
An Empirical Insight into the Theory and Practices of Capital Budgeting in Pakistan

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Abstract

The study explores the different stages of the capital investment decision process and empirically investigates these stages' mediating role. We have used firms, managers, and economic attributes as independent variables. Likewise, ROA, ROE, and EPS are used as proxies for measuring firm performance, which is the dependent variable. A survey was conducted through a self-developed questionnaire for non-financial listed firms of the Pakistan Stock Exchange (PSX). The questionnaire comprises of two parts. The first part is related to managers and firm attributes. The second part covers the nine steps of the Capex Appraisal Model (CAM). PLS-SEM was used to investigate the objectives of the study. Moreover, the results support the applicability of CAM in the corporate sector of Pakistan. For this purpose, 27 hypotheses were empirically tested, of which 21 were found to be significant. However, 6 hypotheses were not supported. The findings suggest that the "Capex Appraisal Model" is a useful approach for the corporate sector of Pakistan. Thus, firms should properly evaluate Capex decisions to enhance performance in the long run.

Keywords: *Capital investment decision, Capex Appraisal Model, Capital Budgeting, Pakistan.*

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Introduction

Capital investment decisions are crucial for firm performance and future growth. Many past studies have acknowledged that firms have limited resources; therefore, their development and sustainability depends on how the top management invests in long term projects (Klammer et al., 1984). The capital investment appraisal process is complicated. A few studies have suggested six steps, while other studies have recommended the nine-steps approach. Despite the debate, the capital investment appraisal process should enhance firm performance and sustainable growth (Peterson & Fabozzi, 2002).

A finance manager in a firm makes a host of decisions that fall under three broad categories, i.e., investment decisions, financing decisions, and dividend decisions. Both short-term and long-term investment decisions affect firm performance, but capital investments substantially affect growth and sustainability. Therefore, firms need to use a well-structured appraisal framework for capital investment. Kakiya and Bosire (2019) suggests that capital investment is a strategic decision. Factors that contribute to this strategic decision include experience, market conditions, and economic situation. While making capital investment decisions, firms should take steps necessary for sustainable growth and competitive advantage. An appropriate capital budgeting technique helps firms to rank multiple investments according to their efficiency and returns. Many past studies acknowledge that successful firms use capital budgeting techniques to make investments in long term projects that are financially viable and match the company's vision (Kim, 1981; Gordon & Pinches, 1984; Scott & Petty, 1984; Mukherjee, 1987; Lumbly & Jones, 1999; Burns & Walker, 2009).

Mubashar & Tariq (2019) argue that a firm's top management must explore, analyze, select, and make long-term capital investments. They should also align capital investment decisions with the organization's vision and mission. This alignment helps to maximize shareholder wealth. Moreover, Bodhanwala (2018) suggests that capital investment is necessary for an organization's sustainable growth. It is irrelevant whether a firm uses its own resources or borrowed resources. Gordon and Pinches (1984) suggests that the utilitarian perspective supports a firm's long-term strategic decisions. Firms that adhere to sustainable strategies related to the code of ethics, sustainable environment, ecological balance, retention of human resources, and socially responsible behavior may benefit immensely. Also, these sustainable practices enhance a firm's reputations and promote better management practices (Michelon et al., 2020).

Previous research on capital budgeting in developed countries have mostly focused on selecting an investment project (Burns & Walker, 2009). Similarly, Baig and Khalidi

(2020) argue that only a few studies on capital budgeting are available in South Asia, and none of them have used a complete evaluation process framework. Thus, the study has examined the mediating role of the appraisal process on firm performance by extending the Capex Appraisal Model (CAM) (Baig & Khalidi, 2020). This study has used managers, firms, and economic attributes as independent variables, and ROA, ROE, and EPS as proxies for measuring firm performance, which is the dependent variable.

