |
| a limited-liability company (s.r.o.) | even 1 person (a natural or legal person) |
| a joint-stock company (a.s.) | even 1 person (a natural or legal person) |
| a cooperative  | A cooperative shall have at least 3 members (natural or legal persons) |

**Registered capital**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | not regulated |
| an unlimited partnership (v.o.s.) | not regulated; (The registered capital may arise – the contribution of the partners) |
| a limited partnership (k.s.) | not regulated (The registered capital always arises – the contribution of the limited partners) |
| a limited-liability company (s.r.o.) | not regulated (The registered capital always arises – The minimum amount of a contribution shall be CZK 1) |
| a joint-stock company (a.s.) | The registered capital of a joint-stock company shall amount to at least CZK 2,000,000 or EUR 80,000 |
| a cooperative  | Every member shall participate on the registered capital of the cooperative with his or her membership contribution.  |

**Administrative demands**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | obtaining a trade license |
| an unlimited partnership (v.o.s.) | The memorandum of association (notarized); obtaining a trade license; Registration of the commercial register. |
| a limited partnership (k.s.) | The memorandum of association (notarized); obtaining a trade license; Registration of the commercial register. |
| a limited-liability company (s.r.o.) | The memorandum of association or a deedof foundation in the form of an authentic instrument; depositing on the account; obtaining a trade license; Registration of the commercial register. |
| a joint-stock company (a.s.) | The memorandum of association or a deedof foundation in the form of an authentic instrument. The establishment of a company shall require the adoption of its articles of association (a person who adopted the articles of association and participates in the subscription of shares shall be the founder)– The articles of association shall also include: the amount of registered capital and information about the selected internal structure system of the company; obtaining a trade license; Registration of the commercial register. |
| a cooperative  | The memorandum of association. In addition to adopting the articles of association, the foundation meeting of a cooperative (the “foundation meeting”) shall elect the members of the bodies of the cooperative and approve the method of fulfilment of the basic membership contribution and the entry membership contribution;obtaining a trade license; Registration of the commercial register.  |

**The share of the profit and losses**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | profit is available to a tradesman |
| an unlimited partnership (v.o.s.) | Profits and losses shall be distributed among the members equally (unless stipulated otherwise in the memorandum of association) |
| a limited partnership (k.s.) | Profits and losses shall be distributed between the company and the general partners. Unless a different distribution method is provided for in the memorandum of association, profits and losses shall be divided in half between the company and the general partners.; The general partners shall share their part of profits and losses in accordance equally; The part of the profits allocated to the company shall be, after taxes, distributed among the limited partners according to the proportion of their business shares. Losses shall not be borne by the limited partners. |
| a limited-liability company (s.r.o.) | The share of the profit was determined by the general meeting for distribution among the members according to the proportion of their business shares (the proportion of his or her contribution pertaining to such business share and the amount of its registered capital); unless stipulated otherwise in the memorandum of association. |
| a joint-stock company (a.s.) | Unless determined otherwise in the articles of association in relation to a specific type of shares, such profit share shall be determined based on the proportion of the shareholder’s share to the registered capital. |
| a cooperative  | If the articles of association do not provide for the method of determining a member’s share of the profit to be distributed among the members, it shall be determined in the proportion of the member’s fulfilled contribution obligation related to the membership contribution to the paid-up registered capital of the cooperative.  |

**Financial options**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Businessman alone (a natural person – self-employed | minimal capital equipment, difficult access to debt |
| an unlimited partnership (v.o.s.) | Equity is formed the contribution of the partners;Possibilities of capital increase– increase of contributions, acceptance of a new partner, silent partner; difficult access to debt. |
| a limited partnership (k.s.) | Equity is formed the contribution of the limited partners;Possibilities of capital increase– increase of contribution of the limited partners, acceptance of a new limited partner, silent partner; difficult access to debt. (A positive is that contributions of limited partners are recorded in commercial register). |
| a limited-liability company (s.r.o.) | Equity is formed the contribution of the members (The minimum amount of a contribution shall be CZK 1); Possibilities of capital increase– increase of contributions, acceptance of a new member, silent partner; access to debt depends on the size of equity and is further complicated by limited private liability of the limited partners. |
| a joint-stock company (a.s.) | The registered capital of a joint-stock company shall amount to at least CZK 2,000,000 or EUR 80,000; Increase of the registered capital– by subscription of new shares; easiest access to debt, highest degree of creditor protection. |
| a cooperative  | Equity is formed the contribution of the members;Possibilities of capital increase – another member’s contribution, admitting new members; access to credit depends on the size of equity.  |

**The tax burden**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| Legal form of business decides only whether the income tax of private persons or the income tax of legal persons applies.Application of other taxes is unrelated to legal form of business, depends on other circumstances. |
| Businessman alone (a natural person – self-employed | is subject to the income tax of natural persons |
| an unlimited partnership (v.o.s.) | is subject to the income tax of legal persons; Profit (tax base) shall be distributed among the members and taxed as their entrepreneurial income by income tax of natural persons. |
| a limited partnership (k.s.) | is subject to the income tax of legal persons, however, the tax base is reduced by the profit share of unlimited partners; unlimited partners tax their profit as their entrepreneurial income by income tax of natural persons. |
| a limited-liability company (s.r.o.) | is subject to the income tax of legal persons. |
| a joint-stock company (a.s.) | is subject to the income tax of legal persons. |
| a cooperative  | is subject to the income tax of legal persons.  |

**The disclosure obligation**

|  |  |
| --- | --- |
| Legal forms of business | Characteristics |
| The disclosure obligation is for all legal and natural persons registered in the Commercial Register, which their financial statements are audited and the criteria have been exceeded or attained:1. total assets of CZK 40 million,2. net turnover of CZK 80 million per annum (the revenues, reduced by sales rebates),3. average number of employees of 50 for the accounting period. |
| Businessman alone (a natural person – self-employed | attained at least two of the three criteria pursuan. |
| an unlimited partnership (v.o.s.) | attained at least two of the three criteria pursuan. |
| a limited partnership (k.s.) | attained at least two of the three criteria pursuan. |
| a limited-liability company (s.r.o.) | attained at least two of the three criteria pursuan. |
| a joint-stock company (a.s.) | attained at least two of the three criteria pursuan. |
| a cooperative  | attained at least two of the three criteria pursuan  |

# BUSINESS PLAN - financial budget

Founding a business requires **extraordinary**, usually **one-time financial resources** for acquiring

* fixed assets, i.e. land, buildings, machines and production equipment, know-how etc., and
* necessary current assets (working capital), for e.g. purchasing raw and other materials, fuel, energy, for paying salaries and other payments,

until the firm receives first payments for goods sold or services provided.

This extraordinary financing **needs to be supported by calculations**, which determine:

1. Expected Revenues, Costs, Profit;
2. Necessary amount of fixed and current assets and sources of their capital coverage;
3. Expected Profitability of the Enterprise, Return on Equity and another ratio.

## Expected Revenues, Costs and Profit

These are determined by the revenue, cost and profit budget, i.e. by estimated profit and loss account.

* The revenue budget is based on the estimated volume of products produced and sold and their prices, or other revenues.
* For the preliminary cost budget, the basic tool is preliminary costing,
* The difference between estimated revenues and costs is the expected profit.

For more detailed calculations, we monitor the expected cash flow in each year of our intended project.

## Necessary amount of Assets and Liabilities

This is also determined by a budget – the budget of assets and sources of their coverage, i.e. the estimated balance sheet.

* Determining the amount of fixed assets is usually simpler; it is based on the price of land, buildings, machines and production equipment, on the price of construction work etc.
* More difficult is determining the amount of current assets (working capital), i.e. determining the necessary amount of raw and other materials, also the amount of money for payment of salaries, other expenditures, etc. The need for current assets (working capital) depends also on their velocity of turnover (especially on the velocity of turnover of stock, receivables).

**Drawing up of budgets is carried out simultaneously** – they are tied together by some items:

* e.g. determining costs requires the knowledge of the amount of depreciation, which can be ascertained only after drawing up the budget of assets;
* similarly, the needed amount of raw and other materials etc. is deduced based on the sales budget.

## Expected Profitability of the Enterprise

* The basic indicator for evaluating every entrepreneurial action, including founding a business, is **Return on Equity (ROE)**. ROE should be at least as high as that achievable by investing capital in other ventures, including depositing money in a bank.
* We can use **methods for evaluating investment efficiency** (payback period, net present value, internal rate of return).
* When founding a business with the aid of debt capital, we also calculate **Return on Assets,** or else **other ratios**, which prove the usefulness and profitability of the anticipated project.

Drawing up an establishing budget is closely related to the choice of legal form of business.

The establishing budget represents the chosen entrepreneurial goal in numerical terms.

## Examples

### Solved example

Establishing a manufacturing company in form of a joint-stock company. A group of entrepreneurs decided to found a joint-stock company producing toys.

A market survey found that the following minimum annual sales could be expected

10 000 pieces of the product A (toy A) at the selling price of 160 CZK a piece,

20 000 pieces of the product B (toy B) at the selling price of 64 CZK a piece.

The sales period is expected to be at least 5 years, after which time the equipment will be used for manufacture of other products.

The joint-stock company is to be established with the registered capital of 4 mil. CZK, to be apportioned into 4000 shares with a nominal value of 1000 CZK each (shares without special rights - ordinary shares), the General Meeting decided to pay out dividends of 12% of the nominal value of the shares for the given year.

The turnover of current assets is approx. 5 times a year.

In order to ensure the desired level of production, we need: a piece of land costing 600 000 CZK, buildings, machines and production equipment costing 3 900 000 CZK, other equipment costing 500 000 CZK.

In case of lack of equity it is possible to obtain a bank credit loan for 5 years at 15 % interest rate.

