

Cash Flow Forecasting Process and its Impact on Capital Budgeting: Evidence from Libya

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Abstract: *This paper highlights the role of cash flow forecasting process in capital budgeting decisions. To achieve this goal, we examine the role of forecasting procedures and methods in estimating future cash flow related to capital budgeting decision, as well to test the influence of contingent and institutional variables on the use of forecasting procedures & methods. Further, this study seeks to ascertain the key factors associated with the forecasting process, which are data sources, forecasting horizon, qualification and position of forecaster. Most manufacturing & oil companies operating in Libya depend on the personal estimates for forecasting future cash flow, as well as use the payback period and accounting rate of return to evaluate the investment projects. Statistically, the findings of this research provided robust evidence that the use of forecasting procedures & methods is significantly associated with the extent of use of capital budgeting techniques. Subsequently, the forecasting horizon and the use of multiple data sources in forecasting are significantly associated with the use of forecasting procedures and methods. Moreover, the results of this study emphasized that the contingency variables have a direct and significant impact on the use of forecasting procedures & methods. In this regard, we found that the influence of the combined contingent variables differs from public to private sector based on PLS multi-group analysis (PLS-MGA), whereas the PLS-MGA was exposed opposite result in terms of manufacturing & oil companies. Moreover, the research findings revealed that there is a significant relationship between the use of forecasting procedures & methods and the financial performance of firms [The term "firms" is often used as a synonym of companies]. Even though, the relationship between the extent of use of CBT and the FPFs is not statistically supported.*

Keywords: Cash flow forecasting process; contingency & institutional variables; capital budgeting techniques; financial performance

Abbreviations:

ARR	Accounting rate of return
CB	Capital Budgeting
CBT	capital budgeting techniques
CCV	Combined contingent variables
CFF	Cash flow forecasting
CFFP	Cash flow forecasting process
CMNP	Coercive, mimetic & normative pressures
CPA	Critical path analysis
DCF	Discount cash flow
DT	Decision tree
EBITDA	Earnings before interest, tax, depreciation & amortization
FMPF	Financial, marketing and production factors
FPFs	Financial performance of firms
FPMs	Forecasting procedures and methods
IRR	Internal rate of return
MP	Mathematical programming
NIS	New Institutional Sociology
NPV	Net present value
ORR	Operating rate of return
PB	Payback period
PERT	Program evaluation & review technique
PLS-MGA	PLS multi-group analysis
PLS-SEM	Partial least squares structural equation modelling

1. Introduction

The capital budgeting process has received considerable attention in recent years. Both the finance and accounting literature offer lots of useful contributions in capital budgeting research (Pike, 1996; Brounen, et al., 2004). Nevertheless, these contributions concentrate on the use of capital budgeting techniques (CBT) in appraising the investment opportunities, whereas the forecasting process of

future cash flow has received less attention in capital budgeting research (Batra and Verma, 2014; Turner & Guilding, 2012).

In previous years, financial analysts focused on the profit methodology as a basis to estimate future earnings, which caused several companies to manipulate earnings through fraudulent reports, as in high-profile cases such as the Enron accounting scandal. As a result, the necessity of cash flow

forecasting process (CFFP) has become a vital factor in the majority of organizations, because cash flow information is a useful indicator in appraising the investment opportunities (Krishnan and Largay, 2000). According to Wilkes (1977), the problems related to the future cash flow obtained from the investment opportunities represent a great challenge for organisations and researchers to bridge a gap between the theory and practice of capital budgeting (CB).

Discussing the factors affecting the criteria for selecting investment projects, it can be seen that the cash flow forecasting (CF) is “a significant determinant of investment for all firms” (Devereux, 1990, p.138). Moreover, forecasting variables are perceived to be more important factors in improving firms’ performance (Danese and Kalchschmidt, 2011a).

Consequently, this paper aims to ascertain the role of CFFP in capital budgeting decisions. In order to attain this aim, this paper seeks to identify the forecasting processes used in estimating future cash flows. Besides, the relationships among the forecasting process variables and the extent of use of capital budgeting techniques are investigated. Moreover, this study examines the influence of contingent and institutional variables on the use of forecasting procedures & methods and the researchers elaborate the effect of forecasting procedures & methods on the financial performance through the extent of capital budgeting techniques usage. These variables are formed and incorporated in the research framework as shown in figure 1.

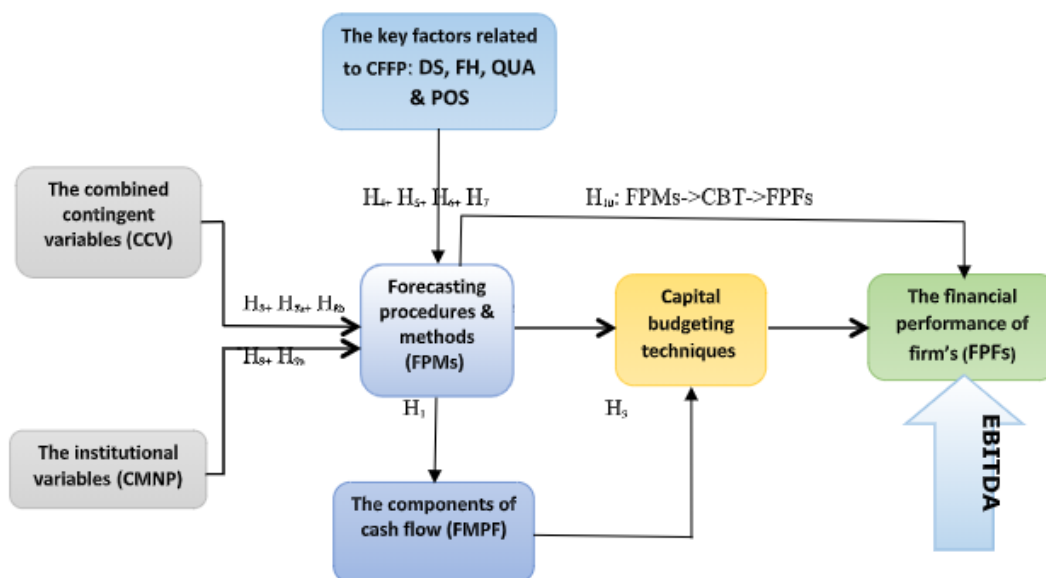


Figure 1: The research framework

Where:

FPMs: The forecasting procedures and methods.

FMPF: The financial, marketing & production factors associated with forecasting process.

CCV: The combined contingent variables:

- Average of annual sales (AAS).
- Average of investment expenditures (AIE)
- Number of Employees (NEM)
- The type of industry (IND).
- Strategic priorities (SP).
- The perceived environmental uncertainty (PEU).

CMNP: Coercive, mimetic & normative pressures.

CBT: Capital budgeting techniques.

DS: Data sources associated with forecasting process

FH: Forecasting horizon.

QUA: Qualification of forecaster.

POS: Position of forecaster.

FPFs: The financial performance of firms (AORR, EB. AAS & EB. AIE)

EBITDA: Earnings before interest, tax, depreciation & amortization (control variable).

H₁, H₂, H₃,....., H₁₁: The research hypotheses.

Figure 1 illustrates the relationships among the research variables. Where, the overall research framework consists of seven research models. Accordingly, this research can be divided into seven main sections. As explained in the introduction, this section demonstrated the main objectives and the importance of the study. In the second section, the theoretical approach is determined based on the contingency and institutional theories. Third, it offers a closer look into capital budgeting. Fourth, this section addresses the empirical literature and hypotheses development. Next, the research methodology is presented in terms of the survey design, the method used in data collection and multivariate regression analysis technique. Then, section six provides the empirical results and discussion. Finally, a conclusion of the study will be addressed in section seven.

2. Theoretical Approach

This paper employs the contingency and institutional theories for capital budgeting (CB). First, the contingency

theory assumes that there is no optimal technique applied in all management accounting systems; this principle can be applied to the CB process, where there is no universal appraisal technique used in most manufacturing and oil firms. In other words, the application of certain appraisal techniques in CB is dependent on specific contingencies, such as firm size, environmental uncertainty, technology and the competitive strategy (Burkert et al., 2014 and Haka, 1987). According to Otley (1980, p.413), “A contingency theory must identify specific aspects of an accounting system which are associated with certain circumstances and demonstrate an appropriate matching”. The theoretical framework of this paper is based on the contingency theory to explain the differences in using the forecasting processes that may reflect on the extent of CBT usage.

Second, institutional theory is commonly used in management accounting research focused on the study of formal and legal issues observed in the organisational sectors. This paper employs new institutional sociology (NIS) theory; it seeks to determine the coercive, mimetic and normative pressures (CMNP) that affect organizations and are affected by the social environment in which they operate. In this paper, we examined the influence of CMNP on the use of forecasting procedures and methods.

However, the benefits deriving from the application of contingency and institutional theories are established according to the concept of fit. Contingency fit maximizes organizational effectiveness, whereas institutional fit leads to useful external perceptions of legitimacy and external

support for the organization. Both contingency and institutional theories conceptualize organizational effectiveness differently, but the organization designer can combine the conclusions from both theoretical perspectives to build an optimal organizational structure.

3. An overview of Capital Budgeting (CB)

Capital budgeting (CB) is the process for planning and control of the investment expenditures; CB is one of the important developments in budgeting. Not only the capital budgeting is used in the planning and control of investment expenditure, but also it plays an essential role in the optimal allocation of resources among the investment alternatives.

In finance and accounting literature, CB is often used synonymously with “capital investment appraisal” (Drury, 2012). In 1951, Joel Dean presented the first original contribution in capital budgeting which depends on the economic theory as a basis for evaluating the investment opportunities (Dean, 1951). Apparently, most of the researchers determined four main stages of capital budgeting process: identifying the investment opportunities, forecasting future cash flow generated by these investments, evaluating the investment opportunities and monitoring the executed projects (Burns & Walker, 2009; Pike, Neale & Linsley, 2012). Apparently, most of the previous researches have often concentrated on the investment appraisal stage of capital budgeting (Burns and Walker, 2009).

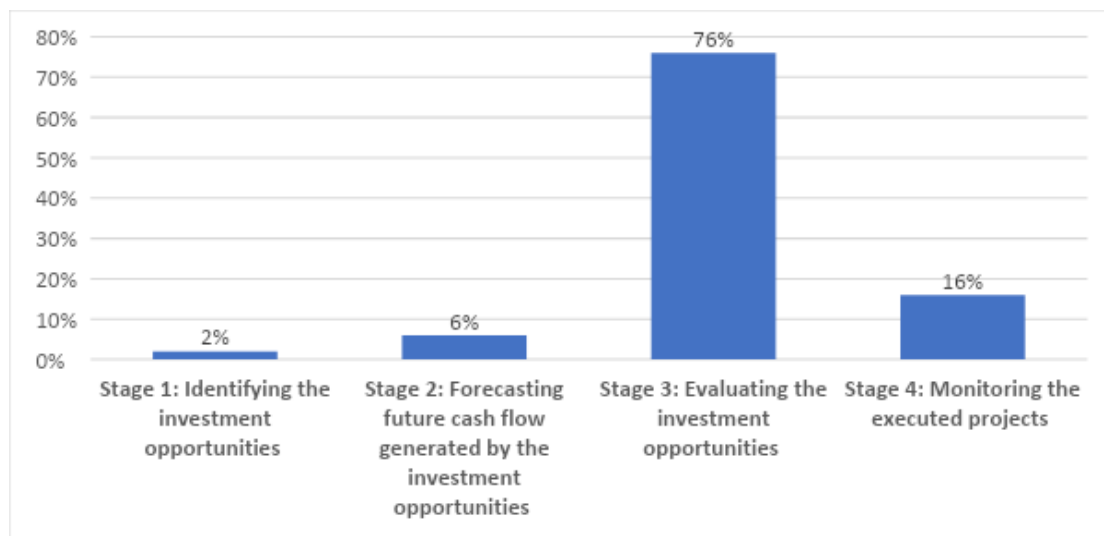


Figure 2: Survey of US studies related to the capital budgeting stages.

Adapted from Burns and Walker (2009)

To confirm the research gap addressed in this paper; the bar chart, in figure No.2, demonstrates the survey of studies related to the stages of capital budgeting in the USA. Where, we found that 76% of the US research concentrates on the appraisal stage that is related to the use of CBT; while the cash flow forecasting phase is less commonly used to support the capital budgeting research (Turner and Guilding, 2012). This result consistent with the prior research confirmed that the main problem in most organizations is how to forecast future cash flow generated by investment

opportunities (McIntosh, 1990). Therefore, this paper emphasises the role of CFF in CB decisions.

4. Empirical literature and hypotheses development

This section can be divided into four main subsections. First, the relationships among the forecasting process variables and the extent of use of CBT are demonstrated. One of these relations is the direct relationship between the use of

forecasting procedures and methods (FPMs) and the components of cash flow (FMPF). Then, the relationship between the use of FPMs, FMPF and the extent of use of CBT are addressed. Secondly, the key factors related to forecasting process are presented in terms of data sources (DS), forecasting horizon (FH), qualifications and position of forecasters (QUA & POS). Furthermore, the influence of contingency and institutional variables on the use of FPMs will be investigated in subsections 3 & 4. Finally, the relationship between the FPMs, the extent of use of CBT and the financial performance of firms (FPFs) is also discussed.

4.1 The relationships among the forecasting variables and the extent of CBT [capital budgeting techniques (CBT) as the same meaning of investment appraisal techniques] usage

4.1.1 The use of forecasting procedures and methods (FPMs)

The forecasting process in capital investment decision depends on the forecasting procedures and methods used to estimate the components of cash flow. In general, the CFFP in CB decisions starts with identifying the procedures and methods used in forecasting process, and ends by exposing the components of cash flow.

In this paper, the forecasting procedures and methods (FPMs) are segmented into three categories. First, forecasting procedures include personal estimates, standard procedures for estimating cash flow (CF) and the official forms used to collect CF data. Second, the forecasting methods consist of judgmental and quantitative methods. Third, the software package used in forecasting is determined in terms of software developed by firms and the commercial software package (e.g. Excel).

In terms of the procedures used in forecasting, Pohlman et al. (1988) and Lazaridis (2002, 2006) found that more than two-thirds of respondents in US firms and about 37% of respondents in both Greek & Cypriot firms have standard procedures for forecasting future cash flow rather than forecasting models. In addition, these studies surveyed seven methods used in creating the cash flow estimates, these methods have been developed from subjective estimates to the use of computer and sophisticated mathematical models (Ibid).

