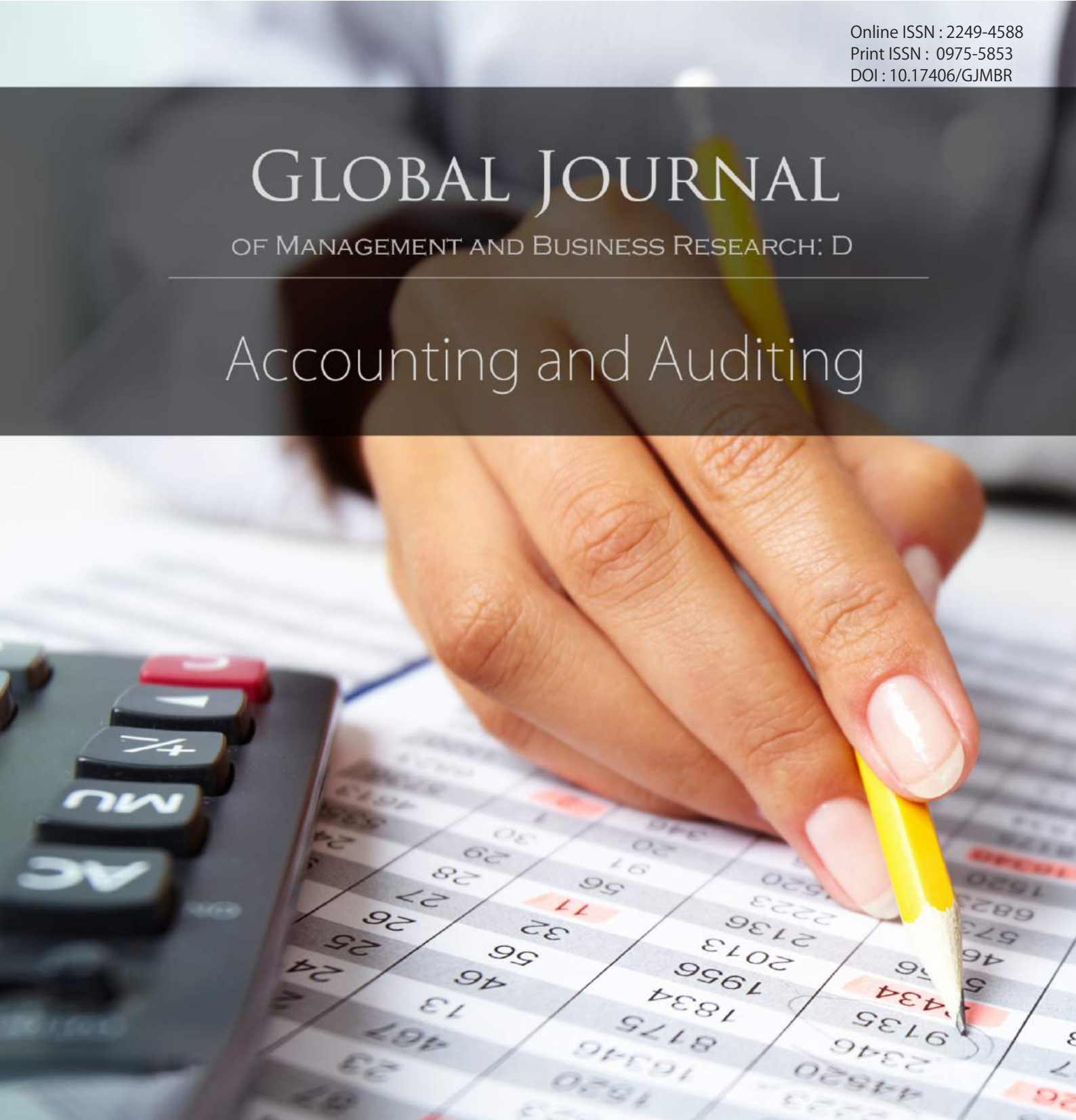
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Accounting and Auditing



Highlights

- Individual Income Tax Planning
- Network Actor in the Mechanistic
- Perception of Earnings Management
- An Econometric-Accounting Analysis

Discovering Thoughts, Inventing Future

VOLUME 19 ISSUE 3 VERSION 1.0

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Relationship Between Accounting Variables and Market Price of Shares - A Case Study of Jordan

By Dr. "Mohammad Khair" Qaseem Sadeq Al-Jarrah

Abstract- Relationship Between Accounting Variables and Market Price of Shares: essential theme of this paper is to examine the information content of accounting variables relating to the market price of the shares of listed companies in Jordan. For the purpose of the analysis, four accounting variables have been selected viz., ROE, Growth rate, Interest Coverage Ratio, and Total Assets Turnover Ratio. Panel Data regression has been done to analyze the impact of the select accounting variables on the market price of the shares. Descriptive statistics have calculated to understand the characteristics of the variables used in regression analysis. In other words, indicates a difference between Market Price and Book Value. If the ratio is more than one, it elucidate that the shares are valued at a premium. On the other hand, if ratio is less than one, it a denotes that the shares are valued at a discount. There are no studies on the analysis of the information content of accounting variables in predicting the stock price movement. To fill the research gap, in the present study, analysis of the information content of accounting variables was made by using the panel data regression model.

Keywords: *accounting variables. market price.*

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Relationship Between Accounting Variables and Market Price of Shares - A Case Study of Jordan

Dr. "Mohammad Khair" Qaseem Sadeq Al-Jarrah

Abstract- Relationship Between Accounting Variables and Market Price of Shares: *essential* theme of this paper is to examine the information content of accounting variables relating to the market price of the shares of listed companies in Jordan. For the purpose of the analysis, four accounting variables have been selected viz., ROE, Growth rate, Interest Coverage Ratio, and Total Assets Turnover Ratio. Panel Data regression has been done to analyze the impact of the select accounting variables on the market price of the shares. Descriptive statistics have calculated to understand the characteristics of the variables used in regression analysis. In other words, indicates a difference between Market Price and Book Value. If the ratio is more than one, it elucidate that the shares are valued at a premium. On the other hand, if ratio is less than one, it a denotes that the shares are valued at a discount. There are no studies on the analysis of the information content of accounting variables in predicting the stock price movement. To fill the research gap, in the present study, analysis of the information content of accounting variables was made by using the panel data regression model. In the following sections of this chapter, the relationship between select Accounting Variables and Price to Book Value ratio is analyzed individually for six select industries viz., Chemical Industry, Engineering and Construction Industry, Food and Beverages Industry, Mining and Extraction Industry, Pharmaceutical Industry and Textiles, Leathers and Clothing Industry.

Keywords: *accounting variables. market price*.

I. Introduction

Today, any responsive, economic entity aims to invest in providing relevant and up-to-date information to its users, hoping to get new investors while maintaining the existing ones. Also it achieves an increase in the volumes and the value of stocks that need to be traded and thus plays important role in activating the financial market. From here, we find that there are three important elements in the investment environment: the financial statements, the financial markets, and investment firms working in tandem to develop the investors. As Accounting Systems operate within complex economic entities, both national and international, it is statutorily compelled to keep up with new developments that help in their integration with the global standards, and that would eventually positively impact everyone.

Market prices of the shares traded in the stock market should reflect. The intrinsic value of the shares. The intrinsic value of the shares is primarily dependent on the future earning potential of the company. The most predominant source of assessing the future gaining prospects of a company is Financial Statements and additional information provided in Annual Reports. Most widely used tool to analyze and evaluate the performance of a company is Accounting Ratios. Accounting Ratios are the results of establishing a logical relationship between various items of the financial statements. As the market price of the shares is expected to reflect the fundamentals of the company, it is legitimate to forecast that Accounting Ratios contain information about the market price of the shares. The market price, being an absolute measure, is not useful for comparison. Hence, there is a need for relative comparison of share prices of different companies in the market. Two commonly used valuation measures are Price to Earnings ratio and Price to Book Value ratio.

II. Statement of the Problem

In light of this, the present study aimed to examine the level of awareness of the investors on the information content of financial statements and how they assign importance to various aspects of financial statements. Besides, it is also the need of the hour to study whether the market price of the shares reflects the fundamentals of the company. Hence, investors are also interested in factor in the solvency and liquidity conditions of the company in pricing the shares. So, intuitively, we can establish a positive relationship between solvency and liquidity conditions and the market price of the shares. However, risk - seeking investors are more interested in profitability rather than solvency and liquidity conditions of the company.

III. Objectives

The specific objectives are:

- To evaluate the information content of accounting variables in predicting the market price of shares listed on the Amman stock exchange.

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a) Hypotheses

H0: Accounting variables (Return on Equity. Interest coverage ratio, Growth Rate, Total Assets Turnover ratio) do not affect the market price of the shares of listed companies.

H1: Accounting variables (Return on Equity, Interest coverage ratio, Growth Rate, Total Assets Turnover ratio) affect the market price of the shares of listed companies.

b) Sample

For this purpose of analysis of the relationship between accounting variables and the market price of the shares, listed companies in six industries have been selected. The industry-wise selected companies and their market capitalization are under as.

Table 1.1: Sample of the Selected Companies and their Market Capitalization as on 31-12-2016(in JD)

Sl. No.	Company	Market Capitalization	% to Industry Capitalization
Chemical Industry			
1	Arab Pesticides & Veterinary Drugs Mfg. Co.	21,840,000	27.89
2	Comprehensive	8,977,500	11.46
3	Industrial-Comm-AGR	31,258,853	39.92
4	Intermediate Petrol Chemicals Industries Co. Ltd.	2,240,000	2.86
5	Jordan Chemical Industries	2,519,474	3.22
6	Jordan Industrial Resources	3,657,500	4.67
7	National Chlorine Industries	5,850,000	7.47
8	Premier Business and Projects	1,157,107	1.48
9	Universal Chemical Industries	810,000	1.03
Total Market Capitalization of the Industry		78,310,434	100.00
Engineering and Construction Industry			
1	Al Assad	2,880,000	3.25
2	Al Quds Ready Mix	2,685,609	3.03
3	Arabian Steel Pipes	13,140,000	14.82
4	Jordan Pipe Manufacturing	3,146,000	3.55
5	Jordan Wood Industries	7,800,000	8.80
6	Ready- mix Concrete & Construction	59,000,000	66.55
Total Market Capitalization of the Industry		88,651,609	100.00
Food and Beverages Industry			
1	Arab Intl Food Factories	22,575,000	11.28
2	General Investment	30,500,000	15.24
3	Jordan Dairy	24,240,000	12.11
4	Jordan Poultry Processing	9,957,040	4.98
5	Jordan Veg Oil Industries	6,600,000	3.30
6	National Poultry	31,500,000	15.74
7	Siniora Food Industries	63,600,000	31.78
8	Universal Modern Industries	11,160,000	5.58
Total Market Capitalization of the Industry		200,132,040	100.00

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Mining and Extraction Industry			
1	Arab Aluminium Industry	13,500,000	0.54
2	Arab Potash	1,749,678,000	70.15
3	General Mining Company	2,985,000	0.12
4	International Silica Industrial	7,810,490	0.31
5	Investments&Integrated Industries	14,500,000	0.58
6	Jordan Cement Factories	77,973,353	3.13
7	Jordan Marble Company	4,000,000	0.16
8	Jordan Phosphate Mines	410,250,000	16.45
9	Jordan Steel	16,450,000	0.66
10	National Aluminium Industrial	4,860,000	0.19
11	National Oil&Electricity Production	2,450,000	0.10
12	National Steel Industry	2,647,591	0.11
13	Northern Cement Co.	166,100,000	6.66
14	Travertine Company	2,898,000	0.12
15	United Iron & Steel Mfg	18,012,499	0.72
Total Market Capitalization of the Industry		2,494,114,933	100
Pharmaceutical Industry			
1	Arab Centre for Pharma & Chemicals	3,800,000	2.75
2	Dar Aldawa	58,000,000	42.01
3	Hayat Pharmaceutical Industries	20,330,000	14.73
4	Jordan Pharmaceutical Manufacturing co.	19,996,875	14.48
5	Mid Pharma	13,126,545	9.51
6	Philadelphia Pharmaceuticals	22,800,000	16.52
	Total Market Capitalization of the Industry	138,053,420	100.00
	Textiles, Leathers ,and Clothing Industry		
1	Akari for Industries ,and Real Estate	2,280,000	2.14
2	Arab Weavers Union Company	26,400,000	24.78
3	Century Investment Group	11,732,926	11.01
4	El-Zay Ready Weak Mfg	3,000,000	2.82
5	Jordan Clothing Company	1,040,000	0.98
6	Jordan Worsted Mills	62,100,000	58.28
Total Market Capitalization of the Industry		106,552,926	100.00

Source: Computed from Data Compiled from Amman Stock Exchange

c) Tools of Analysis

The analysis of the impact of accounting variables (ROE, Growth rate, Interest coverage ratio and total assets turnover ratio) on the market price of the shares done by employing panel data regression with cross-section fixed effects. Besides, descriptive statistics for the variables used in the regression model.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in Chemical Industry of Jordan

This section presents the results of the analysis of information content of accounting variables in predicting the market price of the shares of listed companies in the Chemical Industry of Jordan from 2012 to 2016. There are nine companies belonging to

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chemical industry listed on the Amman stock exchange. The company-wise market capitalization as on 31st December/ 2016 has been presented. The descriptive statistics on the four Accounting Variables selected for the analysis, apart from Price to Book Value ratio. The results of panel data regression have along with the cross-sectional fixed effects of the individual companies.

Table 1.2: Estimation of Price to Book Value Ratio based on Select Accounting Ratios [Chemical Industry]

Variable	Coefficient	Std. Error	t-statistic	Slang
Return on Equity	0.042	0.026	1.611	0.117
Interest Coverage Ratio	0.010	0.003	2.771	0.009
Growth Rate	-0.048	0.028	-1.730	0.094
Total Assets Turnover Ratio	-0.086	0.108	-0.790	0.435
Constant	1.073	0.070	15.287	0.000
R-squared	0.886	F-statistic		20.058
Adjusted R-squared	0.842	Slang (F-statistic)		0.000
S.E. of regression	1.205			

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.2 furnishes the results of regression analysis performed to regress the Price to Book Value (PBV) ratio of the companies in the panel data on four accounting ratios viz., Return on Equity (ROE) ratio, Interest Coverage Ratio, Growth Rate, Total Assets Turnover ratio. The results of the analysis highlight that ROE has an insignificant positive impact while the growth rate has a significant negative on the Price to Book Value (PBV) Ratio. Interest Coverage Ratio has a significant positive, while Total Assets Turnover Ratio has an insignificant impact.

The positive impact of ROE implies that ROE signals the prospects of the company and hence, an increase in ROE of a company leads to an increase in the market price of the stocks. However, the positive impact of ROE is very weak statistically, as indicated by its associated 'p' value. The negative of growth rate may be ascribed to the reason that the number of companies have reported negative ROE and a few companies have paid dividend more than EPS.

Because of this reason, the growth rate of the majority of the companies was negative in this industry. Interest coverage ratio exerts the significant impact on the PBV ratio of the companies in chemical industry. It indicates that companies with higher interest coverage ratio perceived to be less risky, and hence, they are attractive for investment.

R-squared value is 0.89, which reveals that 89% of the variations in the PBV can be captured by the fitted regression model. Besides, F-statistic demonstrates the significant predictability of the regression model.

Table 1.3: Cross-Section Fixed Effects of the Companies in the Panel Data [Chemical Industry]

Sl. No.	Company	Effect
1	Arab Pesticides	2.037
2	Comprehensive	0.267
3	Industrial-Comm-AGR	0.526
4	Petrol Chemicals	-0.718
5	Jordan Chemical Industries	-0.237
6	Jordan Industrial Resources	-0.810
7	National Chlorine Industries	-0.436
8	Premier Business and Projects	-0.323
9	Universal Chemical Industries	-0.383

Source: Computed from data compiled from Amman Stock Exchange

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Table 1.3 shows the cross-section fixed effects of the companies which in the panel data regression. Cross-section fixed effects denote the difference between the average intercept presented in the panel data regression and actual intercept of the individual company.

As shown in the table, The company named Arab Pesticides has fixed effect of 2.037, which indicates that the actual intercept of this company is 2.037 units above the common intercept of the panel data regression. It shows comparatively largest upward distance between the common intercept and actual intercept of this company. On the other hand, Petrol Chemicals has a fixed effect of -0.810 which highlights that the actual intercept of this company is -0.810 units below the common intercept of the panel data regression. It points out the largest downward distance between this company's actual intercept and common intercept derived in the regression model.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in Engineering and Construction Industry of Jordan

This section encompasses the discussion on the analysis of the information content of Accounting Variables about the market price of shares of the companies belonging to the Engineering and Construction Industry. There are six companies listed on the Amman Stock Exchange, which belong to this industry. This section also provides the market capitalization of the listed companies as on 31st December/2016. Before, presenting the results of the regression analysis. Panel data regression analysis has been carried out with cross-section fixed effected and the results with detailed discussion.

Table 1.4: Estimation of Price to Book Value Ratio based on Select Accounting Ratios [Engineering and Construction Industry]

Variable	Coefficient	Std. Error	t-Statistic	Slang
Return on Equity	-0.011	0.018	-0.594	0.560
Interest Coverage Ratio	0.002	0.001	3.180	0.005
Total Assets Turnover Ratio	1.121	0.446	2.514	0.022
Growth Rate	-0.023	0.025	-0.914	0.373
Constant	0.263	0.269	0.978	0.341
R-squared	0.816	F-statistic		8.860
Adjusted R-squared	0.724	Slang (F-statistic)		0.000
S.E. of regression	0.341			

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.4 shows the results of regressing Price to Book Value (PBV) ratio on four Accounting Ratios, i.e. Return on Equity (ROE) ratio, Interest Coverage Ratio, Growth Rate ,and Total Assets Turnover ratio. Out of the four independent variables, only two have shown a significant impact. Interest coverage ratio and total assets turnover ratio have positive. It brings to light the fact that investor give importance to liquidity condition and also the operating efficiency of the companies in their investment decisions.

The R-squared value points out that 82% of the variations in the Price to Book Value ratio can be explained by the fitted regression model. F-statistic highlights that the predictability of the model is significant.

Table 1.5: Cross-Section Fixed Effects of Companies in Panel Data [Engineering and Construction Industry]

Sl. No.	Company	Effect
1	Al Assad	-0.461
2	Al Quds Ready Mix	-0.508
3	Arab Steel Pipes	0.352
4	Jordan Pipe Manufacturing	-0.186
5	Jordan Wood Industries	-0.336
6	Readymix Concrete & Construction	0.969

Source: Computed from Data Compiled from Amman Stock Exchange

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Table 1.5 shows the cross-section fixed effects of the companies in the panel data of the Engineering and Construction industry. As shown in this table, the panel data includes six companies. The common intercept of the panel data regression is 0.263.

