Assessing capital budgeting with risks, uncertainty and certainty models of public sector organizations in Ghana

[1]Dr. Apea-Bah Cyril Swithin, PhD. | [2]Prof. Allan Kwasi Asante-Yeboah, PhD.
[1,2]School of Finance & Financial Management
Business University of Costa Rica
Email: cyrilsarah@yahoo.com

Abstract

The concept, capital budgeting is been assessed with risk, uncertainty and certainty models of public sector organizations in Ghana (the sector). Capital budgeting is 'substantial financial investment in long-lived assets' Fabozzi and Peterson (2003, p.358), whiles concept assessed with, 'certainty implies perfect information, risk implies partial information, and uncertainty implies incomplete information' Taha (1987, p.428). The literature review is ascertained from the foundation, development, different theories and historical thinking from the era before ancient Babylonia to present. Three articles are reviewed, critiqued, and appropriate opinions suggested with models like the Sensitivity Analysis and Simulation Analysis for computing accurate NPV results, where higher margins of risk noted for corresponding higher returns. The sector, from capital budgeting, determined, should consider the profitability mindedness. The assessment of risks, uncertainty and certainty indicators is determined as the markup from the emerging concept derived. The chi-square test of statistics is computed, and the hypothesis derived shows the failure in rejecting the null hypothesis, that the, 'expected value' of the sector do not suffer threat. Since, it is not significant at the alpha of 0.05, which is the conventionally accepted significance level of the probability, $p > 0.05$ of 1.24. Some of the recommendations from the result are; equipping the human capital with financial management know-how, using the required risks and uncertainties functions and risk-adjusted models to calculate for capital projects' results, and resourcing with standard financial policy, and procedure manuals.
Keywords: Capital Budgeting, Capital Risk, Substantial Financial Investment, Public Sector Financing

1.0 INTRODUCTION

The concept of capital budgeting described is 'the process of identifying and selecting investments in long-lived assets, or assets expected to produce benefits over more than one year', Fabozzi and Peterson (2003, p.358). Assessing the concept of capital budgeting of public sector organizations in Ghana with risks, uncertainty and certainty models, the public sector organizations in Ghana is challenged with major financial decisions into long-lived assets of major road networks and infrastructure buildings, for the socio-economic benefits of the country at large. From this concept, most investment appraisal models that compute the cash flow into the future neglect risks and uncertainty as models. There is the risk-adjusted discount rate model that facilitates in adjusting the risk of the discount rate, as in coming out with the estimated value of the uncertain cash flows which is the resulting future cash inflows. Therefore, the risk-adjusted discount rate model should have facilitated in computing the cash flow under certainty from the uncertainty outcome with the use of cash flow valuation function as a model.

However, there are the limitations of difficulty in the calculation and a stringent approach to usage of rates giving arbitrary calculation meanings. The expectancy of the assets in producing benefits into the future is not certain. Therefore, the certainty equivalent approach for incorporating risk from the concept of capital budgeting gives us the lead-way into some Government of Ghana's organizations' whose operations regarding financial investments into fixed assets have problems relating to risks and uncertainty. From the appreciation of this study, 'Knight posited that "risk" referred to those events where the decision-maker could assign mathematical probabilities to the randomness encountered. In contrast, "uncertainty" referred to events when randomness could not be expressed in terms of mathematical probabilities' Boyko and Negus (2006, p.1).

From these critical discussions that some research questions that need answers ensued being; Can risk, uncertainty and certainty models be used to assess the cash flow of public sector organizations in Ghana? What are the signals or indicators that show that an investment decision is risk-free? How are risk and uncertainty measured in long-term projects of public sector organizations in Ghana? Does the expected value of the public sector organizations in Ghana suffer the threat of risk and uncertainty? In gaining the requisite answers to these questions from the survey questionnaires crafted in ascertaining the primary and secondary data, that the requisite analysis from the tables and charts drawn, also computes the results for the hypothesis.

The methods and methodology used are also taken from these questions generated, resulting in the findings and recommendations, made for academic purposes, and the public sector organizations in Ghana.

2.0 LITERATURE REVIEW

The literature on the concept of capital budgeting with risks, uncertainty and certainty models, reviews various studies on investment decisions involving current funds for fixed assets injections. The underlying principle for the investment decisions is the future streams of benefits derived as, the 'expected value' that investors hold to as their worth suffers uncertainty. The review intends to unearth from inception the concept under study.

2.1 Foundations of the Study

In acknowledging the foundations of capital budgeting, which 'involves measuring the incremental cash flows associated with investment proposals and evaluating the attractiveness of these cash flows relative to the project's costs' Petty et al. (2006, p.301), with the four guiding principles for selecting capital budgeting criteria being; Rely on cash flows rather than accounting profits to measure a project's costs and benefits, Be consistent with the goal of maximizing shareholders' wealth, Allow for the time value of money, Be able to account for the risks of projects, Petty et al. (2006, pp.301-302). Also, 'capital budgeting is the process of analyzing investment opportunities in long-term assets which are expected to produce benefits for more than one year' Peterson and Fabozzi (2002), and 'the time value of money' Ivan (2005, p.48), a key indicator from the various ascertained studies.

From these studies capital budgeting distinguishes some principles that needs much attention being, Capital budgeting are critical investment decisions that involves the injection of funds for expected benefits in the future. It ascertains that the expected benefits are in the future as established, noted as 'uncertain', with more than one year benefit. It establishes that cash outlays invested in 'long-term assets' have a significant effect on the organizations' profits, regarding strategic investment decisions on the use of these assets. There could be further cash injections into the assets concerning human capital building for the use of such asset facilities, their monitoring and control, being substantial cash outflow injections. The capital budgeting investment decisions taken are so critical that, the indicator is that they should conform to the worth of shareholders' since these strategic investment decisions are irreversible. The decisions being irreversible point out that all shareholders' and stakeholders' to the success of such strategic investment decisions are needed, therefore, the favourable arguments for wealth maximization[1] derived by Paramasivan and Subramanian (2009, pp.5-7) are invoked as the underlying concepts.

Capital budgeting decisions as strategic investment decisions have some 'degree of risks'. The quantum of the 'degree of risks' is uncertain, and could clear the substantial cash injection with outstanding flows of debt if strategically not diversified when met with the odds, of which can cause organizations' to liquidate. Therefore, the marker is that requisite analyses need to be injected to mitigate against the uncertainty, by this mean ascertaining a 'degree of certainty'. From the theories generated, Financial Management of the National Audit Office's (NAO, Britain) understanding is invoked which brings to light the Financial Management Maturity Model, which considers 16 key questions[2] which assess financial management practices, grouped under these five (5) aspects being; Financial government and leadership, Financial planning, Finance for decision making, Financial monitoring and forecasting, Financial and performance reporting. It is from these informed assessments understanding of the 16 key questions that place an organization on its awareness of the concept. The organization should also be aware of its level of appreciating financial management and that, mitigating risk and uncertainty is important. Therefore, the four ways classification of Frank Knight (1921) proposed serves as a factor for the study being; Combined uncertainties through large-scale organization; Increase control of the situation; Slow the march of progress; and Increase knowledge, Boyko and Negus (2006, p.2). A further study of financial management deduces various understanding from the 'Financial Management and Economic, Marketing, Mathematics, Production Management, Human Resources and Accounting' theories.

However, skewing to Financial Management and Mathematics[3] in relating to the study, the underlying factors for discussion considers returns and risks. With profitability, it mostly depends on the asset in place as to a long-term or short-term decision with the required liquidity of the cash flows, machinery and the human capital. In building the foundations of the study, the sector is envisaged to reduce to a larger extent, the ambiguity of the unknown future.

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[1] See Paramasivan and Subramanian (2009, pp.5-7), under Favourable Arguments for Profit Maximization: i) Main aim is earning of profit. ii) Profit is the parameter of the business operation. iii) Profit reduces risk of the business concern. iv) Profit is the main source of finance. v) Profitability meets the social needs.
Also, followed are the Unfavourable arguments and drawbacks for profit maximization, for valuable reference.
[2] See the NAO - Financial Management Maturity Model, (p.3 of 13), (5) five aspects of financial management and lower level questions that assess financial practice.
[3] See Paramasivan and Subramanian (2009, p.4), Scope of Financial Management, which are mathematical and statistical tools and techniques. They present the economic order quantity, discount factor, time value of money and the other theories as presented.

2.2 Development of the Study

The development of the study described is a study where, 'the Asipu of ancient Babylonia expressed their results with certainty, confidence and authority. Since the Asipu were empowered to read the signs of the gods, probability played no part in their analyses'. Covello and Mumpower (1999, p.34). From this understanding, risk analysis was not mathematically done but rather resorted to 'divination' to achieve the expected value of certainty. Most, studies done on risk during the development stages hovered around insurance in mitigating risk, as in Ur during the reign of King Rim-Sin (1788 B.C.), there was a financial catastrophe of which a royal edict was pronounced declaring all loans 'null and void'. The indicator is that those who owe loans were free while lenders were at a loss. This development made interest rates to move from 0% through to 33%, and others were even 200%, whereby families were the insurance for their commitments. Furthermore, in 1518, there were issues concerning the interest as a way of further mitigating risk, as 'Grier argues that the 68years of sin-free interest rates were enough to stir up intellectual thought about probability' Covello and Mumpower (1999, p.36).

