Economics and Management
ISSN: 2683-1325
Volume: XVII, Issue: 2, Year: 2020, pp. 40-60

USING CAPITAL BUDGETING TECHNIQUES IN RATIONALIZING CAPITAL EXPENDITURE DECISIONS IN JORDANIAN INDUSTRIAL PUBLIC SHAREHOLDING COMPANIES

Abdallah Atieh[1], Malik Muneer Abu Afifa[2], Shadya Al-Manaseer[3]

Received: 20.04.2020 Accepted: 8.07.2020

Abstract

This study aims to examine the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, and to identify the obstacles which might limit this effect. The members of study sample are accountants who work in industrial companies which use capital budgeting techniques. Therefore, the unit of analysis is individuals, and the study uses a questionnaire method.

The main result is that there is a statistically significant effect of using capital budgeting techniques on rationalizing capital expenditure decisions in industrial companies, especially when they apply those practices that consider the time value of money. Additionally, there are significant obstacles that limit the effect of using capital budgeting techniques on rationalize capital expenditure decisions, especially the subjective factor of decision-makers in accepting or rejecting investing projects, and incapability of predicting amounts and timing of projects' cash flows.

Keywords: *capital budgeting techniques, capital expenditure decisions, industrial companies, emerging market*
JEL Codes: *M10, M41, M42*

1. Introduction

Using capital budgeting techniques in industrial companies is crucial to plan, finance and evaluate their investment projects, such as purchasing fixed assets, producing new products, opening new branches or changing from manual to automated manufacturing systems. These projects require decisions to achieve maximum possible returns, which positively reflect on maximizing the wealth of owners (Nishat & Haq, 2009; Khamees et al., 2010; Almazan et al., 2017; Alnidawi & Jaffal, 2018; Brunner & Ostermaier, 2019).

[1] Faculty of Business, Al-Zaytoonah University of Jordan, Amman – Jordan, E-mail: a.atieh@zuj.edu.jo
[2] Faculty of Business, Al-Zaytoonah University of Jordan, Amman – Jordan, E-mail: malik.abuafifa@yahoo.com
[3] Social Security Corporation, Amman – Jordan

There are several capital budgeting techniques that can be used to evaluate investment projects (Sarwary, 2020). They are divided into two groups. The first group techniques recognize the time value of money, such as net present value (NPV), internal rate of return (IRR), and profitability index (PI). The second group techniques do not recognize the time value of money, such as undiscounted payback period (PP) and accounting rate of return (ARR) (Garrison et al., 2015: 586). Previous literature (such as, Duchac et al., 2012; Arora, 2012; Whitecotton et al., 2014; El-Daour & Abu Shaaban, 2014; Vecino et al., 2015; Batra & Verma, 2017) highlighted that financial managers and academics favor undiscounted over discounted models.

The process of preparing capital budgets is a real challenge for decision-makers in order to select the most successful investment project among proposed projects, so decision-makers should go through the stages of preparing capital budgets starting from the most important stage, which is to identify proposed investment projects. They then trade-off those projects by determining expected revenues and costs for each project. A company also determines expected cash inflows for each project during its estimated useful life. Then, a decision is made whether to accept or reject a project based on capital budgeting techniques. In the final stage, there is a need for feedback to evaluate the decision taken and compare actual results with expected results to make the appropriate correction for any problem that may occur during the productive life of a project (Dheeriya, 2008; Verma et al., 2009; Braun & Tietz, 2014; Souza & Lunkes, 2016).

Companies face the risk of poor using of capital budgeting techniques and lack of commitment to their implementation (Dedi & Orsag, 2007; Truong et al., 2008; Ahmed, 2013; Souza & Lunkes, 2016). This risk negatively reflects on the ability to make rational capital expenditure decisions through the optimal investment of scarce resources (Danielson & Scott, 2006; Warren & Jack, 2018), especially since the capital expenditures decision is one of the strategic decisions affecting the value of a company in the long term (Ahmed, 2013; Souza & Lunkes, 2016; Stamevski et al., 2018), so it is necessary to make this decision on the basis of a proper use of capital budgeting techniques (Maroyi & Poll, 2012; Mukherjee et al., 2016). However, there are differences among companies in terms of procedures followed in preparing capital budgets (Ekeha, 2011; Duchac et al., 2012; Batra & Verma, 2017; Mohan & Narwal, 2017; Su et al., 2018).

Companies' management should have the ability to choose the best alternative by using capital budgeting techniques. These techniques help with rationalizing capital expenditures decisions. This study intends to illustrate this effect in the context of Jordan.

The motivation of this study stems from the fact that it deals with a vital subject, although it is rarely highlighted locally - according to the limits of researchers' knowledge - which is to guide Jordanian companies to optimize using of capital budgeting techniques

because of their direct effect on companies' financial performance. The importance of this work also lies in its targeting of the industrial sector, which is considered a key pillar in the Jordanian economy and has a high level of solvency and professional experience.

