

Practical Issues with Decision Preparation of Facility Investments in the National Manufacturing Industry

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SUMMARY

This study deals with a few practical issues related to preparing facility investment decisions and is based on the findings of a questionnaire survey conducted in 2016. This study discusses the length of time required to prepare economic decisions on investing in facilities, the people to be engaged in investment preparation processes and corporate practices concerning analyses of economic efficiency and ranking of projects. Survey findings show that companies spend several months preparing decisions about facility investments and involve not only owners and top management in this process, but also financiers and investment experts. A relatively high proportion of companies usually evaluate the economic efficiency and rank the investments.

Keywords: facility management, facility investments, investment decisions, economic decision-preparation process, evaluation of economic efficiency

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INTRODUCTION

Operation of a manufacturing company that lacks any facility for manufacturing purposes is simply unimaginable. Investment is considered to be one way of acquiring a corporate facility. Corporate facilities determine operation of a company for a long period of time. In addition, costs required for operating and maintaining corporate facilities make up a considerable ratio of total costs. Therefore, it is fundamental to pay particular attention to decisions related to preparing investments in facilities. Since these investments are of very complex and complicated nature, it takes weeks, and even months to prepare them in a highly professional manner. Taking into consideration all investment alternatives as well as the tasks built on each other and related to decision-preparation processes also increases the time needed for preparing sound investment decisions. Since different activities require different skills and professional knowledge, it is appropriate to involve experts from several fields (financiers, production managers, etc.) in investment preparation processes.

Calculation of the economic efficiency of investments is one of the operative stages in the preparation process of

facility investments. However, findings of many international research studies indicate that a relatively high percentage of companies neglect to calculate the economic efficiency of investments in advance or fail to rank alternative projects that are considered to be economically efficient. Some studies revealed that the surveyed companies calculate the economic efficiency of investments with methods different from those recommended by the economic literature.

A questionnaire survey dealing with some issues of facility management practices of manufacturing companies in Hungary was conducted in 2016. The survey investigated decision-preparation processes in facility investments, methods used for evaluating and ranking economically efficient investment alternatives, outsourcing practices of facility management activities, etc. The present study addresses issues encompassing wider areas, such as:

- How long is the economic decision-preparation process of facility investments?
- What employees are involved in preparing investments decisions?
- Do companies calculate the economic efficiency of alternative investments and rank economically efficient project alternatives?

A BRIEF REVIEW OF PREVIOUS STUDIES

A decision in a broad sense is not limited to the selection of possible alternatives. It encompasses a whole decision-preparation process. This process depends on several factors, such as corporate character, corporate situation and decision-makers' approaches (Fodor 2017). Taking into consideration that facilities have a long-lasting impact on managing a company, tie up a lot of capital, and involve high maintenance and operation costs, decision makers need to be extremely cautious when preparing investment decisions. In addition, investments in facilities are very complex and complicated.

Barta (1986), in the preface to his book, highlights that each decision is prepared in time and in space. According to Vargha (2001), there is a one-way relationship – stochastic – between the scope of an investment (measured in costs) and the complexity of decisionmaking, planning, preparation of the work and the required time. Due to the complex and complicated nature of the process, it is assumed that it takes weeks and even months to prepare investment decisions in a professional manner and that the process itself consists of a series of activities.

The majority of the tasks related to preparing economic decisions are built on each other and cannot be performed in parallel, which increases the time spent on preparing facility investments. While an investment decision is being prepared, different alternatives and options are worth considering in order to collect as much information as possible on the particular investment before a final decision on the investment is made. Consequently, information collection, systematisation and selection are likely to take far more time than expected. As a result, the time required to prepare an investment decision may also increase. In companies with a foreign-ownership structure, professionals and experts of parent companies often have to be involved in decision-preparation processes. This, in turn, is also likely to prolong investment preparation processes in foreign-owned companies.

Small companies are shorter of competent professionals than their large counterparts. Therefore, they are more likely to simplify decision-preparation processes, which can be done in two ways: either by skipping one or more phases of the process or by performing activities in a less detailed manner than large companies. A research study conducted in New Zealand supports this assumption. The findings of the study (Vos & Vos 2000) show that small New Zealand companies significantly simplify the calculations related to economic efficiency of investments. In 1999 the researchers investigated investment practices of small companies in New Zealand. While 41% of the responding companies indicated that their managers 'always' make intuition-based decisions, the managers of 26% of them make 'only' intuition-based investment decisions. When asked to indicate the method they use to calculate the discount rate, 42% of the companies

responded that they also use a 'similar' method. Action simplification practices result in the need to investigate whether small companies spend less time on preparing investment decisions. In addition, small companies execute lower capital-intensive investments and enjoy less complex and complicated management relationships than large companies, which also contributes to shortening the time spent on preparing investment decisions.