Perhaps this is the first comprehensive study that has examined the complete appraisal process based on Capex Appraisal Model (CAM). The findings not only contribute towards the body of knowledge but would also help firms to improve their appraisal process. The results may also inspire researchers from Pakistan and other South Asian countries to use this model in their studies.

Literature Review

A firm's main aim is to enhance its market value through rational financial decisions, including financing, dividend, liquidity, and investment decisions (Batra & Verma, 2014). Thus, capital budgeting decisions are an important facet of a firm's financial management strategy. Mintzberg et al. (1976) and Pinches (1982) have empirically examined the four-stage capital budgeting model, including identifying an investment opportunity, developing a general idea to a specific proposal, selecting a final project, and post-audit monitoring. The authors believe that this appraisal framework is an efficient tool for making investment decisions. They also recommend that future researchers should adopt this framework in their studies.

Similarly, Istvan (1961), Mao (1970), and Willam-Petty et al. (1975) examined the four-stage investment appraisal process. These studies found that investment decisions do not originate from top management but a firm's operations management process. Usually, one department of a firm does not evaluate all the aspects of the appraisal process. Most firms have specialized departments that assess specific elements of the appraisal process. Nurullah (2015) suggests that the aim of capital investment should be to acquire funds efficiently for long-term investment.

Mintzberg et al. (1976) suggest that long-term investment projects' selection and control enable a firm to gauge its future rationally. Firms use these funds to acquire long-term fixed assets, either tangible or intangible assets such as property, plant, equipment, copyright, and trademarks. Although these assets consume substantial financial resources, they provide significant benefits to a firm in the long run. Thus, it is concluded that capital investment decisions significantly affect firm value and are critical to sustainable growth. Bettinazzi et al. (2019) found that a firm's long-term investment is

associated with its performance and strategic processes. Strategic processes include a firm's commitment to identify, select, and change the performance evaluation process, incentive system, capital expenditure, monitoring process, and logistics activities.

Similarly, Batra and Verma (2014) suggest that a firm's stakeholders are interested in evaluating a firm's prevailing competitive activities. Thus, firms interested in sustainable growth should adopt a well-structured appraisal process in their core business strategy. Researchers find that firms committed to enhancing their performance have to take strategic investment decisions. Such strategic decisions are necessary for providing growth and a competitive advantage to a firm. Many researchers stress that a firm's sustainability depends on its performance and implementing well-structured capital investment procedures.

Researchers also believe that it is necessary for firms to perpetually assess how new strategies are impacting their performance and sustainability. Many researchers suggest that firms must examine the gap between corporate goals and actual achievement. Researchers also suggest that it is necessary to evaluate an investment's financial and economic impact on firm performance. Besides other factors, the evaluation process depends on estimating future cash flows, risks, and uncertainties. Thus, capital expenditure is an important decision for financial managers. However, an efficient capital budgeting process depends on management's attitude towards such investments. Firms often have limited resources and many investment alternatives. Therefore, before making investment decisions, managers must consider factors that may influence capital budgeting practices. Likewise, scholars also suggest that capital investment decisions significantly depend on the company's growth rate. Thus, irrational capital investment decisions can adversely affect the future of a firm. Batra and Verma (2014) also suggest that large capital investment decisions are complicated because of many uncontrollable factors. Some of those uncontrollable factors are future cash flow, social, technological, economic, and political environment.

