

# THE SUMMARY OF THE GENERAL FRAME OF THE CHAOS THEORY AND ITS WAYS OF APPLICATIONS IN THE ECONOMICAL ACTUALITY



MOHAMMED MOUSA MOHSIN, FAWZAI KHALEP OMER

University of Basra, Iraq, momo\_mathyahoo.com  
 University of Basra, Iraq

## ABSTRACT

The philosophy of the "Chaos Theory" cares about the processing of the confused and complex systems; to transform them into known systems with concrete things. This is done by mixing the mathematical, geometric, mechanic, and topology sciences with the science of economy. The science of economy itself borrows many of its terms from the previous scientific branches, so as to make them known and in a deferent and better way.

The aim of this philosophy is watching the rules and the simple laws; when they get on increasing through the consequently repetition and become a complicated behavior dilemma especially in the non-liner systems. It has also the ability of predicting accurately the outputs (results) of the confused systems; or generating many of the current evaluations data despite the dynamic and topology differences of the system.

"Chaos Theory" is considered as one of the most important idea in the science of protocol of methodology because, in every phase of the phases of the system, it expresses a related pattern with logical connections; so as to realize and distinguish the principles which are

appropriate to the texts that have the properties of instability and taking the risk of getting it out from a partial perspective to a total one. Add that the evaluation of possible opportunities in the bricks of the economical ensample and manage to keep the ensample continuation under the dominate current and futurity circumstances.

**Keywords:** Chaos, Butterfly Effect, complex adaptive system, lorenz attractor

## INTRODUCTION

Chaos theory or the so-called chaos theory, a field of study in mathematics, blended with applications in many fields such as physics, engineering, economics and topology. And other applied fields of disorderly conduct and that can be observed in many natural systems, such as weather or in the analysis of mathematical models of forest and the ramifications of an organization, or through iterative analysis technique and raster maps with significant impacts, the solution of many problems in gathering and blending of differences. Giving scientific evidence on some principles that are so important .

It contains the principles of constructivist theory of topological reliable scientific method, proof in the mathematical sciences, but the theory does not ignore the unstable behavior of dynamic systems that are under the

premise of chaos and future behavior is determined by the initial conditions or in case the primary system, making it a certain formula. Not for the purpose of creating new knowledge does not mean only, but significant results and develop theory for nonlinear dynamical systems and confirm the facts, and link them with precise measurable or quantifiable.

Visualizing theory "chaos" a clear break from the traditional flag formerly through drawings and shapes in the financial system.

Infact, they vary with the nature of risk as standard changes gradually, although the theory of "chaos" is not a way to predict, but they help to understand well the variables which cause and risk factors.

To some extent, the theory of complex mechanical behavior, and accept the risk management in a complex deal and make it as simple as possible, but this does not mean reducing methods, but they view the incredible to describe Visual behavior, market risk, and the risk task administrators from this side will look like as visible to truly understand the mechanical market.

It's a mathematical theory is the study of random and unstable behavior of systems designed, which contains identifying information remains as close to classical physics curriculum, and developing strategic techniques to recognize unstable regimes, which expresses itself with the rest of the ideas as a philosophical theory science contribute to building the modern scientific method.

#### **I-The aim of research:-**

provide detailed study help to read the text of the theory in analysis of the nature of the theoretical and applied trends absorbed. "There is no doubt that the theories taught subject credited the gradual adjustment to previous theories, and this amendment will continue to be

so in the future if not stop thinking about it" [1].

#### **II-The general framework of the theory**

Any theory is based on the data and the results of theoretical philosophy, where data are purely the assumptions required by the need for such data in accordance with the principles of reasoning.

And the "chaos" theory in modern science is a fraction of the traditional knowledge that is often dominated by large operations brought to science. And the traditional rules cannot be applied rigorously whatsoever, it's a mix of good things and the other without it.

Traditional theories already was the main form and unified science and many of the preconceptions which could be amended in particular in mechanical Newton mathematical assumptions are fixed and rigid formalism and methodologically reeducates.

However, this change resulted in the modern progress in scientific research, opening broad prospects to explore better from now on complexity and harshness in natural systems.

Many of the current regulations, for example, financial systems that are complicated are processed far from classic and modern Muslim women still manipulate is part of scientific thinking in the interpretation of the complex relationships in the financial markets, the theory of "chaos" on the image of the flag is a typical iteration engineering concepts to explain these phenomena, mid-stream of modern conventional and traditional ideas. It is perfect as a stream of philosophy or theory of realism?

"There is generally consensus model concerning the theory of knowledge that thing known as not independent of mind knowing ... .... The world really is the

human mind and not sense, a thing is being aware of mentally aware,

There is a necessary Correlation between presence and indissoluble mental knowledge until it United with the self [2].