Empirical literature pays little attention to the software used in forecasting. Sanders (1997, p.33) surveyed the applications of computer software in forecasting and revealed that “69.9% and 14.2% of US manufacturing companies used software developed by their own companies and commercial software packages”, respectively. Indeed, the software used by US manufacturing firms is commercially available, particularly Microsoft Excel.

Consequently, this paper aims to examine the role of forecasting procedures and methods in generating the components of cash flow, which in turn reflects on the extent of use of CBT. In doing so, we suggest two hypotheses. First, the researchers attempt to test the link

between the procedures and methods used in forecasting (PMUF) and the components of cash flow, which are determined by financial, marketing and production factors (FMPF). Second, the direct relationship between the forecasting procedures & methods (FPMs) and the extent of use of CBT will be tested. Therefore, the formulation of the two hypotheses can be determined as follows:

H1: There is a positive relationship between the use of forecasting procedures and methods (FPMs) and the financial, marketing and production factors (FMPF) observed in both manufacturing and oil firms.

H2: The use of forecasting procedures and methods (FPMs) is positively associated with the extent of CBT usage in manufacturing and oil firms.

4.1.2 The components of cash flow: financial, marketing & production factors (FMPF)

Regarding the financial factors related to the CFFP, more than two-thirds of the Greek and Cypriot firms considered the borrowing and repayment of funds (external financing) as significant factors in CFF (Lazaridis, 2002, 2006). Whereas, more than two-thirds of the US firms ranked project risk and tax considerations as the most important factors in forecasting cash flows (Pohlman et al. 1988). Similarly, about two-thirds of the US, Greek and Cypriot firms considered working capital requirements as having a significant impact on CFF (Lazaridis, 2002, 2006; Pohlman et al., 1988).

Subsequently, other financial factors, such as administrative overhead, project evaluation and investigation costs, salvage values and project abandonment values are perceived to be less important in Greek, Cypriot and US firms (Ibid).

Tateishi and Mizumoto (2011) examined the influence of seven factors on cash flows in international companies: foreign exchange rates, depreciation costs, material costs, tax rate, working capital, operating income and labour wages. The results indicated that depreciation costs and exchange rates have a significant impact on the cash flow of international companies in Japan (Ibid).

In terms of marketing factors, approximately 90% of the respondents in US, Greek and Cypriot firms confirmed that sales forecast is the most important factor. In addition, the respondents in US firms ranked product life factor as the third most important factor, whereas selling expenditures are ranked the third most important factor in Greek and Cypriot firms. Moreover, competitive advantages and disadvantages and promotional expenditures are equally evaluated in US, Greek and Cypriot firms (Lazaridis, 2002, 2006; Pohlman et al., 1988). Similarly, most studies focused on sales forecast as an important market factor in the short or long term, because “sales forecast is a common activity in most companies affecting operations, marketing and planning” (Fildes et al., 2003, p.27). On the other hand, the influence of market testing costs, discount policy and transportation cost factors on CFF are considered to be less important in US, Greek and Cypriot firms (Lazaridis, 2002, 2006; Pohlman et al., 1988).

Finally, production factors are the third most important set of variables affecting CFFP, where more than 80% of respondents in US, Greek and Cypriot firms proved that operating expenses is the most important factor, followed by manufacturing overhead expenses and material and supply costs (Lazaridis, 2002, 2006; Pohlman et al., 1988). Shutdown costs, maintenance costs, capacity utilization research and development expense are of less interest in US, Greek and Cypriot firms. On the other hand, start-up costs are more important in US firms than in Greek or Cypriot firms, whereas repair costs are observed to be more important in Greek and Cypriot firms than in US firms (Lazaridis, 2002, 2006; Pohlman et al., 1988).

Ultimately, the aim of this paper is to examine the financial, marketing and production factors (FMPF) associated with the CFFP and their impact on the extent of CBT usage. Therefore, we formulated the following hypothesis:

H3: The financial, marketing and production factors (FMPF), which are created by FPMs, are positively associated with the extent of CBT usage in manufacturing and oil firms.

4.2 The key factors (DS, FH, QUA & POS) related to the cash flow forecasting process

In this paper, we are discussing four factors related to the cash flow forecasting process (CFFP): data sources (DS), forecasting horizon (FH), qualifications and position of forecasters (QUA & POS).

4.2.1 Data sources (DS) used in forecasting.

Data sources (DS) are one of the factors related to the CFFP. DS consists of internal and external data sources. In management accounting literature, the sources of management accounting information are often collected internally from firm's departments and external business processes.

Several studies focus on external and internal information sources used in collecting data relating to the preparation of forecasts (Winklhofer, et al., 1996). According to Wotruba and Thurlow (1976), sales force is an important source of market forecasting information. In multinational companies, "the sales force, historical data and the marketing research department are regularly used. On the contrary, Fildes and Hastings (1994) explored the effectiveness of information sources and found a degree of dissatisfaction among respondents about the scarcity of market research data, as an essential determinant in forecast accuracy.

Regarding external information needed for forecasting, most petrochemical and oil investment projects in Libya depended on feasibility studies that were required to be undertaken by Libyan oil firms (e.g. Ras Lanuf Oil & Gas Processing Company). In the Libyan oil sector, feasibility studies are conducted by foreign consulting firms using information based on global oil markets.

Subsequently, Kalchschmidt et al. (2010) consider that the forecasting process consists of forecasting techniques and information collected from different sources. According to

Danese and Kalchschmidt (2011a, p.208), the data sources used in forecasting are "current economic conditions, customers' sales plans, supplier information and market research". The information collected from reliable sources has a positive impact on the Italian firms' performance (Kalchschmidt et al., 2010). Accordingly, the data used in forecasting process can be collected from the following sources: firm's departments, traders and suppliers, research centres, customer/distributor's sales plans for company products, local analysts (e.g. chartered accountants) and foreign consultants.

This paper seeks to test the influence of using multiple data sources on forecasting procedures and methods as the main task in the forecasting process, which in turn reflects on the extent of CBT usage. To test this, we formulated the following hypothesis:

H4: The use of multiple data sources in forecasting processes is positively associated with the use of forecasting procedures and methods for capital budgeting decisions made by top management in manufacturing and oil firms.

4.2.2 Forecasting horizon (FH)

This factor is also referred to as "the average economic life of a project" (Pohlman et al., 1988, p.74). More than a third of respondents in US firms stated that their forecasting horizon in investment projects is more than ten years (Pohlman et al., 1988). Canadian managers divided the forecasting horizon into four periods: the shortest term "1-3 months", medium-shorter term (4-12 months), medium term "12-24 months", and longest term "more than 24 months" (Klassen and Flores, 2001). McHugh and Sparkes (1983) established that a short-term forecast is considered as more important in firms operating in highly competitive markets.

According to Winklhofer, et al. (1996, p.217), there is a strong link between short-term forecasts and the number of forecasts needed to assess the accuracy of forecasting. Sanders and Manrodt (1994) found that US managers used various techniques for multiple forecast horizons. Similarly, Greek and Cypriot corporations with longer forecasting periods have an interest in using several forecasting methods (Lazaridis, 2002, 2006). In a similar way, Klassen and Flores (2001), judgmental methods are more commonly used with different time horizons.

However, none of these studies investigated the impact of the forecasting horizon on the use of forecasting procedures and methods (FPMs). This paper seeks to assess the relationship between the forecasting horizon and the use of FPMs. Therefore, the following hypothesis was posited.

H5: The long-term forecast is positively associated with the use of forecasting procedures and methods (FPMs) for capital budgeting decisions made by top management in manufacturing and oil firms.

4.2.3 Qualifications and position of forecasters

Forecasters are the official persons who are responsible for estimating future cash flow generated by the investment projects. With regard to the responsibility of the forecasting

process, Pohlman et al. (1988) and Lazaridis (2002, 2006) found that Greek, Cypriot and US firms have one or more official persons preparing and coordinating cash flow estimates, including financial analyst, accountant, treasurer, department manager, controller, vice-president and president. Similarly, 52% of respondents confirm that the controller or vice president in American companies is responsible for forecasting (Drury, 1990). In this regard, the large organizations in British manufacturing relied on dedicated planning staff for preparing new forecasts (Simister and Turner, 1973). Financial teams were more commonly responsible for forecasting operations relating to budgets and financial plans from the 1980s onwards (Drury, 1990). Indeed, the responsibility for forecasting is conducted by the CEO authorized by a company (Klassen and Flores, 2001).

This paper tests the role of the qualifications (QUA) and position (POS) of the forecasters [Forecaster: The official persons who are responsible for preparing the cash flow estimates] in the forecasting process, specifically examining the relationship between the demographic factors (QUA and POS) and the use of forecasting procedures and methods; hence, the researchers sought to test the following hypotheses:

H6: The presence of qualified forecasters is positively associated with the use of forecasting procedures and methods for capital budgeting decisions made by top management in manufacturing and oil firms.

H7: The presence of official persons responsible for the forecasting process (position of forecasters) is positively associated with the use of forecasting procedures and methods for capital budgeting decisions made by top management in manufacturing and oil firms.

4.3 The influence of the combined contingent variables on the use of FPMs

The CB processes can be analysed as the contingent perspectives (Scapens and Sale, 1981). In this regard, the contingency theory assumes that the adoption of the CB process or the use of sophisticated appraisal techniques does not necessarily reflect on the high financial performance in organizations; this orientation requires the fit between the corporate context and the CB process (Pike, 1986).

Consequently, organizational characteristics (firm size, financial position & type of industry), technology, strategy, organization design, decentralization, information system, rewards structure and environmental uncertainty are some of the contingency variables (Baines and Langfield-Smith, 2003; Haka, 1987; Pike, 1986).

In terms of firm size, Verma et al., (2009) revealed that larger Indian companies prefer to use the NPV method more than smaller ones. Pike (1983) stated that sophisticated CBT are only applied in the largest UK firms. In contrast, the payback period method is more popular among smaller US firms (Block, 1997). The sophistication in CB requires “a clearer understanding of the important relationships between firm size, organizational structure, commitment and bias in

the design and operation of CB process” (Pike, 1983, p.208). The application of contingency theory in Pike’s study is perceived as the main support to reduce any misfit between firm’s context and CB process (Pike, 1986).

According to Pohlman et al.(1988), the use of multiple forecasting models in large US firms is associated with high capital expenditures. In most cases, the investment projects with high capital expenditures and high capital intensity lead to the extensive usage of forecasting models in large US firms (Ibid). Indeed, the CFF is “a significant determinant of investment for all firms and has the highest impact on large and new firms” (Devereux, 1990, p.138).

Kadapakkam et al., (1998, p.293) examined the effects of firm size and cash flow on investment in six OECD countries (Canada, France, Germany, the UK, Japan and the USA), where the market value of equity, total assets and overall sales were used to measure the firm size. More simply, Aoun and Hwang (2008) measured firm size by net value of total assets, divided firms into three groups: small firms, with total assets of less than \$13 Million; medium-sized firms with \$13-59.9 Million; and large firms with over \$60 Million. Moreover, Zotteri and Kalchschmidt (2007) refer to the presence of a relationship between a firm size and its forecasting practice based on the number of employees and overall sales.

According to Haka (1987), the environmental uncertainty and centralization in making CB decisions are mitigating factors in utilizing the discounted cash flow techniques (DCFT). Sundem (1975) and Schall & Sundem (1980) demonstrated that perceived environmental uncertainty is an obstructive variable affecting the successful use of DCF techniques.

In fact, the firm’s strategy is the most important contingent factor related to management accounting researches, particularly in the CB processes, because the CB decisions are associated with the long-term strategy of the organization. Subsequently, Govindarajan (1988, p.828) recognized that “different business units within the same corporation often pursue different strategies”, using low cost and differentiation strategy in order to measure organizational strategies.

Haka (1987) determined the US firms’ strategies in three aspects: focusing on the new production lines, selecting the investment projects with high return and risk and emphasising on research and development. Similarly, Abugalia (2011, p.216) determined the strategic policies in Libyan industrial firms in terms of three tasks: “mission strategy, competitive advantage strategy and product & market change strategy”.

Concerning the relationship between forecasting processes and firm’s strategy, Zotteri and Kalchschmidt (2007, p.84) examined the “contingency variables such as firm size, type of sector, strategic priorities and demand characteristics (number of products) and their relationship with forecasting practices”. It is indicated that forecasting processes in Italian companies are contingent upon their competitive strategies (Ibid).

Similarly, Anuar (2005) used the type of industry as similar to the firm's major products; this study examines the relationship between the firm's major products and the use of sophisticated CBT in Malaysian manufacturing companies. According to Verbeeten (2006), the use of sophisticated CB is associated with firm size and type of industry.

Based on the previous discussion, we attempt to assess the influence of firm's contingent variables on the use of forecasting procedures and methods (FPMs). This effect may reflect on the extent of CBT usage in manufacturing and oil companies. In support of the previous discussion, the researchers will test the combined contingent variables (CCV) in one construct. In this paper, the combined contingent variables (CCV) are determined as:

- Average of annual sales (AAS)
- Average of investment expenditures (AIE)
- Number of employees (NEM)
- Type of industry(IND)
- Strategic priorities (SP)
- Perceived environmental uncertainty (PEU)

Thus, the researchers adopted the following hypothesis:

H8: The combined contingent variables (AAS, AIE, NEM, IND, SP and PEU) have a strong effect on the use of forecasting procedures and methods for capital budgeting decisions made by top management in manufacturing and oil firms.

Furthermore, this paper seeks to investigate the significance of the contingency theory in explaining the differences between the public and private companies in terms of using the FPMs. In this regard, the researchers attempt to test the role of ownership in enhancing the relationship between contingency variables and the use of forecasting procedures and methods.

In empirical literature, Eljelly and AbuIdris (2001) surveyed the differences between Sudanese public and private enterprises in terms of the applications of CBT and sought to determine the possible factors that may have an impact on the choice of CBT. They found that the managers of public sector were more active in CB than their private sector peers, and that the NPV method was perceived to be more important in the public sector, while PB was the most widely used in both sectors (Ibid). Similarly, Al-Ani (2015) examined the influence of specific contingencies on the use of the payback period method in two groups working in the Omani energy and oil sectors. Al-Ani's study revealed that the use of the PB methods by both managers and investors is not significantly different according to the specific contingent variables of "risk, liquidity, profitability, market obstacles, management compensation and firm size". In line with this, the discounted cash flow methods are more commonly used in foreign-owned firms than Malaysian-owned firms (Anuar, 2005).

