Modeling Methodologies in Strategic Management

منهجيات النمذجة في الإدارة الإستراتيجية

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Abstract:

This dissertation starts with looking at different methodologies of strategic management that have been used practically and the ones that have been studied in universities. Moreover, the dissertation looks at Probabilistic Safety Assessment (PSA) methodology that is being used to assess Nuclear power plants safety and simplify complex systems relating all elements of these systems. Also, the dissertation introduces PSA methodology as a strategic plan modeling methodology. Therefore, A partial testing model was constructed using PSA methodology to assess an existing strategic plan in order to find weaknesses and strengths, which allow high-level management to take decision taking into consideration these weaknesses and strengths. Additionally, a comparison between PSA and the traditional modeling methodology used in United Arab Emirates (UAE), which is balance scorecard was done. The comparison was done by comparing different companies' managers' responses regarding the PSA model and the traditional method that is being used in most of the companies in UAE. Results had shown that further studies and simplification could help to develop PSA to suit the strategic plan modeling.

ملخص

تتلخص هذه الأطروحة بدايةً بالبحث في المنهجيات المختلفة المستخدمة عملياً وتلك التي لازالت في طور الدراسة في الجامعات لإدارة الخطط الاستراتيجية.

و من ثم تتطرق للطريقة المستخدمة في تقييم سلامة المحطات النووية والتي يطلق عليها تقييم احتمالية السلامة والهدف منها هو تقييم سلامة المحطات عن طريق تقييم احتمالية الحوادث وذلك بتبسيط الأنظمة المعقدة وربطها ببعضها البعض مما يؤدي إلى توضيح العلاقة بين العناصر المختلفة في هذه الأنظمة .

اعتمادا على ما طرح سابقاً فإن هذه الأطروحة تعرض استخدام طريقة تقييم احتمالية السلامة كطريقة أخرى لنمذجة الخطط الاستراتيجية. وتأكيداً على ذلك، فإنه قد تم تكوين نموذج جزئي لخطة استراتيجية لتوضيح الطريقة التي يمكن لها أن تمثل خطة استراتيجية. بناءاً على ذلك، كانت النتيجة من هذا النموذج هي عرض نقاط القوة ونقاط الضعف في الخطة الاستراتيجية وبالتالي فتح المجال أمام الإدارات لتكوين فكرة عن الخطة وبالتالي تقوية نقاط الضعف والحفاظ علي نقاط القوة وأخذها بعين الاعتبار.

ولإثبات فاعلية هذه الطريقة ومدى تقبل الإدارات لها فإنه قد تم مقارنة طريقة تقييم احتمالية السلامة مع الطريقة التقليدية المستخدمة في دولة الإمارات العربية المتحدة وهي بطاقة موازنة الأداء. وقد تمّت المقارنة عن طريق مقارنة استجابة الإدارات المختلفة تجاه الطريقة الجديدة والطريقة التقليدية وقد أظهرت النتائج أن إجراء المزيد من الدراسات والتبسيط يمكن أن يساعد على تطوير طريقة تقييم احتمالية السلامة لتتناسب مع نمذجة الخطة الاستراتيجية.

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CHAPTER 1 INTRODUCTION

A main issue of strategic management nowadays is the monitoring of the relationships and interdependencies inside and outside the company, as this establishes a complication in the management configuration (Armstrong & Shimizu 2007, p. 963). The answer to this question is in understanding the basic configuration of the organizational and managerial system with all its factors and variables. These factors need to be observed in order to allow the company to find any vulnerability and improve and develop it (Armstrong & Shimizu 2007, p. 963). This involves the interpretation of the some variables (Aguinis, Beaty, Boik, & Pierce 2005, p. 97). In such an effort, this will allow management to take the right decision in improving the company arrangement and the strategic plan (Aguinis et al. 2005, p. 97).

Different configurations of concepts and strategic management increase the complication of finding a suitable modeling methodology for all strategic plans (Boyd, Finkelstein, & Gove 2005, p. 847). Therefore, modeling the applicable configurations, and monitoring the changing variables will make the model an effective tool to asset the strategic plan and help management to take decisions. Moreover, strategic plan model is useful for directing the configuration in such a way that the company turns out to be able to protect its persistence and development (Boyd, Finkelstein, & Gove 2005, p. 847). Therefore, any inactive perception of organization should be restricted. Instead, it should be set to relate configuration and performance as a dynamic arrangement (Armstrong & Shimizu 2007, p. 964). This can be performed, by studying estimated models of the actual organization performance (Armstrong & Shimizu 2007, p. 964).

There are many modeling schools that offer their insights into the ways to improve the company's analytical and strategic abilities (Aguinis et al. 2005, p. 97). This research is mainly performed through a group of practical difference of performance in order to choose

and maintain the most encouraging models that protect an alignment to sustainability (Papageorgiou & Hadjis 2006, p. 1). There are two difficulties in all modeling schools:

- "The problem of validity, that is, the degree of correspondence of the model to the real system"
- "The problem of reducing cognitive overload, that is, holding the variables and steering levers of the model within manageable boundaries" (Papageorgiou & Hadjis 2006, p. 1).

An issue of modeling methodology in strategic management is to introduce complication while modeling the plan; moreover, the results of the model may not be applicable to real life. (Aguinis et al. 2005, p. 97). All issues are of importance, and should be determined for the improvement of a reliable, operative planning methodology (Aguinis et al. 2005, p. 97). Therefore, the present dissertation focuses on the modeling methodology of the strategic management.

Background of the Study

The development of strategic management from the time of its foundation has been remarkable (Boyd, Finkelstein, & Gove 2005, p. 848). From its modest early development as the lacking section of a wide-ranging management course in the curriculum of commercial educational institutions, strategic management is nowadays a recognized field in the learning of trade and companies (Armstrong & Shimizu 2007, p. 965). Throughout a short period, this discipline has experienced significant development in various sides (Boyd, Finkelstein, & Gove 2005, p. 848). While spread of issues and methods is commonly promising, reproducing the effectiveness of the discipline, it is also advisable at this stage to analyze the state of concept and study (Aguinis et al. 2005, p. 97).

Strategic management has usually concentrated on trade conceptions that influence company performance (Aguinis et al. 2005, p. 97). The discipline of strategic management is different in nature. Nevertheless, with the contemporary growth of the resource understanding of the company, it has amplified the importance of companies' inner strong points and flaws in relation to their outside prospects and pressures (Barney 1991, p. 107). Demands for the utilization of qualitative approaches to classify a company's capitals are growing (Armstrong & Shimizu 2007, p. 965).

Academic works by Ansoff (1965) and Andrews (1971) highlighted the feature of commercial understanding, and were mainly involved in classifying and creating the excellence. The objective addressees of their research were executives, and learners aiming to be executives (Ansoff 1965; Andrews 1971). Their primary objective was to convey information to specialists, instead of following the data for methodical development (Ansoff 1965; Andrews 1971).

In contrast, Chandler's (1962) viewpoint in his *Strategy and Structure* is more flexible, even though the research methods utilized are still cautious (Rumelt, Schendel, & Teece 1994, p. 14). The author mainly utilized a systematic method to model a thorough strategy for four big companies (General Motors, Standard Oil of New Jersey (also acknowledged as Exxon), Du Pont, and Sears Roebuck), believed to be illustrative to originate his hypothesis and suggestions (Rumelt, Schendel, & Teece 1994, p. 14). Consequently, contrasting Andrews (1965) and Ansoff (1971), Chandler (1962) endeavored to follow generalizations on the subject of his hypothesis.

Unfortunately, the substantial importance of the case method strategy and absence of generality did not offer the base essential for sustained progression of the discipline (Boyd, Finkelstein, & Gove 2005, p. 849). Therefore, the research in this field was not well recognized by other academic disciplines. The necessity for a robust academic base and

experimental assessments of the concept to allow simplification formed “a swing of the pendulum” (Hoskisson, Hitt, Wan, & Yiu 1999, p. 423). Moreover, the majority of the key academic works observed companies mainly as closed arrangements. Nevertheless, companies, as all administrations, are open arrangements (Aguinis et al. 2005, p. 97). Therefore, an open arrangements method to understand strategy was essential. As a consequence of its proper and progressive improvement, the swing shifted toward the utilization of cost-effective concept to examine strategic management features

Another modeling methodology in strategic management is qualitative comparative analysis. Qualitative comparative analysis employs Boolean algebra and the reasoning of Boolean procedures for execution of all-inclusive assessments (Kogut & Ragin 2006, p. 46). The general characteristics of Boolean are

(a) The utilization of binary statistical information,

(b) Combination of reasoning, for instance, a reasoning that does not observe sources in isolation but constantly in the perspective of the occurrence or deficiency of other causally relevant circumstances,

(c) The claim of Boolean algebra functioning to present this combination of reasoning,

(d) Boolean minimization to decrease these terms of fundamental difficulty (Kogut & Ragin 2006, p. 46).

Thus, the modeling methodology in strategic management remains an issue that requires thorough examination by theorists and managerial practitioners.

Problem Statement

This study is found on the assumption that modeling methodology in strategic management is an essential managerial and business problem. For the reason of the upcoming complexity and diversity of the problems in front of the strategic management academics, the methodologies modeled will similarly reproduce a similar level of complication (Armstrong & Shimizu 2007, p. 965). Subject on the investigation demands under study, the researchers have practiced the utilization of a wide-ranging variety of methodological implements, for example event history analysis, event studies, policy capturing, structural equation modeling, and multi-dimensional scaling (Hoskisson, Hitt, Wan, & Yiu 1999, p. 424). In recent times, innovative methodologies, for instance heterogeneous diffusion models, sample selection models, and network analysis are being modeled in strategic management study (Hoskisson, Hitt, Wan, & Yiu 1999, p. 424).

As pointed out by Hitt, Gimeno, and Hoskisson (1998), different kinds of research methods are to be approved by strategy researchers undertaking different research issues (p. 17). As a result of the challenges modeled by innovative research issues, the researchers expect to observe the modeling of different research methods in the discipline of strategic management (Boyd, Finkelstein, & Gove 2005, p. 849). The research issues and circumstances should direct the selection of the suitable research methods (Aguinis et al. 2005, p. 97).

Therefore, the findings reached from dissimilar methods have the prospective to develop researchers' understanding of the issues and produce new understandings concerning the problems (Armstrong & Shimizu 2007, p. 965). Furthermore, the incorporation of qualitative and quantitative methodological implements is expected to be a productive option, specifically due to the re-emphasis on problems inside the company (Armstrong & Shimizu 2007, p. 965). Thus, this dissertation focuses on the concern of exploring the modeling

methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement.

Purpose of the Study

Taking into consideration the problem considered within the framework of the present study, the purpose of the present work is to examine modeling methodology in strategic management. In other words, this study intends to find out the different methodological approaches of strategic management. The following objectives of the study demonstrate the way in which the purpose of the study is to be achieved. To be specific, the purpose of the paper will be achieved through the completion of these principal objectives:

- To explore the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement
- To analyze the efficiency of the utilization of definite modeling methodologies in strategic management
- To reveal the advantages of definite modeling methodologies in strategic management
- To discuss the problems of utilizing definite modeling methodologies in strategic management

Research Questions

Taking into account the problem statement and the purpose of the study, the following research questions are offered:

RQ1: What is the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement?

RQ2: What is considered when structuring a strategic plan and the organization's objectives?

RQ3: how can Probabilistic Safety Assessment (PSA) used in modeling strategic plan?

RQ4: what is management position in UAE in using PSA to model strategic plan comparing with the traditional modeling methodology (the scorecard)?

Significance of the Research

The selection of qualitative or quantitative modeling methodologies in strategic management has always been an issue (Hoskisson, Hitt, Wan, & Yiu 1999, p. 447). Moreover, the contemporary progress of the strategic management has modeled innovative encounters concerning the utilization of quantitative methodologies, even though some researchers have attempted to employ large sample data measures to assess strategic management implementation (Hoskisson, Hitt, Wan, & Yiu 1999, p. 447). However, as a result of the small character of big companies' resources, researchers have utilized more case studies, field-grounded research, outlier samples, and case surveys in order to assess strategic management application.

