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Financial engineering between industry and innovation in the global economy

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Abstract
The use of financial engineering, its instruments and innovations has become the most contemporary theme in the field of financial management, with explosive growth during the last quarter of the twentieth century as a result of economic developments that have engulfed the world, opened global markets and increased competition. This development is accompanied by uncertainty as to what future prices will be, resulting in losses and exposure to price risk, i.e. market risk, if prices go against what is desired or expected. On the basis of this study came to provide a knowledge framework for the nature and how to manufacture and innovate financial engineering, the concept of financial engineering is old-fashioned financial transactions, but it seems relatively recent in terms of term and specialization. Most definitions of financial engineering to date are those derived from the views of researchers developing models and theories, or financial product designers in traditional financial institutions. If this concept in traditional finance needs to be adjusted, especially academically.
Keywords: Financial engineering, Industry, Innovation, global economy.

Introduction

At the beginning of the 20th century, finances consolidated their position as science, deriving from the great practical importance of financial entities, companies, organizations, and investors. During this period, finances have changed significantly to keep pace with technological innovations that occurred after the Second World War and the social and economic changes that have affected the global trading environment. Changes in finance have transformed the nature of finance from descriptive to analytical science, and have become a contributor to the identification of the relationship between financial decisions and the decision environment, eventually becoming engineering science, interested in designing new financial products, developing innovations in tools and processes, and financial solutions.

Therefore, modern scientific knowledge in the field of financial management has led to contemporary intellectual leadership in the instruments of financial engineering, although the principles and fundamentals of these tools have been included in the literature of financial management and financial investments, but the intellectual leadership that has taken place over the last two decades is amazing, it is truly described as an advanced knowledge situation in the knowledge depth of its intellectual contents due to the great intellectual output it has put forward during this period. It has brought many thorny topics and issues that require further scientific research into analysis and testing. In the face of this, while financial engineering instruments are a major knowledge subject, their exclusion and their effects on the economy also require careful consideration, and since options are one of the financial engineering instruments that have obtained their share of this impressive intellectual output, their removal and their effects on the economy also require careful consideration, as they are one of the instruments of financial engineering that has obtained their share of this impressive intellectual output, as they arrange intellectual issues and topics that should be carefully studied by advancing the importance of reducing the risk of current and future price fluctuations.

This transformation began in the late 1950s with Markowitz's portfolio selection business. Then in the 1970s, with black and Scholes working, The Choice Wasser. These pioneering works have demonstrated that the descriptive nature of financial theory is gradually moving towards analytical nature, which eventually led to financial engineering by the late 1980s. In light of the liberalization of the financial markets and their glo bality over the past two decades, the strong competition forces between banks and financial institutions have contributed to these markets on the one hand, and the development of communications and information technology as well as other developments in the fields of business that have enabled companies that have an important impact on innovations in the financial field on the other, which led to the innovation of financial thought based mainly on the concept of financial engineering, whose emergence is a development process, Based on its impact on the revitalization of global financial exchanges, as well as as a new innovation in the investment establishment in general, using financial engineering tools, especially by the financial and banking establishment, This is particularly beneficial as it effectively supports the diversification of more portfolios and increases their returns, and has an effective impact on creating new ways to measure and improve risk management and protect them from the significant risks they may be exposed to as a result of continuing volatility in commodity, securities and other market conditions.

Methodology

1-Search problem:

The subject of financial engineering in general and the subject of industry and innovation of financial engineering tools in particular received the attention of many researchers, but this interest was mainly focused on the global level where efficient financial markets, unlike the local side, where interest in this vital field within the concepts of financial management has brought very limited studies, which requires great efforts and in-depth studies, Field with the aim of evaluating financial engineering mechanisms and their tools and their impact on the local economy. On this basis, this modest research contributes to shed more light and interest in the financial industry, identify its different vocabulary and develop a mechanism to determine the strategy of financial engineering, the value of rewards, as well as other variables of research.

