

## Financial engineering and its impact on audit efficiency in the opinion of experts

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**Abstract.** The present study aimed to examine the impact of financial engineering on audit efficiency by analyzing the results of a research sample that included banks, auditors, financial analysts, and academics in Europe, as previous studies did not examine the relationship between these variables. Three major findings are outlined in this study. First, there is a statistically significant relationship between financial engineering and audit efficiency based on the results of the tests of the hypotheses. Second, there is a statistically significant relationship between financial engineering and the quality of financial reports, as the use of financial engineering innovations leads to a decrease in the credibility and relevance of financial reports for users. Finally, there is a statistically significant relationship between financial engineering and the expectations gap in the audit process, due to the increased need for more details about the financial instruments in the auditor's report. The findings of this study are important for auditors, financial engineers, bank executives, and bodies that set standards for accounting and auditing.

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## 1. INTRODUCTION

The continuous and increasing change in the financial and investment business environments necessitates a search for unconventional financial instruments and products to solve the financing problems of companies. Financial engineering includes a wide set of many new financial instruments, financial innovations in investment institutions and has impact on the strategic thinking of financial and banking institutions, and the rise of emerging financial markets and global financial centers (Low et al., 2008).

The term “financial engineering” has become more common in recent years and is widely recognized as a way to think about and address the financial issues in all areas of finance including corporate finance, asset management, and financing for financial institutions (Pezzuto, 2012). It is also seen as the process of designing and developing financial instruments that find creative solutions to financing problems (Gubler, 2010).

Despite the above, which shows the importance of financial engineering, some believe that the expansion of the use of financial engineering tools has caused the failure of many companies and inflated losses. The innovation of financial engineering was one of the main reasons for the bankruptcy of many large companies and the occurrence of the recent financial crisis in 2008 (Ronald et al., 2015). The successive collapses of many companies around the world have led to investors losing their rights. This also led to the loss of investor confidence in the published information contained in the financial statements of these companies, with the most important of these collapses happening at Enron (Gillan & Martin, 2002).

Although institutions prepare their financial statements based on accounting standards, which strive toward objective accounting measurement, distance from personal bias, and transparency in presentation and disclosure, these standards still give the company's management considerable flexibility in choosing between policies, procedures, and alternative methods for accounting measurement (Thompson, 2010). On the other hand, many accusations have been directed at the accounting system because of the inconsistency and shortcomings in dealing with financial engineering (Bodie, 2000).

Financial engineering brings many advantages in hedging from the financial risks of companies, and its main purpose is to transfer risks from companies that do not wish to take risks to capable units and those willing to take these risks, such as financial institutions and brokerage houses, but their effects on financial accounting systems are different (Krutov, 2006). Previous studies have proven that there are deficiencies in accounting standards in dealing with financial engineering because accounting standards setters often need a long time to formulate the treatments and accounting rules for the financial instrument, but the financial engineer does not need a long time to circumvent these standards (Glover, 2013). Financial engineering led to the emergence of creative accounting, which can be performed by executive accountants, which negatively affects the financial statements, causing them to be misleading and to lose objectivity and credibility (Lakshi & Boolaky, 2019). Therefore, the study problem is represented by the following main question: What is the impact of financial engineering on audit efficiency? To answer the main question, the following sub-questions must be answered:

- What is the difference between financial engineering and accounting engineering (creative accounting)?
- What are the risks of using these instruments on accounting systems and financial reporting?
- What are the effects of using financial engineering on the external auditors?

The importance of this study lies in the lack of previous studies focusing on the effects of financial engineering on financial reports, in particular its impact on the efficiency of auditing, and this study will contribute to ensuring the efficiency of auditing by monitoring the effects of financial engineering on the auditing process and presenting a set of appropriate proposals for raising the awareness of users of the auditor's report and limiting the overuse of financial engineering.

Based on the above, this study aims to bridge this research gap by examining the impact of financial engineering on the efficiency of auditing and the quality of financial statements, especially due to the lack of studies investigating this effect as well as the rapid development of innovations and instruments for financial engineering in recent years.

## **2. LITERATURE REVIEW**

### **2.1. Financial engineering**

The concept of financial engineering appears to be recent in terms of specialization, and most definitions of financial engineering are derived from the perspectives of researchers who develop models, theories, and designs of financial products (Bansal, 2001).

