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Modeling Organizational Planning Management

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Abstract:

Management refers to the process of utilizing organizational resources in order to get things done with and through people. Organizational management refers to a common style of management that managers of modern firms adopt in the running of their enterprises. It is the process of planning and directing efforts and as well as employing of organizational resources, both material and human, in order to accomplish previously determined objectives. Within the overall conceptual domain of management, planning is identified as one of the critical organizational management functions. The organizational method enables managers to establish a structural breakdown of the entire set of operations for a department into several categories and phases. Organizational management models enable the development of critical skills and tools for managing limited organizational resources in a competent manner, which allows for the facilitation of change in organizations within the contextual framework of progressive organizational management skills. Organizational management Mathematical and computer based simulation models are increasingly getting entrenched in the organizational decision making processes, including strategic planning of various management functions. Despite their notable benefits, it is noted that the modern organizational manager faces a myriad issues related to the dynamics within the organizational environment. These challenges require decisive models that are dynamic and can be applied in response to dynamic problems that emerge in course of day-to day operations of the manager. Some mathematical models have been highlighted that illustrate the embedded role of mathematical models in enhancing decisions of the modern manager so as to ensure better outcomes for the organization. Effective planning models enables management to forge its own future in a highly competitive and uncertain business environment, instead of merely reacting to potential external events. Strategic planning based on the mathematical modeling of management functions also help organizations enhance their efficiency and effectiveness in decision making for better results in a rapidly changing organizational environment.

Keywords: *Organizational management, mathematical modeling, organizational performance, organizational success, information technology, computer science, strategic planning*

1. Introduction

This section is an introduction to the research study. In this section, the contents discussed include the main sections such as the background of the research, significance of the research, rationale of the study, the scope of the research, questions addressed by the research study, the hypotheses of the research, as well as the aims and objectives of the study.

1.1 .Background of the Research

Organizations have evolved into complex social, scientific, cultural as well as business phenomena with a diversity of complex interconnected functions. The environment wherein organizations operate has also grown in terms of dynamism, challenges and demands on organizational resources. Even the real meaning and nature of the modern organization has rapidly changed with the virtualization of organizations enable by the rapid developments in computational science and information communication technologies [1]. These realities have had wide impacts, both methodological and substantive, in the way organizational management practice is executed in the context of the modern organization.

With the growing complexity, new decision making tools have been developed which have accelerated effective decision making processes in the context of modern organizations. Mathematical tools and frameworks have been developed that helps manager in modeling and analyzing organization and organizational problems. Mathematical computational models in decision theory,

mathematical logic and probability have been developed in order to tackle various organizational function including planning, organizing, staffing, directing, and controlling organizational resources [2] [3] [4].

Furthermore, computing methods are increasingly being developed, such as formal methods for reasoning and representation, and practical simulation and experimentation techniques, that are being used in combination with computer hardware resources within computer networking frameworks so as to enable faster and quicker decision making processes in the context of modern organization. These powerful tools have had far reaching impact in the operation and functioning of modern organizational systems. The models springing from mathematical and computing modeling are needed in order to help managers in establishing solutions to organizational problems, including in integration of technology and mathematical modeling to the organizational processes.

The growing complexity of modern organizations has thus increased the overdependence of organizational managers on decision making models applicable to strategic planning process as a management function [3][2].

In the real world business environment, there is not a single perfect strategic planning model that applies to all organizations across the board. As such, every organization may end up formulating its own unique nature and modeling of strategic planning. Often times, this model development process may be undertaken through the selection of a desirable model and altering its structural elements along the planning process so as to suit the conditions and circumstances unique to the organization. Due to their strategic importance, planning models have increasingly become an instrumental decision tool for managers to ensure the performance of organizations.

In this paper, some basic models are highlighted which organizations can rely on as the bedrock for developing a strategic planning model that is relevant to their unique business functions. Other organizations may take the option of integrating models so as to meet their business goals. For instance, scenario models have been used as a creative mechanism for identifying strategic issues and goals of organizational functions. Subsequently, such organizations have narrowed down to issue based planning models in undertaking careful strategizing in addressing the identified issues and realize the goals and objective of the organization.

Strategic planning models are important because of their potential benefits to organizational management processes. Strategic planning models can enable managers to clear define or revise as well as entrench in the organizational culture the purpose and mission of the organization. Strategic planning models also enable managers to establish realistic organizational goals and objectives that is linked to the entrenched purpose. Strategic planning models developed will enhanced the organizational management process by improving effective communication of goals and objectives to all members and nonmembers of the organization, thereby ensuring that roles allocated are clearly achieved [5]. Furthermore, the models also ensure the development of effective plans for efficient and effective utilization of the limited resources of the organization by ensuring a sustained focus on important set of priorities. Another benefit of the planning model its ability to guarantee a basis upon which organizational progress can be measured and analyzed in order to establishing a framework for informing organizational change when there is need. According to [6], strategic management models can be used as tools for achieving organizational and management cohesiveness by bringing members of the organization, including board members, managers, employees and clients, closer together by sharing and working together towards a common vision and purpose. Some of the common models that firms depend on when making strategic decisions include: goal-oriented or issue-based planning models, alignment models, basic strategic planning models, as well as organic planning models.

1.2. Significance of the Research

Organizations play a very critical role in the modern economy, which cannot be disregarded in any given empirical research. The important value of this study is to provide an analysis of organizational management by focusing on how effective mathematical modeling can used to improve the prospects of strategic planning with the integration of the information technologies and computing for better decision making frameworks This study also seeks to promote an understanding of the organizational strategic planning methodologies based on theoretical modeling. In this regard, the research will help organizations develop an appreciation of the benefits and potential of the application of planning models contributions towards the progress of organizational management theory. This is achieved through a descriptive review of the various elements of planning models, the reasons for their adoption, as well as challenges and special issues they portend as well as some applications in the context of organizational management.

Effective planning models enables management to forge its own future in a highly competitive and uncertain business environment, instead of merely reacting to potential external events. Strategic planning based on the mathematical modeling of management functions also help organizations enhance their efficiency and effectiveness in decision making for better results in a rapidly changing organizational environment. The strategic models developed from empirical evidence will enable management in defining and revising organizational purpose and vision. Furthermore, they will enhance organizational communication processes through the adoption and integration of information communication technologies based on mathematical and computing models that enable extended analysis of big data objects gathered in the course of the planning process.

This paper contributes to the existing body of knowledge on the subject matter of management by entrenching the role and significance of mathematical modeling to the subfield of strategic planning. Majority of previous studies on strategic planning modeling have laid a major emphasis on pure theoretical models that lay less emphasis on mathematical modeling as a tools for efficient decision making. This study, however, seeks to add to the body of management knowledge the theoretical and practical underpinnings of strategic planning methods so as to enable management practitioners to have a framework from which planning functions of management can derive. Further research should be considered in order to extend the findings from this study to information technology based theoretical modeling of strategic planning through the use of methods developed for management information systems.