In terms of multi-group analysis, the influence of the contingency variables on the use of forecasting procedures and methods may differ from public to private companies.

Therefore, the research team formulated the following hypothesis:

H8_a: The effect of combined contingency variables (AAS, AIE, NEM, IND, SP and PEU) on the use of forecasting procedures and methods is significantly stronger in public firms than in private ones.

This paper also offers another case for multi-group analysis to investigate the significance of contingency theory in explaining the differences between manufacturing and oil companies in terms of the use of FPMs. In this case, industry type (IND) has been excluded from the combined contingent variables, which are AAS, AIE, NEM, SP and PEU. Therefore, the influence of the contingency variables on the use of forecasting procedures and methods may differ between manufacturing and oil companies. In doing so, we formulated the following hypothesis:

H8_b: The effect of combined contingency variables (AAS, AIE, NEM, SP and PEU) on the use of forecasting procedures and methods (FPMs) is significantly stronger in manufacturing firms than in oil ones.

4.4 The influence of institutional variables on the use of forecasting procedures & methods (FPMs)

Institutional requirements, such as political and economic pressures, play an important role in CB processes in the Libyan business environment (Mohammed, 2013). In this regard, external institutional factors have a direct impact on the adoption of new MA systems (Moll et al., 2006). Hussain and Hoque (2002) demonstrated four different dimensions associated with the non-financial performance measurement practices: economic constraints, and coercive, mimetic & normative pressures.

In terms of coercive isomorphism, four factors are tested: "central bank regulatory control, accounting standards and financial legislation, socioeconomic-political institutions' pressures" (Hussain and Hoque 2002, p.163). These aspects describe the dimensions in which organizations are affected by legislation and state institutions in terms of their adoption of accounting practices required by the state. In this regard, the generally accepted accounting principles (GAAP) and international accounting standards (IAS) applied by organizations may impose legislation and constraints on management accounting systems, such as "cost calculation and performance measurement". To emphasize this point, Japanese banks operate under guidelines and accounting principles issued by the Central Bank of Japan (Ibid).

Consequently, the adoption of the investment appraisal processes in manufacturing firms is affected by legislation and the economic-political situation in developing countries – particularly in the case of Libya (Mohammed, 2013). In this paper, the CFFP occurring in the presence of political and economic instability may undermine/restrict the adoption of CB processes in Libyan manufacturing and oil companies.

However, mimicry in the use of systems and other similar processes occurs mostly because of the existence of

uncertainty throughout the external environment to the organization. This is due to asymmetrical information and the difficulty in implementing the organization's objectives. Thus, organizations seek to imitate each other to attain a high level of homogeneity and legitimacy (DiMaggio and Powell, 1983; Liang et al., 2007).

In practice, two of four Japanese banks showed that copying the best costing and performance measurement systems from other organizations only has a moderate impact on performance measurement systems (Hussain and Hoque 2002). In a similar way, Liang et al. (2007) indicate that the adoption of the enterprise resource planning (ERP) process is affected by competing companies (mimetic pressures), through the considerations of top management in the US firms.

In terms of normative isomorphism, it occurs as a result of professional practices or the influence of accounting practitioners on the business environment within the organizations. The influence of "professionals, management's strategic priorities, top management/corporate culture and bank characteristics" were understood as normative pressures on performance measurement systems in a Japanese case study (Hussain and Hogue, 2002). According to Mohammed (2013), financier characteristics, accounting education and practitioners have less influence on the CB processes in Libyan firms.

Consequently, it is reasonable to suppose that the use of forecasting procedures and methods are affected by the existence of coercive, mimetic and normative pressures within the Libyan institutional environment. In turn, this may affect the adoption of CBT in the Libyan manufacturing and oil firms. Thus, the following hypothesis is posited:

H9: The coercive, mimetic and normative pressures within the Libyan institutions have a strong impact on the use of forecasting procedures and methods for capital budgeting decisions made by top management in manufacturing and oil firms.

This paper assumes that the institutional theory explains why organizations adopt specific forecasting procedures and methods in CB processes. Hence, the influence of coercive, mimetic and normative pressures on the adoption of forecasting procedures and methods may differ from private companies to those in public ones, leading to the following hypothesis:

H9_a: The effect of the coercive, mimetic and normative pressures on the use of forecasting procedures and methods is significantly stronger in public companies than in private ones.

4.5 The relationship between the use of forecasting procedures & methods (FPMs) and the financial performance of firms (FPFs)

This part of the study investigates the relationship between forecasting processes, in particular the forecasting procedures and methods, and firms' financial performance. Danese and Kalchschmidt (2008, 2011a, 2011b) examined

the impact of the forecasting process on the organisational performance. According to Liu et al. (2010), the forecast accuracy of CF strengthens confidence in the use of discounted cash flow methods in CB decisions. While it is certain that forecast accuracy is not the only essential determinant affecting operational performance, there are also contextual and forecasting variables that should be studied and managed by decision makers (Danese and Kalchschmidt, 2008; Smáros, 2007).

Several studies investigated the relationship between forecasting practices and performance. According to Kalchschmidt et al. (2010), the forecasting process consists of forecasting techniques and information collected from different sources. Danese and Kalchschmidt (2011a, 2011b) examined the influence of forecasting process variables on operational performance through forecast errors.

In fact, the reason for utilizing qualitative or quantitative methods in forecasting is to limit personal judgments or bias, and the effects of asymmetrical information having been collected from different sources (Makridakis et al., 1998). There is also consistency between the aims of forecasting and the methods used in forecasting, whereby the purpose of the forecasting process is to minimize production and delivery costs instead of focusing on forecast accuracy (Danese and Kalchschmidt, 2008).

However, cost performance is significantly associated with the interaction between the forecasting methods, data sources, and the importance of forecasting processes in supporting decision makers (Danese and Kalchschmidt, 2011b). On the other hand, the interaction between forecasting methods and the role of forecasting is negatively associated with delivery performance (Ibid).

Similarly, Zotteri and Kalchschmidt (2007) examined the relationship between forecasting practices and performance; the factors in this study are divided into three main categories: forecasting practices, structural and contingent factors. In this case, forecasting practices were considered as the mediating variable affecting Italian firms' performance (Ibid). Results showed that Italian firms' performance is affected by forecasting practices, depending on their aims and utilization. These findings suggest that there must be homogeneity or matching between the forecasting process and the organizational structure to improve firms' performance (Ibid).

Ultimately, most studies examine forecasting processes in a short-term application, such as production and sales planning, whereas CFFP in capital investment decisions has received little attention. Furthermore, the effectiveness of forecasting methods with particular attention to forecasting accuracy is contingent upon contextual factors.

In accounting literature, Soares et al. (2007) investigated the CFF errors in CB decisions; they examined the differences between investment projects both before and after implementation to evaluate the CFFP in Portuguese enterprises. The findings of Soares et al.'s study (2007) revealed that issues affecting cash flow in CB are significantly correlated with forecast accuracy, whereby

forecasting errors in CB are perceived to be more volatile than sales and operating costs.

However, the mediating role of CBT between forecasting processes and firms' financial performance is more appropriate in this case. As discussed in the first section, the gap in existing literature is such that existing research has not addressed the relationship between the forecasting process (FPMs & FMPF) and the extent to which CBT are used. This relationship represents the second and third stages of the CB process, respectively. That is the reason for that CBT mediates the relationship between the use of FPMs and financial performance.

Having examined the forecasting process variables and hypotheses in the previous section, this section provides further discussion regarding the influence of the use of forecasting procedures and methods (FPMs) on the financial performance of firms. The purpose of this paper is to investigate the mediating role of CBT between the use of forecasting procedures and methods (FPMs), and the financial performance of firms. To test this effect, the following hypothesis was formulated:

H10: The relationship between the use of forecasting procedures and methods (FPMs) and the financial performance is mediated by the extent of CBT usage in manufacturing and oil firms.

4.6 The direct relationship between the extent of use of CBT and the financial performance of firms

Klammer (1973) studied the relationship between the use of CBT and performance (PERF). The Klammer's study reported that the use of sophisticated CBT was negatively correlated with performance (PERF). This does not mean that the use of sophisticated CBT is not beneficial, and in this study other factors were found to affect firms' profitability. Firm's characteristics are clearly related to the use of CBT and performance. Klammer's study (1973) suggested a number of factors which enhance the fit between CBT usage and PERF, including creating effective investment opportunities, and real estimates of cash flows resulting from these opportunities, in addition to management ability to effectively use of quantitative techniques, particularly operations research models.

Haka et al. (1985, p.652) examined the influence of use of financial appraisal techniques on corporate performance "switching from naive to sophisticated CB selection procedures". They found that the adoption of sophisticated CBT is perceived to be improved corporate performance, and several policies affect the latter, particularly contextual factors. Therefore, sophisticated techniques should be combined with other policies to improve economic growth within companies. Thus, DCF methods need to be developed and extended beyond the direct application of the net present value (NPV) and IRR. No evidence was found that sophisticated CB processes leads to higher levels of performance (Farragher et al., 2001; Pike, 1984, 1986).

Jakovicka et al. (2003) and Alzoubi & Alazawi (2010) also asserted that the application of sophisticated CBT is not

necessarily linked to optimum performance. This was reiterated by (Irungu, 2014), who emphasized that the relationship between the use of CBT and financial performance in Nairobi listed firms was insignificant. Nevertheless, such outcomes are not static, and CBT usage is related to the structural and contextual factors with which the selection of CBT should be compatible, such as firm size, uncertainty, and the CFFP (Klammer, 1973). In line with this trend, senior finance executives have confidence in sophisticated uses of CBT, which play an important role in improving the effective implementation of large investment projects (Pike, 1988). Therefore, a closer fit between the CB process, structural characteristics, and contextual factors may lead to better performance (Klammer, 1973; Pike 1984, 1986).

Ultimately, this paper attempts to investigate the direct relationship between the extent of use of CBT and the financial performance of firms. Therefore, the following hypothesis was posited:

H11: There is a positive relationship between the extent of use of capital budgeting techniques (CBT) and the financial performance of manufacturing and oil firms (FPFs).

5. Research Methodology

5.1 Survey design

This paper adopted a survey as the data collection tool, where the questionnaires were distributed to the financial directors and other officials who participated in preparing the capital budgeting process in manufacturing and oil firms operating in Libya. To achieve the research objectives, different types of questionnaire's questions were constructed to measure the main research variables.

The population of the study involved 257 Libyan manufacturing & oil companies excluding foreign companies, and we determined 100 companies as the sample size, due to convenience sampling method used in this paper. The usable questionnaires are 69 including 2 questionnaires collected from foreign oil companies and excluding two unusable questionnaires, while 31 questionnaires could not be completed for critical reasons. Accordingly, the response rate for this paper is 31%.

However, the respondents participated to complete the questionnaire survey are determined in terms of their qualifications (see: Tables 1).

Table 1: Respondent's job title

Job title	Frequency	Percentage
Financial director	37	53.65
General manager or executives	23	33.30
Production/operational manager	1	1.45
Planning manager	1	1.45
Accounting manager	4	5.80
Vice president or president	1	1.45
Chartered accountant	1	1.45
Others	1	1.45
Total	69	100

From Table 1, it can be observed that more 50% of respondents are financial directors and the findings of the survey have been reported that the majority of respondents held a Bachelor degree.

5.2 Measurement of research variables

The main research variables are the forecasting process variables (FPMs & FMPF), key factors related to forecasting process (DS, FH, QUA & POS), contingency and institutional variables, CBT and the financial performance of firms. Different types of measurement were used in this research to measure independent, mediated and independent variables. Categorical, ordinal, numerical and dichotomous scales are the main measurements used to measure the items of the research variables. In this regard, most of the indicators used to measure the research variables are selected based on previous research that have employed the same measures, where the majority of measures is consistent with Likert scale system.

However, accurate measurements lead to effective analysis of relationships among the research variables. Hence, inferential statistical analysis can be reliable and valid. In this regard, the statistical criteria used to assess the formative indicators are different from the reflective indicators (Hair et al., 2014).

The assessment of reflective indicators can be divided into four elements. Firstly, internal consistency can be assessed by its composite reliability (CR). Secondly, the indicators' outer loadings will be used to assess the reliability of reflective indicators. Thirdly, the convergent validity of reflective constructs can be evaluated by using the average variance extracted (AVE). Finally, the Heterotrait-monotrait (HTMT) ratio is employed to assess discriminant validity. Therefore, this paper used the criteria as addressed in previous studies to assess the reflective indicators. SmartPLS 3 and ADANCO 2.0 software were used to assess the reliability of reflective indicators and their constructs.

As per the criteria adopted in this paper, the most reflective indicators attained the minimum outer loading benchmark of 0.40, and their outer loadings are significant. In addition, the CR values of research variables (constructs) are also above the acceptable benchmark of 0.60. Although the AVE values of most research variables are less than 0.50, the exclusion criterion requires that variables with AVE of less than 0.50 should be retained if their CR values are greater than 0.60 (Huang et al., 2013). Moreover, the findings related to discriminant validity stated that all HTMT ratios are significant under the P values ($p < 0.001$; $p < 0.01$; $p < 0.05$; $p < 0.10$). As a result, all constructs have established discriminant validity (see Appendix C).

In terms of the assessment of formative indicators, this paper adopted two main criteria used to assess the reliability and validity of formative indicators: collinearity issues among the formative indicators and the significance of formative indicator's outer weight and loading (OW/L). In this regard, it can be certain that all financial performance (FP) indicators should remain in the PLS path models, because the variance inflation factor (VIF) for each FP indicator is

less than five. Therefore, the formative indicators do not have collinearity issues. Moreover, the outer weights and loadings of the formative indicators are significant (see Appendix C).

5.3 Multivariate analysis technique:

This paper adopted the mediated causal model that belongs to path analysis models. In empirical literature, path analysis models are sequential and causally-focused, allowing testing of the relationships between the research variables and examining direct and indirect effects on outcomes or dependent variables (Hair et al., 2014; Hair et al., 2011a, 2011b). Accordingly, we used partial least squares structural equation modelling (PLS-SEM) as a statistical technique, which is a combination of multiple regression, path analysis and factor analysis (Hair et al., 2014).

However, partial least squares (PLS) is one of the statistical multivariate techniques suggested in this paper for the following reasons (Hair et al., 2014; Lowry and Gaskin, 2014):

- PLS is used in specific situations where the measurement of observed variables is required to employ different measures, such as nominal, interval, categorical and ordinal scales.
- PLS is used when the sample size is small, involving approximately 50-100 respondents.
- The application of PLS is essential when the research path model includes reflective & formative constructs.
- PLS is applied in this paper because of the non-normal distribution of data.