Most of the previous studies indicate that financial engineering is the process of creating new financial instruments, securities, and techniques to meet the needs of investors or applicants for financing and to solve financial problems through the use of mathematical equations (Merton, 1992). Financial engineering is the possibility of using more than one return from the daily transactions of financial instruments, for example by dividing futures contracts that are bought or sold in one day and diversifying them into multiple deals, leading to the distribution of risks and increased returns (Jenkinson et al., 2008).

There is a difference between financial engineering and accounting engineering, as financial engineering for business enterprises is an analytical quantitative process that includes improving the financial operations, such as negotiating financing or managing a stock portfolio to maximize the value of the enterprise, though some activities such as hedging in financial deals directly affect the value of the company (Chou, 2007). As for financial markets, the term “financial engineering” is used to describe the analysis of data obtained from financial markets, and this analysis usually takes the form of mathematical algorithms or financial models and requires technology, financial, and mathematical skills (Chavan & Somanadh, 2011).

Accounting engineering is a tool to achieve the financial results expected by corporate management (Rodríguez et al., 2015). The theoretical foundations of accounting engineering are a combination of earnings management theory, agency theory (Caramanis & Lennox, 2008). Therefore, the results of accounting engineering depend on the theories and standards on which it is based.

Based on the above, financial engineering is concerned with designing and developing innovative financial instruments such as future contracts, options, swaps, and deferred exchange contracts and providing innovative types of bonds or preferred shares and derivatives (Blach, 2011). Financial engineering also focuses on providing creative solutions to financial problems, such as investment risk strategies, and finally, providing new methods for the efficient use of financial resources to obtain the best possible return at the lowest costs (Instefjord, 2005). Accounting engineering means the use of tools of accounting treatment that those interested in the profession use to achieve the expected financial results and to keep pace with developments in financial engineering, as well as to control business results in the short term, which can be considered a tool for top management to achieve its interests and is also called creative accounting (Zamlynskyi et al., 2019).

### **2.2. The effect of financial engineering on audit efficiency**

Despite the importance of financial engineering in providing solutions to many problems for financial institutions and banks, it may result in many problems, due to the greed of bank managers who carry out more lending and borrowing to obtain great rewards and benefits in the short term, and thus it exposes the financial system to risks in the long term and global crises, as happened in 2008 (Riadh & Najoua, 2010).

Many factors increase the risks of financial engineering, the most important of which, according to previous studies, are the absence of continuous monitoring of the financial markets and lack of commitment in applying standards of market risk (Cannon & Bédard, 2017). There is a gap between the rapid development of financial engineering and the slow response of accounting standards (Barth et al., 2008). Finally, the flexibility of accounting standards in the multiplicity of alternatives and methods of treatment and accounting policies, such as recognition of deferred gain or loss, capitalization of costs, re-estimation of assets, and depreciation methods (Low et al., 2008).

Anderloni and Bongini (2009) state that financial engineering has led to a decrease in the level of reliability and appropriateness of financial information, which is the main product of the accounting system, as recent years have witnessed a decrease in the level of confidence due to the widespread bankruptcy and financial failure of many large companies that have relied on financial engineering, and the main reason behind this is the manipulation of accounts (for creative accounting). Since financial information is the main product of the accounting system, there is no doubt that the published financial statements of companies are the outputs of the audit process, meaning that the manipulation of companies' accounts has not been discovered, preserved, or reported by the auditors (Osuoha, 2013; Glover et al., 2017).

The Enron corporation, which is one of the seven largest companies in the United States and won the best innovation award six times according to *Fortune*, declared bankruptcy in December 2001, and its share price fell to less than a dollar, and this happened, as a result, to use off-balance sheet entities for borrowing and transfer of losses and debt to hide its influence from the parent company's financial statements, and inflated its profits by nearly \$1 billion (Gherai & Dian, 2011). Therefore, the bankruptcy occurred quickly due to the use of financial engineering and creative accounting. Many previous studies found that high audit efficiency limits companies' use of creative accounting practices, while others found that some companies prefer an auditor who has high manipulation capabilities and conceals the practice of creative accounting (Rober & Hun, 1994). The efficiency of the external audit depends on many determinants, the most important of which are the conflict of interest between the external auditor and the company's management and the frequent change of the audit office (Ghosh and Moon, 2005).