1.3. Rationale of the Research

Strategic planning as a management function continues to evolve and impact the outcome of businesses from all kinds of industries. Strategic planning models have improved management decision making process and enhanced performance of firms that choose to undertake planning as a critical management function. The potential for planning models to improve the predictability of organizational results has been the focus of most studies. The role of mathematical modeling in planning for organizational success is tremendous. Despite the potential benefits of strategic planning models very few firms have considered their widespread adoption as an instrumental decision making tool for organizational management and steering towards the achievement of the goals of the organization in terms of better returns for investors. The cautious adoption of strategic planning model as tools for organizational thinking process has been blamed on the weak planning models that firms adopt but which only turn out to be total failures, thereby diminishing the faith of management in planning models. The rationale of this research springs from the fact that through an exploration and empirical analysis of strategic planning modeling, as a functional role of organizational management, planning models will be developed which have the potential of guiding firms in business decisions that improve strategic planning functions towards better service delivery and desirable outcomes for enterprises based on planned organizational performance.

1.4. The Scope of the Research

The study mainly focuses on strategic planning as a major function of organizational management. The focus is further narrowed towards the major mathematical models and non-mathematical models which can be developed in order to improve the planning function of organizations through effective and empirically driven strategic planning practices than are based on sound and efficient mathematical models. Effective strategic planning enable firms and their managers to optimize performance and to develop coherent and reliable force for organizational action. Strategic planning modeling also experience technical and non-technical challenges which can diminish its potential benefits in the organizational management process. Some of these challenges are highlighted in this research as gathered from the review of empirical evidence. Strategic planning models are beneficial to any serious firm seeking to improve its overall performance through strategic organizational actions. The models form the basis of setting objectives and courses of action for the organization as proactive mechanism of preempting the dynamism of the business environment in which the organization operates. The models are based on the basic assumption that through continuous guidance of the organization, the management is likely to improve the future prospects of a business in terms of its state of affairs.

1.5. Research Questions

The study seeks to establish answers to the following set of fundamental research questions:

- What impact does do strategic planning models have on the overall performance of the organization?
- Can mathematical modeling improve the planning process as a management function?
- What are some of the common planning models that are common in most or all organizations?
- What are the challenges impacting strategic planning modeling in the organizational management context?
- What are the benefits of implementing mathematical based strategic planning models in organizations?
- What are the models to enhance the planning process in organizations?

1.6. The Research Hypotheses

In order to be able to answer the highlighted research question, this study is guided by the following hypotheses.

- H1. Strategic mathematical modeling of the organizational planning process offers a critical decision making tool which firms and managers can rely for better organizational outcomes.
- H2. Strategic planning models provide effective frameworks upon which the future prospects of the organization can be based.

1.7. Aims and Objectives of the Research

The aim and goal of the research study is investigating strategic planning as an organizational management tool for modeling the performance of an organization by ensuring the objectives and future business prospects are in sync with environmental conditions and organizational goals. The role of mathematical modeling in strategic planning functions is explored in terms of the effectiveness of the planning models being able to ensure that management actions are based on sound and reliable frameworks that can deliver the desired outcome for the organization. Through a detailed review of empirical evidence, the study seeks to provide recommendations for entrenching the significant role played by strategic planning in organizations. The recommendations offered will have practical applicability value to organizations considering entrenching strategic planning as means to improving the performance prospects for their entities. In order to achieve these aims, the study was based on the following objectives:

- To find out the practice of strategic planning in organizational management.
- To find out most effective ways for modeling the strategic organizational planning applicable to the current dynamic and complex business environment.
- To entrench the important role of mathematically driven strategic planning models in organizational management practice as a tool and framework upon which performance enhancing decision outcomes are based.
- To highlight some of the notable model selection criteria for based on dynamic issues at play in the internal and external environmental context.
- To highlight some of the challenges facing the practice of strategic planning modeling in the context of the modern organizations.

- To highlight some of the notable benefit of strategic planning in general, and mathematically driven strategic planning modeling in particular.
- To recommend effective organizational management strategies for improving ensuring better and improved strategic planning in order to optimize the performance of the enterprise.

2. Research Methodology

This section provides a brief discussion and highlight of the research methodology adopted for this study, and also offers the research method informing this research study. In this section are included a number of elements such as the purpose of the study, the research design which was implemented for these study, empirical evidence from literature review, theoretical modeling and simulation of the study problem, ethical issues considered during the conduct of this research, as well as the notable challenges encountered in the course of the execution of the research process.

2.1. Research Purpose

The approach adopted for the conduct of this research is based on the descriptive methodology of analysis. The purpose of this study is provide a descriptive investigation of various elements of the conditions or phenomena associated with circumstances, situations, or events happening or existing in the knowledge space. Generally, a descriptive research design is adopted when the objective of the research is to establish an empirical ground for generalization of the occurrence or existence of a given set of situations, conditions or phenomena. Ultimately, the intent of generalization of study phenomena is to provide new insights into the development of new theories, or the modification or validation or existing set of theoretical frameworks. Furthermore, the adoption of the descriptive approach can be considering in study situations wherein the researcher only possesses the sufficient level of knowledge that allows for the understanding of the study problem or phenomena, but in which there is no real desire or intention to pursue a correlation approach common in correlational research studies that seek to establish the cause and effect variable relationships and associations of various dimensions of the given study problem. Often, a large number of literature source do recommend the descriptive methodology over other methods of inquiry in circumstances in which the study depends on an extensive array of secondary data sources so as to allow for the investigation and in-depth analysis of a restricted set of aspects of the problem under investigation. A detailed literature review was conducted based on peer-reviewed and reliable journal articles, as presented in the literature review section of the paper. Information gathered from these knowledge source enable the intended validation of claims and generations offered in this paper, alongside significant theoretical derivations and empirical and analysis of the investigated study phenomena.

2.2. Research Design

This study is based on a mixture of the empirical and theoretical study designs. The theoretical framework guiding this study is based on the mainstream theoretical underpinnings of organizational management, and inform the theoretical dimension of the study design. A major focus has been grounded on the empirical design. An extensive literature review was conducted based on the available body of literature covering the subject matter of organizational management and provide the empirical design aspect of this study. Empirical evidence was heavily relied upon for the validation and substantiation of the findings, results and claims insinuated by this study. The advantage of this study design springs from its potential in terms of cost-effectiveness, enabling data comparisons from a multiplicity of sources as well as its benefits associated with being less time-consuming. Furthermore, the method is useful in terms of effectiveness in generating theoretically feasible and practically reliable as well as valid results and findings.