The cross-section fixed effects imply the distance between common intercept and actual intercept of the individual companies. Companies named Al Assad, Al Quds Ready Mix, Jordan Pipe Manufacturing and Jordan Wood Industries have the actual intercept below the common intercept of the panel data regression. On the other hand, companies named Arab Steel Pipes and Ready mix Concrete & Construction have the actual intercept above the common intercept of the Panel Data Regression.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in Food And Beverages Industry of Jordan

This section contains the analysis of the information content of the select accounting variables about the market price of the shares. There are eight listed companies belonging to this industry. The market capitalization of all the eight listed companies as on 31st December/2016 has been provided. To gain insights into the variables used in the regression analysis, descriptive statistics has been presented for the cross-sectional data of the listed companies from 2012 to 2016. Next, Panel Data Regression analysis have been performed with cross-section fixed effects ,and results are presented in detail.

Regression Analysis of the Listed Companies in the Food and Beverages Industry of Jordan

For analysis of the efficacy of information content of select accounting variables in predicting the Price to Book Value ratio of the listed companies in the Food and Beverages industry of Jordan, OLS Regression model has been employed. In the Regression analysis, Price to Book Value ratio has been used as the dependent variable, and four Accounting Variables viz., Return on Equity (ROE), Interest Coverage Ratio, Growth Rate, and Total Assets Turnover Ratio are used as independent variables.

Table 1.6: Estimation of Price to Book Value Ratio based on Select Accounting Ratios [Food and Beverages Industry]

Variable	Coefficient	Std. Error	t-Statistic	Slang
Return on Equity	0.044	0.029	1.518	0.142
Interest Coverage Ratio	0.000	0.000	0.152	0.881
Growth Rate	-0.040	0.031	-1.268	0.217
Total Assets Turnover Ratio	-0.461	0.272	-1.692	0.104
Constant	1.213	0.201	6.025	0.000
R-squared	0.794	F-statistic		8.427
Adjusted R-squared	0.700	Slang (F-statistic)		0.000
S.E. of regression	0.282			

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.6 furnishes the results of Robust regression analysis. Price to Book Value ratio has been regressed on ROE, Interest Coverage Ratio, Growth Rate, and Total Assets Turnover Ratio. None of the predictor variables have a significant impact on the dependent variable. The Total Assets Turnover Ratio has moderate negative impact, as its 'p' value is closer to a 10% level of significance. The negative impact of Total Assets Turnover Ratio can be attributed to the reason that companies may indulge in aggregate sales promotion practices to augment the turnover, and it makes them less profitable. It will have a negative impact on the stock price of such companies.

Table 1.7: Cross-Section Fixed Effects of Companies in Panel Data [Food and Beverages Industry]

Sl. No.	Company	Effect
1	Arab Intl Food Factories	-0.766
2	General Investment	-0.119
3	Jordan Dairy	0.024
4	Jordan Poultry Processing	-0.148
5	Jordan Veg Oil Industries	-0.003
6	National Poultry	-0.245
7	Siniora Food Industries	1.054
8	Universal Modern Industries	0.136

Source: Computed from Data Compiled from Amman Stock Exchange

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Table 1.7 shows the cross-section fixed effects of the companies in the panel data of the Food and Beverages industry. As shown in this table, the panel data includes eight companies. The common intercept of the panel data regression is 1.213, as shown in table 4.23. The cross-section fixed effects imply the distance between common intercept and actual intercept of the individual companies. Companies named Arab Intl Food Factories, General Investment, Jordan Poultry Processing, Jordan Veg Oil Industries, and National Poultry have the actual intercept below the common intercept of the panel data regression. On the other hand, companies named Jordan Dairy, Siniora Food Industries and Universal Modern Industries have the actual intercept above the common intercept of the Panel Data Regression.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in Mining and Extraction Industry of Jordan

This section encompasses the analysis of information content of select Accounting Variables in predicting the market price of the shares of the listed companies in the Mining and Extraction Industry. Just like in the preceding sections, Price to Book Value ratio has taken as a relative measure of the market price of the shares of the companies.

There are fifteen listed companies in this industry. At the outset, the market capitalization of the fifteen listed companies has presented as on 31st December/2016. To understand the characteristics of the variables used in Panel Data Regression analysis, descriptive statistics have presented for the cross-sectional data of the listed companies. The characteristics of the variables, Panel Data Regression analysis has done with cross-section fixed effects.

Panel Data Regression Analysis of the listed Companies in Mining and Extraction Industry of Jordan

Analysis of the information content of select Accounting Variables in predicting the Price to Book Value ratio has been carried out by employing a Panel Data Regression model. The analysis has done under the framework of cross-sectional fixed - effects model. In this regression analysis, Price to Book Value ratio has been used as the dependent variable, and four accounting variables have been used as predictors viz., Return on Equity Ratio, Interest Coverage Ratio, Growth Rate ,and Total Assets Turnover Ratio.

Table 1.8: Estimation of Price to Book Value Ratio based on Select Accounting Variables [Mining and Extraction Industry]

Variable	Coefficient	Std. Error	t-Statistic	Slang
Return on Equity Ratio	0.026	0.012	2.206	0.032
Interest Coverage Ratio	-0.001	0.002	-0.434	0.666
Growth Rate	-0.025	0.012	-2.083	0.042
Total Assets Turnover Ratio	0.485	0.152	3.203	0.002
Constant	1.185	0.085	13.975	0.000
R-squared	0.864	F-statistic		19.707
Adjusted R-squared	0.820	Slang (F-statistic)		0.000
S.E. of regression	0.686			

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.8 provides the results of regression analysis done to analyze the impact of select accounting variables on the market price of the shares of the companies in the Mining and Extraction Industry. For this purpose, Price to Book Value ratio uses as the dependent variable, and independent variables are Return on Equity (ROE), Interest coverage ratio, Growth rate ,and Total Assets Turnover Ratio. Panel data regression has performed with cross-section fixed effects.

Results of the analysis bring to light the fact that the ROE and Total Assets Turnover ratio have a positive impact on the Price to Book Value ratio. However, the Total Assets Turnover ratio is more intense compared to that of ROE has indicated by the p' values. The question of the trade-off between financial performance and operating performance arises, investors tend to give more weight to operating performance.

On the other hand, Growth Rate has the negative impact on the Price to Book Value ratio of the companies in the industry. It can impute to the reason that most of the companies had reported negative ROE and also, a few companies have paid dividend more than the EPS. Impact of Interest Coverage Ratio is not significant.

R-squared value highlights that the fitted regression model can capture nearly 86% of the variations in the Price to Book Value ratio. F-statistic reveals that the predictability of the model is significant.

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Table 1.9: Cross-Section Fixed Effects of the Companies in Panel Data [Mining and Extraction Industry]

Sl. No.	Company	Effect
1	Arab Aluminium Industry	-0.670
2	Arab Potash	0.849
3	General Mining Company	1.306
4	international Silica Industrial	3.726
5	Investments & Integrated Industries	-0.229
6	Jordan Cement Factories	-0.349
7	Jordan Marble Company	-1.022
8	Jordan Phosphate Mines	-0.808
9	Jordan Steel	-1.027
10	National Aluminium Industrial	-1.128
11	National Oil & Electricity Production	0.643
12	National Steel Industry	-0.454
13	Northern Cement Co.	0.531
14	Travertine Company	-0.844
15	United Iron & Steel Mfg	-0.525

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.9 consists of the cross-section fixed effects of the companies in the panel data of Mining and Extraction Industry. As shown in Table 4.31, the common intercept of the panel data regression model is 1.185.

The values of cross-section fixed effects bring to light the fact that five companies named Arab Potash, General Mining Company, International Silica Industrial, National Oil & Electricity Production and Northern Cement Company have the actual intercepts bigger than common intercept derived in panel data regression model. On the other hand, ten companies named Arab Aluminium Industry, Investments & Integrated Industries, Jordan Cement Factories, Jordan Marble Company, Jordan Phosphate Mines, Jordan Steel, National Aluminium Industrial, National Steel Industry, Travertine Company and United Iron & Steel Manufacturing company have the actual intercept lower than the common intercept generated in panel data regression. It is obvious that the companies with actual intercept lower than the common intercept are more than the companies with actual intercept larger than the common intercept.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in the Pharmaceutical Industry of Jordan

Panel Data Regression Analysis of the Listed Companies in Pharma Industry of Jordan

Analysis of information content of Accounting Variables in predicting the Price to Book Value ratio of the companies listed on Amman stock exchange were done by employing Panel Data Regression model. In this regression, Price to Book Value ratio was regressed on four accounting variables viz., Return on Equity (ROE), Interest Coverage Ratio, Growth Rate, and Total Assets Turnover Ratio. Panel data regression analysis was performed with cross-sectional fixed effects.

Table 1.10: Estimation of Price to Book Value Ratio based on Select Accounting Ratios [Pharma Industry]

Variable	Coefficient	Std. Error	t-Statistic	Slang
Return on Equity	-0.013154	0.353	-2.521	0.022
Interest Coverage Ratio	0.002347	0.060	-0.220	0.829
Growth Rate	-0.009749	0.005	0.503	0.622
Total Assets Turnover Ratio	4.437275	0.060	-0.163	0.873
Constant	-0.890555	0.689	6.439	0.000
R-squared	0.936	F-statistic		24.802
Adjusted R-squared	0.898	Slang (F-statistic)		0.000
S.E. of regression	0.457			

Source: Computed from Data Compiled from Amman Stock Exchange

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Table 1.10 furnishes the results of regression analysis. The Price to Book Value ratio has been regressed on four accounting ratios viz., Return on Equity (ROE) and Interest Coverage ratio, Growth Rate, and Total Assets Turnover ratio. The regression analysis was done under the framework of panel data regression with cross-sectional fixed effects. ROE only has a significant negative impact on the Price to Book Value ratio of the companies. Such a counter-intuitive result may attribute to the unsuitable information content of the accounting variables in explaining the stock price.

Table 1.11: Cross-Section Fixed Effects of the Companies in Panel Data [Pharma Industry]

Sl. No.	Company	Effect
1	Arab Centre for Pharma & Chem	1.145
2	Dar Aldawa	-0.605
3	Hayat Pharmaceutical Industries	-0.367
4	Jordan Pharma	-0.885
5	mid pharma	-0.021
6	Mid Pharma	1.669
7	Philadelphiapharma	-0.356

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.11 delineates the cross-section fixed effects of the Pharma companies in panel data. The common intercept of the panel data is -0.890555, as shown in table 4.39. There are six companies in the panel data used in the regression analysis. There are two companies which have actual intercept larger than the common intercept obtained in panel data regression viz., Arab Centre for Pharma & Chemicals and Mid Pharma. On the other hand, there are four companies which have actual intercept lower than the common intercept derived in panel data regression viz., Dar Aldawa, Hayat Pharmaceutical Industries, Jordan Pharma, and Philadelphia pharma. It points out that the companies which have the intercept below the industry average intercept are more than the companies which have the intercept above the industry average.

Relationship Between Accounting Variables and Market Price of the Shares of Listed Companies in Textile, Leathers and Clothing Industry of Jordan

This section comprises the discussion on the results of the analysis of the information content of the select Accounting Variables in predicting the market price of the shares. There are six listed companies in this industry. The market capitalization of all the listed companies in this industry as on 31st December/ 2016 has been presented. To study the insights of the variables used in the regression model, descriptive statistics has been presented in detail. Descriptive statistics have calculate on the cross-sectional data of the listed companies in this industry from 2012 to 2016. Finally, Panel data regression analysis was performed with cross-section fixed effects. Results of the regression were discussed in detail.

Panel Data Regression Analysis of the Listed Companies in Textile, Leathers and Clothing Industry of Jordan

Analysis of information content of select Accounting Variables in predicting the Price to Book Value ratio was done by employing Panel Data Regression model. The regression used Price to Book Value Ratio as the dependent variable and four accounting variables viz., Return on Equity (ROE) ratio, Interest Coverage Ratio, Growth Rate, and Total Assets Turnover Ratio as predictors. The regression analysis was done with cross-sectional fixed effects.

Table 1.12: Estimation of Price to Book Value Ratio Based on Select Accounting Ratios[Textile, Leathers and Clothing Industry]

Variable	Coefficient	Std. Error	t-Statistic	Slang
Return on Equity Ratio	0.032	0.103	0.312	0.759
Growth Rate	-0.046	0.104	-0.442	0.664
Interest Coverage Ratio	0.000	0.002	-0.194	0.848
Total Assets Turnover Ratio	-0.311	3.457	-0.090	0.929
Constant	1.197	1.212	0.988	0.336
R-squared	0.652	F-statistic		3.739
Adjusted R-squared	0.477	slang(F-statistic)		0.008
S.E. of regression	0.579			

Source: Computed from Data Compiled from Amman Stock Exchange

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Table 1.12 furnishes the results of regression analysis. In this regression model, Price to Book Value ratio of the companies in Textile, Leather and Clothing industry is used as a dependent variable and four Accounting Variables viz., Return on Equity (ROE), Interest Coverage Ratio, Growth Rate, and Total Assets Turnover Ratio were used as predictors. The analysis was performed under the panel data regression framework with cross-section fixed effects.

The results of the study reveal that ROE and ICR have a positive effect on PBV ratio while growth rate and 'Total Assets Turnover Ratio' have a negative effect. But, none of the independent variables have a significant effect, as by the values of 'p' ($p>0.05$ However, jointly all the four variables have their influence on the PBV ratio, as shown by the significant value of F-statistic.

Table 1.13: Cross-section Fixed Effects of the Companies in Panel Data [Textile, Leathers and Clothing Industry]

	Company	Effect
1	Akari for Industries and Real Estate	1.285315
2	Arab Weavers Union Company	0.535005
3	Century Investment Group	-0.022592
4	El-Zay Ready Weak Mfg	-0.626556
5	Jordan Clothing Company	-0.579892
6	Jordan Worsted Mills	-0.417772

Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.13 provides the cross-section fixed effects of the companies in panel data of Textile, Leathers, and Clothing Industry. The panel data has six companies. The panel data regression results show that common intercept is 1.197, as shown in table 4.47. The values of cross-section fixed effects indicate how the regression results of individual companies deviate from the industry in respect of the intercept values Accompanied with them. The results of the analysis point out that two companies named Akari for Industries, and Real Estate and Arab Weavers Union Company have the actual intercept above the common intercept derived in the panel data regression. On the other hand, remaining four companies named Century Investment Group, El-Zay Ready Wear Manufacturing, Jordan Clothing Company and Jordan Worsted Mills have the real intercept below the common intercept obtained in the panel data regression.

The Comparison of the Predictability Accounting Variables

In this sub-section, comparison of the predictability of accounting variables was done among the six different industries selected for the analysis. As the nature of the operating and investing and finance activities of the companies differ from industry to industry, the information content of the accounting variables in predicting the market price of the shares may also vary. Because/the accounting variables measure the results of the three types of activities of the business. In light of this, it is pertinent to make the comparison among the six select industries concerning the information content of the chosen accounting variables. The comparison can provide valuable insights into the fundamentals of the companies which are influencing the market price of the shares.

Table 1.14: Regression Beta Coefficient values of Accounting Variables and their Significance

Variable	Chemical Industry	Engineering & Construction	Food & Beverages	Mining & Extraction	Pharma	Textile, Leather & Clothing
ROE	0.042	-0.011	0.044	0.026**	-0.013**	0.032
ICR	0.010**	0.002**	0.000	-0.001	0.002	-0.0003
Growth Rate	-0.048*	-0.023	-0.040	-0.025**	-0.010	-0.046
TATR	-0.086	1.121**	-0.461	0.485**	4.437	-0.311
Constant	1.073**	0.263	1.213**	1.185**	-0.891**	1.197

*(** indicates 5% level of significance, * indicates 10% level of significance)*
Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.14 presents the truncated version of the results of the regression analysis done for each select sector. Return on Equity has positive impact on the Price to Book Value ratio in case of the chemical industry, Food & Beverages industry, Mining and Extraction Industry and Textile, Leather Clothing industry. But, the statistical significance was established only in case of Mining and Extraction Industry. It uncovers the fact that investors value the shares with premium in case of the companies in those industries which earn comparatively better returns. In the case of the Engineering & Construction industry, ROE has an insignificant negative impact. In the case of Pharma industry the ROE has a significant negative influence on

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the PBV ratio. Such counter- intuitive results can impute to the bigger deviations in the data and low sample size.

The positive impact of Interest Coverage Ratio can be observed in the case of the chemical industry, Engineering & Construction industry, Food & Beverages industry, and Pharma industry, but statistical significance was established only in the case of the Chemical Industry and engineering & construct industry. It points out that higher the interest coverage ratio, greater the market price of shares. It brings to light the fact that in case of those industries having a hugger amount of interest payable about EBIT perceive to be risky. So, investors tend to discount the market price of shares of the companies with a larger amount of interest payable.

The Negative effect of growth rate can be noticed in the case of all of selected industries, but the statistical significance of the impact was established only in case of the Chemical Industry and Mining & Extraction Industry. It is worthwhile to remember that the growth rate of a company is estimated based on retained earnings of the company. So, higher the retained earnings, bigger the growth rate of the company. The negative impact of growth rate on the Price to Book Value ratio brings to focus the fact that the investors in those industries prefer distribution of dividend rather than plow back of profits for the expansion of business activities. Such preference of the investors can attribute to the reason that the internal average of return of the companies in the industry may be lower than the expected rate of return.

Total Assets Turnover ratio has a positive impact in case of Engineering & Construction Industry, Mining & Extraction Industry, and Pharma industry. It implies that operating efficiency perceived to the main determining factor for the success of a company. Hence, investors value the companies with higher Total Assets Turnover Ratio at a fair premium.

Table 1.15: Diagnosis of Regression Models

Industry	Adjusted R-Squared	Standard Error	D-W Statistics	F-Statistic	JB Test
Chemical Industry	0.842	1.205	1.939	20.058*	10.022
Engineering & Construction Industry	0.724	0.341	2.150	8.860*	1.812
Food & Beverages Industry	0.700	0.282	3.045	8.427*	56.492
Mining & Extraction Industry	0.820	0.686	1.562	19.707*	2.895
Pharma Industry	0.898	0.457	3.319	24.802*	0.587
Textile, Leather and Clothing Industry	0.477	0.579	0.618	3.739*	1.6477

(indicates 1% level of significance)*
Source: Computed from Data Compiled from Amman Stock Exchange

Table 1.15 presents a consolidated view of the diagnosis of the regression model. Highest adjusted R-squared value was reported in case of pharma industry followed by chemical industry indicating the comparatively better predictability of the regression model.