Realism relies on speak of things foreign, independent, and are known as direct, perceptual knowledge is not only intuitive perception of reality directly, distinct from each other, spiritual and perfect view of realists that the knowledge created to topic [3].

And that science which is called the new science that describes the chaos and complexity, does not see the world working as a machine, and that nature is still actively working to ever higher complexity and complexity and harshness. But still society affects the way we think about our world..

It examines the complexities of humanitarian action and choosing his identity through the lens of chaos theory, and quantitative science that shows human contact between individuals, and Intergalactic space after the classic Newton.

Everyone understands how difficult for existing installations and established that such enterprises need the ability to predict the future and to descriptions of functional and financial projections, though, the real innovation comes from something best described as chaos, the possibility of controlling the chaos under the obsession of innovate . [4].

The innovation of business models should not look back to the past only refers to what can be done to develop future business models. It revolves around the back and comparison, but about creating new mechanisms to create value and generate revenue, to invent new models, based on challenging traditional beliefs in order to design the original business models meet

the needs not met by or new requirements or hidden customers. [5].

And here we find a description of the chaos theory and description of complexity theory, most importantly evoking memories.

## CHAOS

The study of chaos by "Edward Lorenz" in the field of weather forecasting in 1960. Lorenz was a mathematical background was thought to use mathematics to forecast weather changes in an attempt to mimic the behavior of weather, "Lorenz" computer model using the twelve specific and characteristic equation to reach the same result under the same conditions. "Lorenz" that succeeded in creating a model consistent with the way the weather. And that over time could distinguish certain styles, although there are differences appear, as well as an orderly disorder

" Lorenz" found in the simulation of very large differences appear twice, while during the first months results were identical. But after a while all went this similarity and analogy, this was very confusing because the same program has not changed, but finally found that the result was due to an error in the entry was the first entry (.506127) and the last is (.506) and at moment is the sensitivity of the solution depends on the situation and conditions. Which is known as "The Butterfly Effect". It is a butterfly flapping its wings in Asia leading to the hurricane in the Atlantic Ocean, which is illustrated by the following figure(1): [6.] .



[fig <sup>(1)</sup> "The Butterfly Effect"]

Source: Jonas Bengtsson, " Thriving al the Edge of chaos " , 2004, p.15.

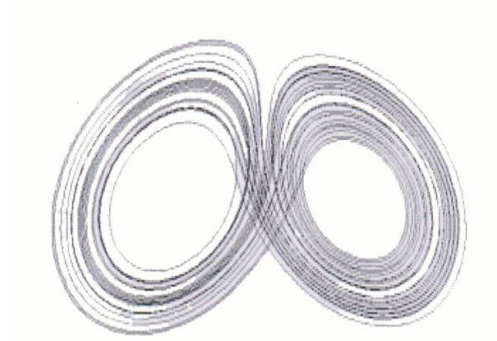
The model was applied in economic reality in some retail businesses, resulting in stimulation of financial operations and the latest change in sources of revenue also turned from the proceeds of the sale once the proceeds of the sale of the service

"Design prototyping is a powerful tool for the development of new and innovative business models, like the Visual thinking. It converts the abstract concepts to concrete concepts. [ 7].

The small changes rising successively through the system which led to significant consequences. So the "Lorenz" long-term prospects for the weather seem impossible. If the butterfly effect "does not exist in the atmosphere, once it reaches the status of them begins to repeat itself periodically

In fact, the "Lorenz" that any physical system does not act on a regular basis. He has continued to work with periodic nonlinear systems, those systems that do not repeat themselves, and enables a system called the Lorenz attractor ". The following figure(2)

illustrates.



[fig <sup>(2)</sup> "Lorenz attractor"]

Source:Jonas, Ibid, p.16

At that time, Lorenz discovered "the impact of science Butterfly specialist, as he focused on the vision implicit in the research questions. This was normal in the display. The fact that the only way to understand all understand. From this aspect, it is not suitable to work in non-linear systems. As in the Attractor "where variables are not supported, as in the case of linear systems if the variables are supported on each other and also internally threaded this effect you can use much when approaching a high level of internal coherence.

Furthermore, it is possible to establish different systems but the Organization ignored the differences. And that hypothesis in understanding natural law must know the approximate initial system conditions, this kind of thinking is only applicable to nonlinear systems due to "the butterfly effect

Finally, more scientists began to consider the theory of "chaos" and realized that the chaos appeared everywhere, and that the entire world was under the influence of non-linearity than in writing.

## COMPLEXITY

Scientists started understanding nonlinear systems, through research on the interactions

between these systems and the interactions within the system itself. Start Complex Adaptive systems (Cas) .

