

Czech University of Life Sciences

Faculty of Economics and Management

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Bachelor Thesis

Capital Budgeting, Case Study

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!!!

Word of Honor

I hereby declare that I have completed my thesis by myself and under the guidance provided by my supervisor. I also declare that I have not abused copyright of the third party.

In Prague April 30, 2009

Aknowledgements

I would like to dedicate this part to my family, friends and also to my supervisor. I would like to thank my family for intensive support and inspiration. Most sincere thanks to my friends for motivation they have given me during my studies. And also profuse thanks to PhDr. Oldřich Ludwig Dittrich for his great patience, guidance and support.

Kapitálový Rozpočet, Případová Studie

Capital Budgeting, Case Study

Souhrn

Tato bakalářská práce je zaměřena na problematiku kapitálových investic. V kapitolách bakalářské práce je podrobně popsána definice kapitálových aktiv a jejich významný vliv na budoucnost společnosti. Dále tato práce věnuje prostor také hlavním motivům, jež vedou manažery společností k různým druhům investic. Následuje popis celého procesu spjatého právě s investicemi do dlouhodobých aktiv. Práce neopomíjí ani důležité kvalitativní faktory členění, které rozhodují při hodnocení daných projektů. Významná část práce se věnuje rozboru relevantních cash flow, které musí být posuzovány při investicích. Celou práci uzavírá souhrn hlavních technik, které jsou hojně využívány při kapitálovém rozhodování.

Klíčová slova: rozpočet kapitálu, kapitálová aktiva, kapitálové investice

Summary

The bachelor thesis is aimed at the theory of capital investment. In the chapters of the thesis readers can find the definition of capital assets with its explanation in terms of the real impact on the firm's cash flow. Besides this, the main motives for capital investment are also discussed. This is followed by a thorough description of the capital budgeting process. Important qualitative factors that influence decision-making are also distinguished. A major share of the thesis is dedicated to the relevant cash flow of projects, which is followed by a concise summary of the most common techniques that are used in capital budgeting.

Keywords: capital budgeting, capital assets, capital investment

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Introduction

Proper capital budgeting has ever been amid the main aims of corporate strategy. Corporate strategy is basically sustained or changed accordingly to management decisions. Surprisingly enough - while looking back to human history - such decisions "have been made for millennia, since human first awakened to the idea that capital could improve life."¹ In addition, when tracing the nature of these decisions, it can be observed that their nature has been changing significantly. In the past human kind relied predominantly on "primitive" capital decisions among which were food, shelter or tools that enabled owners to trade. At the time decisions made by humans were meaningfully influenced by time and effort that were necessary to complete ordinary work.

As human society evolved, the term capital and its perseverance became more complex. According to Herbst this was relevantly notable during the Agrarian Revolution², when the determination to build, gather and protect capital became a sort of commitment in everyday life.

In the Industrial Age³ society faced intensive modernization process, which was related to innovation of technology particularly metallurgy that gave way e.g. to the efficient railway system. In the nineteenth century, technological boom or growth had to be necessarily fostered by capital inputs; by other words it was capital-intensive. Hence, in economics it is commonly perceived that for any given level of technology - when the stock of capital goods increases - the labor supply follows the increase along. Given that fact, it can be easily observed that capital and labor all together are inextricable. What is more, in some of the countries it was and still is in common for employees to

¹ HERBST, ANTHONY F. (2002). Capital Asset Investment: Strategy, Tactics and Tools. Wiley. pp. 1. ISBN 0470845112

² The Agrarian Revolution or the Neolithic Revolution sparked off the transition from hunting and gathering communities to domestication in agriculture and settlement. It took place in the Middle East around 10,000 BC. [Wikipedia, February 2009. http://en.wikipedia.org/wiki/Neolithic_Revolution]

³ or Industrialization (first took place in the late 18th century) is the process of economic and social change that puts emphasize on work, wages and incomes. Such change is inherently linked with modernization of capital assets. [The Canadian Encyclopedia, February 2009. <http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0003992>]

own shares of their employer's company or corporation. During the changeover from the Industrial Revolution to the twentieth century and even up to now the term capital has been inflected in many ways in which it has certainly gained remarkable importance in the field of economic studies. As a matter of fact many schools have emerged hitherto, such as the Adam Smith's classical theory of capital, Böhm-Bawerk's Austrian school, Marginalist's or John Maynard Keynes' theories etc.

The word capital today is in economic studies generally perceived as "a stock of resources that may be employed in the production of goods and services"⁴, which together with land and labor allows production. Capital is therefore inherently connected with human population. It can be described as human abilities or skills gained from education, stocks either finished or unfinished and lastly land, machines or buildings. (Britannica, 2009)

To demonstrate the extent to which capital is being involved in, it would be appropriate to mention some of the issues that most concern not only economists but also ordinary people all around the world. Among most cases that complement the main issues related to capital are unemployment, labor productivity, minimum wage policy, product values etc.

What this thesis will handle, however, are decisions concerning capital investment into capital assets in the private sector. The thesis will provide a concise summary of such commitment - more specifically - an overview of several types of investment projects, process of capital budgeting and financial analysis of particular projects.

⁴ "capital." Encyclopædia Britannica. 2009. Encyclopædia Britannica 2009 Ultimate Reference Suite. Chicago: Encyclopædia Britannica.

Objectives of Thesis and Methodology

The main objective of the thesis is to provide readers with a concise framework of relevant and accurate knowledge from the field related to capital budgeting. The resources have been chosen accordingly to the needs discussed widely in corporate finance. Hence, methods that are used in the thesis play the key role at decision-making levels of companies around the world. The methods used for calculations are the payback period, net present value, and modified internal rate of return.

Literature Overview

Many books relating directly or even indirectly to capital budgeting have been published so far. For some considerable time the concept of capital budgeting or investment appraisal have been widely discussed in the literature. This thesis will mainly concentrate on resources published in the last decade whose authors demonstrate the main importance of investment appraisals.

While introducing authors used for the thesis – it would be appropriate to approach their research chronologically. Let us begin with Fotr who published his “Podnikatelský plan a investiční rozhodování” in 1999. Fotr summarized his work in form of feasibility studies in order to increase successful decision making in particular projects. His work arises from widely accepted methodology, which is also acknowledged by UNIDO⁵. The book is divided into six categories that examine the investment project cycle, opportunity and feasibility studies, essentials of cash flow and finally business plan. The publication generally speaking inclines toward industrial projects, which is suitable for the chosen case study (introduced later in the thesis). Having said that, it is also suitable for other spheres of business such as services based on sections relating to financial, economic and managerial aspects of financial appraisal.

In 2002, Herbst published a well-weighed approach to capital management and budgeting titled “Capital Asset Investment: Strategy, Tactics and Tools”. This book is suited for managers who carry out capital investment decisions; it inquires capital investment policy, project analysis and drafting recommendations. Even though this publication omits few topics important to capital budgeting, it - on the other hand - makes the readers recall the old MAPI method used in capital investment appraisal along with the new method called capital asset pricing model (CAPM). In the same year Dayananda et al. published an exhaustive piece dedicated to “Capital Budgeting: Financial Appraisal of Investment Projects”; where basic concepts, principles and techniques are discussed along with estimation of cash flows and appraisal formulae

⁵ United Nations Industrial Development Organization - its objective is to promote industrial development and international cooperation in developing countries as well as in countries with transforming economies. [<http://www.unido.org/>]

such as the net present value (NPV) and internal rate of return (IRR). What is more, Excel-based tables support all data calculations, which is more than favorable for managers nowadays.

