

# Exploring the Situation of Strategic Management Tools and Techniques in the Context of The Egyptian Construction Industry

Muhammad E. A. El Shennawy  
PhD, Construction Engineering Department,  
Faculty of Engineering, Zagazig University,  
Zagazig, Egypt.

Ahmed H. Ibrahim  
Professor, Construction Engineering Department,  
Faculty of Engineering, Zagazig University,  
Zagazig, Egypt.

**Abstract:-** The overarching aim of this study is to answer the question, to what extent the strategic management tools and techniques be conveyed from the traditional business activities to the Egyptian construction industry sector? Through exploring the situation of strategic management tools and techniques in the context of the Egyptian construction industry. A list contains thirteen common strategic management tools and techniques come with full necessary knowledge was prepared and submitted to managers to give them an overview about the definition, origin background, applications, and purpose. The aim was to examine strategic management tools and techniques against the following criteria Publicity, Familiarity, Necessity, Capability and Applicability of strategic management tools and techniques. The quantitative approach was conducted via a questionnaire survey to gather empirical data from 104 expert managers in the Egyptian construction companies. The study investigated expert managers opinions about the common strategic management tools and techniques based on a pre-determined criteria. The study revealed that most of the strategic management tools and techniques which gained high level of estimated criteria are belong to two groups: power tools (SWOT Analysis), and the traditional tools (STEP analysis, Porter's 5 forces, Value Chain Analysis). The results provide essential information on the application of strategic management tools and techniques in the context of the Egyptian construction industry.

**Key Words:** Strategic Management, Tools and Techniques, Construction Industry, Egypt.

## I. INTRODUCTION

Historically, modern project management may be began (early 1900s) when Henry Gantt's developed his famous creation known as "the bar chart". In the 1950s, different project management tools and techniques developed for the purpose of military plans creation and developing aerospace projects. Over the past seven decades, strategic management has witnessed a booming in the usage of management tools and techniques [1]. The strategic project management tools and techniques grown in the 1960s, it were developed in the 1970s. In this era the project management tools and techniques tended to focus on the implementation phase of the project life-cycle [2]. This phase includes the main stream of old-fashioned project management tools and techniques which depend on the assumption that the project goals can be broken into constituent elements. When goals are not yet defined, it may be vital to use distinct problem configuring techniques before applying traditional project management tools and techniques. Of course the

implementation phase is very significant and necessitated a supreme intensity of attention and efforts where the majority of the expenses were incurred [3]

Accordingly, strategic project management tools and techniques were integrated in the 1980s into conventional practices. In this time, there was a significant increase in the influence of external stakeholders, the green issue, and this create expanding stresses on managers to realize conventional solutions to satisfy all the stakeholders. The attention was commencing to transfer and concentrate more on "the front-end" of the project that had the greatest opportunity to add value and satisfy the project stakeholders [2]. The front-end methodology concentrate on analyzing stakeholder's needs, preparing feasibility studies, risk and uncertainty assessment and designs of the products or facilities. The innovated tools and techniques in that time were concentrated on investigating internal and external factors which can influence the performance of the firms. The utilization of customer satisfaction analysis, market segmentation, customer complaints analysis, customer profitability analysis, reflects the interest in customers. These tools allow companies to better understand and satisfy the needs of company's customers [3] [3]. Furthermore, the front-end methodology pay further attention to the costs projects delivery and the changes because of design errors or the client changing or any expecting variation in costs during the progressive of projects. In the present day, the rapid changing in technology, extreme competitive markets and a powerful environmental interest group have all forced companies managers to switch their management systems targeting to adopt or go to meet their maker conditions [4][5]

Traditionally with the growing number of strategic management tools and techniques in business firms has become more of a science and discipline as accepted practices, it described and validated in the worldwide body of knowledge and certificate programmers [4]. The fundamental contribution of the strategic management tools and techniques is to enable project managers to formulate their business case for improving their current product or service just as submit a new product or service. The strategic management process fulfilled for development products or submission a new product or service must be outlined in sequence for this integration to work environment [3] [6].

Principally, in construction industry projects the integration of time, cost and quality was initially presented as a triangle of balanced requirements, where a change in one parameter could affect the others. Later this was linked by the scope of project and the organization breakdown structure (OBS) to point out that the scope of work was performed through the organization structure. Consequently, strategic management practices became more essential for that companies which are involved in construction activities such as real estate and contracting companies and consulting [7]. For construction managers the question became what is the appropriate strategic management tools and techniques should be handled at their companies. Numerous strategic management tools and techniques keeping up with the latest and greatest, as well as deciding which tools to put to work, is a key part of every manager's task. It must also be practical how to decide which project management tools and techniques are appropriate for work environments and adapt these tools to manager's needs [8]. Strategic management tools and techniques consider the primary element for achieving and developing the strategic planning and management practice in all steps of strategic management process, from the strategic analysis to strategic selection. Several tools and techniques can enhance managers to accomplish their requirements for the duration of investigation the organizations strategic position when preparing for strategic planning and management. The intention of this paper is to explore the strategic management tools and techniques in the context of the Egyptian construction industry through applying quantitative research approach. The strategic management tools and techniques support construction projects managers in making strategic decisions in the direction of improve performance. Managers apply strategic management tools and techniques to clearly define the project goals, develop an execution plan to meet those goals, and meet the aims and end date of the project [9] [10].

The overarching aim of this study is to answer the question, to what extent the strategic management tools and techniques transferred from the traditional business activities to the construction industry sector?. To achieve that, this paper will try to acquire the following objectives which summarized as:

- To shed light on the strategic management tools and techniques for managers in context of construction industry and particularly for the Egyptian construction companies;
- To explore the situation of the strategic management tools and techniques in adjacent to the following criteria Publicity, Familiarity, Necessity, Capability and Applicability. Most notably that these criteria were suggested by the authors, and it will be used explore the strategic management in the context of the Egyptian construction industry [11] .This objective will carried out via questionnaire survey conducted and specially designed to get the perceptions of expert managers belonging to contractors, clients & developers, consultants and academics. Taking into consideration that the suggested criteria are referred to:
  - Publicity: To what extent the tool or technique is popular/common among managers?
  - Familiarity: To what extent the tool or technique is familiar/understood to managers?

- Necessity: To what extent the tool or technique is necessary to managers?
- Capability: To what extent managers are capable/able to use the tool or technique?
- Applicability: To what extent managers applying/utilizing the tool or technique? [12] [13]

- To investigate the level of managerial familiarity with the strategic management tools and techniques in the Egyptian construction companies;
- To submit advices, conclusions, and recommendations about utilization of strategic management tools and techniques and managerial based on the outcomes of research. [5], [14], [15].

This paper includes three main parts; the first part represents research background about management and strategic management tools and techniques, emphasizing the importance of choosing the appropriate tools and techniques with particularly concentrating on construction industry, and finally formulate the overarching aim of the paper and how to achieve it via specific objectives. The second part represents the literature review about strategic management tools and techniques, its benefits, usages, types, common types, and finally explain its importance for construction industry. Third part provide the research describes and the research methodology, statistical data analysis, findings of research and discussion. Moreover, this paper includes the limitation about research methodology and proposed further future work [16].

## II. LITERATURE REVIEW

The term of “strategic management tools and techniques” is used very widely; however there is no general accepted definition of what is meant by strategic management tools and techniques. Many academics provide different explanation for strategic management tools and techniques based on their individual vision and denote them by diverse means, such as management tools”, “strategy tools”. Thus, to submit clear understanding the term of strategic management tools and techniques (acronym SMTT) they are: different tools that support managers in all phases of strategic management from the strategic analysis phase through the strategic choice to implementation with the intention to improve some deficiencies in organization for better performance [17]. [18], [19]. Construction projects have more chances of risk occurrence as compared to other business activity. By careful selection of strategic management tools and techniques could allow improvements in efficiency and profitability of construction projects.