2. Literature Review

Capital budgets play a vital role in different sectors and lead us to distinguish between successful and failed companies. Capital budgets are concerned with long-term investment decisions starting with evaluating capital expenditure projects and ending with choosing the best alternative (Whitecotton et al., 2014). Whitecotton et al. (2014) added that capital budget is a way to assist managers to make investment decisions. Besides, Duchac et al. (2012) discussed that the capital budget is a process that plays a promote role in planning, evaluating and controlling investments.

Capital budgets maximize the corporate value and the wealth of its shareholders. According to Garrison et al. (2015), managers should carefully select projects that generate the maximum return in the future by using capital budgets. This is because capital budgets help managers make their decisions by providing information about a project and benefits that can be obtained from that project (Kida et al., 2001; Mubashar & Tariq, 2019).

According to Andor et al. (2015), capital budgeting techniques used in companies are influenced by their size, multinational culture, goals, and the existence of code of ethics; moreover, Vecino et al. (2015) added the educational level of decision-makers; furthermore, Andrés et al. (2015) added type of company activity.

NPV technique aims to find the difference between the present value of the cash inflows and cash outflows from a specific investment by using a discount rate (required return rate on investment). IRR is the rate at which present value of cash inflows from an investment is equal to the cost of that investment, i.e. when net present value of a project is zero (Hanaeda & Serita, 2014). According to this technique, an investment is accepted if its IRR is greater or equal to the required return rate. PI technique is benefits to costs ratio, and benefits should be greater than costs in order to accept an investment (Truong et al., 2008). Besides, PP technique is based on the time required to recover the initial investment cost. ARR technique is an estimate of profitability of an investment during its useful life rather than relying on cash flows (Wnuk-Pel, 2014).

Preparing capital budgets should be important to rationalize capital expenditure decisions, as those decisions are difficult and they cannot be easily reversed. Capital expenditure decision is based on forecasting future events and cash flows. Capital budgets help managers to make that decision via providing useful information about future events and cash flows. This is consistent with the results of Ekeha (2011). Besides, capital budgeting decisions give indicators regarding firm's plans and goals (Mittendorf, 2006).

Finally, capital budgeting is a measurable method for businesses to determine their long-term economic and financial profitability of any investment (Brunner & Ostermaier, 2019). In this field, the study investigates capital budgeting techniques and capital expenditure decisions in Jordanian industrial public shareholding companies to identify the role of capital budgets in these companies. Thereby, the study investigates the following null hypotheses:

HO1: There is no statistically significant effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies.

HO2: There are no statistically significant differences among the responses of the study sample regarding the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies due to the following companies' characteristics: sector, age, and capital size.

HO3: There are no statistically significant obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies.

HO4: There are no statistically significant differences among the responses of the study sample regarding the obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies due to the following companies' characteristics: sector, age, and capital size.

3. Definitions

Capital budgets: are long-term plans to choose the best alternative among several investments.

Capital budgeting techniques: are methods used to evaluate long-term investment projects to make a more accurate capital expenditure decision.

Capital expenditure decisions: are decisions taken by a company to invest its funds for a long-term period in order to achieve future returns.

Rationalizing capital expenditure decisions: means making long-term capital expenditure decisions according to scientific bases in order to reduce risks and increase efficiency and effectiveness.

4. Methodology

The study aims to investigate capital budgeting techniques and capital expenditure decisions in Jordanian industrial public shareholding companies. The study uses

descriptive-analytical approach and it is based on a quantitative approach (quantitative data collection) via a questionnaire survey based on Graham and Harvey (2001), Imegi and Nwokoye (2015), and Andor et al. (2015) survey. The five points Likert scale is used. Data are analyzed using the statistical package for the social sciences (SPSS); proper statistical tools are used, including descriptive statistics and hypotheses testing (Sekaran, 2009).

The study population consists of all Jordanian industrial public shareholding companies listed on Amman Stock Exchange (ASE) in 2019. There are (58) companies. The study sample is (41) companies which use capital budgeting techniques. These companies are identified by the researchers through making phone calls with all population companies (financial managers and related accountants) and asking them whether capital budgeting techniques are actually used by their companies. Roughly, (71%) of Jordanian industrial public shareholding companies use capital budgeting techniques.

The study questionnaires are distributed to financial managers and related accountants within Jordanian industrial public shareholding companies which use capital budgeting techniques. Five questionnaires are distributed to each company in order to enhance the credibility of the companies' responses. Therefore, the unit of analysis is individuals, and the sample of the study consists of (41) companies with (5) individuals in each company, so the total of distributed questionnaires is (205). (101) questionnaires are collected (individuals' response rate = 49%), and these questionnaires are collected from (24) responding companies (companies' response rate = 59%).

5. Data Analysis and Findings

5.1. Descriptive Statistics

The study questionnaire includes two parts; the first part shows three general questions, namely: company sector, age, and capital size. The second part includes measurement items of study variables. The company sector is identified by determining the affiliation of each company with the sub-industrial sectors according to the ASE classification, which are chemical industries, food and beverage, mining and extraction industries, pharmaceutical and medical industries, textile, leather and clothing industries, and other industries. Age of each company is calculated from the date of its establishing to the year 2019, then the sample companies are divided as follows:

- Less than (10) years old.
- (10) to (15) years old.
- More than (15) years old.