As a consequence of the encounters presented by new strategic research problems, the continuous utilization of different research methodologies in the scope of strategic management appears to be probable (Hoskisson, Hitt, Wan, & Yiu 1999, p. 447). Therefore,

both the context and the research questions ought to command the selection of the suitable research methodologies of strategic management. In all probability, outcomes reached utilizing different methodologies have the prospective to develop the understanding of the difficulties and produce innovative perceptions concerning the issues. Furthermore, the incorporation of qualitative and quantitative methodological implements of strategic management is expected to be a successful option, particularly due to the re-emphasis on problems inside the companies utilizing the strategic management (Hoskisson, Hitt, Wan, & Yiu 1999, p. 447).

Given the deficiency of experimental studies in this field, the results of this study can help in exploring the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement. The researchers found limited information on the modeling methodology of strategic plan. Therefore, this research is intended to help fill the gap in the academic literature.

Organization of the Study

The organization of the present analytical study reflects the content of each of the research paper's structural elements. Overall, this dissertation has five chapters: introduction, literature review, methodology, results, and conclusion. The first chapter, where the brief introduction into the topic, the research objectives, and other relevant information along with the purpose and the significance of the study are presented, is followed by the literature review. The second chapter, the literature review, provides the theoretical basis for the analysis of the modeling the methodology in strategic management. The third chapter that follows the literature review will reveal the methodological issues involved in the study such as research design, data collection, analysis methods, etc. It will also outline the design to be used for this study. The results section will be dedicated to the practical part of the research

that deals with the detailed theoretical analysis of the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement and the efficiency of the utilization of definite modeling methodologies in strategic management. Finally, the principal information on the research topic will be summarized, and the main findings related to the undertaken research will be identified in the conclusion part.

Presentation of Relevant Terminology

Strategic management – "entails three ongoing processes: *analysis*, *decisions*, and *actions*. That is, strategic management is concerned with the *analysis* of strategic goals (vision, mission, and strategic objectives) along with the analysis of the internal and external environment of the organization" (Dess, Lumpkin, & Taylor 2005, p. 23).

Strategic management methodology - is the technique for implanting a strategic management experience in a specific company (Dess, Lumpkin, & Taylor 2005, p. 23).

Chapter Summary

The present chapter has provided the overview of the dissertation topic and research objectives of the analytical study dedicated to the modeling the methodology in strategic management. The problem on which the research is focused is the concern the concern of exploring the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement. Taking into consideration the problem considered within the framework of the present study, the purpose of the present study is to examine modeling the methodology in strategic management. In other words, this study intends to find out the diverse methodological approaches of strategic management.

The main purpose discussed in the introductory part is to explore the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement, analyze the efficiency of the utilization of definite modeling methodologies in strategic management, reveal the advantages of definite modeling methodologies in strategic management, and to discuss the problems of utilizing definite modeling methodologies in strategic management. The research objectives focus on the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement, issues considered when structuring a strategic plan and the organization's objectives, the importance of staff or organizational external public matter in the practice of making decisions concerning the creation and implementation development strategies, the significance of the updates of progression stages to the internal public, and the features required for an organization to do to counter notify and make salvaging moves in the development of organization's strategies. The present research is significant because it reveals essential information related to one of the urgent problems in the scholarly and managerial world, and presents research findings that prove the necessity of the further analysis of the efficiency of the utilization of definite modeling methodologies in strategic management.

Literature Review Plan

1. Methodologies Quantitative and Qualitative approaches
2. Strategic Plan Modeling
3. Endogeneity
4. Probabilistic Safety Analysis (PSA)

Methodology:

1. Overview of Methodology
2. Research Design
3. Data Collection Methods
4. Data Analysis Methods
5. Ethical Considerations
6. Limitations

Model Development

Test Model

Results

Conclusions and Recommendations

Chapter 2: Literature Review

Strategic planning

Strategic planning is described as the process of predicting change, recognizing new opportunities and implementing strategy. Strategic planning is also used to describe idea management, where new ideas are developed classified, processes and subsequently executed within the organization (Pearce and Robinson, 2007, 67). Strategic planning begins when the appropriate data, collected from multiple sources using different methodologies is analyzed and transformed into actionable data (Bergh and Ketchen, 2009, p. 19; Harry, Margarethe and Wiersem, 2004, p. 86). Actionable data identifies specific procedures that an organization may consider in implementing strategy or the attainment of a given objective. For instance, an organization may have the knowledge that overall sales are decreasing but identifying the specific market segments that are decreasing and the organization's rate of penetration within

such segments will be useful in identifying the specific actions that are required to change the situation and boost sales.

Important components of strategy have been identified by various authors and researchers to include: context that focuses of strategic analysis, process that addresses strategy implementation, and conte, that entails the strategic choices made by the organization (Ketchen, Brian and Bergh, 2008, p. 643). Within the context aspect of strategic management, Pearce and Robinson (2007)stated that other factors are included which are: resources and the strategic capabilities of an organization, culture and the expectations of stakeholders as well as the environment within which the strategy plan is to be developed and implemented. With respect to process, Bergh and Ketchen (2009, p. 29) described planning and resource allocation, effective management of the strategic changes s well s organizational structure and design. Content was described to include the identification of strategic options, selection of a viable strategy and the determination of the evaluation options.

Strategic management as a field has greatly advanced both in theory as well as empirical research, especially in the last 25 years. However as Hitt, Brian and Li (2004, p. 1) noted, the previous substantial growth is now beginning to show ineffectiveness especially within the domain of methodologies used to develop strategic management plans. The authors recommended that in order for strategic management to expand as a discipline, there is need for empirical research that suitably addresses all the methodological challenges in various aspects. The suggestion for effectively realizing this end is by addressing important stages of strategic planning, that include how research questions are developed, how data is collected, construct measurements, as well as factoring and analysis of the endogenous relationships and applications between variables (Ketchen, Brian and Bergh, 2008, p. 644).

Some important stages in the development of the field of strategic planning and management include Porters (1980) competitive strategy as well as Hofer and Schendel (1978) publication of a textbook on strategy formulation to more dated strategy management techniques such as Sun Tzu's Art of War. Based on these diverse arrays of perspective, approach and theoretical grounding, research in the field of strategic management has been disorganized albeit with significant growth and advancement. Due to the still developing nature of strategic management planning, Heckman and MaCurdy (1986, p. 12) recommended that research in the discipline should remain deeply committed to theory testing use of dynamic data and models as well as the application of multiple methods during data collection. Hitt et al (1998) also stated that in order to advance the field of strategic management, there is need for researchers to apply more sophisticated statistical methods and tools, more use of longitudinal research designs as well as the development of rigorous dynamic models. The authors also emphasized on the importance of utilizing both qualitative and quantitative methodologies.

Hitt, Brian and Li (2004, p. 5) stated that research in strategic management aims at achieving two important objectives: advancing the level of theory within the discipline, and providing useful normative advice to organizational leaders. The authors also describe important steps in the development of an efficient strategic planning and management model based on Porter's value chain.

Bergh and Ketchen (2009, p. 19) stated that the effective application of both qualitative and quantitative data is the best method for collecting actionable data to guide the development of risk management strategy. The interdependent and balanced application of both qualitative and quantitative methods significantly determines the degree to which a strategy will be able to attain its objectives. Most strategic planning applies research that

promotes a dual agenda. This includes assessing external conditions to determine what an organization should be doing as well as evaluating the existing conditions, described as what the organization is currently practicing.

Ketchen, Brian and Bergh (2008, p. 643) asserted within the domain of strategic management, it is commonly assumed that the management team is able to make choices that create sustainable competitive advantage, ultimately realizing high performance outcomes for the organizations they serve. Owing to this presumption, the field of strategic management is concerned with gaining more understanding of such decision-making that influences the performance of the organization.

Methodologies Quantitative and Qualitative approaches

Harry, Margarethe and Wiersema (2004, p. 86) noted that the highly complex nature of organizations requires the use skillful application of mixed methods that collect and apply both qualitative and quantitative data. Understanding the best approach on how to effectively apply strategic risk management requires multiple points of knowledge gathering as well as adequate understanding of how organizational interactions affect its ability to effectively apply the strategy. Both qualitative and quantitative techniques provide different contributions to strategic risk planning. Quantitative techniques enable planners to portray the 'what' within the organization, while the qualitative techniques makes it possible to answer the 'why' question with regards to what is happening within the organization.

Hatten (1979, 443) noted that qualitative techniques in model development usually provide a deeper and better understanding of the nature and context within which strategy development can occur. On their part, quantitative techniques make it possible to assess the current functioning of the organization. In describing qualitative methodologies in the

development of strategic plans, Harry, Margarethe and Wiersema (2004, p. 86) stated that they mostly refer to, or describe the human interactions and the gathering of data from such interactions can be applied in the development of strategic plans for risk management. Qualitative methods in this case may face-to-face interviewing, strategy development sessions and focus groups. Data from these qualitative techniques can subsequently be applied in the gathering and interpretation of quantitative data. Importantly, such data is applied in determining the strategic actions that the organization will pursue. Quantitative modeling uses numbers and figures that describe the organization's current operation and that of its environment.

Hatten (1979, 448) insisted that an effective strategic planning processes integrates both qualitative and quantitative data collection techniques in an embedded manner. Some of the strategies for achieving this include concurrent approach where qualitative and quantitative data is gathered and analyzed in parallel, sequential application where either qualitative or quantitative data is used to provide a basis for the collection and interpretation of the other type of data or through conversion, where the data is transformed to either qualitative or quantitative data and re-analyzed.

The application of quantitative modeling makes it possible to discover the most relevant factors in the development and implementation of a strategic risk management strategy, which may be difficult to identify when using quantitative modeling only. The quantitative approach enables models to capture system characteristics and attributes to the extent that is possible using the available data (Hatten, 1979, 448). According to Sano and Gilligan (2005, p. 63), quantitative strategic and risk modeling is increasingly acquiring popularity as an effective way of measuring total risk financial portfolios.

Quantitative strategic and risk management models are being commonly used to gain better understanding and management of business volatility. One of the popularly used quantitative strategic management and risk management model is that which was developed by Markowitz (1952). The model proposes that business initiatives and strategies are largely motivated by anticipated returns and the amount of risk involved. Since Markowitz's model, quantitative modeling has become continued to expand, providing business managers with a variety of alternatives from which managers can choose a strategic or risk model that is most appropriate for their nature of business.

According to Ketchen, Brian and Bergh (2008, p. 651). The development of quantitative strategic management and risk models can be simplified by through comparison of the processes, products or business stages with a set benchmark. This is as opposed to developing a covariance matrix where comparisons to each element to the other. also stated that such a model could be updated on established schedules such on a daily, weekly, bi-monthly or monthly basis to reflect shifting business dynamics, and other corporate actions. Factors that should be considered in the development of the strategic and risk management model include rates of data decay and frequency of updates.

Each enterprise has its own unique method on how the data is processed and applied in making risk forecasts. Some of these risks will include volatility in business environment and business dynamics. Makorov (2012, p.16) noted that one metric for the efficacy of risk models is the ability to make comparison between forecasted risks and realized risks within a specified time period. The efficacy of quantitative risk models is enhanced when there have been considerable stable periods and the historical data is representative for risk forecasts and market dynamics and risks are factored within the framework for making forecasts (Makorov, 2012, p.16).

Strategic Plan Modeling

In planning purposes it is imperative that the model captures not the system characteristics at the specific period when the data is available, but to also have a predictive ability of system changes when some critical factors are altered. For instance an efficient risk management model should be able to predict event sequences when there changes in input, output, capacity, scheduling among other important operations within the organization. In the event of some changes or alterations, it would be necessary to determine how consumer or market behavior would be affected as well as how the organization would change its operational strategies in reaction to the occurrence of the event. It would also be necessary to predict over time how the behaviors would be modeled to forecast the event for a future long-term period. To develop a model's predictive ability, it is necessary to determine how the dynamic elements within the model will be captured.