Managers of small companies, who are often single owners of these companies, are able to oversee and control corporate processes as a whole. It is quite a common practice among small companies that managers themselves prepare investment decisions (even facility-investment decisions). Contrary to this, managers of larger companies are unable to oversee the whole economic process in detail, and, therefore, are more likely to involve representatives of several areas (i.e. financial experts, heads of production, etc.) in the preparation of investment decisions. 2012 survey investigated decision-preparation practices and methods applied to calculate the economic efficiency of investments in Hungarian manufacturing companies and revealed that 39% of the responding companies involved three or fewer employees in investment decision-preparation processes, 36% of companies involved four or five workers and one-fourth of them involved six or more people. In addition, the number of people involved in these processes depended on the company size. The larger the company size was, the more employees were involved in the investment decision-preparation process. Managers of a specific corporate entity (a division, a unit) (in two-thirds of responding companies) and employees from finance departments (in 42% of responding companies) were also involved in these processes. A small percentage of companies, namely one-fourth of them, hired external experts or consultants to help prepare investment decisions (Szűcsné Markovics, 2016).

Apart from the survey conducted in New Zealand by Vos & Vos (2000), a considerable amount of national and international research into corporate practices has been carried out related to calculating the economic efficiency of investments. (The studies in this field of research that are usually referred to generally investigate investments and not facility investments.) Sangster (1996) observed that 8% of Scottish companies neglect the calculation of economic efficiency of their investments. Pike (1996) also conducted a survey among British companies in the same year as Sangster and his findings slightly contradict those of Sangster. He found that all the responding companies evaluate the economic efficiency of their investments. According to Osemy (2002), who surveyed investment practices of Egyptian companies, 7% of the sampled companies never conduct economic efficiency calculations when they invest. Andor et al. (2011) carried out a telephone survey and sampled four hundred companies employing twenty-five or more employees in ten Central European countries (Bulgaria, Czech Republic, Croatia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). The research covered a wide range

of areas. It also investigated whether the surveyed companies apply any capital budgeting methods. The findings revealed that 17% of the surveyed companies never perform any economic efficiency evaluations before making a decision to invest. According to my own 2012 survey, a considerably high percentage of Hungarian manufacturing companies (34%) never evaluate the economic efficiency of their investments (Szűcsné Markovics, 2013). Wnuk-Pel et al. (2015) investigated corporate investment practices in Poland and Thailand. The research results published in 2015 show that 4.7% of Polish and 44.5% of Thai companies never calculate the economic efficiency of their projects. Andrés et al. (2015) surveyed Spanish companies and found that 4% of the companies never evaluate the economic efficiency of their investments.

Although numerous empirical research studies have been conducted that surveyed capital budgeting methods preferred by companies when investment decisions are made, they all – without exception – investigated methods that corporate managers applied for evaluating the economic efficiencies of project but not for ranking of projects. The survey of 2012 differed by analysing methods used for ranking projects by Hungarian manufacturing companies and found that a considerably high percentage of responding companies (38%) never rank economically efficient investment alternatives.