Moreover, the size of companies' capital is divided into three levels as follows:

- Small companies: their capitals are less than (5) million Jordanian dinars.

- Medium-sized companies: their capitals range from (5) million to (14) million Jordanian dinars.
- Large companies: their capitals are more than (14) million Jordanian dinars.

Table (1) illustrates the percentage results of types of company activities, ages of companies, and sizes of companies' capitals.

Table 1. The percentage results of company sector, age, and capital size

Item	Frequency	Percentage %
Company sector		
Chemical	3	12.5
Food & beverage	6	25
Mining & extraction	6	25
Pharmaceutical & medical	3	12.5
Textile, leather & clothing	3	12.5
Other industries	3	12.5
Total	**24**	**100**
Company age		
Less than 10 years old	4	17
10 to 15 years old	4	17
More than 15 years old	16	66
Total	**24**	**100**
Company capital size		
Small	6	25
Medium-sized	9	37.5
Large	9	37.5
Total	**24**	**100**

It is clear from Table (1) that the largest percentages of the study sample companies work in food and beverage industries (25%) and mining and extraction industries (25%). The age of (66%) of companies is more than (15) years, so two-thirds of companies have a long experience in using capital budgeting techniques, which might contribute to making rational capital expenditure decisions. (75%) of companies are large and medium-sized companies based on the company's capital, so three-quarters of companies deal with a capital of (5) million Jordanian dinars or more, and the management of those funds needs to use deliberate capital budgeting techniques. Given the age and capital of those companies, it could be concluded that they deal well with the issue of capital budgets.

Table (2) shows statistical results of internal consistency test for the study tool (a questionnaire survey) through Cronbach's alpha.

Table 2. Internal consistency test

Item	Items	Cronbach's Alpha
The effect of using capital budgeting techniques on rationalizing capital expenditure decisions		
In terms of capital expenditure decision making process	14	87%
In terms of capital expenditure decision outcomes	16	86%
Obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions		
Internal obstacles related to companies	6	88%
External obstacles related to capital budgeting techniques	9	84%
Total	45	86%

From Table (2), the values of Cronbach's alpha are between (84%) and (88%) for items of measuring the study variables, and the total index of all (45) questionnaire items together is (86%). These results are statistically acceptable as the values are greater than (60%). When the value is closer to (100%), this indicates a higher degree of internal consistency of the study tool (Sekaran, 2009). It is worth noting that the study examines the normal distribution of the study data by the graph method, and the results show that the study sample data are normally distributed (i.e. representing the study population).

Regarding the extent of using companies of capital budgeting techniques, Table (3) shows the results of descriptive statistical tests, namely means and standard deviations for capital budgeting techniques which are used by the sample companies.

Table 3. Descriptive statistics for capital budgeting techniques

Item	Mean	Standard Deviation	Ranking
Capital budgeting techniques that consider money time value			
Net Present Value (NPV)	3.24	1.27	4
Profitability Index (PI)	3.30	1.25	3
Internal Rate of Return (IRR)	3.10	1.23	5
Capital budgeting techniques that do not consider money time value			

Payback period (PP)	3.56	1.22	1
Accounting Rate of Return (ARR)	3.54	1.09	2
Overall average	3.35	1.21	

Table (3) summarizes that capital budgeting techniques that do not take into account the time value of money are commonly used by Jordanian industrial public shareholding companies (PP and ARR means are 3.56 and 3.54, respectively; their standard deviations are 1.22 and 1.09, respectively), then capital budgeting techniques that consider the time value of money (PI, NPV and IRR means are 3.30, 3.24, and 3.10, respectively; their standard deviations are 1.25, 1.27, and 1.23, respectively). These results are relatively consistent with Khamees et al. (2010), Khakasa (2014), Hanaeda & Serita (2014) and Mansaray (2019), but differ with Imegi & Nwokoye (2015). The researchers explain these results that companies might use traditional methods that do not take into account the money time value when starting to analyze capital projects, then they use more sophisticated methods, which consider the money time value in their detailed analyses of those projects that are approved by traditional methods.

The following Table (4) presents the descriptive statistical tests, namely arithmetic averages and standard deviations for items which measure the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, in terms of capital-expenditure decision-making process.

