The effect of a sustainable balanced scorecard for strategic decision-making under uncertain competitive and climate conditions evidence from Iraq

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Abstract
The present study attempts to use a complex sustainability balanced scorecard to provide a new paradigm in order to make strategic decisions in a tumultuous world (BSC). The fuzzy TOPSIS approach is used to pick environmental variables, which are then applied to a complex BSC model for an organization. The model of making decision is divided into three major scripts: "optimistic" (economical development script), "realistic" (normal long-term economic condition), and "pessimistic" (maintenance of existing penalty situation script), as well as two nterior politics: generation increase and productivity maximization. For the hierarchical BSC model, the model is independently simulated in each situation and strategy, and every significant feature of the organization is studied, for the bulk of income and long-term viability. The findings suggest that in each case, a particular strategy is favored, which may aid strategic managers in making decisions in volatile and chaotic situations. Due to the growing sophistication of companies in today's competitive world, performance assessment frameworks must be proposed. One of the most commonly used approaches for measuring project efficiency that can be adapted to particular situations is the "Balanced Scorecard (BSC)" approach.

Keywords: making decision, peripheral policy, assessment, sustainability system dynamics

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1. Introduction

Iraq is a nation in the central Middle East that is traditionally recognized as a crossroads of events. Even if these events are mostly political in nature, the consequences of their repeated occurrence are felt in other areas, with the economy being one of the most prominent. Maintaining the corporate direction within the optimal course and meeting the expected strategic targets are exceptional challenges for senior executives and strategic managers in Iraq as a consequence of the current tumultuous and highly unpredictable economic environment. In recent decades, a plethora of models have been produced. to assist organisations in preparing, executing, and reviewing strategic decisions. Each suggested approach is applicable to a specific situation, and several considerations, such as company situations, market existence, micro and macro environments, and other similar factors, are essential to true managerial tools. The "Balanced Scorecard (BSC)" approach is a familiar instrument for businesses, especially for performance assessment, and is primarily used by manufacturing firms in Iraq. However, this approach has several drawbacks, which have recently been explored in depth in a number of journals. In real life, cause and effect relationships, as well as the connection between viewpoints, are not defined, and the importance of time in the relationship between growth and financial perspective is largely overlooked. As a result, critics contend that the BSC model is stagnant and lacks dynamicity, as well as ignoring the role of the context, especially in volatile circumstances that may result in dramatic changes in not only businesses but the whole sector. The following study suggests a strategy to assist policymakers in coping with the company's environmental uncertainties, which is its innovation. The hierarchical durability of the "BSC" method is employed in the current investigation to allow for a review of policy outcomes in any extrinsic script and to develop the strategical decisions. Moreover, the application of the suggested method is addressed.

Review of Literature

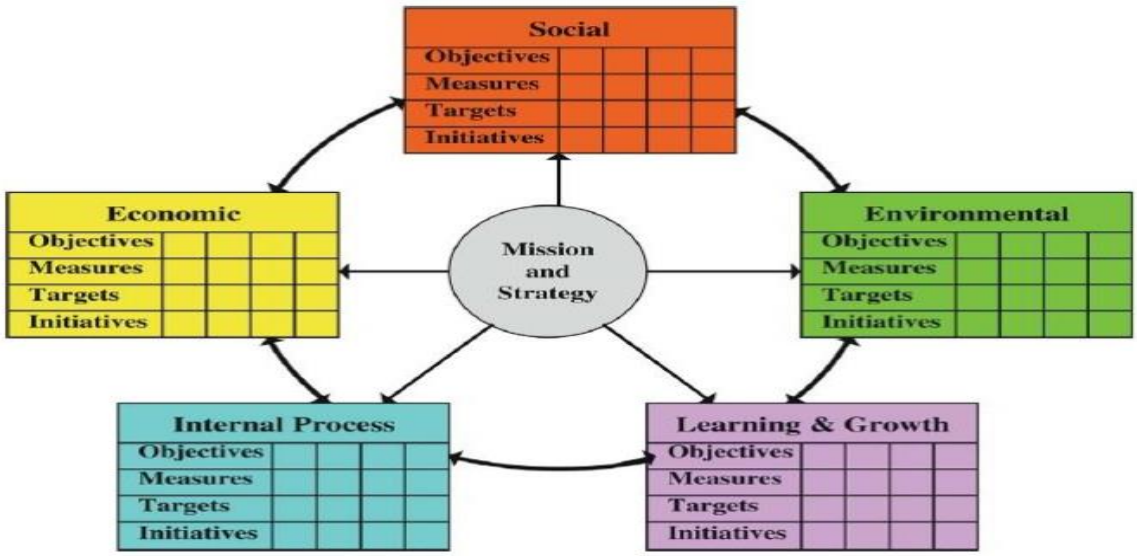
2.1.Balanced Scorecard for Sustainability (SBSC)

Kaplan and Norton (1992) first proposed the Balanced Scorecard (BSC) approach for developing a corporate performance assessment scheme in a Harvard Business Review paper. This method is a systematic assessment model that incorporates both tangible and intangible assets and establishes a connection between various criteria[1].As a corporate performance assessment system, the BSC technique is unique in that it creates a structured system of strategic goals based on four primary perspectives: finances, customers, organizational processes, and learning and development. This approach took into account both non-financial and financial parameters[2]. To assess the utility of thermal power businesses, researchers used a sustainability balanced scorecard, a hazy Delphic approach, and a composite multi-criteria decision-making approach [3].[4] are a few examples of recent research that used the BSC approach. [5] evaluated the contribution of "Corporate Social

Responsibility (CSR)" to the success of hotels run by families using the "SBSC" model. "CSR" was applied as a fifth insight to the standard BSC, and the findings found that CSR had a substantial impact on hotel success.[6]checked the current state of balanced scorecard analysis, identified holes, and proposed some research topics. The BSC method, on the other hand, lacks financial, social, and long-term considerations. As a result, the SBSC was introduced by[7] as a derivation of the conventional BSC that provides practical sustainability administration instruments and controls the conventional BSC's limitations in societal, environmental, and sustainable management systems [3]. [6] for developing sustainable assessment in three international airports, a hybrid MCDM and SBSC model was suggested. They estimated the core impacts on sustainability using DEMATEL and VIKOR and proposed an SBSC model for an airport performance assessment scheme[8] using analytical techniques for product creation and sustainability, analyzing the impact of sustainability considerations on

The product creation process, which may be considered one of the most important aspects of the BSC model's internal process perspective [9] established a new SBSC ranking system for evaluating the success of Greek businesses based on global metrics. Furthermore, depending on a matrix relation through the "Triple Bottom Line (TBL)" meaning measurements and the "SBSC",[10] suggested a sustainability assessment scheme. Furthermore, based on the SBSC model,[4] built and applied a decision-making process in a reverse logistics environment in a mobile manufacturing business. The SBSC system is depicted in Figure 1 as a standard structure. As can be shown, incorporating fiscal, social, and environmental aspects into market strategy[2] promotes corporate sustainability.