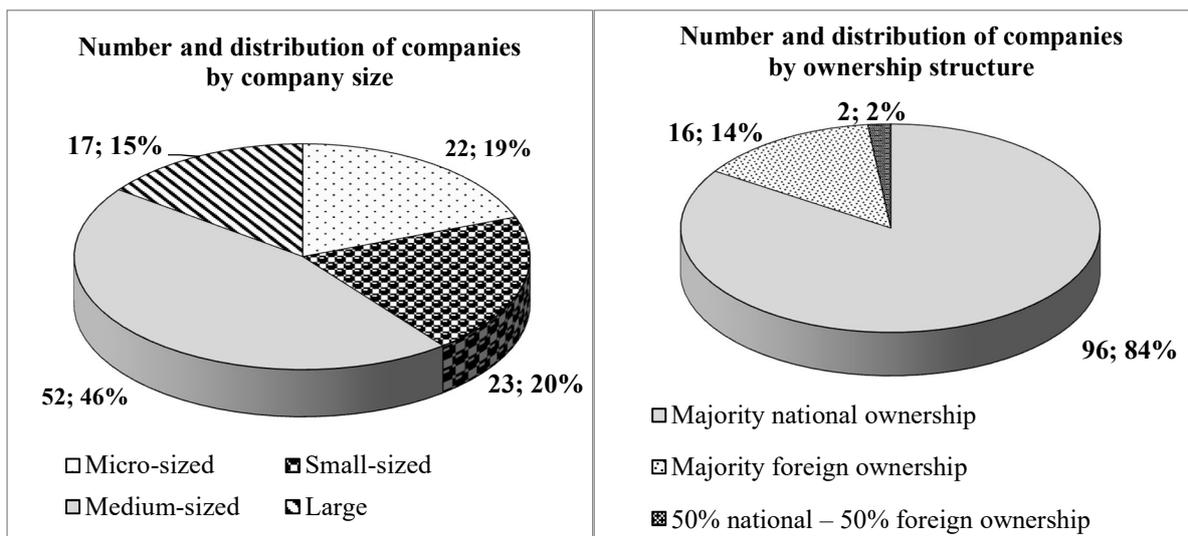
RESEARCH METHODOLOGY

This study addresses some issues related to facility management based on a questionnaire survey of 2016 conducted among Hungarian manufacturing companies. The eight-page questionnaire encompassed the following areas:

- general information about companies: 7 questions;
- information about corporate facilities: 4 questions;
- information about investments in facilities, their decision preparation and analysis: 10 questions;
- information about the operation of facilities: 3 questions;
- information about the practical implementation of facility management: 4 questions.

The questionnaire was completed by 114 companies in a form that could be evaluated. Of the responding companies, 19% were micro-sized companies, 20% were classified as small-sized companies, 46% belonged to medium-sized companies and the percentage of large companies amounted to 15%. As for their ownership structure, the highest percentage of companies (84%) had majority national ownership; 14% had majority foreign ownership and 2% had 50-50% national and foreign ownership. (Figure 1 shows the sample composition by company size and ownership structure).

The data in the completed questionnaires were summarised in Excel spreadsheet software and analysed with the SPSS Statistics software package. Simple descriptive statistical methods (partition coefficient, group mean, etc.) and comparative statistical analyses (correlation coefficient, Chi-squared indicator, discriminant analysis, variance analysis) were performed.



Source: compiled by the author based on the questionnaire responses

Figure 1. Composition of respondents by company size and ownership structure

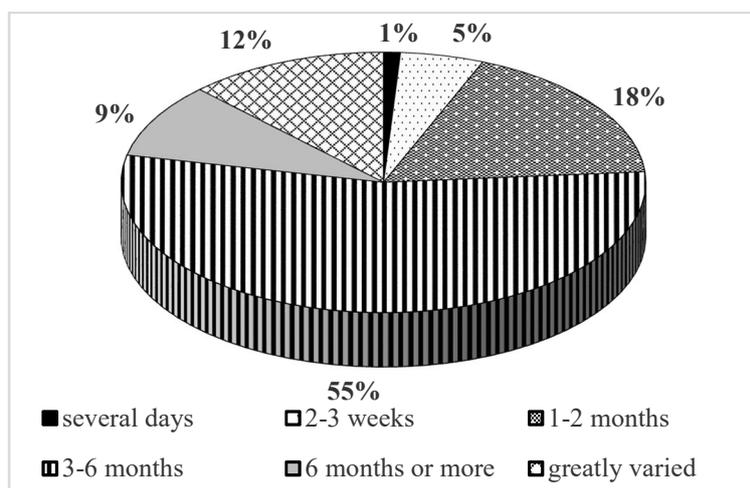
PRACTICAL ISSUES WITH DECISION- PREPARATION OF FACILITY INVESTMENTS BASED ON THE SURVEY RESULTS OF 2016

The Time Required for Preparing Decisions about Investing in Facilities

The questionnaire survey results confirmed the assumption that it takes companies several months to prepare decisions about investing in facilities. The responses of the surveyed companies show that 55% of respondents spent 3-6 months and 18% dedicated 1-2 months to prepare facility-investment decisions. In addition, the percentage of companies that spent as much as half a year to prepare their investment decision amounted to 9%. Only 5% of companies claimed that it took them 2-3 weeks to prepare investment-related

decisions. The respondents that spent only several days to prepare the decisions accounted for 1%. However, 12% of the responded companies claimed that the amount of time spent on decision preparation varied greatly (Figure 2).