More so, Bernstein (1995, p.5) discussed that CAPM (capital asset pricing model) and EMH (efficient market hypothesis) came out in the 1950s and 1960s with well-understood concepts like the standard deviations, and the likes for analyses. However, as time progresses, Frank H. Knight (1921) gives a psychological insight for risk, uncertainty and profit, with its distinction. Other theorists, also 'in the comparison of choices involving described gambles (with specified probabilities) with choices where probabilities must be estimated from observations (Hau, Pleskac & Hertwig, 2010; Rakow & Newell 2010)… and of decision making under risk (Kahnerman & Tversky, 1979, 2000, Tversky & Kahnerman, 1992) have been among psychology's most successful exports to other disciplines including economics, management science, finance and medicine (Laibson & Zeckhauser, 1998)', Rakow, (2010, p.458). The underlying emphasizes points to the potential contribution in recognition to the development of this study. It concludes that 'the whole edifice of the discipline of capital budgeting decisions is built on Knight's three way classification of a decision making environment – certainty, risk and uncertainty', Gupta (1996, p.385).

The theory of risk, uncertainty and certainty moved into motion in the 19th century when mathematical models of simple possibilistic, and chanced constrained models were into decision making for commerce, unlike the previous understanding for non-commercial purposes. In risk assessment relating to the Aerospace in 1986 and the Nuclear Power in the 1950s, decisions in appreciating uncertainty in risk calculations were thrown overboard. However, with the National Research Council coming into the picture gives a way forward in the 1990s with a report mitigating risk. Invariably, else it could be realized that 'after 5,000 years of civilization education on risks, Hurricane Katrina's aftermath has an education to make', all things being equal, according to Cooke (2009, pp.8-9).

2.3 Different Theories

The concept of capital budgeting can align to risk and uncertainty from the distinction of Knight (1921) as the development of the study ensues. The theories in relating to capital budgeting with risk and uncertainty classified are from the ancient Babylonia, and it even showed that the Stone Age era had some form of investment decision, and risks ensued with certainty. Under these developments that the concept of capital budgeting discussed is, with risks, uncertainty and certainty methods from different theories captured.

2.3.1 The Concept of Capital Budgeting

Capital budgeting ascertained is strategic decisions made that involves the exchange of cash outlays for future benefits expected. The future benefits expected are described as the 'expected value'. For ascertaining the 'expected value', some models consider the 'time value of money' in determining these outcomes. The considered models are the discounted cash flows (DCF) of the Net Present Value (NPV), and Internal Rate of Return (IRR). There are the advanced or sophisticated methods comprising of Sensitivity, Simulation and Scenario Analyses. In determining these models, in factoring in risks, the emerging concept has been developed from the functional formula as a markup for requisite cash flow decisions. Also, the Experimental Psychology-Based Research also advanced by Haka (2007, p.712), 'focusing on investment appraisal assumes decision makers have systematic cognitive representations and biases that influence decision outcomes (see Birnberg et al. (2006) for a broader discussion of psychology theory research on management accounting)'. From this understanding, a tabular[4] analyses generated is with the topics discussed formed from; Opportunity costs, Escalation, International issues, Group effects and other, where risks and agency cost issues prevail.

Moreover, as reported by Keršytė (2011, p.1131), Maccarrone (1996) identified six fundamental phases of capital budgeting processes from a wider context regarding planning strategically being; Identifying investment

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[4] See Table.4, Haka (2007, pp.708-711) for the modeling.

opportunities, the performance of development and evaluation of the collection of the relevant and detailed information for each alternative, evaluation of their profitability and global attractiveness in terms of financial or strategic factors, the next phase is the authorization or the period approval stage, and then the implementation or control stage, final stage being post-auditing, for comparison of outcomes with budget targets for accuracy in the forecast, and as a result, errors can be identified with feedback on the decision process. From these theories on capital budgeting, even though discussed toward specified resulting outcomes, risks and uncertainty to a larger extent can be deduced from it.

2.3.1.1 Determining Capital Budgeting with methods

The identified methods for consideration are the NPV, IRR, and the Emerging concept. These methods are assessed with risks, uncertainty and certainty models as presented. In determining with the assessors of risks, uncertainty and certainty in the sector, the NPV and IRR as the DCF models for the study, and the Sensitivity, Monte Carlo Simulation and the Scenario Analyses are some of the advanced models as assessors for risks determination. The stratified method will facilitate in ascertaining requisite data, with the use of the models for appreciating the concept.

2.3.1.1.1 Net Present Value (NPV)

The NPV a determined technique that subtracts the initial investment or the project's cash outflow from the cash injection determined, of the present value, which is discounted at a pre-determined rate, designed of the cost of capital for the firm. It is determined from the formula;

$$NPV = CF \times \frac{1-(1+i)^{-n}}{i} - IO$$

where, CF = Cash inflow

IO = Initial cash investment
i = required rate of return
^ / n = number of periods

The NPV tool has some advantages that;
    i.   It considers the time value of money,
    ii.   It considers the expected cash inflow of projects,
    iii.   It also considers the future cash flow risk,
    iv.   These results as a concept that maximizes owners' wealth.

The NPV tool also has some disadvantages that; it is difficult in computing and determining the cost of capital, it is a tool not appropriate for projects that have several starting dates. The decision rules criteria states that; Where, the NPV > 0, we accept the project, NPV < 0, we reject the project. The decision rule indicates that where NPV > 0, the firm can recover its cost, and as such owners' equity is enhanced. Therefore, the uncertainty about the project, to an extent is determined with the certainty of value to the owners.

2.3.1.1.2 Internal Rate of Return (IRR)

In determining the IRR, it 'is the discount rate that causes the project's NPV to equal to zero', Fabozzi and Peterson (2003, p.423). The indicator is that the firm, at the end of the day will earn its investment back from the rate of return. The IRR to have some advantage that, it considers the time value of money. The disadvantages being that: It is time consuming in computing for uneven cash inflows, it does not consider projects with unstable investment sizes. The decision criteria state as, where the IRR > cost of capital, the project is accepted, IRR < 0, the project is rejected.

Therefore, the firm should retain its cost of capital, and wealth of the owners. This understanding aligns to the appreciation that, the certainty of value for the owners of the firm is determined mathematically from uncertainty outcome. However, we should note that the IRR computation on re-investment can cause us to select wrongful projects. Nevertheless, caution should be made, that the IRR percentage value result should be higher than the cost of capital. In effect, the re-investment rate is evaluated on the cost of capital for the maximization of owners' worth.

2.3.1.1.3 Sensitivity Analysis

The advanced tool of sensitivity analysis answers the 'what-if' concerns on expected cash flow tendencies. It assumes that, projects' risks and uncertainties that are ascertained in variable changes, are shown by the results of NPV or IRR outcome. That is, it measures the change in the project's cash flow to the weather of uncertainty or risk,

assuming from changes in the cost of capital. Any change in variables, like the unit of sales has a reflection on the result of the NPV or IRR. From these undertaking, it reflects that it is a technique that requires think through decisions, for the expected cash flow. The break-even analysis and correlation for taking stringent strategic decisions are tools that facilitate their role. It, therefore, indicates that, where sensitive cash flow assumes mathematically, risks and uncertainty are high there, and such projects avoided.

The use of the Microsoft Excel's inbuilt format for determining decisions, even though quite encouraging, however, there is a difficulty in the computation and resulting effect on the cash flow determinant. The advantages comprise that; it is a tool that determines the total project or stand-alone risks, it determines risks related variables, it considers results from other mathematical tools of breakeven and correlation analysis for the required cash flow. The disadvantages are that; it is a tool that does not consider the relationship between variables, it does not consider diversification, but stand-alone risk, which may not cover the uncertainty inflows, and it does not give a definite rule for decisions.

2.3.1.1.4 Emerging concept

The Emerging concept accepts the rule that uncertainties are indeterminate. Therefore, computing probabilities to determine the future is a wicked problem. However, to be ascertained as a tamed problem, the NPV decision is not the only measuring rod. The risk computation developed is from the table as follows facilitates;

Table 1-2.3.1.1.4 Determining from the Emerging concept

	Using Excel functions
cash inflow (initial inflow) [CF]	
discounting valuation – [dv]	$=NPV(r, CF)^{\wedge\ n=1year\ period\ for\ whole\ sum\ values.}$
add: cash outflow (initial investment) – [IO]	$=IO - ((1+r)^{\wedge n})$
NPV	$=dv + IO$
IRR	$=IRR(dv : IO\ [range],r)$
interest rate [r] / number of period [n]	

In developing the emerging concept, it should be ascertained, that the mathematical derivation for analysis is not the only determinant of risks when gaining risks from the stand-alone risk, market risk and the corporate risk. The subjective risks factors are the enormous determinants ascertained from the uncertainty point-of-view. The fact is that, when all the numerical analysis is achieved, only one factor of the subjective risks factors can turn valued expected cash flow decisions over-board. Therefore, in determining from these considerations, a definite markup determinant is crucial for the unforeseen outcome mitigated.