Therefore, the most important challenges facing the auditing profession as a result of the increase in the use of financial engineering are the inability of the financial report preparers to properly apply accounting standards related to financial instruments or innovations in financial engineering; the complexity in financial transactions, which has led to the expansion of financial engineering and thus the complexity of financial reporting as happened at Enron; the excessive use of the fair value measure; the possibility of subjecting the auditor to legal accountability; and finally, an increase in the audit expectations gap, as the spread of financial scandals for many companies has led to an increase in the expectations gap of the audit process and has thus negatively affected the audit efficiency.

### **3. METHODOLOGY**

#### **3.1. Research model**

The research methodology is one of the most important steps of scientific research regardless of the purpose of the research (Johnson, 2004). Research design is one of the main axes of the research methodology, and therefore quantitative and correlation research design will be more suitable for this study. The relationship approach to describe the relations between the variables and testing the derived hypotheses. The population of the study was bankers, auditors, financial analysts, and academics in four European countries (United Kingdom, Germany, France and Italy). The questionnaire was used as a tool for collecting the primary data and was constructed based on four pillars or sections that involved a set of questions to

answer the questions and test the hypotheses of this study. This questionnaire was based on closed-ended questions, because experts in this field do not have time to answer open questions, and the total number of questions was 32. The questionnaires were sent to all mentioned countries equally. Table 1 shows the sample construction, the number of questionnaires sent, and the number of received and valid responses.

Table 1

Questionnaires sent and received and valid responses

	Number of questionnaires sent	Number of questionnaires received (%)	Number of valid responses (%)
Bankers	25	24 (96%)	23 (92%)
Auditors	25	21 (84%)	21 (84%)
Financial Analysts	25	20 (80%)	19 (76%)
Academics	25	20 (80%)	20 (80%)
<i>Total</i>	<i>100</i>	<i>85 (85%)</i>	<i>83 (83%)</i>

Source: Author's own data

The presented paper uses descriptive and inferential statistics (Simple regression model, Pearson correlations ( $r$ ), analysis of variance (ANOVA) tests, coefficients, and Cronbach's alpha) to test the hypotheses by using IBM SPSS Statistics 25 and MS Office Excel 2013.

Based on the study problem and study questions, Table 2 below shows the main and sub-hypotheses that were formulated:

Table 2

Hypotheses

Main Hypotheses	Sub-hypotheses
H1 1: There is a statistically significant relationship between financial engineering and audit efficiency.	H1 1.1: There is a statistically significant relationship between the use of financial engineering and the inability of financial statement preparers to apply the accounting standards.
	H1 1.2: There is a statistically significant relationship between the use of financial engineering and the complexity of financial deals.
	H1 1.3: There is a statistically significant relationship between the use of financial engineering and the difficulty of judging the quality of financial reports.
	H1 1.4: There is a statistically significant relationship between financial engineering and excessive use of the fair value measurement.
	H1 1.5: There is a statistically significant relationship between the use of financial engineering and the auditor's exposure to legal accountability.
	H1 1.6: There is a statistically significant relationship between the use of financial engineering and the variation in the efficiency of the audit team members in applying the auditing standards.
H1 2: There is a statistically significant relationship between financial engineering and the quality of financial reports.	H1 2.1: There is a statistically significant relationship between financial engineering and accounting engineering (creative accounting).
	H1 2.2: There is a statistically significant relationship between financial engineering and the credibility of financial statements.
	H1 2.3: There is a statistically significant relationship between financial engineering and the relevance of financial reporting.
H1 3: There is a statistically significant relationship between financial engineering and increasing the expectations gap in the audit process.	

Source: Author's own data

#### 4. EMPIRICAL RESULTS AND DISCUSSION

This section presents the results and discussion. Based on the analysis of the data by SPSS shown in the tables below, we can determine the relationship between the independent variable and dependent variables from these results. The value of alpha ranges between zero and one, and the closer the value of the parameter to the correct one, the greater the internal consistency. Table 3 shows that the reliability coefficient for all variables of the study is more than 60%, which means the reliability is acceptable and the items have relatively good internal consistency. The third column contains the number of items or questions for each variable as shown in the study questionnaire (Appendix A).