Fig. (1) The SBSC technique's structure has been implemented.



Retrieved from Rabbani et. al., (2015)

2.2. A study of the dynamics of machine in a few sentences (SD)

The System Dynamics (SD) methodology is a comprehensive framework for resolving real-time issues. For assessing and addressing dynamic problems, this is a useful contemporary organizational analysis approach. SD modeling is sometimes used as the foundation of a structural thought approach[11]. Forrester (1961) first proposed the SD principles, which state that a system's configuration determines its actions. His most significant contribution, however, was the "Stock and Flow Language", which aided learning by allowing the development of virtual worlds and operating experimental laboratories [12]. As a result, it's critical to comprehend a system's actions, knowledge stream, and domination policies. SD draws together the necessary theory and methods for observing dynamic process activity and understanding how it evolves additional time. This method is particularly interested in dynamics influences by "a combination of flows, delays, and feedback loops"[13]. SD is used in a variety of fields, including social science, economic systems, architecture, government policy administration, and peripheral policy, and dynamic decision-making[14]. The SD has the power to recognise indirect or even counter-intuitive associations, according to the literature review[12]. The SD modeling method involves identifying the problem of the study, determining the hypothesis, building the simulation method, assessing the method, and developing policy and evaluation parameters. The three key components in SD method utilized to distribute work and services that share price elements (state variables), flow elements, and subsidiary variables and constants[13]. These components allow the simulation of time differences as well as data input. This structure stocking and fluid arrangement is realized in order to provide a Stock and Flow Diagram (SFD)[15] for an SD simulation model.

To clarify, a standard SD model structure consists of the following elements:

- Project features that depict the production activities as they progress through the project
- A rework loop depicting the flow of routine production activities over time.
- Project management feedback loops are used to control the development of project.
- Project completion has side impacts including "ripple and knock-on".
- Difference among project success and the objectives[13].

In the literature, various uses of SD are discussed like investigating green vertification regulation in the Swedish energy sector "Tang and Rehem, in press", and structure project administration[13]. SD applications in the energy industry[16], the impact of climate change threats on firm economic performance[17], and the simulation of a remanufacturing supply and inventory system[18]. Foreign students' academic success in Turkey[11].

2-3- Scorecard for a Dynamic Balanced Score

As mentioned in former pages, the approach of "BSC" has proven to be one of the widely influential administration thought recently, and now it represents the most widely used methodology for measuring and managing enterprise

efficiency in corporate, governmental, and non-profit organizations[19]. Furthermore, by using policy charts, certain issues resulting from the difference between steps and targets were eliminated[8]. However, there are already some issues with this strategy. Some scholars specifically condemn the BSC methodology for its inability to determine interrelationships between steps. As noted in the following[20], such drawbacks will make it difficult for organisations to adopt this approach. The relationships between the priorities are unclear, and the creator is responsible for the goals.

• The BSC does not adequately explain the causality between the targets, and the causal relations among the subjects do not correspond to the organzation charts.
• The BSC represents a statical approach that can not take time into account. As a result of ignoring the time gaps between the steps, the organization's decision-making process becomes more complicated.
• BSC necessitates movement. It does not, however, take into account the impact of the complexities that occur within a structure.
To address the above shortcomings, the dynamic BSC approach was established in conjunction with the "SD" method that has a lower limitation than the conventional "BSC", making the implementation of a strategic administration structure easier. The capability to choose realistic, reasonable, and based goal targets, script preparation,
Progress tracking, strategy research, and explaining the time gaps in corporate goals are some of the attainable benefits arising from the DBSC deployment[12].[21] discussed the following significant concerns for contributing of "SD" methodology in developing and executing the "BSC":

• Using basic visualization methods to illustrate causal linkages and their polarities, clarifying the definition of causality in BSCs.
• Providing a clearer picture of the system's function.
• Using the feedback loop principle and mixing "core achievement loops" with key performance metrics and variables.
• Relying on frameworks to rigorously evaluate and validate hypotheses, interactions, parameter selections, and strategy growth.
• Doing strategy research and scenario testing, as well as answering "what if" questions Person and interpersonal learning must be sustained, and mental model changes must be supported.
The number of studies addressing the combination of SD and the BSC has increased dramatically in recent years. As an example. [20] suggested an integrated system for combining BSC and the SD methodology, which they tested on an Iraqi public transportation company. [22] presented a review of the literature on the use of SD and the BSC together. Several corporations, public agencies, and advisory firms have used SD to discuss important concerns and decisions over the last decade. The service industry[19] is one of several examples and implementations. Service-based business[24], capital employed[23]. Management of public transportation[20] and service efficiency.

The DBSC model was created by [25] to aid in the decision-making process and the evaluation of alternate scenarios. They used statistics to supplement the suggested "DBSC" method in order to predict the directions of key factors that might affect the Scenarios as well as the company's main internal policies.

2.4. Environment-related ambiguity

Unsurely is a crucial consideration for corporate makers of decision who want to keep their company competitive in the long run. Interactions between ecological, economic, and social processes all include uncertainty[26]. The absence of intelligence, a condition of insufficient information manifesting as inaccuracy , incredibly , or the boundary with unawareness, and any deviation from the unattainable state of full determinism are all characterized as uncertainty[27]. Uncertainty occurs when administrators are unable to reliably forecast potential outcomes or are unsure of their ability to recognize key differences in their business[28]. Furthermore, any new knowledge could create confusion. Other main characteristics of uncertainty include the quality (i.e., impairment of information), setting, and the degree of doubt (ranging from deterministic doubt to a lack of information).