6. Results and discussion

The findings and discussion of this paper can be divided into five main tasks. First, this paper attempts to compare the findings of the descriptive statistics of this paper with the results of previous studies in terms of the extent of use of CBT and the forecasting procedures and methods (FPMs). Second, the findings relating to the forecasting process are represented as the forecasting procedures and methods and the components of cash flow, particularly the financial, marketing and production factors associated with CB process. Regarding the factors related to the forecasting process, three factors are addressed in terms of data sources (DS), forecasting horizon (FH) and qualification & position of forecaster (QUA & POS). Third, a comparison between the findings related to the contingency variables affecting the use of forecasting procedures and methods are deliberated. In the fourth place, the influence of institutional variables on the forecasting procedures and methods are investigated. Finally, the findings related to the financial performance of firms (FPFs) are presented in two ways: the indirect relationship between the use of FPMs and FPFs, and the direct relationship between the extent of use of CBT and FPFs.

6.1 The findings of the descriptive statistics:

6.1.1 The extent of CBT usage

This part compares the findings of this paper with prior studies relating to CBT. In literature, there are three categories of capital budgeting techniques (CBT): financial appraisal, risk analysis and operations research techniques (Pike, 1996; Pike and Sharp, 1989). Most of researchers concentrate on the financial appraisal techniques used as criteria for making CB decisions; these techniques are shown in Table No: 2.

First, the empirical evidence gathered in this paper states that the financial appraisal techniques (FAT) have been widely used in developed and developing countries alike as summarized in Table 2. It can be seen that the PB method is the most common method used amongst UK, Indian, Malaysian, Chinese, South African, Sudanese and Libyan firms. On the other hand, discounted cash flow (DCF) methods are perceived as being of more interest in US, Swedish, Dutch and Australian firms. PB and ARR methods have depended on the concept of traditional income, whereas DCF methods have been based on the concept of the time value of money.

In terms of non-discounted cash flow methods, 58% and 57% of manufacturing and oil companies operating in Libya

considered the PB and ARR to have high priority in the process of CB (respectively). On the other hand, Libyan companies have not paid attention to the use of discounted cash flow methods, with only 19% and 10% of manufacturing and oil firms using NPV and IRR, respectively. Conversely, 85% of US firms and 94% of Canadian firms always or often used the NPV in CB decisions (Bennouna et al. 2010; Ryan and Ryan, 2002).

In contrast to the findings of this study, it seems that CB practices in the Asia-Pacific region (China and India) applied DCF methods combined with non-discounted cash flow methods to evaluate investment projects. In this regard, Indian firms have interested in using the non-DCF and DCF methods. In particular, 80%, 63.3% and 76.7% of these firms often/always used the PB, NPV and IRR respectively (Verma et al., 2009). Similarly, ARR and IRR were primarily employed by Chinese companies (66.7% and 88.9%, respectively). According to Graham and Harvey (2001) and Brounen et al. (2004), NPV, IRR and PB are the most popular methods among North American and Western European firms. In line with this, Drury et al. (1993) and Pike (1996) confirmed that the UK firms employ the payback period (PB) and discounted cash flow techniques in appraising the investment opportunities. For more detail, it can be used the data included in table 2.

Table 2: Percentage of using the financial appraisal techniques by businesses

No	Firm size/ details	Year & country of survey	The sample	The type of answer	% The use of the financial appraisal techniques				
					PB	ARR	NPV	IRR	PI
Current study (2019)									
1	Small, medium and large firms.	2008-2010 Libya	69 firms	An essential and high priority	58	57	19	10	4
Drury et al. (1993)									
2	Small, medium and large firms.	1993 UK	278 firms	Always/often used	63	41	43	57	NA
Pike (1996)									
3	Large	1992 UK	100 firms	Used	94	50	74	81	NA
Arnold and Hatzopoulos (2000)									
4	Small firms	1997 UK	100 firms	Used	71	62	62	76	NA
	Medium firms		100 firms		75	50	79	83	
	Large firms		100 firms		66	55	97	84	
Ryan and Ryan (2002)									
5		USA	205 firms	Always/often used	52.6	14.7	85	76.7	NA
Graham and Harvey (2001)									
6		2001. USA and Canada	392 CFOs	Always/almost always used	57	20	75	75.7	12
Bennouna et al. (2010)									
7		2010 Canada	88 firms	Used	NA	NA	94	87.7	NA
Holmen and Pramborg (2009)									
8		2009 Sweden	143 firms FDI	Always/almost always	57	38	49	34	NA
Daunfeldt and Hartwig (2014)									
9		2005-2008 Sweden	193 listed firms	Frequently or always	54.4	46	61	30	12.4
Hermes et al., (2007)									
10	- Dutch CFOs	2007 Netherlands	42 firms	Always/ almost always used	79	2	89	74	NA
	- Chinese CFOs		45 firms		84	9	49	89	NA
Truong et al. (2008)									
11		2004 Australia	87 firms	Moderately important and very important	79	50	82	70	NA
Verma et al. (2009)									

12		2009 India	30 firms	Often/ always used	80	26.7	63	76.7	NA
Chan et al. (2001)									
13		2001	54 firms	Primary use	13	66.7	89	40.7	46.3
Anuar (2005)									
14		2005 Malaysia	88 firms	Very often and often used	69.4	25	60	61.4	NA
Eljelly and AbuIdris (2001)									
15	-Private firms -Public firms	2001 Sudan	31 37	Used	52 38	5 14	12 24	14 19	6 8
Obi and Adeyemo (2014)									
16		Nigeria	228 firms	Used	39.5	17.5	20.2	13.2	8.8
Mohammed (2013)									
17	Industrial firms	2013 Libya	45 firms	Importance of use	98%	69%	80%	73%	56%

* PB: Payback period; ARR: Accounting rate of return; NPV: Net present value; IRR: Internal rate of return; PI: Profitability index; DCFM: Discounted cash flow methods (including NPV, IRR and PI); SML: small, medium and large firms; NA: Not applicable.

Second, risk appraisal techniques were divided into six categories: subjective assessment (SAS), cost-volume-profit (CVP) analysis, sensitivity analysis (SA), scenario analysis (SCA), shortening the PB period (SPB) and raising the discount rate (RDR). Table 3 shows the percentage of using the risk appraisal techniques by businesses.

assessment (SAS) in appraising the project risk inherent in CB decision, while the majority of US, UK, Canadian and Indian firms applied SA, SPB and RDR, which were commonly used in large firms in the UK – 88%, 60% and 65% respectively (Pike, 1996).

Table 3 shows that 68.1% of the manufacturing and oil companies operating in Libya depended on subjective

Table 3: Percentage of using the risk appraisal techniques by businesses

No	Author	Country and year of survey	The sample	The type of response	% use of the risk appraisal techniques*					
					SAS	CVP	SA	SCA	SPB	RDR
1	Current study (2019)	Libya 2008-2010	69 SML* firms	An essential & high priority	68.1	42	5.8	5.8	5.8	1.5
2	Drury et al. (1993). SML firms	UK 1993	278 firms	Often or always used	NA	NA	51	NA	37	18
3	Pike (1996) (large firms)	UK 1992	100 firms	Used	NA	NA	88	NA	60	65
4	Arnold and Hatzopoulos, 2000 - Small firms - Medium firms - Large firms	UK 1997	100	Used	44	NA	82	**	15	42
			100		33	NA	83		42	71
			100		55	NA	89		11	50
5	Ryan and Ryan (2002)	USA	205 firms	Always or often used	NA	NA	65.1	41.6	NA	NA
6	Graham and Harvey (2001)	USA and Canada 2001	392 CFOs	Always or almost always used	NA	NA	52	NA	NA	NA
7	Singh et al. (2012)	India 2010	166 firms	Used	NA	NA	96	7.69	11.5	11.5
8	Daunfeldt and Hartwig (2014)	Sweden 2005-2008	193 listed firms	Frequently or always	NA	NA	45	NA	NA	NA

*SAS: Subjective assessment; CVP: Cost-volume-profit analysis; SA: Sensitivity analysis; SCA: Scenario analysis; SPB: Shorten the PB period; RDR: Raise the discount rate; SML: Small, medium and large firms; NA: Not applicable; ** Arnold and Hatzopoulos, 2000 used the SA and SCA as a combination method.

Third, operations research techniques are often referred to as management science techniques (Pike, 1996), and are often used when firms have limited funds. According to Beraldi et al. (2012), capital rationing is a special case of the CB that exists whenever the firm's capital budget is not adequate to fund all profitable opportunities. In accountancy and finance literature, several mathematical models are suggested for solving capital rationing problems. The purpose of capital rationing is to maximize the net present value of owners' wealth under the available funds (Manalo & Manalo, 2010).

In this paper, it can be observed that three techniques commonly used to solve the capital rationing problem in CB decision. These are the mathematical programming (MP), decision tree (DT) and program evaluation & review technique (PERT)/critical path analysis (CPA). The descriptive findings indicates that Libyan firms had little interest in the uses of mathematical programming (MP), decision trees (DT), program evaluation and review techniques (PERT) or critical path analysis (CPA) in CB decisions. A much larger percentage of UK firms (32%) and

US firms (31%) used PERT or CPA (Pike and Sharp, 1989; Ryan and Ryan, 2002).

In empirical literature, the use of MP has received extensive attention in CB research, albeit usually for specific CB problems, whereupon the mathematical programming models used in solving CB problems are perceived to be more common in the private sector (Khan, 2008). In line with this, the National Oil Corporation (NOC) subsidiary Company, Ras Lanuf, used linear programming in appraising the oil investment projects (Linsley & Fotouh, 1979).

6.1.2 The use of forecasting procedures and methods (FPMs).

The findings relating to the forecasting process are represented as the procedures and methods used in

forecasting the components of cash flow, in particular, the financial, marketing and production factors (FMPF) associated with CB decisions. In empirical literature, there is little interest in the procedures and methods used in forecasting the future cash flows created by investment projects (Batra & Verma, 2014). Despite this, there are three studies that addressed the CF estimates in CB decisions; therefore, the researchers present a comparison between the results of this paper and those of Lazaridis (2002, 2006) and Pohlman et al. (1988) as shown in table 4.

The findings shown in Table 4 enable researchers to compare between the USA, Cyprus, Greece and Libya. This comparison presents relevant empirical evidence on the application of forecasting procedures and methods in the industrial sector.

Table 4: Comparison of the current research findings with Pohlman and Lazaridis’s research results (FPMs)

The forecasting procedures and methods (FPMs)	Symbol	The current study (2008 -2010) *	Pohlman et al. 1988 (1986)**	Lazaridis, 2002 (2002)**	Lazaridis, 2006 (2002)**
		Libya/ %	USA/ %	Cyprus/ %	Greece/ %
Procedures used in forecasting (PUF):					
Personal estimates	PUF1	70	NA	NA	NA
Standard procedures	PUF2	41	85.3	36.27	37.52
Official or standard forms	PUF3	35	78	18.63	24.02
Judgmental (qualitative) methods used in forecasting:					
Executives' opinions	JM1	78.26	90.5*	59.17	48.17
Delphi method	JM2	7	67.2*	15.00	17.07
Sales force composite	JM3	43	NA	NA	NA
Quantitative methods used in forecasting:					
Time-series models	QM1	28	NA	NA	NA
Regression analysis models	QM2	7	48.3*	3.33	3.51
Software package used in forecasting:					
Software developed by a company	SUF1	4	52.2*	6.67	13.72
Commercial software packages (Excel)	SUF2	52	NA	NA	NA
Sensitivity Analysis	SA	N.A	69*	3.33	3.20
Probability Theory	PT	N.A	43.1	2.50	2.59

*1- The executives’ opinions are often referred to the Management’s Subjective Estimates. 2- Delphi method is often referred to as the consensus of experts’ opinion. 3- Regression analysis models are similar to the sophisticated mathematical models. 4- The software developed by a company is similar to the computer simulation mentioned by Pohlman and Lazaridis. 5- Sensitivity analysis is applied as one of the risk appraisal techniques in capital budgeting as mentioned in this survey. 6- NA: Not applicable. 7-The type of answer in this paper: Always and often used. **8-The type of answer: Used.

Beginning with the procedures used in forecasting, 70% of manufacturing and oil companies in Libya applied personal estimates (PUF1) to forecast future cash flow in CB decisions. The PUF1 does not relate to the executives’ opinions, because it is based only on personality. This is different from US, Cypriot and Greek firms, which did not indicate that they utilised this procedure (PUF1). In addition, the standard procedures used in Libya, Cyprus and Greece are similar (41%, 36.27% and 37.52% respectively), while 85.3% of US manufacturing firms used the standard procedures in CFF.

Moreover, 35% of the manufacturing and oil companies operating in Libya used official forms to collect cash flow data relating to the investment projects. This procedure is similar to those used by Cypriot and Greek firms (18.63% and 24% respectively), whereas 78% of US manufacturing firms employed official forms.

Secondly, this paper addressed some of the qualitative methods used in forecasting. Where, the executives’ opinions are identical to management’s subjective estimates and are used as a qualitative method in forecasting. Where, there are similarities in using the management’s subjective estimates amongst US and Libyan firms (78.26% in Libya and 90.5% in the USA), while 59.17 of Cypriot firms and 48.17 % of Greek firms used the management’s subjective estimates in CB decisions.

Manufacturing and oil companies in Libya did not pay attention to the use of the Delphi method in forecasting (only 7% used this technique, even less than 15% of Cypriot and 17% of Greek firms utilizing it). In contrast, 67.2% of respondents in US firms applied the consensus of experts’ opinion (Delphi method) to forecast future cash flow in investment decisions. With regard to the sales force composite method, the research results of Lazaridis (2002, 2006) and Pohlman et al. (1988) do not refer to this

technique, whereas 43% of the manufacturing and oil firms in Libya used the sales force composite method as one of their qualitative methods.

In terms of Delphi method, UK firms certainly paid greater attention to its use than Libyan ones. The use of sales force composite in UK firms (Fildes and Hastings, 1994) was similar to that of Libyan companies, which was close to 40%. Watson (1996) stated that 82% of UK firms used the sales force composite method in sales forecasting. Time-series and regression analysis models were perceived to be more common in UK firms than Libyan ones. Moreover, UK firms were approximately four times more likely to use software programed by their staff.