Table 4. Descriptive statistics for the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, in terms of decision-making process

Item	Mean	Standard deviation	Ranking
The company use capital budgeting techniques when making capital expenditure decisions	3.10	1.14	13
Clear policies and procedures are established by the company to use capital budgeting techniques when making capital expenditure decisions	3.25	1.12	9
Management is aware of the importance of preparing the feasibility study to make a rational capital expenditure decision through using capital budgeting techniques	3.46	1.25	8
When capital budgeting techniques are used, capital expenditure decisions made by the company are integrated with its strategic goals	3.09	1.21	14
Using capital budgeting techniques contributes to a higher degree of integration among different capital expenditure	3.24	1.23	10

decisions			
Using capital budgeting techniques contributes to improving efficiency of the stages of capital expenditure decision-making process via reducing their costs	3.16	1.32	12
The company uses more than one capital budgeting technique when making capital expenditure decisions to ensure the integrity of the chosen alternative	3.23	1.22	11
Using capital budgeting techniques in rationalizing capital expenditure decisions provides sufficient capabilities and skills to optimally achieve goals of these decisions	3.73	1.19	2
Using capital budgeting techniques contributes to reducing risk when making capital expenditure decisions	3.72	1.05	3
If the company considers the money time value when using capital budgeting techniques, this contributes to improving capital expenditure decisions	3.80	1.26	1
Using capital budgeting techniques when making capital expenditure decisions helps to predicting cash inflows and outflows, so improving returns on investments	3.61	1.22	6
Using capital budgeting techniques helps to predicting future outcomes of capital expenditure decisions	3.65	1.14	4
Using capital budgeting techniques in making capital expenditure decisions does not help to determine benefits of investment projects	3.47	1.20	7
The company does not evaluate any capital expenditure decision before making it via one or more of capital budgeting techniques	3.65	1.21	5
Overall average	3.44	1.20	

Table (4) shows that arithmetic averages for items which measure the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, in terms of capital-expenditure decision-making process are between (3.09) and (3.80) with standard deviations (1.21) and (1.26), respectively. The maximum mean relates to the item that "If the company considers the money time value when using capital budgeting techniques, this contributes to improving capital expenditure decisions". This result is consistent with Bennouna et al. (2010). The minimum mean is for the item that "When capital budgeting techniques are used, capital expenditure decisions made by the company are integrated with its strategic goals". Overall, the mean for all measurement items is (3.44), while their standard deviation is only (1.20). This low value for standard deviation indicates that answers of respondents are somewhat similar.

It is worth mentioning that the last two items are used as control questions to ensure the credibility of respondents in answering the questionnaire, as they are formulated in the negative form, so their points are reversed on Likert scale.

The following Table (5) presents the descriptive statistics for items which measure the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, in terms of capital-expenditure decision-making outcomes.

Table 5. Descriptive statistics for the effect of using capital budgeting techniques on rationalizing capital expenditure decisions, in terms of decision-making outcomes

Item	Mean	Standard deviation	Ranking
Capital expenditure decisions are more effective, if the company uses capital budgeting techniques regardless of their costs use	3.64	1.08	6
Capital budgeting techniques helps the company to improve efficiency of capital expenditure decision-making outcomes by minimizing their cost	3.66	1.12	3
Using capital budgeting techniques when making capital expenditure decisions allows to determine the increase in revenues from an investment project	3.67	1.11	2
By using capital budgeting techniques when making capital expenditure decisions, the company seeks to reduce costs of an investment project	3.36	1.35	8
Using capital budgeting techniques when making capital expenditure decisions reduces labor costs	3.28	1.27	9
The overall performance of the company is improved when capital expenditure decisions are made based on using capital budgeting techniques	3.65	1.28	5
Using capital budgeting techniques when making capital expenditure decisions contributes to maximizing the value of the company and shareholders' wealth	3.65	1.20	4
The company's goals are achieved when capital budgeting techniques are used in making capital expenditure decisions	3.68	1.17	1
Using capital budgeting techniques improves the quality of capital expenditure decisions	2.89	1.33	16
Investment projects are reassessed after implementation to ensure the soundness of capital expenditure decisions based on using capital budgeting	3.26	1.29	11

techniques			
Using capital budgeting techniques helps the company to validate forecasts of capital expenditure decisions	3.54	1.26	7
Using capital budgeting techniques when making capital spending decisions improves the company's keeping up with technological developments	3.26	1.23	10
The company sets clear instructions to innovate and develop products through using capital budgeting techniques when making capital expenditure decisions	3.00	1.24	14
Using capital budgeting techniques in making capital expenditure decisions contributes to product innovation and development. This leads to enter new markets	2.98	1.33	15
Using capital budgeting techniques when making capital expenditure decisions increases the company's efficiency of replacing new assets	3.06	1.26	12
Using capital budgeting techniques in making capital expenditure decisions contributes to develop the company's productive equipment	3.01	1.23	13
Overall average	3.35	1.23	

Arithmetic averages for items which measure the effect of using capital budgeting techniques on rationalizing capital expenditure decision outcomes range from (2.89) to (3.68) with standard deviations (1.33) and (1.17), respectively. The maximum mean is for the item that states: “The company's goals are achieved when capital budgeting techniques are used in making capital expenditure decisions”. This is consistent with the results of Ekeha (2011) and Alrawashdeh (2006). The minimum arithmetic average is for the item that “Using capital budgeting techniques improves the quality of capital expenditure decisions”. The arithmetic average of all items is (3.35), and the standard deviation is (1.23).

With regard to obstacles which limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies divided into internal constraints related to the company itself and external constraints related to capital budgeting techniques. The following Table (6) presents the descriptive statistical tests for items which measure these constraints.