The cultural dimension determinants, by Hofstede (1998) of individualism, power distance, uncertainty avoidance, and masculinity, is a consideration of uncertainty from market and corporate risks stand-points. Therefore, the acronym of 'PESTLE' (Political, Economic, Socio-Religious-Cultural, Technical/Technological, Legal and Environmental) should not be relegated, when crafting the emerging concept of uncertainty to derived certainty.

From the table, the supporting functional formula is determined as,
$c = ((1 + r)^{\wedge n_1} - IO((1 + r)^{\wedge n})$ where, IO = initial investment,

r = interest rate (cost of capital)
n = number of period
CF = cash flow

The theory of risk and uncertainty causes the emerging concept of assessing capital budgeting with risks and uncertainty as a tool being ascertained. It is from these determinants that the NPV and IRR of the sector, stratified from the study's case computation are taken. The advantages are that; it considers the time value of money, it determines markup for uncertainties difficult to identify as determinants for the required expected future cash flow, it considers the expected future cash flow, it considers subjective and behavioural tendencies from the acronym, 'PESTLE' for probabilities determination, it considers the maximization of owners' wealth, described as the business-mindedness. The disadvantage is that; it is an insignificant uncertainty determination, however, significant determinant.

2.3.2 The Concept of Risks, Uncertainty and Certainty

In ascertaining the concepts risks, uncertainty and certainty, from different theories crafted, it notes from the era before the ancient Babylonians that, certainty was the rule as uncertainty and risks limited due to their mode of analyses. From the underlying theories that, Taha (1987, p.428)[5] defines 'certainty' as 'implies perfect information. All relevant information to the problem is known'. 'Risk' also 'implies partial information. Some of all the relevant information to the problem is stochastic' and 'uncertainty' also 'implies incomplete information. Some of all the relevant information to the problem is missing'. The definitions have variables for computing risk, uncertainty and certainty, and further designed as the underlying principles for invoking ratios for financial analysis. The computation of the Acid test ratio and other forms of ratios using Payables and Receivables values are used to ascertain the certainty of an entity's worth. How does an entity decide if it's Payables' and Receivables' have enough number of days to settle payments of debts and credits? This settles the theory on liquidation when taking strategic financial decisions which are not reversible and can lead to takeovers, mergers and acquisitions. In acknowledging the underlying theories, behavioural tendencies through stratification are used to reduce the complexity in research methodology.

The different types of risks identified from the stand-alone risk further developed as the total-risks of the project are acknowledge. There are the market risks and the corporate risks developed to interpret as the total-risks of the firm for a project.

2.2 Historical Thinking on Capital Budgeting With Risks

Gupta (1996, p.385) indicates that, 'the whole edifice of the discipline of capital budgeting decisions is built on Knights' three way classification of a decision making environment – certainty, risk and uncertainty'. The meaning is that capital budgeting decisions are noted to be long-lived investment decisions that should be systematically and carefully analyzed, since it involves huge cash flow decisions. The concept discussed is from the understanding of the economists Frank Hyneman Knight of the early 20th century. Knight (1921) proposes 'risks' as 'known chance, or measurable probability' and 'uncertainty' as 'unmeasurable probability, or indeterminable chance' Rakow (2010, p.458), and craft the distinction between the concepts which psychologists and economists acknowledge as an important contribution to the disciplines. Through history, the thinking of Knight (1921) has passed through a lot of review of probability and mathematical models, as seen in the 'subjective probability' (Ramsey, 1926/1913; Savage, 1954), Rakow (2010, p.462) and that of the 'Brunswikian' framework… (Brunswik, 1943, 1952; Cooksey, 1996, Hammond & Stewart, 2001)' as it considers the 'cognitive judgments'. These and other thinking on Knight's (1921) theory discusses risks and uncertainty. Theorists like Loewenstein (1992) claims that Knight's (1921) concept of risk, uncertainty and profits will not be addressed as the only psychology and economics theory existing between the 19th and early 20th centuries. However, Knight (1921) in managing uncertainty to the fuzzy investment environments poised these four areas in reducing uncertainty being; Combine uncertainties through large-scale organizations; Increase control of the situation; Slow the march of progress; and Increase knowledge.

Further analyzing, the increase in knowledge 'is the most promising pathway since it creates a preferred network of sophisticated investors that differentiates rather than conflates risk and uncertainty' Boyko and Negus (2006, p.2). Furthermore, the historical design of the subject matter according to researchers noted is not even recorded. The pre-ancient Babylonians era, and the noted Stone Age period has a feel of risks and uncertainty, but the computation's analyses is not known. However, the use of pictorial tablets of clay was ascertained in recording economic transactions. About 3200 B.C. lived in the Tigris-Euphrates valley, the Asipu group, identified as consultants for risks, uncertainty and decisions difficult to handle. They identify the problem to issues with alternative outcomes by taking data for their analysis for signs of success or failure. It is noted by Grier (1985) that the Asipu practices can be attested as the first recorded 'simplified form of risk analysis' Covello and Mumpower (1999, p.31). Their style was of faulty prediction, a form of divination, as they read the signs of the gods, and as such they were not using any probability theorem or other to compute outcome for decisions made.

Also, in 1796 B. C. in ancient Mesopotamia, the activities of the Merchants of Ur in giving out loans became a difficult task, when payments not received. This was as a result, during the reign of King Rim-Sin who issued out a royal edict making all loans to become null and void, thereby risks and the certainty of the Merchants exploded. This issue therefore called for higher margin of interest on loans granted to mitigate against the unforeseen. This happened in the 1788 B. C., therefore through to the current era shows that analysis and formats for assessment of risks date as far back to ancient history. Bernstein (1995) acknowledges that great thinkers and philosophers, Galileo in 1630 wrote an essay on the playing of dice which have a contribution to mathematical probabilities as a concept. Also, Aristotle in politics devises a concept of buying and selling between parties on options. Parties have pre-agreed prices for the

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[5] See Encycogov 'Encyclopedia of Corporate Governance, Table: Definitions – Certainty, risk, and uncertainty at http://e.viaminvest.com/A2MonitorSystems/Table1RiskConcepts.asp (online).

buying with degrees of risks under-tone. From these discussions that, Kahneman commented that, 'Moreover, I very much doubt that familiarity with the classics really helps people develop "new" hypotheses. Amos and I often noted that our grandmothers knew most of what we discovered and published - …' Rakow (2010, p.464), as an expression that the concepts were fine-tuned as the years developed.

In assessing the 1967 Apollo Flight risk in terms of what transpired to the Aerospace and the Nuclear Power, reports for mitigating against such risks were avoided, until the National Research Council in 1994 landmark study and 2003 National Academy of Science report did the work. It, therefore, realized that, the capital budgeting decisions into the Apollo Flight, had lesser strategic risk analysis to the uncertainty. The conclusion is, 'the amateurism and short sightedness displayed during Hurricane Katrina, and still evident in the aftermath, might suggest that 5,000 years of civilization have taught us nothing about risk' Cooke (2009, p.9).

3.0 RESEARCH METHODOLOGY

This segment 'describes methodology as the framework which is associated with a particular set of paradigmatic assumptions that we will use to conduct our research', O'Leary (2004, p.85). It is in cognizance with this 'paradigmatic assumptions' or models that the chapter considers the aims, research design, ethical considerations and research methods. These outcomes facilitate in conducting our research, which relates to the literature review, giving appropriate answers to the problem statement in assessing capital budgeting with risks, uncertainty and certainty models of the sector. Therefore, in appreciating the framework, the concepts are presented.

3.1 Aims

The requisite aims of the study are, Using primary, secondary and tertiary sources of data collection for the study's research methods. Employing the quantitative and qualitative techniques and as mixed research methods. Ensure the use of an appropriate sampling method that will give a fair representation of the sample size and for achieving the Hypothesis with statistical computation results. Ensure that the ethical consideration will prove a justified academic study. The adopted aims give the directional guide for the study, 'an activity that involves finding out, in a more or less systematic way, things you did not know' Walliman & Walliman (2011, p.7), not diverting from the clear roadmap.

Therefore, the intention has been quite clear with the adoption of the research project components as derived from Parasuraman et al. (2004) for the research design being; Research purpose, Data needs, Data sources, Data collection form, Sample, Data collection, Data analysis, Inferences/Recommendations. These intentions to a larger extent have defined the study of Smith's (2003) five principles of research ethics for the ethical consideration being; discuss intellectual property frankly, be conscious of multiple roles, follow informed-consent rules, respect confidentiality and privacy, and tap into ethics resources. In a nutshell, the aims as discussed form the basis of the study.

3.2 Research Design

The comprehensive information regarding the research design derived is from Blaxter et al. (2006, p.63) as indicated by the 'Research families, approaches and techniques'[6] and presented in a tabular format.