On the other hand, comparatively lowest adjusted R-squared is derived for the panel data regression for the companies in the textile, leather, and clothing industry. It demonstrates that the proportion of variations in the dependent variable captured by the fitted panel data regression is only 48%. It highlights comparatively poor predictability of the regression model.

Under none of the regression models, the Durbin-Watson Statistic value is less than Adjusted R-squared. It indicates that the results of the regression are not spurious. For all the regression models, F-statistic is significant which implies that the data suits well to the regression model and also the predictability of the model is statistically significant.

Jarque-Berra test is meant to test the null hypothesis that residuals obtained from the regression model are normally distribute ,the null hypothesis is accepted for all the industries except for Food ,and Beverages industry. As the residuals are normally distributed, the results of the regression are reliable and generalization of the results can make more effectively.

IV. Conclusion

- The main objective of the present paper is to examine the efficacy of the accounting variables in predicting the market price of the shares of the listed companies in Jordan. To achieve the said objective the listed companies belonging to six different industries was chosen. The industries selected include Chemical Industry, Engineering, and Construction Industry, Food and Beverages Industry, Mining & Extraction Industry, Pharmaceutical Industry, and Textile, Leather and Clothing Industry. A panel data set is prepared for the listed companies in each industry and panel

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data regression analysis has been performed with cross-sectional fixed effects.

- In the Chemical industry, Engineering & Construction industry, and Textile, Leather & Clothing Industry, the Interest Coverage Ratio was very low or negative. Finance theory asserts that debt is a double-edged sword. When a company earns stable earnings and cash flows of the company are sufficient to pay the fixed interest obligations, debt capital entails advantages to the equity holders by deductibility of interest expenditure for tax purpose. However, when the earnings of the company are highly volatile, and the company does not have sufficient cash flows, having debt in the capital structure may force a company into bankruptcy conditions, which entails many repercussions on the part of the company.
- In the case of Chemical Industry and Engineering & Construction Industry, the impact of Interest Coverage Ratio is significantly positive. It brings to light the fact that investors assign more importance to the liquidity condition of the companies .
- The Average growth rate of all the select industry was negative, except in food and beverages industry. Because of this fact, the coefficient of growth rate was also negative. It implies the positive impact of growth rate on the stock price.
- Significant positive effect of Total Assets Turnover Ratio in case of Engineering & Construction Industry and Mining & Extraction industry reveals that operating efficiently of the companies play a significant role in building the market momentum.
- Based on the overall results of the regression models, it can conclude that the select accounting variables jointly have significant information content in predicting the PBV ratio.

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The Perception of Earnings Management According to an Econometric-Accounting Analysis: The Case of Tunisia

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Abstract- Accounting information provides support for decisions made by the company's management and its partners. Potential investors, financial backers as well as authorities (financial and judicial) make their decisions based on this information, which itself is supposed to be drawn up in accordance with generally accepted accounting standards and principles. However, the existence of accounting choices and accounting policies that are diversified and standardized by the accounting system create the freedom for managers to manipulate the quality of the information. In other words, a situation of information asymmetry may tempt the managers of failing companies to adopt choices in order to influence the perception of risk by its partners.

Keywords: *earnings management, discretionary accruals, financial failure.*

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Abstract- Accounting information provides support for decisions made by the company's management and its partners. Potential investors, financial backers as well as authorities (financial and judicial) make their decisions based on this information, which itself is supposed to be drawn up in accordance with generally accepted accounting standards and principles. However, the existence of accounting choices and accounting policies that are diversified and standardized by the accounting system create the freedom for managers to manipulate the quality of the information. In other words, a situation of information asymmetry may tempt the managers of failing companies to adopt choices in order to influence the perception of risk by its partners.

Keywords: earnings management, discretionary accruals, financial failure.

I. Introduction

Companies that fail financially or who commit violation of legal provisions in terms of accounting or transparency of published financial information are most often listed and classified (AAER of the SEC in the United States or black lists of the AMF in France) . Similarly, information about fraudulent businesses (ranging from fraudulent financial statements to fraudulent bankruptcies) is disclosed instantly and periodically (in developed countries). Therefore, two schemes are important and necessary, to alert and denounce respectively financial failures and fraudulent practices of companies operating in the economy, namely the legal (the judicial authorities) and the financial (the financial authorities). In fact, the subject of companies in difficulty is the privileged domain of the related interests of the manager and the lawyer; the former is interested in the process of forming the accounting result that has led to such distress, and the latter is more interested in the legal-contractual process which has revealed a state of insolvency following a financial default, with, however, as common support of these two processes: accounting. In the United States of America, business difficulties are the catalyst for work that explicitly addresses the impact of the failure as a research context either on the firm's performance or on other variables such as capital structure. Even executive compensation as one can find other research that focuses more specifically on the accounting choices made by managers in a context of financial distress (DeAngelo et al., 1994). The issue of accounting information deserves to be studied through the relationship of failure / accounting, revealing the fundamental dilemma between business secrecy and transparency of accounting and financial information. Moreover, the interest of this subject is related to the more general problematic of the accounting standardization, meaning the capacity of the accounting system to give as much as possible a faithful picture of the economic reality, which of on the one hand, the performance level, can assure the investors as to their investment choices or the donors as for their decision of financing, and on the other hand, can help the judicial authorities as for their decision to pronounce the state of cessation of payment and therefore trigger the procedure of judicial settlement which may lead to legal bankruptcy which can be fraudulent or non-fraudulent.

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II. The Financial Failure Management Process is based on Handling the Accounting Data: Empirical Validation based on a Sample of Companies Listed on the BVMT.

It is important to have an effective information system, that is , to establish sustainable prevention arrangements or to move towards procedures that are more likely to lead to business survival. According to Charreaux (1997), the possibility of detecting the degradation of performance is one of the conditions for designing crisis-prevention corporate governance systems. For Skinner D. and DeAngelo (1994), the provision by managers of sufficient accounting and financial elements would make it possible to identify difficulties and thus to resort to an informal reorganization. This is why one of the privileged fields of research conducted on "accounting-failure of companies" is that of prediction models of bankruptcy vs fraud. At the level of the manipulations of the accounting information in a context of difficulty, one can note that many managers do not resist the temptation to dissimulate to thirds the whole gravity of the situation. According to DeAngelo et al. (1994), the predictions of the positive theory predicts that executives of companies experiencing difficulties make accounting choices to improve the outcome. Two explanations can be given:

- Either they have an incentive to increase the results disclosed, that is, to keep their positions or to avoid the control of donors or regulatory bodies and guardianship.
- Or they can increase the results to avoid violating the contractual clauses related to the indebtedness.

Observing the persistent existence of negative accruals (The behavior of managers is observed through the management of accruals, that is to say the accrual accounts and other products and expenses calculated and offset.), the study conducted by these authors on 76 listed companies results in the distinction of two parts in accruals and their variations. A substantial portion is the result of "real" economic choices made by managers, including a decrease in inventories or changes in technology.

According to the positive theory (A. Scott Keating, Jerold L. Zimmerman, 2000), managers practice an accounting data management that corresponds to the contractual usefulness and the perception that investors will have of the company's situation. Hence its risk. In this logic, the directors of companies at risk of high bankruptcy, manage the accounting data, in a goal of concealment (fraud) financial difficulties. In this approach, the concept of contracts is a crucial piece in the study of managers and stakeholders' behavior . Thus, the latter will manifest through the accounting and financial choices that they will adopt as part of a management strategy on a key variable of appreciation of the company's performance which isn't other than: "the published accounting result". The management of this variable therefore appears as one of the implicit objectives of an accounting policy insofar as the published accounting results, or the balances contributing to its formation, are taken into account in the negotiation of contractual conditions or in the resolution of Conflicts. The accounting policy is therefore the main instrument for the implementation of this results management strategy, the objectives of which are to present a level of performance favorable to the interests of the managers and to mitigate the conflicts and the specific risk of the company. Indeed, for Jensen and Meckling (1976), financial accounting plays a controlling role in contractual relations and the politico-

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contractual approach considers that accounting makes it possible to mitigate the effects of wealth transfer between shareholders and managers and between leaders and creditors (Franco Modigliani, Merton H. Miller, 1958). This allows us to assume that the company at high risk of bankruptcy can be considered as a place of confrontation strategies.

By arbitrating between the preservation of part of their interests and losses related to bankruptcy[1], shareholders and majority creditors (respectively as a percentage of capital and debt) seek compromises (through negotiations) that can maintain control on the company and guarantee their property or financial rights. As for the leaders, relying on the discretionary power they hold, will implement strategies that preserve their interests. In fact, managers are encouraged to make real management decisions that can improve the company's performance or to adopt appropriate accounting choices to act on the firm's image by reducing the external perception of the risk of bankruptcy. They thus instrument the accounting information (result management) to safeguard their interests and consequently those of the company. This assumption stems from a double consideration: the first is that the reality of the company's situation exists and is perceptible by its partners; the second, considers that financial accounting gives a reflection supposed to be reliable and relevant to this reality. The financial difficulties of the company lead all the partners of the company to take measures to avoid bankruptcy by adopting appropriate strategies. Indeed, when the costs of a private renegotiation are a priori cheaper than those related to a judicial bankruptcy, it seems more rational for the company and its partners to avoid triggering the judicial bankruptcy. However, the company can be put to a judicial settlement (by a court decision following a request made to this effect by the directors of the company or its partners - Law 2016-36) when the leaders and the main partners consider that Judicial protection is an optimal solution to ensure recovery and their interests: this is the so-called "defensive" strategy. Conversely, managers can avoid the collective procedure by encouraging the partners to renegotiate the debt and reorganize the capital and structure of the firm: in this case it is the strategy called "d ' offensive ". The implementation of these two strategies will be done through the financial statements through the accounting choices as part of a strategic management of the results modifying the content of these financial statements. From these two strategies follow the basic assumptions of our econometric approach for the rest of this study.

H1: It concerns the existence of result management; it is a question of whether managers of companies with low financial profitability adopt a strategy of management of the result through the accounting choices?

H2: It relates to the meaning of the adjustments of the accounting variables made by the managers of companies with low financial profitability; it is a question of knowing if in such a business context, the leaders manage upward the results? In this case we can consider two sub-hypotheses:

[1] The different costs of bankruptcy include explicit costs, resulting in cash outflows, such as the legal or administrative costs related to judicial settlement or liquidation procedures (fees, transaction costs incurred to liquidate the assets ...), but also implicit costs, also known as opportunity costs, associated, for example, with the loss of trust of suppliers or bankers, or conflicts of interest between creditors and shareholders. The latter is linked to the agency costs insofar as the shareholders are supposed to be the agents of the creditors who entrust their capital to them.

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• H2-1: managers opt for a defensive strategy manifested by a management of the result upward; they opt for accounting choices to increase the performance indicators in order to avoid the collective procedure.

• H2-2: the managers opt for an offensive strategy that manifests itself through a management of the result downward; they opt for accounting choices leading to a drop in performance indicators or to dispel difficulties in order to encourage partners to renegotiate privately.

The model for estimating accounting variable adjustments is defined to test these assumptions.

We have:

$$AVCRT_{it} = RN_{it} - CF_{it} \quad (1)$$

With,

$AVCRT_{it}$ = Adjustment of accounting variables companies i period t

RN_{it} = Net profit of firm i period t

CF_{it} = Cash flow generated by the firm i period t

The latter variable is the difference between the cash flow from operations (CAF) generated by the company and the change in the working capital requirement (ΔBFR) over two consecutive periods:

$$CF_{it} = CAF_{it} - \Delta BFR_{it} \quad (2)$$

CAF_{it} = Cashable products (except disposals) - disbursable expenditure (except disposals)

It represents the flow of internal equity that remains available to the company to be self-financing before the dividend is paid. This is the initial cash flow resulting from the difference between cashable products and the cash costs with the exception of cash flows related to asset disposals.

We note that the AVCRTs are based on the calculated expenses and revenues and the change in the working capital requirement.

Through the estimation models we have found that only a part of these adjustments to the accounting variables can be manipulated: this is the discretionary component of total accruals. As for the non-discretionary part, it corresponds to all the accounting elements on which the managers do not have decision-making power in matters of accounting policy. Therefore, the following hypothesis is formulated:

The variable $AVCRT_{it}$ of firm i at date t consists of a discretionary part we note $AVCRD_{it}$ and from a non-discretionary part that we note $AVCRND_{it}$

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From where:

$$AVCRT_{it} = AVCRD_{it} + AVCRND_{it} \quad (3)$$

Since the first component ($AVCRD_{it}$) cannot be calculated directly, it is estimated from the calculation of the non-discretionary component and the total adjustments. The following accounting elements are contained in the non-discretionary component:

1. The change in working capital requirements (ΔBFR) changes according to the economic activity of the company. It is measured by changes in inventories, debts and turnover. The change in sales adjusted for actual cash balances is considered a non-discretionary item that reflects the actual business performance of the business. This latter variation is a component of non-discretionary accruals.

2. Depreciation and amortization net of reversals included in the calculation of cash flow depend on fixed assets. There is thus a positive and constant relationship between the amount of endowments and the amount of fixed assets. Fixed assets (gross book value) are retained as a non-discretionary item reflecting the real productive capacity of the company.

3. Monetary flows resulting from offsetting accruals, debt restructuring transactions and receivables are also included in the non-discretionary portion of the accounting variables.

We can therefore formulate the non-discretionary part of equation (3) by the following equality:

$$AVCRND_{it} = f(IMMO_{it} + (Var^{t}_{t-1}CA_i - Var^{t}_{t-1}Cr_i) + FMO_{i,t-1}) \quad (4)$$

With:

$IMMO_{it}$ = Total amount of gross fixed assets of the company i period t

$Var^{t}_{t-1}CA_i$ = Change in turnover between 2 successive years t and t-1

$Var^{t}_{t-1}Cr_i$ = Variation of trade receivables company i between t and t-1

$FMO_{i,t-1}$ = Business cash flow i period t-1

The valuation of the adjustments to the total accrual accounting variables for a firm i at the time t ($AVCRT_{it}$) is derived from the following generalized modified Jones model:

$$\frac{AVCRT_{it}}{TA_{it-1}} = \lambda_0 + \lambda_1\left(\frac{Var^{t}_{t-1}CA_i - Var^{t}_{t-1}Cr_i}{TA_{it-1}}\right) + \lambda_2\left(\frac{IMMO_{it}}{TA_{it-1}}\right) + \lambda_3\left(\frac{\Delta FMO_{it-1}}{TA_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

With:

TA_{it-1} = Total assets of the firm i period t-1

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ε_{it} = The error term (of residuals) this corresponds to the portion of the adjustments of discretionary regularization accounting variables.

The error term ε_{it} in this model represents the discretionary portion of the adjustments to the total accounting variables. It is obtained from equation (5), which is the model estimated over an earlier period, by regressing for each enterprise the accounting variables of adjustments observed on the calculated values of the different variables.

This model makes it possible to test the hypotheses on the existence of management of the result and the direction of the adjustments (hypotheses H1 and H2). Indeed, a Student's statistical test is used to determine if the adjustments of the discretionary accounting variables are significantly lower than zero.

The sign of the relation ($AVCRT_{it} - AVCRND_{it}$) indicates the direction of the accounting choices' orientation allowing us to define the strategies that the leaders want to emit through the published accounting information:

A positive difference indicates that the reported accrual accounting variables of enterprise i at period t are greater than the normal adjustment variables:

$$Accruals_Totaux > Accruals_normaux \Rightarrow stratégie_défensive$$

A negative difference means that the reported accrual accounting variables of enterprise i at period t are lower than the normal adjustment variables:

$$Accruals_Totaux < Accruals_normaux \Rightarrow stratégie_offensive$$

Also :

1. If the discretionary component ($AVCRD_{it}$) is positive, it increases the published earnings and therefore reflects an upward management of the result (defensive strategy);

2. If the discretionary component ($AVCRD_{it}$) is negative, it decreases the published profit and thus translates a management of the result downward (offensive strategy).

The selection of our sample was based on the following criteria:

- A listing period of at least 16 years over the period 1999 - 2014 on the Tunis Stock Exchange;

- A set of financial information such as income statements, balance sheet, activity, and structure and profitability ratios is available in the database that has been collected.

Criteria for selecting the sample:

The sample obtained from these two criteria is of size k = 19, and n = 304 observations, distributed according to the sectors of activity as indicated in the table (0).

Table (1) shows the descriptive statistics of the assets and results of the sampled companies for the period (1999 - 2014).

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According to the results found in table (1), it appears that, on average, the net result is positive over the period (1999 -2014). This indicator, however, has a negative 25 percentile (-604.2), which means that a quarter of the companies in the sample have a loss of over 604.200,000 dinars and another quarter has a net income above 11.618.700,000 Dinars. These proportions reflect the difficulties that the companies face, which cannot be explained by operating problems insofar as the average and the median of the gross operating surplus (EBE) are positive. The median pre-tax income (RAI), which includes financial charges, for a quarter of the companies in the sample is relatively small. The difficulties of the companies thus seem to originate for the most part from excessive indebtedness[2]. We also observe that the difficulties encountered by companies in difficulty are influenced on the one hand by sectoral factors related to the competitive pressure and the post revolution events of 2011, and on the other hand to the narrowness of their market. (A significant number of companies have only a portion of the domestic market).

Analysis of accounting adjustment variables:

This is an analysis of adjustment variables that can be adjusted by executives. The decomposition of the total accounting adjustments makes it possible to identify the accounting variables from the following function:

$$AVCRT_{it} = f(\Delta^{t}_{t-1}BFR_{it} + RAP_{it} + PVC_{it} - DAP_{it} - DPRC_{it} - PRIMM_{it}) \quad (6)$$

With:

- $AVCRT_{it}$ = Adjustments of the total accrual accounting variables of enterprise i to period t;
- $\Delta^{t}_{t-1}BFR_{it}$ = The change in the working capital requirement between two successive fiscal years t and t-1 in enterprise i: This variation breaks down as a change in trade receivables ($\Delta^{t}_{t-1}Cr$), changes in inventories ($\Delta^{t}_{t-1}St$) and changes in trade payables and related accounts ($\Delta^{t}_{t-1}FCR$);
- RAP_{it} = Depreciation and amortization reversals of the assets of company i at period t;
- PVC_{it} = Capital gains net of disposal of assets of business i at period t;
- DAP_{it} = amortization and provisions for depreciation of the assets of company i at period t;
- $DPRC_{it}$ = Provisions for contingencies and charges for company i at period t;
- $PRIMM_{it}$ = The fixed productions of company i at period t.