2.3. Ethical Considerations

Like most empirical and theoretically based studies, this research was performed by observing and adhering to the basic ethical preconditions of empirical studies. The research was performed upon seeking and obtaining the requisite permissions from the concerned authorities relevant to this study. The research was also based on a thorough review of literature from relevant publicly available sources of literature, including authoritative published peer-reviewed journal articles covering the topic of organizational management, a subset of the wider domain of organizational theory. The works used in order to realize the goals of this study have been accredited in the most appropriate manner, and the required attributions accorded to the respective authors of the articles using applicable referencing and documentation styles, both in text and on the reference pages, so as to ensure conformance with academic policies prohibiting any form of plagiarism.

2.4. Challenges Encountered

Some challenges were experienced in the course of the study, emanating from both the design of the research as well as the inadequacy of resources required to actualize the objectives of the study. The results of the study, having been designed upon a mixture of theoretical design and empirical analysis methods, particularly from the reviewed sources, may lack the intuitiveness for quick linkage with other results generated through theoretical models of organizational management as a quick way of establishing boundaries between empirical results and theoretical findings. Despite the fact that organizational management theory has been extensively studied in order to establish its practical implications in the context of the modern organization, difficulties were noted, however, with respect to gathering sufficient peer-reviewed scholarly materials with the most current information on organizational management modeling. Besides, this study design was also informed by the research restrictions imposed by limitations of time resources. Together, with limitations in financial resources, these challenges restricted the conduct of this research based on a design considered to be less-time consuming and cost-effective in terms of resource input.

3. Results of the Research

This section presents the findings generated from the study. This section of the paper also offers an incisive examination of the evidence sourced from the literature sources, as gathered through a review of existing body of knowledge covering the topic of study, organizational management modeling. Furthermore, this section provides a detailed review of the existing literature source relevant to the research topic. The exploration enables the researchers to explore and establish comparisons with previously obtained evidence presented in the methodology section of research. Such comparative analysis is geared towards the development of valid and reliable, as well as theoretically plausible, research generalizations and claims.

3.1. Findings from Empirical Evidence Reviewed

Organization management refers to the process of ensuring the performance or execution of functions and task by using organizational resources, both material and human [3] [2] [7]. It implies the process of planning and directing of organizational effort as well as employing the available resources in order to accomplish predetermined goals and objectives, within the general conceptual framework of management, there can be identified strategic planning function, as a subset of planning as a management function. Planning involves selection of organizational objectives, the establishing or development of goals, as well as the structured factual determination of existing conditions and situations, and also evaluating the progress towards a desired future.

When considering the choice of a particular strategic organizational planning model, firms normally attempt at a range of measures that simplify the entire process, thus simplifying the decision requirements involved in the strategic planning process. Some scholars have attempted to simplify the role of organizational planning models as tools for organizational management, by claiming that organizations planning is usually based on a singular planning model across all forms of organizations at any single given time in the life of the organization [3]. Yet others have argued that the fluidity of organizational functions, including planning, ensures that there is always the changing nature of organizations, besides the fact that each organization is unique. As such, this school of thought argues that there cannot be a singular model of strategic organizational planning that traverses all organizational functions with optimum use and applicability. Just as the complexities of everyday experiences of individuals, organizational strategic planning is a complex endeavor that cannot rely upon a single planning model to suit all situations of organizational planning. Despite the fact that there exists not a single strategic planning model adoptable in all circumstances of organizational management practice.

A study recognized the role of strategic planning models in organizations by highlighting empirical evidence from other previous studies [3]. The study also noted that situations exist in organizations that limit the applicability of any viable model of organizational strategic organizational planning. That certain conditions in organizations may render the need for a given strategic planning model irrelevant or ineffective in terms of use. According to [6], the following situations are not suitable for a given planning model in organizations: when the organization's financial position is deteriorating; when the style of leadership adopted in the organizational management model is autocratic; when a brief significant threat or upheaval that threatens the normal functioning of the organization is prospective. Included in this array of exceptions include organizations that are small in size with a limited function set that is based on a clear mission and vision, and whose track of functions is linked to the organizational goals and objectives. Small organizations are believed to be able to easily track the records of what is being done and can easily identify ways of achieving it. In general, however, strategic planning remains a hallmark tool for improved organizational performance in terms of achievement of the goals and objectives of the organizations.

The evolution of strategic organizational planning models, as tools for organizational management steering towards desired goals and objectives, has been tremendous in the recent decades. The evolution of the models has been sanctioned by the need for the models to suit the changing organizational cultures and needs, as well as the need to understand the strategic dynamics of organizations in a given operational environment. Certain planning models have notably survived the changes and have been the subjective of various empirical studies that aim at improving the outcome for organizations.

Some basic characteristics of organizational planning models have been highlighted by various researchers. These elements of organizational planning models are the hallmarks of an effective strategic management planning framework. Such a framework must have a strong means of ensuring the setting of organizational objectives geared towards the long haul performance of the firm. Secondly, an effective strategic organizational planning framework must also be based on a thorough analysis of the factors or variables internal to the firm as well as external variables at play within the environment of operation of the organization. According to [8], these variables must be taken into consideration because they give rise to the most fundamental problems and issues which are to be addressed by the strategic management plan. Thirdly, an effective strategic planning model must also be capable of generating strategically important options for solving the most critical issues facing the organizations. Such a means allows the decision makers the ability to select the most important issues for redress from an array of prioritized affecting the organization. Fourthly, an effective strategic planning model for any firm must consider a means for deciding the most appropriate choice from among the given set of functional and operational options. Finally, an effective organizational planning model must also be based on a visible means of enabling the monitoring of the outcomes or results of the implementation of the models' strategies.

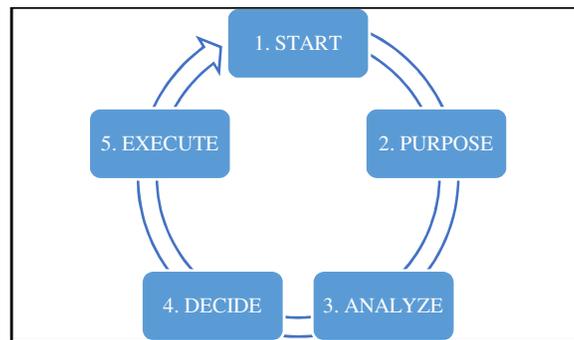


Figure 1: Process for modeling organizational planning

Due to the extensive nature of organizational management, numerous studies focused on the topic have developed some important planning frameworks or models which potentially suit organizational management planning needs in different contexts and style of organizational management. The existence of many models to adopt for planning strategic organizational functions means that decision makers must rely upon an effective selection and assessment criteria for the most appropriate planning model to their context. Table 1 offers a summary of the most common criteria firms use when considering the most appropriate strategic planning model for managing a selected set of issues involved in the daily functioning of the organization. These selection factors are further discussed in the subsequent paragraphs of this section.