The initial assumption was that the company size and the ownership structure greatly affect the time required for preparing decisions about investing in facilities. The conducted analyses show that it took micro-sized companies 1-2 months to prepare their investment decisions. However, it should be noted that a relatively high percentage of micro-sized companies (21%) chose the remaining three responses and indicated that they invest 3-6 months, 6 months or more, or a varied period of time in decision preparation. As for small-sized companies, 35% of them dedicated 1-2 months and 24% invested 3-6 months in preparing investment decisions. The investment decision-preparation process lasted 3-6 months in the majority of medium-sized and large companies (73% and 56%, respectively) (Table 1 shows the distribution of responses to this question.)



Source: compiled by the author based on the questionnaire responses

Figure 2. The time required for preparing decisions about investing in facilities

Table 1

The time required to prepare investment decisions by company size and ownership structure

Duration of decision-preparation activities	Company size				Proportion of ownership		
	Micro-sized companies	Small companies	Medium-sized companies	Large companies	With national majority	With foreign majority	50% national, 50% foreign
Several days	0%	0%	2%	0%	1%	0%	0%
2-3 weeks	7%	12%	2%	6%	5%	7%	0%
1-2 months	29%	35%	8%	17%	17%	13%	50%
3-6 months	21%	24%	73%	56%	57%	47%	0%
More than 6 months	21%	18%	6%	0%	10%	7%	0%
Greatly varies	21%	12%	8%	22%	10%	27%	50%

Source: compiled by the author based on the questionnaire responses

In order to identify the relationship between company size and the time required to prepare investment decisions, Pearson's Chi-squared test was performed. Its value was under 5% of the conventionally accepted significance level (2.3%), which indicated that there is a relationship between the two variables. Cramer's V value amounted to 0.307, which shows a moderately strong relationship between company size and the length of decision preparation.

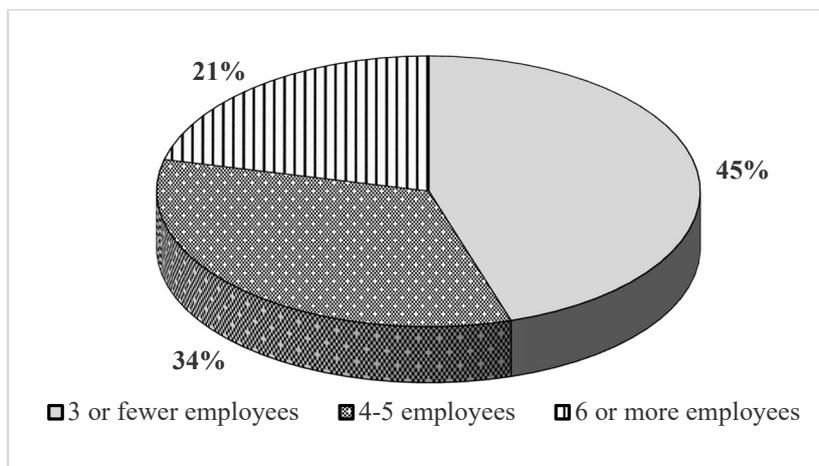
As for the responses related to the proportion of ownership, the results reveal that there is no significant deviation in terms of preparing decisions about investments in facilities. Although there are some proportional differences between responses, companies with both national and foreign ownership structures invested 3-6 months in preparing investment decisions. Only in 2 responding companies was the proportion of the foreign ownership structure the same as the proportion of national ownership structure. One of these two companies invested 1-2 months in preparing investment decisions and in the other the length of decision preparation time greatly varied (see Table 1).

The distribution of responses relating to the ownership structure clearly reveals that there is either no or a very weak relationship between the time required to prepare investment decisions and the ownership structure. The conducted cross tabulation analysis also confirms this

assumption. Pearson's Chi-square test value well exceeded 5% of the conventionally accepted significance level, which indicated that there is no relationship between the two variables. Cramer's V value amounted to 0.205, which indicates a weak relationship.