2- The importance of research

This research attempts to contribute to one of the topics that suffers from relative scarcity in Arab libraries, and a clear lack of theoretical framework by describing the basic dimensions of financial engineering, so the first importance of this research stems in its attempt to provide this new entry, which is the main concern of economic researchers around the world.

3- The goal of the search

This research seeks to achieve the following objectives:

- Identify the financial engineering industry on its institutional side and the challenges it faces
- At the level of financial engineering innovation
- Learn about the controls and foundations of the financial engineering industry
- Learn about financial engineering and the foundations on which it is based, and try to learn about the various financial and economic aspects associated with financial engineering products

The concept and dimensions of financial engineering

Financial engineering is the basis for this new financial innovation and manufacturing aimed at good follow-up of the project by integrating into the processes of strategic advice, guidance and financial analysis, based on the basis of the highest values transferred and its broad reliance on derivatives and investment guidance in order to meet the demands and needs of financing that projects alone are unable to achieve. Our understanding of financial engineering can

therefore be expanded by the concept and origin of financial engineering that we will present in this requirement after addressing the most important dimensions of risk management art in general, and then financial risk management in particular. (Amin, 2011, 28) Financial engineering is one of the financial areas required for many scientific disciplines, it is based on mathematical modeling applications, statistics and computer technology as part of its solution to the problems of the financial services industry such as evaluating financial instruments and determining the value of the institution, distributing risks, introducing new ways of financing, liquefying financial assets, managing portfolios and other methods and tools that have contributed to the interdependence and efficiency of financial markets.

The International Society of Financial Engineers has defined financial engineering as an application of sports methods to solve financial problems, and quantitative analysis has added creativity, efficiency and accuracy to financial markets and the investment process. (Aish, 2012, 20) Financial engineering can therefore have the ability to reduce the cost and risk of existing activities and then develop products and services of new markets, financial engineering is a practice that can be used only when determining the relevant environment (political or social environment) (Enface,2008:23), and financial engineering is concerned with financial institutions as supervisors and regulators are responsible for each company across the industry, The practice of risk management in accordance with its legal objectives (Cosk,2011:6). The term financial engineering is not to learn to describe the analysis of data obtained from the financial market in a scientific way. Such analysis usually takes the form of mathematical algorithms or financial models. Financial engineering is frequently used in the financial market (with adjustments), particularly in currency trading, option pricing and futures stocks ... The use of ADWA and financial engineering techniques allows financial engineers to better understand the financial market, and therefore better understanding by market dealers. This is very important for customers because the accuracy and speed of information are essential in decision-making. (Kunduz, 2010, 2). It is concerned with designing, developing and implementing new financial instruments and providing creative and creative solutions to financial problems. (Finnerty,1988,59), financial engineering also represents the design, development, and application of new financial processes and instruments, and the provision of innovative solutions to economic and financial problems (Nassar,2006: 103), and its role is not only for new products, but also extends to attempts to develop old tools and ideas to serve businesses (Abdulaziz,2002: 320) .

The most important factors that contributed to the emergence of financial engineering and kidneys can be summarized :

- The expansion and multiplicity of investment instruments available in the financial markets, which has increased the liquidity of the financial market and provided more financing by attracting new investors and providing new opportunities for those seeking financing.
- Finding risk management tools, which have enabled the redistribution of financial risks in accordance with investors' risk preferences. Developing tools for market swings, which has enabled improved costs, increased returns and openness to financial markets.
- The multiplicity and diversity of investment strategies as a result of the multiplicity and diversity of investment instruments.