Table 3-3.2. Actions from Research families, approaches and techniques.

Research families	Action for study
• Quantitative or Qualitative • Deskwork or Fieldwork	The study uses these outcomes. The aims of the methods are clear with the Deskwork and Fieldwork for deriving primary, secondary and tertiary data, with the qualitative data analyzed into quantitative for the data analysis.
Research approaches • Action Research • Case Studies • Experiments • Surveys	**Action for study** The study uses the Action Research from the understanding that, 'it aims to improve educational practices' Blaxter et al. (2006, pp.67-68). Also, Surveys as 'systematic observation or systematic interviewing', noted by Sapsford

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[6] See Blaxter et al. (2006, p.63), Box 3.3, 'Research families, approaches and techniques' and further analysis ensuing.

	(1999, pp.4-5), Blaxter et al. (2006, pp.76-77), which presents questions the 'research wants answered' and concerning the range of answers the interviews derived it.
Research techniques • Documents • Interviews • Observations • Questionnaire	**Action for study** The study uses all the four techniques that are the required techniques for the outcome, from the research families, and the selected facts from the research approach.

The underlying principles of Malhotra and Birks (2000, p.75) in deriving research design into exploratory and conclusive research are the driving force for the study, and this understanding is achieved by Parasuraman et al. (2004) when discussing the ensued aims.

3.3 Ethical Considerations

The consideration is the guiding policing of the study not derailing from academic standards, and must as such conform to such required standards of ethical considerations recommended by academicians. In deriving the right primary, secondary and tertiary data, it must be acknowledged to the rightful source of referencing. One of the aims of the study is to 'ensure that the ethical consideration will prove a justified academic study'. This purpose, therefore, referred to Smith's (2003) 'five principles for research ethics', and matched to Bryman and Bell's (2007) 'ten principles of ethical consideration' derived as being; 'Research participants should not be subjected to harm in any ways whatsoever. Respect for the dignity of research participants should be prioritized. Full consent should be obtained from the participants prior to the study. The protection of the privacy of research participants has to be ensured. Adequate level of confidentiality of the research data should be ensured. Anonymity of individuals and organizations participating in the research has to be ensured. Any deception or exaggeration about the aims and objectives of the research must be avoided. Affiliation in any forms, sources of funding, as well as any possible conflicts of interests have to be declared. Any type of communication in relation to the research should be done with honesty and transparency. Any type of misleading informing, as well as representation of primary data finding in a biased way must be avoided.' The study strictly conforms to Bryman and Bell's (2007) and Smith's (2003) principles as enumerated, with the University's letter of consent to the Candidate's work for various organizations for sourcing of primary and secondary data for the study. The guiding principle for the study is the tone of the University's letter[7], of which directly gives a caution on ethics to the Candidate.

The ethical consideration on the part of the researcher has been spelled out, and the study conforms to the laid down rules of which some of them are, confidentiality of the research data and for its purpose, avoidance of deception and exaggeration, and the avoidance of misleading information or data collected. Furthermore, the organizations in the sector and the participants of the research study are accorded the maximum respect and dignity, and as the discussion ensues, the protection of their privacy has been paramount. In a nutshell, the ethics criteria used for the study, and the underlying guidance for achieving its success for the results are the discussed principles.

3.4 Research Methods

In deriving the concept for the research methods that the samples, results, questionnaires and interviews for the study are derived from the research design's understanding of Blaxter et al. (2006, p.63), 'Research families, approaches and techniques'. In appreciating the research methods as reviewed, 'the term method can be understood to relate principally to the tools of data collection or analysis: techniques such as questionnaires and interviews' Blaxter et al. (2006, p.58).

3.4.1 Samples

The study indicates that 'a sample is some portion of a population, because many populations of interest are too large to work with directly, techniques of statistical sampling have been devised to obtain samples taken from larger populations' Proctor (2003, p.100). The 'techniques of statistical sampling' are numerous, grouped into probability and non-probability sampling methods. In respect of the popular probability sampling methods are the stratification, random and systematic sampling methods. Also, the non-probability sampling methods are Quota, Convenience, and Judgment sampling methods. The study used the stratification that divided the entire population

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[7] See Appendix 3 for the University's letter of consent

into different strata, and it is noted that the strata were not to overlap to win the confidence of probability sampling. It then randomly selected the outcome proportionately from the strata in achieving the final sample size. An encouraging targeted population size and random probability processes the study used is derived from Hair et al. (2007, p.171) in a tabular format for 'concept for population outcome' as shown;

Table 4-3.4.1   Concept for Population Outcome

Concepts	Concepts Outcome
Defining the target population	Targeted Population Size of 300
Choosing the sampling frame	Managers, Supervisors, Direct Reports
Determining the sampling size	Usage of a sampling fraction (½) in deriving a size of 150
Selecting the sampling method	Methods and techniques of qualitative and quantitative for analyses from survey questionnaires and interviews.

In view of the discussion above, there is an achieved minimal reduction of sampling error from the targeted population size computed.

3.4.2 Results

In deriving results, errors and biases from sampling and data collection are intended to be handled efficiently and effectively from the research methods and designs adapted. The achieved results are based on the survey questionnaires and interviews granted from the sample size comprising of sampling frame of Managers, Supervisors, and Direct Reports. In analyzing the data in quantitative measures, numerical counts of received questionnaires are manually done. Likewise, with the interviews and questionnaires of qualitative nature, they are computed for Likert scales to achieve quantitative outcomes for their counting. Furthermore, frequency tables are derived with computed percentages for expressing the data as information representing the proportion of the whole study. The computed percentages are rounded to two decimal places for easy analysis, and also for avoiding errors and concealing of factual differences.

In deriving the hypothesis, the chi-square test statistics is computed, and to a larger extent provides an achieved result of not significant. It is ascertained that the data gathered is not sufficiently persuasive enough for preferring the alternative to the null hypothesis. Therefore, the study shows the failure in rejecting the null hypothesis, in that there is no relationship between threats and capital projects. However, the level of appreciating the concepts of risks and uncertainty skews the data for the analysis. There is the assessing of risks, uncertainty and certainty computation from the study's case stratified for capital budgeting decisions. The result indicates that markup is a crucial rule when taking project's valuable decisions, where, wicked problems of uncertainties can become tamed problems derived from the appreciation of the acronym, 'PESTLE'. Therefore, the results of the study derive the discovery, and deduced as the achieved results with requisite functions and computations for further studies on risks, uncertainty and certainty in the sector.

3.4.3 Questionnaires

In considering the research techniques derived by Blaxter et al. (2006, p.63), survey questionnaires have been used to source for primary data, and Punch (2005, p.240) considers that 'the question 'quantitative or qualitative?' is commonly asked, especially by beginning researchers. Often, they are putting the 'methods cart' before the 'content horse'. The best advice in those cases is to step back from questions of method [and tools], and give further consideration to the purposes and research questions, bearing in mind that the way questions are asked influences what needs to be done to answer them' Blaxter et al. (2006, pp.79-80). The problem statement is the heart of the study and the questions derived have the basis for these considerations. The idea is to unearth the subject matter of risks, uncertainty and certainty models used by the sector in Ghana on the topic capital budgeting, with questions for requisite answers, which have been further analyzed as the study's findings and recommendations.

Also, in drawing the questionnaires, it is ascertained that 'grouping questions that are similar will make the questionnaire easier to complete, and the respondent will feel more comfortable' Walonick (2010, p.245), and based on this understanding that the questionnaires are drawn, consisting of four sections with 11 questions. Section A comprises of three questions on Demographic Data of Respondent, the Section B of 2 questionnaires examining the 'Existence of Risks and Uncertainties Model in Capital Projects, Section C, 2 questions on the 'Importance of Risks and Uncertainties Systems in Capital Projects', for investment assessment analysis. Finally is the Section D, also

comprising of 4 questions, on 'Risks and Uncertainties Assessment Systems and Decision Making', for decisions analysis. A considered survey questionnaire is provided as Appendix I.

3.4.4 Interviews

The interviews granted are asking questions with the requisite answers, generating further questions for consideration and observation of events as discussions ensue. The survey questionnaires are the same questions for answers, but since it is in the form of a conversation, the consideration of answers resulting in in-depth understanding of issues limited the type of questions that needs much attention for consideration, with 7 interview questions. Walonick (2010, p.245) indicates that 'the order of the questions can affect the way people respond', is a guiding principle for the interview, since the aims of the study need to be achieved with problem statements being an underlying factor. The ethical consideration of Smith's (2003) 'five principles for research ethics', and that of Bryman and Bell's (2007) 'ten principles of ethical consideration' are directing the study to respect the privacy of respondents'. The data gathered, and honesty with other critical values for deriving the interview is important. Also, the researcher's guide is not to restrict the interview with broader financial 'jargons' and techniques, but the sufficient responses achieved through simple but important questions of note gives the quality outcome, for the recommendation. In achieving the required outcome, the eight considerations of Blaxter et al. (2006, pp.80-87) are also a guide to the interview being; 'What do you need or want to find out? What skills do you have? Will your methodological preferences answer your questions? How will your methods affect the answer you get? How will you affect your research? Which methods are acceptable? Using more than one method. Allowing for changes of direction.' The considered survey questionnaire provided is Appendix I and that of Appendix II is for the interviews.