Table 3

Reliability statistics

Variable	Cronbach's Alpha	Number of Items (N)
Financial Engineering (IV)	72.2%	7
Efficiency of Audit (DV-A)	93.1%	13
Expectation Gap for the Auditing Process (DV-C)	90.4%	5
Disclosure Quality for Financial Reports (DV-B)	60.5%	7

Source: Author's own data

Table 4 shows the correlation ( $r$ ) with the adjusted R-squared for the sub-hypotheses of the first main hypothesis H1 1: There is a statistically significant relationship between financial engineering (IV) and the efficiency of the audit process (DV-A).

Table 4

Model summary

Hypothesis	Adjusted R-Squared	Std. Error of the Estimate
H11.1	.971	1.21238
H11.2	.928	1.96921
H11.3	.926	1.81519
H11.4	.962	2.13861
H11.5	.904	1.11349
H11.6	.908	3.03930

Source: Author's own data

According to the above table, there is a very high positive correlation between financial engineering (independent variable) and the inability of financial statement preparers to apply the accounting standards (dependent variable, DV1), the complexity of financial deals (DV2), the difficulty of judging the quality of financial reports (DV3), excessive use of the fair value measurement (DV4), the exposure of auditors to legal accountability (DV5), and the variation in the efficiency of the audit team members in applying auditing standards (DV6).

Table 4 also shows that  $R^2 > .90$  for all dependent variables in the first main hypothesis, which means that the variance in these variables is explained by financial engineering (independent variable). As for the remaining percentage, it is explained by other variables that were not included in the regression, in addition to the random errors resulting from the sampling method, measurement accuracy, and so on.

Table 5

## ANOVA

H1 1	Regression		Residual		F	Sig.
	Sum of Squares	Mean Square	Sum of Squares	Mean Square		
H1 1.1	4099.471	4099.471	120.529	1.470	2789.004	.000
H1 1.2	4174.022	4174.022	317.978	3.878	1076.393	.000
H1 1.3	3409.816	3409.816	270.184	3.295	1034.869	.000
H1 1.4	9735.961	9735.961	375.039	4.574	2128.706	.000
H1 1.5	969.331	969.331	101.669	1.240	781.805	.000
H1 1.6	7576.538	7576.538	757.462	9.237	820.208	.000

Source: Author's own data

The analysis of variance results in Table 5 show that there is a regressive relationship between the use of financial engineering and the dependent variables in the first main hypothesis, where the value of "F" for these variables is at a statistically significant level of 0.05, indicating the correctness of the regression relationship between those dependent and independent variables. The total variance can be explained by the financial engineering in the regression column and the total variance which is not explained by the independent variable in the residuals column.

Table 6

## Coefficients

	Beta	Sig.
H1 1.1	.986	.000
H1 1.2	.964	.000
H1 1.3	.963	.000
H1 1.4	.981	.000
H1 1.5	.951	.000
H1 1.6	.953	.000

Source: Author's own data

The use of financial engineering has a significant effect on all dependent variables in the first main hypothesis, and the value of this effect is above 95% according to the beta factor. Therefore, based on the above results for the sub-hypotheses of the first main hypothesis, the result is that H11 can be accepted, which means there is a statistically significant relationship between financial engineering and the efficiency of the audit process.

Table 7 shows the correlation ( $r$ ), adjusted R-squared, and standard error for the sub-hypothesis of the second main hypothesis H1 2: There is a statistically significant relationship between financial engineering (DV) and the quality of financial reports (IV-B).

Table 7

## Model summary

Hypothesis	Adjusted R-Squared	Std. Error of the Estimate
H1 2.1	.965	1.63898
H1 2.2	.985	.94973
H1 2.3	.943	2.65796

Source: Author's own data

According to the above table, there is a very high positive correlation between financial engineering (IV) and creative accounting (DV1). There is a very high negative correlation between financial engineering (IV), the credibility of financial reporting (DV2), and the relevance of financial reporting (DV3). Table 7 shows also that  $R^2 > .94$  for all dependent variables in the second main hypothesis, which means that the variance in these variables is explained by financial engineering (independent variable). As for the remaining percentage, it is explained by other variables that were not included in the regression, in addition to the random errors resulting from the sampling method, measurement accuracy, and so on.