UNESCO (2010) presented eight distinct phases of developing a strategic plan, which are: sector diagnosis, policy formulation, identification of key objectives and priorities, design of the strategic management plan, developing a cost and financing plan, developing a monitoring system, writing up the first draft, and lastly revising the draft for final approval. Some the models commonly applied in strategic management include: Traditional or the IO model, the stakeholder model, resource-based view (RBV) and the value chain model. According to Sano and Colin (2005) the traditional (IO) model perceives the organization as the economic actor that responds to market forces.

The external environment is perceived as the basic determinant of the firm's success while strategic decision-making involves selecting suitable markets and products. The basic tools used in this model include financial rations and industry analysis. The stakeholder model perceives the organization as n extended interconnection of dependencies and

relationships where stakeholders are involved in determining sustainability and basic model tools include financial ratios and stakeholder analysis.

The value chain model regards the organization as series of interlined value generating activities that transforms the organization's inputs into outputs and the market determines the success of the strategy. Strategic decisions therefore involve the creation of higher value at greater cost efficiency. The basic tools used in the value chain strategic management model include financial rations, external analysis as well as the analysis of the value chains. In the value chain analysis the firm is deemed as profitable to the degree that the revenue it generates surpasses the overall costs incurred during the development of services and products. This involves the identification of important activities that significantly support overall firm's strategy as well as the monitoring and evaluation of significant activities by comparing costs and the value generated by key activities within the value chan.

Pearce and Robinson (2007) add that comparing key activities to those of industry competitors may also do this. According to the resource based perspective, the firm is a unique collection of competencies and resources and that the outstanding attributes of the organization will determine the degree to which it is able to succeed. Basic model tools include financial rations and VRIN analysis Bergh and Ketchen, (2009) described the VRIN analysis as comprising of valuable, rare, inimitable and non-substitutable. When applying the resource based mode, the organization coverts the inputs into outputs by using organizational capabilities such as procedures and processes, and resources that could be tangible or intangible.

Strategic plan models

Models that are commonly applied in strategic management include the BCG model and matrix, TOWS matrix, core competencies as well Porter's five forces model and Porter's generic strategies. (Pearce and Robinson, 2007) A comprehensive discussion of all these models is beyond the scope of this paper. They are thus briefly summarized to illustrate the available models that have been generally applied in strategic management and planning. In TOW's model, organizational strengths and weaknesses are identified, where strategies are developed based on the strengths while other strategies are developed to specifically mitigate against the identified risks (Wheelen, Hunger, 2006, p. 235).

The BCG model selecting few key strategies and using them as a guideline to make investments and increase revenue margins, when the market share is low, the organizations liquidates its earned revenue in order to remain sustainable (Galbraith and Schendel, 1983, p. 155). Porter's five models focus on the five factors: potential market entrants, substitutes, buyers, suppliers and the influence all these have on competitors and rivalry within the industry. Porter's generic strategies include cost leadership, cost focus, differentiation and differentiation focus. The core competencies approach enables the organization to have a wider access to the market, add value to customer as well as reduce competitor's ability to imitate products or services (Wheelen and Hunger, 2006, p. 239).

The resource based view follows five important steps. The first step includes identification and classification of resources available to the organization, assessing of the organization's strengths and weaknesses in the context of the competition as well as the identification of opportunities available to the organization. Step two involves the identification of capabilities, which are the organization's strengths as well as identifying necessary resource inputs. The third step involves the appraisal of revenue attainment

potential in terms sustainable competitive advantage as well as suitability. The fourth and last step involves selecting a suitable strategy followed by the fifth step that involves identifying key resource gaps, resource replenishing, augmenting and upgrading the resource base.

Linear strategy model

Bergh and Ketchen (2009, p. 111) referred this model is strategy planning as among the first models to become widely adopted by organizations, and it mainly focused on the planning aspect of strategy. Linear is taken to refer to systematic, sequential and directed action that uses planning as its most important basis. Chandler, (1962, p. 13) described the strategy planning process as the determination of the primary long-term goals and objectives of a firm, and the adoption of actions as well as the allocation of resources that would be necessary to realize them. The linear modeling perspective involves a variety of integrated decisions, plans and actions that will establish and realize viable organizational goals and objectives.

The goals as well as the action plan for their attainment are founded upon strategic decision-making. To meet the goals of a strategic plan, an organization will diverge its contact with the environment either by changing its products or its markets. The organization may also opt to undertake other entrepreneurial action. Common terms that are usually used in the linear model include strategy planning, formulation and implementation (Steiner and Miner, 1977). The linear model also perceives organizational managers as having the capacity to change the organization (Chaffee, 2009, p. 90).

The adaptive strategy model

The adoptive strategy model can be described as being primarily concerned with creating a viable match between the risks and opportunities present within the external

environment as well as the organization's capability and resources for utilizing the available opportunities (Hofer, 1973, p. 3). A firm is expected to conduct ongoing assessment of internal and external conditions, an approach that leads to making necessary adjustments within the organization based on the context of the environment t (Chaffee, 2009, p. 91).

. There are various differences between the adoptive model and the linear model. Firstly, environment monitoring and implementing necessary changes occur simultaneously and in an ongoing process within the adoptive model. On the contrary, the linear model demonstrates a time interval that does not appear in adoptive strategic model (Bergh and Ketchen, 2009, p. 117). Secondly, the adoptive model is not as emphatic on goal based decision-making as is the linear model. The adoptive model mostly focuses on the degree to which manages are focused on means or approach, while the goal is represented by suitable integration of the organization with its environment.

The third difference is that the adoptive model understanding of the strategic tendencies is more comprehensive compared to those used by the linear model. The differences in the description enable the adoptive model to integrate both the major changes in markets and products as well as the smaller changes in quality, marketing and other important aspects. The two models also differ in the sense that the adoptive model that not emphasize on advance development of plans as does the linear model. The model is therefore more decentralized, is multifaceted and generally not very integrated compared to the liner mode (Chaffee, 2009, p. 91).

Another important attribute of the adoptive model is that it considers the environment as a complex part of the organization's that consists of events, trends, stakeholders and competitors. The environment, within the adoptive model is an important element that influences strategic decision-making as well as the actions that are subsequently

implemented. This way, the adaptive model is able to integrate more variables and more tendencies towards change compared to the linear model. The model has been described to have more advantage, as it is able to handle more variables and greater flexibilities (Chaffee, 2009, p. 91)

Interpretive strategy model

Pearce and Robinson (2007, p. 321) noted that the upcoming interpretive strategy has been fueled by increased focus of symbolic management and corporate culture in strategic management. The model is founded on the belief of a social contract that than the perception of the organization as an organism, which is reflected by the adoptive mode (Chaffee, 2009, p. 92). The interpretive model perceives the firm as a combination of cooperative agreements that is arrived at by the free will of the individual.

The existence of the organization relies on the degree to which it is able to attract enough entities with to cooperate in ways that are mutually benefiting. Within the model, strategy is understood as changing symbols that of reference that enable the organization as well as its environment to be understood by the stakeholders (Sano and Gilligan, 2005). From this, the stakeholders become motivated to act in ways that are anticipated to produce favorable outcomes for the organization.

The interpretive model that heavily relies on norms and symbols moves away from goal orientation evident in the linear model to give greater focus on the desired interactions. The desired relationships might be such as those that involve the obtaining of operational inputs or widening the market. Still, the interpretive model appears more similar to the linear model as it emphasizes on interacting with the environment as opposed to the adaptive model that changing with the environment, as does the adoptive model (Chaffee, 2009, p. 92).

Sano and Gilligan (2005) noted that similar to the adaptive strategy, the interpretive strategy in management proposes that the organization as well as its environment create an open system. However, in the interpretative strategy, organizational managers influence the attitudes of stakeholders towards the firm and its outputs, such as products and services. This means that they do not make physical changes to organizational outputs. The attitude transformation is perceived as a strategy to enhance the organization's credibility and its products and services.

The field of strategic management holds that managers do not make their organizational strategic decisions randomly, but are rather guided by the expectations of how such decisions will ultimately affect the future performance of the organization. Based on this understanding, the collection and analysis of accurate data is considered as an important element in manager's ability to make decisions that enhance the performance of their organizations (Harry, Margarethe and Wiersem, 2004, p. 89).

Such data must also be able to anticipate and predict risky events and strategies to mitigate their impact on the organization's performance, as well as predicting seasons of high growth to enable the organization to better prepare to exploit favorable markets and seasons. This is basis that enables the understanding that the decisions of managers are predicated on their endogeneity to the anticipated performance of the organization. If this were not the case, then managerial decision-making would be considered random and superfluous (Hamilton, Olin and Nickerson, 2001, p. 1).

Endogeneity

According to Hamilton, Olin and Nickerson (2001, p. 2) endogeneity has significant impact on the statistical analyses of the strategic decisions made by organizational leaders.

Hatten (1979, p. 455) insisted that any form of statistical analysis that does not consider the expectations of managers with respect to performance outcomes and strategy that is selected end up with biased coefficient estimates (p. 2). The biases emerge due to the omitted but important variables that have an impact on the choice of strategy as well its overall performance (Harry, Margarethe and Wiersem, 2004, p. 90).

Wooldridge (2002, p. 54) stated that to come up with unbiased coefficients for such challenges, econometric methods are required, which effectively account for the omitted variables. Ultimately, the econometric strategies effectively account for the omitted variables. There are various econometric techniques that are appropriate for correcting for endogeneity when both the choice of strategy and performance are ongoing. While this is true for continuous strategy selection where the instrumental variable technique and the two or three stage methods are have been commonly implemented, the same does not equally apply for disconnected strategy choices yet the performance outcomes are ongoing.

While the econometric measures were distinctly developed within labor economics context, the econometric problems that are addressed by the models are suitably applicable in the arena of strategic management (Heckman and MaCurdy, 1986, p. 112). Lee (1982, p. 356) reviews the example provided by one labor econometric model where an individual must choose between two given professions, such as teaching or singing. The technique for performing an econometric evaluation of the choice is rooted on the assumption that individuals will readily self-select to the career that best suits their capabilities, thereby potential for better returns.

However, without the effective modeling of this type of self-selection, an income regression on career choice may generate inaccurate estimates for the returns in each given profession (Lee, 1982, p. 357). To demonstrate, a regression analysis that fails to correct for

the self-selection will suggest that returns are independent of career choice, whether it is teaching or it is singing. With a more accurate econometric analysis that factors in the possibility of self-selection, it is more likely to determine that for the persons who choose teaching may earn a higher and more sustainable compared to those who choose singing for their career, and vice-versa.

From this example, the person choosing between two careers may be appropriate compared to a manager who is tasked with the selection between two distinct strategic approaches. An analysis that compares/regresses the profitability of in-house production compared to outsourcing is likely to generate biased estimates of the degree of impact of the strategic choice on performance outcomes. This is unless the model is able to effectively control for self-selection. This situation demonstrates that while organizational managers undertake organizational decision-making on the basis of the expected performance outcomes in strategic management, there are limited econometric models that effectively correct for endogeneity.

Strategic management is based on the notion that the decisions made by the management team are endogenous to their anticipated performance implications (Ketchen, Brian and Bergh, 2008, p. 643). Hamilton, Olin and Nickerson (2001, p. 1) stated that there not sufficient studies that correct, through econometric methodologies, such endogeneity. The authors presented comprehensively described this endogeneity problem in modeling methodologies for strategic management; address the choice of management among the various strategies with ongoing performance outcomes.