### A. Benefits of Strategic Management Tools and Techniques

The benefits of strategic management tools and techniques are:

- It claimed to solve practical problems,
- It can be adapted to a wide range for strategic tasks,
- Facilitating social interaction between strategy participants.
- Provided variety for creating thoughts that help and support decision.
- It designed to help the executives for analyze, understand the environment

*B. Usage of Strategic Management Tools and Techniques*

According to Armstrong, the strategic management tools and techniques can be applied in diverse fields as: 1) General management, 2) Marketing management, 3) Operations management, 4) Financial management, 5) Human resource management, 6) Information technology, 7) Management science, 8) Planning and resource allocation, 9) Efficiency and effectiveness, 10) Used as a powerful lever for solving problems, 11) Provide the basis for decision-making [20].

*C. Types of Strategic Management Tools and Techniques*

Based on the review and research of available materials, there are four groups of tools and techniques that used in strategic management.

- **The Power Tools:** it consider a wide-ranging with high level of both handling and settlement, and well established, an example for these tools is SWOT analysis.
- **The Traditional Tools:** it used frequently in Production and Service / Facility, such as Porter's 5 forces, STEP analysis, Value Chain Analysis.
- **The Performance / Improvement Tools:** it used to measure, appraise and get better performance in the

organization, for example, BCG's Growth Share Matrix, and GE Mckinsey Matrix.

- **The Marketing Tools:** It contains the tools and techniques that used to develop and establish marketing plans, such as marketing mix (4 Ps) [21], [22], [23].

*D. Common Strategic Management Tools and Techniques*

In this study, from an extensive literature review, the authors carefully chosen the following common strategic management tools and techniques. Also, submitted in brief a survey focusing upon four major points (of each tool or technique) which are the author or pioneer, year of submission, a short description of the tool or techniques, and finally area of application of that tool or technique. The selected common tools and techniques are: SWOT Analysis, PEST Analysis, PESTEL analysis, Porter's 5 Forces, Bench-marking, Balanced Scorecard, BCG's Growth/Share Matrix, GE Mckinsey Matrix, The Marketing Mix (4 Ps), VRIO Analysis, Value Chain Analysis, McKinney's 7 S, Life Cycle Analysis (LCA). Table (1), below includes these tools and techniques along with brief details as shown [24]. (See Appendix)

TABLE 1 COMMON STRATEGIC MANAGEMENT TOOLS AND TECHNIQUES. [19] {[22], [26] [27]}

No.	Tools and Techniques	Author / Pioneer	Year	Area of application
1	<b>SWOT Analysis</b>	Ken Andrews Harvard Professors	Early 1970s	Strategic Planning and Management Scanning of the Internal and External
2	<b>PEST Analysis</b>	Francis J. Aguilar	(1967)	Scanning of the External Macro-level Environment
3	<b>PESTEL analysis</b>	Arnold Brown	(1970)	Business Planning Marketing Research Product Development
4	<b>Porter's 5 Forces</b>	Michael E. Porter	(1979)	Competitive Position Analysis "Competitive Advantages"
5	<b>Bench-marking</b>	Angappa Gunasekaran	(1994)	Quality Management
6	<b>Balanced Scorecard</b>	Robert S. Kaplan and David P. Norton	(1996)	Performance Measurement and Strategic Management System.
7	<b>BCG's Growth/ Share Matrix</b>	Bruce Henderson Founder of Boston Consulting Group (BCG)	Early 1970s	Strategic Diagnosis
8	<b>GE Mckinsey Matrix</b>	Fred Gluck	In the 1970s	Strategic Diagnosis
9	<b>VRIO Analysis</b>	Jay Barney	(1991)	Resources Planning Competitive Advantage
10	<b>The Marketing Mix (4 Ps)</b>	E. Jerome McCarthy Updated by Philip Kotler	(1960) & (1967)	Marketing Strategies and Marketing Management Plans
11	<b>Value Chain Analysis</b>	Michael E. Porter	in the early (1980s)	Internal Auditing
12	<b>McKinney's 7 S</b>	Bob Waterman, Golden Bay, and Julien Phillips	(1980)	Strategy Implementation within Organizational Change
13	<b>Life Cycle Analysis (LCA)</b>	Choi et al. and Lu et al. ISO 14040 and 14044 Standards	In the 1960s - 1970s	Production Improvement
14	<b>Cost-Benefit Analysis</b>	French Eng. Jules Dupuit,, British, Alfred Marshall	1840-1950	Support Decision Making Process

*E. Strategic Management for Construction Firms*

A strategy is a decision or series of decisions made within an organization which determines its medium to long-term objectives, priorities and overall direction. It re-positions the organization in relation to its external environment including the availability of key resources. Strategic management refers to a set of processes comprising strategy formulation, strategy implementation, monitoring and control. The strategic management process is repeated and ongoing,

construction firms which establishing good strategic management practices can be characterized by:

- Formulating an overall strategy: at the strategic top level that is based on a combination of management knowledge, awareness, and perception of the surrounding situations.
- Organizing operational units to develop and submit their own plans to the highest board such that they can be consolidated into a particular plan;

- Establish planning departments to provide them with background information undertake analysis and develop the boards thinking into operating plans.
- Having the Flexibility: to change their strategies and adapt it with the conditions that may face them if the external and internal circumstances necessitate it [28].

### III. METHODOLOGICAL APPROACH

A research methodology sets out and justifies the techniques adopted for collecting, analysing and interpreting data. There are many research methods that can be applied, including interviews, questionnaires, one to one discussions, observation, experiments, etc [29]. One of the most common classifications of research methods is to classify it into qualitative, quantitative and mixed methods of research. The methodological approach applied in this paper takes the following steps:

1) *Literature Review*: this paper launched by looking over the relevant literature on crisis and crises management published by the crisis pioneers as well as academic journals to collect the essential knowledge about strategic management tools and techniques, this task of work was performed in the previous section. Conducting qualitative research about strategic management tools and techniques. This step belongs to qualitative research method which is 'subjective' in nature and involves an exploration of the subject without prior formulations, enabling an understanding through the collection of information and data [30].

2) *Quantitative Research: conducting a questionnaire* survey through postal mail to collect information from experts in managing construction project to poll their opinions about the criteria related to the strategic management tools and techniques in the context of the Egyptian construction industry. Walker considered the quantitative method for gathering data a hard stage of research. The data are often analysed using analytical or descriptive statistics, and this kind of quantitative research is 'objective' in nature [31].

3) *Submitting finding: of research results based by using the results of both quantitative and qualitative research methods.*

#### A. Questionnaire Survey

Questionnaires are widely used for descriptive and analytical surveys in order to find facts, opinions and views, they have the ability to provide results that can be quantified and so can be easily treated and analyzed statistically, it provides fast and straightforward results compared with other research methods [30]. A self-administered questionnaire was designed as shown below to gather primary data about the variables that may cause or lead to crisis.

#### B. Design of Questionnaire

In general, there is a lack of previous studies that concerned with exploring the strategic management tools and techniques in the context of construction industry due to the noticeable short in a well-documented and peer-reviewed available in the literature related to such topic. Identification of critical criteria for the study and preparation of questionnaire is a crucial step for the success of the research. To reflect the cross-section of the already available attributes

in the context of Egyptian construction, personal interviews with Egyptian construction experts were conducted [32]. The questionnaire was built with steady pattern; this makes response easier and more helpful data analysis. Beside the formal request for the questionnaire, its documents was composed of the following sections:

1) *Section 1*: Requests personal information about the respondent and his/her firm.

2) *Section 2*: Contains a list of common strategic planning and tools with an overview about the definition, origin background, applications, purpose of each tool and technique. The appendix was attached with Questionnaire.