In order to manage dynamic uncertainties, various approaches to resolving ambiguity have arisen, including those suggested by [25]. The literature, which contains inclusive sensitive analysis, validity and trust constructing assessments, structured scripts analysis, cross-impact matrices, and immediate automated non-linear experiments, highlights SD's ability to handle uncertainty. A list of the reviewed literature is examined in detail in [26], as well as an outline of their work on "SD" modelling for uncertainty and various methods and political styles for differing degrees of uncertainty.

Sustainability is more than just a system's design or a target to be met. Furthermore, it refers to a gradual phase that takes place through time. As a result, "SD" imitation, in conjunction with sustainability, may be a useful tool for evaluating a firm's success and assisting administrator in making better decisions, partivularly in volatile circumstances. Such composition examines several situations and organizational strategies, allowing strategic planners to make more informed decisions on the implications of their choices.

3.Processes and methods

The best way to incorporate with the business strategy is the analytical hierarchical structure approach. This method allows for the rational identification of causal associations in a company's regular operations. Variables considered in the strategy are commonly employed in the dynamic method to perform such identification. In addition, intermediate and auxiliary variables are used to give a greater interpretation of the subject's complex existence.

Based on the master strategy, all operations and procedures are closely monitored. The dilemma is then introduced to the experts of companies and the makers of decision for concept creation and design. The corporation was experiencing a deficiency of detailed investigation of the complexities inherent in the strategic plan's existence at the time. Furthermore, when there was a

pause in the implications layer, the administrators became involved in studying the impact of policies placed on the development and learning layers of the strategic strategy.

Diwaniyah Tires Factory, a major tire manufacturer in Iraq, has played an important part in both the domestic and foreign markets in the Middle East. However, as previously stated, there has been volatility in its climate in recent years, which has primarily impacted its business and financial condition. To be more specific, the managers must respond to the following questions:

• What is the best way to manage consumer demand?

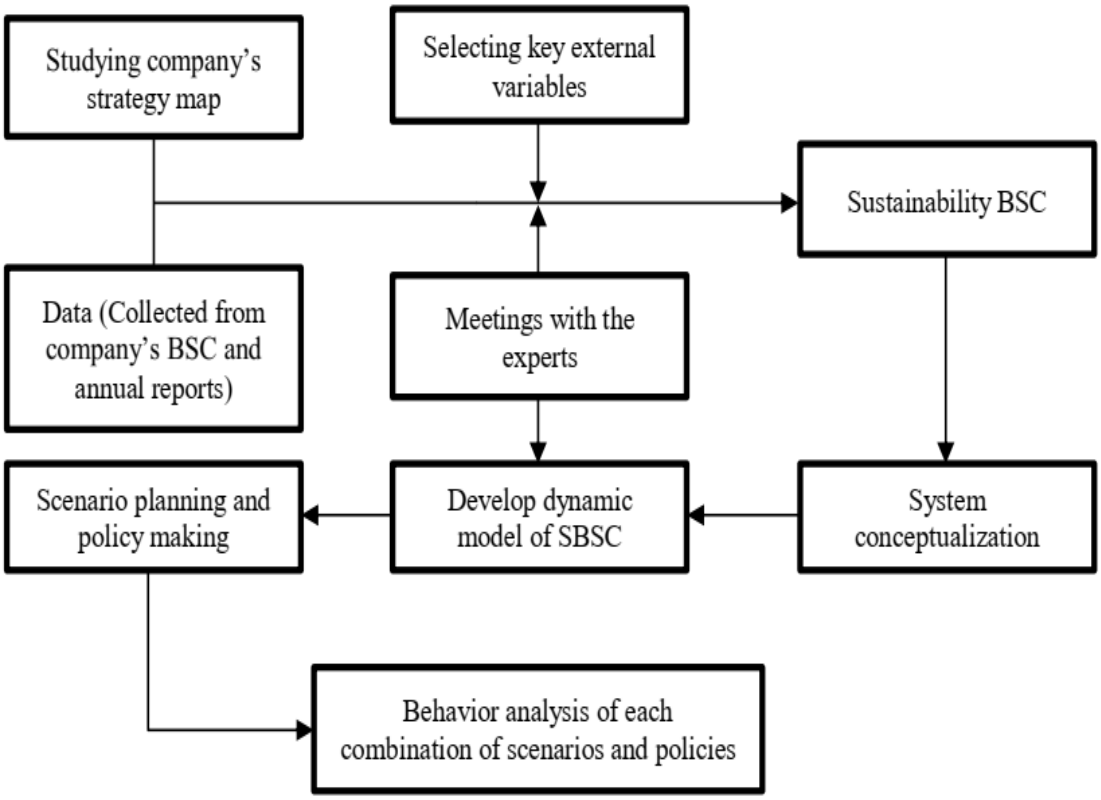
• How will the best amount of productivity be determined in all economical cases?

•How much time and money needed for R&D and new productprogress?

• How do I make the most profitable decisions possible?

Figure 2 depicts the protocol flowchart for this analysis. The company's "SBSC" method of company is firstly designed to apply the main extrinsic variables to the current "BSC" method until the issue has been identified. The "Fuzzy TOPSIS" approach is used to pick external variables for the SBSC model in order to accomplish this. The machine definition model is then created in consultations with experts (including middle and top-level business executives), and a causal loop diagram is drawn to show how the model variables interact. Following that, the company's complex "SBSC" model is completed by formulating mathematical equations based on historical evidence and expert opinions.Lastly, three fundamental macroeconomic scripts are progressed, two major policies are suggested, and the behavior of the main variables is analyzed for each scenario and policy formulation.

Fig.(2) Conducting analysis procedure



3.1. A hierarchical SBSC method is proposed.

If the causal relationships have been established, the stock and flow model is created to address the issues raised in the previous section. All significant Organisation variables are evaluated and compared with the environmental variables influencing the organization in this hierarchical model. It's worth noting that the simulation model is created using the standard BSC platform.