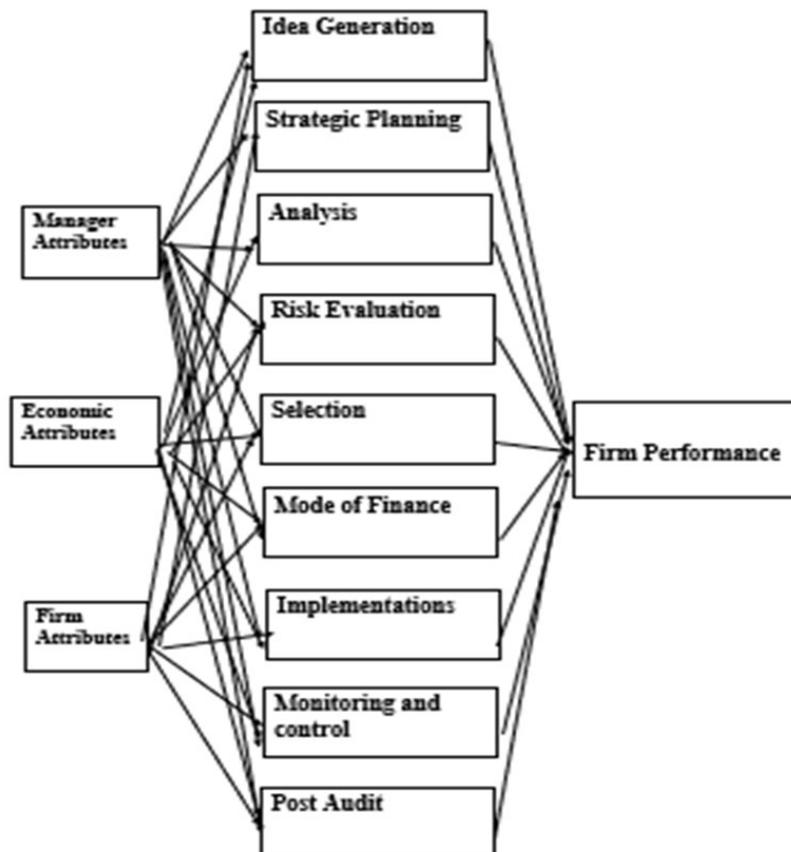
Baig and Khalidi (2020) found that the external environment significantly affects the capital investment appraisal process. Therefore, firms should not ignore macroeconomic indicators (Schall et al., 1978; Chen, 1995). Manager's attributes, also known as behavioral attributes, also affect the investment appraisal process. Also, factors such as managers' qualifications, experience, and expertise affect the capital investment process (Pike, 1986). Many studies have documented that managers' attributes such as management style, age, and experience directly affect the capital investment process but indirectly affect organizational performance (Daunfeldt & Hartwig, 2014; Hakim & Shimko, 1995; Chen, 1995; Thiessen & Waterhouse, 1978; Schall et al., 1978; Carleton, Kendall & Tandon, 1974). Likewise, there are numerous firm characteristics which

directly and indirectly influence the capital budgeting practices, including firm size, decentralization, monitoring, and control. Similarly, uncertainty is also an essential element that affects firm performance and capital investment process. This study has extended the Capex Appraisal Model (CAM) proposed by Baig and Khalidi (2020). This model has nine aspects of the capital investment appraisal process, i.e., idea generation, strategic planning, analysis, risk evaluation, selection, mode of finance, implementation, monitoring and control, and post-audit.

Conceptual Framework

This study's conceptual framework is based on the literature review and a newly developed Capex Appraisal Model (CAM) (Baig & Khalidi, 2020). This framework suggests that the appraisal process steps have a mediating effect between "managers' attributes, economic attributes, firm attributes, and firm performance." We have illustrated the conceptual framework in Figure 1.

Figure 1: Conceptual Framework



Hypotheses from the Capex Appraisal Model

Based on the Capex Appraisal Model, we have proposed 27 mediating relationships empirically tested through the Smart PLS software. We have developed the proposed model Capex Appraisal Model (CAM) through constructivist grounded theory (Baig & Khalidi, 2020).

Variables Measurement

The measurement of the dependent, mediating, and independent variables of the study are discussed in the following sections.

Dependent Variable

Haka et al., (1985) report that many studies have measured firm performance through profitability. Many research scholars have found a strong relationship between firm performance and the capital budgeting process (for instance; Vadeei et al., 2012; Farragher et al., 2001; Pike, 1984; Kim, 1981; Klammer, 1984). Therefore, ROA (Return on Assets); ROE (Return on Equity), and EPS (Earning per share) are used in this study to measure firm performance.