In 2004, it was Asaf who published a remarkable work relating to the latest corporate finance concepts of the top corporations. This book - "Executive Corporate Finance: The Business of Enhancing Shareholder Value" - is essential for helping companies to improve planning and execution in order to minimize risks and maximize returns. The author presents a variety of concepts and models to better understand and withstand business complexity. By providing the readers with up-to-date trends in managing corporate finance, his contribution will partially fill up the theoretical base of the thesis.

Gitman published his 11th edition of "Principles of Managerial Finance", in which he reveals a considerable space for discussion of capital budgeting. By describing key motives of capital budgeting and steps of the whole process, it is easy to give to readers a generalized outlook. Gitman's analyses of cash inflows⁶ and outflows⁷ followed by introduction and demonstration of fundamental techniques form the body of the chapter. Notable is also his emphasis on risks that arise from every financial decision. Therefore, chapter linked to financial risks is indispensable for managers to recognize real options in the decision making process.

And the last strong pillar of the thesis is filled out by the publication named "An Introduction to Corporate Finance: Transactions and Techniques" written by a former investment banker Geddes in 2008. This publication is strongly oriented to readers with advanced experience from the area of banking. Considering its complexity some minor and supportive facts from the chapters (e.g. valuation techniques) will be used in the thesis in order to sharpen the overall outcome.

⁶ "cash inflow" is understood as money acquired by a company from its financing, operating or investment activities (Business Dictionary. 2009. <http://www.businessdictionary.com/definition/cash-inflow.html>)

⁷ "cash outflow" is perceived as the net amount of money that is flown out of a company. The typical examples are expenses. (Superior Investor. 2009. <http://www.superiorinvestor.net/investor-definitions/stock-valuation/fundamental-analysis/cash-outflow.html>)

The Subject of Case Study

While designing a rough concept of the thesis, it was necessary to think of a decent source in order to acquire economic data. Because capital budgeting deals with capital assets, it was necessary to look for a company whose production is fixated strictly to these kinds of assets. Finally, it occurred that the proper company for this would be DYAS.EU.

The company specializes in producing beech plywood and it has been in the plywood and block-board branch since 1930. It is located in Uherský Ostroh (South Moravia) and the plant premises were built on the former sugar factory. The company's product specialization has remained the same except the period under German occupation, when products were customized to fit the armed forces. Since the World War II the enterprise has come through numerous divisions and acquisitions - until 1992 when the key privatization took place and all of the assets and liabilities were offered to public interest. Today's products vary from general softwood core, water resistant to anti-slip or fire resistant used for construction. The company's quality control system has been certified by Lloyd's Register Quality Assurance⁸, which indicates a good management background.⁹

The company is dependant on highly specialized machinery and buildings – which are classified as capital assets. This was a critical criterion for choosing this source – as capital budgeting is interested mainly in these type of assets.

Thank to the company, I was given a permission to use essential economic data, which I will also interpret to readers in the thesis. For the economic data please see supplements.

⁸ Lloyd's Register see more at <http://www.lr.org/industries/lrqa/>

⁹ Facts are taken from the company's CD presentation released in 2008, section History of DYAS.EU. also available at http://dyas.eu/english/historie_spolecnosti_eng.htm

Own Research & Application of Methodologies

Capital Assets in Capital Budgeting

In order to distinguish capital assets from the rest, it is important to realize that capital assets are of a totally different kind. These assets while once acquired are not easily disposable. Capital assets are inextricably combined with long-lived projects whose benefits or loss are expected to emerge over longer periods - one year and more. (Dayananda et al., 2002) As opposed to the projects whose operating expenditure is an outlay expecting benefits within one year. (Gitman, 2005) Therefore any capital budgeting decision influences value of the firm or corporation along with their shareholder wealth.

In the capital budgeting funds are re-invested into the long-term assets particularly into capital assets. The capital assets are generally understood as “all tangible property which cannot easily be converted into cash and which is usually held for a long period, including real estate, equipment, etc.”¹⁰ In terms of corporate finance outlook it can also be added that capital assets might also be understood as intangible ones such as technology, trademarks, patents or even research, design or development testing - argues Dayananda. To provide a clearer hindsight - Herbst - concludes that in capital budgeting tangible factors are emphasized, having mentioned this fact, he further explains that as tangible assets are factored into the process of measuring, intangibles must also be sometimes considered.

Managers – commonly – the people behind decision-making process in businesses are hired to decide accordingly to fulfilling the effort of enhancing shareholder’s value or wealth. These managers are well-educated people who use certain methods and techniques of capital budgeting to achieve long-term goals of their company. Whether managers use these techniques in an appropriate manner resolves only time or more specifically - investment horizon - and its eventually positive or negative return.

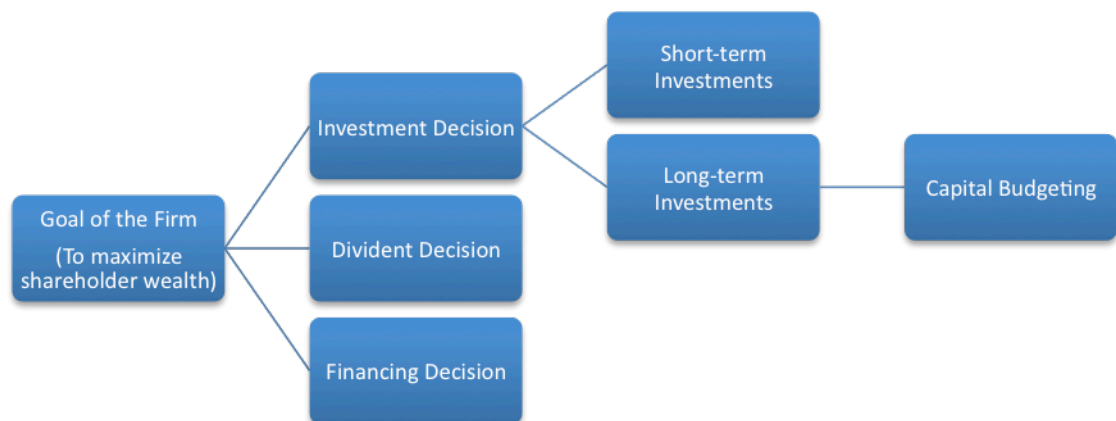
Overall it can be concluded that “the capital budgeting is the process of evaluating and selecting long-term investments that are consistent with the firm’s goal of maximizing

¹⁰ “capital asset” Investorwords. 2009. (http://www.investorwords.com/697/capital_asset.html)

owner wealth.”¹¹ From what is implied - the capital budgeting is the process of justification of capital expenditures.