Table 6. Obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions

Item	Mean	Standard deviation	Ranking
Internal Obstacles related to the company			
There is a lack of practical experience for decision-makers of using capital budgeting techniques in making capital expenditure decisions	3.56	1.31	6
Accepting or rejecting investment projects is based on personal opinion without taking into account the use of capital budgeting techniques	3.82	1.30	1
The lack of conviction of the capital budgeting techniques role in rationalizing capital expenditure decisions	3.79	1.27	2
There are no clear bases for using capital budgeting techniques in making capital expenditure decisions	3.72	1.23	4
Strategic goals are not supportive of using capital budgeting techniques in making capital expenditure decisions	3.68	1.22	5
The scarcity of financial and human resources are a constraint to the use of capital budgeting techniques in making capital expenditure decisions	3.74	1.21	3
Overall average	3.72	1.26	
External Obstacles related to capital budgeting techniques			
Inability to predict amounts and timing of cash inflows	3.93	1.14	1
Inability to predict amounts and timing of cash outflows	3.51	1.15	3
Ignoring subsequent cash flows of the project life	3.59	1.05	2
Inability to arrange the available investment projects and choose the best alternative	3.29	1.41	5
Difficulty in calculating the time value of money	3.38	1.15	4
Inability to determine the value of the discount rate used by the company	3.17	1.00	6
Uncertainty conditions related to results of an investment project	2.88	1.05	7
Failure to make a subsequent evaluation of investment projects under the risk	2.76	1.30	8
Inability to adjust the inflation effect on subsequent	2.73	1.50	9

years of an investment project		
Overall average	3.25	1.19

"Accepting or rejecting investment projects is based on personal opinion without taking into account the use of capital budgeting techniques" is the first internal constraint related to the company (mean = 3.82; standard deviation = 1.30). Then, "The lack of conviction of the capital budgeting techniques role in rationalizing capital expenditure decisions" (mean = 3.79; standard deviation = 1.27). On the other hand, "Inability to predict amounts and timing of cash inflows" is the first external obstacle related to capital budgeting techniques (mean = 3.93; standard deviation = 1.14), and the least important constraint is "Inability to adjust the inflation effect on subsequent years of an investment project" (mean = 2.73; standard deviation = 1.50). These results are relatively agreed with those of Bernado et al. (2001; 2004).

5.2. Hypothesis Testing

The main objective for this study is to investigate the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies. The study use appropriate statistical tests, namely one sample t-test and one-way ANOVA to test the study hypotheses.

HO1: There is no statistically significant effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies.

The following Table (7) summarizes the one-sample t-test results regarding to this hypothesis.

Table 7. One-sample t-test for the effect of using capital budgeting techniques on rationalizing capital expenditure decisions

Hypothesis	*T*	Df.	Sig.	Decision
HO1	5.937	100	0.000*	Rejected

*: significant level at $p < 0.01$

It can be seen from Table (7) that the model is fit at sig < 0.01 with a t-value of (5.937); therefore, HO1 hypothesis is rejected. This means that the use of capital budgeting techniques contributes to the rationalization of capital expenditure decisions in Jordanian industrial public shareholding companies. Hence, the capital budgeting techniques, both those that take into account the money time value and those that do not, provide useful

information to assess investment alternatives in order to choose the appropriate one that achieves company's objectives. Accordingly, information that is provided by capital budgeting techniques helps companies to predict amounts of cash flows and outcomes of capital expenditure decisions, as well as to reduce their risks and costs. This is supported by the descriptive statistical results for measurement items above.

HO2: There are no statistically significant differences among the responses of the study sample regarding the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies due to the following companies' characteristics: sector, age, and capital size.

Table (8) shows the results of one-way ANOVA test regarding to the previous hypothesis.

Table 8. One-way ANOVA for the differences among companies regarding the effect of using capital budgeting techniques on rationalizing capital expenditure decisions

Hypothesis	Source	Df.	*F*	Sig.	Decision
HO2 – Sector	Between	5	0.525	0.788	Accepted
	Within	95			
	Total	100			
HO2 – Age	Between	2	0.876	0.420	Accepted
	Within	98			
	Total	100			
HO2 - Capital size	Between	2	0.184	0.833	Accepted
	Within	98			
	Total	100			

*: significant level at $p < 0.01$

The above null hypothesis investigates whether all means are same between and within groups. The small F-value can be considered as evidence that means are same. Thereby, there are no statistically significant differences in average values among the responses of the study sample regarding the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies due to the following companies' characteristics: type of company activity, age of a company, and size of company's capital. These findings are relatively consistent with Wnuk-Pel (2014) and Alrawashdeh (2006), but differ with Andrés et al. (2015) and Chittenden and Derregia (2015). Andrés et al. and Chittenden and Derregia argued that

capital budgeting techniques used in companies are influenced by their sector, age, and capital size.

HO3: There are no statistically significant obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies.

Table (9) summarizes the one-sample t-test results regarding to the prior hypothesis.