The first move was to identify key external factors that affect the company's efficiency. As previously said, there are three dimensions of sustainability: fiscal, social, and peripheral. In the current investigation, the key factors for each dimension were identified. The "Fuzzy TOPSIS" approach was then utlized to rate and pick the suggested method based on the opinions of industry experts.

Table 1 depicts the judgment matrix:

Table [1] Matrix of choices

Standard substantial	Financial viewpoint	customer viewpoint	Interior business procedures viewpoint	learning & progress viewpoint
distention	8	6	5	4
Rate of currency interchange rate	7	5	4	3
The price of raw material	7	7	3	2
economical progress in Iraq	6	8	3	3
economical progress in middle east	5	4	2	2

car generation	6	6	2	3
Label of tire	3	4	1	2
CO2 releases	2	3	2	1
waste production	4	5	3	3
Rate of unemployment	2	3	1	2
Rate of population progress	3	2	1	1

Table 2 shows the weights assigned to each criterion:

Table [2] Every criterion's weigh

standard	financial vewpoint	customer vewpoint	Interior business procedures viewpoint	learning & progress viewpoint
Weight	0.25	0.25	0.25	0.25

Table 3 shows how to construct a normalized fuzzy decision matrix.

Table [3] Fuzzy decision matrix with normalized coefficient

standard substantials	financial viewpoint	customer viewpoint	Interior business procedures viewpoint	learning & progress viewpoint
distention	0.461112332	0.352941175	0.5488212	0.478091443
rate of currency interchange	0.403473291	0.294117646	0.43905705	0.358568582
Price raw material	0.403473290	0.411764705	0.32929277	0.239045721
economical progress in Iraq	0.345834252	0.470588234	0.32929276	0.358568582
economical progress in middle east	0.288195208	0.235294114	0.21952851	0.239045721
generation of car	0.345834252	0.352941175	0.21952853	0.358568582
label of tire	0.172917124	0.235294117	0.10976425	0.239045721
CO2 releases	0.115278083	0.176470587	0.21952851	0.119522860
waste of production	0.230556166	0.29411765	0.32929277	0.358568582
rate of unemployment	0.115278083	0.176470587	0.10976425	0.239045721
rate of population progress	0.172917123	0.117647058	0.10976424	0.119522860

Table 4 shows the difference between each alternative and the Fuzzy Positive Ideal Solution (FPIS).

Table [4]The distance between each choice and the FPIS

Substantials	**(Di+)**
distention	0.029411768
rate of currency interchange	0.061643143
Price of raw material	0.083710102
economical progress in Iraq	0.068814751
middle east economic growth	0.125209884
generations of car	0.096775937
Label of tire	0.155791073
CO2 releases	0.166416585

waste of production	0.095778552
rate of unemployment	0.168823217
rate population progress	0.181825207

Table 5 shows the distance between each alternative and the "Fuzzy Negative Ideal Solution (FNIS)":

Table [5] shows the distance between each alternative and the FNIS.

Substantial	(Di-)
distention	0.176122676
rate of currency interchange	0.132234388
rate of raw material price	0.120426365
economical progress in Iraq	0.133008281
economical progress in middle east	0.06617923
generation of car	0.105389312
label of tire	0.044334526
CO2 releases	0.031133181
waste of production	0.096749202
rate of unemployment	0.033303459
rate of population progress	0.01440975

Then, for each alternative, the closeness coefficient to the optimal solution is determined (table 6).

Table [6] Proximity to the perfect solution

alternatives	closeness to the ideal solution
destination	0.856901040
rate of currency interchange	0.682051123
price of raw material	0.589930686
economical progress in Iraq	0.6590341
economical progress in middle east	0.34578370
production of car	0.521302807
label of tire	0.221533508
CO2 releases	0.157596651
waste of production	0.502520804
rate of unemployment rate	0.164765265
rate of population progress	0.073431155

Consequently, for the sustainability balanced scorecard model, the six extrinsic variables with closed degrees greater than 0.5 were selected. The final ranking of the extrinsic factors is seen in table 7:

Table 7. Final ranking

Substantial	rank
distention	1
rate of currency interchange	2

rate of raw material price	3
economical progress in Iraq	4
economical progress in middle east	5
generation of car	6
label of tire	7
CO2 releases	8
waste of production	9
rate of unemployment	10
rate of population progress	11

The three categories of operators that can be used in the final model are intrinsic operators, near external factors (factors that are part of the micro-environment), and extrinsic operators (the factors that belong to the macro-environment).The company's strategy diagram, on the other hand, is the key model system. As a result, the BSC model of the company is used to classify additional variables. Table 8 illustrates how the key variables are classified based on their internal/external sources and the case's BSC strategy diagram.

Table [8] Classification of Factors

factors BSC perspective	interior	near extrinsic	extrinsic
financial perspective	• earing • income • whole cost • Salary of employee	• advertisement investment	• price of raw material • rate of distenation • rate of currency interchange
customer perspective	• customer satisfaction • advertisement policy	• market share • perceived value • image • word of mouth	• total market capacity • demand • car production
internal business processes perspective	• production • productivity • order plan for raw material • inventory	• raw material delay time	• waste product
learning & growth perspective	• work force • training policy		

It is clear that the reciprocating mechanism was retained during the model design process, from the creation of the issue to the final step. Even the haphazard model that was created was constantly monitored and updated.

Fixed parameters deduced from default standardization and optimization calculations:

The fixed parameter defaults are described first in this section. The derived values for these parameters are then shown using simulation Table (9).

Table [9] Variables that cannot be changed

Low limitations	Variables	High limitations
14	<=(normal training hours)<=	.40
0	<=(initial WIP -Work in Process) <=	50000
0	<=(initial inventory)<=	100000
1	<=(time to finish production)<=	5
1	<=(delivery delay)<=	1.05
Low limitations	**Variable**	**High limitations**
170	<=(normal production factor)<=	19000
4000	<=(average of other costs)<=	60000
0	0<=(smooth time)	
0	<=(fraction of car production on potential demand)<=	1
80000	<=(car production)<=	100000
0	<=(forecast tolerance)<=	1500
0	<=(normal WOM (Word of Mouth) level<=	10
0	<=(raw materials delay time)<=	1
200000	<=(normal advertisement investment)<=	500000
0	<=(smooth time 3)<=	1
6000	<=(WOM factor)<=	8000
6000	<=Ad factor<=	8000
90	<=(normal CSL -Customer Satisfaction Level-LevelP<=	98

Table 10 shows the values obtained through the optimization process.