The average of the total adjustments is negative (downwards) and represents 5.53% of the total assets of the previous year. This result seems to indicate the importance of the adjustments made by the directors. The standard deviation being relatively high (26%), there are significant differences in the practice of accounting adjustments in firms in difficulty. The average change

[2] This assumption takes into account the improvement in the financial situation of companies during the study period (1999-2014). Indeed, during this period, the overall trend of Tunisian companies was to increase their investments because of the favorable conditions.

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in WCR is positive (0.7%), which reflects an increase in it. At the same time, there is an increase in operating debts (2, 4%). These evolutions seem to confirm the difficulties of the companies, which constitutes constraints of negotiation with their customers of the faster deadlines of settlement and with their suppliers longer payment periods. Depreciation and amortization provisions and provisions for contingencies and charges represent on average a relatively high proportion of total assets (respectively 5.7% and 0.3%). This finding seems to reflect a manipulation of these items for accounting adjustments. It can be seen that even in a context of good performance and positive net results, managers have to make adjustments. This confirms the results management hypotheses to achieve objectives in order to smooth out the results (Hawariah Dalnial et al., 2014). Lastly, the descriptive statistics show that the variables that have the greatest effect on the accounting adjustments are depreciation and changes in the BFR components, respectively. However, the set of accounting adjustment variables is more or less important to the management of results. This observation shows the methodological interest to study the accounting practice from the synthetic variable of accruals[3] since the managers use a combination of the accounting variables to adjust the level of their net results.

The total accruals thus calculated contain both short accruals (such as the BFR, provisions for depreciation of current assets) and long accruals that correspond to the difference. However, these total accruals are not entirely subject to the discretion of the managers since the discretionary portion is valued by the difference between the first and the non-discretionary or "normal" accruals. Indeed, for Hawariah Dalnial et al. (2014), normal accruals correspond to those of the previous year: discretionary accruals correspond to the change in accruals from one year to the next. However, this approach has a major disadvantage of excluding the economic factors that may explain this variation. In contrast, the model proposed by Jones (1991) as modified by Beneish in 1998 corrected this anomaly, especially since some researchers (Patricia M. Dechow and Richard G. Sloan et al. Jones model (where the change in sales is adjusted by changes in trade receivables) Only the increase in sales with no immediate counterpart in accounts receivable is indicative of normal accruals. possible manipulation of payment deadlines to increase sales and consequently the result is neutralized.

Specification of the Total Accruals Model and Formulation of the Econometric Assumptions:

Take again the equation (5)

$$\frac{AVCRT_{it}}{TA_{it-1}} = \lambda_0 + \lambda_1\left(\frac{Var^{t}_{t-1}CA_i - Var^{t}_{t-1}Cr_i}{TA_{it-1}}\right) + \lambda_2\left(\frac{IMMO_{it}}{TA_{it-1}}\right) + \lambda_3\left(\frac{\Delta FMO_{it-1}}{TA_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

With Exogenous (explanatory) variables:

X1 $= \frac{(VarCA - VarCr)_{it}}{TA_{it-1}}$, this measure normalized by the lagged asset, corresponds to the change in turnover adjusted for any abnormal increase, from enterprise i for year t.

X2 $= \frac{IMMO_{it}}{TA_{it-1}}$, this exogenous variable measures the amount of depreciable capital assets (tangible and intangible) of enterprise i for the year normalized by the lagged total assets.

[3] These are adjustments to accrual accounting variables that result from the difference between accrual accounting and cash accounting. As a summary concept, accruals include all adjustments that move from cash to accrual accounting. These adjustments result from year-end work.

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X3 $= \frac{\Delta FMO_{it}}{TA_{it-1}} = \frac{\Delta CF_{it}}{TA_{it-1}} = \frac{\Delta(CAF^{it}{}_{it-1} - \Delta BFR^{it}{}_{it-1})}{TA_{it-1}}$, this exogenous variable measures the variation, normalized by the lagged asset, of the net cash flows[4] generated by the activity of company i for year t.

As endogenous value (to be explained):

Y $= \frac{AVCRT_{it}}{TA_{i,t-1}}$, this endogenous variable represents the total amount of accruals normalized by the delayed active total of enterprise i for year t.

As constant:

(Constant λ0): the sense of the constant λ0 is that, in the absence of exogenous variables, there are always adjustments, normally explained, of the total regulation accounting variables.

Multiple linear regression is the multivariate generalization of simple regression.

We seek to explain the values taken by the endogenous variable Y $= \frac{AVCRT_{it}}{TA_{it-1}}$ using p (= 3) exogenous variables X_j, $(j = 1; 2; 3)$.

We must estimate the values of (3 + 1) parameters (λ_0 ; λ_1 ; λ_2 ; λ_4) from a sample of n (= 304) observations.

We notice in the model:

$i = 1; \ldots\ldots ; n = 304$ corresponds to the number of the observations;

y_i is the i-th observation of the endogenous variable Y;

x_{ij} is the i-th observation of the j-th variable X_j;

$\mathcal{E}_i$ the error (residue) of the model, it summarizes the missing information which would make it possible to explain linearly the values of Y using the p (= 3) variables Xj

The residual of the estimate corresponds to the share of accruals manipulated discreetly by the leaders (Dechow and Sloan, 1995). The random term $\mathcal{E}_i$ which is called the error or model residual, plays a very important role in the regression. It summarizes all the information that is not taken into account in the linear relationship that we seek to establish between the endogenous variable Y $= \frac{AVCRT_{it}}{TA_{it-1}}$, and exogenous variables X_j i.e. specification problems, approximation by linearity, and summarize the role of missing explanatory variables. However, the properties of the estimators are largely based on the assumptions we make about $\mathcal{E}_i$. In practice, after estimating the parameters of the regression ($\lambda_{j=0,1,2,3,4}$), the first checks concern the error $\mathcal{E}_i$ (residuals) calculated on the data during the modeling. These assumptions weigh on the properties of estimators (bias, convergence) and statistical inference[5] (distribution of estimated coefficients). As for simple regression, the hypotheses will make it possible to determine the properties of the estimators (bias, convergence) and the distribution laws (Student's law for each coefficient taken individually, Fisher's law as soon as we treat a group of coefficients we distinguish two types of assumptions:

[4] Cash flow is the difference between receipts and disbursements due to the business activity.

[5] Statistical inference consists in inducing the unknown characteristics of a population from a sample from this population. The characteristics of the sample, once known, reflect with a certain possible margin of error those of the population.

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- Stochastic hypothesis[6]
- Structural hypothesis[7]

Stochastic hypothesis:

First the hypothesis on endogenous variables ($Y = \frac{AVCRT_{it}}{TA_{it-1}}$)

And exogenous ($X_j = \left(\frac{Var^{t}_{t-1}CA_i - Var^{t}_{t-1}Cr_i}{TA_{it-1}}\right), \left(\frac{IMMO_{it}}{TA_{it-1}}\right), \left(\frac{\Delta FMO_{it-1}}{TA_{it-1}}\right)$).

X_j and Y are digital quantities measured without error. X is an exogenous data in the model.

Y is random via $\mathcal{E}_i$ ie d. the only error we have on Y comes from the inadequacies of X_j to explain its values in the model. In other words, we formulate the stochastic hypotheses as follows:

H1 _ X_j are not randomx_{ij} they are observed without error.

H2 _ E (ε_i) = 0, the expectation of the error is zero. On average, the model is well specified.

H3 _ V(ε_i) = σ^2_ε, the variance of the error is constant, it is the hypothesis of homoscedasticity.

H4 _ $COV\left(\varepsilon_i;\ \varepsilon_j\right) = 0, for\ i \neq i'$, the errors are independent, it is the hypothesis of non-auto-correlation of the residues.

H5 _ $COV\ (\ x_j\ ;\ \varepsilon_i) = 0$, the error is independent of the exogenous variables.

H6 _ $\varepsilon_i \equiv N(0, \sigma_\varepsilon)$, the errors are distributed according to a reduced normal centered law.

Structural hypothesis:

We often find a model matrix writing in the literature

$Y = X\lambda + \varepsilon$,

$$X = \begin{pmatrix} 1 & x_{11} & \cdots & x_{1,p} \\ \vdots & & \ddots & \vdots \\ 1 & x_{n1} & \cdots & x_{n,p} \end{pmatrix}$$

The dimensions of the matrices are respectively:

$Y \rightarrow (n, 1)$
$X \rightarrow (n, p + 1)$
$\lambda \rightarrow (p + 1{,}1)$
$\varepsilon \rightarrow (n, 1)$

- H7 _The matrix $X\ de\ taille\ (n, p\ +\ 1)$ contains all the observations on the exogenous (Burcu Dikmen, Güray Küçükkocaoğlu), with a first column formed by the value 1 indicating that we integrate the constant λ_0 in the equation.
  The matrix (X'X) is regular i.e. and (X 'X) ≠ 0 and (X' X) ((-1) exist. It indicates the lack of collinearity between the exogenous. We can also see this hypothesis from the angle $rang(X)\ =\ p\ +\ 1\ et\ rang(X'X)\ =\ p\ +\ 1$.

[6] The classical calculation of probabilities concerns tests where each possible result (or realization) is measured by a number, which leads to the notion of random variable. A stochastic process or random process or random function represents an evolution, discrete or continuous time, of a random variable. This notion is generalized to several dimensions. An important special case, the Markov random field, is used in spatial analysis.

[7] As in simple regression, the hypotheses make it possible to determine the properties of the estimators (bias, convergence); and their distributions (for interval estimates and hypothesis tests), there are two main categories of assumptions: Structural Assumptions and Stochastic Assumptions.

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- H8 _ ((X'X)) / n tends to a non-singular finite matrix when n → + ∞.
- H9 _ n> p + 1, the number of observations is greater than the number of parameters to be estimated.

In the case where n = p + 1, we have an interpolation, the line passes exactly by all the points. When n <p + 1, the matrix (X'X) is no longer invertible.

- The results of the regression of equation (5) are formulated in Table (3)
- The regression vectors and the residuals of the estimate are formulated in Table (4).
- The objective of the ordinary least squares linear regression (as BLUE estimator) is to estimate the parameters of equation (5) as best as possible by minimizing the deviations $(\hat{\varepsilon} = y - \hat{y})$ between the values observed and the values predicted by the model of the endogenous variable: $Y = \frac{AVCRT_{it}}{TA_{it-1}}$.

The error (or residue) observed ε must therefore verify the hypotheses H2 to H6. When the prediction is perfect (extreme situation), we have the following equality:

$$SCR = \sum_{i=1}^{n=304} \hat{\varepsilon}_i^2 = \sum_{i=1}^{n=304} (y_i - \hat{y}_i)^2$$

$$SCT = \sum_{i=1}^{n=304} (y_i - \bar{y}_i)^2 = \sum_{i=1}^{n=304} (y_i - \hat{y}_i + \hat{y}_i - \bar{y}_i)^2$$

$$= \sum_{i=1}^{n=304} (y_i - \hat{y}_i)^2 + \sum_{i=1}^{n=304} (\hat{y}_i - \bar{y})^2 + 2. \sum_{i=1}^{n=304} (y_i - \hat{y}_i)(\hat{y}_i - \bar{y})$$

But in the regression with constant and only in this case, we show that:

$$2. \sum_{i=1}^{n=304} (y_i - \hat{y}_i)(\hat{y}_i - \bar{y}_i) = 0 \qquad équation\ (6)$$

$$SCT = \sum_{i=1}^{n=304} (y_i - \hat{y}_i)^2 + \sum_{i=1}^{n=304} (\hat{y}_i - \bar{y})^2 \qquad équation\ (7)$$

$$SCT = SCR + SCE \qquad équation\ (8)$$

This tie is intercepted as follows:

• SCT is the sum of the total squares. It indicates the total variability of Y i.e. the information available in the data.

• SCE is the sum of the squares explained. It indicates the variability explained by the model ie. the variation of Y explained by X.

• SCR is the sum of the residual squares. It indicates the unexplained (residual) variability by the model ie. the difference between the observed values of Y and those predicted by the model.

Two extreme situations can occur:

- In the best case, SCR = 0 and therefore SCT = SCE:
  The variations of Y are completely explained by those of X.
  We have a perfect model, the regression line passes exactly through all the points of the cloud : $(\hat{y}_i = y_i)$.

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- In the worst case, SCE = 0: X does not provide any information about Y.
  Thus, $(\hat{y}_i = \bar{y}_i)$ the best prediction of Y is its own mean.
- The coefficient of determination R^2, a synthetic indicator derived from the variance analysis equation (6), indicates the proportion of variance of $Y = \frac{AVCRT_{it}}{TA_{it-1}}$

  The endogenous variable explained by the model (5), we have:

$$R^2 = \frac{SCE}{SCT} = 1 - \frac{SCR}{SCT} \qquad \text{Équation (9)}$$

- The closer it gets to 1, the better will be the model: the knowledge of the values $\boldsymbol{x_{ij}}$ of the exogenous variables X_j makes it possible to better predict those y_i of the explained variable $Y = \frac{AVCRT_{it}}{TA_{it-1}}$.
- The results of model regression (5), displays a coefficient of determination $(R^2 = 75.94\%)$, in other words, the variability of total accruals $(Y = \frac{AVCRT_{it}}{TA_{it-1}})$ Is explained by the exogenous variables $X_j = \left(\frac{Var^t_{t-1}CA_i - Var^t_{t-1}Cr_i}{TA_{it-1}}\right), \left(\frac{IMMO_{it}}{TA_{it-1}}\right), \left(\frac{\Delta FMO_{it-1}}{TA_{it-1}}\right)$ in a proportion that is close to 76%. On the other hand, this indicator does not answer the question: is the regression globally significant?
- To answer this question, we will extend the study of variance decomposition by completing the analysis of variance table (Table 5) by the degrees of freedom.

Variance Analysis Table - Determination Coefficient R2 / R2 - Adjusted and Fisher Statistics:

The overall significance test of the model (5) through the coefficient of determination R^2 passes through the statistics $F_\alpha\ (1, n-p-1)$ of Fisher and his p-value at the significance level $\boldsymbol{\alpha}$. To carry out this test we must go through the decomposition of the variability SCT of the variable $Y = \frac{AVCRT_{it}}{TA_{it-1}}$ in variability explained SCE by the model (5) and residual variability SCR, since we estimate p + 1 = 4 parameters, we extend the table (table 5) of analysis of the variance by the degrees of freedom (ddl[8]), The variance part of Y explained by the model is translated by the coefficient of determination $R^2 = \frac{SCE}{SCT} = 1 - \frac{SCR}{SCT}$ $avec$ $0 \leq R^2 \leq 1$

$$R^2 = 1 - \frac{4.88602516}{20.47793973} = 0.76$$

The Fisher statistic is defined as $F = \frac{CME}{CMR} = \frac{\frac{SCE}{P}}{\frac{SCR}{n-p-1}}$ $\qquad$ $équation\ (10)$

[8] The most accessible definition of dll is to understand them as the number of terms explained in the sums (the number of observations, here n = 304) minus the number of parameters (here p = 3 not counting the constant) involved in these sums.

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This statistic indicates whether the explained variance is significantly greater than the residual variance: $si\ R^2 = \frac{SCE}{SCT} > \frac{SCR}{SCT}$

The F statistic can be expressed as a function of the coefficient of determination R^2

$$F = \frac{SCE\ (n-p-1)}{SCR.p} = \frac{R^2.SCT.(n-p-1)}{p.(1-R^2).SCT} = \frac{R^2.(n-p-1)}{(1-R^2).p} = \frac{R^2/p}{(1-R^2)/(n-p-1)}$$

$$F = \frac{R^2/p}{(1-R^2)/(n-p-1)} \qquad équation\ (11)$$

Under the hypothesis H0, the sums:

$SCE\ is\ distributed\ according\ to\ a\chi^2(1), \qquad SCR\ according\ to\ one\ \chi^2(n-p-1)$

And,

$F \equiv \mathcal{F}(1, n-p-1)\ a\ Fisher\ law\ to\ (1, n-p-1)ddl$

The region criticizes the test, corresponding to the rejection of H0, the risk α is deficient for the abnormally high values of F, in other words:

RC[9] $: F > F_{1-\alpha}(3{,}300)$, This α-critical probability (p-value) is provided by EViews software in Table (3), it corresponds to the probability that Fisher's law exceeds the calculated statistic F:

$$F - statistique = \frac{0.761752/3}{(1-0.761752)/300} = 319.730 \quad pour \quad \alpha = 1\%\ ,$$

$its\ probability \quad p - value\ \alpha' = 0.000000 < 1\%,$

We conclude that the linear relationship between the endogenous variable (to be explained) and the exogenous (explanatory) variables is representative of a phenomenon that actually exists in the population.

However, the coefficient of determination R^2 does not seem to be a very good tool for evaluating the role of the additional explanatory variables when comparing the nested models (the trivial one and the one studied). Indeed, by increasing the number of Explanatory, we increase in a mechanical way the value of R^2 but at the same time, we decrease the number of ddl. To remedy this disadvantage, we integrate the number of ddl to counteract the systematic evolution of this coefficient. This is precisely the role of $R^2 - ajusté = \bar{R}^2$ Defined as:

$$\bar{R}^2 = 1 - \frac{CMR}{CMT} = 1 - \frac{SCR/(n-p-1)}{SCT/(n-1)} = 1 - \frac{SCR.(n-1)(1-R^2)}{SCR.(n-p-1)}$$

$$= 1 - \frac{(n-1)}{(n-p-1)}.(1-R^2)$$

$$\bar{R}^2 = 1 - \frac{(n-1)}{(n-p-1)}.(1-R^2) \qquad équation\ (12)$$

[9] Critical region: R.C.