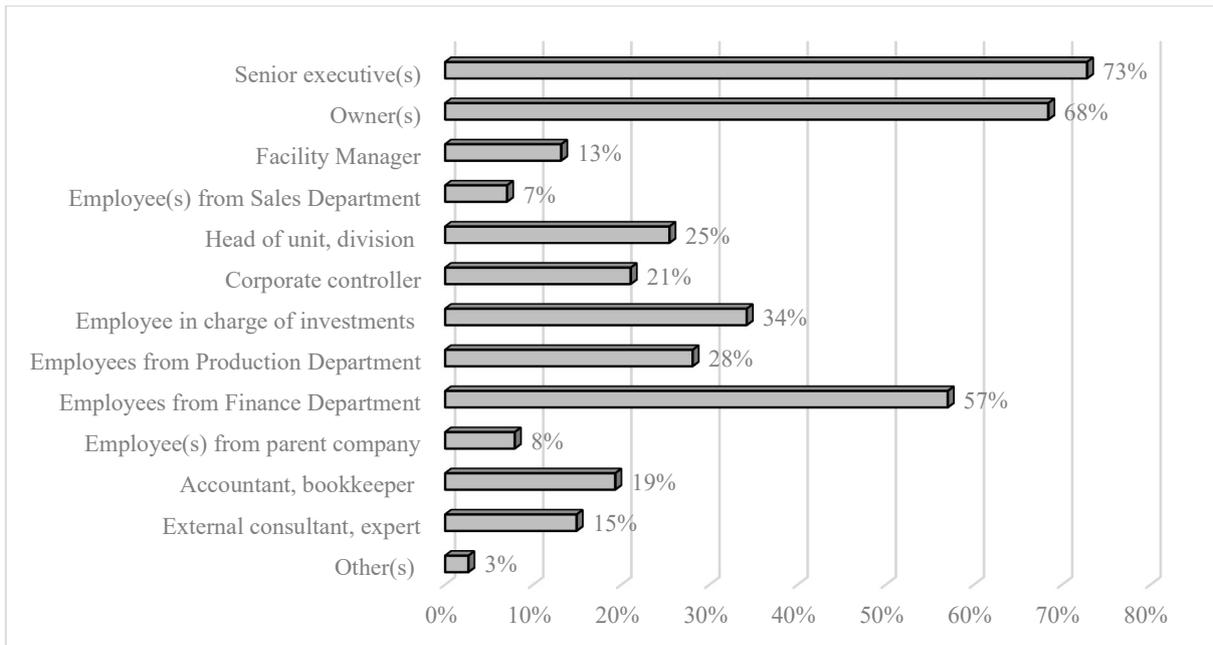
Employees Involved in Preparing Decisions about Investing in Facilities

In a high percentage of companies (45%) a maximum of three people participated in preparing investment decisions. One-third of respondents delegated this work to 4-5 employees and six employees took part in decision preparation in one-fifth of the responding companies (Figure 3). In a large majority of companies (73%), senior management was generally involved in preparing facility-investment decisions. The percentage of companies where owners also took part in decision preparation amounts to 68%. In 57% of respondents, finance people were involved in preparing investment decisions and in 34% of companies employees engaged in different investments were involved. A quite low percentage of respondents (15%) indicated that they hired external experts and consultants when preparing facility-related investment decisions (Figure 4).



Source: compiled by the author based on the questionnaire responses

Figure 3. Number of employees involved in preparing decisions about investing in facilities



Source: compiled by the author based on the questionnaire responses

Figure 4. Employees involved in preparing decisions about investing in facilities

In order to confirm the initial assumptions that large companies involve experts from different areas in preparing investment decisions, the responses were analysed broken down by company size. In 41% of micro-sized companies 4-5 employees prepared decisions about investing in facilities, while in 36% of these companies 3 or fewer workers carried out the preparation. As for the small companies, about half of them (48%) delegated this work to six employees and in 39% of them a maximum of three colleagues were engaged in preparing investment decisions. It is a bit surprising that more than half of the medium-sized companies (51%) invited only three employees onto the decision-preparation team. Large companies also followed this small-team practice, since the percentage of these companies involving either

maximum three or 4-5 colleagues in decision preparation amounted to 44% and 44%, respectively. (Table 2 shows the response distribution in detail.)

In order to establish the relationship between the company size and the number of employees involved in decision preparation, a cross tabulation analysis was conducted. Pearson’s Chi-square test value amounted to 2.5% and was below 5% of the conventionally accepted significance level, which indicated that there is a relationship between company size and the number of employees involved in decision preparation. Cramer’s V value amounted to 0.252, indicating a weak relationship between the two variables. (The percentage distribution of responses also provided grounds for assuming this relationship.)