To help readers better understand the matters of capital budgeting please follow the sketch beneath:

Figure 1.1 Capital Budgeting¹²



¹¹ GITMAN, LAWRENCE J. (2005). Principles of Managerial Finance. Addison Wesley. 11th edition. pp. 376. ISBN 0321267613

¹² DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 2. ISBN 052181782X

Main Motives for Capital Investment

Generally - managers make capital expenditures into the fixed capital assets for several reasons. Gitman classifies these reasons into four main categories:

- Expansion
- Replacement
- Renewal
- Other Purposes

In the first case of “expansion” - it is considered the most common motive for making expenditure. It is made in order to expand the level of operations by or through acquisition of capital asset. It is reasonable in case when the firm is growing and needs more space for production premises.

In the second case a firm may consider “replacing” mature assets through investing into their alternatives. Particularly in a situation when the cost of maintenance of existing assets outweighs benefits of acquiring its alternative.

Thirdly, the reason to “renew” includes rebuilding, overhauling or retrofitting of an existing asset. This may include replacement of components e.g. in rotors, computer systems or air conditioning - all in all in order to improve and enhance efficiency of existing assets.

In the last motive “other purposes” expenditures do not result in acquisition or in transformation of “tangible” capital assets, which align to the Herbst’s explanation of intangibility in capital budgeting. This involves a long-term commitment of investing into advertising, research and development of new products or technology, management consulting etc.

Qualitative Classification of Investment Projects

Before managers proceed to the project concepts and techniques they need to realize the nature of each project. Dayananda in his book “Capital Budgeting” distinguishes three types of projects. These projects are divided into three categories according to which they affect the investment decision process.

- Independent projects
- Mutually exclusive projects
- Contingent projects

As Dayananda argues, the first type of projects – “independent projects” - emerges in a situation when there are several investment projects to be considered. Hence, these projects do not force managers to make trade-offs. Such types of projects are analyzed simultaneously and they do not influence each other in terms of financing. These projects can be therefore evaluated independently.

On the other hand, there are projects that cannot be discussed and decided on simultaneously. Such types are called – “mutually exclusive projects”. For example - final decision proposed on the project A would eliminate the project B. All alternatives must be carefully scrutinized as each decision could also mean eliminating the better option.

“Contingent projects” stand for projects that complement or substitute other projects. Generally, this type of projects comes up when managers realize that favoring a certain project could enhance or even cripple future possibilities. Such projects should provide flexibility. Decision-makers might end up in a situation when things do not go as it was previously desired. Hence the qualitative “what if question of what alternative use may be made of capital investment projects”¹³ should be challenged. In case of complementary projects - that would be when to complement the initial one

¹³ HERBST, ANTHONY F. (2002). Capital Asset Investment: Strategy, Tactics and Tools. Wiley. pp. 14. ISBN 0470845112

by adding an extra project would mean to help to boost up its cash flow. Whereas in substitute projects going for either project would inevitably damage the cash flow of the latter.

In addition, Gitman generously introduces to readers a series of different criteria for classifying investment projects. Besides these already mentioned, Gitman categorizes projects according to their availability of funds:

- Unlimited funds
- Capital rationing

If a company had “unlimited funds” for projects, it would be quite easy – all projects that would provide a reasonable return in the future would be considered acceptable. What is more typical, however, is when a company operates with a fixed number of funds. “Capital rationing” thus makes several projects compete for essential funds. Eventually, there are techniques of the capital budgeting which help to determine the final answer whether to accept or reject particular project. Manager’s decisions are wholly dependent on the outcome of these techniques and therefore they are to be explained later in the thesis. In addition to this, there are to more approaches and patterns that are important to consider.

- Accept-Reject approach
- Ranking Approach

“Accept-Rejected approach” is used by firms that are likely to set minimum acceptance criteria for their proposed projects. It is simple and thus suitable in case of “unlimited funds” with “mutually exclusive projects” where “capital must be rationed”. “Ranking approach” ranks projects according to their predetermined measures – e.g. according to their rate of return¹⁴. Projects with the highest return are ranked first and so on.

¹⁴ see the chapter “Techniques of Capital Budgeting”

The Process of Capital Budgeting

Financial personnel must carefully scrutinize each long-term investment related to capital assets. Particularly for the reasons that were mentioned earlier in the thesis and that was that any decision linked to capital assets has a decisive impact on firms in the long run. Financial personnel should therefore be aware of the company's goal in its investment-decision policy. Managers responsible for such policy must take into account the nature of their motives. After they have put their heads together they are challenged by an enlightening classification of investment projects. Thus, they have to realize and distinguish what type of project they are going to invest their money in. That is a brief summary of what has been discussed in the thesis so far.

To make the above mentioned more clearly to readers, it is necessary to communicate each step in the process more specifically. Gitman simplifies the decision making process of capital budgeting in the five stages:

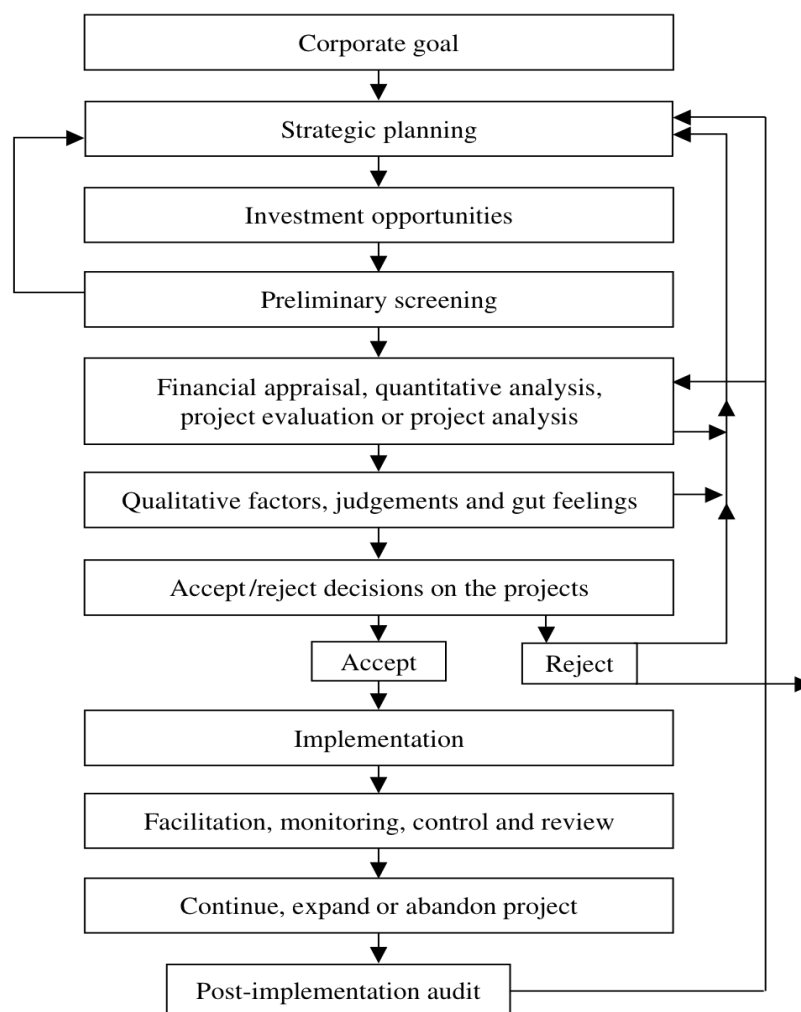
- Proposal generation
- Review and analysis
- Decision-making
- Implementation
- Follow-up

“Proposals” can be initiated at any level of the company, but financial personnel finally look them into. In the phase called “review and analysis” – review and analysis of economic feasibility must be carried out. Further attention will be paid to this matter later in the thesis in order to introduce to readers main techniques of capital budgeting. “Decision-making” stage stands for a final submission of the previous analysis to managers. The board of directors approves budgetary expenditures and some minor adjustments are made to sustain smooth progress. After the necessary

approval follows “implementation” and “follow-up”, in the latter phase actual results are observed and later compared to previously expected costs and benefits in order to reassure of the initial forecast.