Thirdly, the mathematical models used in forecasting were perceived as being of less interest in Libya, whereas 7% and 28% of the manufacturing and oil firms applied regression analysis and time-series models respectively. Cypriot and Greek firms have not paid attention to the use of mathematical models in forecasting, with less than 4% of respondents using these models. Conversely, 48.3% of US manufacturing firms applied sophisticated mathematical models to forecast future cash flow in CB decisions.

However, most researchers in businesses focus on the application of forecasting methods in marketing/sales areas or operational activities (Klassen and Flores, 2001; Lawrence et al., 2000; Watson, 1996). In this regard, Klassen and Flores (2001) stated that the use of forecasting methods in US firms is similar to the Canadian firms, although only 57% of the latter (n=66) used the forecasting process in capital investment decisions.

For more detail, the comparison of the forecasting methods used in Libya and the UK was undertaken by Watson (1996) and Fildes & Hastings (1994), although these studies applied forecasting methods in the marketing field. In terms of the executives' opinions, both this study and Watson (1996) found that this technique was used by the majority of firms for forecasting, but in different ways. About 78% of Libyan manufacturing and oil firms always use executives' opinions in CB cash flow forecasts and 68% of the UK firms used this technique in sales forecasting.

6.2 The findings related to cash flow forecasting process (CFFP) in CB decisions

Danese and Kalchschmidt (2011a) illustrated three main features related to forecasting process in CB decisions can be determined for the purpose of this paper:

- The use of forecasting procedures and methods (FPMs) in CB decisions
- The components of cash flow are represented as the financial, marketing and production factors (FMPF).

However, PLS path models have been addressed the research hypotheses (H_1, \dots, H_{11}). Appendix C illustrates the causal relationships among the main research variables. In this part of paper, it presents the first three hypotheses related to the forecasting process in CB decisions. In the first hypothesis, the statistical results established that there is a

significant and positive relationship between the use of forecasting procedures and methods (FPMs), and the financial, marketing and production factors ($p < 0.001$). It can be certain that borrowing of funds (FF1), tax consideration (FF3) and administrative expenses (FF6) are important financial factors associated with the forecasting procedures and methods (significant at $p < 0.01$ and $p < 0.001$).

In the same way, direct manufacturing costs (PF1), overhead (PF2), and research & development expenses (PF3) are positively associated with the use of forecasting procedures and methods (significant at $p < 0.10$ and $p < 0.001$). Contrary to the marketing factors, it can be seen that 98.5% of manufacturing and oil firms operating in Libya consider sales forecast (MF1) factor as being associated with the forecasting process. Therefore, the MF1 indicator was shown in the PLS path model 1 with weak coefficient (See: Appendix C), because this variable contains the same values meaning that respondents' answers are identical. As a result, the variance ratio is close to zero.

Consistent with the results of the previous studies, Pohlman et al. (1988, P.74) stated that tax consideration is a significant factor affecting the CFFP in investment decisions made by the US firms ($p < 0.05$) and they asserted that the firms "with larger capital expenditures" are positively associated with the use of multiple forecasting methods.

The descriptive results of this paper and prior studies addressing the financial, marketing and production factors confirmed that sales forecast and direct manufacturing costs are the most important factors affecting the forecasting process in the USA, Greece, Cyprus and Libya.

Subsequently, it can be seen that 88% of manufacturing and oil companies operating in Libya consider that working capital requirements is considerably associated with the forecasting procedures and methods. Similarly, US, Cypriot and Greek firms paid more attention to the working capital requirements in the forecasting process (69%, 61% and 72% respectively). In the same way, borrowing and repayment of funds was of less concern to US and Libyan firms (37.5% and 39% respectively), while more than two-thirds of Cypriot and Greek firms considered this to be a vital factor affecting the investment decisions. Statistically, this paper confirms that the use of official forms (PUF3) in collecting information about future cash flow is significantly associated with the financial factors (significant at $p < 0.001$). In this study, the researchers found that the applications of regression models (QM2) in forecasting are positively associated with financial factors (significant at $p < 0.001$).

In the second hypothesis, the statistical results of this study found that the use of forecasting procedures and methods are positively associated with the extent of use of CBT (significant at $p < 0.01$). Consistent with the results of previous studies, Lazaridis (2002 and 2006) and Pohlman et al. (1988) addressed the role of forecasting techniques in estimating future cash flow in CB decisions. In other words, Pohlman et al. (1988) and Lazaridis (2002, 2006) only concentrated on the CFF stage in CB and did not examine the relationship between the CFFP and the appraisal stage (the extent of use of CBT). In terms of financial appraisal

techniques, the use of forecasting procedures and methods is perceived to be more highly associated with the extent of use of discounted cash flow methods (NPV, IRR and PI) instead of using the payback period and accounting rate of return methods (significant at $p < 0.001$).

Similarly, the use of forecasting procedures and methods is significantly linked with the extent of use of cost-volume-profit (CVP), sensitivity and scenario analysis techniques ($p < 0.001$). In contrast, shortening the PB period (SPB) and raising the discount rate (RDR) were widely applied in UK firms (Pike, 1989, 1996). Moreover, the extent of use of the operations research techniques (MP, DT and PERT/CPA) is considerably associated with the use of forecasting procedures and methods, especially the regression analysis models, Delphi method and the formal and standard procedures (significant at $p < 0.001$). Consistent with the results of Pohlman et al. (1988) and Lazaridis (2002, 2006), forecasting methods have played an important role in forecasting future cash flow in CB decisions.

In the third hypothesis, the results of this study provided robust evidence that financial, marketing and production factors (FMPF) are significantly and positively associated with the extent of CBT usage. It is known that the FMPF (components of cash flow) are shaped by the procedures and methods used in forecasting (PMUF). None of the previous studies have addressed the relationship between financial, marketing and production factors and the extent of use of CBT.

The findings of this paper present strong statistical evidence that financial and production factors are the most important factors related to the extent of use of discounted cash flow methods, risk appraisal techniques and operations research techniques. Specifically, the results of this paper reported that the borrowing of funds, administrative expenses, manufacturing overhead and research & development expenses are significantly associated with the extent of use of discounted cash flow methods, risk appraisal techniques and operation research techniques ($p < 0.001$).

6.3 Findings related to the key factors influencing the use of forecasting procedures & methods

6.3.1 Data sources (DS) used in forecasting

In line with the fourth hypothesis, the results of this study stated that the use of multiple data sources in forecasting is positively associated with the use of forecasting procedures and methods (significant at $p < 0.001$).

In descriptive analysis, 61%, 59% and 51% of respondents consider that the firm's departments, suppliers and the customers' sales plans, respectively, are always and often used as the main sources in forecasting cash flows in CB decisions made by the manufacturing and oil firms operating in Libya. Statistically, the results of this study reveal that firm's departments (DS1), university research centres (DS4) and chartered accountants (DS5) are significant sources used in forecasting ($p < 0.001$, $p < 0.10$ and $p < 0.05$ respectively). Subsequently, most of the petrochemical and oil investment projects in Libya depend on feasibility studies conducted by

foreign consulting firms (DS6) using information based on the global oil markets. In this respect, 20.3% of manufacturing and oil firms operating in Libya always & often used foreign consultants and companies (DS6) to forecast the future cash flows in CB decisions. Foreign consultants (DS6) used in forecasting process are not statistically supported ($p > 0.10$). Even so, external data sources were applied to acquire information for forecasting process in Libyan manufacturing and oil firms.

Danese and Kalchschmidt (2011a, p.209) determined three items of data sources used to acquire information for the forecasting process: "current economic conditions, sales plan, suppliers and market research". Similarly, Fildes and Hastings (1994) established that the historical data related to sales history, products and prices are the most important information utilized in the market forecasting and they found that the scarcity of market research information is an essential determinant in forecast accuracy.

6.3.2 Forecasting horizon (FH)

In terms of the fifth hypothesis, the results of this study state that the forecasting horizon is positively associated with the use of forecasting procedures and methods. In line with this result, long term, FH2 (6-10 years) and extensive term, FH3 (over 11 years) forecasts are statistically significant ($p < 0.01$ and $p < 0.001$, respectively).

In contrast, the descriptive results of this study indicate that 94% of the manufacturing and oil companies operating in Libya (65/69) always or often used the lowest period of forecasting horizon ranged from 1 to 5 years (FH1). Even so, this indicator has been cancelled from PLS path model 3, because of the identical answers of respondents. While, only 10% of Libyan manufacturing and oil companies always or often employed the longest period (6-10 years). On the other hand, 88.4% of respondents confirmed that Libyan manufacturing and oil companies never or rarely utilized the forecasting period exceeding 11 years (FH3). To support this, McHugh and Sparkes (1983) established that short-term forecast is the most important factor for firms operating in highly competitive markets. According to Winklhofer, et al., (1996, p.217), there is a strong relationship between short-term forecasts and the number of forecasts needed to assess the accuracy of forecasting process in the UK manufacturing firms (exporters).

Contrary to the previous results, 27% of respondents in US firms stated that the forecasting horizon used in calculating cash flow of investment projects is greater than ten years (Pohlman et al., 1988). In line with this, Sanders and Manrodt (1994) confirmed that US managers used various forecasting techniques for multiple forecast horizons.

6.3.3 The qualification of forecaster (QUA)

The findings of this study enhanced the role of qualified persons in the forecasting process, particularly the use of forecasting procedures and methods. In terms of the sixth hypothesis, the results of this paper assert that the presence of qualified persons responsible for preparing cash flow estimates is positively and significantly associated with the use of forecasting procedures and methods. In this regard,

the presence of academic qualifications (PhD, MA/MSc and BA/BSc) are significantly associated with the use of forecasting procedures and methods ($p < 0.05$ and $p < 0.01$). Consistent with the descriptive analysis of this study, 91.3% of respondents in manufacturing and oil firms operating in Libya relied on graduates (BA/BSc) to prepare cash flow estimates of CB decisions. Likewise, Bennouna et al. (2010) found that 50% of qualified persons in Canadian firms held a Master's degree.

Verma et al. (2009, P.13) established that the relationship between the use of CBT and the CEO's qualification is not significant except for the payback period method, which is significant at the level of p value ($p < 0.05$), where 87.5% of CEOs with an MBA often or always used the payback period method in Indian firms. Besides, there is a significant relationship between the education of the CFO and the CFF stage at the level of 10% (Batra and Verma, 2014). In the same way, CFOs, who have economic qualifications, are significantly and positively associated with the use of sophisticated CB methods (Brunzell et al., 2013).

6.3.4 The position of forecaster (POS)

Regarding the seventh hypothesis, the results of this study emphasise the importance of the role of official forecasters in forecasting process. Statistically, the presence of official persons (POS) in manufacturing and oil firms is significantly and positively associated with the use of forecasting procedures and methods ($p < 0.001$). In this regard, the accountant, accounting manager and financial directors are significantly correlated with the use of forecasting procedures and methods (p value < 0.001). In descriptive analysis, the results of the study are slightly different, whereby 95.7 of respondents in manufacturing and oil companies operating in Libya considered the executive managers (CEO) to be commonly responsible for preparing cash flow estimates in CB decisions, followed by financial directors. In this case, the reason for the CEO indicator not appearing in the PLS path model is due to the identical respondents' answers.

Consistent with the results of the prior studies, Pohlman et al. (1988) and Lazaridis (2002, 2006) asserted that in Greek, Cypriot and US firms, one or more of the following personnel, prepare and coordinate cash flow estimates in CB decisions: financial analyst, accountant, treasurer, department manager, controller, vice-president and president. Similarly, 52% of respondents confirm that the controller or vice president in American companies is responsible for the forecasting process (Drury, 1990). Financial staff is more commonly responsible for forecasting the operations relating to budgets and financial plans (Ibid).

6.4 Findings related to the contingency variables affecting the use of forecasting procedures & methods.

This paper adopted the combined effect of contingency variables on one dependent variable (Otley, 2016). PLS path model 2 tests the influence of combined contingent variables on the use of forecasting procedures and methods (FPMs), which in turn reflects on the extent of CBT usage in manufacturing and oil companies (see Appendix C).

The results of this paper establish that there is a significant and positive relationship between the combined contingent variables and the use of forecasting procedures and methods at the level of p value 0.001 (8th hypothesis). The findings presented strong evidence that the predictability of cash flow (PEU5), changes in the financial position (PEU3), depending on the feasibility study (SP3), training staff (SP7), firm size (AAS, AIE, NEM) and the type of industry (IND) are significantly associated with the use of FPMs ($p < 0.001$).

The strategic priorities relating to the existing main activity (SP1), supporting investments with high return (SP2) and focusing on general economic considerations (SP4) are slightly significant at the level of 0.05. In contrast, the predictability of competitors' actions (PEU2) and demand for existing products (PEU4) are insignificant. Likewise, strategic priorities relating to competitive positions (SP5) and the application of flexible manufacturing systems (SP6) are also not significant. Therefore, the SP5 and SP6 were cancelled from PLS path model 6 (see: Appendix C). In comparison with the descriptive statistics of this study, it can be observed that 59% of respondents strongly agree or agree that competitive position (SP5) represents an essential priority in the strategic decisions of manufacturing and oil firms operating in Libya.

Consistent with the results of prior studies, Pike (1984) asserted that there is a statistically significant and positive relationship between firm size, capital intensity, level of risk (1975-79) and the sophistication of CB processes ($p < 0.001$ and $p < 0.05$). Afonso and Cunha (2009) established that contingency variables are associated with the use of capital investment appraisal methods (CIAM). Similarly, Ntim (2009) revealed that the South African Corporate Governance Index (SACGI) is statistically significant and positively associated with capital expenditure based on the return on assets (ROA) at the level of 0.05.

Anuar (2005) tested the influence of contingent variables on the extent of use of CBT employing firm-specific contingencies to explain the Malaysian firms' decisions to use sophisticated or naive CBT; the most notable results were as follows:

- The industry type and the number of employees are not significantly associated with the use of capital investment appraisal techniques (CIAT).
- The relationship between perceived environmental uncertainty (PEU) and the use of NPV is statistically significant.

In line with the results related to the use of sophisticated CBT, Brunzell et al. (2013) asserted that the use of sophisticated CB methods in Scandinavian countries is significantly and positively associated with firm size, but negatively related to the ROA.

In terms of the forecasting processes in CB decisions, Zotteri and Kalchschmidt (2007) reported that there is a relationship between a firm's size and its forecasting practices. In addition to this, the forecasting processes in Italian companies are contingent upon their competitive strategies.

Apparently, it can be observed that small Italian companies have devoted more attention to adopting the forecasting processes than larger ones (Ibid). In this regard, Pohlman et al. (1988) asserted that the use of multiple forecasting methods in large US firms is significantly associated with higher capital expenditures.