Table 8

H1 2	Regression		Residual		F	Sig.
	Sum of Squares	Mean Square	Sum of Squares	Mean Square		
H1 2.1	6131.726	6131.726	220.274	2.686	2282.624	.000
H1 2.2	5045.038	5045.038	73.962	.902	5593.289	.000
H1 2.3	9669.690	9669.690	579.310	7.065	1368.723	.000

Source: Author's own data

The results of the analysis of variance in Table 8 show that there is a regressive relationship between the use of financial engineering and the dependent variables in the second main hypothesis, where the value of "F" for these variables is at a statistically significant level of 0.05, indicating the correctness of the regression relationship between those dependent and independent variables. The total variance can be explained by financial engineering in the regression column and the total variance which is not explained by the independent variable in the residual column.

Table 9

	Beta	Sig.
H1 2.1	.983	.000
H1 2.2	.993	.000
H1 2.3	.971	.000

Source: Author's own data

The use of financial engineering has a significant effect on all dependent variables in the second main hypothesis, and the value of this effect is above 97% according to the beta factor. Therefore, based on the above results for the sub-hypotheses of the second main hypothesis, the result is that H1 2 is accepted, which means there is a statistically significant relationship between financial engineering and the quality of financial reports, and this correlation is very strongly negative.

Table 10 shows the correlation (r), adjusted R-squared, and standard error for the third main hypothesis H1 3: There is a statistically significant relationship between financial engineering (DV) and increasing the expectations gap in the audit process (IV-C).

Table 10

Hypothesis	Adjusted R-Squared	Std. Error of the Estimate
H1 3	.962	3.71908

Source: Author's own data

According to the above table, there is a very high positive correlation between financial engineering and increasing the expectations gap in the audit process. Table 10 shows also that  $R^2 > .96$  for all dependent variables in the third main hypothesis, which means that the variance in these variables is explained by financial engineering (independent variable). As for the remaining percentage, it is explained by other variables that were not included in the regression, in addition to the random errors resulting from the sampling method, measurement accuracy, and so on.

Table 11

## ANOVA

H1 3	Regression		Residual		F	Sig.
	Sum of Squares	Mean Square	Sum of Squares	Mean Square		
<i>H1 3</i>	28981.813	28981.813	1134.187	13.832	2095.341	.000

Source: Author's own data

The results of the ANOVA in Table 11 show that there is a regressive relationship between the use of financial engineering and the dependent variables in the third main hypothesis, where the value of "F" for these variables is at a statistically significant level of 0.05, indicating the correctness of the regression relationship between those dependent and independent variables. The total variance can be explained by financial engineering in the regression column and the total variance which is not explained by the independent variable in the residual column.

Table 12

## Coefficients

	Beta	Sig
<i>Hypothesis – H1 3</i>	.981	.000

Source: Author's own data

The use of financial engineering has a significant effect on all dependent variables in the third main hypothesis, and the value of this effect is above 98% according to the beta factor. Therefore, based on the above, the result is that H1 3 can be accepted, which means there is a statistically significant relationship between financial engineering and the expectations gap in the audit process.

## 5. CONCLUSIONS

The study found that the overuse of financial engineering has led to an increase in the level of risk, and financial engineering innovations have an impact on the quality of auditing due to the inability of the financial statement preparers to properly apply accounting standards and the increase in the complexity of financial transactions, which means that the financial reports will be more complex, as well as the auditor's difficulty in judging the quality of financial information in the report. Excessive financial engineering use of the fair value method, the possibility of exposure of the auditor to legal accountability, and significant impact on the auditors in compliance with auditing standards. The study concluded that financial engineering has a significant impact on the audit efficiency through its effect on the quality of financial reports and the use of financial engineering has an effect on increasing the expectations gap due to the irrationality in the expectations of users of financial reports, and this leads to issuance of professional legislation to organize the role of auditors and increase the information disclosed in their reports. Based on these results, the present study recommends that in their reports, auditors should clarify the problems and difficulties they faced in dealing with financial engineering during the audit process and their observations regarding the

negative impact of using creative accounting. The need to professional legislation that regulates the role of the auditor in dealing with financial engineering. Therefore, this study shows that it would be worthwhile to conduct further studies on how to develop accounting and auditing standards in line with the innovations of financial engineering.