Probabilistic Safety Analysis (PSA)

According to (Health and Safety Executive, 2009, p. 6) PSA involves multiple disciplines; PSA assessments needs persons with extensive expertise in a variety of areas such as mechanical, engineering, electrical, fault studies, human factors, structural integrity, both internal and external organizational hazards, thermal hydraulics among others. When assessing risks using PSA, the inspectors must decide the nature of risk, which may be demonstrated using numerical inputs (Suyama, 2009, p. 1706).

The overall aim of PSA is to facilitate decision-making with respect to the safety of a facility, and whether operational risks are being actively minimized to as low as is reasonably applicable. According to Rowekamp Lanore and De Gelder (2008) an efficient PSA system should facilitate judgments to be made with regards to the overall risk acceptability of the facility against the set numerical targets. The model should also show that a balanced approach and design has been realized; no particular class of risk, feature or accident of the facility makes an inconsistent contribution the specific risk target.

The model must also be useful in demonstrating that the risks linked with the design and facility operations, and the changes in risks linked to plant or operations modifications are within ALARP (Suyama, 2009, p. 1709). The there may be variances between the extent of PSA in different facilities depending on the magnitude of the risks and hazards as well as the nature and complexity of the facility. Rowekamp Lanore and De Gelder (2008) argued that for some facilities, non-complex analyses, or qualitative decision-making and overall good practice could be sufficient to demonstrate that the risk or hazard is ALARP. In contrast, complex facilities require very comprehensive PSAs that are within modern standards and developed for all classes and types of operational modes and initiating faults.

One of the important principles of PSA is that it should be based on the current operations and design of the site or facility. This indicates that that each element of PSA should be directly linked to the existing facility information, documentation or assumptions made by analyses when such information is not available. Meeting these important requirements requires the constant updating based on the most current facility design and operations as well as the incorporation of feedback from both internal and external perspectives with respect to operational experiences. The updating should consider the facilities increased understanding of accident progression and physical processes as well as improvement in modeling strategy and techniques.

Suyama (2009, p. 1706) noted that the PSA should address all significant sources or initiators of faults, risks and hazards that have been identified within the facility. In the context of nuclear plants, the sources of radioactivity such as handling facilities, fuel ponds, waste storage areas, reactors among others should be considered. Within the organization context, such sources or risks could include human errors, plant malfunctions, and contamination of products, among others. The PSA model should also cover both internal and external risk initiators as well as all operational failures that may initiate a risk.

Another important principle of a PSA model is that it should give an appropriate representation of the entire site and the facilities within. This ensures that the model is technically adequate, with rigorous technical foundations that give a suitable representation of risk contributors within the facility. A PSA model should be able to methodically identify all series of sequences that culminate to the risk event as well as the consequences associated with it. While this may not make a proper distinction on the estimated frequency of risk sequences, it ensures that all possible routes have been systematically identified and accounted for. United States Nuclear Regulatory Commission (2012) noted that to have

relevant numerical targets, the PSA model must factor in risks with very severe consequences and those with higher rates of occurrence frequency but have much lower risk impact.

Suyama (2009, p. 17011) noted that PSA assessment should recognize how the various features within the facility contribute to the risk and enable decision-making based on a balanced PSA design. Having each element assessed in the most suitable estimates can do this. United States Nuclear Regulatory Commission (2012) also insisted that while the conservative PSA designs may be deemed suitable to demonstrate that the risks are either low or to provide screening for future estimates, judgment could be significantly affected by the application of such an analysis.

With regards to the type of data that is used for PSA, Suyama (2009, p. 1710) noted that the greatest degree possible, data that is very specific to the facility should be applied to calculate probability and frequency. In the event that such specific data and information is not accessible, it is possible to use generic data as far as it is appropriate for the PSA design and the operations within the site. There should be specifications with respect to the data source, data uncertainty and data size before it is deemed appropriate for application in the model. Justification should also be provided where alterations are in the source data are undertaken to address differences within the conditions in the facility and the available data (Health and Safety Executive, 2009, p. 9). It is also recommended that where no data is available, PSA developers should make suitable judgments and indicate how such decisions were arrived at. Focus should be given to establishing the how the PSA is impacted the judgments. Justifications should also be provided for the methods used to determine how probabilities are calculated. The justifications should analyze the factors that influence the methodologies.

Findings from the PSA should be properly documented and interpreted to provide meaning to the organizations overall strategy. Health and Safety Executive (2009, p. 9) stated

that the numerical findings should be presented with lists of all fundamental events and their related importance assessments. All justifications for judgments should be clearly indicated. A good PSA should also be able to be used in implementing the design process and ensure operational safety of the site/organization and all facility/business operations within it. This implies that the organization should be able to rely on the PSA when making decisions as well as justifying measures that should be implemented. While the PSA should provide information and data to the facility, the model should also receive data from the facility to ensure consistency between the operation and design of the facility and the PSA model (United States Nuclear Regulatory Commission, 2012).

The main advantage of the Probabilistic Safety Analysis (PSA) models is the fact that they are able to identify and rank possible causes of risks, thus providing a more comprehensive view with respect to plant safety (Rowekamp, Lanore & De Gelder, 2008). The PSA model was originally developed for comparison of risks that are associated with nuclear power and other risks. The first part of PSA usually aims at evaluating the frequency of a specific risk through the identification of all accident sequences related to the risk event and combining the probabilities of the basic events that are likely to trigger each risk event. This way, PSAs use a determinist approach in safety and risk management. According to Rowekamp, Lanore and De Gelder, the deterministic approach applies conservative assumptions, evaluation of a series of faults that are believed to be bounding as well as the use of traditional safety criteria.

Suyama (2009, 1711) noted that PSAs usually start with as much a comprehensive list of initiating risk events and their hazards as possible. The aim is to identify all accident sequences that could culminate in to the real damage or the release of radioactive material to the environment. The PSA gives a combined model generated through the application of best

estimate assumptions to provide a balanced view of the significance of the initiating events, structural failures, human errors, system failures and other risk factors.

According to the United States Nuclear Regulatory Commission (2012, p. 24) PSA should account for all the contributions to the risk, including factors such as: random component individual failures, the components that are failed by the initiation event, unavailability to maintenance of testing, pre-initiating human errors such as alignments, human errors that cause the development of initiating faults and human errors that occur during the course of the event, which may include decision errors, misdiagnosis, omission and commission errors.

Health and Safety Executive (2009, p. 19) insisted that the level of detail of the PSA model should be sufficiently comprehensive to make sure that it is relevant and realistic, that the logic used in its development is accurate and that the dependencies are identified and the data that is used is relevant to the specific boundary for each basic event within the PSA. Ultimately, estimations should be made with respect to the frequency of occurrence and the consequences of each of the fault sequences that is identified. The identified sequences should not be merely discounted on the basis that their individual frequency is low. This is because the combined contribution from all the low sequences may actually be significant with respect to the numerical targets (Health and Safety Executive, 2009, p. 20).

Chapter 3: Research Methodology

Overview

This study was concerned with evaluating a variety of available modeling methodologies, and performing a comparative analysis with a Probabilistic Safety Assessment (PSA) model. Towards this end, the dissertation aimed at developing a generic Boolean algebra with event trees and fault trees to model a strategic plan that can effectively manage organizational risks and opportunities. Comparisons will be drawn from interviewing business managers to determine the acceptability of the model. This means that the methodology will be conducted on two distinct levels.

The first one will involve the development of the actual Boolean model based on the PSA, while the second phase will involve conducting a comparative analysis between one traditional strategic management model, and the developed Boolean model based on the PSA. The comparisons will aim at determining whether indeed such a model can be effectively applied by managers to for strategic management and risk management, and whether, or not the model has superior ability to perform these tasks compared to more traditional models. The research was motivated by the growing interest in quantitative models in organizational strategic management, planning and risk management. The research was also motivated by the potential in adopting the PSA model commonly used in nuclear facilities, in other organizations, and the potential in using a Boolean algebra based model to as a strategic management tool in organizations.

By examining existing strategic management models and modeling methodologies, the research hoped to identify key gaps or potential areas that could be further improved by

using a PSA based model as a strategic management tool. The methods and research techniques discussed in this chapter aim to:

- To explore the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement
- To analyze the efficiency of the utilization of definite modeling methodologies in strategic management
- To reveal the advantages of definite modeling methodologies in strategic management
- To discuss the problems of utilizing definite modeling methodologies in strategic management

The stated objectives will be attained by answering the following research questions:

i. What is the modeling methodology that can be applied in order to model a strategic plan in decision-making towards organizational development and goals achievement?
ii. What is considered when structuring a strategic plan and the organization's objectives?
iii. How can Probabilistic Safety Assessment (PSA) used in modeling strategic plan?
iv. What is management position in UAE in using PSA to model strategic plan comparing with the traditional modeling methodology (the scorecard)?

Interviews

Patton (2000) stated that the a interview conducted for the purposes of academic research is an asymmetrical affair where the ultimate objective of the interviewer is to maximize the amount of evidence or data that can be obtained from the interviewee, which ultimately increases the researcher's chances of answering the research questions effectively. Interviews usually seek to describe the key themes and meanings in the live world of the interviewees, where the main objective of interviewing is to understand the meanings of what the respondents understand. By using this method, the research intended to comprehensively understand the perceptions of the subjects with regards to the two strategic modeling strategies, and the extent to which they perceived each would be assist managers in improving their risk and strategic management strategies (Rubin, 2005).

Interviews usually expose both realistic information as well as meaning, which make them effective in obtaining the perceptions and deeper understanding of the subject's experiences with the phenomenon of interest (Rubin, 2005, p. 3). This is because interviews make it possible for the researcher to provoke in-depth information surrounding the topic. An interpretivist approach was applied in carrying out this study. Posner (2005) described the interpretivist approach as being interested in how individuals interpret reality, contrary to the constructive research approach, which suggests that human phenomenon is constructed socially as opposed to being constructed objectively.

Sampling

As is characteristic of qualitative research, sampling procedures for this study were undertaken purposively and at a small scale (Kuzel , 1999, p. 37) to identify 10 suitable managers working in various organizations in the UAE, who were willing to participate in the study. Participant selection was conducted through purpose or convenient sampling, which

was both cost and time efficient. The researcher made use of personal social network to reach potential participants or to obtain appointments to access organizations' managers for their permission to participate in the study. Out of the 19 who were initially targeted and approached to request for their participation, only 10 were available for the interviews. While great effort was undertaken to reschedule interviews to suit the availability of the respondents, some had to be eliminated as more scheduling would have created time and resource constraints on the study.

Respondents were drawn from organizations operating in various industries that included: two utility companies, one an specialized strategic planning corporation, one law firm company, two companies operation in the financial sector, and four manufacturing companies involved in the production of a different types of consumer products. All these companies operate within the UAE, with some having a global presence in different regions of the globe.

The representation of organizations operating in different industries was particularly useful to the objectives of this study. The main objective of this study was to determine the suitability of a Boolean algebra modeling approach for developing strategic management and risk management plans. Definitely, different industries are faced with different types of risks and may have different strategic management plans. For instance, the risks faced by a utility company may be distinctly different from those faced by a company operating within the financial industry.

While some organizational procedures and strategic management plans may be similar, the unique organizational or industry differences could potentially impact preferred strategic planning and risk management models or they could be more responsive to particular models and not to others. With this in mind, having participants representing

different industries would make it possible to identify which industries were more responsive to the Boolean algebra PSA model and those which were not. In this respect, would also be possible to modify the model to make it suitable for specific industries. In comparing the PSA based modeling strategy and the Linear Strategy Model, it would also be possible to establish the adaptability of specific strategic management and risk modeling strategies to certain industries or individual organization.

Data collection

In qualitative research, data collection usually facilitates close contact and interaction between the subjects and the researcher (O'Leary, 2004). This close contact and interaction between the parties will be particularly useful for this study as it will enable the researcher to not only understand the perceptions and opinions of the participants with regards to the model, but will also make it possible to understand the reasons underlying their various perceptions. Understanding the managers' reasoning make it possible to identify areas that need further improvement based on the perceptions of participants on why the model may or may not be successful.