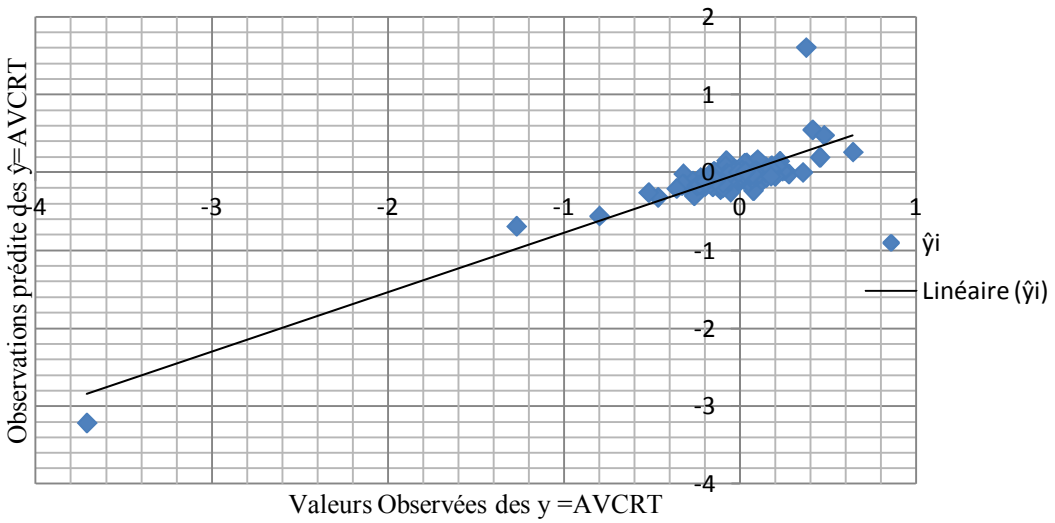
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$$\bar{R}^2 = 1 - \frac{(303)}{300}.(1 - 0.761752) = 0.75936952,$$

This corrected coefficient presents an advantage allowing to compare nested models, in other words, it allows to answer the question: does the introduction of new exogenous induce a "significant" increase in the coefficient of determination R^2 ? So it serves to determine the significance of a group of variables. Indeed, its square root $R = \sqrt{R^2}$corresponds to the multiple linear correlation coefficient that is to say the linear correlation coefficient between the observed values (y_i) and the values predicted by the endogen $(\hat{y}_i)$:

$R = \sqrt{R^2} = \tau_{y,\hat{y}},$

$\tau_{y,\hat{y}} = 0.87278,$



Graph 1: y observed and ŷ predicted - Multiple Linear Correlation Coefficient - Adjustment of Total Regulatory Accounting Variables - AVCRT - (R = 0.87278)

This correlation coefficient suggests the graphical construction of the cloud of points comparing the observations (y_i) and the predictions $(\hat{y}_i)$ of the model: if the model is perfect, then the points would be aligned on the first bisector (Graph 1):

Indeed, this graph reveals that our model is very well specified and globally significant. The explanatory power of the exogenous, taken as a whole, is very significant on the endogenous.

Global Significance Test:

This test consists of checking whether the model, taken as a whole, is relevant.

The null hypothesis corresponds to the situation where none of the exogenous ones conveys useful information in the explanation of the endogenous; the test is written:

$$\begin{cases} H_0 : \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0 \\ H_1 : \exists j \; such \; as \; \lambda_j \neq 0 \end{cases}$$

If H0 is true, we know that λ_1 , the constant is equal to the average of the endogenous observations, which is why we did not include the constant in the Wald test. (Including it in the test would distort the results).

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Fisher Statistics Test:

It is written: according to equation (10),

$$F = \frac{CME}{CMR} = \frac{\frac{SCE}{p}}{\frac{SCR}{n-p-1}} \ , \ F = \frac{\frac{R^2}{p}}{\frac{(1-R^2)}{(n-p-1)}}$$

Under

H_0 F *follows a Fisher law* $\mathcal{F}(p, n-p-1)$. *At the risk of* α, *the critical region ie rejection of* (H_0) *of the test corresponds to exceptionally large values of* F :

$R.C. : F > F_{1-\alpha}(p, n-p-1)$

Applying this to our data, we get:

$$F = \frac{R^2/p}{(1-R^2)/(n-p-1)} = \frac{0.761752/3}{(1-0.761752)/300} = 319.730$$

Using the variance analysis table, we obtain:

$$F = \frac{SCE/p}{SCR/(n-p-1)} = \frac{15.59191456/3}{4.88602516/300} = 319.112$$

The result obtained is almost the same as the one obtained with EViews software (Table 3). In an Excel calculation we compared this observed value of F with the order quantile 0.95 for a Fisher test at 5% ie $F_{0.95}(3, 300) = 2.6347$ (Table 7). Therefore at 5% risk, we conclude that model (5) is globally significant.

This statistic indicates whether the explained variance is significantly greater than the residual variance. In this case, we can consider that the explanation led by the regression reflects a relationship that really exists in the population (Bourbonnais, page 34 - http://fr.slideshare.net/JeromeYounan/econom trie-rgie-bourbonnais-9me- edition).

Significance Test of a Coefficient:

After determining the overall significance of the regression, we evaluate the relevance of the variables taken individually.

Let's assume that:

$\varepsilon_i \equiv \mathcal{N}(0, \sigma_\varepsilon)$ This hypothesis is justified by the results of the estimation (graph 3)

We then have:

$\frac{\hat{\lambda}_j - \lambda_j}{\hat{\sigma}_{\hat{\lambda}_j}} \equiv \mathcal{T}(n-p-1)$ *avec* $n = 304$, $p = 3$, $\lambda_j =$ *parameter to be estimated for* $j = 1, .., p$

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From these data we can formulate the tests of significance by tests of conformity to a standard (the confidence interval) by opposing the hypotheses:

$$\begin{cases} H_0: \lambda_j = 0 \\ H_1: \lambda_j \neq 0 \end{cases} \quad the\ test\ statistic\ is\ written: t_{\hat{\lambda}_j} = \frac{\hat{\lambda}_j}{\hat{\sigma}_{\hat{\lambda}_j}}\ and\ the\ region\ criticize\ R.C.\ for\ a\ risk\ \alpha\ written: \left|t_{\hat{\lambda}_j}\right| > t_{1-\frac{\alpha}{2}}(n-p-1)$$

These tests are provided by the regression of equation (5) in Table (3) from which the Student's tests are extracted for the significance of the coefficients of the regression $\hat{\lambda}_j$ in Table (8).

We did not integrate the constant into the procedure. Indeed, as we have emphasized before, calling into question the constant modifies the nature of the regression. For each variable, we calculated the test statistic (Table 8). The significance test of a coefficient (the three parameters $\hat{\lambda}_j\ j = 1,2,3$ shows that the coefficients are very significant at the 5% threshold and therefore the contribution of the exogenous variable X_j in the explanation of the endogenous

$Y = \frac{AVCRT_{it}}{TA_{it-1}}$ is significant for each of these exogenous variables. In other words, all our exogenous variables are relevant. Each vehicle explains the adjustments of the total accruals of the companies in the sample studied.

Interpretation of Coefficients:

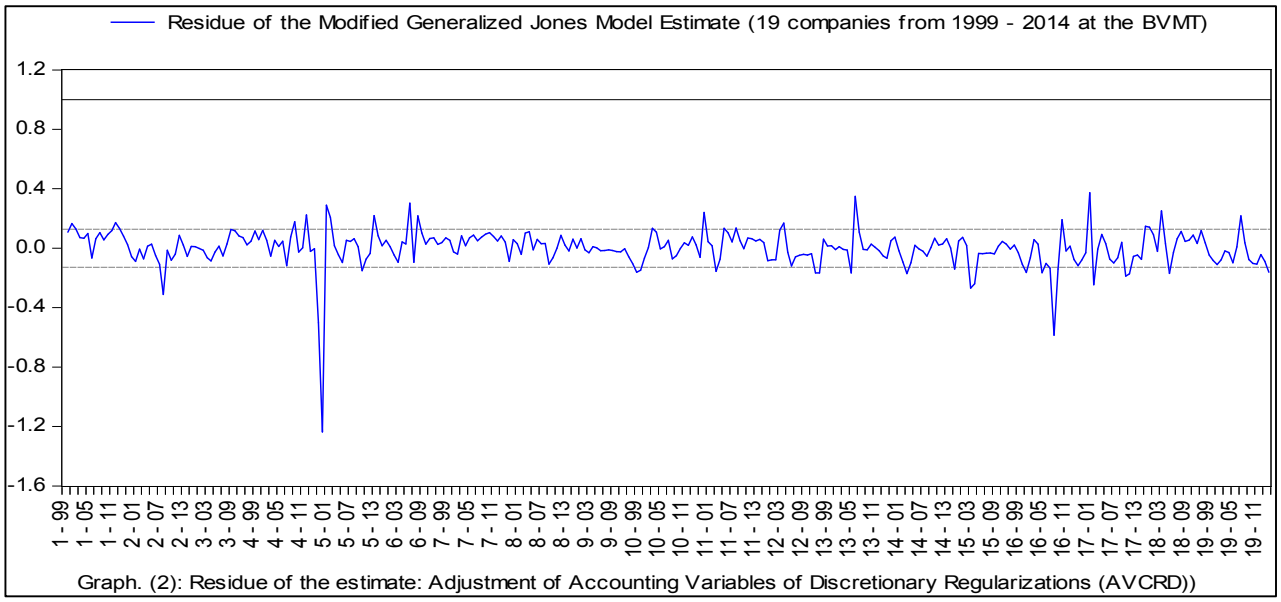
The variable "change in sales normalized by deferred assets" is positively correlated (0.079061) with the adjustments of the accounting variables of total adjustment (total accruals). In other words, a marginal variation of 7.91% of the change in turnover corresponds to a marginal variation of one unit of total accruals;

The variable "asset normalized by lagged assets" is negatively correlated (-0.160681) with total accruals, which means that a marginal variation downwards of -16.07% of this variable results in a marginal change in the opposite direction of a unit of total accruals;

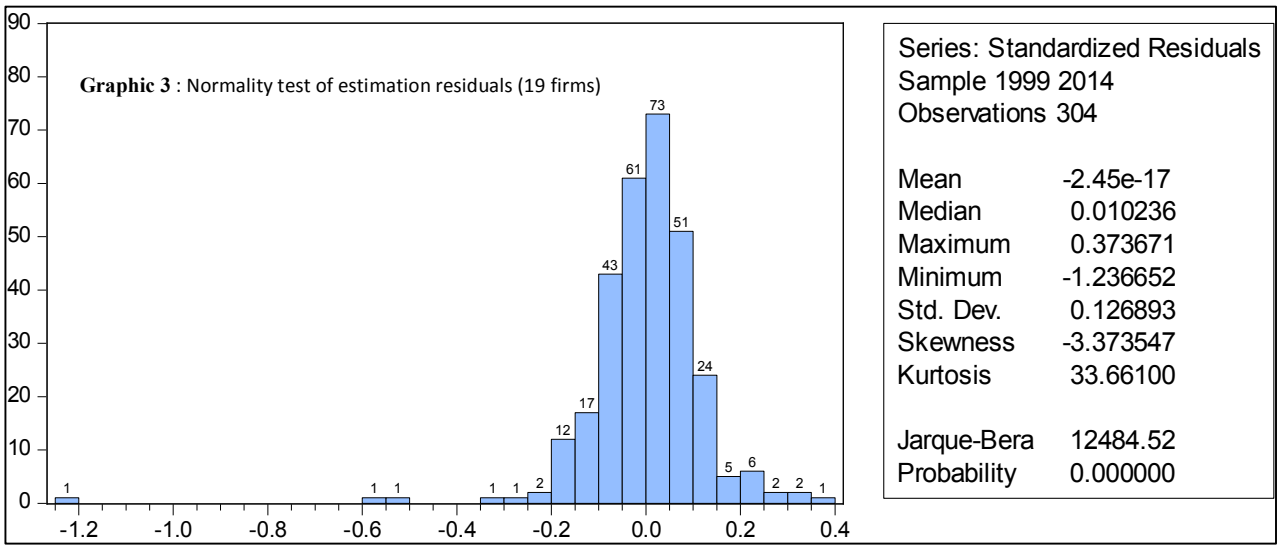
The variable "change in net cash flows normalized by lagged total assets" is also negatively correlated (-0.401971) with total accruals, a marginal variation downwards of -40.20% of this exogenous implies a marginal variation in the opposite direction of a unit of the endogenous;

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These explanatory variables, which correspond to non-discretionary accruals, ie accounting variables that have been subjected to accounting manipulations according to the NPCGAs[10], vey information related to the formation of the part normally obtained from the net accounting



Graph. (2): Residue of the estimate: Adjustment of Accounting Variables of Discretionary Regularizations (AVCRD))



The normality assumption of errors is a key element for statistical inference. Indeed, the graph illustrates this normality ($\bar{\varepsilon}_i = -2.45e-17$) which implies that our sample has the same characteristics of the target population. And therefore the model (5) is robust to this assumption and that our estimators are unbiased. Discretionary components of the adjustment variables ($AVCRD_{it}$) are derived from equation $AVCRT_i = AVCRND_i + AVCRD_i$ (3)

Take the equation (4):

$$AVCRND_{it} = f(IMMO_{it} + (Var^{t}_{t-1}CA_i - Var^{t}_{t-1}Cr_i) + FMO_{i,t-1}) \quad (3-4)$$

[10] Norms and Accounting Principles Generally Accepted.

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From the results of the regression estimates (Table 3) we obtain Jones' modified estimated model of the following non-discretionary accounting adjustments by equation (13)

$$\frac{\hat{AVCRND}_{it}}{TA_{it-1}} = 0.024224 + 0.079061\frac{(\Delta CA - \Delta Cr)_{it}}{TA_{it-1}} - 0.160681\frac{IMMO_{it}}{TA_{it-1}} - 0.401971\frac{\Delta FMO_{it-1}}{TA_{it-1}}$$

From this model, therefore, we have been able to calculate the discretionary part of the accounting adjustments $(AVCRD_{it})$ made by the companies in the sample studied, which corresponds to the difference between the observed value of the total adjustments $(AVCRT_{it})$ and the calculated value of the so-called normal adjustments. is formulated by equation (14)

$$\frac{\widehat{AVCRD}_{it}}{TA_{it-1}} = AVCRT_{it} - (0.024224 + 0.0079061\frac{(\Delta\widehat{CA} - \Delta CR)_{it}}{TA_{it-1}} - 0.160681\frac{\widehat{IMMO}_{it}}{TA_{it-1}} - 0.401971\frac{\widehat{\Delta FMO}_{it}}{TA_{it-1}})$$

With:

$(AVCRT_{it})$ Calculated from net income and cash flows

Is : $AVCRT_{it} = RN_{it} - CF_{it}$ and $CF_{it} = CAF_{it} - \Delta BFR_{it}$ [11]

III. Conclusion

Accounting information provides support for decisions made by its partners. Potential investors, financial backers as well as authorities (financial and judicial) make their decisions based on this information, which itself is supposed to be drawn up in accordance with generally accepted accounting standards and principles. However, the existence of accounting choices and accounting policies that are diversified and standardized by the accounting system create the freedom for managers to manipulate the quality of the information. In other words, a situation of information asymmetry may tempt the managers of failing companies to adopt choices in order to influence the perception of risk by its partners. Based on this assumption of the positive theory (Watts and Zimmermann, 1986-1990), which considers that the directors of companies in financial difficulty, exploit the accounting information in their interests, we adopted an econometric approach to detect accounting manipulations by the method of management of the result and by estimating, according to ordinary least squares, the Modified Generalized Jones model, it was possible to confirm the existence of discretionary accounting manipulations at the level of the accounting results published by the companies forming our sample studied. The analysis of the significance and relevance of the model used allowed us to validate empirically this hypothesis concerning the management of the result. Other significant results relating to the residue of the estimate were revealed by the regression conducted on the Jones model. Indeed, the terms of the residual of the estimate, which summarize all the discretionary accruals or all the other exogenous variables not taken into account in the modeling, do indeed satisfy the stochastic and structural assumptions (relating to the bias and the convergence), in other words these terms are governed by a normal, centered, reduced law, and therefore, the studied sample perfectly induces the characteristics of the population it

[11] CF_{it} = cash flow generated by the business activity i period t, This last variable is the difference between the cash flow from operations (CAF) generated by the company and the variation in the working capital requirement ΔBFR over two consecutive periods: $CF_{it} = CAF_{it} - \Delta BFR_{it}$

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represents in terms of mean and variance. This led us to push the residue analysis by distinguishing companies that manipulate discretionary accruals upwards from those that manage it downwards, which allowed us to. This will be the subject of a new exploration of characteristic variables and This approach is interesting in the sense that it made it possible to check the correlation between the financial default and the upward management of the result (defensive strategy).