Table [10] Degree of fixed variables that is optimal

variables	optimum level	variable	optimum level
ordinary hours of training	15	forecast tolerance	69233
First WIP (Work in Process)	5000	Ordinary "WOM "(Word of Mouth) level	10
First divest	7128	Delayed on raw materials delay time	0.0384
Period of completing the production	1	normal advertisement investment	2107000
delivery postponement	1	smooth period 3	1
ordinary product operator	1714	"WOM "operator	6000
rate of other cost	50770	"Ad" operator	6000
smooth period	354.035	Ordinary "CSL" (Customer Satisfaction Level) Level	90.097
role of car product on potential request	0.02	product of car	9000

Optimization: Further to roles identified previously and their limitations, the related weights of the costs for which data is given (table 11) should be considered to fit its behaviour during the optimization process.

Table [11] The proportional weights

variable	relative weight
income of sales	0.01
product	0.24
request	0.24
earning	0.02
complete cost	0.06
Share of market	0.00000076
raw materials	0.247
The whole cost of raw materials	0.04616
"Customer Satisfaction Level"	0.00032

3.2. Validation of the model :

Validation of models is an essential section of system dynamics. Effectiveness of the model's findings is contingent on the model's validity. A variety of experiments have been developed to evaluate complex models, which are classified into two categories: structural and behavioral. Structural and behavioural tests were used to analyze model behaviour and performance validity. Two structural tests that come to mind are the boundary adequacy examination and structural assessment. Sensitivity analysis (one of the most critical measures for testing the efficacy and durability of different models), "reflective behaviour, inconsistent behavior, and behavior predicting" are all examples of behavioral assessments[29]. In the technique of structural dynamics, groups of experts associated with the subject assess the significance of numerical values and the forms of relationships between variables. In addition, expert committees, procedural assessment, and boundary adequacy measures were included in the proposed model in this article.

Test for Adequacy of Boundaries: The aim of this test is to address two essential questions:

1.Have the model's active variables been deemed endogenous?

2. Has the period limitation been adequately considered?

It examines whether the model boundaries contain key words and variables relevant to the topic and if these variables are endogenous to the method. To react, it should be indicated that the boundary adequacy test was thoroughly investigated by referring to expert sentiments in realizing the variables' effect on the method border and utilizing the resulting results. It's worth remembering that the data time span for 2019 is eight years, which covers global tire market volatility, systemic changes in macroeconomic parameters, and key industry variables.

Structural Assessment Test: This assessment aims to reply the crucial question of f the method process is in accordance with the governing system's

laws and decision-making structure. The framework assessment assesses how well the model's behaviour corresponds to its function. The behaviour of the variables in the positive and negative feedback had to be exponential and goal-seeking in the simulation model. As a consequence, as discussed in the previous section, the variables that make up the negative feedback loops in the presented dynamic SBSC model have goal-seeking behavior in the simulated method.

4- Designing a scenario: Uncertainties in the system that governs economical basis and organisations should be investigated. The scenario planning strategy, as described in section 1, is capable of predicting the complexities that impact an Organisation. Since the economic subsystem that governs an community has such a significant impact on the community, it is thought to be dependent on economical inconstant.

Furthermore, increasing sales and lowering expenses are two practices that a company should use to boost profits. As a result, the manager will choose between two general methods. In other words, this would turn into a challenge of company benefit optimization, which has two objective functions. The first goal feature is to maximize sales, while the second goal is to reduce costs. It's worth remembering that these objective functions aren't quite the same, that means, activities that can raise the income will often lead to a raise in expenditures. Furthermore, cutting costs could lead to a drop in sales.Organizational internal policies are largely focused on the two above targets, with a primary focus on increasing productivity and sales and a secondary strategy of cost reduction.

Given the importance of economic variables in environmental situations impacting enterprises, we looked at three economical progressive inconstants: distension rate, yearly interchange rate progress, and yearly auto output progress. Furthermore, companies are now confronted with three main future scenarios: "optimistic (global development scenario), realistic (average long-term economic situation), and pessimistic (continuity of the current sanctions)".

In the other side, we describe the organization's key variables and illustrate how they are affected by each environmental scenario.

Then, in the context of corporate internal policies, we examine each position within the Organisation variables. As a result, the company will implement two internal policies:

- Policy A: overall production volume and maximum revenue, advertising, and R&D expenditures.
- Policy B: rising efficiency while lowering prices and output levels to a predetermined amount.

The benefit of the company serves as the basis for evaluating its internal policies. When you model an outlet for each strategy in a situation, you get a benefit pattern over time. Finally, in each case, the benefit pattern in relation to each internal regulation is calculated. The amount of benefit as well as the organization's longevity are two major factors that have stayed dormant in the organization's efficiency trend. In other words, any trend of profit would either

contain the sum of profit or show the productivity's long-term sustainability. According to this explanation, management may choose to sacrifice productivity for a significant short-term advantage, or opposite, or it may be best to preserve earning over time disregarding its scale. Tables 12, 13, and 14 describe the elements of the environmental situations that impact the organization and its internal policies.

Table [12] Scenario 1: Economical expansion

Economical progress	**8 per.**	Economical progress	**08** per.
distention	**10** per.	**distention**	**10** per.
Yearly progress of interchange rate	**10** per	Yearly progress of interexchange rate	**10** per.
Yearly progress of car production	**15** per	Yearly progress of car production	**15** per.
Interior policy of company A		Interior policy of company B	
Degree of production in maximum state		Increase in product	
Maximum sales and advertisement		Reduction in production cost to needed degree and not more	

Table [13] Scripts -2: Long-Term Economical Cases

Economical progress	**2** per.	Economical progress	**2** per.
distention	**15** per.	**distenation**	**15** per.
Yearly progress of interchange rate	**20** per.	Yearly progress interchange rate	**20** per.
Yearly progress of car production	**5** per.	Yearly progress of car production	**5** per.
Interior policy of company A		Interior policy of company B	
Degree of production in maximum state		Increase in product	
Maximum sales and advertisement		Reduction in production cost to needed degree	

Table [14] Present Sanctions Case of Organization (Scenario No.3)

Economical progress	**4** per.	Economical progress	**4** per.
Destination	**35** per.	**destination**	**35** per.
Yearly progress of interchange rate	**35** per.	Yearly progress in interchange rate	**35** per.
Yearly progress of car production	**10 per.**	Yearly progress incar production	**10** per.
Interior policy of company A		Interior policy of companyB	

Level of production in maximum state	Increase in product
Maximum sales and advertisement	Reduction in production cost to needed degree and not More

5. Findings : The dynamic method is imitated using the hypotheses given in the section on peripheral scripts. Interior strategies and patterns for the main variables are examined in subsequent cycles. The parts below look at the patterns for each primary inconstant in the method.

