INVESTMENT DECISION MAKING CRITERIONS IN PRACTICE

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Abstract

Investment decision making is an important part of strategic decision making in every enterprise because new investment projects essentially affect future economic results and the enterprise’s prosperity. Successfulness of new projects dramatically contributes to the growth of enterprise’s efficiency. On the other hand, unsuccessfulness can lead not only to a considerable decline in efficiency, but it can even jeopardize its future existence. Successfulness or unsuccessfulness of projects considerably depends on the quality of preparing, evaluating and choosing these projects. The quality of investment decision making is affected by a larger number of factors, while the most important of them include choice of the criterions applied in evaluating and choosing investment projects. The article’s aim is a presentation of the results of the empirical research done at Faculty of Business Administration of University of Economics in Prague (Kislingerová, 2008) and comparing them with results of other researches on that issue.

Keywords: investment, investment valuating methods, NPV, IRR, Payback Period.

Introduction

The empirical research of investment decision making at Faculty of Business Administration of Economics in Prague in a form of questionnaire investigation was done in the terms of the solution of research intention MSM 6138439905 “New theory of organizations’ economy and management and their adaptation processes”. This investigation was done before the period of economic and financial crisis at the edge of year 2007 in chosen Czech enterprises (in total 252 well filled questionnaires were gained and elaborated). Each questionnaire contained 77 basic questions focused on enterprise’s economy and management and other 15 questions aimed specially at logistics. Most questions were conceived so as the examined one could answer by choosing one or more possibilities or by a particular value if you like. In addition to the research mentioned above, results of other researches of similar area were used, realized both in the Czech Republic and then in the USA, Great Britain, Finland and Sweden.

Classification of criterions of investment decision making

Projects of investment character can be in term of quantitative outputs characterized by three basic factors, namely by cash flows, or if you like by the difference between receipts and expenditures resulting from the investment, by the real service life and by the risk, that is run by implementation of the investment and for which the enterprise should require an adequate return. There are many methods or criterions for evaluating capital projects that approach to these basic factors in different ways. Criterions of evaluating capital projects can be divided into two groups – static and dynamic criterions.

Static criterions consider mainly cash flows. They consider time in constraint mode and in principle they do not work with risk. They include e.g. total investment income, net total investment income, annual average returnability, average payback period, payback period.

Dynamic criterions take into account all three factors which mean cash flows, service life and undergone risk as well. They involve e.g. Net Present Value (NPV), Internal rate of return (IRR), Profitability index (PI), Benefit-Cost Ratio (CBR), Discounted Payback period (PP), Discounted Economic Value Added (DEVA), Annuity (AN).

During the evaluation of investments, other instruments are being used, mainly in connection with integration of the risk and uncertainty into this process of evaluation. They include above all sensitivity analysis, scenarios and simulation techniques. Evaluation of flexible investment projects is enabled by real options.

Choice of a criterion for evaluating investments reflects more aspects, mainly preferences of the decision-maker (impact on relative or absolute profitability, stress on short Payback Period, existence of the budget constraint), then also intensity and elaborateness of application of particular criterions, relevance of the decision, time pressure or customs in the organization.
Knowledge from own research of criterions applied in investment decision making

In terms of the research respondents expressed themselves of used criterions evaluating investment projects by the answer for the question: “Which criterions do you use at present for evaluating investment projects?”. Respondents could choose even more possible answers. Primary data gained in the empirical research, absolute and relative frequencies are introduced in table 1.

Table 1. Criterions used in evaluating investment projects

<table>
<thead>
<tr>
<th>Type of criterion</th>
<th>Criterion</th>
<th>Number</th>
<th>Rake-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>static</td>
<td>Indices of profitability and payback</td>
<td>190</td>
<td>75%</td>
</tr>
<tr>
<td>static</td>
<td>Payback period (static)</td>
<td>69</td>
<td>27%</td>
</tr>
<tr>
<td>dynamic</td>
<td>Discounted Payback period</td>
<td>28</td>
<td>11%</td>
</tr>
<tr>
<td>dynamic</td>
<td>Internal Rate of Return (IRR)</td>
<td>55</td>
<td>22%</td>
</tr>
<tr>
<td>dynamic</td>
<td>Net Present Value (NPV)</td>
<td>56</td>
<td>22%</td>
</tr>
<tr>
<td>dynamic</td>
<td>Profitability index (PI)</td>
<td>20</td>
<td>8%</td>
</tr>
<tr>
<td>dynamic</td>
<td>Benefit-Cost Ratio (BCR)</td>
<td>8</td>
<td>3%</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>9</td>
<td>4%</td>
</tr>
</tbody>
</table>

Most respondents (more than 75 %) use static criterions which do not except contemporary using dynamic criterions. Only less than quarter of respondents (22 %) use dynamic criterions for evaluating investments such as Net Present Value (NPV) or Internal Rate of Return (IRR). As the data show, managers prefer using criterions focused on profitability and investment return and unfortunately using of static criterions for evaluation investment projects prevails.