Preliminary Costing (per 1 pc. – in CZK)

|  |  |  |
| --- | --- | --- |
| Costing item | Product A | Product B |
| Direct material | 20,20 | 9,40 |
| Direct labor | 15,40 | 4,40 |
| Other direct costs | 2,00 | 1,20 |
| Production overhead | 28,90 | 11,50 |
| Administrative overhead | 19,20 | 7,70 |
| Sale cost | 4,30 | 1,80 |
| Total Costing of output | 90,00 | 36,00 |
|  from that fixed cost (depreciation) | 29,00 (24,70) | 11,60 (9,90) |
|  from that variable cost | 61,00 | 24,40 |
| Sale price | 160,00 | 64,00 |
| Profit | 70,00 | 28,00 |

Solution:

**Annual Revenues, Cost and Profit/Loss Budget (In Thousand CZK)**

|  |  |
| --- | --- |
| **Cost in thousand CZK** | **Revenues in thousand CZK** |
| Production consumptionPersonal expenses ServicesValue adjustments in the operational area Other operating expenses Interest expenses (from costing 10 000 pc. A \* 90 CZK + 20 000 pc. B \* 36 CZK) | 1 620 | Revenues from the sale of own products and services (10 000 pc. A \* 160 CZK + 20 000 pc. B \* 64 CZK) | 2 880 |

|  |  |
| --- | --- |
| Profit/Loss before tax (+/-)  | 1 260 |
| - Income tax (Income tax of legal persons for 2018 = 19 %) | - 239 |
| Profit/Loss after tax ( +/- )  | 1 021 |
| Expected Cash flow – in thousand CZK |  |
| Profit/Loss after tax ( +/- )  | 1 021 |
| + Depreciation (10 000 pieces A \* 24,70 CZK + 20 000 pieces B \* 9,90 CZK) | 445 |
| = Cash flow | 1 466 |

**II. The Budget of Fixed And Current Assets And LIABILITIES (CAPITAL) In Thousand CZK**

**Opening Balance sheet in thousand of Czech Crowns**

|  |  |
| --- | --- |
| TOTAL ASSETS | TOTAL LIABILITIES |
| Current assets | 5 235 | Equity | 4 000 |
| Cash and bank accounts | 5 235 | Registered capital | 4 000 |
|  |  | Other sources | 1 235 |
| TOTAL | 5 235 | TOTAL | 5 235 |

|  |
| --- |
| **Current Assets (Working Capital)** in thousand CZK |
| Annual Sales | 2 880 |
| - depreciation | - 445 |
| - profit | - 1 260 |
| = Expenditure on Annual Sales | 1 175 |
| Current assets (Working Capital) with turnover 5 times a year |  |
| = 1 175 : 5 = | 235 |
| Fixed Assets (in thousand CZK) |  |
| Land | 600 |
| Building, Equipment | 3 900 |
| Other tangible fixed assets | 500 |
| Fixed assets total | 5 000 |
|  |  |
| Liabilities - Capital (in thousand CZK) |  |
| **Capital:** |  |
| Registered capital (4 000 shares with a nominal value of 1 000 CZK)= Equity | 4 000 |
| Remaining credit at the bank = Debt | 1 235 |

**Balance sheet in thousand of Czech Crowns as at December 31st, 201x**

|  |  |
| --- | --- |
| TOTAL ASSETS | TOTAL LIABILITIES |
| Fixed assets | 5 000 | Equity | 5 021 |
| Land | 600 | Registered capital | 4 000 |
| Equipment |  3 900 | Profit/loss - current year (+/-) | 1 021 |
| Other tangible fixed assets | 500 | Other sources | 1 235 |
| Current assets | 235 | Liabilities to credit institutions |  |
| Cash and bank accounts | 1 021 |  |  |
| TOTAL | 6 236 | TOTAL | 6 236 |

**III. Expected Profitability of the Enterprise**

Return on Equity (ROE) =

20,33 %

It should be at least as high as that achievable by investing capital in other ventures, including depositing money in a bank.

Return on Assets =

16,37 %

Alternatively, the Return on assets ( ROA) can be calculated based on the following relationship:

ROA = 23,17 %

Return on Sales (Revenues) =

35,45 %

ratios 1 to 3 are: profitability ratios

Debt ratio = 19,80 %

Interest Coverage = 7,81 -times

ratios 4 a 5 are: debt ratios

Break Even Point =



Product A =

  2 929 pc.

Product B =

 5 859 pc.

The Break Even Point at constant prices and linear development of costs: after it was achieved, a profit is generated, which becomes higher the more products are manufactured.

Payback Period =

 3,57 years

Ratio 7 is: Indicator of investment efficiency

Conclusion:

Because the decisive indicators used for the project evaluation are favourable, founding of the joint-stock company in question can be recommended. It may be expected to prosper during the next five years.

### Example to practice

Draw up an establishing budget based on the following data:

* a market survey found that it would be possible to sell every month up to 3000 pieces of a certain product priced 72 CZK a piece;
* the assumed annual production capacity is 35 000 pieces of the product;
* a preliminary costing per 1 piece has been calculated, giving the following parameters:

total costing of output 42 CZK

from that -variable costs 32 CZK

 -fixed costs 10 CZK

 (depreciation 6 CZK);

* the sales period for the product is expected to be at least 5 years, after which time the equipment will be used for manufacture of other products;
* the expected financial income remains unchanged during the 5-year period;
* the current assets (working assets) turnover period is expected to be approx. 2 months;
* in order to ensure the desired level of production, we need: a building costing 2 400 000 CZK, machines and production equipment costing 600 000 CZK, other equipment costing 150 000 CZK with a service life of 5 years and a plot of land costing 60 000 CZK.
* this means founding a smaller enterprise in the form of a limited-liability company, to be founded by 3 partners, each contributing 900 000 CZK;
* in case of lack of equity it is possible to obtain a bank credit loan for 5 years at 17 % interest rate.
* the income tax of legal persons for 2018 is 19 %;
* using the net profit, the company is supposed to replenish the reserve fund every year (according to the articles of partnership) by the amount representing 5% of net profit and to set aside 160 000 CZK a year for further development of the enterprise;

work out:

1. Annual Revenues, Cost and Profit/Loss Budget (in thousand CZK);
2. The Budget of Fixed and Current Assets and Liabilities (Capital) in thousand CZK;
3. Expected Profitability of the Enterprise.

# The property structure of the company, Depreciation of Fixed Assets

Fixed assets serve the enterprise for a longer period of time and therefore the cost of acquiring them cannot be included in the expenses of the period, during which they were incurred. While the fixed assets are being used, they may undergo both physical depreciation (natural wear and tear either as a result of them being used for work, or caused by the environment) and obsolescence (as a result of technological advances – improvements to and reduction in price of those assets).

## Financial Statement

**Balance sheet** (statement of financial position, statement of net worth) provides a snapshot of assets, liabilities and owner´s (or stockholders´) equity of the accounting entity at a point of time.

|  |
| --- |
| Balance Sheet |
| Assets (Property) | Liabilities &Equity (Capital) |
| Fixed Assets | Equity |
| Current Assets | Long Term Liabilities (Loans) |
| Current Liabilities |

The property structure of the company is characterized by the following scheme:

 Tangible

 Fixed

 Assets

 Fixed Intangible

 Assets Fixed

 Assets

 Long-term

 Financial

 Assets

Assets

(Property)

 Current Inventory Material

 Work

 in progress

 goods

 Finished

 Products and

 Goods

 Young and

 other animals

 and groups thereof

 Short-term Cash and

 financial Bank accounts

 assets

 Short-term

 Shares

 Receivable

## Depreciation of Fixed Assets

Through **depreciation**, the initial value of fixed assets is gradually being transferred to operating costs.

**Depreciation**

* allows expressing gradual reduction in price of fixed assets (enumerating residual value of fixed assets).
* is part of costs and therefore allows the enumeration of true operating costs.

 **Methods of depreciation of Fixed assets**

We may distinguish basically three methods of depreciation of fixed assets (FA):

* linear (uniform),
* degressive (declining),
* progressive (increasing).

### The Linear Depreciation Method

This lies in depreciating fixed assets during their service life (or useful life). The amount of annual depreciation is the same for each year of their useful life. Use of this method relies on applying annual depreciation rate, expressed as a fraction (in %) of the initial value of fixed assets. This method is one of the simplest and most frequently used.

General relationships for the linear depreciation:

* if we consider the final value of FA:

 ;  ;

 ;  ;

 ;

* if we do not consider the final value of FA:

 ;  ; 

;

* determining the residual value of FA:

**  ;

where: *IV* – initial value of FA in CZK (initial value, or input cost = IV –

 acquisition cost of FA, RAP – replacement acquisition price of FA, OC – own costs of FA in CZK),

 *FV* – final value of FA in CZK (*FV = Vliquid – Cliquid*),

 *Vliquid* – liquidation value of FA in CZK (price of FA at its retirement),

 *Cliquid* – cost of liquidating FA in CZK (cost of fixed assets retirement),

 *DV* – initial value of FA being depreciated, in CZK (*DV = IV– FV*),

 *t* – service life (or useful life) expressed in years,

 *D* – annual depreciation (annual depreciation value) in CZK,

 *p* – annual depreciation rate in %,

 *RVn* – residual value of FA in CZK after „*n*“ years of use (depreciation),

 *n* – years of use (depreciation) of FA, i.e. from *1* to *t*, after which time the RV is assessed (*RV0 = InV*).

### The Degressive Depreciation Method

This is characterized by decreasing annual depreciation amounts for single years of depreciation. There are several variants of this method, the most common of which is a special case of degressive depreciation decreasing geometrically – the so-called „**fixed-percentage method** “.

Another method of degressive depreciation is the „**SYD method** “(Sum of the Years Digits Method). It is based on decreasing depreciation rate and constant depreciation base. Its name is derived from the sum of single years of service life. The **DDB method** (Double Declining Balance Method) lies in constant depreciation rate and decreasing depreciation base. The depreciation rate is expressed as the double of the linear depreciation rate (but different multiples may also be used). Annual depreciation amounts in single years are calculated by means of this constant depreciation rate as a percentage of decreasing residual value of fixed assets.

### The Progressive Depreciation Method

This is characterized by increasing annual depreciation amounts for single years of depreciation. The most well-known variant is the „**annuity method** “(redemption reserve method). Its procedure is to calculate the annual redemption amount – the annuity (the annual depreciation amount with interest) and then to divide this amount on interest and depreciation.

In connection with progressive depreciation, the so-called „**decelerated depreciation method “**is sometimes mentioned. This method is based on increasing depreciation rate and constant depreciation base. It is somewhat analogous to the SYD method.

The above-mentioned depreciation methods are sometimes termed **time methods**, based on the expected service life (usable life). However, for depreciating fixed assets, the **units-of-output method** may also be used.

### The units-of-output method

This method is used for fixed assets, whose wear and tear degree is dependent on the degree of its actual use, on its output volume and how this is distributed throughout the time of its operation (in case of e.g. manufacturing equipment, means of transport etc.).

The knowledge of general methods of depreciation of fixed assets is useful in current economic practice in the field of book depreciations.