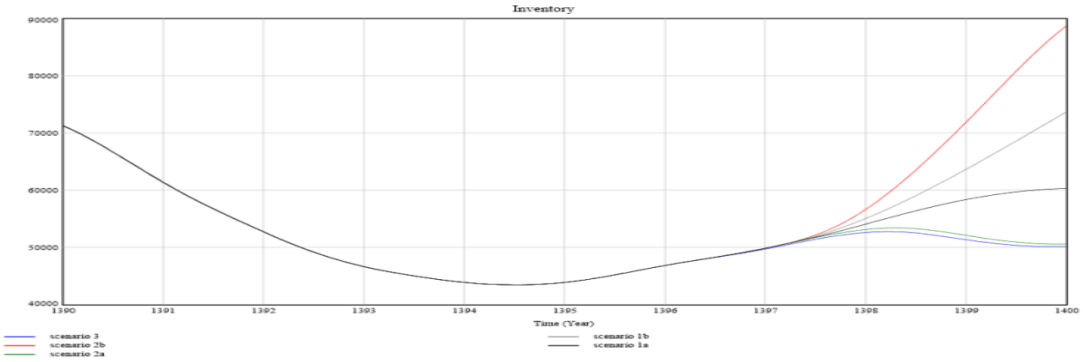


Fig. (3) Instances of Divest Behavior in Scripts

A.Inventory levels

A major variation exist among divest patterns in politics "A" and "B" for any peripheral case, as seen in figure 3. When only one internal protocol (policy A or policy B) is chosen, though, there is no substantial variation between the three scenarios. As a result, the projected trajectory for the community's divest is unaffected by peripheral script and is solely based on the organization's internal policies. It indicates that any difference in divest levels under the management of the company is determined by demand, advertising, and efficiency policies. The divest is greatly reduced if the output volume is maximized by significantly more revenue and ads. However, if the policy is to raise efficiency while lowering production costs, the divest trend will rise.

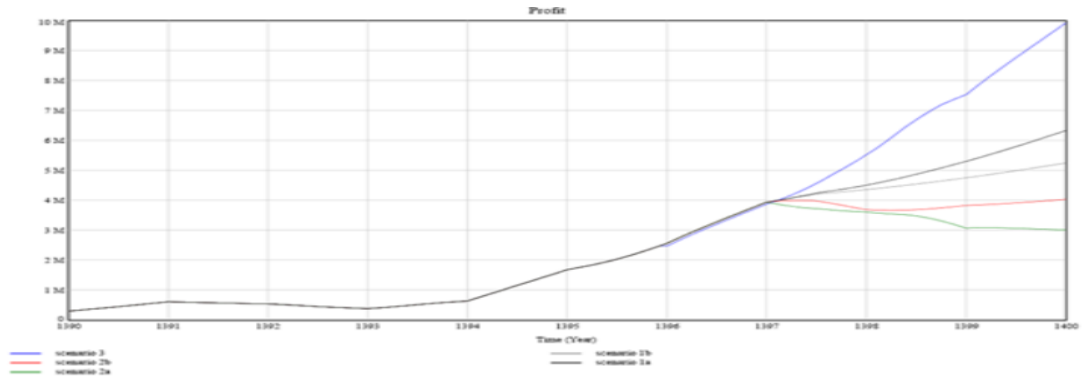


Fig.(4) In situations, the profit behaviour is

B. Earnings

If Scenario 1 is realized, as shown in Figure 4, policy A implementation will result in an initial output, but the gradient of profit growth will be significantly reduced. In Scenario 1, on the other hand, the implementation of policy B begins with a rapid growth rate and continues to do so. If scenario 2 is completed successfully, a similar result would occur. Due to the output pattern for both "B1" and "B2" is rasing at a large rate, the company should select policy B regardless of the setting in which the scenario occurs. This is significant because, if a manager is focused on increasing productivity, the policy of increasing productivity while lowering production costs should be considered. Furthermore, if the third scenario, which is a constant rise in the inflation rate, is implemented, other extrinsic operators like a reduction in request are crushed, resulting in substantial variance from other scenarios and, as a result, profit would develop exponentially. Any fixed expenses, such as employee salaries and overhead costs, are responsible for this result.

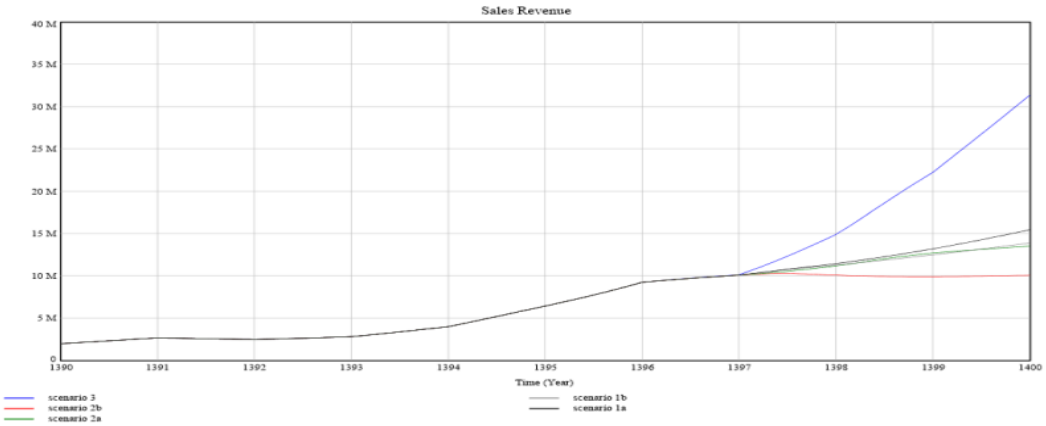


Fig.(5) In cases, what happens to sales revenue

C. Revenue from Sales:

Figure 5 shows that there are no significant variations between the graphs. However, a more thorough review shows that executing Policy B generates more revenue in either the first or second environmental scenarios. As a consequence, productivity will rise, and output costs will fall even further. It can be reflected that the third example would lead to a significant various in sales income. Clearly, the rise in the inflation rate is the most important stimulator in this case.