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## REFERENCES

- Anderloni, L., & Bongini, P. (2009). Is financial innovation still a relevant issue? In: L. Anderloni, D. T. Llewellyn, & R. H. Schmidt (Eds.), *Financial Innovation in Retail and Corporate Banking*. Cheltenham: Edward Elgar.
- Bansal, J. F. (2001). *Financial Engineering: A Complete Guide to Financial Innovation*. New Delhi: Prentice-Hall of India Pvt. Ltd.
- Barth, M., Landsman, W., & Lang, M. (2008). International accounting standards and accounting quality. *Journal of Accounting Research*, 46, 467–498. <https://doi.org/10.1111/j.1475-679X.2008.00287.x>
- Blach, J. (2011). Financial innovations and their role in the modern financial system – Identification and systematization of the problem e-Finance. *Financial Internet Quarterly*, 7(3), 13–26.
- Bodie, Z. (2000). Financial engineering and social security reform. In J. Campbell & M. Feldstein (Eds.), *Risk Aspects of Investment-Based Social Security Reform*. 46-81.
- Cannon, N., & Bédard, J. (2017). Auditing challenging fair value measurements: Evidence from the field. *The Accounting Review*, 92(4), 81–114. <https://doi.org/10.2308/accr-51569>
- Caramanis, C., & Lennox, C. (2008). Audit effort and earnings management. *Journal of Accounting and Economics*, 45(1), 116–138. <https://doi.org/10.1016/j.jacceco.2007.05.002>
- Chavan, S., & Somanadh, K. (2011). Financial engineering in the capital market of India. *Streams Research Journal*, 1(9), 1–3.
- Chou, Y. K. (2007). Modeling financial innovation and economic growth: Why the financial sector matters to the real economy. *The Journal of Economic Education*, 1, 78–91. <https://doi.org/10.3200/JECE.38.1.78-91>
- Gillan, S.L., & Martin, J. (2002). Financial Engineering, Corporate Governance, and the Collapse of Enron. *Financial Accounting eJournal*. No. 2002-001.
- Gherai, D., & Diana, M. (2011). From creative accounting practice and Enron phenomenon to the current financial crisis. *Annales Universitatis Apulensis – Series Oeconomica*, 13(1), 34–41. <https://doi.org/10.29302/oeconomica.2011.13.1.3>
- Ghosh, A., & Moon, D. (2005). Auditor tenure and perceptions of audit quality. *The Accounting Review*, 80, 585–612. <https://doi.org/10.29302/oeconomica.2011.13.1.3>
- Glover, J. (2013). Can financial accounting regulators and standard setters get (and stay) ahead of the financial engineers? Emanuel Saxe Lecture at Baruch College.
- Glover, S., Taylor, M., & Wu, Y. (2017). Current practices and challenges in auditing fair value measurements and complex estimates: Implications for auditing standards and the academy. *Auditing: A Journal of Practice & Theory*, 36(1), 63–84. <https://doi.org/10.2308/ajpt-51514>
- Gubler, Z. J. (2010). *Instruments, institutions and the modern process of financial innovation*. <http://ssrn.com/abstract=1608409>