3) *Section 3*: Represents the main body of questionnaire, it designed to receive respondent's opinions about the predetermined criteria to examine the "strategic management tools and techniques.

A five-point Likert scale administered for measuring the degree of agreement or disagreement in accordance to each question. The respondents had to evaluate their conceptions about Publicity, Familiarity, Necessity, Capability and Applicability as following: (9) is given for "Excellent", (7) for "Very Good", (5) for "Good", (3) for "Average", and (1) given for "Poor". For example, the respondents were asked to indicate to what extent the tools and techniques are currently (Popular, Familiar, Necessary, Capable, and Applicable) in their companies strategic management practices [33].

#### C. Piloting the Questionnaire and Modification

According to Dillman [34], pre-testing of the questionnaire should be carried out; it should include different groups, such as colleagues and potential users of the data. McQueen and Knussen [35], suggested that piloting is important to know whether the proposed methods of collecting data may produce information that can be used to achieve its intended goals. One of the possibilities for this is through open-ended or unstructured methods by means of face-to face discussions, brainstorming and meetings sessions. In all forms of piloting, however, it is crucial to keep detailed notes, to record all the factors prior to mailing the ultimate questionnaire; it was piloted among construction experts using sessions to ensure that the intended population will easily answered the questions. The questionnaire was piloted by a small size of respondents to test whether the questionnaire is clear and easy to answer. The feedback of the respondents was helpful in improving the questionnaire, filling in gaps, and determining the time required for completion [36].

#### D. Sample Size

In this research, to find out the number of the society under studying, it was difficult to determine a definitive number for such society because there are several institutions for registering the parties working in the construction industry in Egypt. Perhaps the linkage between each other is not good. These institutions include the Egyptian federation for construction and building contractors, chambers of commerce, the Egyptian syndicate of engineers where consultants are registered, and finally academics interested in the studies of construction project management. So, the sample size was calculated according to the formula (1), and

it is applied in case of inability to determine accurately the study population.

$$N = \frac{Z^2 \times P(1-P)}{C^2} \quad (1)$$

Where:

N = Sample Size

Z = standardized variable (e.g. 1.96 for 95% confidence interval).

P = percentage picking a choice, expressed as a decimal

C = confidence interval, expressed as a decimal (for Precision (e)) [37]

Considering a 95% of confidence level corresponds to  $\alpha = 0.05$  [38].

In the two tails normal distribution shape, the region to the right and to the left of  $\alpha/2$  is called Z (sometimes  $Z\alpha/2$ ). From the table of standard normal distribution, the critical value is therefore (Z) or  $Z\alpha/2 = 1.96$ . (C) is the confidence interval (sometimes called the margin of error). It is often ranged between ( $\pm 10\%$ ) as suggested by Maisel and Persel. It is assumed to be  $\pm 10\%$  for this research. In case of calculating the sample size to give a certain level of accuracy assume that the worst-case percentage picking a choice (p). It is assumed to be 50% or 0.5 [39]. Based on the previous values and assumptions, the estimated sample size is 97.

#### E. Sampling Procedures

To get the required number of sample sizes that was previously calculated with verifying the condition of practice and experience for more than fifteen years. Considering the well-known methods for gathering data, the helpful manner called "Snowball technique" was considered the most appropriate to reach the required number as the conditions mentioned. The idea of this method is based on communication with associates and colleague networks, they asked to nominate or refer for others and so on [37]. An initial list of the appropriate construction practitioners was prepared based on the following criteria: construction practitioners who have more than fifteen years of experience in the Egyptian construction industry. Nearly about 185 request to fill the questionnaire were sent and delivered, only 107 returned; three questionnaires from (107) were excluded due to missing data. Hence, the considered questionnaires are (104) the profiles of respondents were distributed as the following (55 Contractors, 19 Developers & Clients, 16 Consultant, and 14 Academic); the process of gathering data

was applied in the period from June 2019 to the end of December 2019.

#### F. Statistical Analysis

Statistical analysis concerns with data explanation, normally in numerical form aimed at describing and summarizing data collected, or investigating patterns in the data in order to draw conclusions about the population under study taking into account to the randomization and uncertainty in the referred observations. In this study, statistical analysis were undertaken to settle on the most important attributes that cause or may lead to crises occurrence in the context of Egyptian construction industry of construction industry. Descriptive statistics concerning with the methods of classifying, quantitatively review, and displaying data in a convenient and informative way, it used to describe the main features of the data gathered in quantitative terms [40].

A spreadsheet (Excel Sheet) was used to input the data, and then the data were entered and analyzed by using Statistical Package for Social Sciences (SPSS) V. 22 to be analyzed.

- First Step: was to obtain descriptive statistics that include means, and standard deviation. Based on means, statements were ranked in order. Since, criteria in the questionnaire were prepared to measure answers in an ordinal scale that was expressed by Likert scale. Then, the distance between numbers on the scale was not definitive, so it was required to apply a non-parametric test.
- Second Step: the non-parametric test (Kruskal-Wallis (KW)) to check agreement among different respondents was carried out.
- Third Step: the reliability analysis was applied to check the internal consistency. [41]

#### G. Descriptive Statistics

To calculate descriptive statistics, data were entered as the following: 104 cases collected from the respondents represented by IDs, while variables (criteria) were the values resulted from the respondent's opinions. Descriptive statistics were carried out for five pre-determined criteria. Table (2) below represents the outcomes of the questionnaire results. Moreover, the results were explained in figures (1), (2) and (3) below. [45]

TABLE [2] OUTCOMES OF THE QUESTIONNAIRE RESULTS.

Criteria / Tools and Techniques	Publicity		Familiarity		Necessity		Capability		Applicability		Over All	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
SWOT Analysis	93	1	87	1	95	1	88	1	84	1	89	1
PEST Analysis	78	2	81	3	83	3	70	2	73	2	77	2
PESTEL analysis	61	3	83	2	81	2	68	4	66	3	72	3
Porter's 5 Forces	54	4	76	4	68	6	74	3	57	4	66	4
Bench-marking	67	5	64	5	77	4	63	5	51	5	64	5
Balanced Scorecard	58	6	59	7	69	5	59	6	48	7	59	6
The Marketing Mix (4 Ps)	52	7	61	6	57	7	52	7	53	6	55	7
Cost-Benefit Analysis	43	8	51	8	49	8	47	8	41	8	46	8
Life Cycle Analysis (LCA)	39	9	47	9	37	9	.31	9	38	9		9
VRIO Analysis	29	10	37	10	34	12	29	10	30	10		10
McKinsey's 7 S	22	11	21	12	23	11	26	12	27	11		11
Value Chain Analysis	18	12	19	11	17	10	20	11	21	12		12
BCG's Growth/ Share Matrix	13	13	14	13	15	13	17	13	18	13	15	13
GE McKinsey Matrix	7	14	8	14	11	14	12	14	11	14	12	14