No.	Issue considered
1.	Organizational environment
2.	Organizational size
3.	Organizational health
4.	Organizational attitudes
5.	Organizational development state
6.	Purpose of the organization
7.	The organizational structure

Table 1: Factors Influencing the Selection of a Strategic Planning Model

When selecting an appropriate planning model, the organization takes cognizance of the environment upon which it operates. The influence of the environment in modeling organizational functions is significant in terms of the environment stability, or lack thereof, determining the duration and sequencing of various issues or components of the planning process. Stable environments allow for a thoroughly considered comprehensive planning process, as managers involved in the process have ample time to analyze a great deal of data and to undertake the necessary extensive consultations. In such cases, the decisions reached are generally effective in realize the goals and objectives of the organization. On the other hand, when planning decisions are considered in turbulent circumstances, the decision process is bound to be hasty and imbued with numerous errors. According to Steiner, the type of influence exerted on the organization by the environment, internal or external, has the potential to determine the particular strategic planning model employed by decision makers undertaking the planning as a management function [7]. The environment of operation of an organization includes variables such as legislations and regulations that have a controlling measure on the kind of operations a particular business enterprise can undertake.

Model selection for planning purposes also takes into account the structure of the given organization. According to Galli the various aspects of the structure of the organization may need to be readjusted in order to achieve the goals of a particular planning model [6]. Structural aspects of the organization particularly important include such issues as geographical scope of the organization, the kind of managerial accountability structures considered in the particular organization, as well as the multiplicity the lines of business that exists in the organization. Furthermore, the model selection process will also consider the question to do with the players involved in the relevant decision making processes. An effective data-driven mathematical planning model will also heavily rely on the potential sophistications of the required data gathering mechanism so as to enable effective decision making and better outcomes for the organization.

Some studies have highlighted the role of stage of organizational development in determining the choice of an effective strategic planning model for improved organizational outcome. During the planning process, an organization's position in terms of its life cycle is also critical in determining the most appropriate and predictive panning model [7] [8]. Others have argued the role of strategic planning modeling is reduced in organizations or small startups with heavy leanings towards entrepreneurial or missionary agenda, or by firms focusing their business strategies on a given market or market segment. These organizations or business process tend to overlook the planning process, and no strategic formal model, or efforts the development of such tools of organizational management is required. Also included among these set of exceptional circumstances in the planning decision making, are situations in which the organization is involved in the pursuit of a new invention. However, along the growth curve of the organization, the expansion demands for the introduction of more personnel as well as additional professional organizational management practices for better organizational performance. Under such growth and expansion scenarios, the decision models for planning organizational functions become paramount

as they form part of the formal professional management practices that every serious organization must adopt in order realize its business goals in a complex but highly competitive business environment. Notably, firms considering planning models for introductory or initial business operations tend to rely on less complex planning as compared to firms that have developed into complex structures with a multiplicity of functional structures [7].

Another critical factor that potentially determines the choice of planning model is the purpose of the organization, in terms of whether a firm is a for-profit or a non-profit organization. When developing planning models for nonprofit organizations, a series of complex issue arise that must be taken into account various stakeholders along the planning process. Nonprofits further complicate the modeling process by usually involving many aims and objectives, besides demanding for the inclusion of a larger number of stakeholders or groups with diverse interests in the planning process. Furthermore, nonprofits tend to cover a wider business scope, which befits a clearly structured planning model, as an effective management tool for realizing the goals and objectives of the organization [6].

Organizational attitudes have also impacted the kind of models adopted for planning the functions of the organizations. Traditionally, or through the style of management, some firms and individuals employed in them have adopted varying attitudes towards involvement in formal processes of planning. For instance, academic institutions take cognizance of a set of issues to do with the formal status of the persons directly or indirectly involved in the planning process and in general management decision making, which may not necessarily correspond to the demands of a hierarchically structured managerial accountability in the organizational management functions [2]. Thus these different systems of administrations impose different attitudes to the planning process as cause the need for a separate set of lines of planning data analysis as well as decision making, and also determining the flow of opportunities for different groups within the organization to be involved in the deliberation of fundamental issues to be addressed by the planning process. Some organizations may limit the over-formalization of various issues altogether, including the planning function that they perceive as excessively bureaucratic or rationalistic in nature. Thus a good planning model must take several issues into account.

The influence of the health of an organization in the planning model selection process has also been the subject of previous studies. When organizations are in distress situations previously highlighted, planning may be limited in such circumstances. Firms experiencing turbulent times may decide not get involved in the strategic planning process, and small firms in such situations may be able to manage the strategic planning function through informal structures and organizational thinking processes. The argument is that an enterprise facing challenging circumstances is more likely to prioritize its focus in the rescue or winding up process as opposed to the long term processes of the planning function for improving organizational performance. In this regard, an organization whose management style is generally autocratic in nature is more likely to waste time and other organizational resources if it engages in elaborative participative planning processes, because there is a higher probability that the autocratic manager will overrule or bypass most of the participative decisions undertaken by the collective members in the organization. Notably, when a firm faces a potential major upheaval, there is likely to be a decrease in the quality of decisions reached towards the planning process. In such circumstances, the solution is deferring all forms of major strategic planning functions to a later period when things have changed in such a manner that allows for the adoption of a strategic planning model in a bid to improving the performance and business outcome for the organization.

Simulating organizational strategic planning provides organizations with an instrumental methodology for researchers to advance theory and conduct studies of complex organizational structures and processes. Despite these potential benefits for management decision making these tools have been slowly embraced in the organizational management processes as compared with their adoption in related social science fields. Establishing an understanding of these models by managers is a potential method for extending their embrace and adoption by firms so as to initiate improved planning decision making for better organizational outcomes [5].

Several previous studies have presented the organization through the lens of a mathematical model and views an organization as a complex structure of informational as well as co-informational functions and processes. According to [4], the organizational structure consists of inputs and outputs of energy, material, and information which organizational management manipulates through another set of transformative function types including preparation, input, material processing, output function, delivery mechanisms, as well as emission or storage of the output. The study was based on an emphasis of organizational management processes involving the use of information technologies, which have the potential to diminish the role of organizational hierarchies in the management process thereby ensuring that a flatter structural model of the organization emerges [4]. The role of information technologies in structuring the organizational resources is thus very strong.