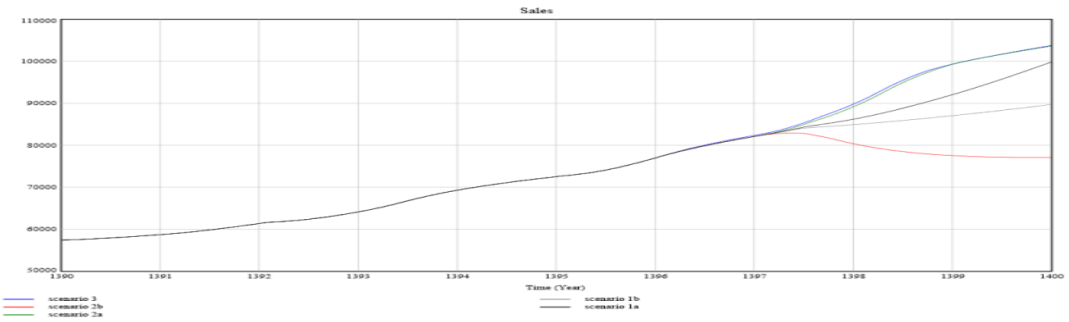


Fig. (6) In certain cases, sales level behavior

D. Level of sales

Figure 6 shows the disregarding of the global development scenario or the ratio of long-term economical condition, the revenue volume will continue to rise due to the implementation of the productivity increase and output cost reduction strategy. Furthermore, in each case, the revenue degree begins with a quite low gradient and then experiences a drop in its progressive gradient, resulting in an approximately steady trajectory by the implementation of the strategy of optimizing demand, growing sales practices, and increasing advertising. Anywise, in the third example, the revenue growth rate would be constrained by a drop in demand. Thus, the company can achieve a very high degree of revenue in all three environmental scenarios simply by selecting a strategy to maximize efficiency and lower manufacturing costs.

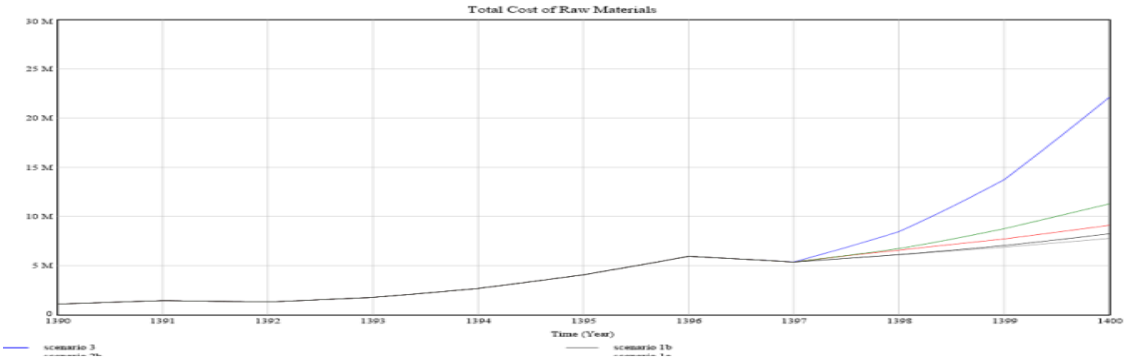


Fig. (7) cases, how does the total cost of raw materials behave?

E. Overall cost and raw material costs

Figure 7 shows that preferring Policy B over Policy A would result in lower net costs if the economical development script and/or the continuation of the present case situ scenarios arise. Clearly, the whole expense and the value of raw materials are included in the cost. However, it can be deduced that the net expense in the third case (i.e. an uptick in inflation and a reduction in economic growth) would increase with time, which is distinct from other scenarios.

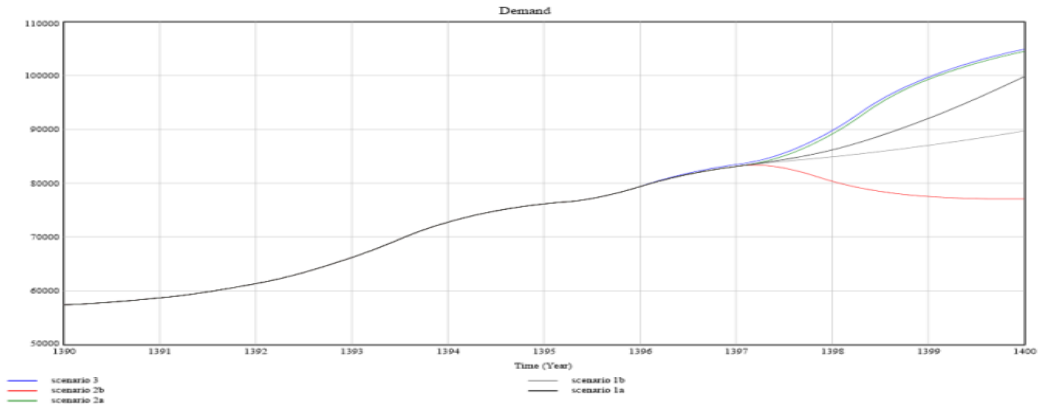


Fig (8) Demand Dynamics in Scenarios

F. Demand

According to the market research shown in Figure 8, in all three environmental scenarios, increasing production and the degrees and ads (Policy A) will result in higher demand growth. This finding is explained by Policy A's reliance on promotional tools and sales progression, which would ultimately lead to an increase in demand. It's important to keep in mind that a reduce in car demand and economical progress (as in the third scenario) will not lead to a new business trend. This outcome is the culmination of two factors: 1) Diwaniyah Factory is a domestic industry pioneer, which means it can maintain its market share no matter what happens 2). During an economic downturn, customers are more likely to maintain their cars for prolonged periods of time, resulting in a rise in tire demand. Despite these two factors, the market growth curve would steadily decline.