In recent years, the main purpose of the use of financial engineering has been hedging and risk transfer, but its use has expanded significantly in recent years to include investment and speculative purposes, the process of developing financial engineering instruments with constant and increasing renewal and continued growth to date, despite the wide and obvious complexities of financial engineering, but it gives possible and risk-avoiding solutions, Or he avoided most of the risks (Stambaugh,1990:53), and where financial engineering tools are used in several different ways to avoid risks(Frigi), 2001.3 The main objectives and primary tasks

of financial engineering are financial risk control and management, and these risks can be managed through the combination of derivatives and other securities (www.fenews.com.2004), and in fact financial engineering covers several areas, including: -

- Financial services in banks .
- Planning financial services for individuals and preparing a legal financial scheme .
- Providing financial services to offices, real estate companies, investment secretaries and insurant.
- Financial business management of any kind of financial, commercial (private and public), domestic and international for profit or other purposes (Hindi,2003, 15)

Through the above definitions, we can define the concept of financial engineering as a philosophy through which to guide the use of innovative instruments of derivatives and financial risk hedging, as well as to include guidance techniques on future securities trading and investment instruments. (Carpenter, 1999, 20-21).

Reasons for the emergence of financial engineering:

There are many and many theories that have tried to explain the reasons for the existence and creation of financial engineering, but in its entirety it is in one template: need or invention. The need to overcome the constraints and obstacles facing certain economic objectives prompts customers to seek innovative and creative solutions to these problems. The most important factors that helped to bring the concept of financial engineering to the ground include:

First: The different needs of investors and finance applicants:

Financial media from banks, insurance companies, investment companies and brokers generally facilitate the transfer of funds from cash surplus units to fiscal deficit units and it can be said that this task could have been done by individuals themselves, at least theoretically, without the need for these institutions and financial media. However, it has become recognized that the establishment of individuals leads to a lot of ineffectiveness and a lack of perceived competence. Nevertheless, the emergence of new and evolving needs for different financing methods in terms of design and maturity dates has made it difficult for these financial media in their traditional forms and old tasks to satisfy the wishes of investors and participants in the financial markets in general. There was therefore a need for innovation and the creation of new ways to meet those needs. (Al-Jly, 1996, 11).

Second: The evolution of financial theory:

Financial engineering became possible after the progress of financial theory, improving the valuation of securities, and the relationship between their different types. Assumes a good understanding of the proposal of new types of securities that do not exist but can be suggested. (Nawal, 2011, 46).

Third: increased risks and the need to manage them:

Preventing financial risks is one of the main tasks that companies must take care of. The use of derivatives to avoid these risks is a practical strategy but depends heavily on the skills of customers and the accuracy of forecasts. . (Nawal, 2011, 46). The economic shift from employment-focused to knowledge-intensive economies has led to significant and unexpected fluctuations in the global economic environment as a whole, posing a major threat to businesses and threatening their existence. As a result, new products need to be produced. (Carpenter, 1999, 224).

Fourth: Trying to take advantage of the financial system:

The financial system reflects the bodies, agents and mechanisms that allow some agents over a certain period of time to access funding resources, and others to use and employ savings. (Kaddi, 2003, 260).

Benefits of financial engineering tools

These instruments have become a key financial activity in financial markets and are becoming increasingly important as they devise new ways of understanding, measuring and managing

risks. Financial engineering tools can bring many benefits to their customers if used correctly, the most prominent of which are:

1- Risk management:

Financial engineering, through its tools or methods of dealing, allows risk to be redistributed more efficiently to financial actors, and the most prominent manifestation of this distribution of risk is the hedging process. (Indian, 2003, 187), and manage each of these risks individually through the hedging process, as futures, futures and options can be used to hedge the risks of fluctuating prices, interest rates and foreign exchange rates, and exchanges and others can be used to manage the risks of interest rate volatility and determine interest cost levels according to special strategies. (Abadi, 2008, 107) Financial institutions, banking institutions and investors in general can hedge potential risks using less money than if they buy assets that appear in the budget. (Jabbari and Khmeli,2010: 7).

2-Investment:

Investors (who wish to acquire certain property rights) purchase options or instruments to purchase shares in order to have a future opportunity to purchase shares at a price equal to only a fraction of their future warrants (after improving the company's conditions at the time). However, there is a risk of losing the value of options or instruments as a whole if future market share prices fall below the purchase price level specified in the option or instrument. (Aish,2011,45) as opportunities for additional revenue and increased profits can be enhanced by increasing investment opportunities, diversifying the investment portfolios of financial institutions, entering clients in market industry operations and forming financial centers, as well as diversifying financial services that provide customers with the purposes of building desired portfolios. (Amin, 2012, 77).