Data generated by qualitative methods is usually extensive and rich while the analysis if suitably flexible to emerging ideas and concepts, which my generate more detailed descriptions, identify promising patterns and develop new explanations (Warren and Karner, 2005, p. 115-116) While quantitative data is able to generate relatively objective data, quantitative techniques are usually not sufficient extensively explore the interpretations and perceptions of subjects as in their interactions with the object of interest. For this study, the perceptions and interactions of the subjects with the model was thought to be particularly important. Through such interactions, the participants would be in a position to form informed opinions about the suitability of the model in dealing with routing organizational

strategic management and risk planning. This would also enable them to make comparisons between the Linear Strategy Model and the PSA based model to identify the key strengths and weaknesses of each modeling strategy.

Instrumentation

Semi-structured interviews were uses to collect data for the study. In semi-structured interviews, the interviewer has the option to prepare a list of important issues, themes and questions to be explored during the interview but no need to conduct prior research for specific hypothesis testing (David and Sutton, 2004, p. 86-87). Contrary to structured interviews, a researcher using semi-structured interviews has the liberty to interchange the order and flow of the questions based on the direction that the interview is taking as well as the possibility of adding more questions that were not previously included.

The semi-structured questions were developed in a manner that would comprehensively explore the perceptions and understanding of the participants about a PSA based modeling approach for developing a risk and strategic management plan for their specific organization. The questions were also developed in such a way, as they would enable the identification of key weaknesses within the model that made it ineffective or unsuitable for application, as well as possible ways that the model could be improved to make it more appropriate. The semi-structured questions of also probed the respondents into making comparisons between the Linear Strategy Model and the PSA based model to determine the appropriateness of each for use by an organization operating within the specific industry.

The semi-structured interview made it possible to perform a thorough evaluation of both the explanatory and descriptive aspects of the research. Descriptive elements included describing the suitability of the PSA oriented modeling strategy for the organization while

explanatory information elaborated on the reasoning underlying the responses given by the subjects. The researcher was tasked with comprehending what the interviewers were trying to express and hopefully use this feedback to determine the suitability and acceptability of the model as well as possible areas for improvement to align it with organizational needs.

While interviewing method provides for greater flexibility in the collection and analysis of data, using a semi-structured interviewing method allowed the researcher to regain relative control with respect to the direction that the interview would take, while still retaining the ability to elicit deeper and richer responses about the participants understanding of the model. **Appendix A** provides the open-ended questions that were used to guide the interviewer during the interviewing process. The interview sessions were electronically recorded and later transcripts of the sessions were prepared for further analysis in the subsequent stage of the research.

Procedure

The interviewing procedure aimed at capturing the perceptions of participants about the PSA model developed in the first part of the methodology, as well allowing participants to compare the model with another traditional Linear modeling strategy. This means that participants would require to first assess the model before they were able to make their opinions about its suitability for the organization they were working for. **The possibility of presenting the model to the subjects during the actual interview was initially considered but later discarded as it would not only make the interview sessions lengthy, but would also not give participants sufficient time to evaluate the model and form opinions about its application.**

The second option that was followed involved distributing the model outline and details to all potential participants as part of the consent and approval procedure before the interviews were scheduled. While sending a letter requesting the participation of a potential manager, an outline of the model as well as a detailed part was attached. Those who approached were requested to examine the model and indicate whether they would like to participate in a study evaluating its practicality as well as to make comparison with the traditional Linear Strategy Model.

Once consent was received through email or telephone conformation, the researcher scheduled the interview date and time based on the availability of the interviewee. During the actual interviewing, a brief summary of the model was presented to the respondent one more time before the questioning and dialogue began. All interviews were conducted at the work premises of the subjects.

Data analysis

Data analysis of the interview transcripts applied codes for tagging information segments, as well as the organization of the tagged data into appropriate major themes and data categories (Atkinson, Coffey, Delamont, 2003). In performing the coding procedure, the researcher also relied on information and major themes identified in the literature review with regards to the application of the various modeling techniques in developing a strategic management plan.

The literature review provided an outline of potential themes that could be used to categorize data obtained from the interviews as well as in determining the data's ultimate implications on the objectives of the study. For instance, the literature review was useful in outlining the known characteristics of the comparative model as well as that of the PSA,

while the interview data was interpreted based on the established characteristics as well as the perceptions of the interviewees about the suitability of these characteristics in strategic management planning and risk management. The final data analysis was done by continually reviewing the interview transcripts in recurring cycles of reflections in order to allow the intuitive crystallization of data interpretations.

Ethical issues

Every type of research is surrounded by various ethical issues that must be evaluated before, during and after conducting the interview. In conducting this research, the first ethical issue involved the privacy and confidentiality of the participants. To protect the privacy and confidentiality of participants, the names of the organizations where participants worked were not mentioned, but only identified on the basis of the industries they operated within. Participants were also dully informed about the purpose of the study as well as any potential risk that they may encounter as a result of choosing to participate. The researcher also explained the data collection boundaries within which the research and interviewing would constrain itself.

Chapter 4: Model development

This research entails the assessment of diverse modeling methodologies, and undertaking a comparative analysis with Probabilistic Safety Analysis (PSA) model, which is used for strategic management purposes. Towards the conclusion, the dissertation focused at establishing a generic Boolean algebra with fault trees and event trees to a strategic plan, which will cost-effectively manage organizational opportunities and risks in a given management environment. In order to arrive at convincing comparisons, business manager will be interviewed to ascertain the capacity of the model, which implies that the methodology will be undertaken using two definitive levels. In the first level, it will involve the development of the actual Boolean model that is founded on the PSA, whilst the second phase of development will entail undertaking comparative analysis between one conventional risk/strategic management model, and the already developed Boolean model that is founded on the PSA model. The comparisons will focus at ascertaining if this model, if really developed, will be effectively applied by various managers for risk/strategic management, and whether or not the PSA model has better-quality capability to perform these activities compared to more conventional models available for management purposes (Aguinis *et al*, 2005).

The model being designed is founded on the Probabilistic Safety Assessment (PSA) or Probabilistic Risk Assessment (PRA), which is conventionally applied in nuclear power plants to manage risks and promote safety. The model aims to assist companies other than nuclear power plants to identify planning and organizational strengths, weaknesses, threats, and opportunities, which may endanger the capacity to attain company's business mission (Papageorgiou & Hadjis, 2006). As a result of time and resource and time limitations, the research doesn't focus to design a complete scope model intended for the management

system, however, it will in turn design a partial model, which will be used by firms with the balanced scorecard strategic planning approach usually employed in organizations operation in diverse organizations to get the position of this organizations concerning the model. Therefore, the comparison phase of this research will carry out 10 interviews on managers within the United Arab Emirates to ascertain the degree to which they agree with the anticipated PSA model for use in other firms rather in nuclear power plants and their readiness to invest their full resources for full development of PSA model that will be used for the management purposes. Therefore, the major aim of this research is to confirm the necessity of employing the PSA methodology for purposes of risk and strategic management in comparison to other planning methodologies (Papageorgiou & Hadjis, 2006).

In developing the PRA model, the initial stage entails familiarization with the plant strategic plan utilized by the organization in question. This is factored in as the main stage in the development of PSA model in nuclear power plants as it permits the employees of the organization to become familiar and exposed to the plant and comprehend the different plant systems and their interdependency (Aguinis *et al*, 2005). This element of familiarization in development of PSA model enables the employees to develop a PSA model, which reflects the actual position of the firm in terms of management. The process of familiarization entails comprehending the organization's strategic plan, procedures, organization, as well as the processes in the organization. This is despite the reality that the degree of complexity that exists between a strategic plant and a nuclear plant is very different, where similar conceptual is applicable in both plants.

In the case of nuclear plants, there are various activities, which can probably challenge the safety of the reactor, thus making it a necessity to institute systematic techniques to identify the source of these events. On the opposite, the strategic plan assumes

the objectives of potential failures and risk initiatives of these initiatives, which will rationally fail the objectives. In such instance, the relationship between the source of the event and the objectives defines every event tree.

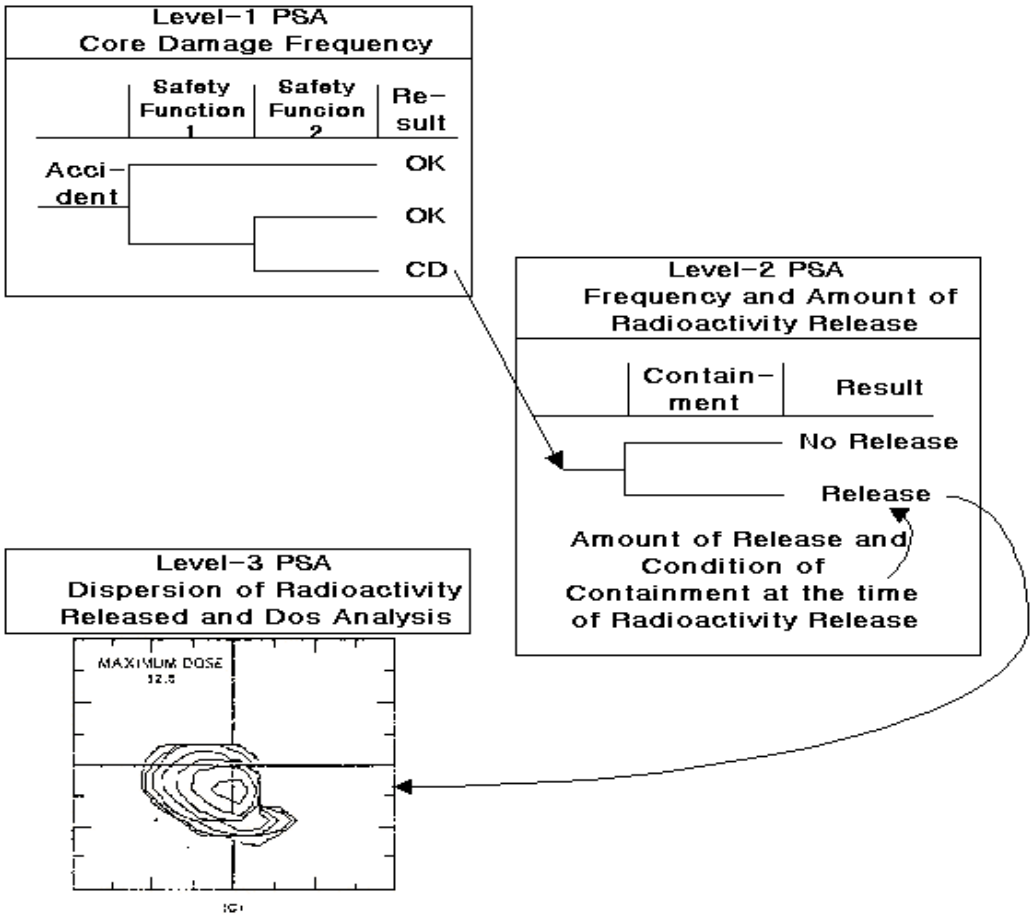


Figure 1: Stages Followed In PRA Development

Stages Followed In PRA Development

1. Preparation of a list that contains all initiator events, whereby during this stage, the initiatives of a given objective are critically defined.