## Book Depreciations

(by ACCOUNTING ACT, Act No. 563/1991 Coll. on Accountancy)

Tangible and intangible fixed assets (or their parts) are written off based on the depreciation plan by means of book depreciations:

* **subject to depreciation** are tangible and intangible fixed assets (or their parts);
* **not subject to depreciation** are land and other assets (or their parts) defined by special regulations (e.g. assets considered essential for national defence etc.);
* Accounting units shall draw up their **depreciation plan**; on its basis assets shall be gradually written off during their use. Each asset can be written off only up to the assets valuation in the books of account. Accounting units **themselves determine the methods of depreciation** as part of the depreciation plan.

Determining book depreciations:

* book depreciations are calculated from the value, at which the assets are assessed in the accounting (**initial value** – acquisition price, replacement acquisition price or own costs), and that **only up to its full amount**;
* the entrepreneur **may**, in depreciation of assets, **take into account** the expected positive **final value** (*FV* = *Vliquid* – *Cliquid*), in accounting, this value is termed expected salvage value;
* book depreciation **rates** (the course of use) are determined by the entrepreneur based on e.g. the time, usable life, or in relation to output (in case of e.g. means of transport);
* **the residual value** is ascertained by means of accumulated depreciation of tangible and intangible assets determined in accordance with book depreciations;
* depreciations are rounded up to the crown.

## Tax Write-Offs

(by Act No 586/1992 Coll. Income Tax Law).

Write-offs are made from **tangible or intangible assets**.

### Depreciable Tangible Assets

As **tangible assets** are considered the following:

* Equipment with separate technical-economic purpose, whose input cost (initial value) is higher than 40 000 CZK and its Useful Life longer than 1 year,
* Stationary buildings and Constructions,
* Perennial crops with productivity period longer than 3 years,
* Breeding and draught animals, whose input cost is higher than 40 000 CZK,
* Other tangible fixed assets:
* e.g. technical improvements (building alterations, reconstruction, modernization),

**Write-offs** are defined asincluding depreciation of tangible assets in expenditures (costs) for the purpose of determining the income tax base.

Tangible assets are **written off by the depreciator,** (always only a single taxpayer).

As the **input cost** (initial value) of tangible assets is considered the following:

* acquisition price – if the assets are acquired against payment,
* own costs – if the assets are acquired or manufactured by the company itself,
* replacement acquisition price (determined according to special regulations or by court-appointed expert) – in remaining cases.

**The residual value** (**The balance of the value)** is defined as the differencebetween the input cost of tangible assets and the amount of total depreciation of these assets.

**Increased input cost** and **increased residual value** – if the cost of technical improvements (e.g. modernization) is not written-off independently by the lessee, these improvements increase

* input cost = increased input cost and
* residual value = increased residual value.

**Determining depreciation of tangible assets**

* In the first year of depreciation the entrepreneur classifies tangible assets into depreciation groups (see the annex to the Income Tax Act); the depreciation period is at least:

|  |  |
| --- | --- |
| Depreciation group | Depreciation period |
| 1 | 3 years |
| 2 | 5 years |
| 3 | 10 years |
| 4 | 20 years |
| 5 | 30 years |
| 6 | 50 years |

* The entrepreneur does either **straight-line** or **accelerated** **depreciation**. The form of depreciation is set for each newly acquired tangible asset and **cannot be changed** throughout the whole depreciation period.
* Tangible assets can be depreciated only up to maximum of the full input cost (initial value) or the increased input cost.

**Straight-line depreciation**

* For the purpose of straight-line depreciation of tangible assets, the following maximum annual depreciation rates are assigned to the respective depreciation groups:

|  |  |
| --- | --- |
|  | Annual depreciation rate |
| Depreciation group | for the first year  | for subsequent years | for increased |
|  | of depreciation | of depreciation | input cost |
| 1 | 20 | 40 | 33,3 |
| 2 | 11 | 22,25 | 20 |
| 3 | 5,5 | 10,5 | 10 |
| 4 | 2,15 | 5,15 | 5,0 |
| 5 | 1,4 | 3,4 | 3,4 |
| 6 | 1,02 | 2,02 | 2 |

* If certain conditions specified by the Income Tax Law are met, an entrepreneur may increase the depreciation in the first year of depreciation by applying the annual depreciation rates specified for this purpose in the same Act (An entrepreneur whose business is predominantly agriculture or forestry, who is first owner (or depreciator) of an agricultural or forestry machine (CZ-CPA 28.3), may increase the depreciation in the first year of depreciation by 20 %; An entrepreneur who is first owner (or depreciator) of a water purification and treatment equipment (CZ-CPA 28.29.12), may increase the depreciation in the first year of depreciation by 15 %; An entrepreneur who is first owner (or depreciator) of tangible assets classified within depreciation groups 1 to 3 (with some exhaustively listed exceptions) may increase the depreciation in the first year of depreciation by 10 %).
* The annual depreciation is set at one hundredth of the product of the input cost and the assigned annual depreciation rate; The entrepreneur may, at his discretion, apply rates lower than the maximum ones.
* The annual depreciation for increased input cost is set at one hundredth of the product of the increased input cost and the assigned annual depreciation rate applicable for increased input cost.
* Annual depreciations are rounded up to the crown.

**Accelerated depreciation**

* For the purpose of accelerated depreciation of tangible assets, the following accelerated depreciation coefficients are assigned to the respective depreciation groups:

|  |  |
| --- | --- |
|  | Accelerated depreciation coefficient |
| Depreciation group | for the first year | for subsequent years | for increased |
|  | of depreciation | of depreciation | residual value |
| 1 | 3 | 4 | 3 |
| 2 | 5 | 6 | 5 |
| 3 | 10 | 11 | 10 |
| 4 | 20 | 21 | 20 |
| 5 | 30 | 31 | 30 |
| 6 | 50 | 51 | 50 |

* Annual depreciation is determined:
* **In the first year** of depreciation as the quotient of the input cost and the assigned accelerated depreciation coefficient applicable in the first year of depreciation;
* an entrepreneur, who is first owner (or depreciator), may increase this depreciation in the first year:
* by 20 % of input cost of an agricultural or forestry machine (CZ-CPA 28.3), this applies only if the entrepreneur’s business is predominantly agriculture or forestry;
* by 15 % of input cost of a water purification and treatment equipment (CZ-CPA 28.29.12);
* by 10 % of input cost of tangible assets classified within depreciation groups 1 to 3 (with some exhaustively listed exceptions);
* **in subsequent years** of depreciation as the quotient of double the residual value and the difference between the assigned accelerated depreciation coefficient applicable in subsequent years of depreciation and the number of years over which it was already depreciated.
* The annual depreciation for the increased residual value (resulting from technical improvements) is determined:
* in the year of increase of residual value as the quotient of double the respective increased residual value and the assigned accelerated depreciation coefficient applicable for increased residual value;
* in subsequent years as the quotient of double the residual value and the difference between the assigned accelerated depreciation coefficient applicable for increased residual value and the number of years over which it was already depreciated based on the increased residual value.
* Annual depreciations are rounded up to the crown.

Some examples selected from the Annex No. 1 to the Act No. 586/1992 Coll., Income Tax Law.

**Classification of tangible assets into depreciation groups**

|  |  |  |
| --- | --- | --- |
| Item | CZ-CPA(CZ-CC) | Name |
| Depreciation group 1 |
| (1-1) | 01.4 | Live animals and animal products |
| (1-2) | 01.4.1 | Dairy cattle, live |
| (1-23) | 28.23 | Office machinery and equipment (except computers and peripheral equipment) |
| (1-24) | 28.24 | Power-driven hand tools |
| Depreciation group 2 |
| (2-45) | 28.25.13 | Refrigeration and freezing equipment and heat pumps, except household type equipment |
| (2-53) | 28.29.50 | Dish washing machines, of the industrial type |
| (2-56) | 28.4 | Metal forming machinery and machine tools |
| (2-65) | 29.10.4 | Motor vehicles for the transport of goods |
| Depreciation group 3 |
| (3-41) | 30.11 | Ships and floating structures |
| (3-42) | 30.20 | Railway locomotives and rolling stock |
| etc. |

### Depreciable Intangible Assets

**Subject to depreciation are the following intangible assets** (basically fixed intangible assets):

* Research and development,
* Software,
* Valuable rights and Other intangible assets;

provided that

1. they were:
* acquired against payment, as a contribution by a partner, a silent partner or a co-operative member, by conversion, donation or inheritance, or
* created by own activity;
1. their input cost is higher than 60 000 CZK and
2. their usable life is longer than 1 year.

Intangible assets are depreciated **straight-line** and **without interruption**, namely:

* audio-visual work 9 months,
* Software and Research and development 18 months,
* Other intangible assets 36 months.

Depreciations are determined with accuracy in months; they are rounded up to the crown.

## Examples

### Solved example

The acquisition price of a newly acquired machine tool is 1 250 000 CZK; the entrepreneur did not use the option to increase depreciation in the first year of depreciation.

Assignment:

1. classify this tangible asset into the corresponding depreciation group;
2. draw up a depreciation plan for a straight-line depreciation;
3. draw up a depreciation plan for an accelerated depreciation.

Solution:

a) depreciation group: 2 depreciation period: 5 years

b) and c) depreciation plan:

|  |  |  |
| --- | --- | --- |
| Year | b) for straight-line depreciation | c) for accelerated depreciation |
|  | Annual depreciation in CZK | Residual value in CZK | Annual depreciation in CZK | Residual value in CZK |
| 1 | 137 500 | 1 112 500 | 250 000 | 1 000 000 |
| 2 | 278 125 | 834 375 | 400 000 | 600 000 |
| 3 | 278 125 | 556 250 | 300 000 | 300 000 |
| 4 | 278 125 | 278 125  | 200 000 | 100 000 |
| 5 | 278 125 | 0 |  100 000 | 0 |

 

 

  etc.

### Example to practice

The acquisition price of a newly acquired refrigerating equipment is 3 000 000 CZK.

Assignment:

a) for the purpose of tax write-offs, classify this tangible asset into the corresponding depreciation group;

b) draw up a depreciation plan for a straight-line depreciation;

c) draw up a depreciation plan for an accelerated depreciation;

Solution:

a) depreciation group: depreciation period:

b) and c) depreciation plan:

|  |  |  |
| --- | --- | --- |
| Year | b) for straight-line depreciation | c) for accelerated depreciation |
|  | Annual depreciation in CZK | Residual value in CZK | Annual depreciation in CZK | Residual value in CZK |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

# Capital structure, The Cost of capital

Companies have essentially two sources of capital. One is equity, which they get from shareholders (the members of company) and the other is loans from lenders. The companies choose the structure of these sources such that the cost of their use is minimal.