3- Cost:

Reduce costs for exporters and investors, increase their returns, expand a range of financing and investment alternatives and reduce loss risk if their risks are well managed. (Jabbari and Khmeli,2010: 7). Dealing with financial engineering tools allows for reducing the costs of traditional transactions, with only a small margin paid for contracting purposes, and the upper limits of borrowing costs or minimum (rules) of returns on investments in deposits or loans can be set, and can be used in arbitrage (arbitration) processes to obtain an appropriate cost structure for customers. (Amin, 2012, 77).

4-Liquidity:

Most financial engineering tools are highly liquid, enabling customers to improve their overall liquidity. The customer thus enjoys these tools with multiple opportunities to form and cancel positions according to his needs and desires.

Philosophy of Financial Engineering:

The philosophy of financial engineering is embodied in the development of a range of new financial instruments, helping clients in financial markets to adapt to the highly complex and rapidly changing conditions that characterize these markets at present, and these circumstances lead to a loss of accuracy and objectivity in predicting the direction and extent of movement of financial variables affecting the work of enterprises, thereby increasing uncertainty, which means increasing the risk faced by these enterprises. (Abadi, 2007, 32) the philosophy of financial engineering is based on analysis and periodic decisions on financial instruments (financial products), exchange and various concurrences that achieve the highest return with the lowest risk, and try to change and modify financial instruments to avoid risks and increase returns (exchange shares in bonds or bonds or shares in bonds or currency in other accordance with the volatility and dynamics of the financial markets). To illustrate the philosophy of financial engineering (Nawal, 2011, 45) engineering, that term derived from the English word (Engineering) It is generally known as a set of intellectual activities that contribute to the rational and practical design of the work while ensuring the integration of the various

organizations that help to achieve it. The emergence of financial engineering as a new concept in the world of finance, both scientific and academic in recent years, has made it possible to use more than one return from daily transactions of financial instruments. Thus, financial engineering has become a development process, as no one can deny its role in revitalizing global financial exchanges, bringing about new innovations that will help investment enterprises in general, as well as the impact they have had on the strategic thinking of financial and banking facilities and the emergence of emerging financial markets and global financial centres. Financial engineering has the ability to reduce the costs and risks of existing activities and make it possible to develop new products, services and markets. (Amin, 2011, 2).

Financial engineering objectives

Financial engineering is the lifeblood of financial innovation, and it has many objectives, perhaps the most important of which is: to reduce the amount of financial risk, usually by creating and developing a variety of new financial instruments that, by engineering them with certain combinations, can build risk centers, and manage these risks in the best possible way.

There are a set of sub-objectives resulting from financial engineering. (Jabbari and My Family, 2010: 7)

- Financial institutions, bankers and investors in general can hedge potential risks by using less money than if they buy assets that appear in the budget.
- Supporting services provided to customers by financial and banking institutions, by building a variety of portfolios.

Dealing with financial engineering is less expensive compared to basic assets such as stocks and bonds.... etc. Reducing the cost to exporters and investors, increasing their returns, expanding a range of financing and investment alternatives and reducing the risk of loss if their risk management is well managed.

The reality of the financial industry

The financial engineering industry can have several entrances, and it is a multiplicity of ways that can be used by financial institutions to establish the industry... But it's often not out of step with one of the following approaches (Kunduz, 2007, 6)

The first approach: simulation, which means that the desired result is predetermined from the financial engineering industry product, which is usually the same result as the traditional product.

Approach 2: Originality and Innovation: Creating a Financial Engineering Industry • The second entry point for financial product development, which is the subject of financial engineering, is to look for the actual needs of customers and work to design the right products for them. The concept of the financial industry as an innovation of financial solutions can therefore be summed up. It focuses on innovation and innovation and offers solutions, thereby meeting existing needs or exploiting disruptive opportunities or resources. Being financial determines the area of innovation in economic activities, both in exchange and in finance.