Table 2
Number of employees involved in decision- preparation of facility investments by company size and ownership structure

Number of employees in decision-preparation	Company size				Proportion of ownership		
	Micro companies	Small companies	Medium-sized companies	Large companies	With national majority	With foreign majority	50% national, 50% foreign
3 or fewer employees	36%	39%	51%	44%	42%	56%	100%
4-5 employees	41%	13%	35%	44%	34%	31%	0%
6 or more employees	23%	48%	14%	11%	24%	13%	0%

Source: compiled by the author based on the questionnaire responses

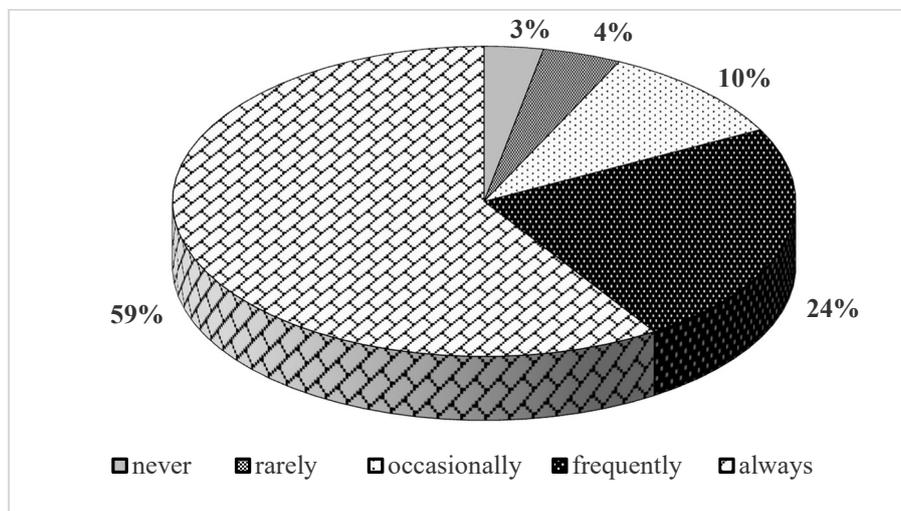
The second assumption was that in companies with foreign-majority ownership, employees of parent companies also participate in preparing investment decisions and therefore more people are involved in decision-preparation processes than in companies with national-majority ownership. Although the distribution of responses provided by companies with national-majority ownership and with foreign-majority ownership showed some differences in corporate practices, these differences were insignificant. While 42% of companies with national-majority ownership engaged three or fewer employees in preparing investment decisions, 34% of these companies involved 4-5 employees in this process. As for the companies with a foreign-majority ownership structure, this proportion is 56% and 31% respectively. In companies with 50% national and 50% foreign ownership, the decision-preparation team was made up of three or fewer employees (Table 2 shows the distribution of the responses).

The distribution of the provided responses suggests that the relationship between the ownership structure and the number of people involved in preparing investment decisions is weak. The conducted cross tabulation analysis confirmed this assumption, since the Chi-square test value well exceeded the 5% conventionally accepted significance level. Cramer's V value amounted to 0.133, indicating a very weak relationship between the two variables.

Evaluation of Economic Efficiency of Facility Investments

The findings of the conducted questionnaire survey reveal that a high percentage of companies (59% 'always' and 23% 'frequently') calculated economic efficiency of investment alternatives. Considering the current findings in the light of previous research studies, it should be highlighted that only 3% of respondents never carried out economic efficiency calculations, which is a very positive trend. In previous national surveys this percentage was 17% (Andor et al. 2011) and 37% Szűcsné Markovics (2013). (Figure 5 shows the distribution of responses.)

As generally anticipated, evaluation practices of facility investments depend on a company's size. There are a few micro and small companies that never conducted economic efficiency analyses of investments. A relatively high percentage of micro-sized companies 'always' (43%) or 'frequently' (21%) calculated the economic efficiency of investments. As for the medium-sized companies, this ratio was not that high. Only 22% of the responding companies 'always' and 28% 'frequently' evaluated economic efficiency of potential projects. The efficiency evaluation was 'always' conducted by two thirds and 'frequently' by 29% of medium-sized companies. In large companies this percentage amounts to 83% and 6% respectively. (Table 3 shows the distribution of responses.)