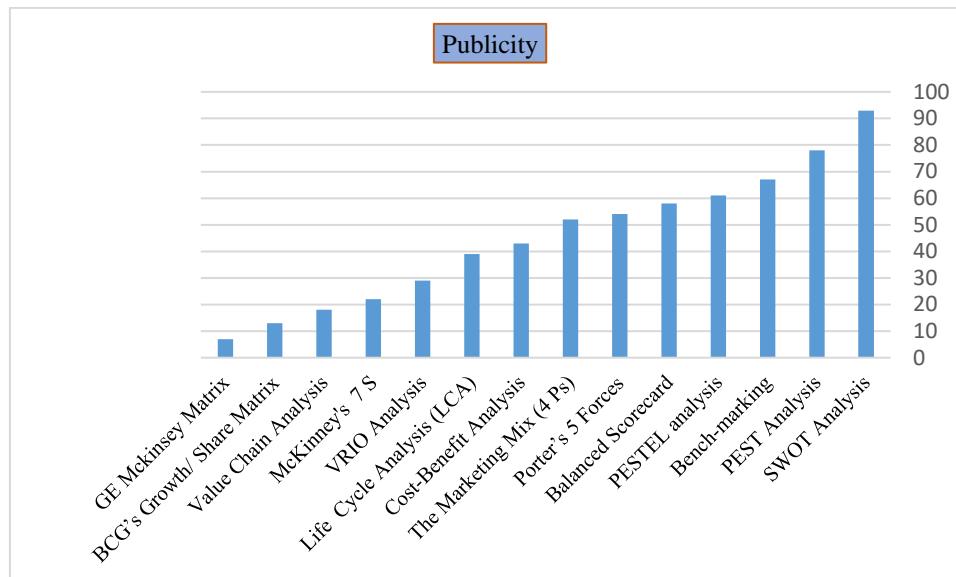


FIGURE [1] PUBLICITY OF STRATIGIC MANAGEMENT TOOLS AND TECHNIQUES

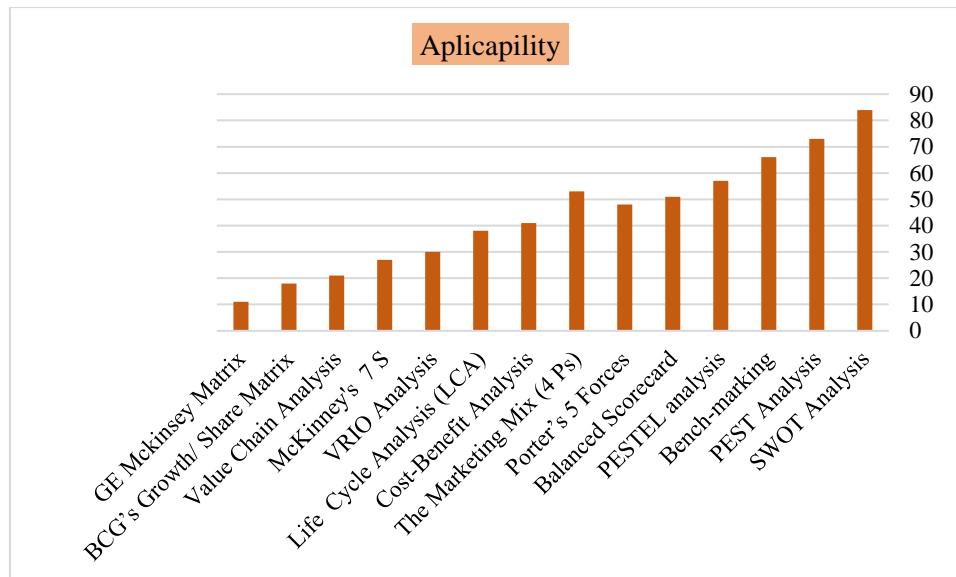


FIGURE [2] APPLICABILITY OF STRATIGIC MANAGEMENT TOOLS AND TECHNIQUES

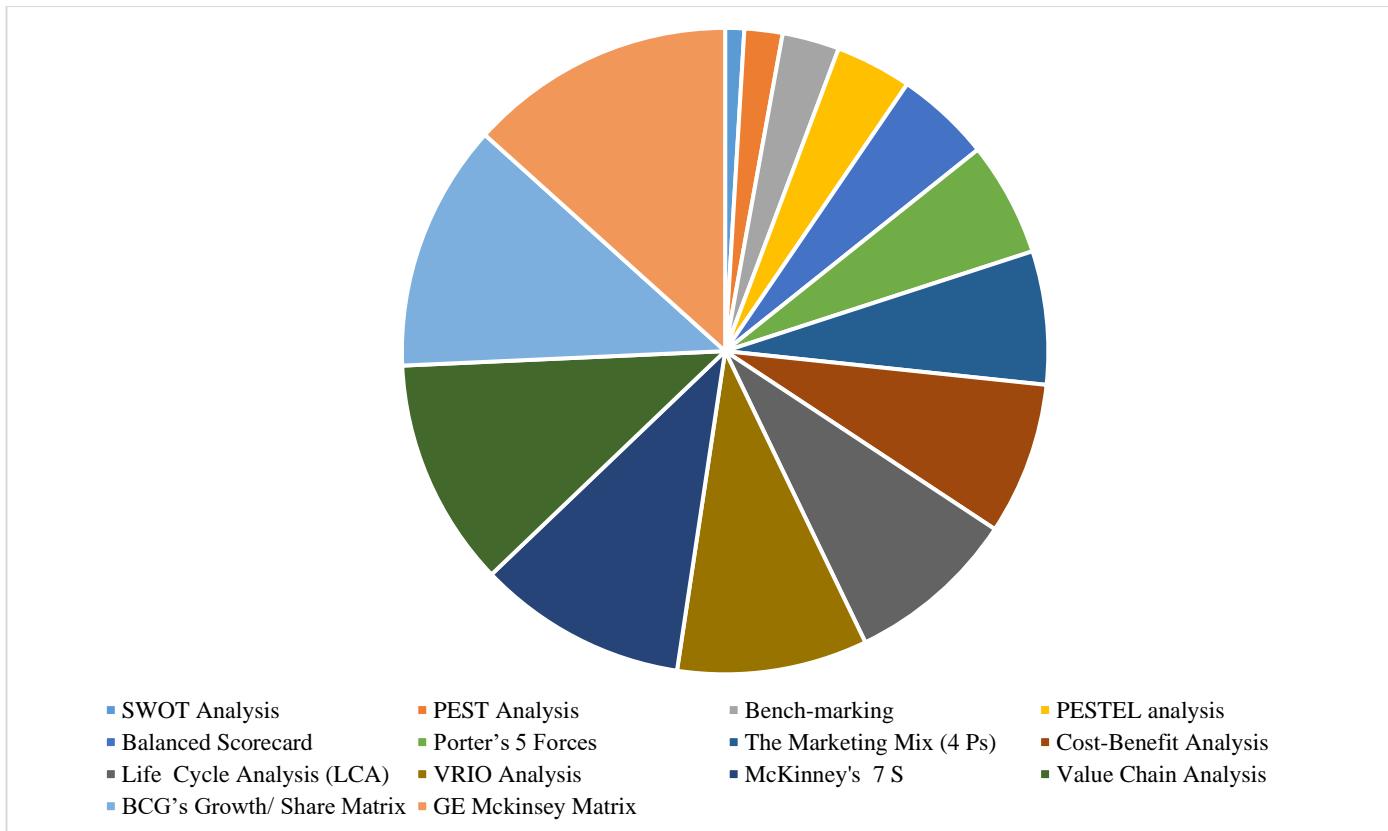


FIGURE [3] OVER ALL RANKING OF STRATIGIC MANAGEMENT TOOLS AND TECHNIQUES

#### H. Agreement Analysis

As a non-parametric test, the "Kruskal-Wallis" (known as H test) was used to analyse the agreement among the four parties of the respondents. Since the gathered opinions come from different parties, this test was applicable in case of presence of two or more groups in the research and under the condition that each group sample was independent from the others belonging to the population samples. This test presents a relative analysis to distinguish the four parties' opinions. The test was applied at a level of confidence 95%. This is statistically wise, looking for the values of (p) that corresponds to each category. In case of the null hypothesis  $H_0: \mu \leq \mu_0$  or  $(p) \leq 0.05$  the null hypothesis will accept it. We can say that there was a significant difference between the categories. This means that there was no full agreement between the population categories. Alternatively, in case of alternative hypothesis  $H_a: \mu > \mu_0$ , or  $(p) > 0.05$ , we can say that there was no significant difference between the groups hence; the null hypothesis was rejected, while the alternative hypothesis was accepted. This means that there was a high agreement among the population classes. The values of (KW) ranged between 0.125 and 0.981. These results reveal the highest agreement among the four parties on the ranking of criteria. [47].