Dayananda and his colleagues further enrich the specification of capital budgeting process:

Figure 1.2 The Capital Budgeting Process¹⁵



In the figure (1.2) Dayananda introduces multi-faceted activities of capital budgeting with sequential stages. “Strategic planning” defines the current position of a firm and also outlines its position in the future. Eventual feedback that sometimes occurs may

¹⁵ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 5. ISBN 052181782X

influence adjustment of the firm's strategic plan. "Identification of investment opportunities" is a stage where the initial proposal is raised. The proposal must adhere to the company's goals, vision, mission and long-term strategic plan. In the next stage – "preliminary screening" of the projects – an array of proposals is sorted out and only relevant ones are chosen for further considerations. Later follows one of the most important stages of the capital budgeting process - the "financial appraisal of projects". This part is characteristic for its quantitative analysis, which also has a crucial impact on the project selection. As Dayananda points out "qualitative factors in project evaluation" should also be classified, as they are difficult to evaluate or measure (e.g. environmental impacts, societal impacts in the region – employment and labor unions, political attitudes). These qualitative factors "require considerable management experience and judgmental skills"¹⁶ in order to be classified properly. When the project is finally accepted, it is followed by its "implementation". The last stage "post-implementation audit" corresponds to what Gitman calls "follow-up", which is monitoring and evaluation of the real outcomes of the previous decision-making process.

¹⁶ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). *Capital Budgeting: Financial Appraisal of Investment Projects*. Cambridge University Press. Pp. 5. ISBN 052181782X

Project Cash Flows

In order to proceed to the capital budgeting techniques it is necessary to determine the relevant cash flows relating to capital expenditures. These relevant cash flows of a project are “all cash inflows and outflows that are generated throughout the project’s life.”¹⁷ Adoption of any project will cause changes in the firm’s cash flows. Such changes are important to trace out – as they increase existing volume of cash flows – they are also known as incremental or marginal cash flows (Dayananda et al., 2002). It is therefore important to carry out a thorough analysis in order to say whether particular projects provide value to the shareholders or not. “Estimation of cash inflows will depend on managerial judgment, economic environment, competition and trends in product design”¹⁸, and as Herbst further argues – techniques of capital budgeting help to determine quantitative factors, nevertheless, there is not a single accurate mathematical model that would precisely forecast cash flows. According to Dayananda cash flows can have two types of effects:

- Indirect effects
- Synergistic effects

“Indirect effects” come up when there is a new project that is meant to initiate the new production line e.g. product B manufacture. Introduction of the new product – nevertheless – may influence cash flow of the previous one (decrease it). This effect must be thus considered in the cash flows of the new project. On the contrary, there are also “synergistic effects”. Such effect appears when other type of service complements genuinely provided service. This can be seen at hairdresser studios. Classic hair cutting is usually complemented by skin treatment and so on, which positively influences cash flows. “Cash flows are simply the dollars received and dollars

¹⁷ FOTR, JIŘÍ (1999). Podnikatelský plán a investiční rozhodování. Grada Publishing. 2nd Edition. Pp. 82. ISBN 8071698121

¹⁸ HERBST, ANTHONY F. (2002). Capital Asset Investment: Strategy. Tactics and Tools. Wiley. pp. 21 ISBN 0470845112

paid out by the firm at particular points in time”¹⁹. To better realize cash flows in these particular points of time - Fotr as well as Dayananda distinguishes three life phases of investment projects:

- Initial project outlay/investment
- Its maintenance/additional investments
- And removal/termination

It is typical for the first phase named “initial project outlay/investment” to incur only outflows – not only for the fact that they are always more confidently estimated – but for the fact that there is genuinely a great outflow right at the beginning for the project acquisition. On the other hand phases characterized as “maintenance/additional investments” and “removal/termination” cover both inflows and outflows. Such movements of cash flows basically arise from the company’s investment, operating and financial activities. It is important for managers to be able to realize what is counted into these activities. The discussion generally entails:

- Opportunity costs
- Sunk costs
- Overheads costs
- Working capital
- Tax
- Depreciation
- Interest and inflation

¹⁹ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). *Capital Budgeting: Financial Appraisal of Investment Projects*. Cambridge University Press. Pp. 12. ISBN 052181782X

“Opportunity costs” of any project must be considered meticulously. It is “the value of the most valuable alternative that is given up, if the proposed investment project is undertaken”²⁰. Humbly interpreted – opportunity costs stand for extra money that are generated without the project, and thus must be included in the project. “Sunk costs” are generally known for its irreversible nature. They represent money already spent in the past – and in terms of capital budgeting – its initial outlay is not influenced by the project. Sunk costs are not included in cash flows. On the other hand, “overheads costs” are included in calculations, and moreover incremental overheads costs are logically stressed out. Fotr particularly highlights the importance of “working capital” in investment projects. Net working capital is counted as in a generally known equation = current assets²¹ – current liabilities²². In order to realize the new project, Fotr argues that it is necessary to enhance the volume of stocks, accounts receivables and short-term liabilities. It is because – as Dayananda also adds - an increase of working capital decreases the firm’s liquidity and therefore creates opportunity cost. In order to treat “tax” it is considerable to realize that it stands for cash outflow. And if a project creates tax, it must be included. “Depreciation”, as Dayananda concludes, is not cash flow. “It does not represent the annual decline in value of the asset, it does not measure the value of the asset used up, and it does not measure the actual unit costs of the assets and services”²³. Depreciation provides tax shield. Herbst argues that because of the fact that companies pay income taxes on earnings and depreciation is deductible – for this reason – depreciation in fact decreases cash outflow. Companies therefore strive to calculate and spread their tax allowances according to several models. This is not discussed in the thesis however. Financial activities of the firm also engulf consideration of “interest and inflation”. Interest as well as financial activities - such as dividends and loan repayments - is not included in cash flows. For the same reason as above-mentioned – the asset of the project does not generate them.

²⁰ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 15. ISBN 052181782X

²¹ cash, inventories, raw material, finished goods and accounts receivables

²² accounts payable, wages payable

²³ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 19. ISBN 052181782X

Interest, furthermore, as a return to providers of debt capital is already included in discount rate, which is applied in the capital budgeting techniques (Dayananda et al., 2002). The same applies to inflation. It is specified in the Fisher equation and helps to determine the real interest rate that is indispensable in discounting.

Figure 1.3 The Fisher equation²⁴

$$r = \frac{(1 + n)}{(1 + p)} - 1$$

Where:

n = the annual nominal interest rate (decimal value)

r = the annual real interest rate (decimal value)

p = the expected annual inflation rate

The required rate of return used for discounting is taken from observed market rates, interest rates and returns on equity. To make a better overview of cash flows in different points of time - managers consider those two patterns, which sum up the final impact of the company's cash flows:

- Conventional cash flow pattern
- Nonconventional cash flow pattern

Cash flow patterns trace out cash inflows and outflows of an investment project.