4.0 DATA ANALYSIS

The data collected on risks, uncertainty and certainty models is analyzed with various statistical computation and functions derived for assessing capital budgeting of the sector.

4.1 Data and Information Description

The study uses both quantitative and qualitative techniques from the survey and interview questions in arriving at precise data in analyzing the requisite information in making a meaning. The study uses statistical tools in achieving the required results from frequency tables. These are presented graphically with cone and pyramid charts among others. These statistical computations use other methods in deriving the chi-square test statistics, p-values and degree of freedom in arriving at statistical decisions for the conclusion of the hypothesis result computed. Therefore, the results achieved, are interpreted from the frequency tables, charts, and statistical computations derived. The statistical test values derived are from the web-page computation tool of Bruce Simmons (online), with Microsoft Excel statistical tool for the results, also recommended for academic use. The calculation to a larger extent devoid of errors and biases rounded is to two decimal places, with numerical counts manually done. With qualitative Likert scale questionnaires, they are given the requisite values coded, and computed quantitatively for data analysis.

4.1.1 Data Determinants – NPV and IRR

The sectors' case study stratified data is from the Electricity Company's 2011 Approved Budget and, that of the notes on risks captured from the Audited Financial Statement for the year 2009. The assumptions to the extracted data are from the year 2009 Financial Statement notes from pages 27 to 28 as indicated;

- (ii) IDA 2467, the sector given the number of years (15years) to complete the payment at a required interest rate (7.5%).
- The Budget assumptions also used the interest rate of 10%.

The result from the determinants of the NPV and IRR, with the Microsoft Excel format, is developed as;

Table 5-4.1.1   Extracts from 2011 Budgeted Annual Cash Flow, (Appendix 5)

	Amount (GH¢)
External Cash Receipts (Funding):	
World Bank (GEDAP)	140,112,417.42
Capital Expenditure:	
Distribution/Development Projects	8,850,270.00
Sub-transmission Projects	57,821,359.92
Prepayment Metering-Ashanti	24,698,520.00
Rural Projects (Intensification + Grid Ext.)	43,332,000.00

Building and Civil Works	4,410,267.50
ICT Development	1,000,000.00
Capital Expenditure Total	140,112,417.42
Derived Capital Expenditure Total (less) ICT Development	**139,112,417.42**
interest rate (r)	10%
number of years (n)	15

In analyzing risks and uncertainty from the cash flow extracts, the ICT Development value is taken out to compute the reality of the project, all things being equal.

Table 6-4.1.1   Determination with NPV and IRR from Extracts of 2011 Budgeted Annual Cash Flow

	Amount (GH¢)
cash inflow (initial inflow)	140,112,417.42
discounting valuation	127,374,924.93
add: cash outflow (initial investment)	-139,112,417.42
NPV	-11,737,492.49
IRR	9%

Therefore, the decision rule states that, the project does not appear well with any best method, rather a negative NPV value, and its IRR is less than the cost of capital.
The decision rule does not favour the owners' worth maximization.

4.1.2 Data Determinants – Emerging Concept
        The determination from the functional formula, marks-up the risks and uncertainty to conclude the certainty. The final factor is that the business-minded concept of the sector stratified is technically determined. Where risk measured signifies the expected value of an undesirable outcome concludes, from the combination of the probabilities of the various possible events into a single-value of markup determinant. The Microsoft Excel computation determines as;

Table 7-4.1.2   Determination with NPV and IRR from Extracts of 2011 Budgeted Annual Cash Flow

cash inflow (initial inflow)	140,112,417.42
discounting valuation	127,374,924.93
add: cash outflow (initial investment)	-139,112,421.60
NPV	-11,737,496.67
IRR	9%

        Therefore, the decision rule states that, the project does not appear with any best method, but of a negative NPV value, and its IRR is less than the cost of capital. The decision rule does not favour the owners' worth maximization. The markup rule given is on the cash outflow (initial investment), of which satisfy the concept though realized with a lesser impact, but a significant tool in assessing uncertainty. The hypothesis result has a conclusive outcome to the emerging concept, reviewing the NPV and IRR results in determining profitability. There is no doubtful effect to ascertain that the sector do not suffer threat, developed as risks and uncertainty. In effect though, the study shows the failure in rejecting the null hypothesis, interviews drawn concludes the indicators. Therefore, the time value of money for the sector, assessing with risks and uncertainties are markup to determine valuable expected cash flow from wicked to tamed problems.

4.2 Context of Research Sites
        The first point of call was the HR department with the mission of the study given. Then, a photocopy is made from the shown original letter of introduction from the University to the HR Manager, for the organization's file. The HR departments at this point had some clearance from other Managers and, then directed the study to the Accounts and Engineering departments since it involved capital projects and cost estimates. The limiting factor was busy working schedules, meetings and submission of reports.

However, the planned interview was scheduled for 40population as the sample size, but 17population was carried out representing a 43% for the Managers, Supervisors, and Direct Reports, constituting 100% total responses for the interview. Also, the survey questionnaires of a sample size of 150population achieved 106population responses of 71% that constituted 100% total response rate for the survey questionnaires achieved. Therefore, the tables and charts give a presentation of the results from the response pattern of the Managers, Supervisors and Direct Reports achieved.

Table 1 Response Pattern – Survey questionnaires

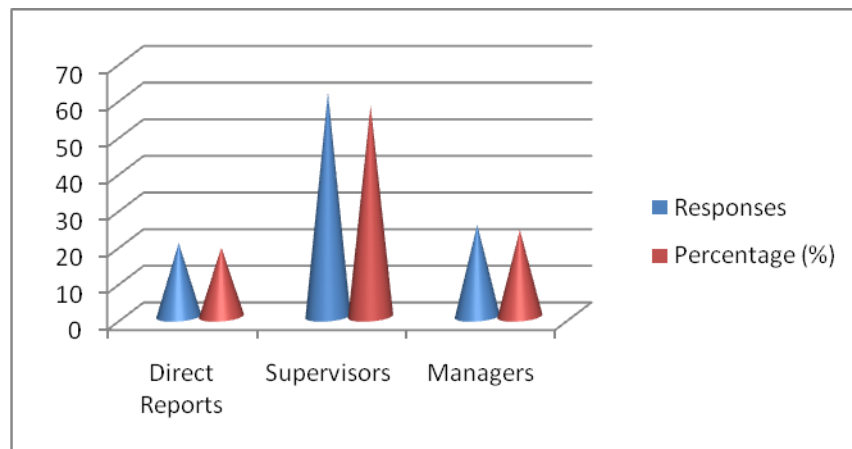| Respondents	Responses	Percentage (%)
Direct Reports	20	18.87
Supervisors	61	57.55
Managers	25	23.58
n=	**106**	**100**

Figure 1 Analysis of Response Pattern – Survey questionnaires

Table 2 Response Pattern – Interviews

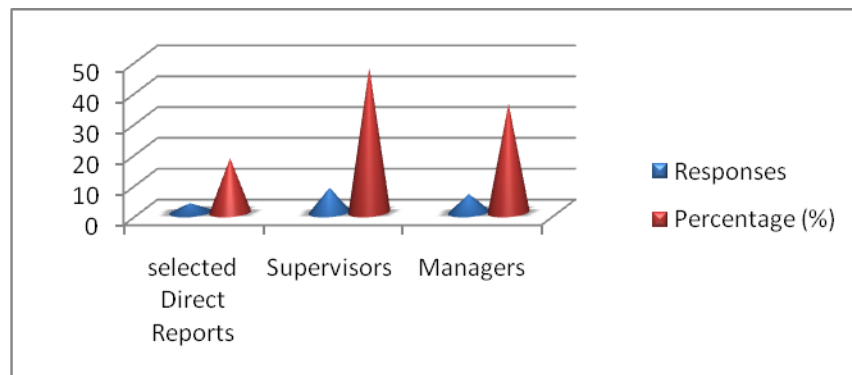| Respondents	Responses	Percentage (%)
selected Direct Reports	3	17.65
Supervisors	8	47.06
Managers	6	35.29
n=	**17**	**100**

Figure 2 Analysis of Response Pattern – Interviews

4.3 Analysis of the Questionnaires

The survey questionnaires derived were from the samples given, with the probability method of stratification derived as the tool for achieving the total responses from the strata ascertained. Therefore, from this method, the statistical and financial appreciation results in the analysis are drawn.