**The starting point for the company’s decision-making is the analysis of source structure in terms of Return on Equity achieved.**

Using debt capital increases the profitability of the enterprise because debt is generally less expensive than equity. Two factors are at work here:

* profit shares (dividends) demanded by the entrepreneurs (partners, shareholders, members) for a higher risk involved in putting money into an enterprise as opposed to risk-free depositing of money in a bank, are higher than interest;
* interest on debt capital counts as costs. The fact that interest on debt is deductible for tax purposes results in the interest cost being reduced by the amount of taxes saved. This is the so-called „Tax Shield “from using debt capital (e.g. credit).

**Using debt capital** therefore **increases Return on Equity (ROE)** both by

* the „Tax Shield “,
* and by using cheaper debt capital.

 ;

where: *ROE* –Return on Equity in %,

 *EAT* –Earnings After Taxes in CZK,

 *E* – Equity in CZK.

**Using debt capital is advantageous to the company** (by increasing Return on Equity), if the **Return on Assets (ROA), evaluated based on Earning before Interest and Taxes (EBIT), is higher than the Tax Cost of Debt**.

 ;

where: *ROA* –Return on Assets in %,

*EBIT* –Earnings Before Interest and Taxes in CZK,

 *A* – Assets in CZK.

If we denote by *rd* the interest rate on credit in %, then:

 - using debt capital is advantageous to the company, increases ROE,

 - using debt capital is disadvantageous to the company, decreases ROE,

 - using debt capital means no difference to the company, it has no influence on ROE.

## Optimal capital structure

The traditional approach to capital structure implies that the cost of capital is dependent on the capital structure of the firm. Optimal capital structure can generally be determined as **minimum Weighted Average Cost of Capital (WACC)**.

  ;

Where: *rd* – After-Tax Cost of Debt in % (Tax Rate),

 *re* – Costs of Equity in % (required ROE),

 *t* – Tax Rate (rate of the income tax of legal person– coefficient),

 *E* – Equity in CZK (respectively market value Equity),

 *D* – Debt (interest-bearing Debt) in CZK (respectively market value of debt outstanding)

 *C* – Capital, total in CZK, the relationship applies *C = E + D*,

Costs of Equity (*re*):

a) a joint-stock company: b) other enterprises:

  ;  .

**Capital costs and the traditional approach to capital structure**

 *re*

Capital

Costs (%) 

 WACC

 Debt ratio (Financial leverage) in %

## Optimal Debt Structure

Equally important as

maintaining optimal balance between equity and debt capital,

is also maintaining optimal balance between long-term and short-term sources (source structure) of long-term and short-term capital (especially of long-term and short-term debt capital).

Short-term debt capital is cheaper than long-term debt capital.

**Short-term debt capital** should be used only for financing **liquid assets**, these are mainly money, debts due, or finished products, i.e. assets which can be used to repay these short-term debts (short-term debt capital) quickly and without loss.

**Long-Term Capital** (Long-term Debt and Equity) should cover **Fixed Assets** and permanently locked-up Current Assets.

Using long-term debt capital for financing short-term assets is **inefficient**.

Using short-term debt capital for financing fixed assets, in turn, carries a **high risk**.

Surplus of Current Assets over Short-term Debt (current liabilities) is called **Net Working Capital** – NWC. It can also be defined as the part of current assets being financed by long-term sources. Net Working Capital represents the amount of free resources available to the company after all current liabilities had been settled. It is desirable that it be kept directly in the form of money. A satisfactory amount of Net Working Capital is one of the signs of a good financial situation of the company.

If Short-term Debt becomes higher than Current Assets – which is utterly undesirable, a so-called **Flowing Debt** ensues.

Representation:

Fixed Assets

Current Assets

**Net Working Capital**

Equity

Long-term Debt

Short-term Debt

Long-term Capital

Short-term Capital

In practice, it is very difficult to choose the optimal level of indebtedness or the optimal debt structure.

**In general**: borrowed money helps make more money; but if too much money is borrowed, financial risk increases.

**Optimization of company’s capital structure** lies inmutualbalancing of two factors – Profitability and Risk – so that best results are achieved.

## Examples

### Solved example

Companies have essentially two sources of capital. One is equity, which they get from shareholders (the members of company) and the other is loans from lenders. The companies choose the structure of these sources such that the cost of their use is minimal.

**The starting point for the company’s decision-making is the analysis of source structure in terms of Return on Equity achieved.**

Calculate Return on Equity based on these assumptions:

* total capital of company A (in thousands CZK) is 2 000 and is constituted only by equity;
* total capital of company B (in thousands of CZK) is also 2 000, out of which 1 000 is represented by debt capital with an interest rate of 10 %;
* property (in thousands of CZK) of both company A and B is therefore 2 000;
* profit of both companies before tax and interest payments is the same - 400 thous. CZK; the income (profits) tax rate is 19 %.

|  |  |  |
| --- | --- | --- |
| Ratio | Enterprise A | Enterprise B |
| Assets (Property) | 2 000 | 2 000 |
| Capital | 2 000 | 2 000 |
| Equity | 2 000 | 1 000 |
| Debt | 0 | 1 000 |
| Earning before Interest and Taxes (EBIT) | 400 | 400 |
| Interest (Interest rate 10 %) | 0 | 100 |
| Earning before Taxes (EBT) | 400 | 300 |
| Income Tax (Tax rate 19 %) | 76 | 57 |
| Earning after Taxes (EAT) | 324 | 243 |
| ROE – Return on Equity (in %) | 16,2 | 24,3 |
| ROA – Return on Assets (in %) | 20,0 | 20,0 |

Assessment:

* Using debt capital increases ROE (24,3 % with the use of debt capital –company B; 16,2 % with the use of equity only – company A).
* As the interest rate is only 10 % and is lower than ROA – 20 %, the difference, i.e. 10 %, goes to the profit of company’s owners, the entrepreneurs; therefore, the use of debt capital increases ROE for the company B.

### Example to practice

At what amount of expected sales it becomes more advantageous for the company to use only equity, and when is it, on the contrary, more advantageous to borrow? Form your answer based on the following assignment using the Return on Equity criterion:

|  |  |  |
| --- | --- | --- |
| Ratio | Enterprise X | Enterprise Y |
| Assets (thousand CZK) | 2 000 | 2 000 |
| Sales ((thousand CZK) – lower a) | 1 000 | 1 000 |
|  - average b) | 1 500 | 1 500 |
|  - higher c) | 2 000 | 2 000 |
| Earning before Interest and Taxes (EBIT) | 20 % from sales | 20 % from sales |
| Interest | 15 % from Credit | 15 % from Credit |
| Tax rate | 19 % from Earning | 19 % from Earning |
| Credit (thousand CZK) | 0 | 1 000 |
| Equity (thousand CZK) | 2 000 | 1 000 |

Solution:

|  |  |  |  |
| --- | --- | --- | --- |
| Enterprise X | Sales a) | Sales b) | Sales c) |
| Capital |  |  |  |
| Equity |  |  |  |
| Debt |  |  |  |
| Earning before Interest and Taxes (EBIT) |  |  |  |
| Interest (Interest rate 15 %) |  |  |  |
| Earning before Taxes (EBT) |  |  |  |
| Tax rate (19 %) |  |  |  |
| Earning after Taxes (EAT) |  |  |  |
| Return on Equity - ROE, in % |  |  |  |
| Return on Assets - ROA, v % |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Enterprise Y | Sales a) | Sales b) | Sales c) |
| Capital |  |  |  |
| Equity |  |  |  |
| Debt |  |  |  |
| Earning before Interest and Taxes (EBIT) |  |  |  |
| Interest (Interest rate 15 %) |  |  |  |
| Earning before Taxes (EBT) |  |  |  |
| Tax rate (19 %) |  |  |  |
| Earning after Taxes (EAT) |  |  |  |
| Return on Equity - ROE, in % |  |  |  |
| Return on Assets - ROA, v % |  |  |  |

Assessment:

## Working Capital

Equally important as

* maintaining optimal balance between equity and debt capital,
* is also maintaining optimal balance between long-term and short-term sources (source structure) of long-term and short-term capital (especially of long-term and short-term debt capital).

Short-term debt capital is cheaper than long-term debt capital.

Short-term debt capital should be used only for financing liquid assets, these are mainly money, debts due, or finished products, i.e. assets which can be used to repay these short-term debts (short-term debt capital) quickly and without loss.

Long-Term Capital (Long-term Debt and Equity) should cover Fixed Assets and permanently locked-up Current Assets.

* Using long-term debt capital for financing short-term assets is inefficient.
* Using short-term debt capital for financing fixed assets, in turn, carries a high risk.

Surplus of Current Assets over Short-term Debt (current liabilities) is called Net Working Capital – NWC. It can also be defined as the part of current assets being financed by long-term sources. Net Working Capital represents the amount of free resources available to the company after all current liabilities had been settled. It is desirable that it be kept directly in the form of money. A satisfactory amount of Net Working Capital is one of the signs of a good financial situation of the company.

If Short-term Debt becomes higher than Current Assets – which is utterly undesirable, a so-called Flowing Debt ensues.

### Net working capital - various approaches

We assume that with its fixed assets and production capacity the company can manufacture

10,000 units (for instance, wheel disks) per year. The company may have a different level of circulating assets to secure production

From the viewpoint of company liquidity (capability to meet obligations)

Approach A is conservative (the most conservative of all the three variants) - it has the highest OM level as compared with approaches B and C. Approach C will have the lowest liquidity. It is an aggressive approach (with a minimum OM level that is only necessary to secure production).

From the viewpoint of profitability

It is clear from the formula that the lower OM level (shift of approach A to approach C) shall increase potential profitability. Approach C has the highest ROA. A more aggressive circulating capital policy shall lead to higher profit.

From the viewpoint of risk

The shift from approach A (conservative) to approach C (aggressive) means:

– Reduced cash flow (short-term financial assets

– Reduced receivables (strict observance of the maturity – consequence of loss of suppliers

– Reduced inventories may result in lower sales revenues.

A more aggressive approach to the management of working capital shall lead to higher risk.

Profitability develops inversely to liquidity.

Higher profitability brings a higher risk.

**The optimal level of circulating assets (respectively, NWC) is determined by the approach of the management and balancing of profitability and risk.**

# COSTING

## Basic Terms

Calculating costs belongs to basic tools of company’s internal control. Its function is:

* **to ascertain costs** already incurred with specific outputs (**Actual Costing**) or
* **determine costs** of specific outputs planned for the following period (**Preliminary Costing)**.