#### I. Reliability of Analysis (Significance Test)

The reliability or "internal consistency" was appraised by using "Chronbach's Alpha coefficients". Alpha values range between zero and one. The higher value of alpha considered as an excellent reflection of consistency to measured items. All calculated values of alpha were, showing 0.908 for Academics, 0.749 for Contractors, 0.912 for Consultants, and

0.868 for Developers & Owners. The overall alpha value was 0.831. Results indicate that the measurements are reliable. Values of alpha are shown in (Table 3 & Table 4). They seem to be between "excellent" and "very good" as suggested by [41].

TABLE [3] RELIABILITY STATISTICS

		N	%
Cases	Valid	104	100.0
	Excluded <sup>a</sup>	0	0
	Total	104	100.0

a. Listwise deletion based on all variables in the procedure.

TABLE [4]: RELIABILITY STATISTICS

Cronbach's Alpha	N of Items
.831	5

#### J. Findings of Questionnaire

Descriptive statistics revealed the following results related to strategic management tools and techniques. Outcomes of the exploratory questions (section 2 of the questionnaire) showed that:

- (12 %) of the responds have never used any of the strategic management tools and techniques yet before.
- Six of the strategic management tools and techniques are popular enough (more than 50%) for most respondents' namely: SWOT analysis (84%), PEST analysis (71%), PESTEL analysis (66%), Porter's 5 forces, (57%), The Marketing Mix (4 Ps) (54%) and Bench-marking (51%).

- These tools belong to what so called "power tools" such as (SWOT analysis), and "traditional tools" such as (STEP analysis, Porter's 5 forces). Another tools (Porter's 5 forces) used in "Competitive Advantages", (The Marketing Mix (4 Ps)) used in "Marketing Management Process", while (Bench-marking) is used in "Quality Management" practice.
- On the other hand, eight of strategic management tools and techniques which are Balanced Scorecard, Cost-Benefit Analysis, Life Cycle Analysis (LCA), VRIO Analysis, McKinney's 7 S, Value Chain Analysis, BCG's Growth Share Matrix, GE McKinsey Matrix the majority of respondents (more than 50%) were able to identify it well in full details.
- The results show modest utilization of tools such as Balanced Scorecard, Cost-Benefit Analysis, Life Cycle Analysis (LCA), While other tools such as VRIO Analysis, McKinney's 7 S, Value Chain Analysis, BCG's Growth Share Matrix, GE McKinsey Matrix are utilized scarcely.
- The results revealed that there is a frequently "Positive Relationship" between the five pre suggested criteria (Publicity, Familiarity, Necessity, Capability and Applicability) and each other. That means, the more Familiarity is the more Applicability, and so on.
- The results revealed that most the construction experts expressed their appreciation for the strategic management tools, they expressed their willingness and readiness to use the strategic management tools and techniques in the future.
- Moreover, outcomes of the questionnaire related to the strategic management tools and techniques showed that there is an agreement among construction experts to take into consideration the strategic management applications.

#### IV.DISCUSION

This study offers a significant awareness to the strategic management tools and techniques. The study shed the light on the the strategic management tools and techniques and its importance for top management to assist in carrying out their companies strategic management. Generally, the study pointed out that managers particularly in the field of the Egyptian construction industry need to give more awareness for the strategic management tools and techniques. Moreover, the main purpose of this paper was attempt to convey the application of strategic management tools and techniques with concentration on the domain of construction industry. The results revealed that most managers, in the Egyptian construction industry, who have more than 15 years of experience, were not able to recognize most common strategic management tools and techniques except for those who had the opportunity to gain postgraduate studies. It remains low and poorly recognized knowledge about strategic management tools and techniques

. The outcomes revealed that, in the Egyptian construction when performing their strategic management procedures, the most frequently used strategic management tools and techniques are SWOT analysis, PEST analysis, PESTEL , Porter's 5 forces, The Marketing Mix (4 Ps) and Bench-

marking (above 50 per cent of companies utilize these tools and techniques). [49]

The authors argued that the recognition of SWOT analysis at most of the respondents is well-matched with other previous studies applied in different countries. However the high level of SWOT analysis utilization may be conflicted with the low level of Porter's forces and PEST analysis utilization. While, other tools and techniques are used sometimes such as benchmarking and balanced score card. In addition, most of managers showed their wish and intention to trial, proceed and apply other strategic management tools and techniques in their practical works. [50]

#### V.CONCLUSIONS

Based on the above findings and discussion, the following conclusions are composed in the context of the Egyptian construction industry:

- The study applied an exploration to the situation of strategic management was applied based on five criteria assumed by the authors, these criteria are Publicity, Familiarity, Necessity, Capability and Applicability.
- The main conclusion arise from this study is that the strategic management tools and techniques in construction organization are required to be publicized among construction managers. Concluding from the above, managers in construction companies need to pay more attention towards the strategic management tools and techniques the construction projects. For that reason, managers in construction companies must study well these tools and techniques through attending seminars, lectures, workshop sessions, and so on.to enhancing their capabilities in performing their strategic management practices.
- One of the vital conclusions from this study is that the strategic management tools and techniques appears to be significantly influenced by as such factors related to the degree of knowledge management gained by construction project managers.
- Another vital conclusions from this study is that strategic management tools and techniques appear to be significantly reflect the internal situation of the construction companies and external situation of the market in which construction organizations work;
- This study provides an over view concerning the strategic management tools and techniques in the context of construction industry particularly in Egypt.
- Through paying superior attention to the application of the strategic management tools and techniques, construction organizations can increase their rate of project success.
- Having said that, most significantly is to apply the appropriate strategic management tools and techniques which used to measure performance in construction companies, neglecting that may make issues evolve to a situation that threaten the firm's reputation, employments; even the firm's survival.
- Tools and techniques involved in operations management aim to ensure competitive advantage in

production, distribution and project management activities. The financial management area involves tools which provide the basis for decision-making for finance and predicting the performance of the company. Therefore, management tools and techniques are commanding force which can support managers to identify and improve recommended clarification to the current situation and difficulties within the company.

- From the theoretical point of view and based on previous research findings, utilization of different management tools and techniques can support companies to investigate the internal and external competitive environment, structure strategic management activity, support decision-making process, customer requirements, improving financial performance outcomes, rationalizing production costs and imitate different opportunities. In this perspective, implementing, assembling and grouping of diverse management tools and techniques may improve companies' performance and its profitability.

The results of the paper have reinforced the research objective by identifying factors that may cause a crisis and are therefore it bases for build on. There are some reservations regarding this study most notably that, although calculation of sample size is agreeing with the criteria followed to obtain the sample size in quantitative works for such cases, but the sample size is considered relatively small, which makes us say it would be better in the future to perform this research by increasing the sample size. Moreover, it is suggested to expand the research in the content of other materials related to such topic. Another limitation of this study is it is based on self-administrated questionnaire; the survey was depended on criteria suggested by self-administrated of the authors, therefore data collection may be suffers from missing variables.

Furthermore, in this research, the opinions were polled mainly from experts in the field of construction industry who have more than fifteen years' experience; the opinions of other level specialists were not taken into account. To eliminate this bias, future research could collect data from other relevant stakeholders, particularly, financial managers, executive directors, and project steering groups.