Mediating Variables

The Capex appraisal model (CAM) has suggested nine mediating variables (Baig and Khalidi, 2020). These include (1) idea generation (2) strategic planning (3) analysis (4) risk evaluation (5) selection (6) mode of finance (7) implementation (8) monitoring & control and (9) post-audit.

Independent Variables

In this study, we have three independent variables. Past researchers highlighted the direct and indirect influence of these variables on firm performance (Daunfeldt & Hartwig, 2014; Hakim & Shimko, 1995; Chen, 1995; Tiessen & Waterhouse, 1978; Schall et al., 1978; Carleton, Kendall & Tandon, 1974). The data related to managers' attributes and firms' attributes have been collected through a self-developed questionnaire. The study has used GDP growth rate, inflation rate, and employment rate averages as the proxy of economic attributes.

Proposed Hypotheses

Manager's Attributes

The nine mediating relationships derived from the Capex Appraisal Model are:

H1a: The idea generation stage "mediates the relationship between the manager's attributes" and firm performance.

H1b: Strategic planning stage “mediates the relationship between the manager’s attributes” and firm performance.

H1c: Analysis stage “mediates the relationship between the manager’s attributes” and firm performance.

H1d: The risk evaluation stage “mediates the relationship between the manager’s attributes” and firm performance.

H1e: The selection stage “mediates the relationship between the manager’s attributes” and firm performance.

H1f: The mode of finance stage “mediates the relationship between the manager’s attributes” and firm performance.

H1g: Implementation stage “mediates the relationship between the manager’s attributes” and firm performance.

H1h: The monitoring and control stage “mediates the relationship between the manager’s attributes” and firm performance.

H1i: Post-audit stage “mediates the relationship between the manager’s attributes” and firm performance.

Economic Attributes

H2a: Idea generation stage “mediates the relationship between economic attributes” and firm performance.

H2b: Strategic planning stage mediates “the relationship between economic attributes” and firm performance.

H2c: The analysis stage mediates “the relationship between economic attributes” and firm performance.

H2d: Risk evaluation stage “mediates the relationship between economic attributes” and firm performance.

H2e: The selection stage “mediates the relationship between economic attributes” and firm performance.

H2f: Mode of finance stage “mediates the relationship between economic attributes” and firm performance.

H2g: Implementation stage “mediates the relationship between economic attributes” and firm performance.

H2h: Monitoring and control stage “mediates the relationship between economic attributes” and firm performance.

H2i: Post audit mediates the “relationship between economic attributes” and firm performance.

Firm Attributes

H3a: Idea generation stage “mediates the relationship between firm attributes” and firm performance.

H3b: Strategic planning stage “mediates the relationship between firm attributes” and firm performance.

H3c: The analysis stage “mediates the relationship between firm’s attributes” and firm performance.

H3d: Risk Evaluation stage “mediates the relationship between firm attributes” and firm performance

H3e: The selection stage “mediates the relationship between firm attributes” and firm performance.

H3f: Mode of finance stage “mediates the relationship between firm attributes” and firm performance.

H3g: Implementation stage “mediates the relationship between firm attributes” and firm performance.

H3h: Monitoring and control stage “mediates the relationship between firm attributes” and firm performance.

H3i: Post audit stage “mediates the relationship between firm attributes” and firm performance.

Methodology

The study is quantitative in nature. The study has used a questionnaire for collecting data on investment appraisal practices. We have derived the questionnaire from the newly developed Capex Appraisal Model (CAM) (Baig and Khalidi, 2020). The study has also collected the data from listed companies of the Pakistan Stock Exchange. PSX firms belong to 36 distinct industries/sectors.