The basic strategic planning model is considered by small organizations with little or no previous strategic planning experience. Usually, such firms undertake some basic planning process in initial entry years, only to be embellished in later phases as the organization expands in terms of functions and complexities so as to enable the management ensure a well-rounded enterprise planning process. The implementation of the model is done by the top-level personnel in the management cadre. The simple or basic strategic planning model takes the shape shown in Figure 2. Accordingly, the steps involved in the planning process include: first, the purpose identification seen in terms of the organizational mission statement. The mission statement summarizes the reason for an organization's existence, and describes the consumers being addressed by the very existence of the organization. Notably, this statement serves as the guide towards the goals of the organization, and is usually developed by the top level management [9]. Secondly, goal selection is another step in the simple model, and identifies the goals an organization ought to reach if mission accomplishment is to be realized. Thirdly, there is the identification of the specific strategies or approaches for implementation in order to realize the goals of the planning process. Accordingly, such strategies must be dynamic in order to deal with challenges and changes that emerge as organizations become more complex and management procedures become entrenched in high levels of complexities for robust management strategic planning functions. The change in complexity is often a function of conditions in the internal and external environments. Fourth, the next phase of the simple model is the identification of specific action plans that help in the implementation of each planning strategy. In this phase, specific activities are aligned with each major management function that must be undertaken in order to ensure the effective

implementation of each functional strategy. Clearly worded objectives are preferred so as to enable easier assessment and evaluation in terms of whether they have been met as outlined. Fifth, the final phase in the simple strategic planning model is the monitoring and process evaluation. The objective of planning in at this stage is allow of the updating of the strategic plan. Decision makers involved in the planning process undertake regular reflective analyses of the extent of the success of the goals as well as on the status of the implementation of the outlined action plans. Measures entrenched in the model can be critical feedback mechanism linking the customers’ needs and the achievement of the goals, which serves as success indicators [1].

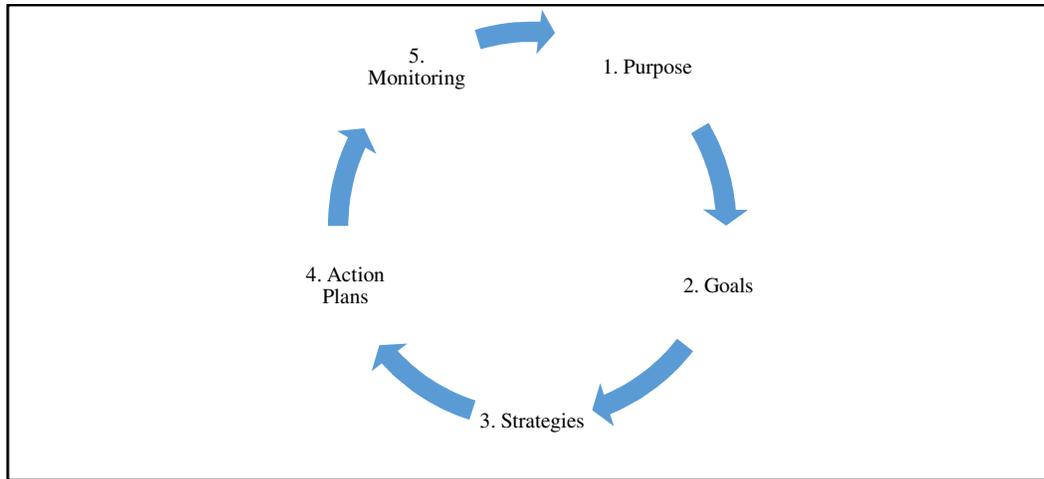


Figure 2: General process of strategic planning

Although the simple strategic planning model is devoid of mathematical modeling approach, most mathematical models have been generated from its basic ideas.

3.2. Results of Mathematical Modeling of Organizational Planning

Organization Organizational planning function is a critical component of the larger domain of organizational management. Often, organizations evolve from the simple model to a more advanced goal-oriented or issue-based model. As an organizational management model, the goal-oriented model is preferred because of its comprehensiveness and practical applicability towards a more effective planning method. Table 2 offers a summary of the view of the issue based planning model as it could be applied in the real organizational management context. Notably, strategic planning models are meant to cover a short duration of time upon whose expiry a reevaluation process is undertaken, usually one year, or a given interval for multi-strategic planning models. Mathematical models are developed in order to enable decision making when allocating resources towards the planning models activities for effective implementation.

No.	Activity
1	SWOT analysis of internal and external evaluation
2	Strategic analysis for identification and prioritization of major goals or issues
3	Programming Designing key strategies to address the issue
4	Designing/Revising overall vision, mission and organizational values
5	Developing action plans including objectives, roles, and resource needs
6	Recording issues, goals, programs, vision and mission in a strategic plan document
7	Developing operating plan document
8	Budgeting for the planned operations
9	Implementation of the planned operations

Table 2: Summary of the Goal Oriented Planning Model

SWOT analysis in the model implies the Strengths, Weaknesses, Opportunities, and Threats faced by the organization [7]. According to the model, the organizational strengths are the internal variables that enable the organizations to exploit and optimize returns from opportunities that exist with the operating environment, commonly the market. Weaknesses, on the other hand, are internal variables that limit the prospect of an organization exploiting the opportunities available or derail the maximization of returns from marketplace environment. Opportunities of an organization, as defined in strategic planning models, include potential or real external conditions and situations which an organization could exploit under right circumstances and appropriate planning. Threats, on the hand, are potential or real external conditions and situations which could potentially limit or hamper an organization’s effectiveness and reduce its competitiveness, if not addressed in proactive ways.

*SWOT = Strength, Weakness,
Opportunity, Threat* (1)

Another model that has been widely used in the management of organization is the alignment model. The main function of the alignment model is enable decision makers achieve a strong alignment of the overall goal, mission and objectives with the resource capacity of the organization in order to be able to manage the resources effectively for better outcomes and the overall wellbeing of the organization [6] This model is particularly useful for firms that seek to achieve a further refinement of their programs or strategies as a way of improving organizational performance. It is also applicable to organizational situations where planned activities and operations are not going according to the strategic plan. According to [7], alignment models are useful in circumstances in which the organization experiences an increased number of issues concerning internal organizational inefficiencies, as way of addressing the potential problem areas. The effectiveness of the alignment model is further achieved when it is used in combination with other planning models. As shown in the summary of TABLE 3, the alignment planning models are considered as tools for corrective decision structures.