Source: compiled by the author based on the questionnaire responses

Figure 5. Distribution of companies by evaluation of economic efficiency of facility investments

Table 3
Evaluation of economic efficiency of facility investments by company size and ownership structure

Frequency of economic efficiency calculations of facility investments	Company size				Proportion of ownership		
	Micro companies	Small companies	Medium-sized companies	Large companies	With national majority	With foreign majority	50% national, 50% foreign
Never	14%	6%	0%	0%	4%	0%	0%
Rarely	0%	11%	4%	0%	5%	0%	0%
Occasionally	21%	33%	0%	11%	13%	0%	0%
Frequently	21%	28%	29%	6%	24%	13%	50%
Always	43%	22%	67%	83%	54%	87%	50%

Source: compiled by the author based on the questionnaire responses

In order to establish the relationship between company size and the evaluation of economic efficiency of facility investments, a cross tabulation analysis was conducted. The first number of the Pearson’s Chi-square test value was very close to zero, which indicated that there is a relationship between the two variables. Cramer’s V value amounted to 0.353, indicating a moderately strong relationship between these variables.

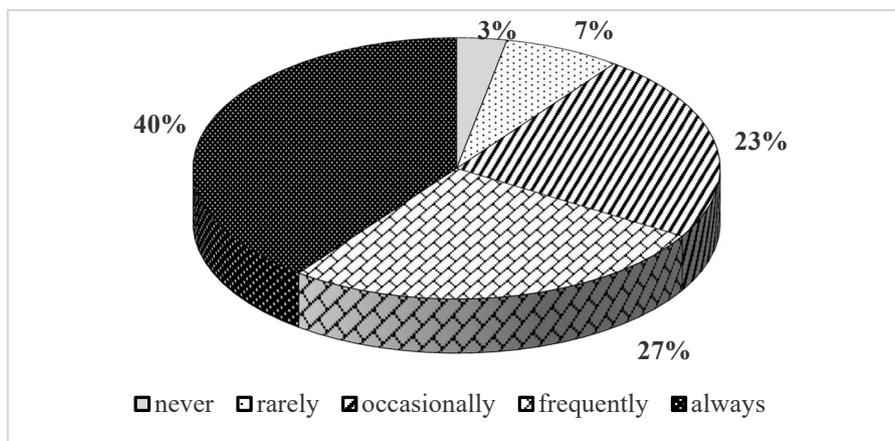
Analysing the responses to the questions related to the ownership structure, it can be claimed that the responding manufacturing companies ‘always’ or ‘frequently’ calculate the economic efficiency of facility investments irrespective of the observed differences in percentage. While 54% of companies with national-majority ownership ‘always’ calculated the economic efficiency of facility investments, 24% of these companies ‘frequently’ performed this activity. As for the companies with a foreign-majority ownership structure, the percentage is even better because companies conducting economic efficiency evaluation amount to 87% and 13% respectively. In companies with 50% national and 50% foreign ownership, the economic efficiency evaluation

was never done by 4%, ‘rarely’ performed by 5% and occasionally conducted by 13%. (Table 3 shows the distribution of the responses in detail).

In order to establish the relationship between the ownership structure and the evaluation of economic efficiency of facility investments, a cross tabulation analysis was conducted. The Pearson’s Chi-square test value was very high, which indicated that there is no relationship between the two variables. The Cramer’s V value of 0.193 indicated a weak relationship between these variables.

Ranking Facility Investments

If there are several potential alternative projects, the economic efficiency evaluation is followed by ranking of projects. The findings of the questionnaire survey revealed that 40% of the responding companies ‘always’ and 27% of them ‘frequently’ ranked projects. The percentage of companies that never ranked potential project alternatives is relatively low and accounts for only 3% (Figure 6).



Source: compiled by the author based on the questionnaire responses

Figure 6. Distribution of companies by ranking economically efficient facility investments

Table 4
Ranking economically efficient facility investments by company size and ownership structure

Ranking frequency of economically efficient facility investments	Company size				Proportion of ownership		
	Micro companies	Small companies	Medium-sized companies	Large companies	With national majority	With foreign majority	50% national, 50% foreign
Never	21%	6%	0%	0%	5%	0%	0%
Rarely	0%	6%	6%	17%	6%	13%	0%
Occasionally	21%	39%	22%	11%	27%	7%	0%
Frequently	36%	33%	27%	11%	28%	13%	50%
Always	21%	17%	45%	61%	34%	67%	50%

Source: compiled by the author based on the questionnaire responses

Comparing the responses to the question related to project ranking by company size, the findings revealed significant differences in corporate practices. A high percentage of micro-sized companies (21%) never ranked investment alternatives. This percentage amounts to 6% in responses provided by small companies. There were no medium-sized and large companies that never ranked projects. Only one-fifth of micro-sized companies 'always' and 36% 'frequently' ranked economically efficient projects. So did 17% and 33% of small companies respectively. A significant percentage of medium-sized companies 'always' (45%) and 'frequently' (27%) ranked projects. Ranking practices were even more frequently performed by large companies: 61% 'always' and 11% 'frequently' ranked projects. (Table 4 shows the distribution of the responses in detail.)