**Costing Object** means determining or ascertaining costs of:

* company’s outputs (sales outputs), i.e. products, works and services destined for implementation, or
* internal outputs, i.e. outputs destined for internal company needs.

**Costing** – is a method of calculating costs per unit of output (i.e. per unit of product, work or service).

A company uses costing:

* as a criterion for setting an acceptable limit on the market price,
* for valuation of assets created by own activity,
* for controlling and assessing its economy of operation etc.

**Output** (**calculated output**) – means individual kinds of products, works or services.

For the purpose of performing costing it is necessary to ascertain:

* the costs themselves, but also
* the output of products, works or services

from the purposive point of view according to individual sectors of activity – outputs.

**Cost Units** – are physical units, by means of which calculated outputs (products, works or services) are expressed, i.e. e.g. kg, l, pcs, t, tkm, but also e.g. motor vehicle, engine, piston, certain operations – e.g. polishing of cylinders.

Cost Unit expresses an output (a product, service, good etc. or their parts or assemblages) delimited by number, time or other quantity.

**Costing Scheme** – costs are calculated according to a certain model, called the costing scheme. The costing scheme determines, what should be the structure of cost units in which costs of individual outputs are to be ascertained.

Structuring cost units inside the costing scheme is supposed to create a basis for both planning and analysis of costs with regard to most important cost types and also to in-company relationships.

The structure of costing scheme is therefore usually based on a combined classification (structuring) of costs:

* from a costing point of view (distinguishing direct and indirect costs);
* according to types (this allows us to monitor the most important cost types); and
* according to production turnover (distinguishing primary – external costs and secondary – internal costs for the purpose of analysing in-company relationships).

**Costing Scheme**:

1. Direct material
2. Direct wages
3. Semi-finished products of own production
4. Other direct costs
5. Production overhead

Production costing *= total of items 1 to 5*

1. Administrative overhead

Costing of output *= total of items 1 to 6*

1. Sale cost

Total Costing of output *= total of items 1 to 7*

for **Price Costing**:

1. Profit

Production price *= total of items 1 to 8*

1. Business and sales charges and deductions

Sale price *= total of items 1 to 9*

There are two basic groups of costs included in the costing scheme, namely:

* **Direct Costs** (Cost Units), directly assigned to individual outputs (individual kinds of products etc.) and
* **Indirect Costs** (Overhead Costs), which are jointly expended on more outputs (more kinds of products etc.) or to ensure the operation of the whole company.

Indirect costs are assigned to individual outputs indirectly by means of charges according to a certain key (see the following).

## Types of Costing According to the Period (Time) of its Being Performed

**With respect to period (time)**, in which costing is performed, we distinguish:

Preliminary Costing,

Actual Costing.

***Preliminary Costing*** – is calculated before beginning production and thus it serves to limit costs. The purpose of preliminary costing is to create pressure towards lowering costs. There are two basic forms of it, namely:

Standard costing or

Estimate Costing.

 **Standard costing** relies on specific standards; according to which standards are used, we further distinguish between:

**Operational Costing**, which is calculated based on operational standards, i.e. standards current at the time of costing (standards for consumption of direct material, labour, or standards and charging rates set on other direct cost items, and also standards and charging rates (charges) of indirect costs); It is used for production and operations management.

**Plan Costing**, which is calculated based on plan standards (standards for consumption of direct material, labour, or standards and charging rates set on other direct cost items, and standards or charging rates (charges) of indirect costs concerning technology and other production conditions during the relevant period); It is used for production planning.

**Estimate Costing** is calculatedbased on the data from Standard costing or Actual Costing comparable outputs or their parts. Estimate Costing finds use wherever standards either do not exist or had not been set up – e.g. in case of new products. With it, costs can be determined only approximately.

***Actual Costing*** – is calculated only after production had ended and reflects the real state of things.

During Actual Costing,the actual amount of sums of cost units of finished outputs per cost unit is ascertained.

## The Procedure for Costing

Costing is (since 1. 1. 1993), as to both its extent and definition of contents, solely an affair of individual companies. The company itself determines how to perform costing, for which outputs etc.

For **Actual costing,** the company draws on the internal accounts. Costing accounting represents a deepening of internal accounting through monitoring costs in relation to individual outputs.

For **Preliminary costing** the company draws on technical and economic standards, namely

* on current (operational) standards for operational costing,
* on plan standards for plan costing.

**The procedure for costing** is as follows:

1. determining calculated outputs and cost units, defining costing scheme;
2. calculation of direct costs;
3. calculation of indirect overhead costs;
4. calculation of costs per cost unit.

## Examples

### Solved example

Perform preliminary costing for a product, where the standard for consumption of direct material is 50 CZK and the standard for direct labour is 30 CZK per 1 piece. Production overhead is determined based on direct material, administrative overhead based on direct labour. Planned annual consumption volume of direct material for the plant, where our product is manufactured, is 5 000 000 CZK, planned annual volume of direct labour for the company is 4 000 000 CZK. Annual budget of production overhead for our plant is 1 100 000 CZK, the administrative overhead budget is 1 200 000 CZK.

Assignment:

1. Calculate:
* Burden rate (in %) Production and Administrative overhead, and
* the ratio of Production and Administrative overhead per unit of allocation basis;
1. Perform Preliminary costing and determine the Production price, assuming that the company uses cost-oriented formation of prices with a mark-up set at 25 % from total costs.

Solution:

1. Production overhead:



Administrative overhead:



Preliminary costing:

|  |  |
| --- | --- |
| Costing item | in CZK per 1 pc |
| 1. Direct material | 50,00 |
| 2. Direct labour | 30,00 |
| 3. Production overhead (22 % from 50, or 0,22 . 50) | 11,00 |
| Production costing | 91,00 |
| 4. Administrative overhead (30 % from 30, or 0,30 . 30) | 9,00 |
| Costing of output | 100,00 |
| 5. Profit (25 % from 100) | 25,00 |
| Production price | 125,00 |

### Example to practice

A textile manufacturing company’s annual budget of production overhead for its main production is 2 604 000 CZK. The administrative overhead has an annual budget (allotted to main production) of 1 736 000 CZK. The annual volume of planned direct labour is 2 480 000 CZK.

The cloth being produced in January has a standard for consumption of yarn set at 300 g per 1 m (a regular metre, 1,40 m wide), the yarn being priced at 120 CZK per 1 kg. The standard for direct labour of weavers and other production workers is 5,00 CZK per 1 m of cloth.

Assignment:

1. Calculate:
* Burden rate (in %) Production and Administrative overhead, and
* the ratio of Production and Administrative overhead per unit of allocation basis

using Direct labour for Allocation Basis.

1. Calculate Preliminary costing per 1 m of cloth.

Solution:

1. Overhead rate (in %) – Production overhead:

 - Administrative overhead:

ratio of overhead per l CZK of direct labour - production:

 - administrative:

1. Preliminary costing per 1 m of cloth:

|  |  |
| --- | --- |
| Costing item | in CZK per 1 m |
| 1. Direct material |  |
| 2. Direct labour |  |
| 3. Production overhead |  |
| Production costing |  |
| 4. Administrative overhead |  |
| Costing of output |  |

# COST FUNCTIONS

Cost Functions (CF) express relationship between

* costs (dependent variable) and
* production volume, (independent variable);

  ;

where: *TC* – costs in monetary terms,

 *Q* – production volume in natural units.

We distinguish:

* Short-term Cost Function and
* Long-term Cost Function.

## Basic Characteristics of a Cost Function

**Basic characteristics** of a Short-term Cost Function are:

* Total Costs,
* Average Costs,
* Marginal Costs.

### Total Costs (TC )

Total Costs are all cost expended on the total volume of output (they are given by the values of a cost function).

Cost Classification by Behaviour:

* Fixed Costs,
* Variable Costs.

**Fixed Costs** (FC):

* Are costs that do not change with output;
* For example: the interest being paid on a debt, rent on facilities, and so on.

**Variable Costs** (VC):

* do vary with the level of output;
* for example: the cost of materials and components used in providing the product would increase as more is produced, and so on.

Variable Costs may change in different ways; we distinguish the following types of Variable Costs :

* **Variable Costs linear**– VCl – change in direct proportion to production volume,
* **Variable Costs progressive** – VCp – grow faster than production volume (if the law of diminishing returns is at work in the enterprise),
* **Variable Costs degressive** – VCd – grow slower than production volume (e.g. after starting mass production).

The most common development pattern of Variable Costs in an enterprise is the combined behaviour, the **degressive-progressive** behaviour.

* *Total cost = Fixed cost + Variable cost*

*TC = FC + VC*

### Average Costs (AC)

* provides a measure of variable costs on a per-unit basis;
* is defined as variable cost (VC) divided by the number of units of output:

 .

Average cost = Average fixed costs + Average variable costs

 *AC = AFC + AVC*

**Average Variable Costs** – these can be:

* Average Variable Costs linear– AVCl – do not change with production growth,
* Average Variable Costs progressive – AVCp – grow with growing production volume,
* Average Variable Costs degressive – AVCd – decrease with growing production volume.

**Average Fixed Cost** – AFC – will continually fall as more units are produced. This is because the fixed costs can be „shared out“ over more units.

**Average Costs** – AC – their development depends on the ratio of individual cost types. If total costs are composed of fixed costs and variable costs of the degressive-progressive type, the course of development of Average Costs first enters

* the **sphere of degression** – mainly due to initial fast decline in Average Fixed Costs, and later
* the **sphere of progression** – the decline in Average Fixed Costs slows down while Average Variable Costs grow ever faster.

### Marginal Costs – MC

Is the extra cost of producing another unit (the cost of producing an additional unit of output):

    .

Marginal cost is simply the derivative of the cost function.

Marginal Costs imply change in costs, therefore they can be tracked only

* in case of Variable Costs,
* in case of Total Costs composed of both Fixed and Variable Costs.

##  Cost Function and Break-Even Analysis

A technique for studying the relationship among fixed costs, variable costs, sales volume, price and profits. It is also called cost/volume/profit (C/V/P) analysis.

*Q* – Quantity produced and sold, (in natural units),

*p* – price (price per pc.),

*TR* –Total Revenue; we assume that everything produced is also sold,

*FC* – Fixed costs (their volume),

*AVC* – Average Variable Costs,

*TC* – Total Costs.

The Break-Even Point analysis allows to determine primarily:

* at what minimum production volume the production becomes profitable,
* at what production volume the enterprise starts showing a profit etc.