Population and Sample Size

Pakistan Stock Exchange companies are listed and segmented into 36 sectors. We have not considered the financial sector in our sample. The financial sector comprises around 125 firms, which includes banks, insurance, and leasing companies. Questionnaires were emailed and posted to 320 companies, and we received data from 135 listed companies in Pakistan. We did not consider 15 cases as they were blank questionnaires, had significant missing values, and inadequate responses. Thus, the sample size was 120. CFOs, finance executives, and other professionals have busy schedules; consequently, they were reluctant to fill the questionnaire. Therefore, the response rate was 37.5%, which is similar to previous studies. For instance, Hanaeda and Serita (2014) received a 6.2% response as they targeted 3618 CFOs; Bennouna et al., (2010) received an 18.4% response rate from the 478 CFOs; Truong et al., (2008) obtained 24.48% response from 256 CFOs; Hermes et al. (2007) received a response of 17% from dutch firms. Trahan and Gitman (1995) obtained a 12% response from 700 CFOs.

Findings

Respondents Profile

We approached those firms that maintain accurate information of the capital investment appraisal process. The responses are summarized in Table 1.

Table 1: Questionnaire Response

Particulars	Number of Companies
Total listed companies	546
Financial Companies (Banks, insurance, etc.)	125
Non-Financial Companies	421
Approached	320
Number of Responses	135
Questionnaire rejected (Blank and missing values)	15
Response Rate	37.50%

Statistical Analysis through Smart PLS

The study has used the two-steps approach for data analysis. In the first stage, we tested the measurement model based on reliability, validity, and discriminant validity. In the second stage, we tested the structural model for generating results related to the proposed hypotheses.

Reliability and Validity

The results related to reliability and validity are illustrated in Table 2. The results suggest that all the Cronbach's Alpha values are greater than 0.70, meaning that all the latent variables have acceptable internal consistency. Table 2 also indicates that the composite reliability values range from 0.833 to 0.969. At the same time, item loadings are also greater than 0.70. Thus, based on composite reliability AVE values, we have inferred that the latent variable meets the convergent validity requirements (Hanlein & Kaplan, 2004).

Table 2: Reliability and Validity Analysis

Construct	Cronbach's Alpha	Composite Reliability	AVE	Indicators	Factor Loading
Firm Attributes	0.963	0.968	0.755	FA-6	0.771
				FA-7	0.784
				FA-8	0.827
				FA-9	0.784
Economic Attributes	0.802	0.883	0.716	ED1	0.854
				ED2	0.863
				ED3	0.821
Manager Attributes	0.876	0.909	0.667	MA1	0.828
				MA3	0.836
				MA4	0.807
				MA5	0.839
Idea Generation	0.94	0.95	0.706	IG1	0.833
				IG2	0.874
				IG3	0.83
				IG4	0.795
				IG5	0.827
				IG6	0.83
				IG7	0.838
				IG8	0.891
Strategic Planning	0.945	0.954	0.697	SP1	0.849

				SP2	0.757
				SP3	0.831
				SP4	0.8
				SP5	0.754
				SP6	0.886
				SP7	0.846
				SP8	0.879
				SP9	0.901
Analysis					
	0.896	0.918	0.616	A1	0.766
				A2	0.772
				A3	0.718
				A4	0.757
				A5	0.829
				A6	0.819
				A7	0.825
Risk Evaluation	0.935	0.947	0.69	R1	0.817
				R2	0.775
				R3	0.781
				R4	0.81
				R5	0.792
				R6	0.818
				R7	0.924
				R8	0.916
Selection	0.948	0.956	0.709	S1	0.837
				S2	0.77
				S3	0.82
				S4	0.801
				S5	0.788
				S6	0.873
				S7	0.913
				S8	0.861
				S9	0.904
Mode of Finance	0.964	0.969	0.758	M1	0.82
				M2	0.77
				M3	0.814
				M4	0.768
				M5	0.836