4.3.1 Demographic Data of Respondents Analysis

The role in decision making of respondents analyzed is with a table and pictorially as follows;

Table 3 Decision-making role

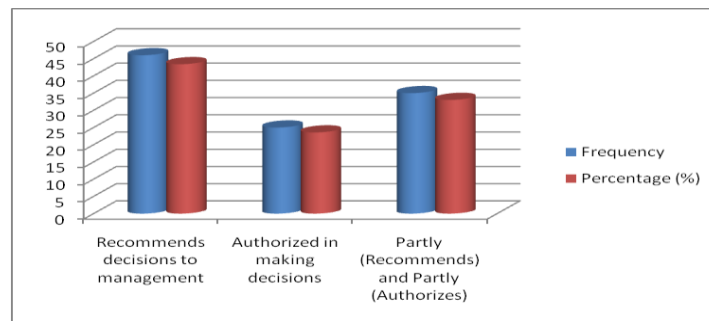| Activity	Frequency	Percentage (%)
Recommends decisions to management	46	43.40
Authorized in making decisions	25	23.58
Partly (Recommends) and Partly (Authorizes)	35	33.02
n=	**106**	**100**

Figure 3 Analysis of Decision-making role

The result of respondents of 43.40% shows that the demography of respondents for the survey, 'recommends decisions to management'. The 33.02% also 'partly (recommends) and partly (authorizes)' for decision-making processes, an indicator from Direct Reports and Supervisors roles in decision making to Managers, a few who authorizes in making decisions.

4.3.2 Existence of Risks and Uncertainties Model in Capital Projects

The study intended to ascertain the existence of risk and uncertainties model the sector uses in capital projects' decision making. The results achieved were that, 81.13% shows that the sector has its system of calculating for risks in capital projects, and those with none of 18.87%. The results achieved the answer of the problem statement of whether the sector computes risks. This is as follows;

Table 4 System for capital projects' risks calculation

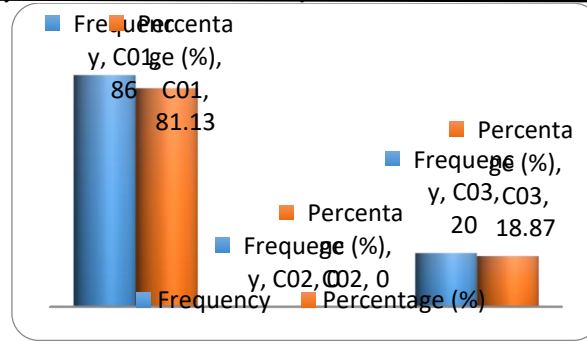| Activity	Coded	Frequency	Percentage (%)
Organization's system of calculation	C01	86	81.13
Recognized Financial Method	C02	-	-
Non	C03	20	18.87
n=		**106**	**100**

Figure 4 Analysis of System for capital projects' risks calculation

4.3.3 Importance of Risks and Uncertainties Systems in Capital Projects

The relevance of the concept of risks and uncertainties systems to the productivity of capital projects of the sector, as the counting reflects respondents chose more than one answer giving a total counting of 300 responses. The analysis results of 48% is, 'it provides a guide for strategic decisions' and this is presented in a chart to show the frequency and pictorial presentation, with an ideology gathered that virtually Managers and Supervisors heed to these higher resultants gained. These are coded to present a simple pictorial presentation as shown.

Table 5 Risks systems relevance to capital project's productivity

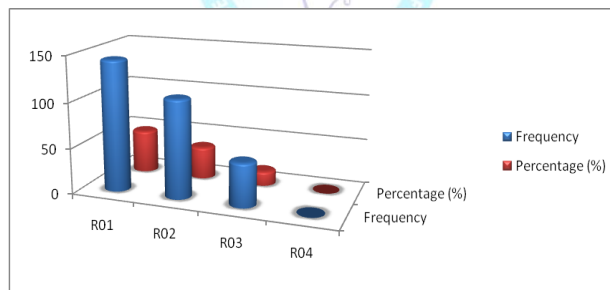| Activity	Coded	Frequency	Percentage (%)
It provides a guide for strategic decisions	R01	144	48.00
It unearths capital projects' weaknesses	R02	108	36.00
It provides for adjustments in Capital Projects	R03	48	16.00
Other(s)	R04	-	-
N^1=		**300**	**100**

Figure 5 Risks systems relevance to capital project's productivity

Also, in rating the risks and uncertainties system as a model for capital projects, the rating is graphically presented, and this decision in rating the 'organizations' model' for computing risk of 35.85% gives a discovery and a recommendation for academicians as this result also answers the problem statement. The charts and tables for the 5 point Likert scale rating from one (1) lowest to five (5) the highest for rating the organizations' risk and uncertainty systems in capital projects gives a NIL figure for a Recognized Financial Model.

Table 6 Rating risks and uncertainty systems in Capital Projects

Financial Model	Coded	Rating Activity	Ratings Frequency/Percentage (%)					
			R1	R2	R3	R4	R5	Total
Organization's system of calculation	R01	Frequency	-	14	-	26	38	**78**
		Percentage (%)	-	13.21	-	24.53	35.85	**73.58**
	R02	Frequency	-	-	-	-	-	**-**

Recognized Financial Method		Percentage (%)	-	-	-	-	-	**-**	
Non	R03	Frequency	-	8	20	-	-	**28**	
		Percentage (%)	-	7.55	18.87	-	-	**26.42**	
		n=						**106**	

4.3.4 Risks and Uncertainties Assessment Systems and Capital Projects Decision Making.
The computation for this section involves analysis from four questions answered as follows;

Table 7 Prevalent Capital Projects

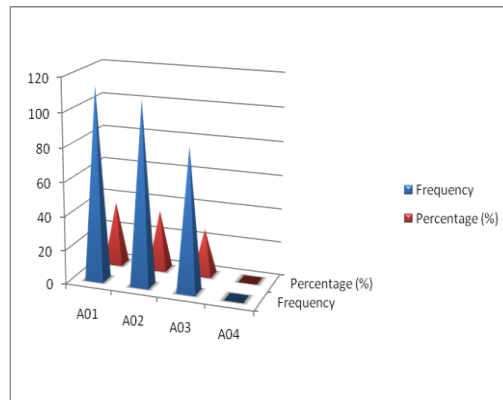| Activity	Coded	Frequency	Percentage (%)
New Projects	A01	114	37.25
Replacement Projects	A02	108	35.29
Expansion Projects	A03	84	27.45
Non	A04	-	-
$N^1=$		**306**	**100**

Figure 7 Analysis of Prevalent Capital Projects

The projects mostly undertaken as reflected shows that New Projects of 37.25% mostly is done. The next is 35.29% for Replacement Projects and Expansion projects 27.45%. The indicator is that technically all the decisions are prevalent in capital projects of the sector from the marginal differences ascertained. The assessment of risks in gaining the result for threat concluded as follows;

Table 8 Identifying threat of risk and uncertainty

Observed	Managers /Senior Supervisors	Supervisors/Direct Reports	Total	Percentage (%)
Threats	36	13	49	46.23
No Threats	13	44	57	53.77
Non	-	-	-	-
n=	**49**	**57**	**106**	

The outcome of the responses shows that capital projects suffer threats of 46.23%, and 53.77% shows that threats do not happen in capital projects. The outcome facilitates in the tests of the hypothesis with a p-value of 1.24. The result shows that levels of positions can skew an outcome.

Table 9 Carrying-out of risks assessment

Assessment	Frequency	Percentage (%)
Yes	92	86.79
No	-	-
Non	14	13.21
n=	**106**	**100**

In intermittently carrying out the risk assessment in capital projects' of the sector, 86.79% signifies this assessment, an important decision in the sector, and indecision of 13.21%.

Table 10 Facilitators of risks assessment exercise

Facilitators	Frequency	Percentage (%)
In-house project team	35	33.02
Projects Department/Section	59	55.66
External Consultants	12	11.32
Other(s)	-	-
n=	**106**	**100**

The study claims, this is the final analysis of knowing the one, who does the risk assessment exercise in the organizations in the sector. The 55.66% informs that 'Projects Department/Section' does it, is greatly rewarded, and also, an 'In-house project team' with 33.02% also signifies the awareness amongst the respondents and with 11.32% of 'External Consultants.'

4.3.5 Test of Values - Hypothesis
The survey gave an analysis with the number of respondents of 106 as 100% for Managers, Supervisors, and Direct Reports, and from the table 8 'Identifying threat of risk and uncertainty' we concluded with the hypothesis. The Hypothesis was as follows;

N_o = the 'expected value' of the sector do not suffer threat.
N_1 = the 'expected value' of the sector do suffer threat.

In testing the results from the computation for the analysis, the Microsoft Excel Statistical tool for chi-square, developed by Simmons (online) is the tool used for the data analysis.
The results indicate that the study fails to reject the null hypothesis, pointing out that the 'sector do not suffer threat' in their capital projects valuation. The results are;
- Chi-square test statistic = 27.21
- Alpha = 0.05
- Degree of freedom (df) = 2
- P-value = 1.24

The sample results show that it is not significant at the alpha of 0.05, the conventionally accepted significance level where $p > 0.05$ with the p-value of 1.24 at the (df) of 2.

The data provided concludes evidence that respondent responses to survey questionnaires skewed to observations and interviews granted. The computation is at Appendix 4.