“Conventional cash flow pattern” counts with an initial cash outflow that is followed by cash inflows. On the other hand “nonconventional cash flow pattern” depicts an initial cash outflow that is followed either by cash inflows or outflows throughout the given period. (Gitman, 2005)

²⁴ “the Fisher equation” DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 23. ISBN 052181782X

To better distinguish features of cash flows, Gitman and Dayananda stress out the difference of cash flows for:

- Replacement decisions
- And expansion decisions

Two different approaches to reason cash flows must be applied, since the “expansion decision” does not include cash flows from sale of an old asset. Hence, calculating incremental cash flows that result from proposed replacement challenges managers.

Initial project investment that stem from expansion decisions is calculated:

$$\begin{aligned} & \text{Cost of new asset(s)} \\ & + \text{Installation and shipping costs} \\ & + \text{Initial investment in working capital} \\ & \hline & = \text{Initial investment} \end{aligned}$$

Such calculations comprise all costs that are linked to “installation, shipping or transportation” of new assets at the first year of acquisition. Change in “working capital” must also be considered – as it was mentioned earlier in the thesis – and that should reflect precautionous investments into supplies. Net operating cash flows are computed as follows:

$$\begin{aligned} & \text{Cash inflow from sales} \\ & - \text{Cost of goods sold} \\ & - \text{Selling, general, administrative and other expenses} \\ & - \text{Depreciation} \\ & \hline & = \text{Taxable income} \\ & - \text{Tax payable} \\ & \hline & = \text{Net income (after tax)} \\ & + \text{Depreciation} \\ & \hline & = \text{After-tax net operating cash flow} \end{aligned}$$

It is apparent from the scheme that “depreciation”, which was also earlier discussed, forms the necessary tax shield. Operating cash flows summarize a-year-to-year inflows

and outflows from the sales and cost of goods sold. And to finish up, only terminal cash flows remain uncalculated:

$$\begin{aligned} & \text{Proceeds from sale of assets} \\ & \quad - \text{Taxes on sale of assets} \\ & \quad = \text{After-tax salvage value} \\ & \quad + \text{Recovery of working capital} \\ & \quad = \text{Terminal cash flow} \end{aligned}$$

The “salvage value” – often used - is the same as the “proceeds from sale of asset(s)”. It stands for “the amount net of any removal or cleanup costs expected upon termination of the project”²⁵. “Replacement decisions” however have to deal with the cash flows of the old asset(s). Therefore calculation previously applied need to be slightly readjusted. For the initial investment:

$$\begin{aligned} & \text{Cost of new asset} \\ & \quad + \text{Installation costs} \\ & \quad - \text{Proceeds from sale of old asset} \\ & \quad + \text{Taxes on sale of old asset} \\ & \quad + \text{Initial investment in working capital} \\ & \quad = \text{Initial investment} \end{aligned}$$

For the incremental operating cash flows:

$$\begin{aligned} & \text{Operating cash flow new asset} \\ & \quad - \text{Operating cash flow old asset} \\ & \quad = \text{Incremental cash flow of the proposed replacement project} \end{aligned}$$

And lastly terminal cash flows:

$$\begin{aligned} & \text{Proceeds from sale of new asset} \\ & \quad - \text{Proceeds from sale of old asset} \\ & \quad - \text{Taxes on sale of new asset} \\ & \quad + \text{Taxes on sale of old asset} \\ & \quad + \text{Recovery of working capital} \\ & \quad = \text{Terminal cash flow} \end{aligned}$$

²⁵ GITMAN, LAWRENCE J. (2005). Principles of Managerial Finance. Addison Wesley. 11th edition. pp. 395. ISBN 0321267613

Once managers have all calculated and figured out, it is also decisive to carry out future outlook of cash flows for given projects. “The success of a business firm is closely related to how well management is able to anticipate the future and develop suitable strategies.”²⁶ This is probably the most complex part of the capital budgeting as a whole. Many books about forecasting methods have been published so far. As it was mentioned before, managerial decisions rely on personal judgments and intuitions, these facts are however very difficult to translate into numbers. It is up to each industry to choose one of them and analyze their cash flows forecasts accordingly. The thesis has not been intended to go too much in depth about these forecasting techniques. Thus, it will demonstrate only a brief concept of the most important once. According to Dayananda there are two distinct approaches toward cash flow forecasting:

- Quantitative techniques or routes
- Qualitative methods

“Qualitative techniques or routes” contain regression methods, time trend projections, time series, top-down or bottom-up routes, or so-called smoothing models – such as moving averages or exponential smoothing. Regression models strive to explain behavior of selected variables (independent and explanatory). They rely on historical data that create the base for future estimates. Time trend projections are considered more flexible – since they are expected to project either long or short-term horizons. They also rely on the past patterns. Smoothing models complement the previous variety of options. They are used in cases where historical data do not exhibit clear trends. They are likely to react to the most recent observations in the behavior. Techniques already mentioned are considered the most common for calculation. Nevertheless, there are a series of more complex options to calculate accurate estimates. Time series are a profound statistical method that are not easily practiced in

²⁶ DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). *Capital Budgeting: Financial Appraisal of Investment Projects*. Cambridge University Press. Pp. 37. ISBN 052181782X

general, but may provide astonishing results. Top-down or bottom-up routes are suitable for scenarios in which demand for certain commodities plays the key role for future estimations.

On the other hand, “qualitative techniques” offer solutions for managers especially when past observations (quantifications) are not available. Such assumptions usually apply to new products or fundamental analyses of particular markets. Among qualitative techniques belong – information obtained from individuals (often very valuable), surveys or other qualitative methods, and also the Delphi method²⁷.

(Dayananda et al., 2002)

The basic assumptions and calculations now have been all noted in the thesis above. In order to proceed further to the final chapter of the thesis – economic data need to be obtained. This would be the main role of the chosen subject for the capital budgeting thesis, and that is DYAS.EU.

²⁷ “the Delphi method” - a systematic, interactive forecasting method which relies on a panel of independent experts. The carefully selected experts answer questionnaires in two or more rounds. (ROWE and WRIGHT (1999). The Delphi technique as a forecasting tool: issues and analysis. International Journal of Forecasting. Volume 15. Issue 4.)