State that seems disconsolate at first sight is however usual also in international comparison (see part devoted to compare it with other researches) and it need not indicate cut of more sophisticated criterions of dynamic character but the state when particular criterions are being used accordingly to the purpose and aim. In the first move of decision making process also investments that after quantification of receipts and expenditures do not meet the basic criteria of acceptability are evaluated therefore then their possible risk is not taken in account. For this reason using of static criterions can be an adequate instrument for rationalization in further examination of investment options. The mentioned state can be a signal of management’s proactive attitude to control of enterprise’s development through investments – more possibilities of location of enterprise’s liquid capital are being searched more intensively. Many of them do not go through the first decision making screen for the reason of obvious inadvisability that is already disclosed by static criterions. On the other hand these grounds can be doubted to a certain extent because as it results from other researches (Švecová, 2005 or Dudek, 2003), most managers prefer more simply criterions mainly for reason of insufficient knowledge of more sophisticated instruments and time pressure. We can take it that enterprises in the Czech Republic prefer methods that emphasize timely rate of return.

Comparison with other local and foreign researches

The preferences in using criterions of evaluating investments were a subject of many empirical researches in a form of questionnaire investigation. These researches differ not only in size and structure of the set of respondents but also in the way of asking questions and filling particular criterions and methods into a set of criterions that are examined in preference. In table 2 there are introduced relative frequencies of using particular criterions as they were presented in home scientific literature. (Research A is introduced...

Table 2. Comparison of the results of research

<table>
<thead>
<tr>
<th>Criterion/research</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>I (USA)</th>
<th>J (Sweden)</th>
<th>K (Finland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRR</td>
<td>31 %</td>
<td>33 %</td>
<td>36 %</td>
<td>22 %</td>
<td>76 %</td>
<td>23 %</td>
<td>54 %</td>
</tr>
<tr>
<td>NPV</td>
<td>46 %</td>
<td>54 %</td>
<td>39 %</td>
<td>22 %</td>
<td>75 %</td>
<td>52 %</td>
<td>50 %</td>
</tr>
<tr>
<td>Discounted Payback Period</td>
<td>72 %</td>
<td>27 %</td>
<td>77 %</td>
<td>11 %</td>
<td></td>
<td></td>
<td>35 %</td>
</tr>
<tr>
<td>Payback Period</td>
<td>64 %</td>
<td>60 %</td>
<td>62 %</td>
<td>27 %</td>
<td>78 %</td>
<td>63 %</td>
<td></td>
</tr>
<tr>
<td>Investment Profitability</td>
<td>35 %</td>
<td>92 %</td>
<td>23 %</td>
<td>75 %</td>
<td>24 %</td>
<td>19 %</td>
<td></td>
</tr>
<tr>
<td>Profitability Index</td>
<td>42 %</td>
<td>8 %</td>
<td>55 %</td>
<td></td>
<td></td>
<td></td>
<td>6 %</td>
</tr>
<tr>
<td>Other DCF</td>
<td>5 %</td>
<td>11 %</td>
<td>3 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other not DCF</td>
<td>1 %</td>
<td>21 %</td>
<td>2 %</td>
<td>2 %</td>
<td>4 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the outline of researches in the Czech Republic we can voice presumptions only, not conclusions, because the groups of questioned enterprises are not entirely comparable, for example researches A and C was aimed in preference on technologically developing enterprises. We can pursue a high rate of applying some forms of criterion quick rate of return (Payback Period or Discounted Payback Period or investment profitability). Almost all researches (CZ) confirm a lower measure of using criterion IRR than NPV and most confirm a considerable representation of static criterions as well.

Considering the results of researches realized in the Czech Republic there is in foreign researches a visible preference in using dynamic criterions namely IRR above all, that even preferred to NPV (except research J).

Stress on using IRR that can be seen in the USA, is probably a result of different attitude to investment that is determined historically. On one hand, most Czech enterprises perceive realization of investment projects as a means of future development through gaining assets and then efficient using of them. On the other hand, American attitude perceives investment rather as a temporary allocation of capital. Therefore IRR is logically being preferred.

Cross-table comparison

Some other rather older empirical researches about applying criterions of evaluating investment projects realized mainly in Great Britain led to conclusions that the size of the enterprise is an important factor of measure of using criterions flowing from discounted cash flows, while with growing size of the enterprise, the measure of applying it increases as well. This statement was proved by researches realized in large enterprises (Mills-Herbert, 1987), in enterprises of a medium range (McIntyre-Coulthurst, 1987) and in small enterprises (Nimako, 1987).