				M6	0.945
				M7	0.941
				M8	0.919
				M9	0.946
				M10	0.918
Implementation	0.952	0.959	0.7	I1	0.784
				I2	0.752
				I3	0.804
				I4	0.777
				I5	0.818
				I6	0.897
				I7	0.89
				I10	0.84
Monitoring & Control	0.929	0.942	0.67	MC1	0.805
				MC2	0.855
				MC3	0.774
				MC4	0.824
				MC5	0.807
				MC6	0.859
				MC7	0.785
				MC8	0.833
Post Audit	0.943	0.953	0.717	P1	0.886
				P2	0.807
				P3	0.811
				P4	0.82
				P5	0.803
				P6	0.861
				P7	0.897
				P8	0.884
FP	0.768	0.866	0.683	FP1	0.828
				FP2	0.849
				FP3	0.801

Discriminant Validity

The discriminant validity is evaluated by using the Fornell and Larcker (1981) criterion. The results are exhibited in Table 3. The results suggest that the “square root of AVE is greater than Pearson correlation values, suggesting the constructs are “unique and distinct.”

Table 3: Discriminant Validity

	VIF	A	EA	FP	FA	IG	I	MA	MF	MC	PA	RE	S	SP
A	3.54	0.785												
EA	2.94	0.650	0.846											
FP	1.08	0.840	0.778	0.826										
FA	3.3	0.691	0.483	0.672	0.869									
IG	4.95	0.759	0.626	0.837	0.589	0.840								
I	2.39	0.771	0.576	0.782	0.783	0.703	0.836							
MA	2.65	0.564	0.375	0.557	0.804	0.483	0.625	0.817						
MF	3.03	0.832	0.615	0.817	0.841	0.728	0.814	0.647	0.870					
MC	2.78	0.739	0.624	0.838	0.610	0.861	0.725	0.521	0.740	0.818				
PA	2.65	0.491	0.467	0.558	0.527	0.472	0.438	0.496	0.500	0.431	0.847			
RE	2.54	0.689	0.559	0.688	0.571	0.708	0.581	0.488	0.635	0.676	0.548	0.831		
S	2.11	0.551	0.519	0.630	0.590	0.521	0.490	0.558	0.566	0.490	0.928	0.603	0.842	
SP	5.08	0.634	0.543	0.713	0.551	0.641	0.572	0.482	0.611	0.606	0.790	0.723	0.780	0.835

Coefficient of Determination (R-squared) & Adjusted R-Squared

The coefficient of determination (R^2) value shows the proportion of dependent variable variance explained by the model (Hair et al., 2011). The coefficient of determination (R-squared) and adjusted R-squared values are illustrated in Table 4.

Table 4: Coefficient of Determination (R-Squared) and Adjusted R-Squared

	R Squared	Adjusted R Squared
Idea Generation (IG)	0.500	0.487
Strategic Planning (SP)	0.409	0.394
Analysis (A)	0.609	0.598
Risk Evaluation (RE)	0.434	0.419
Selection (S)	0.441	0.427
Mode of Finance (MF)	0.767	0.761
Implementation (I)	0.664	0.656
Monitoring & Control (MC)	0.518	0.505
Post Audit (PA)	0.353	0.336
Firm Performance (FP)	0.859	0.848

The results suggest that adjusted R-square values range from 0.336 to 0.848. Post audit ($R^2=0.394$) and strategic planning ($R^2=0.394$) have low values, and the rest variables have medium to high predictive values (Hair Jr et al., 2016).

Path Coefficients

We have determined the path coefficient values by using bootstrapping functions. The results are presented in Table 5, showing beta values, t values, and P values.