2. Systems sequences: In this stage, the outcome of the acknowledged starting events are acknowledged and outlined. In this stage of the PRA development, the model attempts to identify any potential measures and remedies, which can be used to solve the problem or to take care of any emerging risk during the process of model development.
3. Branching probability: In this stage, the system list across the top of the event tree pointing out the systems that needs to be analyzed to get the branching probabilities of the event tree. Furthermore, these systems may be analyze3d utilizing fault tree, getting the needed probabilities. For the case of nuclear power plant, this is obtained by looking at each system equivalent rate of reliability and failure (Aguinis *et al*, 2005). Nevertheless, for the purposes of modeling a strategic plan, modeling initiatives and solutions will be undertaken through the analysis of KPIs or the firm's history or that of other firms in similar industry.
4. Dependency analysis: This entails analyzing the relationship that exists between the constituents present in the nuclear plant that could be potentially translated in strategic management language by looking at the relationships between the constituents of the different relationships of the initiatives.
5. Presentation of Results: In this stage, the results normally indicate all the events that contributed to the failure of the nuclear plant to attain its objectives. Nevertheless, the results from modeling a strategic plan will indicate that the objectives' contributions to the collapse of the firm in realizing its objectives. In this manner, vital processes and procedures will be acknowledged and appropriate decisions undertaken to mitigate against potential threats. Furthermore, continuous updates of the management strategic plan will undertake and introduced to the model to make it more cost-effective (Papageorgiou & Hadjis, 2006). The continuous updates will

indicate how the organization will be reacting to the changes and acknowledge the particular objectives that are significant for the firm to attain its overall objective.

In this study the two main constituents of the proposed PSA model are the Fault Tree and Event Tree.

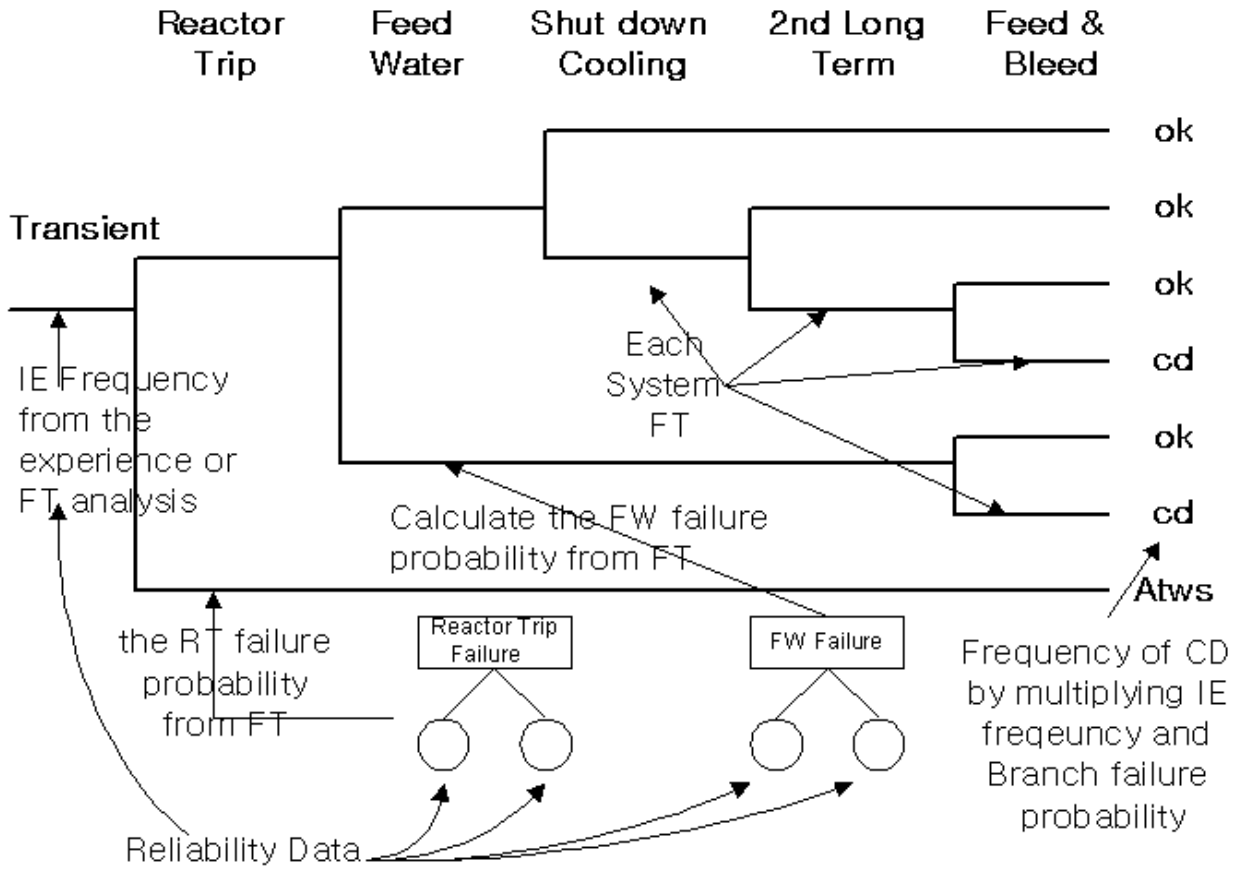
The Event Tree

The event tree appraises the sequence of a given event, which may make the organization fail in realizing its objectives. To show this, the research carried out a brief study of law firm concerning its management strategic plan. The major focus of the company was found to be the need to attain excellence and attain overseas clients in their business. In order to attain this objective, the law firm should meet the expectations of clients thus attain the level of customer satisfaction. In this case, the researcher factored in the failure in order attain the customer satisfaction level as the major event that will instigate the failure of the law firm in attaining its objectives while serving its clients overseas. Subsequently, the major problem in this case was identifying a strategy that the law firm could employ in an eventuality that it fails to meet the customer satisfaction level in their business, which would stop its capacity to realize its major mission. The possible solutions, which the law firm may put into consideration comprise: recruiting new legal assistants and lawyers; lowering its consultation fee; or modifying the firm's focus from criminal cases to contract cases (Papageorgiou & Hadjis, 2006).

The following diagram show a representation of an Event Tree that is applicable for the proposed PSA model. The proposed solutions are founded on the assumptions of the researcher and will specifically designed as per the probable solutions ,which can be factored

in by the organization employing the PSA model for strategic planning purposes (Fullwood, R. R., & Fullwood, R. R.,2000).

Figure 2: The diagram below shows an event tree



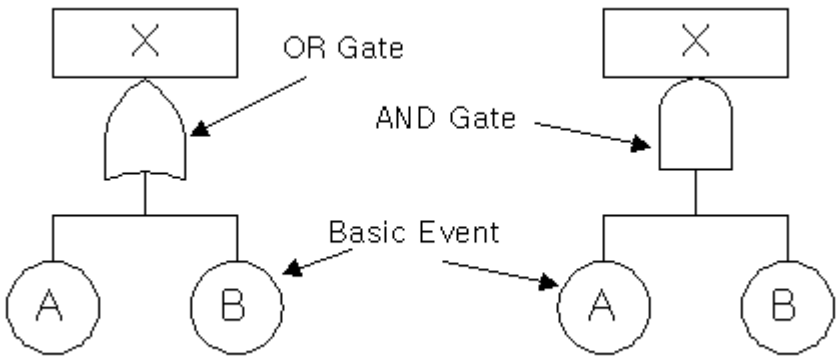
The Fault Tree

The Fault Tree majorly employs AND OR gates, whereby the following diagram represents the type of modeling, which the human resource manager utilizes when recruiting productive employees for the particular company. This is also taken as one of the solutions

for the posed risks that are likely to be subjected to the law firm, which will lead to the failure of the firm to attain its objectives. One of the solutions proposed was the change of the employees when consultation fee is altered and viewed that the finances was not adequate to meet customer satisfaction level. The notation AND implies that both the aspects should not succeed in upper gate, whilst the notation OR implies that there is one failure of a component in the upper gate. In this instance, probabilities will in the end introduced derived from the statistics that is accessible, which will eventually be linked to the event tree. This will basically conclude in quantification, whereby the outcome of the event will indicate the most vital elements (Aguinis *et al*, 2005).

In the end after modeling all the objectives, the quantification would indicate the objectives, which will highlight the highest contribution to the failure of the firm's mission in meeting its objectives. Therefore, this implies that the management will be in a position to fashion decisions to promote this particular mission that have the greatest risk to organization's capacity to attain the objective of attaining high level of customer satisfaction among its employees (Papageorgiou & Hadjis, 2006).

Figure 3: The figure below shows a faulty tree diagram



Chapter 5: Test Model

As mentioned in Chapter 4 “PRA model development”, the first step in constructing PRA model is to get familiarized with plant, which is in the researcher’s case; the strategic plan, one objective of the company from the strategic plan was picked. The objective is to achieve highest standard of industrial safety. This objective has two main initiatives.

- Initiative one: the contractor is in compliance with regulations on Health, Safety (HSE) and Environment procedures and it was coded as (KPINCOMHSEANDREG) in the model
- Initiative two: Failure of HSE leading to or lagging indicator is on or ahead of target coded as (FAILUREOFINDICAOTR) in the model

So to start with the process, being familiarized with the HSE department is an important task. Therefore, couple of meetings was conducted to understand the procedures and process. Event trees were constructed based on logic and scenarios understood. An assumption was taken that failure of the initiatives will fail the main objective.

The first event tree was about failure of initiative one where the contractor did not meet the regulation or the HSE procedures. The procedure in order to solve this problem is to perform an audit in order to find the gaps; however, if the department was not able to perform the audit, there is a very high possibility that the objective will fail. On the other hand if the audit succeeded and gaps were found then a schedule will be initiated in order to meet all gaps; nevertheless, if there is not time to meet the gaps there is a high probability that the objective will fail. If the second step of solving the problem was to succeed then a review would be performed. If the gaps still exist then the main objective will fail.

Each branch of the event tree has a probability and probabilities are acquired from the fault tree. Due to time constraints, one fault was constructed for the audit and other probabilities were assumed based on department's experts' expectations and judgment.

The logic of the fault tree was as follows: in order to fail the audit, a self assessment and an independent review have to fail. Therefore, the AND gate was used. This means that self-assessment AND independent review had to fail in order to fail the Audit. Which means if self assessment or independent review succeeded then Audit will succeed. For the self assessment to succeed both of following the procedures and honesty has to succeed and those two are called basic events and for each one a probability is assigned. This probability can be acquired from peoples' judgment or any other available studies. The same story goes for the independent review, both management acceptance for the reviewer qualification, review and analysis follows the standards. In other words, if management acceptance or standard gap analysis failed, the independent review also fails. The two variables are considered basic events and experts or any available studies assume probabilities. The same concept goes for the second event tree, which represents the second initiative.