Financial Engineering Business Environment

Developments in the global economy since the 1970s, and the comprehensive financial liberalization of prices (exchange rates, interest, equity, commodities) and the technological revolution of the media and communication (NTIC), have made global markets and financial intermediaries financially risky and have had a wide impact on the returns on their investments, making the intervention of the financial engineering industry necessary and necessary to develop new financing methods, means and financial strategies (such as financial derivatives) that allow for financing the needs of parties. Economic ease while ensuring significant cash flows for their investments (whether individuals, companies, financial institutions or governments). This has been called a revolution of financial innovations and innovations in risk management and hedging, as well as an expansion of the financial exchange base in

international financial markets, allowing financing capacities to be inflated to and from these markets. (Ramadan,2005, 286)

Since the early 1960s, global financial markets have revolutionized financial innovations, which can be summarized in the following four phenomena: (Kunduz, 2010, 3)

1-The breadth and multiplicity of investment tools available in the financial markets, this has increased market liquidity, provided more financing by attracting new investors and offering new opportunities for finance seekers.

2-Finding risk management tools, which have enabled the redistribution of financial risks according to investors' risk preferences .

In short, we note that businesses are exposed to four types of financial risks: interest rate risk, exchange rate risk, risk of volatility in stock prices (equity) and commodity price risks. The risk problem is not in its magnitude, but in the fact that it occurs unexpectedly, and risk management tools do not go beyond three: either by reducing them by eliminating the source of risk by selling, diversifying, or by securing risks.

3-The development of arbitrage tools has improved costs, increased returns and openness to global markets.

4- The multiplicity and diversity of investment strategies as a result of the multiplicity of d and diversity and renewal of investment funds (especially derivatives).

The concept of financial innovations

Peter Drucker sees financial innovation as a specific project function, whether in private business, or in a public service institution. These are the means by which the entrepreneur can create: either new resources that produce wealth, or give the available resources additional possibilities for creating wealth .The American-Austrian economist Joseph Schumpeter, the author of the economic development theory who advocated innovation, believes that innovation should be

- Bring to the market a new product that is distinct from others and has a weight of importance.
- To provide advanced production art .
- to open new markets.

The difference between financial innovation and financial engineering

Financial engineering is a means of implementing financial innovation, and is a method formulated in the form of a system or set of ideas and principles used by financial services institutions or companies to find better solutions to certain financial problems facing their customers, and the foregoing benefits that financial engineering and financial innovation are not one thing, but are complementary processes that depend on each other. The need drives innovation, and innovation depends on the financial engineering with the expertise, skills and ability to employ complex mathematical and statistical models to put these innovations into practice. To be put on the market in the form of financial instruments, services, competing financial institutions are racing to have the advantage of offering them to their customers. (Nawal, 2011, 17). Innovation by its very nature is unpredictable, otherwise it would not have been called innovation. Attention should therefore be directed towards tools and techniques that facilitate innovation and creativity. Financial engineering can therefore be described as follows: principles and strategies for the development of innovative financial solutions. Here we talk about the difference between the tools of innovation and innovation itself. In 1970, the term "lateral thinking" was coined to describe thinking strategies and techniques that allow Bono to encourage creativity, creativity being a result and not the same subject of analysis. Similarly, financial engineering relates to tools, technology, methods and methods for developing creative tools and innovative products, the definition of financial engineering mentions financial solutions rather than tools or contracts. (Radwan, 2005, 83)

From the above, we can define financial engineering as: "design, development, implementation, innovative financial tools and mechanisms, and the formulation of creative solutions to financing problems." In doing so, it indicates that financial engineering includes three types of activities (Sweilem, 2000, 5)

1-Create new financial instruments, such as credit cards.

2-Create new financing mechanisms that will reduce procedural costs - for existing work, such as web exchange.

3- Create new financing management solutions, such as liquidity or debt management, or develop financing formulas for specific projects to suit the circumstances surrounding the project.