Techniques of Capital Budgeting

In order to begin a profound analysis of proposed projects, the process of capital budgeting itself has to be initiated. The capital budgeting techniques apply, when the managers have already considered the main motives for capital expenditures. Fundamental factors such as whether the company intends to grow or replace obsolete technology must be recognized. Once the company's management figures it out, it must proceed to financial criteria – such as – the extent of funding availability etc. What is more, the difference between mutually exclusive and independent projects also appeals to the decision making process. While all of the investment opportunities are being evaluated, financial managers carry out a series of exhaustive calculation in order to provide sustainable cash flow scenarios. This phase belongs to the company's know-how and it is highly protected, the matters of such protections are incorporated in the employees' contracts. The thesis will provide readers with adjusted calculations for later mentioned techniques. The thesis will discuss these three techniques:

- Payback period (PP)
- Net present value (NPV)
- Modified Internal Rate of Return (MIRR)

The feasibility of several types of projects will be demonstrated through these three techniques. To do that, it is necessary to realize the fundamental assumptions for consequent comparisons. The level of risk²⁸ adherent to each project is the same. The same will apply for the cost of capital²⁹. The company's available funds are just right for the proposed projects; however the funds are not unlimited. According to the

²⁸ "risk in capital budgeting" the level of uncertainty about future development – estimated by statistical methods such as coefficients of deviation etc. (<http://www.slideshare.net/adhirock/risk-and-capital-budgeting>)

²⁹ "the cost of capital" is an opportunity cost of finance, because it is the minimum return which an investor requires (<http://cbdd.wsu.edu/kewlcontent/cdoutput/TOM505/page41.htm>)

Geddes’s research, the length of the future cash flow estimations is between five and seven years. For this reason, the explanatory examples will consider a minimum of five-year period for each project. The size of each project demonstrated in the examples is relatively equal in its size, therefore comparable.

“The payback period” is probably the oldest of capital budgeting measures. It is easy and very intuitive. (Herbst, 2002) Basically, “it is the amount of time required for the firm to recover its initial investment in a project, as calculated from cash inflows.”³⁰ The managers from DYAS.EU would use this method just to make the picture of the future payback horizon. Here are some provided examples:

Table 1.1 The Shandong’s drying machine BY214 (in CZK) Project “P”

		1,227,000	1,227,000	1,227,000	1,227,000	1,227,000
	0.	1.	2.	3.	4.	5.
	(3,632,320)					

In the first example managers from the DYAS.EU company look into the first opportunity, this is an investment into the new Shandong’s drying machine. Initial investment accounts for about 3.6 million Czech crowns and the cash flow forecasts are divided into five consequent years. Calculations for the project “P” are not difficult.

$$\frac{3\ 632\ 320}{1\ 227\ 000} = 2.96$$

A simple division of initial outlay of 3,632,320 CZK and the first cash inflow 1,227,000 CZK provides the answer of 2.96 years that are needed to retrieve the initial investment. This can be interpreted such that it will take almost three consequent

³⁰ GITMAN, LAWRENCE J. (2005). Principles of Managerial Finance. Addison Wesley. 11th edition. pp. 419. ISBN 0321267613

calculated. The rest that accounts for 857,000 CZK is about 59 per cent of the whole third year cash inflow (857,000 divided by 1,432,000 multiplied by 100). Thus it can be concluded that the payback period of the project “Q” is 2.59 years (two previous years + 0.59). In case the company considered the project “P” and “Q” independently, both would be acceptable in the accept-reject approach - if the maximal payback period criterion would remain the same (5 years). Those two projects, however, are classified as mutually exclusive, because they exemplify the same kind of assets. The managers carry out their decision via the previously mentioned ranked approach. The project “Q” is ranked first (favored), because its cash inflows are able to retrieve the initial investment faster and project “P” is ranked second.

The payback period method is usually used for the smaller projects because it is quickly understood and calculated. On the other hand it is infamous for the fact that it ignores the time value or opportunity cost of funds used. Furthermore, it also does not take into account cash flows that occur after the payback period. (Gitman, 2005)

In the next part of the thesis, only sophisticated methods of capital budgeting will be discussed. The net present value and modified internal rate of return are two most common tools. “Traditionally, the investment is considered to be viable if the net cash-flows represent a positive net present value (NPV) or an internal rate of return (IRR) which is above the required hurdle rate.”³¹ The net present value of a streamed cash flow for a given period is calculated by this equation:

Figure 1.5 The net present value formula³²

$$NPV = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - CO$$

Where C_t is estimated cash flow for a given period; and r stands for the discount rate, cost of capital, required return or opportunity cost. The net present value (NPV) then

³¹ ASAF, SAMIR (2004). Executive Corporate Finance: The Business of enhancing shareholder value. FT Press. Pp. 100. ISBN 0273675494

³² DAYANANDA, IRONS, HARRISON, HERBOHN & ROWLAND (2002). Capital Budgeting: Financial Appraisal of Investment Projects. Cambridge University Press. Pp. 85. ISBN 052181782X

would equal to the sum of all discounted cash flows to the year 0 minus the initial investment outlay C_0 in the same year 0. The company DYAS.EU considers an acquisition of longitudinal peeling machine. Project "G" represents acquisition of the Qingdao's longitudinal peeling and cutting machine SL-250. Whereas project "H" is the Shandong's long bark peeling and cutting machine BQ1226/8F. Using the net present value technique (NPV), calculations are shown below:

Table 1.4 Projects "G" and "H" calculations

		A	B
1	(in CZK)	Required return	13%
2	Year	Project "G"	Project "H"
3	0.	(4,241,200)	(3,942,300)
4	1.	923,600	1,324,500
5	2.	923,600	1,029,300
6	3.	923,600	1,502,900
7	4.	923,600	1,105,200
8	5.	923,600	1,105,200
9	6.	923,600	1,105,200
	NPV	(549,063)	886,048

Project "G" calculated as
 $=NPV(\$B\$1,A4:A9)+A3$

Project "H" calculated as
 $=NPV(\$B\$1,B4:B9)+B3$

By using excel worksheets it is easy to obtain calculations through the financial function listed as NPV. It is apparent that the project "G" does not generate sufficient discounted cash inflows over the six years. Its net present value is lower than zero, in the accept-reject approach it is thus considered unacceptable. Had the project "G" been intended for longer period, would it have been accepted? The answer is yes; the question would remain on how long its economic life would need to be prolonged. But since the company is comparing between two mutually exclusive projects, the economic life must remain the same. Nevertheless, the project "H" is able to generate enough discounted cash inflows that are greater than initial outlay. The net present value (NPV) of the project "H" is greater than 0, thus it is considered acceptable. No

further ranking is necessary because the previous project did not fulfill criteria in order to be accepted and ranked. According to the result managers from DYAS.EU have been given a clear signal which possesses the capacity to give hand in their decision making process. The net present value technique is considered a better approach to capital budgeting than payback period. It offers conservative and more realistic reinvestment rate, as opposed to the internal rate of return. What is more, it works with numbers in terms of assigning worth to each investment. Having said that, “NPV provides distorted comparison between projects of unequal size and/or unequal economic life.”³³

Now it is time to proceed further. When managers obtain calculations via the internal rate of return, their calculations may face difficult interpretations as a result of multiple IRR – that is in case of nonconventional cash flow patterns. (Gitman, 2002) Bruner concludes that the internal rate of return often provides unrealistic rates of return. In order to bypass these difficulties in estimations the thesis will discuss the “modified rate of return” (MIRR) instead. According to Bruner, this method correctly assumes reinvestments at the project’s cost of capital and avoids the problem of multiple internal rates of return. MIRR is “the discount rate that equates the NPV of an investment opportunity with 0.- CZK (because the present value of cash inflows equals the initial investment)”³⁴. The steps of the MIRR technique are – firstly - to determine all cash flows as in the net present value technique; secondly to calculate the future value of all cash inflows at the last year of the project’s life; and lastly to determine the discount rate that causes the future value to be equal to the initial investment at time zero. The discount rate thus is known as the modified rate of return (MIRR). (Bruner, 2009) The basic formula for calculations of MIRR can be derived from:

³³ HERBST, ANTHONY F. (2002). Capital Asset Investment: Strategy, Tactics and Tools. Wiley. pp. 54. ISBN 0470845112

³⁴ GITMAN, LAWRENCE J. (2005). Principles of Managerial Finance. Addison Wesley. 11th edition. pp. 425. ISBN 0321267613

Figure 1.6 The modified rate of return formula³⁵:

$$PV \text{ Costs} = \frac{TV}{(1 + MIRR)^n}$$

Where TV represents a sum of future value inflows, n stands for the number of periods and PV Costs is the initial outlay of the project. To start off, let us compare the modified rate of return (MIRR) to the net present value (NPV) technique from the previous example. Let us suppose that the previously accepted project “H” is also to be revised by the modified rate of return technique (MIRR):

Table 1.5 The Project “H” MIRR calculations

	A	B	C	D	E	F	G
Project "H"							
Year	0.	1.	2.	3.	4.	5.	6.
1 (in CZK)	(3,942,300)	1324500	1029300	1502900	1105200	1105200	1105200
2							1105200
3							1248876
4							1411230
5							2168530
6							1678246
7							2440305
8 Required return		13%				Sum of FV inflows	10052388
		^					
	MIRR	17%		Calculated as =((G8/A1)^(1/6))-1			

In the previous example the net present value (NPV) technique generated a precisely calculated number (CZK 886,048), whereas here the modified internal rate of return (MIRR) technique inclines toward an explanation given in percent. The point is that the MIRR technique advises to accept given project if its MIRR discount rate is greater than the company’s required return or cost of capital and vice versa. In this case, the MIRR method affirms of correctness of the NPV method. Here 17 % is greater than the required return of 13 %. Both techniques thus imply that the decision to accept the

³⁵ “the modified rate of return”. THINKANDDONE.COM (2009). “mirr”. <http://www.thinkanddone.com/finance/mirr.html>

project would result in the firm’s goal of maximizing the shareholder’s wealth. But on the other hand - what would be the outcome of the MIRR technique in the project “G”? Follow the table beneath:

Table 1.6 The Project “G” MIRR calculations

	A	B	C	D	E	F	G
Project "G"							
	Year	0.	1.	2.	3.	4.	5.
1	(in CZK)	(4,241,200)	923600	923600	923600	923600	923600
2							923600
3							1043668
4							1179345
5							1332660
6							1505905
7							1701673
8	Required return	13%		Sum of FV inflows			7686851
	MIRR	10%		Calculated as $=((G8/A1)^{(1/6)})-1$			

The previous solution that was calculated via the NPV method rejected the project “G”. The modified rate of return technique came up with a number that is lesser than the company’s required rate of return. This implies that the project “G” does not provide sufficient rate of return – MIRR is 10 % - which would overcome the cost of capital reinvested elsewhere at the rate of 13 %. The MIRR technique in this case advises managers not to take this alternative as a ranked possibility. It is directly implied - by the result - to reject it in case of either mutually exclusive or independent project.

It can be concluded that both techniques are genuinely right, but the net present value (NPV) method appears more critical and more accurate. It reassures of its strengths not only in theoretical thinking, but also in practical examples as mentioned above. The most important steps of the financial investment appraisal have been completed so far. Once the project has been accepted - it is implemented. Right after the exhaustive process of implementation - managers observe, monitor and compare the actual costs and benefits to the facts and figures estimated in the analysis.

Conclusion

The thesis discusses and provides a concise summary of capital budgeting. It describes the process of capital budgeting, and also strives to enrich the readers' hindsight on techniques of financial analysis.

The capital budgeting is a very important element in corporate finance. Decisions related to capital assets decisively influence the cash flow of firms in the future. Thus, special attention must be paid by the key decision makers in order to precisely follow the correct procedures.

The key decision makers of every process within capital budgeting are the managers of particular company. Their management skills are influenced by their personal abilities, judgmental skills and also intuition. Throughout the capital budgeting process they strive to justify their decisions made on capital expenditures.

The process itself comprises a series of steps that are generally applied to capital budgeting procedures. It helps managers to identify, distinguish and realize the fundamental motives for making consequent decisions. Once the vital motives have been successfully interpreted to shareholders, managers are given permission to proceed further.

Even though the general perceptions about mathematical projections and estimations are rather negative, the quantitative analysis is still considered extremely helpful and important in the process of capital budgeting. The future of the shareholder's value or wealth directly relies on the capital budgeting techniques.

To carry out a profound financial analysis of cash flow, all relevant cash flow must be calculated. The capital budgeting provides hints and patterns to managers to be able to distinguish between certain rules of cash flow calculations.

The process of capital budgeting also provides managers with an array of forecasting methods. These methods are grasped as a vital part of the each company's know-how, therefore, highly valued and protected information.

Once the forecast of cash flows of each projects have been estimated, there are techniques of capital budgeting that resolve whether to accept or reject initial proposals. The techniques vary, from the simplest methods such as the payback period

to more complicated ones - the net present value or modified internal rate of return. It is up to each project and manager which method is eventually applied. In addition the last two techniques demonstrated in the thesis are more sophisticated – thus favorable, because they do not ignore the time value of money.

The capital budgeting from the Asaf's standpoint however offers rather unsophisticated view of a static world in which management possess no flexibility. "In reality, however, plans are rarely ever carried out as originally conceived. Changing business assumptions on external or internal conditions, or over- or under-achievement of project goals often necessitate revisions of original plans."³⁶

What is more each investment holds an uncertain extent of risk or simply uncertainty. Such big unknowns are very likely to be impossible to calculate, and thus they may vastly influence the expected outcome.

³⁶ ASAF, SAMIR (2004). Executive Corporate Finance: The Business of enhancing shareholder value. FT Press. Pp. 101. ISBN 0273675494

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Supplements

Incremental Operating Cash Flows						
Project "P" The Shandong Drying Machine BY214 (in CZK)						
New Machine		2010	2011	2012	2013	2014
1.	Operating Income	2822100	2822100	2822100	2822100	2822100
2.	Depreciation	640000	640000	640000	640000	640000
3.	Income before Tax (1-2)	2182100	2182100	2182100	2182100	2182100
4.	Tax 26%	567346	567346	567346	567346	567346
5.	Income after Tax (3-4)	1614754	1614754	1614754	1614754	1614754
6.	Operating Cash Inflows (5+2)	2254754	2254754	2254754	2254754	2054764
Old Machine		2010	2011	2012	2013	2014
1.	Operating Income	1294970	1294970	1294970	1294970	1294970
2.	Depreciation	0	0	0	0	0
3.	Income before Tax (1-2)	1294970	1294970	1294970	1294970	1294970
4.	Tax 26%	267216	267216	267216	267216	267216
5.	Income after Tax (3-4)	1027754	1027754	1027754	1027754	1027754
6.	Operating Cash Inflows (5+2)	1027754	1027754	1027754	1027754	1027754
Incremental Cash Flows (new-old)		1227000	1227000	1227000	1227000	1027010