Table 9. One-sample t-test for the obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions

Hypothesis	*T*	Df.	Sig.	Decision
HO3	7.440	100	0.000*	Rejected

*: significant level at $p < 0.01$

Table (9) illustrates that the model is fit at sig < 0.01 with a t-value of (7.440), so HO3 hypothesis is rejected. This means there are constraints that limit the contributions of using capital budgeting techniques in the rationalization of capital expenditure decisions in Jordanian industrial public shareholding companies. This result is consistent with Abu Huwaidi (2011) and Seiam (2003). As previously discussed in descriptive statistics, there are internal constraints related to the company itself, which are more important that the acceptance or rejection of investment projects is based on personal opinion and the lack of conviction of the capital budgeting techniques role. Moreover, there are external constraints related to capital budgeting techniques, which are more important that the inability to predict amounts and timing of cash flows and the ignorance subsequent cash flows of the project life.

HO4: There are no statistically significant differences among the responses of the study sample regarding the obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies due to the following companies' characteristics: sector, age, and capital size.

In order to examine the above hypothesis, one-way ANOVA test is used, and the following Table (10) shows the results of this test.

Table 10. One-way ANOVA for the differences among companies regarding the obstacles that limit the effect of using capital budgeting techniques on rationalizing capital expenditure decisions

Hypothesis	Source	Df.	*F*	Sig.	Decision
HO4 - Sector	Between	5	1.118	0.358	Accepted
	Within	95			
	Total	100			
HO4 - Age	Between	2	0.065	0.937	Accepted
	Within	98			
	Total	100			
HO4 – Capital size	Between	2	0.101	0.904	Accepted
	Within	98			
	Total	100			

*: significant level at $p < 0.01$

Table (10) shows small F-values. This means that all means are same between and within groups. Therefore, HO4 hypothesis is accepted. Thereby, there are no differences in average values among the responses of the study sample on identifying the constraints that limit the contributions of using capital budgeting techniques in the rationalization of capital expenditure decisions in Jordanian industrial public shareholding companies due to the following characteristics: type of company activity, age of the company, and the size of the company's capital.

6. Study Conclusions

The results of the study indicate that there is an average level of using capital budgeting techniques in evaluating capital projects in Jordanian industrial public shareholding companies. It is also found that companies use various capital budgeting techniques when evaluating capital projects, and the use rate is spread over all techniques. The payback period (PP) technique achieves the highest use rate, followed by the accounting rate of return (ARR) technique, and then the methods that take into consideration the time value of money, starting with the profitability index (PI) technique, then the net present value (NPV) technique and finally the internal rate of return (IRR) technique.

Additionally, the results show that there is an average level of the effect of using capital budgeting techniques on the process of making a capital-expenditure decision. However, there is a high level of this effect if companies take into account the time value

of money, because this contributes to improving their decisions. Using capital budgeting techniques provides sufficient capabilities and skills to optimally achieve goals of capital expenditures.

Furthermore, it is found that there is a relative weakness in some companies with regard to merging capital expenditure decisions with strategic goals when using capital budgeting techniques. This flaw might negatively affect efficiency related to stages of capital expenditure decision-making by increasing costs of those stages. In addition, some companies that do not use more than one technique might be prevented from ensuring the safety of their chosen alternative.

The results point out that there is generally an average level of the effect of using capital budgeting techniques on outcomes of capital expenditure decisions. Specifically, using capital budgeting techniques significantly achieves company's goals within its financial resources, determines the increase in revenues generated from its investment project, and improves efficiency related to reducing costs of capital expenditure decision-making outcomes, so maximizes the value of a company, which is reflected in maximizing the value of shareholders' wealth.

There is a relative weakness in some companies regarding the use of advanced capital budgeting techniques, which might negatively affect improving the quality of capital expenditure decisions and product innovation and development. This leads to difficulty entering new markets and reduces competitiveness of those companies. This could be attributed to the failure of some companies in setting clear instructions for innovating and developing their products through using different capital budgeting techniques, and to shortcomings in those companies with regard to upgrading their productive equipment.

There is a generally high level of internal obstacles in companies themselves. These constraints limit the impact of using capital budgeting techniques on rationalizing capital expenditure decisions. The most important constraint is that the acceptance or rejection of investment projects is based on personal opinion in some companies. Besides, some companies are not convinced of the role of capital budgeting techniques in rationalizing their decisions. The least obstacle among companies is the lack of experience of decision-makers in using capital budgeting techniques.

Regarding external obstacles, there is an average level of external constraints for capital budgeting techniques. The most important constraints are the inability to predict amounts and timing of cash inflows and outflows, and the ignorance of subsequent cash flows of the project life. While the external obstacles that have a relatively less impact are the inability to adjust inflation in subsequent years of the investment project, in addition to

the failure to make a subsequent evaluation of available investment projects in the light of risk.

The study concludes that there is a statistically significant effect at a level of 0.05 for the effect of using capital budgeting techniques on rationalizing capital expenditure decisions in Jordanian industrial public shareholding companies. The researchers explain this result through the fact that capital expenditure decisions could not be undone easily, as this reversing would incur a company large losses over a long period, especially if it begins implementation. This fact necessitates the use of capital budgeting techniques. However, there are no statistically significant differences for this effect among companies due to their sector, age, or size of capital.