And then the "chaos" theory in line with non-linearity. And with the complex alignment system is a special kind of nonlinear systems, that can be seen in the chemical reactions which have additional capacity to use behavior and events effectively and uniformly.

Harmonized systems of complex can be seen everywhere and expected in many different aspects. Examples of such complex systems ecosystems, human immune system, and economics, and central nervous system. Harmonized systems consist of a group of affiliates or agents each have a set of principles when dealing with branches and other agents. And the fact that the various regulations which reflect the diversity of branches and agents. As in the ecosystem, while agents antibodies in the human immune system.

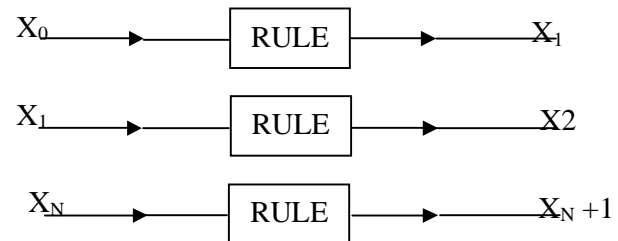
And complex adaptation systems remain the same for long, as they constantly change and triggers the change may come from the environment and experience of affiliates or agents. And the time it takes the system to change and learning-friendly, may be for only the second time, and in the central nervous system and possibly for thousands of years as in the ecosystem.

There are several principles that affect the behavior of all systems of the complex alignment, but there are seven common characteristics between these lines is":

- 1-Aggregation
  - 2-Tagging
  - 3-Nonlinearity
  - 4-Flows
  - 5-Diversity
  - 6-Internal Models
  - 7-Building blocks
- [8].

## FOUNDATIONS OF THE THEORY OF "CHAOS"

The theory of the "chaos" to observe simple rules when they become detailed and take successive growing, and it seems to become a complex behavior, For example:  
 [9].



Indeed, among the fundamental principles of that law,  $(X_0)$  changed successively by a small amount, the result we will get a very different result after a few calculations, regular iterative mathematical tables, chaos theory may not be acceptable for all, but in practice most important landmarks reflect.

And the definition of chaotic systems,

CHAOT that follows:

1. The solution must be periodically.
2. The solution must be selected
3. The solution is sensitive and varies according to Wallace for the case of the primary system.

Either the law that controls the system "Chaotic system", it must meet certain conditions including :

1. Should be a law, not a linear.
2. The Map does not reflect informal derivation or complex one-dimensional.
3. The law includes at least three dimensions of probability (chaba).

The three properties above, all of which are essential for the solution to it is called the "chaotic". The case of nonlinear system based on task analysis that all more or less for the sum of its

parts. Unlike linear systems which all equals the sum of its parts:

As an example of the types of systems, "CHAOTIC", if we have

$$X_{N+1} = 10X_N \pmod{1}$$

$$0 \leq X_N \leq 1$$

To explain the theory of "Chaos" in the system, it follows that:

	$X_0 = 0.1123456.....$
	$X_0 = 0.1123598.....$
Then we	
have seen:	$X_1 = 0.123456.....$
	$X_0 = 0123456.....$
And:	$X_2 = 0.2598.....$
	$X_2 = 0.23456.....$

So we see, The details comes with great speed and detailed.

**ECONOMIC APPLICATIONS**

There are many things you can talk about the economy, economic efficiency concept is widespread among economists, and maximize production at the lowest possible cost, or maximize the available cash income benefit, and equitable income distribution theory to a large segment of consumers and members of the community.

"These problems require modern instruments analysis in line with scientific development for the rest of the sciences such as physics, computer algorithms, as well as the imperative need to develop tools of economic analysis to reflect the real scale economic problems faced in everyday

life as a consumer product or economic enterprise or national economy to treat large problems

Such as inflation, unemployment and economic dependency and indebtedness. As well as fluctuations in currency values or the failure of the experiences of the economic growth of many developing countries

[10].

Historically, it has been observed that the ideas that science somehow affect the economic models for the same period. Thus, the ideas that control mechanical Newton of the 19th century remained the same in control of economic models and do not reflect an accurate method that distinguishes mathematics, so that those ideas later used for example in international trade and financial systems, which will make the traditional theories. We cannot really predict what interest rates will be in the future and not in the price movements in the stock markets that move in a manner very similar to the random movement in most of the times, recalling the theory of random movement made it impossible to build any future expectations on strategy based on previous price movement, nor does it offer something on the gains that can be achieved by choosing alternatives.

For this and other reasons, it is necessary to create a more coherent approach to economic and financial systems, including point of contemporary science. As chaos theory and the theory of modular redundancy architecture. Which is important for risk management that allows professionals and professionals in the field to understand the risks in a more holistic, as well as, the use of statistics to improve the models of financial risk through the premise of the theory of "chaos" and risk "Risk". For the actual measure of market risk, can



contribute to clarify the overall risk assessment and management.