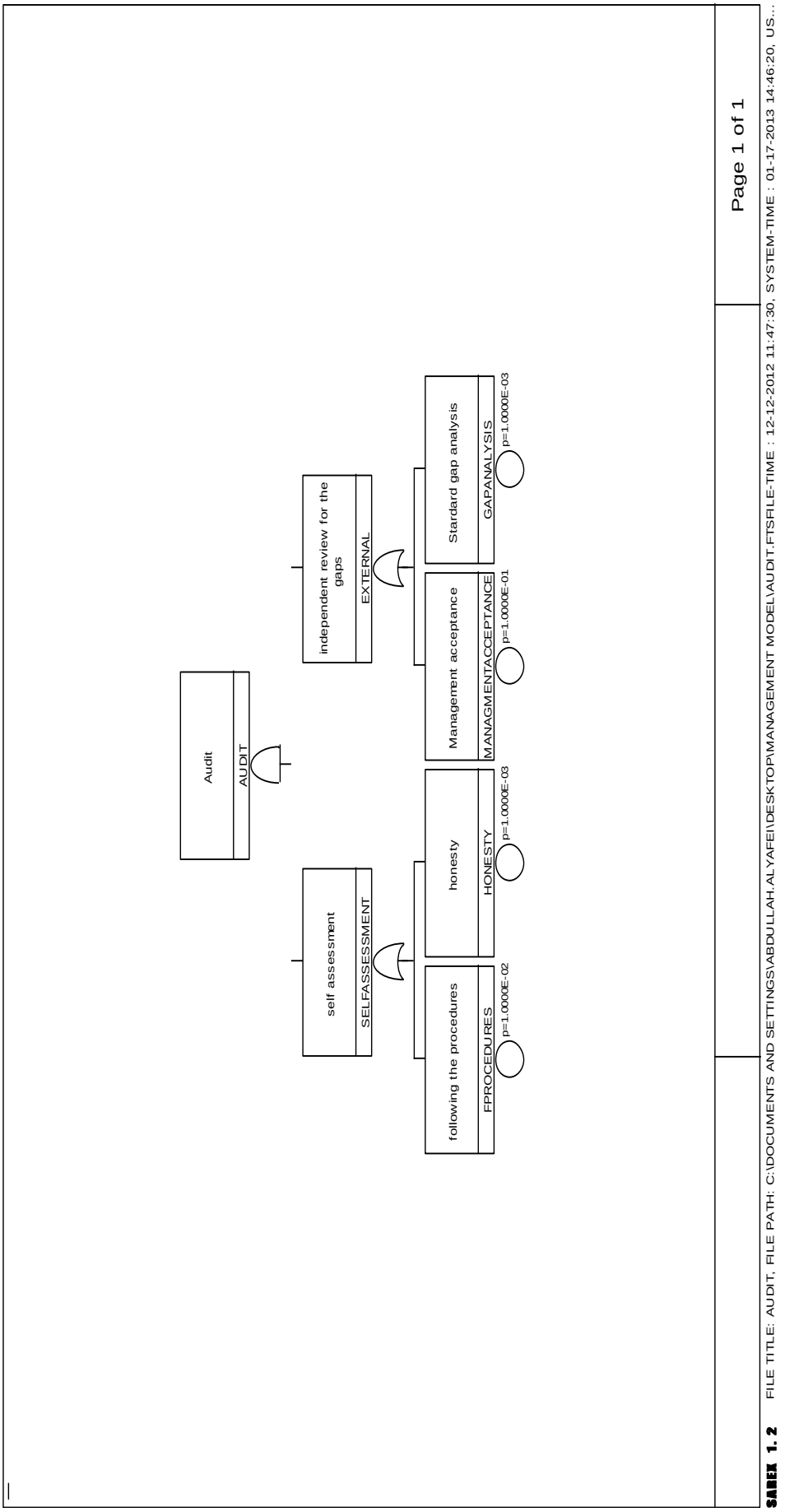


Figure 4: Initiative one, Modeling Audit

Figure 5: Initiative Two, Modeling Collection of data

Model results:

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SAREX Event Tree Analyzer 1, 2, 1, 13
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Created time: Wednesday, December 12, 2012


Total Frequency           : 1.332E-02 (/Year)
Total Frequency (Subsumed): 1.332E-02 (/Year)

------------------------------------------------------------
Initiator    Freq(/Year)  Perc(%)   Subsumed(/Year) # MCS
------------------------------------------------------------
FAILUREOFINDICAOTR 1.020900E-02  76.651   1.021E-02          4
KPINCOMHSEANDREG 3.109888E-03  23.349   3.107E-03          6
------------------------------------------------------------


------------------------------------------------------------
Initiator    Freq(/Year)  Perc(%) Subsumed
KPINCOMHSEANDREG 3.109888E-03  23.349 3.106669E-03
------------------------------------------------------------
Sequence     Freq(/Year)       Perc(%)       Cum(%) # MCS
KPINCOMHSEANDREG002 9.990001E-04       32.123        7.501      1
KPINCOMHSEANDREG003 1.000000E-03       32.156        7.508      1
KPINCOMHSEANDREG004 1.110888E-03       35.721        8.341      4
------------------------------------------------------------