- Instefjord, N. (2005). Risk and hedging: Do credit derivatives increase bank risk?. *Journal of Banking and Finance*, 29, 333–345. <https://doi.org/10.1016/j.jbankfin.2004.05.008>
- Jenkinson, N., Penalver, A., & Vause, N. (2008). Financial innovation: what have we learnt? *Bank of England Quarterly Bulletin*, Q3 (2008), 330–338.
- Krutov, A. (2006). Insurance-linked securities: an emerging class of financial instruments. *Financial Engineering News*, 48, 7–16.
- Lakshi, D., & Boolaky, D. (2019). Fair value hierarchy in financial instruments disclosure – do audit committee and internal audit matter? *International Journal of Corporate Governance (IJCG)*, 10(2), 113–<https://doi.org/133.10.1504/IJCG.2019.101511>
- Low, M., Davey, H., & Hooper, K. (2008). Accounting scandals, ethical dilemmas and educational challenges. *Critical Perspectives on Accounting* 19, 222-254. <https://doi.org/10.1016/j.cpa.2006.05.010>
- Merton, R. (1992). Financial innovation and economic performance. *Journal of Applied Corporate Finance*, 4(4), 12–22. <https://doi.org/10.1111/j.1745-6622.1992.tb00214.x>
- Merton, R., & Bodie, Z. (1993). Design of financial systems: towards a synthesis of function and structure. *Journal of Investment Management*, 3(1), 1-23. <https://doi.org/1-23.10.2139/ssrn.313651>
- Osuoha, J. I. (2013). Financial engineering, corporate governance and Nigeria economic development. *Journal of Financial Risk Management*, 2, 61–66. <https://doi.org/10.4236/jfrm.2013.24010>
- Pezzuto, I. (2012). Miraculous financial engineering or toxic finance? The genesis of the U.S. subprime mortgage loans crisis and its consequences on the global financial markets and real economy. *Journal of Governance and Regulation*, 1(3-1), 114–125. [http://doi.org/10.22495/jgr\\_v1\\_i3\\_c1\\_p5](http://doi.org/10.22495/jgr_v1_i3_c1_p5)
- Riadh, M., & Najoua, E., (2010). The quality of audit process: an empirical study with audit committees. *International Journal of Business*, 15(1), 87–99.
- Rober, L., & Hun, T. (1994). Modeling the determinants of audit expertise. *Accounting, Organization and Society*, 19(8), 701–716. [https://doi.org/10.1016/0361-3682\(94\)90030-2](https://doi.org/10.1016/0361-3682(94)90030-2)
- Rodríguez, L. I., Otero, L., Cantorna, S., & Durán, P. (2015). The effect of credit derivatives usage on the risk of European banks. *Revista de Economía Mundial*, 40, 197–220.
- Ronald, A., Jonathan, C., & Shyam, S. (2015). Financial engineering and the arms race between accounting standard setters and preparers. *Accounting Horizons*, 29(2), 265–295. <https://doi.org/10.2308/acch-50992>
- Thompson, J. R. (2010). Counterparty risk in financial contracts: should the insured worry about the insurer? *The Quarterly Journal of Economics*, 125(3), 1195–1252.
- Zamlynskiy, V., Zerkal, A., & Antonov, A. (2019). A conceptual framework to apply financial engineering at the enterprise. *Baltic Journal of Economic Studies*, 5(1), 68–74. <https://doi.org/10.30525/2256-0742/2019-5-1-68-74>

## APPENDIX (A)

**5 Strongly Agree**

**4: Agree**

**3: Neutral**

**2: Disagree**

**1: Strongly Disagree**

<b>1. Financial Engineering (IV)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1.1 The use of financial engineering instruments is increasing in recent times					
1.2 A wide range of financial engineering instruments are available.					
1.3 Innovations in financial engineering are constantly evolving and renewing					
1.4 Accounting for instruments of financial engineering is based on non-standard principles of measurement					
1.5 Innovations in financial engineering exploit some of the existing deficiencies in accounting standards for these instruments					
1.6 The risks will increase with the new instruments for financial engineering					
1.6 There is a low level of transparency in the use of financial engineering					
<b>2. Efficiency of Audit (DV-A)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
2.1 There is variation in the ability of financial statement preparers to apply the accounting standards					
2.2 There is variation in the ability of financial statement preparers to deal with new instruments for financial engineering					
2.3 Financial transactions are complex					
2.4 The financial report is complex					
2.5 There is difficulty in judging the reliability of the financial reports					
2.6 There is difficulty in judging the relevance of the financial reports					
2.7 Different and complex methods are used for applying fair value measurement					
2.8 Difficulty in obtaining evidence and justification for fair value application					
2.9 The auditor expresses an adverse opinion to what is included in the books and records					
2.10 Dealing unprofessionally with the new financial innovations					
2.11. There is variation in the commitment of the auditor to practice professional care					
2.12. There is variation in the commitment of the auditor to apply the fieldwork standards					

2.13. There is variation in the commitment of the auditor to disclose all financial information					
<b>3. Expectation Gap for the Auditing Process (DV-C)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
3.1 Users of financial reports have unreasonable expectations'					
3.2 There responsibilities of the external auditor have increased					
3.3 The need to clearly define the role of the auditor regarding new instruments and innovations for financial engineering					
3.4 There is need for legislation and professional issuances for auditors to deal with these instruments					
2.5 There is need for information with more details about the instruments of financial engineering in audited reports					
<b>4. Disclosure Quality for Financial Reports (DV-B)</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
4.1 Application of accounting engineering methods (creative accounting)					
4.2 Flexibility of accounting standards					
4.3 The possibility of relying on financial reports.					
4.4 The representation is faithful and free from errors'					
4.5 Financial reports are relevant to the needs of users'					
4.6 Financial reports are able to give more accurate predictions about future events.					
4.7 Financial reports are able to evaluate the performance for the past periods					