## CONCLUSION

This study provides a set of conclusions to this theory and to identify areas of serious applications:

1. To conduct disorder can be observed in many natural systems, such as the economic system, as well as in the study of economic efficiency, and fairness of distribution and price as high real estate prices and lower share prices in the stock market and the impact of interest rates on individuals that are interrelated and escalation in Lacey.
2. Choose a modern identity through the prism lens of chaos theory. And assess trends in the application of the theory of "chaos" quantitatively and self-importance of the work that the theory in the field of financial analysis and the complexities of relationships in humanitarian work.
- 3-the mechanism of the "chaos" theory is at work against the trend of traditional ideas and methods were already written, it's a revolt against traditional physical ideas even for the theories of evolution and the modern scientific language and proposes new tools to address the complex reality as "gleek " starting chaos stops science classic.
- 4-Organization of the self to a new and better adapted to the new situation, and that the most important key strengths are in understanding the relationship between the Organization and its environment in order to continue to survive, innovation, despite its focus on physical aspects.
- 5- systematic theory in the aim of being able to respond quickly to changes and able to provide proper conditions for self-regulation and restructuring of the new good results as well as accurate short-term forecasts.

6- Solve problems that require new and innovative business models to design the ideal solutions. In fact there are a lot of opportunities and a lot of choices in designing economic models or new management or ideas for the development of the current models.

## RECOMMENDATIONS

These ideas in a new theory to know the path that theory as well as find out what can be done under this path:

1-We hope that we have developed for researchers, the dynamic approach tools and mechanisms in the design of new models and innovative competition, there is still much that can be applied in the light of the theory of "chaos" and engineering complex harmonization. And others.

2- It should be applied in economic areas such as hotbeds of liquidity and the market for contact to the balance when the horizontal investments have some difference in equilibrium.

3- possible to formulate administrative and business models as standard so useful in product innovation and competitive economic specification work through the disassembly and focus on substantial new work.

4- study of changes in the economic environment helps a lot to adapt work more effectively to external changes, because of the growing complexity of the scene. And to make "tangible business models. As well as to make future is something concrete. MARGINS [1]. R. G. Kolngood, translate and study, Fatma Ismail "essay on philosophical method (Supreme Council of culture, the national translation project, Cairo, 2001), p. 19.

[2].R. G. Kolngood, translate and study, Fatma Ismail "essay on philosophical method (Supreme Council of culture, the national translation project, Cairo, 2001), p. 49.

[3].R. G. Kolngood, translate and study, Fatma Ismail "essay on philosophical method (Supreme Council of culture, the national translation project, Cairo, 2001), p. 50.

[4]. Alexander Oster, falder, "innovation business model," first edition, (Mount Oman, publishers, 2013), p. 135.

[5]. Alexander Oster, alder, "innovation business model," first edition, (Mount Oman, publishers, 2013), p. 136. 6-6.jonas Bengtsson , [6]."Thriving al the Edge of chaos" , 2004. [www.bth-selipd](http://www.bth-selipd) .p.14.

[7]. Alexander Oster, alder, "innovation business model," first edition, (Mount Oman, publishers, 2013), p. 8.

[8]. jonas Bengtsson , Ibid,p.169-

[9].T.R.RAMAMOCHAN CMMACS , "Introduction to chaos theory"

Ban galore ,2013, Website.

[10]. Fawaz Al-Jarallah Naif, wekidar Hassan Ahmed, the "microeconomic analysis" (the University of Mosul, books for printing and publishing, 1987), p. 15.]

to general biology", Mosul University, National Library of Printing and Publishing, 1988.

[8] - Fawaz Garallah Nayef, and Kedar, Hassan Ahmed, "micro-economic analysis", Mosul University Library for printing and publishing 1987.

## REFERENCES

[1]- Jonas Bengtsson, " Thriving al the Edge of chaos " , 2004.

[2]- T.R.RAMAMOCHAN GMMACS, "In trodution to chaos theory" ,2013.

[3]- Tania velasquez , " chaos theory and the scence of fractals , and their applicatlon in risk management" , 2009 .

[4] - Alexander Oster Valdr, "innovation business model," the first edition (Jabal Amman, Publishers 2013.

[5] - R. G. Collenjwood, "an article in the philosophical approach" translation and study, Fatima Ismail, (the Supreme Council for Culture, the National Project for Translation, Cairo) 2001.

[6] - Steven Landsberg, "philosopher of the economy," translation Rasha Saad Zaki (Cairo, Arabic words for Translation and Publishing, 2008).

[7] - D. Samir Bashir iron, "Introduction