In elaborated data in own research it was possible to make cross tables for comparison of used criterions depending on size of the enterprise, major owner, characteristic of the branch, number of employees and similar other factors. We become only these results:

Hypothesis about dependence of choice of criterion on enterprise’s size was tested through \( \chi^2 \) test of fit. It was proved that the size of the enterprise influences the choice of criterions for evaluating investments. In the research there is a noticeable tendency of large enterprises’ shift to using dynamic criterions (NPV, IRR), however it is not provable statistically.

Enter of foreign capital into Czech enterprises is often a very important step to rationalization of decision making processes on all levels of managing. For this reason we have worded the hypothesis about the dependence of choice of evaluating criterions on the type of owner. By the application of Spearman’s coefficient of ordinal order we get correlation 95 %, which means that the criteria choice of major Czech owners is very similar to the criteria choice of foreign owners. Hypothesis regarding relationship between used criterions and kind of owner was not confirmed. The reason is probably that Czech market by terms of integration in EU and worldwide influences of globalization processes is affected so much by trends of the environment yet, that even domestic owners have accepted attitudes of foreign owners.

As it was already suggested, impacts that are hardly realized by hard business data and that were not examined exist as well – for example a fact whether the owners are the managers at the same time or whether the owners delegated decision making about (at least some) investments to the top management. This then
affects preferring the method of payback period which stresses manager’s interests in the best way and its increased level of application can be determined by the fact that the management prepares basis for decision making and without direct decision making, it passes under “his” method to the owner. In the introduction it was said that there is a whole range of dynamic criterions while their common base is a recalculation of future earnings to present value while including factors of time and risk. It cannot happen that some investment would be acceptable while evaluating by one criterion and at the same time another one would refuse it.

**Principle of choosing criterions for decision-making**

Why several criterions do co-exist there, then?

1) Each criterion pursues the investment from different angle on it. NPV quantify absolutely increase in value no matter the relative relation to capital expenses. On the other hand, IRR evaluates relative rate of return only. Both measures are otherwise connected in Profitability Index, but its result does not say anything about a concrete sum of money in cash gained by the investment. Payback Period prefers liquidity only, which means a quick rate of return of cash flow. In different cases investors can have various requirements on the investment and according to them they choose the key criterion.

2) Otherwise criterions predicate accordingly about one investment, in case of two or more alternative (acceptable) investments can a particular criterions predicate in different way and then they rely on investor’s preferences (in the light of aims and criterions).

3) Some criterions predicate (and from their substance must predicate) completely in agreement – it concerns criterion NPV, discounted EVA (this very good criterion did not appear in none research) and annuity (favourite in Germany, but unfortunately we did not have any data available from this area). Each of them also pursues absolute effects (money) from different point of view during the course of investment – annuity method looks at the investment as at a necessary stable generator of sums of money, NPV and EVA respect different dynamics of earnings during the course of operating. Net present value then stresses the sum of money that is going to be available in given period, while discounted economic value added pursues capital valuation in the light of retained capital (no matter the continuously generated cash flows).

In general acceptable alternatives here are two main reasons of different recommendations:
- range of investment which work the difference in absolute and relative rate of return,
- distribution of (financial) effects during the course of the service life.

Final statement about profitability is therefore the same, only from different point of view, difference can happen once choosing between more options. (Some enterprises mentioned during the research more used criterions - which can be seen both in table 1, 2).

Any research (not even ours) did not reflect whether:
- a) firms evaluate each investment by one basic criterion and other complementary or
- b) each time they use more criterions (all researches would prompt it), which are chosen either accidentally or on purpose according to the elaborated methodology.

In this sense it would be suitable to enrich other questionnaire investigations, because preferences of criterions should be accordingly to the investment’s aim. Objectives of the investment depend at least on:
- a) reason of investment in the light of enterprise’s needs (an investment needed by reason of development, therefore necessary purchasing assets or an investment needed by reason of allocating free capital resources),
- b) type of investment in the light of the aim of location (replacement, developing or regulatory investment),
- c) stadium of firm’s life cycle, in which it is found – this information replaces size of the firm only partly and insufficiently, because it is not able to intercept other problems connected with markets of raw materials, products, labour and money.

**Investments criterions and firm life-cycle**

Phase of setting up is characterized by a great investment activity caused by lack of possession that is needed for creating enterprise’s outputs, but at the same time by lack of created financial resources – investments mainly have developing character (replacement ones do not appear because there is not anything to replace) and regulatory investments are usually solved neither. A firm with aims from profit area will not
enter to the area of business where regulatory investments would be needed on larger degree. (If the branch is encumbered by regulations then these investments are solved as a part of the founding plan at the beginning, but not during the course of life.) The aim of this phase is to survive, to gain a place in the market, a certain position and means for other developing and expansion. Suitable criterions for evaluating investments in this phase would be profit oriented – after initiatory cleanup by static criterions it would be probably payback periods and NPV. While a high rate of increase in investment opportunities and need of quick creating of cash flow rather payback period would be preferred.