4.4 Conclusions from Questionnaires
The questions vividly assessed risks and uncertainties systems in capital projects with requisite answers that form the basis for concluding hypotheses drawn. Graphical and frequency tables gave an outcome from the demographic data responses in decision making, the Existence of risks and uncertainties models in capital projects classified, The text derives these discussions;
- Importance of risks and uncertainties systems in capital projects ascertained with requisite results,
- The risks and uncertainties assessment systems for capital projects decision making, and
- Then the outcome of data analysis which concluded for the hypothesis.

In conclusion, it can be ascertained that the sector uses its' risks and uncertainty model for calculation in capital projects.

4.5 Analysis of the Interviews
The interviews granted are analyzed with requisite graphical presentation and statistical tables indicating the frequency percentages. The counting was manually done, with the qualitative techniques coded for a meaningful quantitative outcome. The outcome indicated that the use of the survey questionnaires facilitated, in the choice of answers since the survey questionnaires and the interview questions used were for the segment.

4.5.1 Existence, Measuring and Relevance of Risks and Uncertainties in Capital Budgeting
The analysis is as indicated;

Table 11 Understanding and Differences in Risks and Uncertainty

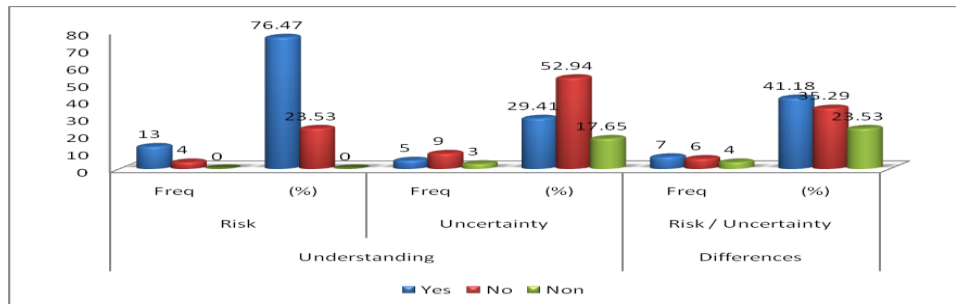| Activity	Understanding				Differences	
	Risk		Uncertainty		Risk/ Uncertainty	
	Freq	(%)	Freq	(%)	Freq	(%)
Yes	13	76.47	5	29.41	7	41.18
No	4	23.53	9	52.94	6	35.29
Non	-	-	3	17.65	4	23.53
n =	**17**	**100**	**17**	**100**	**17**	**100**

Figure 11 Analyses of Understanding and Differences in Risks and Uncertainty

The pictorial presentation for the understanding of risk and uncertainty indicated is with the meaning solely shown as the risk. This result reflects the varying differences between the two concepts, with 'Yes' having 41.18% to the others respectively of 'No' and 'Non' being 35.29% and 23.53%. A summation of these two outcomes shows that the concept of uncertainty is not known. Also, in measuring and understanding the systems of risks and uncertainties computation in decision making for the sector, some concluding discussions ensued. The discussions follow as;

- Threats in capital projects had results as;
  - Litigation on lands
  - Government of Ghana (GOG) delay in Funding
  - Pressure Groups / Political influences on projects
- Measuring risks and uncertainties;
  - Each Department/Section submits proposal
  - Budget Officers factor an Inflationary Rate on the proposed value to arrive at the final Budgeted Cost of the project.

From these discussions, it is envisaged that the sector does not use any financial model for computing risks.

4.6 Conclusions from Interviews
The interviews conducted gathered both survey questionnaires and interview questions for making an informed data analysis. The study ascertains that the understanding of risks is appreciated, but aligning it to uncertainties is a theory not known. Therefore, there is no difference between risk and uncertainty in the sector, as Frank Knight (1921) proposes a distinction between risks and uncertainty. In assessing identified threats in capital

projects, suggestions and observations made were classified under factors identified as Social, Economic and Political concerns.

Furthermore, inflationary rates the sector proposes were the factors used in computing the results for proposals in capital projects' estimates. In a nutshell, the interviews gathered shows that, the sector needs training on the use of recognized financial models for measuring risks and uncertainties.

5.0 EVALUATION OF THE RESEARCH

The evaluation of the study on 'assessing capital budgeting with risks, uncertainty and certainty models for the sector in Ghana' concluded in answering the problem statements through survey questionnaires and interviews. The achieved results reflected in the data analyses through charts and tables, with computation drawn for the hypothesis.

5.1 Summary

The study assesses capital budgeting derived by Fabozzi and Peterson (2003, p.358) as the concept of substantial financial investments in long-lived assets, with risk, uncertainty and certainty models in the sector in Ghana. The risk-adjusted discount rate model adjusts the risk of the discount rate, in coming out with the estimated value of the uncertain cash flows, purported to be the certainty. Therefore, the certainty-equivalent approach coefficient model is also an appropriate tool for the computation of the assessment of risk in capital projects. The problems that engulf the study from the problem statement are;

i.   Assessing cash flows in the sector with risks, uncertainty and certainty models.
ii. The use of essential functions and models specific for computing risk-free investment decisions in the sector.
iii. The required manpower with the necessary appreciation of the financial management functions and models for the risks assessment.
iv. The type of capital project activity of Replacement and or Expansion has some risk and uncertainty attacks, which results in the value of the future cash flows.

In addressing these issues that survey questionnaires, interviews and observations are undertaken in drawing a concluding data for analysis. However, the study had a sample size derived from stratification with the necessary computation to win the confidence of probability sampling.

The data analyses identified are;

a.   The demographic data of respondents gives the role the respondents take in decision making. The responses skew to a proportion of the population adopted in respect of Managers, Supervisors, and Direct Reports. In giving the outcome, recommending decisions had the highest, followed by partly recommending and partly authorizing, and finally authorizing the lowest.
b.   Also, the existence of risks and uncertainties model in capital budgeting concluded emphatically that the sector has its derived system in calculating for risks in capital projects. The result had the answer to the problem statement indicating that the sector computes risk.
c.   More so, the importance of risks and uncertainties systems to productivity of capital projects in the sector concludes as follows;
   - It provides a guide for strategic decisions with the highest score, followed by
   - It unearth capital projects' weaknesses, and finally
   - It provides for adjustments in capital projects.
d.   The risks and uncertainties assessment systems and capital projects decision-making derive four analyses with the analysis for the hypothesis gathered on identifying the threat of risk and uncertainty.

The analysis inferred from Managers/Senior Supervisors and Supervisors/Direct Reports on their responses on threatening indicators, and no threatening indicators. The results computed with chi-square tests statistics gives a $p > 0.05$ of 1.24, and the degree of freedom (df) of 2. The results fail to reject the null hypothesis, as it is not significant at the alpha of 0.05. These identified findings and discoveries from the study are the recommendations and, notable concerns for further study and research.

5.2 Findings and Discoveries

The findings and discoveries are from the research questions of the study, facilitated by the survey questionnaires and interviews indicated as;

Can risks, uncertainty, and certainty models be used to assess the cash flows of the sector in Ghana? A guiding theory gathered on this question is Knight's (1921) distinction between risk and uncertainty. However, Dwyer and

Minnegal (2006, pp.2-3) held an opposing view to the theory. From the data analysis on interviews, table 11 – Understanding and Differences in risks and uncertainty, the results indicated that, the understanding of risk for Yes is 76.47%, No is 23.53%, and Non is NIL. The understanding of uncertainty for Yes is 29.41% and a No and None respectively of 52.94% and 17.65%. For the study finding out if there were any differences or distinction between the two concepts of risk and uncertainty gives a Yes of 41.18%, No of 35.29% and none of 23.53%. The result is also with a graphical representation presented. The final answer shows that the theory of uncertainty is not popular to risks with the sector. However, the theory of uncertainty is unpopular, and table 9 – Carrying out of risks assessment gives a Yes of 86.79%, a No of NIL and None being 13.21%. A further address is given in table 10 - Facilitators of risks assessment exercise, showing that the assessment done is by the Projects Department/Section of 55.66%, the In-house project team of 33.02%, the External Consultants of 11.32% and other (s) with no result. The findings from these results answer the question put forth.

What are the signals or indicators that show that an investment decision is risk-free? The signals that indicate issues in investment ascertained is from the interviews analysis, where threats realized are at project sites. The calculation as an indicator for risk-free investments for decision making is unrealized.

How are risk and uncertainty measured in long-term projects of the sector in Ghana? In carrying out risks assessment from table 9 - Carrying out of risks assessment, it is an indicator that assessments are done with results ascertained. Regarding measurement, the table 4 - System for capital projects' risks calculation, answers with 43.40% representing organization's system of calculation, 23.58% for recognized financial methods and 33.02% for none. The underlying factor is that, capital projects measured are with the organizations' system of calculation, and from the interviews granted the Departments/Sections submit their proposals to the Budgeting Officers, whom also factor on the values an inflationary rate on the proposed figures to arrive at the composite figures for their capital projects.