The research demonstrates that there are statistically significant internal and external obstacles that negatively limit the impact of using capital budgeting techniques on rationalizing capital expenditure decisions. There are no statistically significant differences among respondents about identifying those obstacles owing to the type of company activity, its age, or its size.

7. Study Recommendations & Future Research

Based on the results concluded in this study, the researchers recommend the following suggestions: companies, especially Jordanian industrial public shareholding companies, should increase their use of capital budgeting techniques in order to rationalize their capital expenditure decisions.

Moreover, Jordanian industrial public shareholding companies should be urged to address the obstacles that limit the impact of using capital budgeting techniques on rationalizing their capital expenditure decisions, specifically the problem of personal opinions in accepting or rejecting investment projects, the problem of not convincing by managers for the role of capital budgeting techniques in rationalizing their decisions, the problem of inability to predict amounts and timing of cash inflows and outflows, and the problem of neglecting subsequent cash flows in the life of a project.

Additionally, companies should train managers responsible for making capital expenditure decisions in order to provide them with necessary knowledge and experience to allocate scarce financial resources to their optimal use.

This study also recommends companies to cooperate with academics to research the mechanisms of optimal using of capital budgeting techniques in order to make rational decisions, as well as to investigate how to counter obstacles that prevent that optimal using. Future research might be conducted on the remaining of Jordanian industrial public shareholding companies that do not use capital budgeting techniques to guide them about the importance of these techniques in rationalizing their investment decisions and

improving their financial performance. Furthermore, future research could also determine mechanisms of making each capital expenditure decision according to its type, and according to each capital budgeting technique to know the best technique or techniques for each decision.

REFERENCES

Abu Huwaidi, N. (2011). *The role of accounting information in rationalizing the decisions of capital expenditure: An empirical study on the listed companies in Palestine Exchange*, Master Thesis, Islamic University, Gaza, Palestine.

Ahmed, I. (2013). Factors determining the selection of capital budgeting techniques. *Journal of Finance and Investment Analysis, 2 (2)*, 77–88.

Almazan, A., Chen, Z., & Titman, S. (2017). Firm investment and stakeholder choices: A top-down theory of capital budgeting. *The Journal of Finance, 72 (5)*, 2179–2228.

Alnidawi, A.Z., & Jaffal, S.A. (2018). The impact of organizational creativity on organizational performance: the moderating role of knowledge sharing: empirical study in pharmaceutical Jordanian companies. *Economics and Management*, 15 (1), 144-156.

Alrawashdeh, K. (2006). *Capital expenditure evaluation methods and capital budgeting practices in the Jordanian industrial and service corporations*, Master Thesis, Yarmouk University, Irbid, Jordan.

Andor, G., Mohanty, S., & Toth, T. (2015). Capital budgeting practices: A survey of Central and Eastern European firms. *Emerging Markets Review, 23*, 148–172.

Andrés, P., Fuente, G., & Martín, P. (2015), Capital budgeting practices in Spain. *Business Research Quarterly, 18 (1)*, 37–56.

Arora, P. (2012). An empirical investigation on capital budgeting practices in India. *International Journal of Research in Commerce and Management, 3 (5)*, 166–169.

Batra, R., & Verma, S. (2017). Capital budgeting practices in Indian companies. *IIMB Management Review, 29*, 29–44.

Bennouna, K., Meredith, G., & Marchant, T. (2010). Improved capital budgeting decision making: Evidence from Canada. *Management Decision, 48 (2)*, 225–247.

Bernado, A., Cai, H., & Luo, J. (2001). Capital budgeting and compensation with asymmetric information and moral hazard. *Journal of Financial Economics, 61*, 311–344

Bernado, A., Cai, H., & Luo, J. (2004). Capital budgeting in multidivision firms: Information, agency, and incentives. *Review of Financial Studies, 17*, 739–767.

Braun, K., & Tietz, W. (2014). *Managerial Accounting*, 3rd ed., London: Pearson.

Brunner, M., & Ostermaier, A. (2019). Sabotage in capital budgeting: The effects of control and honesty on investment decisions. *Journal European Accounting Review, 28 (1)*, 71–100.

Chittenden, F., & Derregia, M. (2015), Uncertainty, irreversibility and the use of 'rules of thumb' in capital budgeting. *British Accounting Review, 47 (3)*, 225–236.

Danielson, M., & Scott, J. (2006). The capital budgeting decisions of small businesses. *Journal of Applied Finance, 16 (2)*, 45–56.

Dedi, L., & Orsag, S. (2007). Capital budgeting practices: A survey of Croatian firms. South East European. *Journal of Economics and Business, 2 (1)*, 59–67.

Dheeriya, P. (2008). Investment decision making in an entrepreneurial firm: An application. *Journal of American Academy of Business, Cambridge, 12 (2)*, 22–25.

Duchac, J., Reeve, J., & Warren, C. (2012). *Managerial accounting*, 1st ed., New York: South-Western.