Phase of growth is from the light of investments the most varied one, investments of all types according to the character appear. Still growth investments prevail, need of quick cash flow usually stop to be acute, therefore criterion NPV is being preferred with them. It can be used for replacement investments, as well. If a need of regulatory investments appears in this phase, it is possible to use NPV focused on costs (NPVC). In case of entering markets with higher rate of uncertainty, in investments with usable flexibility it is possible to broaden NPV by methods of real options, simulations or scenarios and complement decision making by sensitivity analysis.

Phase of stability is characterised by sufficiency of capital and cash, but less possibilities in the light of allocating to possesses which would be able to generate corresponding profits. While choosing a portfolio of investment activities the importance of relative valuation grows, therefore methods IRR, eventually PI. As far as dynamic methods are concerned NPV is replaced by method DEVA, which otherwise brings same summary results, but during the course of investments process it evaluates an investment in the light of creation of value and therefore effective using of retained capital, not generating cash flow as in the case of NPV. For the phase of stability a great amount of replacement investments is typical, as well. For reasons of sufficiency of capital such attention is not paid to them, from their operational phase a stable creation of revenues and consumptions of costs are expected, therefore they are evaluated by some of value dynamic methods (NPV, annuity), eventually by costs, too. For regulatory investments cost alternatives of NPV or benefit analysis are used.

Phase of decline comes from different purposes – causes of stagnation can be both internal (insufficient activity in finding new possibilities and managing business activities, bad coordination of activities with their financing...) and external (growing competition, saturated market, business cycle). Then the result is a decline in creating new capital, in financial options, but also slower finding new investment opportunities, therefore developing investments appear in lower rate and replacement ones prevail. In the terms of effort of restructuring and following revitalization, strategic aims are being reassessed and a firm can deprive of some activities, which it does not want devote to in future. For this reason also in the area of replacement investment the replacing is selective and evaluated more severely in the light of effects of contribution. Regulatory investments are not only related to obligatory regulations to which impulses come from outside, but also to eventual restructuring measures. For other revitalization and growth it is needed to maintain financial resources and their quick rate of return, therefore in evaluating of all types of investments criterions NPV and discounted payback period prevail. After a positive development and making the phase of decline up, phase of revitalization follows and it is similar to a new phase of growth in investments and methodology of their evaluation.

For completeness’ sake let’s add that in all phases of enterprise’s life static criterions are used as a first investment screen and evaluation of investments by dynamic ones relies on risk, which changes during firm’s life.

Conclusion

The aim of the article was to analyze and evaluate important area of investment decision making connected with criterions used in evaluating and choosing investment projects on the basis of knowledge from domestic empirical researches as well as researches realized abroad.

Knowledge from own extensive research about criterions applied in investment decision making have shown that static criterions are wide spread mostly (above all the indices of profitability and payback period), while their frequency is approximately three times higher that frequency of dynamic criterions (NPV, IRR and IR). Testing dependences of using criterions of investment decision making on chosen characteristics of respondents has lead to a conclusion that the choice of these criterions is affected by the size of enterprise, but it does not depend on the type of ownership (domestic or foreign). Similar researches that were realized at VŠE in past years or at other workplaces in the Czech Republic did not bring markedly different results on average. Comparison with the results of some foreign researches has shown a considerably higher rate of
applying and the use of dynamic criterions, both in the USA and in chosen European states (Great Britain, Sweden and Finland).

On the basis of comparison with advanced west countries in future there can be expected a gradual increasing in applying dynamic criterions in the Czech Republic. However, this tendency can be confirmed only by the results of researches of investment decision making.

While evaluating the research some other important aspects were not taken in account – they can affect choice of criterion for evaluation in dependence on other enterprise’s characteristics that were not questioned in the research and it is a question whether it is realistic to get these data by direct and sufficiently wide questioning.

Firms will have a little willingness to provide internal data about who decides about investments in them, the more to more detailed characteristics. An undistorted insertion of firms to a life phase will be also very difficult, mainly in firms that already will leave the phase of growth.

That is the reason why neither other comparable investigations, whose data we worked with, did not inserted pursuing of this type to the final evaluation. In the terms of research intention MSM 6138439905 “New theory of organizations’ economy and management and their adaptation processes” a close cooperation with business sphere is going to be established next year and it gives a chance to a deeper research, but in smaller extent. In spite of it we would like to try to analyse whether logical theoretical conclusions do reflect in enterprise methodology of creating basis for investment decision making.

References