Finally, this study provided a modest contribution added to the science and knowledge management related to construction industry through recognizing the strategic management tools and techniques in the context of Egyptian construction industry; the results could be benefit to fellows and managers in the construction industry, it may only be considered valid in this particular context. Future studies could be designed to have more perspectives from other managers, moreover, data could be collect from other regions - unlike Egypt - to see whether the findings are repeated or not and to investigate the influence of national culture on the causes of crises. Another field of research related to this paper is to investigate the effect of strategic management tools and techniques application on the performance of projects, companies and organizations.

## REFERENCES

- [1] Drucker, Peter F. (2001). "Management Challenges for the 21st Century", Publisher: Harper Business; first edition, ISBN-13: 978-0887309991.
- [2] Easterby-Smith, M. Thorpe, R. and Lowe, A. (2002). "Management Research: An Introduction", 2nd, Ed, London, SAGE.
- [3] Ammar, M. A. & Elsamadony, A. A. and Rabie A. A. (2009). "Risk Allocation and Mitigation in the Egyptian Barrage Projects", 13th, International Conference on Structural and Geotechnical Engineering (ICSGE) 27-29 Dec. 2009 - MNG-001-1 - Cairo - Egypt.
- [4] Darrel K. Rigby (2001). "Management Tools and Techniques: A Survey", California Management Review, Vol. 43 No. 2, winter, pp. No. 2, pp. 139-160.
- [5] Andrews, K., (1980). "The Concept of Corporate Strategy", Dow Jones-Irwin, Homewood, IL.
- [6] Ivancevich, John M & Gibson, James L. and Konopaske, Robert (2011). "Organizations: Behavior, Structure, Processes", 14th Ed. - Published by McGraw-Hill, A Business Unit of the McGraw-Hill Companies, Inc. ISBN.
- [7] Akintoye, A. S. and MacLeod, M. J. (1997). "Risk Analysis and Management in Construction", International Journal of Project Management1, 5 (1), pp. 31-38.
- [8] Porter, Michael E. (1996). "Competitive Strategy: Techniques for Analyzing Industries and Competitors", New York, NY: Free Press.
- [9] O'Brien, James A. and Marakas, George M. (2011). "Management Information Systems", 10th Ed. / Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., ISBN-13: 978-0-07-337681-3.
- [10] Kessler, Eric H. (2013). Editor of "Encyclopedia of Management Theory", Published by SAGE Publications, Inc. ISBN 978-1-4129-9782-9 (hbk.).
- [11] Babafemi, Ilori David (2015). "Corporate Strategy, Planning and Performance Evaluation: A Survey of Literature", Journal of Management Policies and Practices June 2015, Vol. 3, No. 1, pp. 43-49 ISSN: 2333-6048 (Print).
- [12] Mintzberg, H., & Ahlstrand, B. and Lampel, J. (1998), "Strategy Safari", London, Prentice Hall.
- [13] Ball, Michael and Antonioni, Peter (2005). "Diversification as a Strategy for Minimising Fluctuations in Construction Firm Turnovers". As cited in Construction and Real Estate Dynamics / Edited by Thalmann, Philippe and Zarin-Nejad, Milad. First published 2003 by Palgrave Macmillan. ISBN 1-4039-1545-8.
- [14] Banaitiene, N. and Banaitis, A., (2012). "Risk Management in Construction Projects". - Department of Construction Economics and Property Management, Faculty of Civil Engineering, Vilnius Gediminas Technical University, Vilnius, Lithuania.
- [15] Boddy, David (2014). "Management an Introduction", 6th Ed. Published By Pearson Education Limited ISBN: 978-1-292-00444-0 (PDF).
- [16] Bryman, A. (2002). "Research Methods and Organization Studies", Reprinted 2002. London: Unwin Hyman Ltd.
- [17] Chandler, A. D. J. (1962). "Strategy and Structure: Chapters in the History of the American Industrial Enterprise", Cambridge, MA: Harvard University Press.
- [18] Chong, Heap-Yih (2014). "Improving Construction Procurement Systems Using Organizational Strategies", ACTA Polytechnica Hungarica, Vol. 11, No. 1, 2014.
- [19] Cooper, Donald R., & Schindler, Pamela S. (2014). "Business Research Methods", Twelfth edition. The McGraw-Hill/Irwin (Series in Operations and Decision Sciences Business Statistics) ISBN 978-0-07-352150-3.
- [20] Cresswell, Jhon W. (2009). "Research Design Qualitative, Quantitative, and Mixed Methods Approaches", 3rd, Ed. Published by SAGE Publications, Inc. ISBN 978-1-4129-6556-9.
- [21] Kraus Sascha and Kauranen Ilkka, (2009). "Strategic Management and Entrepreneurship: Friends or Foes?" Int. Journal of Business Science and Applied Management, Volume 4, Issue 1, 2009.
- [22] Cunliffe, Ann L. (2008). "Organization Theory", SAGE Publications Asia-Pacific Ltd - ISBN: 978-1-4129-3549-4 (pbk).
- [23] Armstrong, Michael "How to Be an Even Better Manager. A Complete A-Z of Proven Techniques And Essential Skills", 7th Ed.
- [24] Yang, J, Shen, & Q G, Drew, D S and Ho, M F (2009). "Critical Success Factors for Stakeholders Management: Construction Practitioners Perspectives", Journal of Construction Engineering and Management", ASCE 136, 778-786.

[25] Wysocki, Robert K. (2014). "Effective Project Management: Traditional, Agile, and Extreme", Seventh Edition Published by John Wiley & Sons, Inc. ISBN: 978-1-118-72916-8.

[26] Bateman, Thomas S. and Snell, Scott A. (2013). "Management", Published by the McGraw-Hill Companies, Inc. ISBN 978-0-07-802952-3 (Student Ed.).

[27] Drucker, Peter F. (2001). "Management Challenges for the 21st Century", Publisher: Harper Business; first edition, ISBN-13: 978-0887309991.

[28] Easterby-Smith, M. Thorpe, R. and Lowe, A. (2002). "Management Research: An Introduction", 2nd, Ed, London, SAGE.

[29] El Shennawy, Muhammad E. A. (2020). "Developing a Conceptual Framework for Strategic Planning and Management of Crisis in the Egyptian Construction Industry", A Thesis Submitted in Partial Fulfillment to the Requirements for the PhD. in Construction Engineering and Management, Faculty of Engineering, Zagazig University, Egypt.

[30] International Journal of Civil Engineering and Technology 10(10), 2019, pp. 368-391.

[31] Fellows, R and Liu, A. (2008). "Research Methods for Construction", Chichester: John Wiley & Sons Ltd.

[32] Robert A. and Peter K. (2012). "The Relationship between Strategic Planning and Firm Performance", International Journal of Humanities and Social Science Vol. 2 No. 22 [Special Issue – November 2012].

[33] Czaja, R. and Blair, J (2005). "Designing Surveys, A Guide to Decisions and Procedures", Thousand Oaks, CA: Pine Forge Press..

[34] Leech, Nancy L. et al. (2005). "SPSS for Intermediate Statistics: Use and Interpretation", 2nd Ed. Publishers: Lawrence Erlbaum

[35] Martín J.C. & Román C. and Gonzaga C. (2018). "How Different N-Point Likert Scales Affect the Measurement of Satisfaction in Academic Conferences", International Journal for Quality Research 12(2):421-440 January 2018, DOI: 10.18421/IJQR12.02-08

[36] Associates, - Mahwah, New Jersey, London ISBN 0-8058-4790-1.

[37] Fleisher, Craig S. and Bensoussan, Babette E. (2015). "Business and Competitive Analysis: Effective Application of New and Classic Methods", by 2015 by Pearson Education, Inc. ISBN-13: 978-0-13-308640-9.

[38] Griffin, Ricky W. (2016). "Fundamentals of Management", 8th Ed. Published by Cengage Learning, Boston, MA, USA, ISBN: 978-1-285-84904-1.