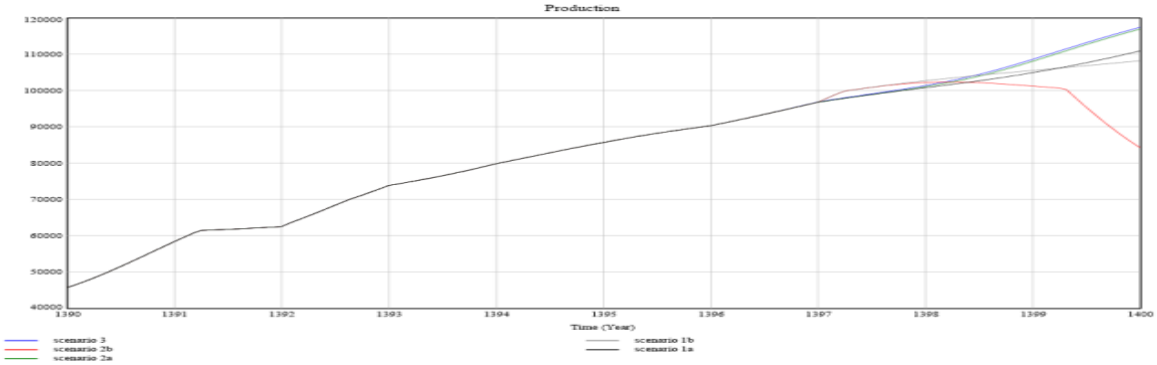


Fig. (9) Production activity in particular environments

G. Manufacture

Even if the demand level is growing in all three cases seen in Figure 9, the rise in policy A is greater than the increase in policy B. In this scenario, a growth of productivity along with a reduction of prise and supply (policy B) would lead to a lower degree of demand. However, one of the key components of policy A is optimizing output level, although the gap between the two policies is not important in the first case. In the other hand, the second example shows a greater disparity in the two strategies. Finally, according to the study listed for

the demand rate, the third scenario is likely to sustain the rising pattern of supply.

6. Conclusion:

To deal with unstable and chaotic conditions, an adaptive hierarchical BSC model was introduced in this article. The majority of research in this field are restricted to the conventional BSC system and do not include the impact of external stimuli. Furthermore, the outcomes are rarely applicable to real-life scenarios. The complex sustainability BSC model was extended in this paper with economic and environmental stimuli that have a significant impact on an company's efficiency. comparing to the energizing outcomes and data from the organization's past was used to verify the built model. Consequently, three common scenarios were designed depending on the current case, with the study of the two major politics in each scenario, using an optimization approach to refine the inconstant in the dynamic method to provide a more detailed simulation model. As the findings show, strategic managers' strategies and actions in turbulent situations produce quite distinct outcomes in all key areas of the company. This indicates that companies cannot use the same paradigm in both predictable and unstable situations. Furthermore, in many cases, the effect of external forces on an organization's success is more important than the internal strategies and decisions taken by managers. The historical data in the "BSC" method (at Diwaniyah Factory) was restricted to less than 10 years, which is a major limitation of this study. Furthermore, in order to simplify the suggested method, certain extrinsic inconstant that existed with the "Fuzzy TOPSIS" system were omitted. In addition, certain intrinsic and extrinsic variables cannot be measured, so they were left out of the suggested method.

In conclusion, the recommendations below are made in light of the conclusions:

• Doing calculations using an optimization approach and proposing the best options to policy makers.

• "System of Systems Methodologies (SOSM)" may be used to improve the interrelationships among various relevant topics in our suggested method to solve the challenges of making decision in complex circumstances of the real world.

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The effect of a sustainable balanced scorecard for strategic decision-making under uncertain competitive and climate conditions evidence from Iraq

تأثير بطاقة الأداء المتوازن المستدامة لاتخاذ القرارات الاستراتيجية في ظل ظروف تنافسية وظروف مناخية غير مؤكدة دليل من العراق

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المستخلص:

يهدف هذا البحث الى استخدام بطاقة أداء متوازنة مستدامة(BSC) ، لتوفير نموذج جديد من أجل اتخاذ قرارات استراتيجية في ظل مناخ مضطرب. يتم استخدام نهج TOPSIS الغامض لاختيار المتغيرات البيئية ، والتي يتم تطبيقها بعد ذلك على نموذج BSC مستدام للوحدة الاقتصادية ، إذ ينقسم نموذج اتخاذ القرار إلى ثلاثة متغيرات رئيسة: "متفائل" (نص تطوير اقتصادي) ، و "واقعي" (حالة اقتصادية طبيعية طويلة المدى) ، و "متشائم" ، بالإضافة إلى متغيرين هما السياسة الداخلية، وتعظيم الإنتاجية. بالنسبة لنموذج BSC الهرمي ، تتم محاكاة النموذج بشكل مستقل في كل موقف واستراتيجية ، ويتم دراسة كل ميزة مهمة للوحدة الاقتصادية ، من أجل زيادة الربحية والقدرة على البقاء في المدى الطويل. إذ تشير النتائج إلى أنه في كل حالة ، يتم تفضيل استراتيجية معينة ، والتي قد تساعد الادارة في اتخاذ القرارات الاستراتيجية في المواقف المتقلبة والفوضوية. نظرًا للتطور المتزايد للوحدات الاقتصادية في عالم اليوم التنافسي ، يجب اقتراح أطر تقييم الأداء، إذ يعد نهج "بطاقة الأداء المتوازن (BSC)" أحد الأساليب الأكثر استخدامًا لقياس كفاءة المشروع والتي يمكن تكييفها مع مواقف معينة. هذه الدراسة فريدة من نوعها من حيث أنها تدمج القضايا البيئية في نموذج BSC ديناميكي للوحدة الاقتصادية.

الكلمات الافتتاحية: صنع القرار ، السياسة الخارجية ، التقييم ، ديناميكيات نظام الاستدامة.