### The Break-Even Point at constant price and linear development of costs

In managerial calculations, we usually assume this situation, i.e. constant price and linear development of variable costs. Relations are first examined in case of producing **products of the same kind**.

* Total Revenue – *TR* at constant price the following relation applies:



* Total Costs (*TC*) at linear development of Variable Costs the following relation applies:



* It further applies that (*Z*) is the difference between Revenues and Costs:



From this follows that profit is realized when *TR > TC*; when *TR < TC*, a loss ensues.

A breakeven quantity is a zero profit activity level. At breakeven quantity levels, total revenue (*TR = p . Q*) equals total cost *(TC = FC + AVCl . Q)*:

 

 

 

where: *Q*(*BEP*) – **Break-Even Point.**

 *p – AVCl*, **Profit contribution** (Contribution Margin, Unit Contribution margin) equals price minus average variable cost. Profit contribution can be applied to cover fixed costs and then to provide profits.

**Linear Cost-Volume-Profit Chart:**

 *TR*

Total revenues

 Total costs

 (TR, TC) profit

 *TC*

 loss

 *Q(BEP)*

 *Q(BEP)* Quantity- units (Q)

The intersection of the total cost line with the total revenues line determines the break-even point.

After the Break-Even Point is reached, profit arises; the profit becomes higher – at constant price and linear development of costs – the more products are produced and sold.

**Critical use of production capacity (in %)**:

Critical use of production capacity (*Qp krit*) is determined as the ratio of production volume at the Break-Even Point *Q*(*BEP*) to production capacity (*Qp*):

 

**The Break-Even Point for achieving the desired profit**:

The goal of enterprises is to produce profit, to achieve a certain profit. If we term this desired profit the **minimum profit** (*Zmin*), then the new Break-Even Point, which includes also the generation of this profit *Q*(*Zmin*), can be expressed by the following relation:

  (we proceed from the relation: )

### The Break-Even Point at changing price and non-linear costs

* With rising production (and therefore rising supply), the product’s price decreases.
* With rising production, Variable Costs may grow faster than production volume.

In this situation, there are:

* **two Break-Even Points**

- first Break-Even Point, when production becomes profitable,

- second Break-Even Point, when production again becomes loss-making.

These can be determined easily, if we know the Total Revenue Function (*TR*) and the Total Costs Function (*TC*):

* we determine both Break-Even Points by solving the equality between the Total Revenue Function and the Total Costs Function, i.e. when *TR = TC* .

**The profit-maximizing output:**

 *TC*

Total revenues  *loss*

Total costs *TR*

 *(*TR, TC)

 *profit*

 *loss*

Q(BEP1) Q(BEP2) Quantity- units (Q)

## Example

The company produces one kind of product, whose selling price is 22 CZK per 1 pc. Variable Costs per 1 pc are 14 CZK, annual amount of the company’s fixed costs is 2 800 000 CZK.

Assignment:

1. Determine the Break Even Point.
2. Determine the extent of production, at which the enterprise achieves the desired profit of 800 000 CZK.

# PROFIT AND LOSS AND ITS DISTRIBUTION

The economic result of a company (EBT) is determined as a difference between revenues and costs and it is either profit (+) or loss (-).

The subcategories of the economic result can be expressed analogically:

* the difference between operating revenues and operating expenses gives

Operating profit/loss (+/),

* the difference between financial revenues and financial expenses gives

Profit/Loss from financial operations ( +/- ).

For evaluation of economic result, we use ratio indicators, whose component is the profit; the most widely used ratio indicators are the following:

* Return on Cost - ROS (profit/costs);
* Return on Sales – ROS (profit/sales(revenues));
* Return on Equity – ROE (profit/Equity);
* Return on Assets- ROA (profit/Assets) etc.

Our accounting system distinguishes among different profit levels, which must be transformed so as to correspond to the profit categories used in financial analysis.

Profit categories:

– Earnings Before Interest and Taxes (EBIT),

– Earnings Before Taxes (EBT),

– Earnings After Taxes (EAT),

– Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA).

Profit/Loss after tax (Profit/Loss of current accounting period +/-)

EAT (Earnings After Taxes)

+ Income tax

= Profit/Loss before tax (+/-)

EBT (Earnings Before Taxes)

+ Interest expenses

= Profit/Loss Before Interest and Taxes

EBIT (Earnings Before Interest and Taxes)

+ Value adjustments of intangible and tangible fixed assets – permanent = Depreciation

= Profit/Loss Before Interest, Taxes Depreciation and Amortization

EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization)

## Example to practice

Based on the data from the PROFIT/LOSS ACCOUNT for 31. 12., ascertain the basic categories of economic result (profit), including the missing figures in the PROFIT/LOSS ACCOUNT. The Profit/Loss Account is shown on the following two pages.

Solution:

|  |  |  |
| --- | --- | --- |
| Profit category | Current period | Previous period |
| **Profit/Loss - after tax**  |
| EAT Earnings After Taxes +/- (Profit/Loss of current accounting period +/-);  Profit/Loss after tax ( +/- ) |  |  |
| **Profit/Loss - before tax (+/-)**  |
| Operating profit/loss (+/-) |  |  |
| Profit/Loss from financial operations ( +/- ) |  |  |
| EBT Earnings Before Taxes Profit/Loss before tax (+/-)  |  |  |
| Net turnover for the accounting period |  |  |
| EBIT Earnings Before Interest and Taxes Profit/Loss Before Interest and Taxes |  |  |
| EBITDA Earnings Before Interest, Taxes, Depreciation  and Amortization Profit/Loss Before Interest, Taxes Depreciation and Amortization,  |  |  |

|  |
| --- |
|   |
| Minimum compulsory information under Regulation 500/2002 Coll. | **PROFIT/LOSS ACCOUNT** |  | Commercial name or other name of an accounting unit |
| **as at December 31st, 2017** |  |
|   | (in thousands of Czech Crowns) |
|   | **TYPE CLASSIFICATION** | Registered office or address of an accounting unit |
| **IC** |
|   |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Profit/Loss Account | Row | Current | Previous  |
| a | b  |   | period | period |
| c | 1 | 2 |
| I. | **Revenues from the sale of own products and services** | 01 | **39 130** | **37 965** |
| II. | **Revenues from sold goods** | 02 | **193** | **345** |
| A. |   | **Production consumption (r. 04 + 05 + 06)** | 03 |  |  |
| 1. | Expenses on sold goods | 04 | 178 | 314 |
|   | 2. |   | Consumption of material and energy | 05 | **21 534** | **22 179** |
|   | 3. |   | Services | 06 | 0 | 0 |
| B. |   | **Change in inventory of own products (+/-)** | 07 | **0** | **0** |
| C. |   | **Capitalisation (-)** | 08 | **0** | **0** |
| D. |   | **Personal expenses (r. 10 + 11)** | 09 |  |  |
|   | 1. |   | Wages and salaries | 10 | 8 527 | 9 147 |
|   | 2. |   | Social security, health insurance and other expenses (r. 12 + 13) | 11 |  |  |
|   | 2. | 1 | Social security and healt insurance expenses | 12 | 2 900 | 3 110 |
|   | 2. | 2 | Other expenses | 13 | 0 | 0 |
| E. |   | **Value adjustments in the operational area (r. 15 + 18 + 19)** | 14 |  |  |
|   | 1. |   | Value adjustments of intangible and tangible fixed assets (r. 16 + 17 ) | 15 |  |  |
|   | 1. | 1 | Value adjustments of intangible and tangible fixed assets - permanent | 16 | 5 031 | 6 216 |
|   | 1. | 2 | Value adjustments of intangible and tangible fixed assets - temporary | 17 | 0 | 0 |
|   | 2. |   | Stock value adjustments  | 18 | 0 | 0 |
|   | 3. |   | Receivable value adjustments | 19 | 0 | 0 |
| III. | **Other operating revenues (r. 21 + 22 + 23)**  | 20 |  |  |
|   | III. | 1 | Revenues from disposals of fixed assets | 21 | 220 | 419 |
|   |   | 2 | Revenues from disposals of materials | 22 | 0 | 0 |
|   |   | 3 | Other C | 23 | 3 213 | 5 415 |
| F. |   | **Other operating expenses (r. 25 to 29)** | 24 |  |  |
|   | 1. |   | Net book value of sold fixed assets | 25 | 215 | 450 |
|   | 2. |   | Net book value of sold material | 26 | 0 | 0 |
|   | 3. |   | Taxes and fees | 27 | 579 | 566 |
|   | 4. |   | Reserves and complex deferred costs | 28 | 0 | 0 |
|   | 5. |   | Other operating expenses | 29 | 495 | 677 |
| **\*** | **Operating profit/loss (+/-)** | 30 |  |  |
| **(r. 01 + 02 - 03 - 07 - 08 - 09 - 14 + 20 - 24)** |   |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Profit/Loss Account | Row | Current | Previous  |
| a | b  |   | period | period |
| c | 1 | 2 |
| IV. | **Revenues from long-term financial assets – shares (r. 32 + 33)** | 31 |  |  |
|   | IV. | 1 | Revenues from shares – controlled and controlling organizations | 32 | 1 178 | 737 |
|   |   | 2 | Other revenues from shares | 33 | 0 | 0 |
| G. |   |   | **Costs spent for sold shares** | 34 | **85** | **42** |
|   | V. |   | **Revenues from other long-term financial assets (r. 36 + 37)** | 35 |  |  |
|   | V. | 1 | Revenues from other long-term financial assets – controlled and controlling organizations | 36 | 0 | 0 |
|   |   | 2 | Revenues from other long-term financial assets | 37 | 0 | 0 |
| H. |   |   | **Costs related to other fixed financial assets** | 38 | **0** | **0** |
|   | VI. |   | **Interest revenues (r. 40 + 41)** | 39 |  |  |
|   | VI. | 1 | Interest revenues – controlled and controlling organizations | 40 | 48 | 42 |
|   |   | 2 | Other interest revenues | 41 | 0 | 0 |
| I. |   |   | **Value adjustments and reserves in the financial area** | 42 | **0** | **0** |
| J. |   |   | **Interest expenses (r. 44 + 45)** | 43 |  |  |
|   | 1. |   | Interest expenses – controlled and controlling organizations | 44 | 1 754 | 1 048 |
|   | 2. |   | Other interest expenses | 45 | 0 | 0 |
| VII. | **Other financial revenues** | 46 | **12** | **15** |
| K. |   | **Other financial expenses** | 47 | **112** | **96** |
| **\*** | **Profit/Loss from financial operations ( +/- )** | 48 |  |  |
| **(r. 31 - 34 + 35 - 38 + 39 - 42 - 43 +46 - 47)** |   |
| \*\* | **Profit/Loss before tax (+/-) (r. 30 + 48)** | 49 |  |  |
| L. |   | **Income tax (r. 51 + 52)** | 50 |  |  |
|   | 1. |   | Income tax – due tax | 51 | 516 | 219 |
|   | 2. |   | Income tax – tax deferred | 52 | 0 | 0 |
| \*\* | **Profit/Loss after tax ( +/- ) (r. 49 - 50)** | 53 |  |  |
| M. |   | Transfer profit (loss) to partners (+/-) | 54 | 0 | 0 |
| **\*\*\*** | **Profit/Loss of current accounting period (+/-) (r. 53 - 54)** | 55 |  |  |
| \* | **Net turnover for the accounting period = I. + II. + III. + IV. + V. + VI. + VII** | 56 |  |  |

# Supply

Its goal is to ensure that the stock levels and structure of inventory are maintained such as to

* correspond to the company’s needs and
* at the same time respect the criteria for economic efficiency of the company’s activities.