The conducted cross tabulation analysis confirmed the assumption that there is a relationship between company size and project ranking. Pearson's Chi-square test value was very low and accounted for only 0.5%, while the Cramer's V value of 0.308 indicates a moderately strong relationship.

Analysing the responses to the ranking question by the ownership structure, it can be claimed that companies with national majority ownership laid less emphasis on ranking projects than companies with a foreign majority ownership structure. One-third of companies with national majority ownership 'always' and 28% 'frequently' ranked projects. Companies with a foreign majority ownership structure showed a more positive attitude to ranking: two-thirds of them 'always' and 13% of them 'frequently' ranked economically efficient project alternatives. In companies with 50% national and 50% foreign ownership, ranking was 'always' done by one company and 'frequently' performed by the other company. (Table 4 shows the distribution of the responses in detail.)

In order to establish the relationship between the ownership structure and ranking economically efficient facility investments, the Chi-square test was conducted. Its 30% value well exceeded the 5% conventionally accepted significance level indicating no relationship between the two variables; Cramer's V value of 0.22 indicated a weak relationship.

SUMMARY

All corporate managers have to make decisions about investments, including facility investments that determine the future of their companies. Investments in facilities considerably affect how a company is managed for years or even decades. Therefore, it is essential to apply appropriate methods when decisions about investments are prepared.

This study addressed some practical issues related to preparing decisions about investing in corporate facilities, such as the length of time dedicated to decision preparation, the number of employees involved in preparation processes, the evaluation of economically efficient investment alternatives and ranking efficient projects. This study used the findings of a questionnaire survey conducted in 2016 and presented corporate practices of manufacturing companies operating in Hungary. The findings can be summarised as follows:

1. It takes several months to prepare decisions about investing in facilities. The majority of companies dedicate 3-6 months to this process. However, the amount of the time spent on preparing decisions depends on the company size. These results are consistent with the results of the survey on investment practices of Hungarian manufacturing companies (referred above) conducted in 2012 (Szűcsné Markovics 2013). The results of Hungarian surveys should also have been compared with the findings of international surveys, but research results on this issue published in English were not found.
2. Teams consisting of three or perhaps 4-5 employees participate in the decision-preparation process irrespective of the company size or the ownership structure. Apart from senior managers and owners, finance people and people engaged in different projects also participate in decision preparation. Involving external experts or consultant is not typical. These results slightly contradict with the results of the survey conducted in 2012 (Szűcsné Markovics 2013). According to the survey of 2012, it was typical that teams consisting of several members, such as 4 or 5

employees or minimum 6 people were generally involved in preparing investment decisions. In addition, the number of team members taking part in decision preparation showed a positive relationship with the size of companies. This means that in large companies the decision-preparation team was also large. (These findings were not compared with any results of international surveys either because of the lack of publications in this issue in English.)

3. A great majority of companies frequently evaluate the economic efficiency of facility projects and rank economically efficient projects. Investment practices of small and large companies greatly differ. A positive trend can be observed in corporate practices, since only 3% of the responding companies reported never conducting economic efficiency analyses and never ranking efficient projects. The survey seems to observe a very positive change compared to the findings of the Hungarian survey carried out in 2012 (Szűcsné Markovics 2013), which revealed that a high percentage of sampled companies in Hungary (34%) never performed capital budgeting evaluations. The obtained 3% indicates a very positive shift not only among national companies, but also among companies

operating in international markets. This ratio is lower than in some other countries, such as 8% in Scotland (Sangster 1996), 41% in New Zealand (Vos & Vos 2000), 7% in Egypt (Osemy 2002) and 17% in Eastern and Central European countries (Andor et al. 2011). As for the ranking list of projects meeting the required rate of return, the results seem even more favourable. According to the 2012 survey (Szűcsné Markovics 2013), 38% of companies never ranked projects. Although a great number of international scholars have investigated capital budgeting methods used by companies, none of their studies mention any methods that corporate decision-makers use for ranking projects. Consequently, it was impossible to perform any comparison in this issue either.

Considering these findings, it can be claimed that manufacturing companies gave due consideration to preparing facility investments because they spent several months on preparing decisions about investments and involve several employees in this process. The majority of companies often conduct economic efficiency analyses of alternative investments and rank economically efficient alternative projects.

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