No.	Activity
1	Outlining the organizational mission, strategies or programs, resources, as well as required support.
2	Identification of effective areas and areas that need readjustment
3	Identification of ways of making adjustments identified
4	Incorporating the identified adjustments into the strategic plan

Table 3: Overall Process of Alignment Strategic Planning Models

Scenario planning models have also been the basis planning organizational resources. Scenario planning approach t strategic planning is one of the models that fully encompasses strategic thinking principles, and enable organizational planners in undertaking the identification of strategic goals and issues with considerable impact on the performance of the organization [2] [8]. The model is summarized in the TABLE 4, which offers a simplified view of a very complex model.

No.	Activity
1	Identifying/Selecting potential external factors influencing the organization and their impact
2	Review different future organizational scenarios influenced by the identified factors
3	Suggesting measures under each future scenario as an organizational response to the best, neutral and worst case scenario factors
4	Identifying common strategies for responding to external factors
5	Selecting the factor with the highest probability of influencing the organization and establishing the most appropriate strategies feasible in responding to the potential change scenario.

Table 4: Summary of Activities Common in Scenario Planning Models

Despite their potential to guiding organizational management decision making in executing planning functions, the traditional planning models so far discussed above have been viewed as offering a linear view of a complex management process [7]. These deficiencies have led to the development of more natural organic models which takes into account the continual discussions of issues.

In general, though, strategic planning models helps organizational management determine the direction of the organization within a predetermined period, both in the short run and long run throughout the life of the organization. The planning models also determine and structure the procession towards an organizational target or goal, and provide a feedback mechanism for evaluating the process towards the goal by analyzing the achievements realized thus far and comparing the planned outcome desired in order to determine whether the organization is on the right track. As opposed to development of business plans, strategic planning process encompasses an entire organizational environment in an organic and dynamic management environment, and not focusing on a particular program, service or product within a fixed duration, as is common practice in business planning.

Despite the potential benefits of strategic planning, some challenges emerge that may derail the progress towards organizational goals and objectives for which strategic management is undertaken. One of the notable drawbacks to strategic planning is the potential lack of organizational leadership. According to [7] [10], an organization will fail to meet its strategic goals of the strategies or programs are not given enough supportive function by the top-level leadership. The leaders must emphasize the important role of strategic planning from the initial stages of the planning process all the way to final stages in order to entrench the goals and missions of the planning model within the organizational setup. Furthermore, organizational managers offer the leadership role as they guide the organization towards its vision and mission through strategic thinking processes. Strategic thinking enables the organization to remain on course in the procession towards the goals and objectives of the plan [6] [7].

Another problem that has hindered the development of effective planning models is the common phenomenal of lack of consensus in organizations. Strategic planning is one area in the management process that is heavily driven by consensus building. Consensus building promotes communication, collaboration and participation in organizational functions. It provides a formal and informal platform for airing organizational conflicts and dealing with the unavoidable political struggles. Other studies have highlighted the failure to synchronize the panning model into the organizational culture as a potential hotspot for planned failure.

The focus on the previous sections of the research has been on theoretical aspects of strategic planning process. In this subsection, a focus is given to the application of mathematical modeling to the organizational planning practice. An analysis of various mathematical

models is given. A hospital organizational management can implement the simple mathematical model proposed for strategic planning for booked admissions of patients being introduced to a health service scheme [3]. The model's analysis takes into account the variability of length patient stays as a limiting factor that potentially causes an increased level capacity requires in case booked admissions are introduced. The planning model is based on a simple mathematical model. It assumes that a surgical unit books N number of admissions in a day of operation, all of whom are present at the time the investigator collects the data. As such the length of stay is assumed to be the only source of variability in the model, assuming also that the patient population that is the subject of study is homogenous in nature. The model proposed takes the following form (2).

Where p_i represents a measurement of the probability that a given patient would still be a resident of the hospital facility on the i -th day after the date of admission to the facility. According to the model, there is a steady state of probability of k beds that are being required on any given operational day and is the value of the coefficient of x^k in the established power series. If variability is not taken into account, there is high chance of bed requirements for the hospital admissions would be estimated as N multiplied by the average or mean length of stay of all booked admissions. But as implied by the model (1), the hospital facility would experience frequent phenomenal overloads of bed spaces. In such scenario, an attempt at reducing the possibility of such overloads to manageable would require that capacities be increased by a reserve of at least a quarter of the total bed spaces.

$$Q(x) = \left[\prod_{i=0}^{\infty} [(1 - P_i) + p_i x] \right]^N \quad (2)$$

On the basis of the information provided by the model, the management of the hospital facility, as an organisational entity, can thus be able to plan for the appropriate number of bed spaces available for admission intakes. This ensures that hospital resources are optimally used in an efficient and effective manner. In effect, mathematical modelling has informed effective decision making for better outcomes for the organization. Although this model illustrates the role mathematical modelling as a decision tool in the planning processes, it is much simpler and cannot effectively provide a full representation of the real world planning environment. Hence the need for a better and more comprehensive model that can capture the real world scenario.

A stochastic mathematical model has been developed in order to determine the real number of beds needed in a single hospital ward as a function of a number of factors [3]:

- numbers of the total booked patient admissions for H number of health groups (HRGs), according to a given planning cycle – in this case the planning cycle is taken to be a day of the week;
- the mean or average number of emergency patient admissions depending on a given day of the week;
- length of patient stay distribution, which depends upon the day of patient admission, emergency or elective status, and on HRG;
- the DIN^T category, of those who did not attend, a function of HRG;

When applied to hospital contexts with a regular cycle of booked patient admissions, the closed analytical method is applicable, based on the formula below, in order to estimate the mean μ_d and also the value of the variance D^2_d of the total number of bed spaces required on a day d of a given planning cycle covering a period of C days.

$$\mu_d = \sum_{h=0}^H \sum_{c=1}^C n_{h,c} \sum_{w=0}^{\infty} P_c^h (wC + d - c) \quad (3)$$

$$\mu_d = \sum_{h=1}^H \sum_{c=1}^C n_{h,c} \sum_{w=0}^{\infty} P_c^h (wC + d - c) \\ c) (1 - P_{c,(wC+d-j)}^h) + \sum_{c=1}^C n_{0,c} \sum_{w=0}^{\infty} P_{c,(wC+d-c)}^h \quad (4)$$

According to the above formula, for **1.h. H.**, $n_{h,c}$ corresponds to the average number of emergency patient admissions at the ward. The quantity represented by $P_{c,i}^h$ provide a measure of the probability that an admitted patient would still be resident at the ward i number of days after the booking day of admission, a function of the day of the cycle on which the booking is done and the value of the HRG.