The intended innovation is not merely a difference from the prevailing one, but must be so distinct that it has achieved a better level of efficiency and idealism. Therefore, the innovative tool or financing mechanism must achieve what the prevailing tools and mechanisms cannot achieve. The concept of the financial industry as an innovation of financial solutions can therefore be summed up. It focuses on innovation and innovation and offers solutions, thereby meeting existing needs or exploiting disruptive opportunities or resources. Being financial determines the area of innovation in economic activities, both in exchange and in finance. (Kunduz, 2007, 9) .

The future of the financial engineering industry and financial innovations

Starting from the reality of financial innovation referred to earlier, Cr's role indicates that the financial industry, if it wants

Advancing from its deteriorating reality, it has two ways ahead of it (Nawal, 2011, 37)

1-Replacing existing engineering with new ones: the first route imposes the need to replace the current industry with new elements and ideas from abroad, which happened to the financial market in London, which was on its way to decline 40 years ago, immigrants from Germany, Switzerland, France and America came and contributed to its revival and make it one of the most prominent centers in the world.

2-Adapting enterprises to the new reality: the second way is for existing institutions to reformulate themselves to be innovative and innovative for new products already. Today, it is very possible to have those who plan and work to exploit disruptive opportunities or to create leading products, which will replace existing services or turn them into lost products, the author says. Kerr's role then concludes: It may not be too late for today's large financial institutions to re-innovate, but it is certainly too late.

The need for financial engineering arises either in response to investment opportunities in accordance with the aspirations of both investors and institutions, or to deal with international competition constraints and to prevent risk and uncertainty surrounding investment activities, which are financial hedging instruments. The purposes of financial engineering are determined by the situation facing the institution concerned (Emmons,1998:31). This requires the financial engineer to be a knowledgeable and knowledgeable person with the following skills (Eales,2000:11):

1. Extensive and clear knowledge of the tools, their applications, benefits, disadvantages and impact in reducing risk and increasing returns .
2. A good understanding of financial theory: it has a broad background in mathematics, statistics, economics and the way in which these sciences have been adopted in advanced financial subjects such as optimal portfolio building, option pricing, hedging measures, etc.
3. Extensive knowledge of international and domestic law in relation to financial mechanisms and markets .
4. A strong background in knowledge of global and local tax law .
5. .Extensive knowledge of computer software and data specialized in the development of new techniques in finance science.

All of these activities can include the use of quantitative models, technical programs and derivatives. The International Society of Financial Engineers (IAFE) points out that financial engineering includes the innovative development and application of financial theory and financial instruments to find solutions to complex financial problems to exploit financial opportunities, financial engineering is not a tool but a task through which instruments are used and differ from financial analysis, as financial analysis means analyzing the thing to understand it, and financial engineering refers to building that thing.

The term financial engineering is associated with innovation and the search for good solutions to financial problems, which often means designing new financial contracts to manage risks and provide the best among investors and corporate needs, which has enhanced the efficiency of the financial system. Financial engineering instruments are mainly determined by derivatives.

Conclusions

The need for research and development to develop new products or services that meet the financial needs of consumers has emerged in financial institutions in response to investment opportunities in accordance with customer expectations in dealing with international competition constraints and preventing the risks of uncertainty surrounding financing and investment activities. We have clearly found that the overall objective of financial engineering is to achieve a set of objectives that all share the common interest of ensuring that the organization, whatever its kind, remains in the business world for use of a range of basic tools and techniques. Overcoming and exceeding its limits may also reverse the expected consequences of the industry's existence in the first place.

Recommendations

1. The researcher recommends the legislative authorities (The Iraqi Parliament) and other relevant entities to make the necessary approvals and legislation, to regulate the functioning of financial markets in such a way that they can adopt derivative financial instruments, and in a way that also enables them to conduct their financial transactions.
2. It is necessary to spread scientific and applied awareness by researching the importance of adopting derivatives instruments because they have a major role in the field of advanced finance.
3. The need to lay clear foundations for financial engineering while outlining its limits, so that the tricks leading to financial problems, whether intentionally or wrongly, do not open the door to financial and economic stability.

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