Ekeha, G. (2011). Capital budgeting practices and economic development: A comparative study of companies in Western Europe and West Africa. *Management Accounting Research, 35 (12)*, 33–58.

El-Daour, J., & Abu Shaaban, M. (2014). The use of capital budgeting techniques in evaluating investment projects: An applied study on the Palestinian corporations working in Gaza Strip. *Journal of Al-Quds Open University for Research and Studies, 32 (2)*, 9–50.

Garrison, R., Noreen, E., & Brewer, P. (2015). *Managerial accounting*, 15th ed., New York: McGraw-Hill.

Graham, J., & Harvey, C. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics, 60 (2–3)*, 187–243.

Hanaeda, H., & Serita, T. (2014). *Capital budgeting practices: Evidence from Japan*, Working Paper.

Imegi, J., & Nwokoye, G. (2015). The effectiveness of capital budgeting techniques in evaluating projects' profitability. *International Association of African Researchers and Reviewers (AFRREV), 9 (2)*, 166–188.

Khakasa, E. (2014). *Capital budgeting for information systems investments - Evidence from Kenya*, Business and Management Conference, 5-7 November, South Africa, 1–16.

Khamees, B., Al-Fayoumi, N., & Al-Thuneibat, A. (2010). Capital budgeting practices in the Jordanian industrial corporations. *International Journal of Commerce and Management, 20 (1)*, 49–63.

Kida, T., Moreno, K., & Smith, J. (2001). The influence of affect on managers' capital-budgeting decisions. *Contemporary Accounting Research, 18 (3)*, 477–494.

Mansaray, S. (2019). The impact of capital budget decision on financial performance of commercial banks in Sierra Leone. *International Journal of Research in Business Studies and Management, 6 (7)*, 31–37.

Maroyi, V., & Poll, H. (2012). A survey of capital budgeting techniques used by listed mining companies in South Africa. *African Journal of Business Management, 6 (32)*, 9279–9292.

Mittendorf, B. (2006). Capital budgeting when managers value both honesty and perquisites. *Journal of Management Accounting Research, 18 (1)*, 77–95.

Mohan, V., & Narwal, K. (2017). Capital budgeting practices: State of the art. *Asian Journal of Research in Banking and Finance, 7 (4)*, 57–74.

Mubashar, A. & Tariq, Y.B. (2019). Capital budgeting decision-making practices: evidence from Pakistan. *Journal of Advances in Management Research*, 16 (2), 142-167. https://doi.org/10.1108/JAMR-07-2018-0055

Mukherjee, T., Al Rahahleh, N., & Lane, W. (2016). The Capital budgeting process of healthcare organizations: A review of surveys. *Journal of Healthcare Management, 61 (1)*, 58–76.

Nishat, M., & Haq, Z. (2009). *Capital budgeting practices: A survey of Pakistani firms*, Proceedings in South Asian Management Forum (SAMF 10), Bhutan, 9–10 April 2009.

Sarwary, Z. (2020). Strategy and capital budgeting techniques: the moderating role of entrepreneurial structure. *International Journal of Managerial and Financial Accounting*, 12 (1), 48-70. https://doi.org/10.1504/IJMFA.2020.107001

Seiam, W. (2003). The extent of realizing the importance of using accounting data for guaiding capital expenditure decisions: A field study applied to Jordanian public industrial shareholding companies. *King Abdulaziz University Journal: Economics and Management, 17 (2)*, 151–174.

Sekaran, U. (2009). *Research methods for business: A skill building approach*, 2nd ed., New York: John Wiley and Sons.

Souza, P., & Lunkes, J. (2016). Capital budgeting practices by large Brazilian companies. *Contaduría Y Administración, 61*, 514–534.

Stamevski, V., Stamevska, E., & Stankovska, A. (2018). Some aspects of strategic management. *Economics and Management*, 15 (2), 129-133.

Su, S., Lee, H., Chou, J., Yeh, J., & Thi, M. (2018). Application and effects of capital budgeting among the manufacturing companies in Vietnam. *The International Journal of Organizational Innovation, 10 (4)*, 111–120.

Truong, G., Partington, G., & Peat, M. (2008). Cost-of-capital estimation and capital-budgeting practice in Australia. *Australian Journal of Management, 33 (1)*, 95–121.

Vecino, C., Rojas, S., & Munoz, Y. (2015). Capital budgeting practices in Colombia. *Estudios Gerenciales, 31*, 41–49.

Verma, S., Gupta, S., & Batra, R. (2009). A survey of capital budgeting practices in corporate India. *The Journal of Business Perspective, 13 (3)*, 1–17.

Warren, L., & Jack, L. (2018). The capital budgeting process and the energy trilemma - A strategic conduct analysis. *The British Accounting Review, 50 (5)*, 481–496.

Whitecotton, S., Libby, R., & Phillips, F. (2014). *Managerial accounting*, 2nd ed., USA: McGraw-Hill.

Wnuk-Pel, T. (2014). *The practice and factors determining the selection of capital budgeting methods – Evidence from the field*, 19th International Scientific Conference; Economics and Management, 23-25 April, Latvia, 156, 612–616.