The above two equations (3) and (4) are algebraic in nature, but they provide an insight into the planning and operations decision making processes due their linearity in respect of variables $n_{h,c}$. A further mathematical analysis can be able to formulate an optimization problem that seeks to establish some meaningful patterns of inpatient admissions at the facility [3]. An objective of the strategic planner of the hospitals operations would be to establish the minimization value of the maximum expected hospital facility bed overload during the planning cycle, which form the constraints that correspond to the total number of patients taken from different HRGs who need to give treatments. Such a model would be even more effective in terms of being able to capture larger sets of data when applied in computer driven computation environment. The computer software developer integrates the optimization function into the software computational environment, such as is the case of mathematical spreadsheets like Microsoft Excel. The user can then be able to run simulations based on the objective function of the optimization model [5] [10]. In all cases, these models represent mathematical modeling as a very important powerful tool for enabling organizational planning decision making.

This model seeks to minimize drawbacks within the hospital system, as a management planning-related functional problem. The issues involved in the hospital management processes encompass a territorial boundary demarcation beyond a mere unit or ward and involve processes concerning the progression of the hospital's patients through a series of successive care functions and processes in the hospital

environment, each process being undertaken within a distinct location. For instance, patients may move from a ward to an operation theater, or may be to an intensive care unit, from where they are transferred back, and ultimately discharged.

With a sufficient amount of data an analyst can formulate a model that depicts the journey undergone by the patient along the care processes based on location-probability distribution dichotomies, as illustrated in Fig. 3. Applied to the general case, this problem can lead to a formulation of the patient’s booked admissions pattern that is cyclic in nature. Such a pattern would be drawn based on data recorded during a planning cycle covering a period of C days, a record of patients processed in H number of different HRGs. The analysis proceeds as in the previous two equations (3) and (4) that helps in the estimation of the of the parameters representing the mean as well as the variance of the demand for hospital beds in each of the individual K number of different hospitals represented by index k.

In this model, $g_{h,k}(P)$ and $f_{h,k}(P)$ are closed-form analytical expressions, a function of the probabilities of patient processions. A hypothetical results simulation of sample probabilities can take the form shown in Fig. 4 below. The model represented by (5) and (6) is important since the equations provide a means for introducing a mathematical methodology called integer programming which allows for the establishment of the problem areas in the hospital environment and consequently leads to the decision making processes as to whether to allocate more investments resources in the purchase of new hospital beds for better functioning of the hospital system [3].

$$\mu_{d,k} = \sum_{h=0}^H \sum_{c=1}^C n_{h,c} f_{h,k}(P) \tag{5}$$

$$\sigma^2_{d,k} = \sum_{h=1}^H \sum_{c=1}^C n_{h,c} g_{h,k}(P) \tag{6}$$

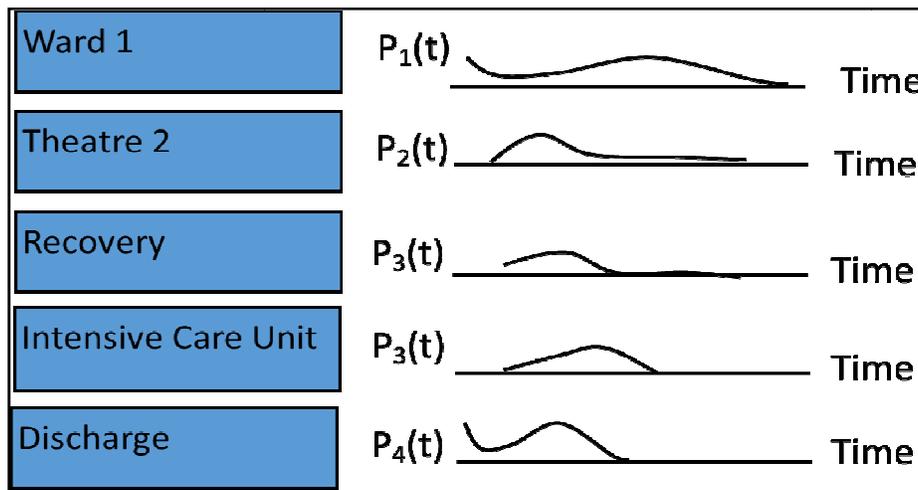


Figure 4: Shows patient location probability distributions as a function of time from distribution

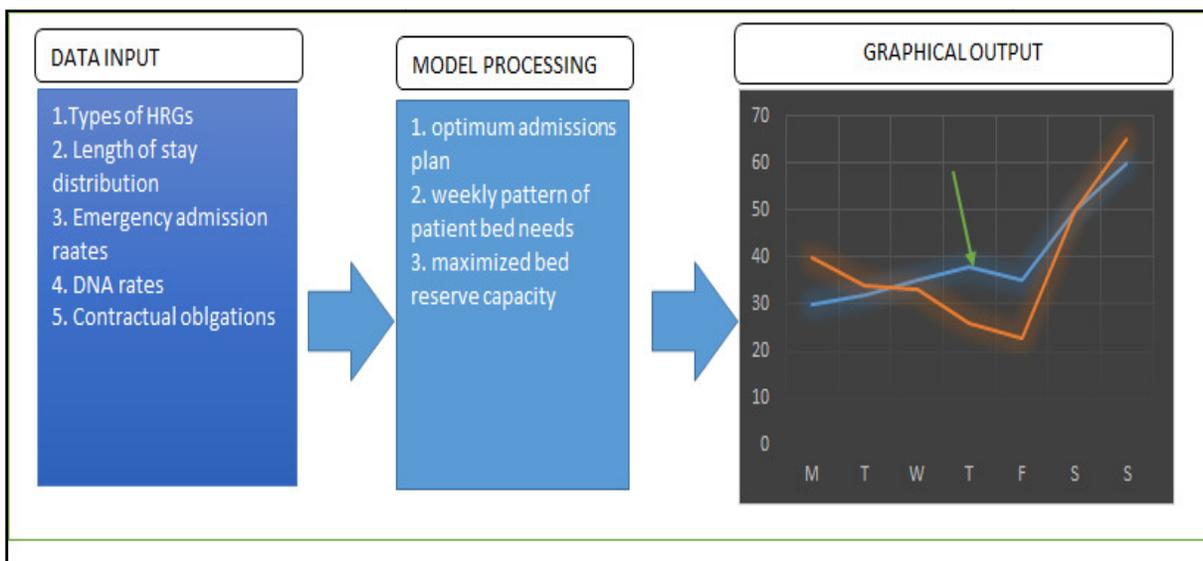


Figure 5: Shows results of a sample simulation of the hospital bookings model; arrow points to the optimization value of bed space reserves

3.3. Research Outcome and Analysis of Results

The outcome of the research study springing from the analysis of empirical evidence point to the fact that strategic planning is an important organizational management function. Strategic planning models based on mathematical modeling and computational science is implanted different organizations based on several factors. It was noted that small and initial entry startups will prefer less complex unstructured strategic planning models. On the other hand, experienced organizations are more inclined to implement planning models that are both mathematically based and which are integrated with information communication models developed in computing science methods. Thus the decision of whether to select a more complex or simple planning model.