[39] Haberberg, A. and Rieple, A. (2008). "Strategic Management: Theory and Application", New York: Oxford University Press.

[40] Helms, Marilyn M. (2006). Editor of "Encyclopedia of Management", 5th Ed. Published by Thomson Gale, a part of The Thomson Corporation- ISBN: 0-7876-6556-8.

[41] Hendrickson, Chris (1998). "Project Management for Construction Fundamental Concepts for Owners", Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA 15213 First Edition originally printed by Prentice Hall, ISBN 0-13-731266-0.

[42] Hill, CharlesW.L. and Jones, G.R. (2010). "Strategic Management: an Integrated Approach", 7th ed. Houghton Mifflin Company, Boston, MA.

[43] Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2001). "Strategic Management: Competitiveness and Globalization: Concepts and Cases", Cincinnati, OH: South- Western College Press.

[44] McCabe, Steven. (2010). "Corporate Strategy in Construction: Understanding Today's Theory and Practice", 1st ed. ISBN 978-1-4051-5912-8, Published by Blackwell, John Wiley & Sons Ltd.

[45] Hunger, J. David and Wheelen, Thomas L. (2011). "Essentials of Strategic Management", 6 th ed. - Published by Pearson Education, Inc., ISBN-13: 978-0-13-600669-5.

[46] Johnson, Gerry & Scholes, Kevan & Whittington, Richard (2009). "Fundamentals of Strategy" –First published 2009 Pearson Education Limited 2009 - ISBN: 978-0-273-71310-4.

[47] Langford, David A. and Male, Steven (2001). "Strategic Management in Construction", Second Edition Published 2001 by Blackwell Science Ltd. ISBN-10: 0-632-04999-5.

[48] CIOB, the Chartered Institute of Building (2014). "Code of Practice for Project Management for Construction and Development", John Wiley & Sons, Ltd, ISBN 978-1-118-37808-3 (paperback).

[49] Low, S. P.; Tan, J. H. K. (2005). "Integrated ISO 9001 Quality Management System and ISO 14001 Environmental Management System for Contractors", Journal of Construction Engineering and Management, ASCE, 131(11), 1241-1244.

[50] Maisel, R. & Persell, C. H. (1996). "How Sampling Works", Thousand Oaks, California, Pine Forge Press.

[51] Gibson, James L. et al. (2012). "Organizations: Behavior, Structure, Processes", 14th Ed. - Published by McGraw-Hill, A Business Unit of the McGraw-Hill Companies, Inc. ISBN 978-0-07-811266-9.

[52] Pitt, Martyn and Koufopoulos, Dimitrios (2012). "Essentials of Strategic Management", Published by SAGE Publications Ltd- ISBN: 978-1-84920-186-5.

[53] Remenyi, D., & Williams, B., & Money, A. and Swartz, E. (1998). "Doing Research in Business and Management: an Introduction to Process and Method", SAGE Publications, London.

[54] Tharenou, Phyllis and Donohue, Ross & Cooper, Brian (2007). "Management Research Methods" Cambridge University Press- ISBN-13: 978-0-511-29498-3.

[55] Tostiga, George (2015). "Strategy in Practice: A Practitioner's Guide to Strategic Thinking", 3rd Edition. Published by John Wiley & Sons, Ltd, ISBN 978-1-119-12167-1 (ebk).



Professor Ahmed Hussein Ibrahim is a Professor of Construction Management and Engineering at Construction Engineering Department Faculty of Engineering, Zagazig University, Egypt. His research interests include systems modeling and optimization, and the application of artificial intelligence (AI) techniques to complex engineering domains.



Muhammad El Sayed Aly El Shennawy (PhD.) is working as general manager at Al Bonyan for Development and Construction Projects Management, (a limited liability Egyptian company). As a member of the construction industry for over 30 years gained a considerable understanding of the engineering and management on construction projects. He worked on large and small construction project sites, for contractors and for owners. In addition, he earned the Certificate of Experts for Real Estate Appraisal and Marketing from Ain Shams University, Egypt. He gained Ph.D. degree at Construction Engineering Department., Zagazig University, Egypt. His fields of interest include methods of construction, management topics and applications of improving quality & performance in construction firms.

APPENDIX

Tools and Techniques	Author/ Pioneer	Year	Description	Area of application
SWOT Analysis	Ken Andrews Harvard Professors	Early 1970s	<ul style="list-style-type: none"> <li>SWOT (Strengths, Weaknesses, Opportunities and Threats)</li> <li>It is a business environmental scan both internally (Strengths, Weaknesses), and externally (Opportunities and Threats)</li> <li>It is an extremely popular situational strategy tool.</li> <li>It describes a summary of the future business models, and forms the information foundation from which the business model is developing.</li> <li>SWOT is more generalist in nature and looking on both sides of the organization's boundary.</li> <li>SWOT is more subjective, more flexible tool, and easier to bend in into the demands of the situation.</li> </ul>	Strategic Planning and Management Scanning of the Internal and External
PEST Analysis	Francis J. Aguilar	(1967)	<ul style="list-style-type: none"> <li>Harvard professor Francis J. Aguilar (1967) is thought to be the creator of PEST Analysis. He included a scanning tool called ETPS in his book; "<i>Scanning the Business Environment.</i>" the tool examines the influence of organization's external forces placed upon the firm.</li> <li>The acronym PEST stands for "<i>Political, Economic, Social, and Technological</i>" factors within the external environment.</li> <li>PEST is externally prescriptive and tends to have an economics unfairness with the environment identification specifically;</li> </ul>	Scanning of the External Macro-level Environment
PESTEL analysis	Arnold Brown	(1970)	<ul style="list-style-type: none"> <li>Harvard professor Francis J. Aguilar (1967) is thought to be the creator of PEST Analysis. He included a scanning tool called ETPS in his book; "<i>Scanning the Business Environment.</i>" the tool examines the influence of organization's external forces placed upon the firm.</li> <li>The acronym PEST stands for "<i>Political, Economic, Social, and Technological</i>" factors within the external environment.</li> <li>PEST is externally prescriptive and tends to have an economics unfairness with the environment identification specifically;</li> </ul>	Business Planning Marketing Research Product Development
Porter's 5 Forces	Michael E. Porter	(1979)	<ul style="list-style-type: none"> <li>As a simple framework for assessing and evaluating the competitive strength and position of a business organization. Porter's five forces of competitive position analysis divided the potential sources of pressures within an industry into five categories.</li> <li>The analysis derived from using the five forces framework is usually applied to a suite of products or services delivered by an enterprise. Porter divided the potential sources of pressures within an industry into five categories.</li> <li>The five forces are Competitive rivalry, Supplier power, Buyer power, Threat of substitution, and Threat of new entrants.</li> </ul>	Competitive Position Analysis "Competitive Advantages"
Bench-marking	Angappa Gunasekaran	(1994)	<ul style="list-style-type: none"> <li>A measurement of the quality of an organization's policies, products, programs, strategies, etc., and their comparison with standard measurements, or similar measurements of its peers. The objectives of benchmarking are (1) to determine what and where improvements are called for, (2) to analyze how other organizations achieve their high performance levels, and (3) to use this information to improve performance.</li> </ul>	Quality Management
BCG's Growth/ Share Matrix	Bruce Henderson Founder of Boston Consulting Group (BCG)	Early 1970s	<ul style="list-style-type: none"> <li>It grew out of work on "Experience Curve Effects".</li> <li>Business firms face some important questions: <ul style="list-style-type: none"> <li>How much of a firm's scarce resources (such as capital), should be allocated to each unit?</li> <li>What businesses should a firm be in, to begin with?</li> <li>Which ones should be disposed of?</li> <li>What should the performance targets of each business be?</li> </ul> </li> <li>The elements of the matrix are represented on both the vertical axis, which captures the market growth rate while the horizontal axis captures the relative market share.</li> <li>The matrix is divided into four quadrants: cash cows, stars, dogs, and question marks.</li> </ul>	Strategic Diagnosis
The Marketing Mix (4 Ps)	E. Jerome McCarthy Updated by Philip Kotler	(1960) & (1967)	<ul style="list-style-type: none"> <li>The 4Ps referred to Price, Place, Promotion and Product.</li> <li>The marketing manager must concentrates on these four major areas while planning the marketing activities.</li> <li>Philip Kotler (People, Processes, Programs, Performance) updated the model. The four Ps model is expanded to the seven Ps: (Process, People, and Physical Environment).</li> <li>Moreover, there is alternative model proposed by Koichi Shimizu (1973) called the 4Cs [Commodity (Product), Cost (Price), Communication (Promotion), Channel (Place)].</li> </ul>	Marketing Strategies and Plans Marketing Management