Does the expected value of the sector in Ghana suffer the threat of risks and uncertainty? From the granted interviews, litigation on lands sited for projects, pressure groups/political influences on projects and Government of Ghana (GOG) delays in funds results as some of the threats to capital projects. The table 8 - Identifying threat of risk and uncertainty, indicated from responses to a total envisaged threat of 49 frequency points representing a 46.23%, comprising of Managers/Senior Supervisors with 36 frequency points, and Supervisors/Direct Reports of 13 frequency points. In envisaging No threats with a total of 57 frequency points representing 53.77%, comprises of Managers/Senior Supervisors with 6 frequency points, and Supervisors/Direct Reports of 51 frequency points. The outcome of the responses shows that the expected value of the sector does not suffer the threat of risks and uncertainty, from a statistical computation of $p > 0.05$ of 1.24, with a (df) of 2 showing that it is not significant at an alpha of the 0.05. However, interviews and observations to a larger extent indicate the study's result as failing to reject the null hypothesis has some challenges. The discovery for the study is the hypothesis statistical result computed with chi-square tests statistics from the table 8. The results facilitate in recommending financial appreciation for the human capital in the sector involved in capital projects decision making. The importance is that substantial cash outlays ensue, and, therefore, the requisite strategic decisions needed are for the investors' return on their investments.

5.3 Limitations
There are some limitations in the study being;

The sector's human capital for capital projects' appreciation and understanding, from the concept of capital budgeting with risk and uncertainty models, is an issue. The granting of some of the interviews posed a problem since questions for answers had to be re-scheduled on several meeting times. The results of the study reflect in the data analysis and the hypothesis computation.

Also, the property of the sector being given out for academic exercise from an observation was a difficult task. The gathered information is investigative journalists, posing as students on industrial training sources for information from the sector, in revealing shortfalls in the sector. Thereby, their best way in handling students is the non-readiness and non-co-operation from officials in the sector.

There is a frustrating bureaucracy system in gathering primary data. The Managers and Supervisors are always busily attending meetings. The few Direct reports also show reluctances when served with survey questionnaires.

However, the primary issue is the concept of capital budgeting with assessing models of risks, uncertainty and certainty to non-financial management appreciation group, and which has reflected as a recommendation from the state of the realized findings and discoveries.

5.4 Recommendations

From Petty et al. (2006, pp.301-302)[8] 'four main guiding principles' for selecting capital budgeting criteria are,

a. 'Rely on cash flows rather than accounting profits to measure a project's costs and benefits.
b. Be consistent with the goal of maximizing shareholders' wealth.
c. Allow for the time value of money.
d. Be able to account for the risks of projects'.

Since substantial cash outlays occur in such decisions the study recommends as follows;

i. The sector needs resourcing of human capital that have the knowledge and appreciates financial managements', theories and concepts for capital budgeting strategic decision making. The recommendation will assist in strategic decisions taken, irrespective of the profession of the human capital, Engineering, Surveying and or Accounting.

ii. Identified considerations of risks and uncertainties of corruption, strike actions, exchange rate parity, interest rates fluctuation and inflation have negative effects on capital projects. The ability 'to account for the risks of projects' Petty et al. (2006, p.302) facilitates in the recommended function, in computing the outcome as; c = ((1 + r) ^ - (risk + uncertainties)) ^ where, uncertainties = 'non-financial consideration' being political influences on projects, court actions, litigations, chasing project workers with knives, matches, and arms at project sites/lands. The derived function tends to assist in reducing the spate of capital projects halting half-way due to uncertainty issues. The emerging concept determined is a tool recommended for business-mindedness of the sector.

iii. Standard financial policy and procedure manuals adopted should be in building a solid financial management foundation, right from the Head Quarters and flowing through Regional Offices to District Offices. The standard financial manual will invoke recognized financial models for decision making, and how risks and uncertainties computed for the required healthy returns.

iv. The Petty et al. (2006, pp.370-371) methods for incorporating risk into the required rate of return computation are also recommended as a financial tool to the function model recommended. The method uses the net present value for the risk-adjusted discount rate as:

$$NPV = \sum_{t=1}^{n} \frac{ACF_t}{(1 + [i^*])^t} - IO$$

where, ACF_t = the annual cash flow in period t

IO = the initial cash outlay

i^* = the risk-adjusted discount rate

n = the project's life

The reason is as referred from the text[9], Petty et al. (2006, p.370) for the requisite cash flow computation, and using the table below, Petty et al. (2006, p.371) for the rate-of-return categorization in the formula is;

Table 8-5.4. Projects' purpose/risk class with the pre-assigned discount rate.

Project	Required Rate of Return (%)
Replacement decision	12
Modification or expansion of existing product line	15
Project unrelated to current operation	18
Research and development operations	25

[8] See Petty et al. (2006, pp.301-302), Principles for Selecting Capital Budgeting Criteria – They are the four guiding principles. The text is crucial for further reading to pick the concept.

[9] See Petty et al. (2006, pp.370-371), on required rate of return's risk-adjusted discount rate computation, definitions, and discussions

The recommendations made to a larger extent would change the horizon of doing things haphazardly for professional and academic touch in realized decision making.

5.5 Further Study and Research

In appraising from the study for further study and research areas, the following are considered as;

The assessing of capital budgeting with risks, uncertainty and certainty models of the private sector. It develops as a sector with substantial cash outlays into major capital projects with higher margins of risks, whiles the investor also anticipate higher margin of returns commensuration. The Accenture[10] proposes a project management guide that takes into account various forms of risks monitoring techniques for the investor. In deriving tailor-made concepts for specified private organizations on uncertainties, there is the need for investment guidance. There have been results from incidences in Ghana between years 2012 to 2014 for the Micro Finance organizations folding-up with substantial debts and customers' deposits suffered the fold-ups. The study should be an academic exercise, computing the test of statistics and derive the hypothesis for a concluded discovery for recommendation to, the Central Bank as the regulator for the Banking Industry, and the Association of Ghana Industries as the mouth piece for the private industries.

The evaluation of inactive responsibilities and controls leading to higher rates of risks and uncertainties in public sector organizations' capital projects. Cash outlays from the Government's resources are difficult for distribution for the sector. However, the requisite controls and systems put in place to unforeseen circumstances is also neglected. There have been series of fire outbreaks on Government's properties between years 2013 to 2015, with the Medical Warehouse and abandoned projects with substantial investments left for deteriorating by the weather. The study is appropriate as an academic exercise, the test of statistics and hypothesis have to be done, with a problem statement for required answers on whom the onus falls in mitigating against risks. The standards put in place, are assessed with requisite inferences for a concluded discovery for recommendation the Government's sector for the study, and the organizations' involved for the study's Head Quarters.

Assessing capital budgeting from the project management's models' perspective with risk and investment appraisal models of the public sector. The assessment would discuss the extent of capital projects executed, with their cash outlays, deriving risk and investment appraisal models the project managers would use as project management methodology. The use of sophisticated mathematical models and systems needs the injection into the computation of results. The study needs to be done as an academic exercise by Academicians with their discoveries and recommendations academically computed. The result would add value to academic work, and he result also is to be addressed to the Gtovernment, and if possible published.

5.6 Conclusions

These aims facilitated in achieving the study being;
  i.   Using primary, secondary and tertiary sources of data collection for the research method,
 ii.   Employing the quantitative and qualitative techniques, and deriving them as mixed research methods,
iii.   Ensure the use of an appropriate sampling method that will give a fair representation of the sample size, and for achieving the Hypothesis with computation results,
 iv.   Ensure that the ethical consideration will prove a justified academic study.

These guides taking an informed conclusion from Walliman and Walliman (2011, p.7) concluded the data analysis with counted results as follows;
  i.   The requisite sources of data collected are through survey questionnaires and interviews granted.
 ii.   The use of the mixed quantitative and qualitative methods facilitated in analyzing the data collected.
iii.   The sample size of 150population for the survey questionnaires achieved 106population responses representing 71%, and a 100% for the study.

Also, the interview of the sample size of 40population achieved 17population responses representing 43% for a 100% results for the study. Amongst some of the results for analysis is the Decision making roles, with 43.40% recommending, 33.02% partly recommending and partly authorizing, and the final slot of 23.58% authorizing. The existence of risks and uncertainties model in capital projects shows 43.40% as the response rate by which the organizations use their own mode of calculating risk and a Non-response of 33.02%.

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[10] See Risk Modeling – to Drive Capital Project Performance, topics discussed is, Continuous risk management during project delivery, for risk modeling. Accenture is High-Performance Delivered,

The hypothesis in identifying the threat of risk and uncertainty, gives No threats of 53.77%, Threats of 46.23% and none of no result. The conclusion of this result shows a $p > 0.05$ of 1.24, an analysis of the not significant result. The result shows the failure in rejecting the null hypothesis.

iv. Finally, the ethical consents facilitated in achieving the study with the concluding statistical analysis results. The study to a larger extent has assessed capital budgeting with the necessary risks, uncertainty and certainty models in the sector as resulting trends have shown.

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