Terminal Cash Flows						
Project "P" The Shandong Drying Machine BY214 (in CZK)						
1.	Proceeds from Sale of New Machine (+)				232000	
2.	Proceeds from Sale of Old Machine (-)				43500	
3.	Taxes on Sale of New Machine (-)				60320	
4.	Taxes on Sale of Old Machine (+)				11310	
5.	Recovery of Working Capital (+)				60500	
Total Terminal Cash Flow (1-2-3+4+5)					199990	

Overall Cash Flows						
Project "P" The Shandong Drying Machine BY214 (in CZK)						
	2009	2010	2011	2012	2013	2014
Initial Outlay	-3632320					
Operating Cash Flow		1227000	1227000	1227000	1227000	1027010
Terminal Cash Flow						199990
Total Cash Flow	-3632320	1227000	1227000	1227000	1227000	1227000

Incremental Operating Cash Flows						
Project "Q" The Qingdao's Drying Machine STG-U1250 (in CZK)						
New Machine		2010	2011	2012	2013	2014
1.	Operating Income	2955770	2416450	2921970	3083470	3374946
2.	Depreciation	930000	620000	682000	434000	434000
3.	Income before Tax (1-2)	2025770	1796450	2239970	2649470	2940946
4.	Tax 26%	418016	370696	462216	546716	606862
5.	Income after Tax (3-4)	1607754	1425754	1777754	2102754	2334084
6.	Operating Cash Inflows (5+2)	2537754	2045754	2459754	2536754	2768084
Old Machine		2010	2011	2012	2013	2014
1.	Operating Income	1294970	1294970	1294970	1294970	1294970
2.	Depreciation	0	0	0	0	0
3.	Income before Tax (1-2)	1294970	1294970	1294970	1294970	1294970
4.	Tax 26%	267216	267216	267216	267216	267216
5.	Income after Tax (3-4)	1027754	1027754	1027754	1027754	1027754
6.	Operating Cash Inflows (5+2)	1027754	1027754	1027754	1027754	1027754
Incremental Cash Flows (new-old)		1510000	1018000	1432000	1509000	1740330

Terminal Cash Flows						
Project "Q" The Qingdao's Drying Machine STG-U1250 (in CZK)						
1.	Proceeds from Sale of New Machine (+)				214000	
2.	Proceeds from Sale of Old Machine (-)				43500	
3.	Taxes on Sale of New Machine (-)				55640	
4.	Taxes on Sale of Old Machine (+)				11310	
5.	Recovery of Working Capital (+)				60500	
Total Terminal Cash Flow (1-2-3+4+5)					186670	

Overall Cash Flows						
Project "Q" The Qingdao's Drying Machine STG-U1250 (in CZK)						
	2009	2010	2011	2012	2013	2014
Initial Outlay	-3385000					
Operating Cash Flow		1510000	1018000	1432000	1509000	1740330
Terminal Cash Flow						186670
Total Cash Flow	-3385000	1510000	1018000	1432000	1509000	1927000

Incremental Operating Cash Flows							
Project "G" The Qingdao's Peeling and Cutting Machine SL-250 (in CZK)							
New Machine		2010	2011	2012	2013	2014	2015
1.	Operating Income	2124280	2124280	2124280	2124280	2124280	2124280
2.	Depreciation	666667	666667	666667	666667	666667	666667
3.	Income before Tax (1-2)	1457613	1457613	1457613	1457613	1457613	1457613
4.	Tax 26%	378979	378979	378979	378979	378979	378979
5.	Income after Tax (3-4)	1078634	1078634	1078634	1078634	1078634	1078634
6.	Operating Cash Inflows (5+2)	1745301	1745301	1745301	1745301	1745301	1497641
Old Machine		2010	2011	2012	2013	2014	2015
1.	Operating Income	1035343	1035343	1035343	1035343	1035343	1035343
2.	Depreciation	0	0	0	0	0	0
3.	Income before Tax (1-2)	1035343	1035343	1035343	1035343	1035343	1035343
4.	Tax 26%	213642	213642	213642	213642	213642	213642
5.	Income after Tax (3-4)	821701	821701	821701	821701	821701	821701
6.	Operating Cash Inflows (5+2)	821701	821701	821701	821701	821701	821701
Incremental Cash Flows (new-old)		923600	923600	923600	923600	923600	675940

Terminal Cash Flows						
Project "G" The Qingdao's Peeling and Cutting Machine SL-250 (in CZK)						
1.	Proceeds from Sale of New Machine (+)	315000				
2.	Proceeds from Sale of Old Machine (-)	56000				
3.	Taxes on Sale of New Machine (-)	81900				
4.	Taxes on Sale of Old Machine (+)	14560				
5.	Recovery of Working Capital (+)	56000				
Total Terminal Cash Flow (1-2-3+4+5)		247660				

Overall Cash Flows							
Project "G" The Qingdao's Peeling and Cutting Machine SL-250 (in CZK)							
	2009	2010	2011	2012	2013	2014	2015
Initial Outlay	-4241200						
Operating Cash Flow		923600	923600	923600	923600	923600	675940
Terminal Cash Flow							247660
Total Cash Flow	-4241200	923600	923600	923600	923600	923600	923600

Incremental Operating Cash Flows							
Project "H" The Shandong's Peeling and Cutting Machine BQ1226/8F							
New Machine		2010	2011	2012	2013	2014	2015
1.	Operating Income	2404693	2145061	2760517	2334295	2334295	2040892
2.	Depreciation	1152000	720000	648000	360000	360000	360000
3.	Income before Tax (1-2)	1252693	1425061	2112517	1974295	1974295	1680892
4.	Tax 26%	258492	294060	435916	407394	407394	346851
5.	Income after Tax (3-4)	994201	1131001	1676601	1566901	1566901	1334041
6.	Operating Cash Inflows (5+2)	2146201	1851001	2324601	1926901	1926901	1694041
Old Machine		2010	2011	2012	2013	2014	2015
1.	Operating Income	1035343	1035343	1035343	1035343	1035343	1035343
2.	Depreciation	0	0	0	0	0	0
3.	Income before Tax (1-2)	1035343	1035343	1035343	1035343	1035343	1035343
4.	Tax 26%	213642	213642	213642	213642	213642	213642
5.	Income after Tax (3-4)	821701	821701	821701	821701	821701	821701
6.	Operating Cash Inflows (5+2)	821701	821701	821701	821701	821701	821701
Incremental Cash Flows (new-old)		1324500	1029300	1502900	1105200	1105200	872340

Terminal Cash Flows								
Project "H" The Shandong's Peeling and Cutting Machine BQ1226/8F								
1.	Proceeds from Sale of New Machine (+)				295000			
2.	Proceeds from Sale of Old Machine (-)				56000			
3.	Taxes on Sale of New Machine (-)				76700			
4.	Taxes on Sale of Old Machine (+)				14560			
5.	Recovery of Working Capital (+)				56000			
Total Terminal Cash Flow (1-2-3+4+5)					232860			

Overall Cash Flows							
Project "H" The Shandong's Peeling and Cutting Machine BQ1226/8F							
	2009	2010	2011	2012	2013	2014	2015
Initial Outlay	-3942300						
Operating Cash Flow		1324500	1029300	1502900	1105200	1105200	872340
Terminal Cash Flow							232860
Total Cash Flow		1324500	1029300	1502900	1105200	1105200	1105200