APPENDIX

Tools and Techniques	Author/ Pioneer	Year	Description	Area of application
GE McKinsey Matrix	Fred Gluck	In the 1970s	<ul style="list-style-type: none"> <li>• Fred Gluck a McKinsey &amp; Co. consultant's director in General Electric was established to come up with a strategy that developments framework can compete BCG matrix.</li> <li>• A matrix consists of nine cells of different colors that indicate appropriate strategies for different businesses.</li> <li>• It developed originally in order to help GE in managing its portfolio of business units; in addition, it can be used to evaluate possible acquisitions, mergers, and/or new product.</li> <li>• The matrix eliminates the majority of the inherent weaknesses of the BCG matrix by employing composite measures of business strengths and industry attractiveness.</li> <li>• With the GE matrix, a strategist may plot a business in any of nine positions, as opposed to the BCG's four positions.</li> <li>• GE's matrix also includes a corresponding increase in the number of advisable strategies identified.</li> <li>• It consists of nine cells of different colors that indicate appropriate strategies for different businesses or products.</li> <li>• The vertical axis represents industry attractiveness while the horizontal axis represents the strength of the business or product. Both axes have high, medium, and low locations.</li> <li>• A framework provided a common language, platform, and starting point for managers of multi business firms to explore the critical questions faced by multi business firms.</li> <li>• It could be used to explore not only the performance of a business unit but also to explore the performance of units in different countries or regions, different products, different technologies, brands, major customers, and revenue models</li> </ul>	Strategic Diagnosis
VRIO Analysis	Jay Barney	(1991)	<ul style="list-style-type: none"> <li>• Professor Barney's 1991 paper developed a simple framework for distinguishing among several different types of firm performance.</li> <li>• Description: VRIO analysis is an analytical technique, which for each type of strategic capabilities; resource considers several evaluation dimensions for the organization to evaluate if they contribute to competitive advantage. VRIO is an acronym from the initials of the names of the dimensions: Value, Rareness, Imitability, and Organization.</li> <li>• Competitive disadvantage, competitive parity, temporary competitive advantage, and sustained competitive advantage competitive advantage, and identified the attributes of resources and capabilities that would make them costly to imitate</li> </ul>	Resources Planning Competitive Advantage
Value Chain Analysis	Michael E. Porter	in the early (1980s)	<ul style="list-style-type: none"> <li>• In value chain approaches, value is created through efficient production of services based on a variety of resources.</li> <li>• The company is perceived as a series or chain of activities. The value chain is composed of distinct activities (called "value activities") that an organization performs in the course of doing business.</li> <li>• These value activities fall into nine generic categories: five primary and four secondary, and translate an organization's broad competitive strategy into specific action steps required to achieve competitiveness. Primary activities include inbound logistics, operations, and outbound logistics marketing and sales,</li> <li>• After-sales service: support activities include firm infrastructure, human resource management, technological development, procurement. Attention is on performing these activities in the chain in efficient and effective ways.</li> </ul>	Internal Auditing
Cost-Benefit Analysis	French engineer, Jules Dupuit, Alfred Marshall	Origin (1840s.), Became popular in the (1950s)	<ul style="list-style-type: none"> <li>• A cost-benefit analysis (CBA) is the process used to measure the benefits of a decision or taking action minus the costs associated with taking that action.</li> <li>• A CBA involves measurable financial metrics such as revenue earned or costs saved as a result of the decision to pursue a project.</li> <li>• A CBA can also include intangible benefits and costs or effects from a decision such as employee morale and customer satisfaction.</li> <li>• In a cost-benefit analysis applied into the decision-making process. Opportunity costs are alternative benefits that could have been realized when choosing one alternative over another.</li> <li>• By means of considering all choices and the probable overlooked opportunities, the cost-benefit analysis is more thorough and permits for better decision-making</li> </ul>	Support decision making process

APPENDIX

Tools and Techniques	Author/ Pioneer	Year	Description	Area of application
<b>McKinsey's 7 S</b>	Bob Waterman, Golden Bay, and Julien Phillips	(1980)	<ul style="list-style-type: none"> <li>The 7 S model for analyzing corporate strategy, was developed in the early 1980s by Tom Peters and Robert Waterman, two consultants working at the McKinsey &amp; Company consulting firm a formally birthed in a Business Horizons article by Bob Waterman, Golden Bay, and Julien Phillips titled: "Structure Is Not Organization." June 1980. It brought McKinsey experts great importance on "Corporate Culture" based in large part on the internal culture of the firm itself.</li> <li>The McKinsey 7S model is a diagnostic management tool used to test the strength of the strategic degree of fit between a firm's current and proposed strategies.</li> <li>The 7-S framework offers a sound approach to combining all of the essential factors that sustain strong organizations: Strategy, Systems, Structure, Skills, Style, And Staff, all united by Shared Values. The 7-S framework remains one of the enduring elements of diligent, focused business management."</li> </ul>	<b>Strategy Implementation within Organizational Change</b>
<b>Balanced Scorecard</b>	Robert S. Kaplan and David P. Norton	(1996)	<ul style="list-style-type: none"> <li>Robert Kaplan, a professor at Harvard University, and David Norton, developed it in mid of 1990s.</li> <li>It was born from a research study conducted early in 1990 and developed until 1996</li> <li>It became a diagnostic business tool for thousands of organizations all over the world.</li> <li>Assists organizations to overcome two main issues: measurement of performance and carrying out strategy.</li> <li>It is a carefully selected set of measures derived from an organization's strategy.</li> <li>The measures selected for the model represent a tool for leaders to use in communicating to employees, external stakeholders, outcomes and performance drivers by the organization will achieve mission and strategic objectives.</li> </ul>	<b>Performance Measurement and Strategic Management System.</b>
<b>Life Cycle Analysis(LCA)</b>	Choi et al. and Lu et al. ISO 14040 and 14044 Standards	In the 1960s - 1970s	<ul style="list-style-type: none"> <li>(LCA) is the systematic approach of looking at a product's complete life cycle, from raw materials to final disposal of the product [1]. It offers a "cradle to grave" look at a product or process, considering environmental aspects and potential impacts [2]. When LCAs, were first developed in the 1960s, they were motivated by the economic struggles of the time. Through the 1970s and 80s, this analytical process became less popular due to the lack of standardization. The LCA concept has once again become important to industry and academia [3]. Life Cycle Assessment: Principles and Practice, published by the U.S. Environmental Protection Agency (US EPA) in 2006 [3], provides a detailed guideline for a systematic LCA approach. The EPA report, as well as other reports from the International Journal of Life Cycle Analysis used as sources for this description of basic life cycle concepts. Examples of life cycle assessments can be found in Choi et al. [4] and Lu et al. [5]. The industry situation is described in five stages: (Development, Growth, Shakeout, Mature and Decline.)</li> </ul>	<b>Production Improvement</b>