Subsequently, Yenilmez-Dramali (2013) asserted that there was a positive and significant relationship between environmental turbulence and the effectiveness of export sales forecasting ($p < 0.001$). Similarly, managerial characteristics had a positive and significant impact on export market performance depending on the firm's characteristics (Ibid).

After all, Otley (2016) determined three dominant contingent variables (environmental uncertainty, firm strategy and national culture) to explain why the adoption of management accounting systems is different from one firm to another. In dealing with the results of management accounting research applied the contingency theory, Abdel-Kader and Luther (2008) found that the application of sophisticated management accounting practices (MAPs) is significantly and positively related to UK firms that have faced highly uncertain environments ($P \text{ value} < 0.05$).

6.5 Findings related to the institutional variables affecting the use of forecasting procedures & methods

Testing the ninth hypothesis, the results derived from the inferential statistics show that the use of forecasting procedures and methods is significantly affected by the coercive, mimetic and normative pressures ($p < 0.001$). Statistical findings revealed that government intervention (CP4), international accounting standards (CP5), Libyan companies (MP1) and chartered accountants (NP2) have all played an important role in the adoption of forecasting procedures and methods when addressing CB decisions.

In comparing the statistical descriptive results, most coercive, mimetic and normative pressures (CMNP) have little impact on the use of forecasting procedures and methods (FPMs), with the exception of political instability. In this case, 99% of respondents in manufacturing and oil companies stated that political instability (CP6) in Libya undermines the use of FPMs. Even so, the influence of political instability on the use of forecasting procedures and methods is not statistically supported.

In addition, 38% and 30% of the respondents strongly agree that the financial constraints/banking system (CP2) and state intervention (CP4), respectively, have an impact on the use of FPMs. In a similar way, 28%, 25% and 26% of respondents in manufacturing and oil firms strongly agree and agree that chartered accountants (NP2), Libyan companies (MP1) and multinational & foreign companies operating in Libya (MP2), respectively, have a direct impact on the use of FPMs. In contrast, only 6% and 7% of respondents in Libyan manufacturing and oil firms strongly agree and agree that international accounting standards (CP4) and the education system in Libyan universities (NP1), respectively, have an impact on the use of FPMs.

To compare between the descriptive results of this paper and Hussain and Hoque's study (2002), the following aspects can be identified; in terms of coercive pressures, Japanese Central Bank regulations have a moderate influence on the performance measurement practices (PMPs). This is compatible with the results of this paper, which report that only 38% of Libyan manufacturing and oil firms considered the banking system to influence on the FPMs.

On the other hand, financial legislation and international accounting standards (IAS) have no effect on the PMPs (Ibid). This is similar to the results of this paper, where only 7% of manufacturing and oil firms in Libya consider international accounting standards to have an impact on the use of forecasting procedures and methods.

With regard to the normative pressures, there is no evidence that copying the best costing and performance measurement systems from other organizations leads to the adoption of the same systems of performance measurement in most Japanese banks (Ibid). Similarly, the descriptive results of this paper stated that approximately 25% of manufacturing and oil firms operating in Libya considered local companies (MP1) and the multinational & foreign companies (MP2) to have an impact on the use of forecasting procedures and methods.

Subsequently, Ibrahim (2007) revealed that coercive pressures and perceived legitimacy and self-interest have a significant effect on the extent of use of standard costing systems (SCS) in Syrian manufacturing public companies. Consistent with the results of this paper, the influence of Libyan government regulations (commercial and tax law) on the use of forecasting procedures and methods is statistically significant ($P < 0.001$) and has a positive relationship with the use of FPMs.

Nevertheless, the descriptive results indicate that only 29% of respondents in manufacturing and oil firms consider Libyan government regulations to have an impact on the use of forecasting procedures and methods. In this regard, Mohammed (2013) revealed that the Libyan government policies, regulations on the banking sector, personal experience and state development plans have a significant effect on the capital budgeting processes in Libyan firms ($p \text{ values} < 0.05$).

In terms of the normative pressures, the adoption of ERP systems by suppliers and customers in the US is statistically significant and has a positive direct relationship with the use of ERP systems at the level of $p \text{ value} < 0.05$ (Liang et al., 2007). Compared with the results of this paper, wherein the adoption of forecasting procedures and methods by Libyan universities (NP1) has a low effect on the use of FPMs in manufacturing and oil firms (7%), but the adoption of FPMs by chartered accountants (NP2) has a moderated effect (28%). Statistically, these relationships are supported at the level of $p \text{ values} (p < 0.001 \text{ and } p > 0.01 \text{ respectively})$.

Regarding the mimetic pressures, the assimilation of the enterprise resource planning (ERP) systems by US associates (main competitors) is statistically significant and positively related to the use of ERP systems in US firms at

the level of p value of 0.05 (Liang et al., 2007). In the same way, the adoption of FPMs by Libyan, multinational and foreign companies (MP2) has a significant and positive effect on the use of FPMs in the manufacturing and oil firms operating in Libya; even so, only 25% of respondents confirmed this effect (the descriptive analysis).

6.6 Findings related to PLS multi-group analysis (PLS-MGA)

In this part of the study, the researchers aim to test the influence of contingent variables on the use of forecasting procedures and methods (FPMs) to explain the differences between public and private companies, as well as the differences between manufacturing and oil companies. Using the SmartPLS 3 software, the multi-group analysis can be used for all of the PLS path models, provided that the number of observations is greater than the number of indicators.

After testing the eighth research hypothesis, the researchers modified H8 based on the specific data collected from public and private companies (H8a), as well as manufacturing and oil companies (H8b). In this case, this paper utilizes the multi-group analysis to test the relationship between the combined contingent variables (CCV) and the use of forecasting procedures and methods (FPMs) based on the data collected from two groups: 1) public and private companies, 2) manufacturing and oil companies. The researchers attempt to answer the following questions:

- 1) Are there significant differences between public and private companies in accordance with the eighth hypothesis (H8a)?
- 2) Are there significant differences between manufacturing and oil companies in accordance with the eighth hypothesis (H8b)?

First, the results derived from PLS-MGA determined the relationships among the research variables of PLS path model 6 based on the specific data collected from public and private companies. Statistically, the results of this paper confirmed that the influence of combined contingency variables (CCV) on the use of forecasting procedures and methods (FPMs) is significantly stronger for public companies than for private ones. Hence, the path coefficient effect of public companies ($PC=0.838$) is stronger than in private ones ($PC=0.711$). Moreover, there are several relationships among the research variables (PLS path model 2) based on the multi-group analysis and the researchers selected the eighth research hypothesis in order to expose the significance of contingency theory.

Second, the results derived from PLS-MGA elaborated the relationships among the research variables of PLS path model 6 based on the specific data collected from the manufacturing and oil companies. This paper proved that the impact of combined contingency variables (CCV) on the use of forecasting procedures and methods (FPMs) is not significantly stronger for manufacturing companies than for oil ones. Therefore, the modified eighth hypothesis (H8_b) is rejected. This is similar to institutional theory, where the results of this paper confirm that the influence of CMNP on

the extent to which forecasting procedures and methods (FPMs) are used is not significantly stronger in public companies than in private ones (the modified ninth hypothesis-H9_a).

6.7 Findings related to the financial performance of firms (FPFs)

This paper addressed the relationship between the use of forecasting procedures and methods, the extent of use of capital budgeting techniques and the financial performance of firms. Theoretically, the cash flow forecasting process is a vital stage of CB (McIntosh, 1990). Where, the investment appraisal stage in capital budgeting process depends on the cash flow forecasting stage in selecting the investment projects.

Testing the tenth hypothesis, the results derived from the PLS path models (1...7) asserted that the indirect relationship between the use of forecasting procedures & methods and the financial performance of firms (FPFs) is slightly positive, but this relationship is not statistically supported ($p\text{-value}>0.10$). Therefore, the assumption of the tenth hypothesis is rejected. Nevertheless, we found that the use of forecasting procedures and methods has a direct and significant effect on the financial performance of firms (FPFs) at the level of p-value ($p<0.05$). Even though, this effect has a negative path coefficient. Consequently, the path $PUF1 \rightarrow$ FPMs has a negative path coefficient ($PC = -0.644$ & -0.657).

In comparison with prior studies, Danese and Kalchschmidt (2011a) found that the relationship between forecasting methods and firm performance is not due to forecast error (mediated variable). This result is consistent with the results of this paper, where the researchers indicated that the mediating role of CBT in the relationship between the use of forecasting techniques and the financial performance of firms is not statistically supported. Even though, a direct relationship is strengthened. According to Danese and Kalchschmidt (2011a), the use of forecasting techniques has a significant and direct impact on cost and delivery performance at the level of 0.01.

Moreover, the eleventh hypothesis tests the direct relationship between the extent of use of CBT and the financial performance of firms (FPFs). The findings of this paper (path models 1...7) confirmed that there is a slightly positive relationship between the extent of use of CBT and the financial performance of firms (FPFs), but this relationship is not statistically supported (See: Appendix C).

Consistent with previous studies, there is no evidence that sophistication in CB processes leads to higher levels of performance (Farragher et al., 2001; Pike, 1984, 1986). In line with these results, achieving the best performance is not necessarily linked with the use of sophisticated CBT (Alzoubi and Alazawi, 2010; Jakoviccka et al., 2003).

On the other hand, these results can be changed because the use of CBT is contingent on structural and contextual factors, such as firm size, uncertainty and the CFFP (Klammer, 1973). Based on the financial theory, the use of

sophisticated CBT leads to an improvement in firm performance (Copeland and Weston 1988). To support this orientation, senior finance executives have confidence in the uses of sophisticated CBT, which plays an important role in improving the effectiveness of large investment projects (Pike, 1988). In this regard, Haka (1987) tested the fit between the contingent variables and the effectiveness of using the discounted cash flow techniques (DCFT) and concluded that the use of DCFT leads to an improvement in firms' performance.

Conversely, the use of payback period and accounting rate of return has a negative coefficient on the effectiveness of CB (Pike, 1989). Similarly, the results of this paper stated that the use of accounting rate of return method has an insignificant link with the CBT construct and a weak coefficient (p value >0.10 and $PC <0.10$). While the use of the payback period method is significantly associated with the CBT construct ($p <0.10$), but this relationship has a negative path coefficient.

Several studies are related to measuring firm performance when utilizing the CB process. Pike (1984, 1986) utilized operating rate of return (ORR) to measure the financial performance of US and UK firms using CBT. Proponents of this approach consider that return on investment (ROI) is not a reliable measure of a firm's ability to reward its shareholders (Bernstein, 1993), because its use depends on traditional income concepts.

The results of this paper offer strong evidence that the average operating rate of return (AORR) is the best ratio compared to return on sales (EB..AAS) and return on investment (EB..AIE) ratios. In terms of using AORR to measure the FPFs, this paper confirms that the AORR is strongly significant ($p <0.001$) and has a positive coefficient on the FPFs construct ($PC >0.70$). The AORR is ranked as the best ratio followed by the return on sales (EB..AAS).

Furthermore, this paper used earnings before interest, taxes, depreciation and amortization (EBITDA) as a control variable, which is considered the most important factor directly affecting the profitability ratios. The results provided robust evidence that EBITDA is statistically significant and has a positive coefficient on the FPFs.

7. Conclusions and Recommendations

Based on the descriptive and inferential results of this paper, the research team attained to a number of conclusions and recommendations, where this paper examined the cash flow forecasting process (CFFP) and its impact on the extent of CBT usage. It is specified a description of the forecasting procedures & methods and the CBT practiced in manufacturing and oil companies operating in Libya. It can be certain that most of the Libyan manufacturing and oil companies depended on the subjective/personal estimates to forecast future cash flow.

Regarding the extent of use of CBT, most Libyan companies used the PB and ARR as the main techniques for evaluating and selecting the investment opportunities. Statistically, this

paper reinforces the role of cash flow forecasting process in capital budgeting (the hypotheses: H1, H2 & H3).

It is evident that no specific forecasting and appraisal technique can be applied universally among all manufacturing and oil companies, because the choice of technique to be adopted may be affected by environmental circumstances surrounding the company's work. Therefore, the contingency theory is appropriate for explaining why forecasting methods and CBT may differ from one company to another. To support this fact, this paper stated that the combined contingent variables have a positive impact on the use of forecasting procedures and methods at the level of 0.001 (hypothesis H8).

The results of this paper stated that the relationship between the combined contingency variables (CCV) and the use of forecasting procedures and methods is significantly stronger for public companies than for private ones (hypothesis H8a). Conversely, there are no significant differences between the manufacturing and oil companies in accordance with the eighth hypothesis (H8_b).

Moreover, the findings asserted that the qualifications and position of forecasters play a vital role in cash flow forecasting process (CFFP), as well the crucial impacts of using multiple data sources on cash flow forecasting process.

In terms of the financial performance of firms (FPFs), the results revealed that the indirect relationship between the use of forecasting procedures & methods and the financial performance of firms (FPFs) is not statistically significant. Nevertheless, there is a direct and significant relationship between the use of FPMs and FPFs. On the one hand, we found that the extent of use of CBT is slightly associated with the financial performance of firms (FPFs); even so, this relationship is not statistically supported. This is consistent with the findings from previous studies, where there is no evidence that the use of sophisticated CBT leads to high levels of performance (Klammer, 1973; Farragher et al., 2001; Pike, 1984, 1986).

However, this paper produced a number of contributions to existing knowledge. First, it is a unique study for exploring the relationship between the use of FPMs and the extent of use of CBT. Second, it builds a causal sequence model based on the interrelated parts of the research framework (independent, mediated and dependent variables). Third, this paper elaborated the importance of contingency theory for explaining why the use of forecasting procedures and methods may differ from one company to another.

The findings of this paper have practical implications in improving the ability of financial directors, accountants and analysts to build effective capital budgets based on optimal plans of future cash flow forecasts. Additionally, this paper also provides useful information about cash flow forecasting processes that can be used as a practical guide for decision makers in Libyan firms.

Based on the potential contributions of this paper, the suggestions and recommendations for further research

address various issues, such as the application of forecasting models in CB research, diversity of data sources used in forecasting, the criteria used for evaluating the forecasting

processes, the influence of demographical characteristics of forecasters on the use of forecasting procedures and methods (FPMs).

Appendix A: Assessing the reflective constructs and their indicators

1) Internal consistency reliability of reflective measures – Indicators of forecasting process variables (FPMs & FMPF) and key factors related to forecasting process (DS, FH, QUA & POS).