A company must pay proper attention to inventory management, and that for the following reasons:

* inventory locks up a substantial amount of capital (and therefore limits the possibilities of using it elsewhere – e.g. for the development of the enterprise);
* inventory incurs costs for its maintenance, storage etc.;
* on the other hand, inventory has a positive influence on continuity of production and capacity utilization.

The basis for inventory management are inventory standards.

Stock limit expresses the desirable (economically optimal) stock level of specific kinds of material in either physical, temporal, or financial terms.

## Calculating Stock limit

Several methods are used, both in theory and practice, for calculating Stock limit:

* in the case of so-called classical methods, the basic criterion is minimizing stock levels,
* in the case of optimization methods, the basic criterion is minimizing total costs of acquiring and maintaining inventories.

Under market conditions, an optimization approach using the cost criterion is considered basic:

* current and safety stock inventory levels are maintained such as to minimize total costs of acquiring, holding and maintaining inventories and the costs incurred from non-coverage (or delayed coverage) of supply needs for production;
* it is, however, necessary to also take into account changes in delivery conditions with respect to different stock-replenishment modes, also eventual price abatements (discounts) related to the size of delivery, or price surcharge for purchasing less than the set minimum; similarly, it is necessary to consider delivery periods etc.

There is a large number of different optimization methods, but all are commonly based on calculating the order quantity.

Therefore one of approaches to minimizing supply costs without interfering with continuous production operation, is Optimal Order Quantity.

### The Economic Order Quantity (EOQ)

**The economic order quantity (EOQ)** is a model that is used to calculate the optimal quantity that can be purchased or produced to minimize the cost of both the carrying inventory and the processing of purchase orders or production set-ups. The economic order quantity (EOQ) can be expressed according to the following relationship (Harris- Wilson EOQ Model):

 ;

where:

 *Do* – Optimal Order Quantity in natural units (the optimal quantity to minimize the cost of both the carrying inventory and the processing of purchase orders),

 *NM* – Annual demand of material in natural units,

 *Nd* – fixed cost per order or the ordering cost (procurement costs),

 *Ns* – inventory holding cost per unit in CZK for the planning period (year).

### The length of delivery cycle

**The length of delivery cycle**, which corresponds to the Optimal Order Quantity, is subsequently expressed according to the following relationship:

 ;

where: *td* – length of the delivery cycle (in the given case the optimal length of delivery cycle) in days,

 *T* – length of the planning period in days.

### Total Inventory costs

Total Inventory costs are expressed according to the following relationship:

 ;

where: *Nc* – Total Inventory costs in CZK, i.e. costs of securing deliveries, holding and maintaining stocks incurred in overall acquisition of material during the planning period (e.g. a year).

**Development of supply costs in proportion to changes in number and quantity of orders**

 (the chart characterizes the main factors influencing the Optimal Order Quantity)

total inventory costs

 **costs**

 **(CZK)**

fixed cost per order

inventory holding cost per unit

 the number of orders in proportion to quantity

 (the higher the number, the smaller the quantity)

### Stock limit

The basic inventory standard is composed of current stock and safety stock.

* **Current standard** – means that part of stock, which covers material consumption in the period between two regular deliveries. Its stock level therefore fluctuates during the delivery cycle between the minimum (or safety) stock level (immediately before receiving a delivery) and the maximum stock level (immediately after the delivery); It is most commonly expressed as the Average Current standard, which equals half the order quantity.
* **Safety stock** is primarily supposed to cover deviations in consumption, order quantity and the length of delivery cycle. It may be ascertained by various methods; However, the basic method of calculating safety stock is most commonly based on the number of days necessary for acquiring the needed material (from placing an order to releasing for consumption). A quantity of safety stock expressed in days so ascertained is subsequently converted into the quantity of safety stock expressed in natural units using the average daily consumption.

Stock limit for a given material is then expressed according to the following relationship:

 ;

where: *NZ* – Stock limit in natural units,

 *bz* – Current standard in natural units,

 *pz* – Safety stock in natural units,

 *Do* – Optimal Order Quantity in natural units,

 *tpz* – Safety stock period in days,

 *Md* – average daily material consumption in natural units.

## Examples

### Solved example

The expected annual material consumption (= Annual demand of material in natural units) is 2 500 t, fixed cost per order is 50 000 CZK, inventory holding cost per unit is 1 000 CZK per 1 ton per year. The price per l ton is 80 000 CZK.

Assignment:

Calculate the Optimal Order Quantity, optimal delivery cycle and Total Inventory costs .

Solution:

* Optimal Order Quantity:

 ;

Optimal Order Quantity is 500 tons of material.

* Optimal delivery cycle:

 ;

Optimal Delivery Cycle (the period between two regular deliveries) is 73 days.

* Total Inventory costs:

;

* Total Inventory costs are 500 000 CZK per year and under the given circumstances these represent the minimum costs for the company.

### Example to practice

The expected annual material consumption (material consumption = purchase of material) is 50 000 pcs., the costs of one delivery are 50 000 CZK, holding and maintenance costs including interest are 200 CZK per 1 pc. of material stock per year. Material price is 800 CZK per 1 piece.

Assignment:

1. Calculate the Optimal Order Quantity, Optimal Delivery Cycle and Total Inventory costs corresponding to Optimal Order Quantity.
2. Calculate the Stock limit in pc., assuming we need to create a safety stock covering 10 days.
3. For this given case, decide on the Optimal Order Quantity assuming that the supplier:
4. grants a 0,5 % material price reduction for purchasing 10 000 pcs. in one delivery,
5. grants a 1,0 % material price reduction for purchasing 10 000 pcs. in one delivery.

# Investment effectiveness

**The basis of investment evaluation** lies in comparing the investment cost (cash outflow) with the expected cash inflows resulting from the investment.

The ultimate result is the decision

* whether to make the investment (action) or
* if there are more investment options, which one to choose.

## Methods of Investment Evaluation

For the evaluation of investment effectiveness, we can use the following methods:

1. **Return on Investment,**
2. **Payback period method,**
3. **Net Present Value method,**
4. **Internal Rate Of Return Method.**

The methods of investment evaluation are usually divided into two groups:

* **static methods**, which do not account for the time factor –Return on Investment and the Payback period method;
* **dynamic methods**, which account for the time factor and are based on updating (discounting) all input data entering into the calculations - Discounted Payback Period, the Net Present Value method, and the Internal Rate Of Return Method.

### Return on Investment method

Return on Investment (*ROI* ) is expressed by the following relationship:

  ;

where: *Zr* – Average annual Earning after Taxes resulting from the investment,

 *K* – investment cost (cash outflow).

Return on Investment is deduced from the commonly used return on equity indicators. It accounts neither for the distribution of net profit in time nor for the time factor itself, and it is therefore a static method.

The return as calculated is compared with the return required; if:

* *ROI* > return required – then the investment is favourable;
* *ROI* < return required – then we should not make the investment.

### Payback Period Method

Payback Period (PP) is the expected number of years of operation required to recover an initial investment from net cash flows.

**Nominal Payback Period (PP)**

* If the **cash flow** is **the same** for every year of life of the investment, we determine the Payback Period according to the following relationship:

 ; 

where: *PP* – Nominal payback period in years,

 *K* – investment cost (cash outflow) (a total of non recurring investment costs),

 *P* – Annual Expected cash flow (EAT + depreciation = cash flow).

* If the **cash flow** is **different** for different years of life of the investment, we determine the Payback period by gradually adding up the expected cash flow (inflows) in subsequent years until the cumulative expected cash flow equals the investment cost (cash outflow).

The shorter the payback period, the more desirable the investment project. Naturally, the payback period must be shorter than the life of the investment.

The Nominal Payback Period is a statistical indicator, it does not account for the time factor.

**Discounted Payback Period *(PPds)***

An improvement on the Payback period method is a method, that works with discounted cash flow. Expected cash flow from the investment is discounted:

* Average Cost of Capital (company's discount rate) or
* required Return on Investment.

Payback period is detected as the cumulative discounted cash flow (discounted profit after taxes and depreciation) in years, until the cumulative expected cash flow equals the investment cost (cash outflow).

The Discounted Payback Period is a dynamic indicator, it accounts for the time factor. The method with discounted values is more „strict“ than the previous method.

### Net Present Value method

Net Present Value is the difference between the expected discounted cash inflows of the investment and investment cost (cash outflow). Net present value can be characterized as sum of the cumulative discounted cash inflows.

  ;

where: *NPV* – Net Present Value,

 *SHP* – the expected discounted cash inflows of the investment in the *t* th years,

 *Pn* – the expected cash inflows of the investment in the *n* th years (*n = 1 to t*),

*i* – the risk-adjusted discount rate (coefficient), represents the Average Cost of Capital to the firm,

 *n* – individual life years, i.e. the years *1 to t*,

 *t* – the expected life of the investment in years,

 *K* – the project´s investment cost or cash outflow.

The NPV method is recommended as the basic and primary method of evaluation of investment effectiveness; it is a dynamic method.

* If NPV > 0, the project should be accepted ;
* If NPV < 0, the project should be rejected;
* If NPV = 0, the investment project is indifferent to the company, its acceptance neither raises nor lowers the company's market value.

.

A variant of NPV analysis often used in budgeting situations when capital is scarce is called **the profitability index** (PI), ort he benefit/cost ratio method. The profitability index is calculated as follows:

  ;

In PI analysis, a project with PI >1 should be accepted and a project with PI < 1 should be rejected. PI method is used for alternative projects.