Tableau 0: Caractéristiques de l'Echantillon (19 entreprises observées sur la période 1999 – 2014)

Sample	Firm Ei	Activity sector		Distribution by sector of activity	
	COMPANY CODE	DETAIL OF THE SECTOR	% IN THE SECTOR	SECTOR	% IN RELATION TO ALL SECTORS
Industrial	E1	CHEMICAL INDUSTRY	10.00%	I	5.26%
	E2	CHEMICAL INDUSTRY	10.00%	I	5.26%
	E3	MECHANICAL INDUSTRY	10.00%	I	5.26%
	E4	CHEMICAL INDUSTRY	10.00%	I	5.26%
	E5	HOUSEHOLD INDUSTRY	10.00%	I	5.26%
	E8	ELECTRIC INDUSTRY	10.00%	I	5.26%
	E9	PHARMACEUTICAL INDUSTRY	10.00%	I	5.26%
	E10	GLASS INDUSTRY	10.00%	I	5.26%
	E13	PNEUMATIC INDUSTRY	10.00%	I	5.26%
	E14	MILK INDUSTRY	10.00%	I	5.26%
subtotal 1	**10**		**100%**	**10**	**52.63%**
Commercial	E6	AGRO-FOOD TRADE	16.66%	C	5.26%
	E7	DISTRIBUTION TRADE	16.66%	C	5.26%
	E12	WHOLESALE	16.66%	C	5.26%
	E15	DISTRIBUTION TRADE	16.66%	C	5.26%
	E16	COMMERCE DE GROS	16.66%	C	5.26%
	E17	DISTRIBUTION TRADE	16.66%	C	5.26%
subtotal 2	**6**		**100%**	**6**	**31.59%**
Service provider	E18	TELECOMMUNICATION SERVICES	33.33%	S	5.26%
	E20	REAL ESTATE PROMOTION	33.33%	S	5.26%
	E21	AIR TRANSPORT	33.33%	S	5.26%
subtotal 3	**3**		**100%**	**S**	**15.78%**
Total	**19**		**100%**	**3**	**100,00%**

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Table 1: Descriptive statistics of assets and sample results

Variables		Total assets Immobilized TAI	Total assets TA	Turnover CA	Added value VA	Gross operating surplus EBE	Result before taxes RAI	Net profit RN	Cash flow CAF
Average		99683,7	179402,5	147890,3	63864,2	7816,3	5683,2	4842,7	16375,2
Median		90234,8	168185,1	145876,6	67545,2	8025,4	7170,5	6214,9	17047,5
Standard deviation		45701,6	77693,4	74738,4	32475,0	11392,9	10705,1	10719,9	12586,5
	25	58725,3	110240,9	76523,4	25462,9	1630,2	40,2	-604,0	8782,3
percentiles	50	90234,8	168185,1	145876,6	67545,2	8025,4	7170,5	6214,9	17047,5
	75	137760,2	236867,0	201592,8	87479,8	15506,1	12854,2	11618,7	23698,5

Table 2: Descriptive statistics of the accounting adjustment variables of the sampled companies Period 1999 – 2014

Variables	$\frac{AVCRT}{TA_{t-1}}$	$\frac{\Delta BFR^{t}_{t-1}}{TA_{t-1}}$	$\frac{VarCr^{t}_{t-}}{TA_{t-1}}$	$\frac{VarSt^{t}_{t-1}}{TA_{t-1}}$	$\frac{VarDT^{t}_{t-1}}{TA_{t-1}}$	$\frac{D°AM.PR.DEP.AC}{TA_{t-1}}$	$\frac{D°PR.RISQ.CH}{TA_{t-1}}$
Average	-0,053	0,007	0,021	0,020	0,024	0,057	0,003
Median	-0,046	0,003	0,008	0,007	0,010	0,051	0,000
Standard deviation	0,260	0,251	0,100	0,102	0,101	0,037	0,016
Minimum	-3,711	-3,142	-0,208	-0,237	-0,332	-0,006	-0,085
Maximum	0,6415	0,7470	1,1467	1,1467	1,2574	0,3486	0,0839

Table 3: Regression coefficients and significance tests of model (5)

Dependent Variable: $\frac{AVCRT_{it}}{TA_{it-1}}$

Variables Y_i, X_j/constante	Coefficients $\lambda_{j=1,2,3,4}$	Std. Error	t-Statistic	Prob.
$\frac{Var^{t}_{t-1}CA_{i} - Var^{t}_{t-1}Cr_{i}}{TA_{it-1}}$	0.079094	0.026625	2.970692	0.0032
$\frac{IMMO_{it}}{TA_{it-1}}$	-0.160501	0.033202	-4.834114	0.0000
$\frac{\Delta FMO_{it-1}}{TA_{it-1}}$	-0.401996	0.013680	-29.38496	0.0000
Constante C	0.024211	0.017024	1.422167	0.1560

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R-squared	0.761752	Mean dependent var	-0.052978
Adjusted R-squared	0.759369	S.D. dependent var	0.259969
S.E. of regression	0.127526	Akaike info criterion	-1.267928
Sum squared resid	4.878837	Schwarz criterion	-1.219020
Log likelihood	196.7251	Hannan-Quinn criter.	-1.248364
F-statistic	319.7300	Durbin-Watson stat	1.515915
Prob (F-statistic)	0.000000		

Table 4: Simplified table of analysis of the variance

Explained	$SCE = \Sigma(\hat{y}i - \bar{y})^2$
Residual	$SCR = (yi - \hat{y}i)^2$

Tableau 5: Tableau *d'analyse de la variance pour la régression multiple*

Source of variation	**Sum of squares**	**ddl**	**Middle squares**
Explained	$SCE = \Sigma(\hat{y}i - \bar{y})^2$	$P = 3$	$CME = \frac{SCE}{p} =$
Residual	$SCR = (yi - \hat{y}i)^2$	$n-(p+1) = n-p-1 = 300$	$CMR = \frac{SCR}{(n-p-1)} =$
Total	$SCT = (yi - \bar{y})^2$	$n - 1 = 303$	-

Table 6: Simultaneous nullity test of the regression coefficients of equation (5)

Wald Test : $\lambda_2 = \lambda_3 = \lambda_4 = 0$

Test Statistic	Value	df	Probability
F-statistic	328.5873	(3, 300)	0.0000
Chi-square	985.7620	3	0.0000
Null Hypothesis: C(2)=C(3)=C(4)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(2) λ_2		-0.160501	0.033202
C(3) λ_3		-0.401996	0.013680
C(4) λ_4		0.024211	0.017024

Restrictions are linear in coefficients.

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Tableau 7: Test de Fisher pour la significativité globale de l'équation (5)

Source of variation	R^2	Sum of squares	ddl	Middle squares	Middle squares Values	Statistique-F $F = \frac{CME}{CMR} = \frac{(\frac{SCE}{p})}{(\frac{SCR}{(n-p-1)})}$
Explained	$\frac{SCE}{SCT} = 1 - \frac{SCR}{SCT}$ 0,76140055	$SCE = \Sigma(\hat{y}i - \bar{y})^2$	p = 3	$CME = \frac{SCE}{p}$	5,197304 85	319,1124493 $LOI.F(0{,}05; 3; 300)$
Residual		$SCR = (yi - \hat{y}i)^2$	$n-(p+1) = n-p-1 = 300$	$CMR = \frac{SCR}{(n-p-1)}$	0,016286 75	2,634700804 $p - value = Loi.F(319{,}112; 3; 300)$
Total		$SCT = (yi - \bar{y})^2$	n -1 = 303	$\frac{CMT}{SCT} = \frac{}{(n-1)}$	0,067583 96	= 5,41074E-93
The Fisher test justifies the overall significance of the model (5)						Then: the null hypothesis is rejected

Table 8: Significance tests of the coefficients of the regression of equation (5)

Coefficient : $\hat{\lambda}_j$	Std. Error : $\hat{\sigma}_{\hat{\lambda}_j}$	t-Statistic : $\frac{\hat{\lambda}_j}{\hat{\sigma}_{\hat{\lambda}_j}}$	p-value $Loi\ Student\ (x;\ dll;\ bilateral)$
0.079094	0,026625	2,970692	0,003211476
-0.160501	0,033202	-4,834114	0,000000000
-0.401996	0,01368	-29,38496	0,000000000

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Desarrollo Del Pensamiento Contable A Traves De Las Mediaciones Semióticas E Iteracciones Con Los Modelos Matematicos

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Abstract- It is necessary to mention that the accounting thought has evolved enough during the XX and XXI centuries, but this evolution has been given to chance through semiotic mediations, and not as a reaction to conscious efforts to perfect and invigorate a methodology. The mechanism of book keeping in accounting represents an abstract mathematical system whose validity depends more on its logical coherence tan on empirical understanding. It would be advisable to extend or rectify this model, or create new and complementary ones based on the new existing mathematical models.

However, this abstract system generates another problem: The Accountant must decide which mathematical model most appropriately reflects a specific situation where the economy, administration, accounting and finance are involved.

Keywords: semiotic mediations, accounting models, accounting process, accounting thinking, information system, mathematical models.

GJMBR-D Classification: JEL Code: M41, M42, M49



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Desarrollo Del Pensamiento Contable A Traves De Las Mediaciones Semióticas E Iteracciones Con Los Modelos Matematicos[1]

Abel María Cano Morales [α] & Carlos Mario Restrepo Pineda [σ]

Resumen- Es preciso mencionar que el pensamiento contable ha evolucionado bastante durante los siglos XX y XXI, pero dicha evolución se ha dado al azar a través de mediaciones semióticas, y no como reacción a esfuerzos conscientes para perfeccionar y vigorizar una metodología. El[3] mecanismo de teneduría de libros en contabilidad, representa un sistema abstracto matemático cuya validez depende más bien de su coherencia lógica, que de la comprensión empírica. Convendría entonces ampliar o rectificar este modelo, o bien crear otros nuevos y complementarios con base en los nuevos modelos matemáticos existentes.

Sin embargo este sistema abstracto genera otro problema: El Contador debe decidir qué modelo matemático refleja más apropiadamente una situación determinada donde se ven implicadas la economía, la administración, la contabilidad y las finanzas. Si las proposiciones contables se expresan con símbolos, será más fácil adaptarse e Integrarlas a las proposiciones teóricas del dominio de las disciplinas.

Palabras Clave: mediaciones semióticas, modelos contables, proceso contable, pensamiento contable, sistema de información, modelos matemáticos.

Abstract- It is necessary to mention that the accounting thought has evolved enough during the XX and XXI centuries, but this evolution has been given to chance through semiotic mediations, and not as a reaction to conscious efforts to perfect and invigorate a methodology. The mechanism of book keeping in accounting represents an abstract mathematical system whose validity depends more on its logical coherence tan on empirical understanding. It would be advisable to extend or rectify this model, or create new and complementary ones based on the new existing mathematical models.

However, this abstract system generates another problem: The Accountant must decide which mathematical model most appropriately reflects a specific situation where the economy, administration, accounting and finance are involved. If the accounting propositions are expressed with symbols, it will be easier to adapt and integrate them to the theoretical propositions of the domain of the disciplines.

Keywords: semiotic mediations, accounting models, accounting process, accounting thinking, information system, mathematical models.

I. Introducción

Iniciaremos este acápite, hablando de las mediaciones semióticas e iteraciones de los modelos matemáticos que han servido de base para el desarrollo del pensamiento contable, y nos referiremos a los modelos matemáticos de mayor aplicación en la realización de operaciones, contables, económicas y financieras, y su desarrollo a través de la teoría general de los sistemas, ya que como es bien sabido la contabilidad se concibe como el sistema de información más complejo y completo que existe, debido a que provee información para todos los stakeholders de los entes económicos, en razón a ello traeremos a colación una reflexión citada por (RESTREPO & Pineda, 2006), quien en su artículo plantea, que el discurso de la teoría general de los sistemas se remonta a los orígenes de la filosofía y la ciencia. En el siglo XVII la ciencia deja atrás a la filosofía en el propósito de explicar la naturaleza del orden del universo, y para el efecto cita a Bertalanffy quien escribió, cito textualmente:

> "Una de las caracterizaciones de la revolución industrial de los siglos XVIy XVII consiste en afirmar que ésta sustituyó la concepción descriptivo – metafísica del universo compendiada en la doctrina de Aristóteles, por la matemático – positivista o galileana; esto es, la concepción del mundo como un cosmos teleológico se vio reemplazada por la

[1] Este artículo es uno de los productos, resultado de la ejecución de la investigación sobre Didáctica de las matemáticas en la enseñanza de la contabilidad en Latinoaméricay hace complemento con la investigación "Proceso de Formación de contadores públicos que puedan atender las necesidades de la Globalización en Latinoamérica". Ambos financiados por la Universidad de Medellin.

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descripción de los hechos dispuestos según leyes causales y matemáticas[4]".

No obstante podemos afirmar que la contabilidad y la matemáticas siempre han tenido una relación bastante estrecha, ya que como se expresa en el trabajo de (CANO; Morales, Abel M. RESTREPO; Pineda, Carlos Mario; VILLA; Monsalve, Omar., 2017); la partida doble, el álgebra y la aritmética, tres temáticas que hacen parte de la Summa de Luca Pacioli, son fundamentales para objetivar el valor, número, cantidad y magnitud, medula espinal de la sociedad mercantilista de los siglos XIII, XIV, XV y XVI. Por consiguiente y basados en este postulado, será necesario reflexionar en torno a los sistemas contables y los modelos matemáticos.

El concepto de sistema se define como la interrelación de una serie de elementos que conforman un conjunto y que tiene como propósito fundamental dar explicación lógica a la realidad de las cosas y de los hechos, cabe anotar que los sistemas por su estructura misma, pueden ser simples, complejos y dinámicos, y si tomamos en cuenta su función, estos pueden ser determinísticos y/o probabilísticos, igualmente los procesos que se llevan a cabo dentro del sistema se conocen como funciones, lo que nos permite pensar que el sistema tiene una función en relación con su medio, y que todo sistema viviente tiene una función, en palabras de (RESTREPO & Pineda, 2006), ésta es generar la neguentropía necesaria que le permita sobrevivir hasta cumplir su ciclo de nacer - crecer - y morir. Los sistemas inanimados están desprovistos de función de tal manera que adquieren una función cuando entran en relación con otros sistemas, y si observamos a la contabilidad, a las matemáticas, a la estadística, a la geometría, todos ellos constituyen sistemas, acaso no es la geometría la encargada de dar la mejor interpretación del universo con sus formas y sus relaciones, no obstante citaremos las siguiente definiciones:

> "Dos son los conceptos fundamentales de toda teoría de sistemas: el conceptode sistema y el concepto de entorno del sistema. Se entiende por *sistem* un conjunto de elementos interrelacionados entre sí, cuya unidad le viene dada por los rasgos de esa interrelación y cuyas propiedades son siempre diferentes a los de la suma de propiedades de elementos del conjunto. El*en torno* de un sistema es el conjunto de elementos que tienen influencia sobre los elementos del sistema o son influidos por él, aunque no pertenecen al mismo sistema. Asimismo, es importante distinguir en un sistema su estructura y su composición. La *composición* de un sistema es conjunto finito de elementos que lo forman. La *estructura* de un sistema expresa el conjunto de relaciones existentes entre los elementos que lo componen[5]".

Continúa Ignacio Izuzquiza diciendo:

> "Luhmann admite, como punto de partida. Algunos de los elementos de la teoría clásica de sistemas. Un sistema es un determinado conjunto de elementos que mantienen determinadas relaciones entre sí. Las propiedades y el comportamiento del sistema no es nunca equivalente a la suma de propiedades y comportamientos de sus elementos. Asimismo, en un sistema debe distinguirse la composición o conjunto de elementos que lo forman y la estructura o conjunto de relaciones entre esos elementos. Sin embargo, el concepto de sistema que Luhmann emplea supone ya el marco del estructuralismo funcional y de la autorreferencia y la autopoiesis. Es decir, un sistema es autorreferente, crea su estructura y los elementos de que se compone y se encuentra orientado en su comportamiento por determinadas funciones, que le sirven siempre de referencia dinámica[6]"

Ambas definiciones citas por (RESTREPO & Pineda, 2006), en su trabajo sobre la teoría de los sistemas, no obstante y como la idea es establecer la relación directa y los puntos comunes entre los sistemas contables y los modelos matemáticos, continuaremos con la definición de los modelos matemáticos y su aproximación al desarrollo del pensamiento contable.

Los modelos matemáticos son abstracciones de la vida real, considerados bastante útiles en la toma de decisiones en razón a dos situaciones: El primero es que reducen problemas complejos a problemas más sencillos y más factibles de manejar y el segundo es que proporcionan un medio para predecir cuál será el resultado de una decisión de inversión en el corto, mediano y largo plazo.

Existen diversos tipos de modelos que se utilizan para la toma de decisiones en el mundo financiero - empresarial y, especialmente en la producción, algunos modelos son: modelos físicos, modelos esquemáticos, modelos matemáticos los cuales se dividen a su vez en determinísticos y probabilísticos.

La prueba determinante de la viabilidad de si un modelo es útil o no al aportar un entendimiento delcontex to real, se ve reflejado en la posibilidad conveniente de que el modelo tenga algún potencial predictivo, para que las decisiones concernientes a futuros casos puedan hacerse mediante una aproximación relativamente clara y oportuna, dicho modelo predictivo.

[4] BERTALANFFY, Ludwing Von; ASHBY, W. Ross; WEINBERG, G. M. y Otros. La Teoría General de Sistemas. Selección y Prólogo. J. KLIR, George. Madrid: Alianza Editorial, 1987. ISBN: 84-206-2208-7.P. 30.

[5] IZUZQUIZA, Ignacio. La Sociedad sin Hombres: NiklasLuhmann o la Teoría como Escándalo. Barcelona: Anthropos, 1990, p. 145.

[6] Ibíd. p. 153.

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La constante solicitud por parte de los empresarios de cuantificar las operaciones y decisiones implica exigencias por parte de la contabilidad y de las matemáticas, a los contadores públicos; para que aparte de presentar las cifras contables, presenten igualmente las apreciaciones, sugerencias y recomendaciones en torno al desarrollo económico y financiero de las organizaciones; en un lenguaje que pueda ser interpretado fácilmente por los administradores, y para ello es necesario un manejo eficiente de las matemáticas, de manera tal que el trabajo se desarrolle a través de una metodología que obligue a la disciplina contable a reducir la teoría a sus límites lógicos, para de esta manera lograr progresos en las teorías operativas pertinentes en sectores cruciales del desarrollo contable financiero de las organizaciones en los siguientes aspectos:

A. La valoración de las Utilidades y su respectiva apropiación
B. La Valoración de los activos, analizando la importancia de los mismos en la generación de riqueza para la empresa
C. Informes Multivalentes, que permitan a los directores empresariales, tomar decisiones adecuadas y acertadas en beneficio de las organizaciones.
D. Información acerca de los datos contables, de manera que comprendan la implicación que tienen dichos datos, y su respectiva explicación cuantitativa de manera que permitan una interpretación simple y concatenada.

Por lo tanto es muy importante que los contadores públicos colombianos utilicen en su quehacer diario los modelos matemáticos, de no ser así, los analistas de operaciones desplazarán a los contadores públicos a un segundo plano, en su quehacer cotidiano.

Un problema con el que nos enfrentamos hoy en día en las aulas universitarias, es la concepción de lo que hemos creído que es lo correcto en la educación durante decenios; los profesores son asumidos como administradores de un conocimiento terminado, que se fragmenta en áreas de conocimiento, para dárselo a los estudiantes en pequeñas dosis, durante ciclos. Este esquema ya no funciona, porque actualmente nos enfrentamos a dos paradojas; por un lado, la existencia de una superabundancia de información en las fuentes y una extrema escasez de información relevante; y por otro, que el ser humano ha progresado en el manejo del conocimiento y que éste no es estático, que a su vez requiere de la búsqueda y el hallazgo de nuevo conocimiento.

Lo anterior nos lleva a plantearnos las siguientes preguntas: ¿debemos continuar enseñando con pedazos de esa masa informativa que se produce en el mundo, para que el estudiante la repita de memoria durante un tiempo determinado, por lo menos hasta que acredite la materia? o ¿debemos equiparlo y adiestrarlo con herramientas que lo faculten para navegar en esa masa de información y para ser capaz de crear nuevo conocimiento?

El actual desarrollo de la tecnología en la informática obliga a la sociedad a elaborar más instrumentos, lo que a su vez requiere de la elaboración de habilidades nuevas y distintas, que conformen a un individuo capacitado para responder a las exigencias del presente y del futuro inmediato.