------------------------------------------------------------
Initiator    Freq(/Year)  Perc(%) Subsumed
FAILUREOFINDICAOTR 1.020900E-02  76.651 1.020900E-02
------------------------------------------------------------
Sequence     Freq(/Year)       Perc(%)       Cum(%) # MCS
FAILUREOFINDICAOTR002 9.900000E-05        0.970        0.743      1
FAILUREOFINDICAOTR003 1.000000E-02       97.953       75.081      1
FAILUREOFINDICAOTR004 1.099990E-04        1.077        0.826      2
------------------------------------------------------------
```

Figure 6: Event tree analyzer

A Capture of the results

When the software executed the model, the result indicated that almost 77% of the failure of the objective comes from the failure of the second initiative. If these information was given to high level management they would consider looking at this initiative closely which will allow them to introduce more defense layer which eventually can strengthen the success of the main objective

Chapter 6: Results

This part presents a report of the statistics that were obtained for the 10 interviews with the managers of the principal firms within the United Arab Emirates (The interviews were carried out as section of the current research in order to compare the PSA strategic management planning with other conventional strategic planning methods, which are presently used in the featured firms. The statistics obtained from the interviews are vital for making comparisons on the use and of the PSA model in other firms and business rather in nuclear power plants. The interviews in this study was under-taken found on semi-structured questions, which were formerly tailored to direct the flow of the interview and to make sure that the interviewer was in position to get much of the relevant information concerning the model as possible, which will be employed in meeting the goals of the current research. After categorization and further coding, the interview statistics was provided in summarized sub-topics. In studying the results further, it will be provided in the interpretation and data analysis in the following chapter. Interviewees in this study were presented with a prototype of a model, which was in written form and more explanation of the PSA model during the sessions of the interview to make it clearer. This means that the explanation of the model during the interview session made sure that the interview totally comprehends the nature of planning methodology and the objectives that it is intended to attain if applied by the organization as a risk and strategic planning instrument. Taking into an account that majority of the respondents was reported to have applied the balanced scorecard methodology alongside the proposed PSA model

From the interviews carried out, most of the respondents in the study showed that the most widely used methodology in strategic planning were the balanced scorecard. Respondents indicated that balance scorecard was majorly used because its element of

applicability and simplicity. Therefore, the balanced scorecard methodology was described to have much simpler processes as compared to other types of planning methodologies and it allows the management to have a better and wider overview of all their objectives and plans

During the interview, one of the respondents indicated that the balance scorecard strategy has been employed in one of the firms for a period of three years with proof of yielding positive results as compared to other previously used planning strategies The respondent indicated that majority of the positive outcomes has been achieved particularly because the balanced scorecard strategy was capable of aligning organization's goals, initiatives, and objectives. A different respondent during the interview also confirmed on the simplicity of applying the balanced scorecard model in strategic planning that made it more preferable because of the simplicity in application and the reality that positive results have been realized from its application in different planning management contexts. Therefore, majority of the contexts during the interview reported that in organizations they come from they apply the KPIs a method of capturing quantitative data, and particularly since they are the very vital indicators of the organization's present position.

In the interview, one of the respondents was not conscious of the strategic model being explained in the interview as a methodology being used in his organization. Nevertheless, the respondent said that there was which were underway in the company to embrace configuration management model as a methodology for risk and strategic management (Hitt *et al*, 1998).

In the course of carrying the interview, one of the respondents was quite optimistic concerning the importance of the PSA model if a simpler model can be designed ,which didn't need highly specialized skills to use it in the organization for strategic/risk planning. The respondent in this stage identified that their company, which deals with transportation

had outsourced its strategic planning to a consultant firm where the balanced scorecard was being used in combination with other methods of strategic/risk planning.

Perception of using the PSA model in other organizations

After providing an explanation concerning the conceptual of PSA model applicability in many firms for their strategic planning and other firms, I needed to seek clarification concerning the views of the managers regarding the PSA model. One of the distinctive elements of PSA model compared to balanced scorecard model strategy and other conventional strategic planning methodologies is that it has some probable shortcomings during the early stages of development, which at last will lead to failure of some of the organizational goals dependent on the event, and later result to incapacity to attain the mission of the company. The PSA model when compared to other models seems to assess all the probable failure points and also evaluate any possible solutions.

In this case, one of the respondents during the interview stated the importance of the adopted PSA model and was very optimistic that the developed model will cost-effectively profit the strategic management field in many firms rather than in nuclear power plants. Nonetheless, the same respondent argued that the PSA model will proof more profitable if it is founded on a definite structure for the PSA model could offer the strategic planning managers a qualitative approach whilst the quantitative statistics will be accrued from KPIs lesson received as well as the history of the business. Furthermore, the respondent said that there is no confirmation that the failure of the initiative during the time of strategic planning procedure could entirely result to the failure of the mission of the organization. With this argument on the PSA model, it is imperative to acknowledge the relationship if one really exists other than making some presumptions founded on the original PSA model.

Whereas in this interview the respondents were specifically excited regarding the new adopted PSA model, there were issues concerning how and where the methodology would capture possibilities , particularly because the probabilities are inclined to people's views. From this position, it was deemed as essential to carry out additional interviews during the modeling stage and during the integration of KPIs. One of the respondents during the interview said that this was certainly an appropriate model for fixing issues related to probabilities obstacles using KPIs in the model will replicate the accuracy of the project more than any other understanding extracted from the interviews and the opinions of managers of different organizations where the interview was undertaken During the interview one of the respondents commented that the PSA model seems to be specifically complicated in its application in other firms. The interviewee observed that the PSA model was utilized to design strategic planning management in particular multifaceted systems within firms. Nonetheless, the strategic planning of the other normal firms need less complex models as their management systems were less complex. With this position, the respondent had the suggestion that the proposed PSA model may not be useful for purposes for strategic planning. Nevertheless, it is imperative that to take into account that the level of complexity will rely on the already established system and the individual, or group of people who are responsible for the modeling role. This implies that if an organization wants a less complex version of the model, it means that the model developer could just develop a simple methodology based on the requirements and the already established system of the company. Similar adaptability customization is also undertaken in nuclear power plants founded on the degree of complexity as the systems also differ based on different utilities forms available in the organization. Furthermore, there are general principles, which must be observed when developing a PSA methodology. The other issue raised by the managers was in line with the particular set of skills essential for the strategic planning and risk management teams

when applying the PSA model. One of the respondents during the interview observed that there are not that numerous strategic planning and risk management teams with the correct level of knowledge and skills to successfully use the PSA model in their planning activities. This poses a specific obstacle for the PSA's implementation in several firms as training would first be mandatory before the model could be embraced and used for management purposes. To overwhelm this barrier, it was proposed that the PSA model must be first pilot-tested so as to validate the significance of the PSA model in the strategic planning of companies.

The nature of the developed model and apparently requirement for specialized personnel seemed to pose some challenges in its widespread acceptability and application in several companies. The requirement of trained labor to affect the model may have significant implications that are related to time and cost for implementation and training the personnel. This implies that the PSA model requires further development and monitoring to make sure that it has specific qualities and beneficial results compared to other conventional risk and strategic planning models presently applied in organizations, which include balanced scorecard.

Weaknesses of the Balanced Scorecard Methodology

In as much as the balanced scorecard strategic planning methodology seemed to be the most favored planning approach by most interviewed managers, some weaknesses were also observed in its application. One of the interviewee argued that the balanced scorecard strategy only dealt with the top of the pyramid of the firm's management system that is limited in its capability to incorporate data and management facts from the bottom of the pyramid. This offers the PSA model a specific advantage as the methodology has the capability to appraise top to bottom and bottom to top aspects of strategic management

planning. The PSA model consequently is capable of even assessing the smallest elements of the firm and classify possible failures and challenges from both the bottom and the top of the planning and managerial pyramid of a particular organization

Chapter 7: Discussion

PSA is used to determine the probability of damage to the core due to series of accidents acknowledged by the research and it's used by the management as a tool to develop strategic management plans (Hitt *et al*, 1998). With the development of this model, PSA is used to assess the magnitude of risks through the use of probabilities in major firms to ensure that the management. These assessment results will be used by the organizations to ensure that they reduce potential risks thus mitigating the organizations from some risks. whereby in most organizations in urgency of their importance in ascertaining the risk and strategic management strategies and identifying probable framework weakness that exists in a particular company thus allowing the management to design some solutions.

Therefore, the results of the study provides some weaknesses of the PSA that is developed to be used in many organizations form management purposes, however, the model has some strengths as confirmed by managers interviewed. The PSA model focuses to aid firms other than nuclear power plants to recognize planning and organizational strengths, weaknesses, opportunities, and threats, which can expose the capacity to accomplish company's business undertaking. Due to time and resource limitations, the study doesn't center to design a complete model planned for the management system, conversely, turn a partial model of an objective was constructed, that basically addressed one objective and failure of the initiative's which will be used by organizations with the balanced scorecard strategic planning approach usually employed in organizations operation in different organizations to get the position of this organizations concerning the model. The results of

the study provides a comprehensive analysis and responses from the managers in UAE thus assisting in setting strategic plans as well as focusing on the efforts on the major points identified as the most sensitive and urgent in terms of contribution they make in enhancing risk assessment thus promoting management strategies. Certainly, in this kind of assessment, which is commonly undertaken, provided that as an analytical instrument was quickly acknowledged as the most essential element as strategic/risk management plan (Aguinis *et al*, 2005).

Figure 7: The diagram below shows reliability analysis

This means that PSA model targets to ensure that the management team in a given organization is well armed with strategic and risk plans that will avert possible risks and other threats that are likely to jeopardize organization's goals. Therefore, the model will be employed during the operating and design stages of strategic plans in company to analyze and identify every probable sequence and situation of unfolding events within the organization, which might lead to severe damage or make the organization not to realize its objectives (Fullwood, R. R., & Fullwood, R. R., 2000). This means that a classical PSA model entails: identifying initiating states and events of management plans; acquiring an in-depth understanding concerning the organization, its stakeholders, as well as collecting a voluminous related facts; assessment of the relationship between human activities and events; modeling the main management systems of the company within the organization utilizing fault and event trees; and designing a database on the reliability of a particular organization's systems and components (Fullwood, R. R., & Fullwood, R. R., 2000). After designing all the

objectives using PSA, the quantification would point out the goals that would underline the maximum input to the failure of the firm's undertaking in meeting its objectives. Consequently, this will mean that the management will be in a position to approach and design decisions to support this particular assignment that have the maximum risk to organization's capability to accomplish the objective of attaining high level of customer satisfaction among its personnel.

In general, PSA model contain a section, which is referred to as probabilistic assessment of initiating events that is focused at acknowledging and approximating the frequencies of initiating events within the organization (Hitt *et al*, 1998). The identification and estimation of initiating events with the organization will assist the organization to avert possible management or other risks that are likely to jeopardize the firm's missions due to system failure or human error. PSA also appraises the reliability of the management systems structured to meet the strategic plans of an organization. The assessment aspects in PSA comprises of identification, of every system and function reviewed, of failures that may result in the organization losing its focus on its objectives. The probability of every kind of failure experienced occurring within the management is the calculated and the failures occurring can be arranged in a descending order of the probability. Probable weaknesses in the organization might, therefore, be revealed. This section of the assessment is specifically significant since its results will be greatly relying on the reliability of statistics used in calculating the probabilities. The reliability aspect values should be founded on the statistics on data, which are representative of organization's operating experience, particularly in its risk/strategic plans and therefore, on the events and incidents witnessed in the management system concerned (Papageorgiou & Hadjis, 2006).

Furthermore, the other part of PSA focuses on assessment and identification of sequences of events, which might result to a severe loss of organization's objectives that focuses on ensuring that all the stakeholders are aware of potential risks. In this case, analyst generally employs the use of an event-tree method that comprises of identification of failure sequences from individual initiating events and the probability of failure of the risk/strategic plans triggered by the event in question. The strategic/risk plan failures anticipated are those acknowledged and calculated in the previous stage of assessment. This underscores the significance of collecting reliable data (Aguinis *et al*, 2005). Looking at the results acquired from the test model, we could conclude that a huge percentage of objective failure comes from failure of one of the initiatives. This should give high-level management an indicator; however, the logical reason behind this high probability should be understood and a deep study should take place because sometimes results could be deceiving if conservative data are used. Therefore, decisions should not be taken based on risk, but decision should consider risk and evaluate different solutions in order to find the most effective and efficient solution

Limitation of PSA

Basically as other models such as balanced scorecard, PSA has its limitations. This is because of the fact that the outcomes of a PSA as seen during the interview with the managers in UAE invariably consist of risks that emerge from three main sources. First, the risks in PSA emerge as a result of lack of comprehensive data concerning the area under reflection. It is not easy to show the exhaustiveness of a PSA model, even when the degree of the assessment has been increased to as large number of events as possible –particularly in terms of different strategic/risk assessment plans and probable initiating events. Second, entails risks or uncertainties that deal with data. These uncertainties deal with the aspect of reliability data for the organizations' management components, common-mode failures,

frequency, and the failures that emerge due to human activities (Fullwood, R. R., & Fullwood, R. R., 2000). The fundamental uncertainty in PSA are those which are connected to the frequency of rare initiating events within a company, for instance, the integration of compelling risks that needs urgency as well as data that concerns human factors. Third, it entails risks that are linked to modeling assumptions, which cannot be easily quantified, which include resistance of certain elements under accident conditions, poorly comprehended physical phenomena by the staff or human actions in an organization.

In looking at these risks and uncertainties, the main assumptions that the PSA is based are structured to make sure that efficient strategic/risk plans in management are well understood by the employees and other members of the company. It critical noting that the risks and uncertainties are not inherent to PSA model, however, might generally be linked to lack of detailed knowledge among the personnel in many organizations. Definitely, one of the gains of carrying out PSA in an organization is that they can possibly identify areas about which need the managers to learn more and provide suitable solutions. In spite of these risks, the appraisal of both the weaknesses and the strengths of the PSA features can evidently imply means of enhancing both the model and operation of in strategic/risk plans of a given organization. Probabilistic safety analysis has, consequently become a vital enhancement to methodology analysis in checking the safety level of an organization and promoting it by pointing out plan weaknesses. Furthermore, appraising the safety of an organization at a given point in its life span, such applications have also established the worth of PSAs in other areas and variety of number of programs are already being tailored that tip-off at future applications. The model will be useful in application in organizations rather than only in nuclear power plants. In the interview, it was evident that numerous strategic planning and risk management teams need correct level of acquaintance and skills to productively use the

PSA model in their planning activities. This poses a specific impediment for the PSA's accomplishment in numerous organizations as training would first be obligatory before the PSA model could be adopted and applied for management purposes. To beat this problem, it was proposed that the PSA model must be first pilot-tested so as to authenticate the worth of the PSA model in the strategic planning of companies.

The Future of PSA

The improvement and development of PSA has led not only in an increase in the number of evaluations undertaken, however, it has also and more outstandingly in growth of their extent of application in many organizations, particularly in management aspects. A research published in 1989 by the OECD Nuclear Energy Agency themed Probabilistic Safety Assessment (PSA) in Nuclear Power Plant Management showed the benefits gained through the application of PSA in the management of safety in nuclear power plants. The conclusion developed in the research was founded on specific on the example of one utility that factored in the application of PSA to be an essential element of the day-by-day events of its organization (Fullwood, R. R., & Fullwood, R. R., 2000). The specialists in management who outlined this report considered that the application of PSA a tool of safety management in organizations provides instant benefits to those who execute PSA model in the plan and operation of their companies and for all those endeavoring to improve the safety their organizations and ensure that they achieve their objectives. According to the authors, the achievement of PSA will decrease the frequencies of relentless incidents and accidents and will therefore, be of advantage to a particular organization as a whole (Kuzel, 1999).

Whereas some organizational processes and strategic management programs might be alike, the exclusive managerial or industry differences can possibly affect favored strategic planning and risk management models or they can be more receptive to particular strategic

models and not to others. With this in the reasoning, having managers representing diverse firms will make it likely to recognize which organizations were more receptive to the PSA model and those that were not. In this case, it will also be probable to adapt the model to make it appropriate for explicit in organizations. In contrasting the PSA model anchored on modeling strategy and the balanced scorecard, it will also be likely to institute the adaptableness of particular strategic management and risk strategies to definite firms or individual organization

A recent report published by the Nuclear Energy Agency themed Living Probabilistic Safety Assessment for Nuclear Power Plant Management outlines the recent accomplishments in the application of PSA in power plants and organizations (Kuzel, 1999). The recent applications of PSA model have indicated a unique capability to evaluate alternative engineering or configurations modifications that could be tailored to meet the expectations of the management team in averting risks. It is therefore, become clear that PSA model can be effectively applied in the management and assessment of safety-related businesses and that of strategic modifications regularly made in a process to organizations strategic plans. So as to maintain track of this strategic modification, nevertheless, they have to be included in a process for routinely updating the PSA model so as to make sure that the latter precisely represents the present structure of the organization.

This procedure comprises the "living" PSA program, whose fundamental constituent is a well-documented, well-designed, reviewed, decidedly comprehensive and detailed research of the organization. To make sure that this research remains "living," it is occasionally restructured to replicate all applicable organizational changes, thus monitoring and controlling the safety level of the organization over time.

Whereas a PSA model offers provides a safety outline of a company at a given time, a "living" PSA program monitors and impacts modifications in this safety outline as a function of time. Therefore, this capability to examine the effect of design and technical modifications on the safety outline of the organization or a plant, and to persuade modifications, which develop safety, creates a "living" PSA model, which is a prevailing tool with which to sustain and promote managerial decisions that impact the organization or plant safety and to promote understanding between the usefulness and the safety authorities within the organization (Kuzel, 1999).

In conclusion, after a moment of forethought, the performance of PSA model as used as strategic tool in organizations has emerged to be a popular model and most applications are tending or have an existing model, which has been developed. Further development, nevertheless, will need a better comprehensive undertaking of the present limitations of PSA model particularly the significant risks, which still remain unresolved in most organizations (Fullwood, R. R., & Fullwood, R. R., 2000). Nations, which are enthusiastically implementing PSA model is presently endeavoring to, lower the risks by enhancing their models and the reliability of their input data. The limitations must not essentially curtail the application of PSA, as long as sufficient allowance is made for the model in the safety assessment. As long as PSA persist to be applied by constructors, managers, operators, and safety authorities to evaluate the structure of their risk/strategic plans, then we can securely foretell that their application as a tool of organizational management will enhance considerably for the day by day management of companies and nuclear power plants under both standard and accident cases that will likely to distract the focus of the organization from achieving its goals. It is in this regard, which PSA to meet the largely objective of nuclear safety and thereby constitute an indispensable tool for assessment and exchange of ideas

between the different stakeholders accountable for the attainment of organizations' objectives (Kuzel, 1999).

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Appendix A: Interview questions

Group A: general questions in the awareness

1. What strategic planning model is your organization currently using?
2. How would you describe your awareness of the PSA model?
3. What is your perception of using the PSA model in other organizations other than nuclear facilities?
4. What is your awareness of the linear strategy model in organizational decision-making and strategic planning?
5. What are your perceptions about the model's strategic management capabilities?
6. Is the model applicable or adaptable to your organization?

Group B: questions concerned with models advantages and disadvantages

7. What do you feel are the most important strengths of the linear strategy model?
8. What do you feel are the disadvantages?
9. Do you think the linear strategy model is can be effectively used as a decision-making tool in your organization?
10. Please explain the reasons for your response.

Group C: specific question about the model in order to measure the response

11. Having read the proposed PSA based model, what is your initial perception?
12. What is your perception about the model's risk management capabilities?
13. What are your perceptions about the model's strategic management capabilities?
14. Is the model applicable or adaptable to your organization?
15. What are the key weaknesses of the model?
16. What are the key strengths of the model?

17. Is the model applicable to other organizations in the same or different industry as yours? Please explain your response.
18. What do you think are the key weaknesses of the model compared to the linear strategy model?
19. What do you think are the key strengths of the model compared to the linear strategy model?
20. In conclusion, what recommendations would you make with respect to the improvement and refinement of the proposed model?

8: Initiative one: KPINCOMHSEAND REG compliance regulations

9:

Initiative two: Lagging indicator