No	A construct and its measures (indicators)	Symbol	Outer loadings	T values	a *	CR*
	Forecasting procedures & methods* (9 indicators) :	FPMs	-----		0.799	0.800
1	Personal estimates	PUF1	-0.657*	7.117		
2	Standard procedures	PUF2	0.762	11.914		
3	Official forms/worksheets	PUF3	0.878	31.788		
4	Delphi method (panel of experts' opinions)	JM2	0.631	6.918		
5	Sales force composite	JM3	0.299*	1.909		
6	Time-series models	QM1	0.521	3.833		
7	Regression analysis models	QM2	0.657	6.806		
8	Software developed by company	SUF1	0.686	11.159		
9	Commercial software packages (Excel)	SUF2	0.705	9.335		
	Financial, marketing & production factors (8 indicators):	FMPF			0.496	0.645
1	Borrowing and repayment of funds	FF1	0.547	3.452		
2	Tax considerations	FF3	0.495	2.780		
3	Administrative overhead	FF6	0.740	9.517		
4	Sales/revenue forecast.	MF1	-0.072	0.387		
5	Selling expenses	MF2	0.290	1.428		
6	Direct manufacturing costs	PF1	-0.286*	1.762		
7	Manufacturing overhead expenses	PF2	0.482	3.208		
8	Research and development expenses	PF3	0.655	6.061		
	Data sources : 4 indicators :	DS			0.356	0.609
1	Firm departments	DS1	0.819	7.946		
2	University research centres	DS4	0.444	1.816		
3	Local analysts (chartered accountants)	DS5	0.545	2.466		
4	Foreign consultants and companies	DS6	0.265	1.122		
	Forecasting horizon : "2 indicators*":	FH			0.515	0.800
1	6-10 years	FH2	0.741	3.033		
2	Over 10 years	FH3	0.887	7.232		
	Qualification : 3 indicators :	QUA			0.152	0.635
1	BA/BSc	BSc	0.523	2.914		
2	MA/MSc	MSc	0.602	3.066		
3	Ph.D.	PhD	0.690	3.105		
	Position : 4 indicators:	POS			0.641	0.779
1	Accountant	ACC	0.808	10.796		
2	Accounting manager	ACCM	0.880	30.186		
3	Financial director	CFO	0.496	5.108		
4	Others	Others	0.514	3.546		

* a: Cronbach's alpha; CR: Composite Reliability; FPMs is often used as a synonym of the forecasting procedures and methods (FPMs); PUF1 indicator is significant (P<0.001); JM3 and PF1 indicators are significant (P<0.10).* FH1 has been excluded from the PLS path model 3, because FH1 has a weak coefficient on its construct (FH).

Appendix A: (continued)

1) Internal consistency reliability of reflective measures: Contingency variables

No	A construct and its measures (indicators)	Symbol	Outer loadings	T values	a	CR
	Combined contingent variables (13 indicators):	CCV			0.785	0.835
1	Average of annual sales	AAS	0.894	26.709		
2	Average of investment expenditures	AIE	0.851	20.037		
3	Number of employees	NEM	0.798	13.676		
4	Type of industry	IND	0.421	3.293		
5	Competitors' actions	PEU2	0.131	0.830		
6	The changes in financial position	PEU3	0.552	5.221		
7	Demand for existing products	PEU4	0.138	1.017		
8	Expected cash flows	PEU5	0.654	9.141		
9	Protecting and promoting the existing main activity...	SP1	0.289	2.249		
10	Focusing on the investments associated with high return	SP2	0.274*	1.989		
11	Implementing feasibility studies...	SP3	0.433	4.221		
12	Depending on general economic considerations...	SP4	0.384	2.935		
13	Supporting the training of human resources....	SP7	0.825	23.976		

* SP2 indicator is significant (p<0.05).

No	A construct and its measures (indicators)	Symbol	Outer loadings	T values	a *	CR*
	Coercive, mimetic & normative pressures (CMNP) "9 indicators":	CMNP	----		0.734	0.795
1	Commercial code and tax system	CP1	0.522	3.411		
2	Financial constraints and banking system	CP2	0.481	2.945		
3	The system of privatization*	CP3	0.476	3.029		
4	Intervention by Libyan Government*	CP4	0.631	5.789		
5	International accounting standards	CP5	0.523	4.195		
6	Libyan companies	MP1	0.600	4.214		
7	Multinational and foreign companies	MP2	0.515	3.503		
8	Education system in Libyan universities	NP1	0.565	3.227		
9	The Libyan chartered accountants	NP2	0.616	3.518		

Internal consistency reliability of reflective measures: Indicators of institutional variables

2) Internal consistency reliability of reflective measures: Capital budgeting techniques (CBT).

No	A construct and its measures (indicators)	Symbol	Outer loadings	T values	a *	CR*
	Capital budgeting techniques (12 indicators):	CBT			0.734	0.795
1	Payback period	PB	-0.268	1.771*		
2	Net present value	NPV	0.732	8.429		
3	Profitability index	PI	0.655	7.241		
4	Internal rate of return	IRR	0.819	15.300		
5	Subjective Assessment	SAS	-0.334	1.987*		
6	Cost-Volume-Profit Analysis	CVP	0.547	7.043		
7	Sensitivity analysis.	SA	0.716	9.759		
8	Scenario Analysis	SCA	0.777	10.304		
9	Shorten the PB period	SPB	0.427	3.143		
10	Mathematical Programming	MP	0.675	5.178		
11	Decision Tree/Theory	DT	0.740	9.861		
12	PERT/CPA analysis	PERT	0.642	6.740		

* PB indicator is significant (p<0.10). * SAS Indicator is significant (p<0.05).

Appendix A: (continued)

1) Convergent validity – average variance extracted (AVE) statistics

Convergent validity – average variance extracted (AVE) statistics

No	A construct or latent variable (LV)	Symbol	No. of indicators	AVE*	\sqrt{AVE}
1	forecasting procedures and methods	FPMs	9	0.438	0.662
2	Financial, marketing and production factors	FMPF	8	0.241	0.491
3	Capital budgeting techniques	CBT	12	0.403	0.635
4	The data sources used in forecasting	DS	4	0.309	0.556
5	Forecasting horizon	FH	2	0.443	0.666
6	Qualification of forecaster	QUA	3	0.370	0.608
7	Position of forecaster	POS	4	0.484	0.696
8	The combined contingent variables	CCV	13	0.329	0.574
9	Coercive, normative and mimetic pressures	CNMP	9	0.303	0.550

Appendix B: Assessing the formative construct and their indicators

1) The financial performance of firms (FPFs) and their indicators – Multi-collinearity analysis

The financial performance of firms (FPFs): 3 indicators:	Symbol	Multi-collinearity statistics	
		Tolerance	VIF
Average operating rate of return	AORR	.726	1.379
EBITDA/ average of investment expenditures	EB..AIE	.753	1.328
EBITDA/ average of annual sales	EB..AAS	.646	1.548

2) The significance of formative indicators

Indicators	The significance of outer weights		The significance of outer loadings	
	Outer weights	T Statistics	Outer loadings	T Statistics
AORR	0.755	8.328	0.946	26.782
EB..AAS	0.228	2.043	0.709	8.741
EB..AIE	0.209	1.701	0.592	4.673
EBITDA*	1.000	-----	1.000	-----

*EBITDA: Single latent variable.

Appendix C: Decisions related to the significance of research hypotheses (PLS path models)

No	PLS path model No.	The research hypothesis	PC*	P value	Test result	Decision
H ₁	PLS path model No: 1	There is a positive relationship between the use of FPMs* and FMPF	PC>0.10	p<0.001	1. Positive relationship 2. Significant	Accept H ₁
H ₂	PLS path model No: 1,2,3,4,5,6,7	The use of FPMs is positively associated with the extent of use of CBT.	PC>0.10	p<0.01	1. Positively associated 2. Significant	Accept H ₂
H ₃	PLS path model No: 1	The FMPF are positively associated with the extent of use of CBT.	PC>0.10	p<0.001	1. Positively associated 2. Significant	Accept H ₃
H ₄	PLS path model No: 2	The use of multiple data sources in forecasting (DS) is positively associated with the use of FPMs	PC>0.10	p<0.001	1. Positively associated 2. Significant	Accept H ₄
H ₅	PLS path model No: 3	The long-term forecast (FH) is positively associated with the use of FPMs	PC>0.10	p<0.01	1. Positively associated 2. Significant	Accept H ₅
H ₆	PLS path model No: 4	The presence of qualified forecasters is positively associated with the use of FPMs.	PC>0.10	p<0.001	1. Positively associated 2. Significant	Accept H ₆
H ₇	PLS path model No: 5	The presence of official persons (POS) is positively associated with the use of FPMs	PC>0.10	p<0.001	1. Positively associated 2. Significant	Accept H ₇
H ₈	PLS path model No: 6	The combined contingent variables (CV) have a positive impact on the use of FPMs.	PC>0.10	p<0.001	1. Positive impact. 2. Significant	Accept H ₈
H ₉	PLS path model No: 7	The coercive, mimetic and normative pressures (CMNP) have a positive impact on the use of FPMs	PC>0.10	p<0.001	1. Positive impact 2. Significant	Accept H ₉
H ₁₀	PLS path model No: 1,2,3,4,5,6,7	The extent of use of CBT mediates the relationship between the use of FPMs and FPFs**.	PC<0.10	p>0.10	1. Positive relationship 2. Insignificant	Reject H ₁₀
H ₁₁	PLS path model No: 1,2,3,4,5,6,7	There is a positive relationship between the extent of use of CBT and FPFs.	PC>0.10	p>0.10	1. Moderate relationship. 2. Insignificant	Reject H ₁₁

*PC: Path coefficient. * FPMs is often used as a synonym of the procedures and methods used in forecasting (PMUF)

**There is a direct relationship between the FPMs & FPFs and this relationship is significant (p<0.10).

References

[1] Abdel-Kader, M., & Luther, R. (2008). The impact of firm characteristics on management accounting practices: A UK-based empirical analysis. *The British Accounting Review*, 40(1), 2-27. doi:10.1016/j.bar.2007.11.003

[2] Abugalia, M. (2011). *The Influence of Business Environment on the Effectiveness of Management Accounting Practices: Evidence from Libyan*

- Companies* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.571527>
- [3] Afonso, P., & Cunha, J. (2009, June). *Determinants of the use of capital investment appraisal methods: evidence from the field*. Paper presented at the European Applied Business Research Conference (EABR), Prague, Czech Republic.
- [4] Al-Ani, M. K. (2015). A Strategic Framework to Use Payback Period (PBP) in Evaluating the Capital Budgeting in Energy, Oil and Gas Sectors in Oman. *International Journal of Economics and Financial Issues*, 5(2). Retrieved from <http://www.econjournals.com>.
- [5] Alsharif, A. A. (2004). *Preparation of the capital budgeting via dynamic programming: An Applied Study on Ras Lanuf oil & gas Processing Company* (Unpublished MA). University of Garyounis, Benghazi, Libya.
- [6] Alzoubi, A., & Alazawi, Y. (2010). *Capital budgeting techniques and firms' performance. Case study: Jordanian listed services firms*, (MA). UMEA University. Retrieved from <https://www.diva-portal.org/smash/get/diva2:345945/FULLTEXT01.pdf>
- [7] Anuar, M. A. (2005). *Appraisal techniques used in evaluating capital investments: conventional capital budgeting and the real options approach* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.418368>.
- [8] Aoun, D., & Hwang, J. (2008). The effects of cash flow and size on the investment decisions of ICT firms: A dynamic approach. *Information Economics and Policy*, 20(2), 120-134. doi:10.1016/j.infoecopol.2007.12.001
- [9] Arnold, G. & Hatzopoulos, P.D. (2000). The Theory-Practice Gap in Capital Budgeting: Evidence from the United Kingdom. *Journal of business finance & Accounting*, 27(5-6), 603-626.
- [10] Baines, A., & Langfield-Smith, K. (2003). Antecedents to management accounting change: a structural equation approach. *Accounting, organizations and society*, 28(7), 675-698. doi:10.1016/S0361-3682(02)00102-2
- [11] Batra, R., & Verma, S. (2014). An Empirical Insight into Different Stages of Capital Budgeting. *Global Business Review*, 15(2), 339-362. doi: 10.1177/0972150914523588
- [12] Bennouna, K., Meredith, G. G., & Marchant, T. (2010). Improved capital budgeting decision making: evidence from Canada. *Management decision*, 48(2), 225-247. doi:10.1108/00251741011022590
- [13] Beraldi, P., Bruni, M. E., & Violi, A. (2012). Capital rationing problems under uncertainty and risk. *Computational Optimization and Applications*, 51(3), 1375-1396. DOI: 10.1007/s10589-010-9390-y
- [14] Bernstein, L. A. (1993). *Financial Statement Analysis: Theory, Application, and Interpretation*. Homewood, Illinois: Richard D. Irwin, Inc.
- [15] Brounen, D., Jong, A. d., & Koedijk, K. (2004). Corporate Finance in Europe: Confronting Theory with Practice. *Financial Management*, 33(4), 71-101.
- [16] Burkert, M., Davila, A., Mehta, K., & Oyon, D. (2014). Relating alternative forms of contingency fit to the appropriate methods to test them. *Management Accounting Research*, 25(1), 6-29. Retrieved from <http://dx.doi.org/10.1016/j.mar.2013.07.008>
- [17] Burns, R., & Walker, Joe. (2009). Capital budgeting surveys: The future is now. *Journal of Applied Finance (Formerly Financial Practice and Education)*, 19(1&2).
- [18] Chan, H., Haddad, K., & Sterk, W. (2001). Capital budgeting practices of Chinese firms. *Unpublished manuscript*.
- [19] Danese, P., & Kalchschmidt, M. (2008). The impact of forecasting on performances: is accuracy the only matter. In: *Proceedings of the XV Working Seminar on Production Economics*, pp. 153-166. Innsbruck: Austria.
- [20] Danese, P., & Kalchschmidt, M. (2011a). The impact of forecasting on companies' performance: Analysis in a multivariate setting. *International Journal of Production Economics*, 133(1), 458-469. doi:10.1016/j.ijpe.2010.09.006
- [21] Danese, P., & Kalchschmidt, M. (2011b). The role of the forecasting process in improving forecast accuracy and operational performance. *International Journal of Production Economics*, 131(1), 204-214. doi:10.1016/j.ijpe.2010.04.016
- [22] Daunfeldt, S. O., & Hartwig, F. (2014). What determines the use of capital budgeting methods? Evidence from Swedish listed companies. *Journal of Finance and Economics*, 2(4), 101-112. DOI:10.12691/jfe-2-4-1
- [23] Dean, J. (1951). *Capital Budgeting: Top-Management Policy on Plant*. Columbia University Press.
- [24] Devereux, M. P. (1990). *The impact of taxation and financial factors on company investment: an examination using UK panel data* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.307705>.
- [25] DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48 (2), 147-160.
- [26] Drury, C. (2012). *Management and cost accounting* (Vol. 8th). Andover: Cengage Learning.
- [27] Drury, C., Braund, S., Osborne, P., & Tayles, M. (1993). A survey of management accounting practices in UK manufacturing companies. *Certified Research Report-Chartered Association of Certified Accountants*.
- [28] Drury, D. H. (1990). Issues in forecasting management. *Management International Review*, 30(4), 317-329.
- [29] Eljelly, A. M., & Abuidris, A. M. (2001). A Survey of Capital Budgeting Techniques in the Public and Private Sectors of a Less Developed Country (LDC) The Case of the Sudan. *Journal of African Business*, 2(1), 75-93. DOI: 10.1300/J156v02n01_05
- [30] Farragher, E. J., Kleiman, R. T., & Sahu, A. P. (2001). The Association Between the Use of Sophisticated Capital Budgeting Practices and Corporate