Por lo tanto lo que pretendemos mediante el desarrollo de esta investigación; es proponer o por lo menos indicar un modelo de educación matemática que permita al contador público de la Universidad de Medellín, estar a la vanguardia de los conocimientos matemáticos necesarios para atender las necesidades de información contable financiera, para una adecuada toma de decisiones, por lo tanto el contador público deberá recibir una formación acorde con su perfil de actuación el cual debe estar caracterizado por lo siguiente:

A. Ser un solucionador permanente de problemas.
B. Presentar información oportuna y veraz para que pueda convertirse en un tomador de decisiones permanente.
C. Ser un profesional con un excelente manejo hábil de las múltiples inteligencias.
D. Ser un comunicador espontáneo y profundo en sus comunicaciones.
E. Con una permanente Inclinación al trabajo en equipo.
F. Facilidad para aprender a aprender.
G. Enfocado al humanismo.
H. Con criterios holísticos en su forma de vida.
I. Conectado e interactuando de manera permanente a una red de información internacional.
J. Miembro de una sociedad mundial de pensadores contables.
K. Y una serie de características afines con una personalidad inclinada al cambio constante como proyecto de vida.

Como han influenciado las mediaciones semióticas e interacciones sociales, en el desarrollo del pensamiento matemático en la academia: para el perfeccionamiento de la contabilidad

La lógica de la investigación matemática es indispensable para comprender y perfeccionar el engranaje contable. Aquí se da una relación recíproca donde la primera aporta el rigor, la universalización y el carácter de ciencia. A su vez la contabilidad aporta a las matemáticas un laboratorio amplio, en el cual puede ensayarse empíricamente las teorías y los procedimientos técnicos matemáticos.

Toda disciplina que trate de reforzar y consolidar sus bases teóricas debe incluir el análisis Matemático. Ya que la interpretación de signos matemáticos forman una teoría basada en hechos que sólo puede confirmar el análisis y la verdad empíricos. En razón a que cuando se presenta una Abstracción

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expresada en forma simbólica, las deducciones se facilitan de acuerdo con los principios matemáticos.

En razón a lo expuesto anteriormente podemos decir que un modelo matemático determinístico es un enunciado expresado como ecuaciones de relaciones entre las variables y constantes asociadas con un problema. Un modelo determinístico predecirá los resultados exactos bajo ciertos hechos y suposiciones. Por ejemplo la ecuación de una línea $Y = a + bx$ es un modelo matemático determinístico que puede aplicarse a la proyección lineal de predicciones, a las intersecciones de parámetros en programación lineal y a la intersección del costo total y el ingreso total en el análisis del punto de equilibrio desde el punto de vista financiero.

Al reemplazar el o, los números apropiados para las letras a (intersección en y) y b (la pendiente), se puede expresar como una línea recta algebraicamente para encontrar los puntos de intersección, las expresiones que representan una línea se igualan con la otra y se resuelven con certeza y confiabilidad.

Por el contrario un modelo probabilístico es un enunciado de las relaciones entre variables y constantes a las que se asocian algunas probabilidades estadísticas. Dicho de otra manera se presenta incertidumbre en las decisiones a tomar.

La toma de decisiones no es más que un proceso que consiste en escoger un curso de acción entre múltiples alternativas.

Son muchos los factores que afectan la toma de decisiones en la producción, aunque se han desarrollado cursos de acción alternativos. Entre los cuales se encuentran los siguientes:

1. Probabilidades de estos resultados esperados.
2. Parámetros que afectan la aplicación de los cursos de acción alternativos.
3. Objetivos de la empresa.
4. Sistemas de valor para sopesar los cursos de acción alternativos.
5. Predicciones de resultados esperados de los cursos de acción alternativos.

Como el tema que nos convoca es la relación que existe entre los modelos matemáticos y el desarrollo de la contabilidad, iniciaremos este trabajo hablando de los modelos matemáticos que apoyan la toma de decisiones en inversión, pero especialmente se hará énfasis en los modelos dinámicos de A.G. AGANBEGUIAN – N.F. SAHTILOV, más conocido como modelo A-SH. Y el de A. A. PETROV-Y. P. IVANILOV, conocido como modelo P-I. Dada su relación con las inversiones en producción, consumo y reconversión de activos.

Iniciamos la descripción del modelo dinámico de A.G. AGANBEGUIAN-N.F. SHATILOV (modelo A-SH). Ya que es un modelo macroeconómico usado para el estudio de las regularidades generales de las tendencias del desarrollo de la economía y para su pronóstico. Este modelo no es bueno para la solución de problemas de planificación concreta y de dirección de la economía. Para la solución de los problemas prácticos de la planificación son necesarios otros modelos de mayor grado de minuciosidad. Sin embargo, esto no quiere decir que los modelos muy agregados sean menos importantes o menos necesarios, con su ayuda se pueden resolver muchas cuestiones, no solo con mayor rapidez, sino que pueden dar mejores resultados.

Por lo tanto el modelo propuesto por A.G. Aganbeguian y N.F. Shatilov. Es el primer gran modelo dinámico soviético, que se emplea como instrumento seguro de planificación desde hace mucho tiempo.

La base de todos los modelos dinámicos, está en la condición de balance (Ley de conservación). En los modelos multirramales, esta condición se escribe de manera simple: El producto final, es decir, el producto que puede ser empleado en inversiones y consumo, Y, es igual a todo el producto fabricado, X, menos aquella parte suya necesaria para su producción, F(X):

$$Y = X - F(X)$$

F(X), es un cierto análogo de la función de producción. Como función de producción en los modelos de este tipo se emplea generalmente una función lineal $F(X) = Ax$ (para ser rigurosos, F(X) no es aún la función de producción; ella no contiene la dependencia del producto final respecto al volumen de fondos y a la cantidad de trabajadores). La matriz A lleva el nombre de matriz de gastos directos. Esta Matriz fue introducida inicialmente por V.V. Leontiev y con frecuencia es denominada matriz de Leoontiev.

En lo sucesivo la ecuación de balance será escrita de la siguiente manera:

$$Y = X - AX \qquad (1.1)$$

Igualmente podemos afirmar que existen áreas de comercialización que responden adecuadamente a la observación sistemática, al análisis y a la instrumentación de modelos matemáticos, que se interrelacionan con la información contable de manera permanente.

Ya hemos explicado que es un sistema, igualmente se ha dicho que es un modelo, ahora los relacionaremos con la matemática y la contabilidad, la verdadera razón de ser de este artículo.

No obstantes es preciso mencionar que desde la época de Fray Luca Pacioli, (CANO, Abel M. RESTREPO, Carlos M. y VILLA, & Omar., 2015)un Fraile Franciscano, quien fue el primero en dar a conocer la partida doble en Europa a finales del siglo XV, lo cual

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parece un logro pequeño, pues no hemos aprendido a dimensionar las contribuciones de este fraile al desarrollo de la contabilidad, la economía y las finanzas, dado que él también publicó en el mismo texto los usos comerciales de la época, la nueva aritmética y la nueva geometría, con lo cual hace un gran aporte a las necesidades sociales en general y en particular a las necesidades comerciales; la aritmética, el álgebra y la partida doble hacen parte de ese proceso de abstracción, de la generalización de los conceptos que serán tan importantes no solo en la ciencia, sino en el mundo occidental: número, cantidad y magnitud. La partida doble, el álgebra y la aritmética, tres temáticas que hacen parte de la Summa de Fray Luca Pacioli, son fundamentales para objetivar el valor, número, cantidad y magnitud, es decir fue considerada la medula espinal de la sociedad mercantilista de los siglos XIII, XIV, XV y XVI. Ya que como es bien sabido tanto en las matemáticas, como en la contabilidad; el razonamiento sigue un orden de sucesión, partiendo de proposiciones básicas para llegar a conclusiones, y se formulan hipótesis con suficientes datos circunstanciales para derivar las conclusiones necesarias. Teniendo presente esta semejanza podemos abstraer las características de las matemáticas y aplicarlas en el método contable:

1. Estado hipotético de las cosas.
2. Abstracciones.
3. Generalizaciones.

Cabe anotar que para las matemáticas es de gran importancia inscribir la índole hipotética de las cosas. La interpretación de los signos matemáticos engendra una teoría basada en hechos que sólo puede confirmar el análisis empírico y la verdad empírica, aunque se expresa con símbolos matemáticos, difiere en su índole de la verdad lógica de los teoremas correspondientes en el sistema matemático, y opera con postulados al igual que la contabilidad y la economía.

Aunque las matemáticas son un buen medio que facilita la actuación del científico, se sigue el largo y complejo proceso de las deducciones en forma mecanicista, la cuestión metodológica básica por resolver permanece sin variar.

La abstracción se logra prescindiendo de ciertas propiedades o atributos de las leyes, de manera que sólo quedan los objetivos de fondo de la investigación.

Las proposiciones se infieren por procesos de abstracción y generalización, objetivados en leyes y reglas de demostración que son las que configuran el proceso deductivo. La abstracción y generalización también tienen que ver con las capacidades de análisis.

La explicación generalizada de cosas cualitativamente diversas depende de la formulación abstracta de las propiedades pertinentes. Aunque la abstracción no implica generalización, es imposible generalizar si falta la abstracción.

Como se ha mencionado a través de la historia de la contabilidad, el contador público actualmente utiliza un único tipo de procedimiento técnico simbólico a través de la partida doble. Las cuentas de mayor para resumir aumentos y disminuciones, los estados financieros que son proyecciones de estas cuentas y las ecuaciones contables básicas, han constituido los elementos importantes de la metodología contable, desde hace aproximadamente unos 600 años.

A través de ellos, ha existido mucho perfeccionamiento. Sin embargo esos cambios no se han formulado en forma simbólica, para facilitar las manipulaciones matemáticas. La contabilidad necesita ampliar su expresión semiótica, tan útil no sólo para las matemáticas, sino también para las ciencias físicas. La expresión elemental: $A = P + C$ parece que es el límite máximo aceptado por casi todos los contadores acerca de la estructuración matemática de la contabilidad.

De esta manera la contabilidad necesita ampliar su expresión semiótica. La función de los símbolos ahorra trabajo físico y mental; con ellos se logra la sencillez y la concisión. "Todo símbolo matemático no sólo pone de manifiesto los errores que han pasado inadvertidos, sino que permite hacer deducciones y formar conclusiones, así como nuevos y fructíferos procesos mentales"[17]

Son cuantiosas las ventajas de una disciplina capaz de expresar sus relaciones importantes de forma simbólica. La desventaja es el temor que causa en el común de los usuarios, el uso de las matemáticas. La adopción de métodos matemáticos genera puntos de vista mucho más amplios y universales.

Tradicionalmente las cuestiones relativas al pensamiento parecen competer específicamente al campo de la Psicología, en lo que concierne específicamente al pensamiento matemático, indudablemente la obra de Jean Piaget ejerció, y ejerce aún, una influencia considerable para señalar que el pensamiento matemático está subordinado a las estructuras lógicas, es decir que su desarrollo es independiente de las singularidades de las actividades, contenidos o prácticas que desarrolle el sujeto.

Con los resultados (desde 1950) de estudios sobre los procesos reflexivos y cognitivos de los estudiantes cuando usan las matemáticas para resolver problemas contables (aditivos, multiplicativos, entre otros) comenzó a cambiar la idea sobre el pensamiento matemático desde el punto de vista Piagetiano. Numerosos estudios de los procesos de pensamiento contable de los estudiantes en relación con contenidos matemáticos específicos, comenzaron a mostrar que éstos usaban procedimientos informales sobre conceptos de las matemáticas para resolver problemas

[17] NEWMAN. James R. Editorial The world of mathematics III, p. 1853.

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contables. En particular, las investigaciones desarrolladas y financiadas por la Universidad de Medellin, delas cuales podemos citar las siguientes:

- Determinación escalonada de modelos de inversión para Medellín (1990 – 2003). Un estudio para la aplicación pragmática por décadas.
- Proceso de Formación de Contadores Públicos con perfil internacional que puedan atender las necesidades de la globalización en Colombia, y el proyecto de investigación.
- La didáctica de las matemáticas en las ciencias económicas: situación actual en el currículo del programa de contaduría pública de la Universidad de Medellín.

Permitieron identificar las necesidades de formación que tenían los contadores, de manera que pudiesen reconocer que las actuaciones en contexto, es decir, resolviendo situaciones de la vida diaria, permitían mostrar que los profesionales contables, desarrollan razonamientos informales sobre contenidos matemáticos. Pero en especial la investigación "La didáctica de las matemáticas en las ciencias económicas: situación actual en el currículo del programa de contaduría pública de la Universidad de Medellín"; permitió, identificar una serie de característica importantesy que consistieron que en la posibilidad de introducirlos elementos necesarios para el diseño de un nuevo marco de referencia en los estudios cognitivos orientados hacia los dominios matemáticos. Cabe anotar que los dominios establecen la complejidad de las relaciones lógicas entre conceptos. Los resultados de estas investigaciones empezaron a mostrar que más importante que estudiar conocimiento o actuaciones aisladas era necesario establecer la conectividad entre conceptos y actuaciones de los sujetos, lo que condujo a aceptar que el pensamiento matemático se desarrolla progresivamente y cada vez es más complejo.

Por otra parte, desde los avances que se realizan también desde la década del 60, para asumir las matemáticas como una actividad humana, se acepta que existen diversas prácticas matemáticas que están insertas en culturasy sociedades en las cuales los sujetos no solo desarrollan competencias sino también vocabularios, aptitudes y saberes informales sobre las matemáticas dependientes de entornos materiales y sociales en el que realizan las prácticas (Cauty, 2001). Con estos aportes, especialmente la visión socio–cultural, se comienza a interrogar si es posible clasificar y valorar el pensamiento contable matemático desde el punto de vista exclusivo de la "cultura matemática occidental moderna" lo que conduce a cuestionar qué se entiende por contabilidad y por hacer contabilidad.

La discusión sobre los saberes matemáticos que se encuentran en las prácticas contables involucra a una amplia comunidad que incluye a los matemáticos, administradores, contadores y economistas; de esta discusión han surgido distintas expresiones para nombrar estos saberes.

Por su parte, los contadores aducen que estas prácticas son muy localizadas, los procedimientos y nociones matemáticas involucradas son particulares, accesorias a los contextos, y a los sistemas, y son verbales, por consiguiente se diferencian del pensamiento contable en tanto éste se caracteriza por el grado de generalización y los sistemas contables de representación documentales que le son característicos. Para la comunidad que acepta la existencia de diversidad de prácticas matemáticas, la diferencia radica en el grado y la naturaleza de los objetos matemáticos involucrados (Cauty, 2001) y por el tipo de representaciones contables y los procedimientos utilizados. La aceptación de estas diferencias se argumenta en el análisis histórico del desarrollo de conceptos contables, pues el desarrollo histórico de varios conceptos como el de número por ejemplo, muestra que las representaciones utilizadas, tanto en matemáticas como en contabilidad, el número tres mediante tres palitos, si bien su representación no tiene el grado de abstracción y generalización que presenta la notación numérica actual para la cultura egipcia representaba el tres.

Cauty, señala que otra invariante importante para determinar el pensamiento matemático, es el relativo a la abstracción, igual como sucede con la contabilidad, pues ésta no puede ser entendida como extraer propiedades y reducir la complejidad de lo real, por el contrario es enriquecer lo real, organizarlo y estructurarlo (Cauty, pp. 72, 2001), lo que da lugar a resolver lo real desde la perspectiva del caso general. Otra de las cuestiones que le es intrínseco al pensamiento matemático y contable en su racionalidad, es la lógica de sus demostraciones, y la búsqueda de objetividad y universalidad.

En razón de reconocer a que los invariantes presentes en el pensamiento matemático y en el pensamiento contable moderno occidental tal como se le caracteriza, generalización, abstracción universalidad, y rigor, son el resultado de prácticas históricas de la actividad comercial bajo el uso de las matemáticas y no resultado de repentinas revelaciones, ni es absoluta, sino relativa, la comunidad de investigadores sobre la Didáctica de la Matemática ha construido nuevas teorías del aprendizaje de la contabilidad y la construcción histórica de la misma, en la reflexión sobre el estatus epistemológico y antológico de los constructos contables y matemáticos, particularmente en el reconocimiento de los contextos humanos de creación del conocimiento contable. De esta manera se asume que el conocimiento matemático y el pensamiento contable no son divorciados de la cultura humana y de los valores humanos. Como resultado de estas posturas, las matemáticas informales cobran una importancia suprema (Ernest, 1991) de igual modo, el

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lenguaje, las reglas lingüísticas y los procesos sociales interpersonales juegan un papel determinante en el desarrollo del pensamiento contable-matemático.

En el párrafo precedente se ha descrito de manera sucinta algunos de los principios que han orientado las nuevas visiones sobre el pensamiento contable y que se soportan el campo de la Didáctica de la Matemática como campo académico e investigativo. Como resultado de estas visiones se han construido varias teorías de aprendizaje que incluyen la dualidad contabilidad /matemáticas y el desarrollo del pensamiento contable a través de los objetos matemáticos, que sin lugar a dudas son también coherentes con los aportes de la economía constructivista. Una cuestión importante es que las teorías no sólo aportan a modelos de aprendizaje de la educación Media, sino también a la educación avanzada de alto nivel. La razón de este aporte reside en que también existe un amplio abanico de resultados de investigación a los que de grosso modo se denominan estudios pluriculturales de la contabilidad, las matemáticas, de etno-matematica, cuyos resultados muestran que adultos campesinos, trabajadores informales y etnias culturales, realizan prácticas contables simples, a través del uso de las matemáticas comunes. En particular estos estudios, han demostrado que estos grupos, que no han asistido a la educación formal, muestran que poseen un razonamiento proporcional debido a las necesidades tanto de cultivar la tierra como de comercializar sus cosechas.

Un ejemplo de estas investigaciones lo constituyen los amplios estudios que se han realizado sobre el desarrollo del pensamiento contable mercantilista, que ha permitido el razonamiento proporcional de la matemática en explicación de los resultados contables. No obstante de los estudios realizados con egresados contables y con adultos sin educación formal, se concluye que para resolver problemas de tipo multiplicativo se utilizan procedimientos que si bien el sujeto no puede explicitar ni formular de manera analítica, en estos encuentra algunos saberes matemáticos relacionados con la estructura multiplicativa, dando origen a resultados contables y financieros.

De otro lado, la institución educativa transmite los saberes a través del diálogo didáctico, el cual es un esquema de comunicación que busca formatear la transmisión-apropiación de los saberes a través de esquemas de interacción maestro-alumno, alumno-alumno. En lo que concierne a la mediación de herramientas semióticas en el aprendizaje es necesario la utilización de representaciones icónicas y simbólicas, como las que usualmente observamos en la contabilidad.