The results of this research highlighted the factors that determine strategic planning selection including organizational size, organizational health, the attitudes of the organization towards the planning process as an instrumental management function, the state of development of the organization, the structural makeup of the organization, and the purpose of the organization. Organizations can improve their effective and efficiency in management of the resources bestowed upon them by implementing strategic planning models so as to enable a structured progression towards the goal and objectives of the organization. Information technologies can further enhance these prospects for through the adoption of management information systems or software in order to help in the planning process, particularly in organizational contexts where huge arrays of data are involved in the analysis.

The research discovered that strategic planning models of organizational management can generally be categorized into the basic strategic planning models which are both linear and nonlinear in nature. In the complex organizational environment nonlinear strategic planning models provide a clear representation of the complexities that exist in the organizational environment as well as the variables, both internal and external, that influence the management practice and processes.

4. Discussion

This research sought to analyze strategic planning models as tools for effective organizational management decision making framework. The purpose was to highlight decision models which can to enable managers directly involved in the organizational planning process to undertake empirically driven management functions. As the first hypothesis implies, the empirical evidence generated from the literature provides a conclusive result that strategic planning models are a critical tool for structured decision making in terms allocating roles and functions across the multiple organizational resources, both material and human. The general findings of this study offer support for the claims of the effectiveness of these models with respect to the proposed hypotheses that guided the research.

The empirical evidence provided in this study provide answers to the research questions, thereby enabling the achievement of the aim of this study. Effective strategic modeling, as a management function, improves decision making prospects for organizations and managers undertaking planning decision in a dynamic and complex organizational environment. The findings show that while planning model selection depends on the needs and the stage of growth of a given organizational context or circumstances, the theoretical conceptualization of the models are more or less the same. In generally, the development of mathematically driven models which integrate with computer and information technology driven models, have their inherent bearing on the basic linear and nonlinear or organic models discussed in this study. However, the common feature among these models is their potential to improve decision making process in the context of modern organization in ways that bring about efficiency and effectiveness while limiting the uncertainties associated with haphazard decision choice selection devoid empirical grounding.

The findings of this research provide empirical evidence that corroborates the existing literature as gathered from the review and analysis of previous research studies. Mathematical modeling and computing modeling enhance the prospects for effective strategic planning, a very important management function [5] [3]. Strategic planning models enhance the decision making in planning for the functions and activities as well as human and material resources at the disposal of managers [2].

Although mathematical and computing models have been developed in order to improve the management practice in modern organization, the application of these methods and techniques differs from organization to organization, depending on a number factors. These factors the determine the level of embrace and the nature of implementation of these techniques and methods to management practice in a given organizational environment, include the organizational structure, the management style, the size of the organization as well as the organizational attitudes towards the general strategic planning process [4]. Although, these have not been conclusive in the coverage of strategic planning models, it was noted that such conclusive study and analysis is difficult as a result of the dynamic nature of the organizational environment and the existing differences in the goals and interests of organization for which strategic planning may be a necessity. Small or startup organizations are likely to adopt less complex and unstructured strategic planning models in their long term and short term operations. On the other hand, large and complex organizations may embrace more advanced and computer technology driven planning models in their strategic decision making processes [4].

5. Conclusion

Organizational management is the process of manipulating organizational resources so as to ensure that desirable outcomes are achieved. The issues involved in organizational management are wide, although the conceptualization of management is quite straight forward. In a complex organizational environment, there is bound to be some inherent uncertainty as well as unpredictability in the outcomes of management functions as a means of interactive manipulations of both material and human resources of the organization, which require dynamic decision making. Strategic management models provide strong decision making frameworks that are able to reduce the uncertainties involved in organizational operations by laying down both linear nonlinear processes for recognizing and addressing changes caused by internal and external organizational influences. Planning models enable managers to cope with challenges arising from within and without the organization by ensuring that such uncertainties are planned for well in advance. Thus, the organization becomes resilient and flexible to changes and surprises that are inevitable in the organizational context. Planning models

based on mathematical modeling also provide a formidable decision making that lessens the reality of trial and error methodological approaches to the management of complex organizations. However, strategic planning models do not generate direct and easy solutions to problems faced by management. Instead, the models produced only a simplified view of reality, and may apply only to unique set of organizational management situations or in addressing problems experienced by a particular organization. Nevertheless, strategic planning models, as a subset of organizational management, offer a greater potential when effectively designed and applied in a way that is appropriate to the given organizational situation.

Strategic planning models helps organizational management determine the direction of the organization within a predetermined period, both in the short run and long run throughout the life of the organization. The planning models also determine and structure the procession towards an organizational target or goal, and provide a feedback mechanism for evaluating the process towards the goal by analyzing the achievements realized thus far and comparing the planned outcome desired in order to determine whether the organization is on the right track. As opposed to development of business plans, strategic planning process encompasses an entire organizational environment in an organic and dynamic management environment, and not focusing on a particular program, service or product within a fixed duration, as is common practice in business planning.

This study has highlighted a variety of models, perspectives as well as approaches that are practically applicable in strategic planning in the context of the organizational environment. The development of a strategic planning model is a function of so many factors including organizational leadership, organizational culture, dynamism and complexity of the organizational environment, the organizational size, as well as the technical and non-technical expertise level of the planners. The complexity of the model also depends on the kind and scope of the plan being sought. While basic planning models are scoped to cover one year, the scope varies depending on the purpose and goal of the strategic plan, with varying contents and lengths across the organizations. In all cases, however, the role of strategic planning models is entrenched in terms of clarifying an organization's plans of action and help ensure that critical management decision makers are in tune with the dynamics within the organizational environment. Importantly, the actual modeling of the strategic planning process is critical in effectively and efficiently managing modern organizations towards better.

Mathematical and simulation models are increasingly getting entrenched in the organizational decision making processes, including strategic planning of various management functions [1]. Despite their notable benefits, it must be noted that the modern organizational manager faces a myriad issues related to the dynamics within the organizational environment. These challenges require decisive models that are dynamic and can be applied in response to dynamic problems that emerge in course of day-to-day operations of the manager. Some mathematical models have been highlighted that illustrate the embedded role of mathematical models in enhancing decisions of the modern manager so as to ensure better outcomes for the organization. Further research is necessary in this field to improve the incorporation of the new computer technology innovations towards making modeling and organization management easier as well as providing the ability to process large volume of data within a short time.

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