### Internal Rate of Return method

The internal rate of return (IRR) is the interest or discount rate that equates the present value of the future receipts of a project to the initial cost:

  ; or :  ;

after rearranging terms:

  ; or :  .

Here the equation is solved for the discount rate, i, which produces a zero net present value or causes the sum of the discounted future receipts to equal the initial cost. It is often difficult to solve for the actual IRR on an investment.

In practical calculations of the internal rate of return, we can use the iterative procedure consisting of the following steps:

* One begins by arbitrarily selecting a discount rate.
* If it yields a positive NPV, the internal rate of return must be greater than the discount rate used, and another higher rate is tried. If the chosen rate yields a negative NPV, the internal rate of return on the project is lower than the discount rate, and the NPV calculation must be repeated using a lower discount rate.
* This process of changing the discount rate and recalculating the net present value continues until the discounted present value of the future cash flows equals the initial cost. If there is a difference of at most one or two per cent between two discount rates, out of which:
* The lower discount rate „*i*“ results in positive *NPV* and
* The higher discount rate „*i*“ results in negative *NPV*,

we may use the following linear interpolation for our calculation:

 ;

where: *IRR* – internal rate of return („*i*“),

 *in* – lower discount rate, where positive NPV,

 *iv* – higher discount rate, where negative NPV,

 *NPVn* – positive *NPV* (*in*),

 *NPVv* – negative *NPV*.

We usually do not discount the Investment cost (cash outflow), because we assume it is expended as non-recurring and at present.

If the investment is financed by credit, the internal rate of return should be higher than the interest rate.

## Examples

### Solved example

The project´s investment cost (K) is 400 thousand CZK. Expected cash flow from investment: first year 120 thousand CZK, second year 150 thousand CZK, third year 160 thousand CZK, fourth year 130 thousand CZK (from that profit after taxes: first year 20 thousand CZK, second year 50 thousand CZK, third year 60 thousand CZK, fourth year 30 thousand CZK). The expected life of the investment is 4 years. The company's discount rate is 12 %.

Assignment:

Calculate:

1. Return on Investment,
2. Payback Period
3. Nominal payback period,
4. Discounted payback period,
5. Net Present Value,
6. Internal Rate of Return.

Conduct the final assessment of this investment project.

Solution:

1. Return on Investment:

 ;

 .

Return on Investment (10 %) is lower than required return (12 %), the project should be rejected based on this method.

1. Payback Period:
2. Nominal payback period:

|  |  |
| --- | --- |
| Year | Expected cash flow |
|  | annual | cumulative |
| 1 | 120 | 120 |
| 2 | 150 | 270 |
| 3 | 160 | 430 |
| 4 | 130 | 560 |



As the payback period is 2,81 years and as it is shorter than the expected life of the investment (4 years), the project should be accepted based on this method.

1. Discounted payback period:

|  |  |
| --- | --- |
| Year | Expected discounted cash flow |
|  | annual | cumulative |
| 1 |  | 107,1 |
| 2 |  | 226,7 |
| 3 |  | 340,6 |
| 4 |  | 423,2 |



The investment will be repaid during its expected life, but the length of the time of repayment is markedly close to the life of the investment; even so, this project should be accepted based on this method.

1. Net Present Value:



If NPV is positive (*NPV* = 23 200 CZK), the project should be accepted based on this method.

1. Internal Rate of Return:

|  |  |
| --- | --- |
| Year | Expected discounted net cash flow |
|  | Discounted rate (i) 14 % | Discounted rate (i) 15 % |
|  | annual | cumulative | annual | cumulative |
| 0 | - 400,0 | - 400,0 | - 400,0 |  - 400,0 |
| 1 | 105,3 | - 294,7 | 104,3 | - 295,7 |
| 2 | 115,4 | - 179,3 | 113,4 | - 182,3 |
| 3 | 108,0 | - 71,3 | 105,2 | - 77,1 |
| 4 | 77,0 | 5,7 | 74,3 | - 2,8 |

 

IRR (14,67 %) is higher than required return (12 %), the project should be accepted

based on this method.

Final assessment of the investment project:

Based on both the static methods (Nominal Payback Period, but with the exception of the Return on Investment reference indicator), and the dynamic methods (Discounted Payback Period, Net Present Value, Internal Rate of Return), this investment project appears to be favourable. The difference in evaluation of the nominal and the discounted payback period is due to the dynamic method’s accounting for the time factor, in which case the assessment is stricter, but also more accurate. The longer expected life of the investment (4 years) and the higher discount rate (12 %) are both reasons for us to prefer the dynamic methods of evaluation in this case, and to recommend the project.

### Example to practice

The company is considering buying a universal machine tool with the following specifications:

* the purchase price is 5 200 000 CZK,
* the expected service life is 5 years, linear depreciation is assumed,
* the investment is to be funded by a loan amounting to 2 600 000 CZK with a 10 % interest rate, the remaining amount is to be covered by own sources,
* the rate of taxation of profits (income tax rate) is 19 %,
* the company’s discount rate is assumed to be at the level of average amount of capital costs, while the required return on equity (the dividend rate) is 15,9 %,
* the expected net profit from this investment in the individual years of its life is:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| year | 1 | 2 | 3 | 4 | 5 |
| Profit after taxes | 300 000 | 350 000 | 400 000 | 450 000 | 500 000 |

Assignment:

1. Perform calculations using the following methods of investment evaluation:
* Return on Investment,
* Nominal and Discounted payback period,
* Net Present Value
* Internal Rate of Return.
1. Assess, whether the investment into the universal machine tool is favorable.

# REORGANISATION AND DEMISE OF THE COMPANY

## Crisis Development of the Enterprise

Business in market conditions is also related to the risk of bankruptcy. The major characteristics of corporate crisis management, bankruptcy, mainly include long-term financial problems.

The company crisis management (bankruptcy) stages are as follows:

1. A decline in its profitability, rise in costs, decline of the cash flow.

2. Increase of the loan burden, more difficult access to foreign resources and rise in interest rates.

3. Payables are not settled within maturity, restriction of some costs and clearance sale of inventories.

4. Reporting of losses and their compensation from the reserve fund (or from other hedge funds, or from the retained earnings).

5. The reported loss is so high that it cannot be covered by the reserve fund (other hedging funds, or retained earnings), and cannot even be transferred to the accumulated losses account.

 In this phase, the company must take action in the form of, so-called, reorganisation (stabilisation).

Reorganisation means a set of company management measures targeted at fundamental financial stabilisation and renewal of the company’s performance.

The enterprise must mainly:

* - recognise the reported loss to reduce the registered capital,
* - secure new funds,
* - propose measures for recovery of the company.

The causes of economic problems may be - internal, or

 - external.

The internal causes include: - obsolete manufacturing standards,

 - poor organisational structure,

 - erroneous financial and depreciation policy,

 - inadequate sales, etc.

The external causes mainly include:

 - development of the global economy,

 - political situation, change in economic policy,

 - changes in demand,

 - new technical knowledge, etc.

If the enterprise exhibits economic problems, signs of bankruptcy, it is necessary

- to analyse the causes as soon as possible, and subsequently

- solve the situation immediately,

and do so as soon as possible upon failure of the enterprise.

## Solving the crisis

Solving the situation according the degree of the economic problems, loss level, is possible in the following ways:

1. Agreement on deferment of payment obligations - simplest form.

2. Reorganisation

 - either in the form of so-called clean reorganisation, i.e. reduction

 of the registered capital,

 - or reorganisation in the form of obtaining additional financial

resources (reduction of the registered capital to such an extent to create the so-called capital saving, which enables the company to create the so-called reorganisation profit, which can be used to satisfy the creditors; sell part of its fixed assets to cover losses;

 - eventually, reorganisation in the form of issue of new shares.

3. Merger - merger with an economically stronger enterprise. The pre-requisite of the merger is that the enterprise even when it is experiencing financial problems (from various causes), has a prospective manufacturing programme, market position, etc. By such merger, the enterprise demises without liquidation; however, all obligations of the enterprise pass to the new enterprise.

4. Transformation of the enterprise from one form to another - in case of significant change of conditions, for instance, transformation of partnership into a joint-stock company, etc.

Reorganisation of partnership and sole entrepreneur companies is substantially simpler - it usually takes the form of the sale of movables and real estate with the objective to obtain free funds to cover payables.

## Demise of the Company

Demise of the enterprise is the last life stage of the company. The enterprise may demise in the following ways

- according to the corporation’s act or

- according to the Bankruptcy Act (bankruptcy and arrangements with creditors);

namely:

a) on the basis of the voluntary decision of the entrepreneur, entrepreneurs (partners) with the following options:

 - expiration of the period for which the company was established,

 - by decision of the partners,

 - by achievement of the purpose for which it was established,

 - by transformation (change of legal form), merger,

 - by death of the owner,

 - by declaration of bankruptcy;

b) forced, due to the following:

 - by court ruling,

 - by declaration of bankruptcy.

If the enterprise has economic problems (is destined for bankruptcy), the entrepreneur has the following decision-making options:

1. **Sale of enterprise** - when selling the enterprise, it is important

 - sell the enterprise at the right moment,

 - sell the enterprise as a whole (functional unit) - the price is usually higher,

 - consider whether the proceeds from the sale shall suffice to settle the obligations.

2. **A solution may also be merger with another enterprise**

 - this also results in the legal demise of the enterprise without liquidation,

 - however, the enterprise may continue to exist, but as a new legal entity,

 - all obligations are transferred to the new enterprise.

3. **Demise of the enterprise with liquidation** - the Corporations Act stipulates the binding liquidation procedure. Liquidation of the enterprise means settlement of the company’s shares after its liquidation and is an assumption for demise of the enterprise.

4. **Bankruptcy of the enterprise** and arrangements with the creditors - according to the Bankruptcy Act.

The Bankruptcy Act differentiates two basic forms of bankruptcy - insolvency and over-indebtedness; also known as so-called imminent bankruptcy:

- insolvency - incapacity of the enterprise (debtor) to fulfil

 obligations to creditors;

- over-indebtedness - the total of all obligations of the enterprise (debtor) exceeds the values of its assets;

- imminent bankruptcy - reasonable assumption that the enterprise (debtor) shall not be capable of fulfilling obligations; in this case, only the debtor may file for bankruptcy.

## Methods for solution of bankruptcy - by ruling of the Bankruptcy Court

- declaration of bankruptcy (on the assets of the debtor), i.e. liquidation procedure, on declaration of bankruptcy

- reorganisation permission (in the case of debtors - entrepreneurs), i.e. reorganisation procedure.

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