- Performance. *The Engineering Economist*, 46(4), 300-311. doi: 10.1080/00137910108967579
- [31] Fildes, R., & Hastings, R. (1994). The organization and improvement of market forecasting. *Journal of the Operational Research Society*, 45(1), 1-16. Retrieved from <http://www.jstor.org/stable/2583945>
- [32] Fildes, R., Bretschneider, S., Collopy, F., Lawrence, M., Stewart, D., Winklhofer, H., & Moon, M. A. (2003). Researching Sales Forecasting Practice: Commentaries and authors' response on "Conducting a Sales Forecasting Audit" by MA Moon, JT Mentzer & CD Smith. *International Journal of Forecasting*, 19(1), 27-42.
- [33] Govindarajan, V. (1988). A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy. *Academy of management Journal*, 31(4), 828-853. Retrieved from <http://www.jstor.org/stable/256341>
- [34] Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of financial economics*, 60(2), 187-243.
- [35] Hair, J. F., Celsi, M., Money, A. H., Samouel, P., & Page, M. J. (2011b). *Essentials of business research methods*. Armonk, NY: ME Sharpe Inc.
- [36] Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage Publications.
- [37] Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011a). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- [38] Haka, S. F. (1987). Capital budgeting techniques and firm specific contingencies: a correlational analysis. *Accounting, Organizations and Society*, 12(1), 31-48.
- [39] Haka, S. F., Gordon, L. A., & Pinches, G. E. (1985). Sophisticated capital budgeting selection techniques and firm performance. *The Accounting Review*, 60(4), 651-669. Retrieved from <http://www.jstor.org/stable/247460>
- [40] Hermes, N., Smid, P., & Yao, L. (2007). Capital budgeting practices: a comparative study of the Netherlands and China. *International Business Review*, 16(5), 630-654. doi:10.1016/j.ibusrev.2007.05.002
- [41] Holmen, M., & Pramborg, B. (2009). Capital budgeting and political risk: Empirical evidence. *Journal of International Financial Management & Accounting*, 20(2), 105-134.
- [42] Huang, C.-C., Wang, Yu-Min, Wu, Tsin-Wei., and Wang, Pei-An. (2013). An empirical analysis of the antecedents and performance of using the noodle platform. *International Journal of Information and Education Technology*, 3(2), 217-221.
- [43] Hussain, M., & Hoque, Z. (2002). Understanding non-financial performance measurement practices in Japanese banks: a new institutional sociology perspective. *Accounting, Auditing & Accountability Journal*, 15(2), 162-183.
- [44] Ibrahim, A. K. (2007). *The practice of standard costing systems in Syrian public companies: an exploration for the impact of institutional, technical and intra-organizational factors: set-theoretic approach* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.440020>.
- [45] Irungu, E. N. (2014). *The relationship between the capital budgeting techniques and financial performance of companies listed at the Nairobi securities exchange* (MA), University of Nairobi. Retrieved from <http://erepository.uonbi.ac.ke/bitstream/handle/11295/75677/Irungu>.
- [46] Jakovicka, J., Kheddache, M., & Axelsson, H. (2003). *Capital Budgeting Sophistication and Performance* (MA). Göteborg University. Retrieved from https://gupea.ub.gu.se/bitstream/2077/2359/1/gbs_thesis_2002_38.pdf
- [47] Kadapakkam, P.R., Kumar, P., & Riddick, L. A. (1998). The impact of cash flows and firm size on investment: The international evidence. *Journal of banking & Finance*, 22(3), 293-320.
- [48] Kalchschmidt, M., Nieto, Y., & Reiner, G. (2010). The impact of forecasting on operational performance: Mediation effects through flexibility enablers. *Operations Management Research*, 3(3-4), 129-137. doi: 10.1007/s12063-010-0036-0
- [49] Kester, G. W., & Tsui, K. C. (1998). Capital budgeting practices of listed firms in Singapore. *Singapore Management Review*, 20(1), 9-23.
- [50] Khan, A. (2008). Capital budgeting under capital rationing: an analytical overview of optimization models for government. *International Journal of Public Administration*, 31(2), 168-194. doi: 10.1080/01900690701411016
- [51] Klammer, T. (1973). The association of capital budgeting techniques with firm performance. *The Accounting Review*, 48(2), 353-364. Retrieved from <http://www.jstor.org/stable/244924>.
- [52] Klassen, R. D., & Flores, B. E. (2001). Forecasting practices of Canadian firms: Survey results and comparisons. *International Journal of Production Economics*, 70(2), 163-174.
- [53] Krishnan, G. V., & Largay III, J. A. (2000). The Predictive Ability of Direct Method Cash Flow Information. *Journal of Business Finance & Accounting*, 27(1-2), 215-245. doi: 10.1111/1468-5957.00311
- [54] Lawrence, M., O'Connor, M., & Edmundson, B. (2000). A field study of sales forecasting accuracy and processes. *European Journal of Operational Research*, 122(1), 151-160.
- [55] Lazaridis, I. T. (2002). Cash flow estimation and forecasting practices of large firms in Cyprus: Survey findings. *Journal of Financial Management & Analysis*, 15(2), 62-68.
- [56] Lazaridis, I. T. (2006). Cash flow estimation practices in Mediterranean countries. *Managerial finance*, 32(8), 625-633. Retrieved from <http://dx.doi.org/10.1108/03074350610676723>
- [57] Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management. *MIS quarterly*, 31(1), 59-87.
- [58] Linsley, J. N., & Fotouh, K. A. (1979). *Linear Programming study for Phase III-Ras Lanuf Process Selection*, In Brown & Root Consultants (Eds), USA. Azzawiya Oil Refining Company. Ras Lanuf, Libya.

- [59] Liu, H., Hu, Y., & Ma, W. (2010). *Cash flow forecasting based on GA-BP model in valuation*. Paper presented at the International Conference on Advanced Management Science (ICAMS 2010).
- [60] Lowry, P. B., & Gaskin, J. (2014). Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Transactions on Professional Communication*, 57(2), 123-146. doi: 10.1109/TPC.2014.2312452
- [61] Makridakis, S. G., Wheelwright, S. C., & Hyndman, R. J. (1998). *Forecasting: methods and applications* (Vol. 3rd ed). Chichester; New York: John Wiley & Sons.
- [62] Manalo, R. G., & Manalo, M. V. (2010). *Comparing Project Prioritization method and net present value method of capital rationing using kendall's tau distance*. Paper presented in the International Conference on Management of Innovation and Technology (ICMIT). Retrieved from <http://ieeexplore.ieee.org.libaccess.hud.ac.uk/stamp/stamp.jsp?arnumber=5492833>.
- [63] McHugh, A., & Sparkes, J. (1983). The forecasting dilemma. *Management Accounting*, 61(3), 30-34.
- [64] McIntosh, W. (1990). Forecasting cash flows: evidence from the financial literature. *The Appraisal Journal*, 58(2), 221-229.
- [65] Miles, R., & Snow, C. (1978). *Organizational strategy, structure and processes*. New York: McGraw-Hill.
- [66] Mohammed, M. (2013). *The capital investment appraisal process: the case of Libya* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.590527>.
- [67] Moll, J., Burns, J., & Major, M. (2006). Institutional theory. In Zahirul Hoque (Ed), *Methodological Issues in Accounting Research: Theories, Methods and Issues* (pp.183-205). Spiramus Press Ltd.
- [68] Obi, A. N., & Adeyemo, S. O. (2014). Evaluation of Capital Budgeting and Investment Decisions in Nigeria: A Study of Selected Industrial Firms in Imo State. *Open Access Library Journal*, 1(09). Reterived from <http://dx.doi.org/10.4236/oalib.1101141>
- [69] Otley, D. (1980). The Contingency Theory of Management Accounting: Achievement and Prognosis. *Accounting, Organizations and Society*, 5(4), 413.
- [70] Otley, D. (2016). The contingency theory of management accounting and control: 1980–2014. *Management Accounting Research*, 31, 45-62. doi: 10.1016/j.mar.2016.02.001
- [71] Pike, R. (1996). *A longitudinal survey on capital budgeting practices*. *Journal of Business Finance and Accounting*, 23, 79-92.
- [72] Pike, R. H. (1983). *A review of recent trends in formal capital budgeting processes*. *Accounting and Business Research*, 13(51), 201-208.
- [73] Pike, R. H. (1984). *Sophisticated capital budgeting systems and their association with corporate performance*. *Managerial and Decision Economics*, 5(2), 91-97.
- [74] Pike, R. H. (1986). *The design of capital budgeting processes and the corporate context*. *Managerial and Decision Economics*, 7(3), 187-195.
- [75] Pike, R. H. (1988). *An empirical study of the adoption of sophisticated capital budgeting practices and decision-making effectiveness*. *Accounting and Business Research*, 18(72), 341-351.
- [76] Pike, R. H. (1989). Do Sophisticated Capital Budgeting Approaches Improve Investment Decision-Making Effectiveness? *The Engineering Economist: A Journal Devoted to the Problems of Capital Investment*, 34(2), 149-161, DOI: 10.1080/00137918908902983.
- [77] Pike, R. H., & Sharp, John. (1989). Trends in the Use of Management Science Techniques in Capital Budgeting. *Managerial and Decision Economics*, 10(2), 135-140.
- [78] Pike, R., Linsley, P., & Neale, B. (2012). *Corporate Finance and Investment* (7th ed). GB: Pearson Education M.U.A.
- [79] Pohlman, R. A., Santiago, E. S., & Markel, F. L. (1988). Cash flow estimation practices of large firms. *Financial Management*, 71-79.
- [80] Ryan, P. A., & Ryan, G. P. (2002). Capital budgeting practices of the Fortune 1000: how have things changed? *Journal of business and management*, 8(4), 355-364.
- [81] Sanders, N. R., & Manrodt, K. B. (1994). Forecasting practices in US corporations: survey results. *Interfaces*, 24(2), 92-100.
- [82] Schall, L. D., & Sundem, G. L. (1980). Capital Budgeting Methods and Risk: A Further Analysis. *Financial Management*, 9(1), 7-11. doi: 10.2307/3665304
- [83] Shao, L. P., & Shao, A. T. (1996). Risk analysis and capital budgeting techniques of US multinational enterprises. *Managerial Finance*, 22(1), 41-57. doi:10.1108/eb018542
- [84] Simister, L., & Turner, J. (1973). The development of systematic forecasting procedures in British industry. *Journal of Business Policy*, 3(2), 43-54.
- [85] Singh, S., Jain, P., & Yadav, S. S. (2012). Capital budgeting decisions: evidence from India. *Journal of Advances in Management Research*, 9(1), 96-112. doi:10.1108/09727981211225671.
- [86] Smáros, J. (2007). Forecasting collaboration in the European grocery sector: Observations from a case study. *Journal of Operations Management*, 25(3), 702-716.
- [87] Soares, J. O., Coutinho, M. C., & Martins, C. V. (2007). Forecasting Errors in Capital Budgeting: A Multi-Firm Post-Audit Study. *The Engineering Economist*, 52(1), 21-39. doi: 10.1080/00137910601159771
- [88] Sundem, G. L. (1975). Evaluating capital budgeting models in simulated environments. *The Journal of Finance*, 30(4), 977-992. Retrieved from <http://www.jstor.org/stable/2326717>
- [89] Tateishi, F., Mizumoto, T., Nagahira, A., & Ishida, S. (2011, August). *The Impact of Global Management Factors on the Cash Flows of Japanese Discrete Business Companies*. Paper presented in International Conference of Management and Service Science (MASS), (pp.1-4).
- [90] 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.
- [91] Turner, M. J., & Guilding, C. (2012). Factors affecting biasing of capital budgeting cash flow forecasts: evidence from the hotel industry. *Accounting and Business Research*, 42(5), 519-545. DOI: 10.1080/00014788.2012.670405
- [92] Verbeeten, F. H. (2006). Do organizations adopt sophisticated capital budgeting practices to deal with uncertainty in the investment decision?: A research note. *Management accounting research*, 17(1), 106-120. doi:10.1016/j.mar.2005.07.002
- [93] 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.
- [94] Watson, M. C. (1996). Forecasting in the Scottish electronics industry. *International Journal of Forecasting*, 12(3), 361-371. doi: 10.1016/0169-2070(96)00670-X
- [95] Wilkes, F. M. (1977). *Capital budgeting techniques*. New York & London: Wiley.
- [96] Winklhofer, H., Diamantopoulos, A., & Witt, S. F. (1996). Forecasting practice: A review of the empirical literature and an agenda for future research. *International Journal of Forecasting*, 12(2), 193-221.
- [97] Wotruba, T. R., & Thurlow, M. L. (1976). Sales force participation in quota setting and sales forecasting. *Journal of Marketing*, 40(2), 11-16.
- [98] Yenilmez-Dramali, D. (2013). *Moderating effect of forecasting methods between forecasting criteria and export sales forecasting effectiveness: an empirical model for UK organizations* (Doctoral thesis). Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.587391>.
- [99] Zotteri, G., & Kalchschmidt, M. (2007). Forecasting practices: Empirical evidence and a framework for research. *International Journal of Production Economics*, 108(1), 84-99. doi:10.1016/j.ijpe.2006.12.004