Table 5: Path Analysis

Hypotheses	Beta Value	P Values	Significance
H1a Manager Attributes -> Idea Generation -> FP	0.147	0.020*	Significant
H1b Manager Attributes -> Strategic Planning -> FP	0.123	0.034*	Significant
H1c Manager Attributes -> Analysis -> FP	0.143	0.010**	Significant
H1d Manager Attributes -> Risk Evaluation -> FP	0.132	0.012*	Significant
H1e Manager Attributes -> Selection -> FP	0.239	0.001***	Significant
H1f Manager Attributes -> Mode of Finance -> FP	0.231	0.032*	Significant
H1g Manager Attributes -> Implementation -> FP	0.143	0.030*	Significant
H1h Manager Attributes -> Monitoring & Control -> FP	0.231	0.034*	Significant
H1i Manager Attributes -> Post Audit -> FP	0.134	0.039*	Significant
H2a Economic Attributes -> Idea Generation -> FP	0.145	0.000***	Significant
H2b Economic Attributes -> Strategic Planning -> FP	0.165	0.043*	Significant
H2c Economic Attributes -> Analysis -> FP	0.114	0.096	Not Significant
H2d Economic Attributes -> Risk Evaluation -> FP	0.196	0.091	Not Significant
H2e Economic Attributes -> Selection -> FP	0.231	0.001***	Significant
H2f Economic Attributes -> Mode of Finance -> FP	0.198	0.001***	Significant
H2g Economic Attributes -> Implementation -> FP	0.156	0.231	Not Significant
H2h Economic Attributes -> Monitoring & Control -> FP	0.129	0.040*	Significant
H2i Economic Attributes -> Post Audit -> FP	0.139	0.415*	Not Significant
H3a Firm Attributes -> Idea Generation -> FP	0.197	0.030*	Significant
H3b Firm Attributes -> Strategic Planning -> FP	0.132	0.012*	Significant
H3c Firm Attributes -> Analysis -> FP	0.127	0.049*	Significant
H3d Firm Attributes -> Risk Evaluation -> FP	0.212	0.11	Not Significant
H3e Firm Attributes -> Selection -> FP	0.193	0.043*	Significant
H3f Firm Attributes -> Mode of Finance -> FP	0.192	0.030*	Significant
H3g Firm Attributes -> Implementation -> FP	0.211	0.000***	Significant
H3h Firm Attributes -> Monitoring & Control -> FP	0.232	0.001***	Significant
H3i Firm Attributes -> Post Audit -> FP	0.156	0.37	Not Significant

Our results support all the hypotheses except six hypotheses: H2c, H2d, H2g, H2i, H3d, and H3i.

Conclusion

The study found that the appraisal process has a mediating effect on firm performance in 21 hypotheses out of 27 hypotheses. Thus, we infer that long-term corporate sustainability is an important aspect of the Capex appraisal process. This study reveals that attributes of finance executives and firms are crucial for any finance manager. This study has collected data from individuals working in the corporate sector and make decisions related to capital investments. It also includes individuals who were formally part of a team involved in making capital investment decisions. The study has measured managers' attributes based on their current position, educational background, age, and experience.

Similarly, firm attributes consist of four major elements, i.e., respondent companies related sectors, number of employees, size of the annual capital budget, and firm ownership. Moreover, these attributes indicate corporate professionalism and the ability to evaluate capital investment decisions. Firm size is reflected through the annual capital budget and the number of employees. Most of the surveyed firms have domestic ownership, and their capital investment policies are prepared and approved locally. The study has analyzed nine mediating relationships on the manager's attributes, and the results support all of them. In these relationships, the independent variable was manager attributes, stages in the CAM were mediating variables, and firm performance was the dependent variable. Similarly, we have formulated nine mediating hypotheses on economic attributes, of which the results do not support four hypotheses: H2c, H2d, H2g, and H2i. In these relationships, the independent variable was economic attributes, stages of CAM were mediating variables, and firm performance was the dependent variable. We also formulated nine mediating relationships on firms' attributes, of which the results do not support two hypotheses: H3d and H3i. In these relationships, the independent variable was firm attributes, stages of CAM were mediating variables, and firm performance was the dependent variable.

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