Como resultado del cúmulo de investigaciones realizadas en torno al razonamiento proporcional, cabe señalar que las actuaciones de los contadores, dependen del enunciado y de variables del contexto, tipo de representaciones, lo que ha llevado a concluir que la actuación es altamente dependiente de las variables de las tareas que se proponen a los contables. Y que la interacción entre estas variables es tan compleja que es imposible determinar por una sola actuación y en una sola tarea la actuación de los egresados contables. De estas investigaciones también se concluye que los cambios en las actuaciones que incluyen la perspectiva multiplicativa dependen de que las situaciones de aprendizaje ofrezcan actividades que obliguen romper la actuación predominantemente aditiva en los estudiantes de contaduria. De igual modo, la dimensión social de las prácticas conlleva a reconocer que las prácticas contable-matemático son dependientes de las instituciones donde se realizan y que varían de institución a institución.

II. Conclusiones y Reflexiones

Las matemáticas y los razonamientos lógicos se deben usar cada vez más para resolver los problemas contables. El crecimiento de las ciencias administrativas ha exigido gran variedad de informaciones contables más precisas para la formación de modelos que ayuden a la toma de decisiones gerenciales.

Las matemáticas representan uno de los instrumentos más útiles para los contadores, en la formulación de procedimientos contables sistemáticos, muy diferentes a la recopilación de las prácticas convencionales.

Los modelos matemáticos constituyen la forma más estricta de conocimiento científico de una realidad, sin que ello deba suponer, el que su utilización indiscriminada asfixie toda elaboración teórica no directamente matematizable o encubra bajo un procedimiento estrictamente planteado un conocimiento falso de la realidad. Constituyen un soporte cuantitativo a quienes tienen la responsabilidad de tomar decisiones en todas las áreas tales como analistas en las oficinas de planificación, consultores en proyectos de gerencia, planificadores de procesos de producción, analistas financieros y de economía, entre otras áreas.

Es preciso mencionar que en este proceso de la toma de decisiones intervienen dos actores: uno es el tomador de decisiones y el otro es el constructor o intérprete del modelo, quien debe asistir al tomador de las decisiones en el proceso de decidir, por lo tanto quien desarrolle el modelo debe estar equipado con un conjunto de métodos analíticos.

Un modelo matemático es una ecuación, desigualdad o sistema de ecuaciones o desigualdades, que representa determinados aspectos del sistema físico representado en el modelo. Los modelos de este tipo se utilizan en gran medida en las ciencias físicas, en el campo de la ingeniería, los negocios y la economía.

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Un modelo ofrece al analista una herramienta que puede manipular en su análisis del sistema en estudio, sin afectar al sistema en sí. Por ejemplo, supóngase que se ha desarrollado un modelo matemático para predecir las ventas anuales como una función del precio de venta unitario. Si se conoce el costo de producción por unidad, se pueden calcular con facilidad las utilidades anuales totales para cualquier precio de venta. Para determinar el precio de venta que arrojará las utilidades totales máximas, se pueden introducir en el modelo distintos valores para el precio de venta, uno a la vez, determinando las ventas resultantes y calculando las utilidades anuales totales para cada valor de precio de venta examinado. Mediante un proceso de prueba y error, el analista puede determinar el precio de venta que maximizará las utilidades anuales totales.

Lo ideal sería que si el modelo matemático es una representación válida del rendimiento del sistema, mediante la aplicación de las técnicas analíticas adecuadas, la solución obtenida a partir del modelo debería ser también la solución para el problema del sistema. Así, la efectividad de los resultados de la aplicación de cualquier técnica operativa es en gran medida una función del grado en el cual el modelo representa al sistema en estudio. A fin de definir las condiciones que nos conducirán a la solución del problema del sistema, el analista primero debe identificar un criterio según el cual se podrá medir el sistema. Este criterio a menudo se denomina medida del rendimiento del sistema o medida de efectividad. En aplicaciones empresariales, la medida de efectividad generalmente son los costos o las utilidades.

El modelo matemático que describe el comportamiento de la medida de efectividad se denomina función objetivo. Si la función objetivo es describir el comportamiento de la medida de efectividad, debe capturar la relación entre esa medida y aquellas variables que hacen que dicha medida fluctúe. Las variables del sistema pueden categorizarse en variables de decisión y parámetros. Una variable de decisión es una variable que puede ser directamente controlada por el decisor. También existen algunos parámetros cuyos valores pueden ser inciertos para el decisor. Esto requiere un análisis de sensibilidad después de descubrir la mejor estrategia. En la práctica, resulta casi imposible capturar la relación precisa entre todas las variables del sistema y la medida de efectividad a través de una ecuación matemática. En cambio, el analista debe tratar de identificar aquellas variables que afectan en mayor grado la medida de efectividad y luego debe intentar definir de manera lógica la relación matemática entre estas variables y la medida de efectividad. Esta relación matemática es la función objetivo que se emplea para evaluar el rendimiento del sistema en estudio.

En cada etapa del proceso de desarrollo, el analista debe evaluar la correspondencia o validez del modelo. Normalmente se emplean dos criterios para realizar esta determinación. El primero implica la experimentación del modelo: someter el modelo a una serie de condiciones y registrar los valores asociados de la medida de efectividad dada por el modelo en cada caso. Si la medida de efectividad varía de manera antinatural con una sucesión de condiciones de entrada, es posible que la función objetivo no sea válida.

Un modelo puede ser inadecuado aun cuando intenta capturar los elementos apropiados de la realidad si lo hace de una manera distorsionada o sesgada. Una ecuación que pronostica el volumen mensual de ventas puede ser exactamente lo que el gerente de ventas quiere pero podría generar grandes pérdidas si arroja constantemente cálculos de ventas altos. En consecuencia, un modelo útil es aquel que captura los elementos adecuados de la realidad con un grado aceptable de precisión.

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Incidence of the Electronic Billing in the Tax Collection in the Latacunga Canton, Cotopaxi Province, Ecuador, from Year 2006 to Year 2017

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Abstract- Due to the ignorance about the contribution that this billing system offers in the tax collection, the present investigation analyzed the incidence of the electronic invoicing in the tax collection in the payment of the taxpayers of the Canton Latacunga. The investigative approach used in this work was quantitative, descriptive, explanatory and deductive. Information was collected in the Internal Revenue Service (SRI), specifically of the tax obligations Withholding Tax, Income Tax, Value Added Tax and Special Consumption Tax. This investigation verified the percentage increases of customers incorporated into the electronic invoicing regime, economic amounts collected before and after the implementation of this billing system and its variations and differences. The vital performance and efficiency of the management of electronic invoicing in tax collection and tax obligations carried out by taxpayers. Based on the results obtained, it is essential that the SRI encourages customers to use this system, encouraging, innovation, efficiency and the competitiveness in commercial operations carried out by users must be achieved in order to achieve greater collections for the Treasury and control them timely.

Keywords: *taxpayers, electronic invoicing, tax collection.*

GJMBR-D Classification: *JEL Code: H29*



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Incidence of the Electronic Billing in the Tax Collection in the Latacunga Canton, Cotopaxi Province, Ecuador, from Year 2006 to Year 2017

Incidencia de la facturación electrónica en la recaudación fiscal del Cantón Latacunga, Provincia de Cotopaxi, Ecuador, del año 2006 al año 2017

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Resumen- Debido al desconocimiento sobreel aporte que este sistema de facturación ofrece en la recaudación tributaria, la presente investigación analizó la incidencia de la facturación electrónica en la recaudación fiscal en el pago de los contribuyentes del Cantón Latacunga. El enfoque investigativo empleado en este trabajo fue cuantitativo de tipo descriptivo, explicativo y deductivo. Se recolectó información en el Servicio de Rentas Internas (SRI), permitiendo obtener datos relevantes sobre la recaudación fiscal de los contribuyentes del Cantón Latacunga, específicamente de las obligaciones tributarias de Retención en la Fuente, Impuesto a la Renta, Impuesto al Valor Agregado e Impuesto a los Consumos Especiales. Esta investigación comprobó los incrementos porcentuales de contribuyentes incorporados al régimen de facturación electrónica, montos económicos recaudados antes y después de la implementación de este sistema de facturación y sus variaciones y diferencias. Se evidenció el vital desempeño y eficiencia que presenta el manejo de la facturación electrónica en la recaudación fiscal y en las obligaciones tributarias que llevan a cabo los contribuyentes. En base a los resultados obtenidos es indispensable que el SRI incentive a los contribuyentes el uso de este sistema, fomentando la innovación, eficiencia y la competitividad en las operaciones comerciales a fin de lograr mayores recaudaciones para el fisco y controlarlas oportunamente.

Palabras claves: contribuyentes, facturación electrónica, recaudación fiscal.

Abstract- Due to the ignorance about the contribution that this billing system offers in the tax collection, the present investigation analyzed the incidence of the electronic invoicing in the tax collection in the payment of the taxpayers of the Canton Latacunga. The investigative approach used in this work was quantitative, descriptive, explanatory and deductive. Information was collected in the Internal Revenue Service (SRI), specifically of the tax obligations Withholding Tax, Income Tax, Value Added Tax and Special Consumption Tax. This investigation verified the percentage increases of customers incorporated into the electronic invoicing regime, economic amounts collected before and after the implementation of this billing system and its variations and differences. The vital performance and efficiency of the management of electronic invoicing in tax collection and tax obligations carried out by taxpayers. Based on the results obtained, it is essential that the SRI encourages customers to use this system, encouraging, innovation, efficiency and the competitiveness in commercial operations carried out by users must be achieved in order to achieve greater collections for the Treasury and control them timely.

Keywords: taxpayers, electronic invoicing, tax collection.

I. Introducción

La incidencia tributaria en el Ecuador ha sido un tema relevante y de alto impacto, por lo que se promovió la creación de un organismo regulador que garantice, controle y administre los recursos tributarios generados por el estado. Este organismo es el Servicio de Rentas Internas (SRI).

La facturación electrónica en el Ecuador se instauró basándose en un modelo brasileño y tomando a la gestión y control como una forma de agrupar al sector económico en el que recae el uso de este método innovador."Brasil es un punto de referencia a partir de la promulgación del Decreto Presidencial del 03 de abril de 2000, que presenta a la comunidad las políticas implementadas, directrices y normas relacionadas con el gobierno electrónico" (DA SILVAHERNANDEZ, DA SILVA y HENRIQUE, 2016a, p.2) cita a Sousa (2009).

Desde mayo del 2002se crea en Ecuador un entorno legal y fiscal apto para enviar y recibir comprobantes electrónicos. A partir de esa fecha, numerosas empresas han utilizado la facturación electrónica. A partir de la RESOLUCIÓN NAC-DGERCGC13-00236, emitida el 06 de mayo de 2013, la facturación electrónica empezó a ser obligatoria en Ecuador para aquellos sectores económicos seleccionados por el Servicio de Rentas Internas. (SERES, n.d.)

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Por lo expuesto, la presente investigación surge en respuesta a la necesidad de determinar como la facturación electrónica influye en la recaudación y pago de impuestos por parte de los contribuyentes del cantón Latacunga.

Los objetivos investigativos se fundamentan en determinar el nivel de crecimiento anual de los contribuyentes del Servicio de Rentas Internas del Cantón Latacunga desde la vigencia del régimen de Facturación Electrónica, cuantificar el pago de los tributos efectuados por los contribuyentes del Servicio de Rentas Internas del Cantón Latacunga antes de laaplicación al régimen de facturación electrónica, calcular cuáles fueron los valores económicos recaudados por el Servicio de Rentas Internas del Cantón Latacunga desde la vigencia del régimen de facturación electrónica y finalmente comparar los valores recaudados por el Servicio de Rentas Internas antes y después de la vigencia del régimen de facturación electrónica.

II. Marco Teórico Referencial

a) Facturación electrónica

Entre las alternativas de análisis que contribuirán a fragmentar el problema de la presente investigación, se hace imprescindible conocer la funcionalidad que tiene la facturación electrónica, este sistema: "es un documento tributario generado por medios informáticos en formato electrónico, que reemplaza al documento físico en papel, pero que conserva su mismo valor legal con unas condiciones de seguridad no observadas en la factura en papel" (MILLET y NAVARRO, 2008, p.89).

De acuerdo a lo mencionado, la facturación electrónica es una forma distinta de emisión de comprobantes, al ser un documento electrónico, aparece como una opción de sustitución de la facturación tradicional o física, su garantía está representada por una firma electrónica permitiéndole cumplir con los requerimientos legales en función de su utilización por parte del SRI, organismo regulador que pone en manifiesto su validez y veracidad legal.

b) Funcionalidades de la facturación electrónica

Este modelo de sistema electrónico tiene como finalidad incrementar la eficiencia en los servicios de facturación, así como también mantener y mejorar el control por parte del organismo regulador tributario que es el Servicio de Rentas Internas.

La factura electrónica otorga nuevas oportunidades de negocio, ya que las organizaciones podrían adquirir nuevas tecnologías y contratar profesionales especializados en consultoría tributaria para atender a esta nueva legislación, la cual hace que el trabajo manual que se venía realizando hasta el momento de digitalizar la información, se reduzca y así ese tiempo se pueda usar para agregar más valor a los servicios ofrecidos. Algunas organizaciones pueden considerar que existen desventajas con la implementación inicial de la nueva facturación electrónica, debido a que estos procesos generan costos, plazos de ejecución, y la inversión en equipos y software, y adicionalmente tienen que contratar a terceros especializados para avanzar en el proceso. (DA SILVA et al., 2016b, p.6).

Frente a lo citado, se considera entre las funcionalidades de este nuevo modelo la disminución del tiempo empleado en la emisión de facturación tradicional y la oportunidad de crear ventajas competitivas al generar nuevas oportunidades de negocio que se pueden concretar con la utilización de este sistema de facturación. Sin embargo, los costos asociados a su implementación deben ser considerados si desea alcanzar rapidez, eficiencia y automatización en la trasferencia de los documentos tributarios.

c) Modelo de la facturación electrónica

El Servicio de Rentas Internas proporciona un modelo de facturación electrónica estructurada directamente a las necesidades de los contribuyentes, por lo que no existe un diseño estándar de este sistema. Cada organización tiene la facultad de establecer y modificar sus facturas acordes a las necesidades propias que presenta.

d) Firma electrónica

Este modelo de facturación debe estar certificado y registrado para que se reconozca su validez. El contribuyente no tendrá que preocuparse por archivar sus facturas ya que estarán almacenadas automáticamente en la base de datos del Servicio de Rentas Internas, además, no presentarán fecha de caducidad porque poseen permanencia indefinida.

La certificación de la firma electrónica es un mensaje compuesto por datos y acredita la utilización de la firma electrónica a una persona. Está a cargo del Banco Central de Ecuador (BCE) y su función es: "Emitir certificados digitales de firma electrónica y otros servicios relacionados con la certificación electrónica para personas jurídicas y personas naturales, garantizando la seguridad jurídica y tecnológica en entornos electrónicos cumpliendo el marco legal" (Banco Central del Ecuador, n.d.).

e) Recaudación fiscal

La recaudación fiscal tiene como finalidad generar recursos que amparen el desarrollo integral del estado. En el Ecuador los impuestos más importantes a nivel recaudatorio son el impuesto a la renta y el impuesto al valor agregado. El impuesto a la renta grava la suma de los rendimientos obtenidos por una persona o una empresa. El impuesto al valor agregado es un impuesto aplicado sobre las ventas, cuyo fin es

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gravar el consumo de las personas. AMAYA (2014, p.13)

En síntesis, se determina que la recaudación fiscal aparece como respuesta del estado a satisfacer las necesidades públicas vinculadas a la equidad, seguridad, autonomía, etc.; pretendiendo así, garantizar la vida y el desarrollo social de la nación. Entre los tributos que mayores ingresos generan al fisco están el Impuesto a la Renta (IR) y el Impuesto al Valor Agregado (IVA), los mismos que son recaudados por el Servicio de Rentas Internas, organismo regulador tributario ecuatoriano.

f) Sujeto pasivo

Se determina que el sujeto pasivo no está representado por un contribuyente.

Siguiendo la doctrina, la Corte ha distinguido los sujetos pasivos "de iure" de los sujetos pasivos "de facto". A los primeros corresponde formalmente pagar el impuesto, mientras que los segundos son quienes en últimas deben soportar las consecuencias económicas del gravamen. "En los tributos directos, como el impuesto a la renta, en general ambos sujetos coinciden, pero en cambio, en los impuestos indirectos (…) el sujeto pasivo de iure no soporta económicamente la contribución, pues traslada su costo al consumidor final." (Gerencie.com, 2017) cita a Corte Constitucional, Sentencia C-412 (1996).

Ante lo expuesto, se determina que el sujeto pasivo es aquella persona que está obligada a contribuir con su tributo al Estado, teniendo en cuenta que se deben considerar la presencia de los impuestos directos como el impuesto a la renta; y, los impuestos indirectos como el impuesto al valor agregado.

g) Contribuyente

Contribuyente es la persona natural o jurídica a quien la ley impone la prestación tributaria por la verificación del hecho generador. Nunca perderá su condición de contribuyente quien, según la ley, deba soportar la carga tributaria, aunque realice su traslación a otras personas. (Código Tributario, 2005, p.5)

En síntesis, se determina que el contribuyente es aquella persona natural o jurídica a quien se establece que debe cumplir con las obligaciones tributarias que se le presenten en su actividad económica y mientras la ejerza, jamás dejará de ser un contribuyente del estado, teniendo en consideración que las contribuciones están reguladas de acuerdo a la capacidad económica que posee.

III. Metodología

Esta investigación posee un enfoque cuantitativo y analiza las cifras económicas de tributación comprendidas desde el año 2006 hasta el 2017, para determinar, si existió o no incidencia de la facturación electrónica en la recaudación fiscal del cantón Latacunga.

La investigación efectuada es de tipo descriptiva y explicativa, reseñando rasgos, cualidades y atributos de la población; dando a la vez, las razones del porqué de esta incidencia.

Esta investigación permitió conocer los procedimientos en los que se enmarcan la facturación electrónica en la recaudación de impuestos mediante las obligaciones que deben cumplir los contribuyentes con el manejo del sistema electrónico y el contexto que se presenta en las obligaciones tributarias a través del manejo de la facturación electrónica.

La información requerida se la obtuvo del Director de Planificación del Servicio de Rentas Internas, a través de la entrevista como técnica basada en el diálogo y la conversación, proporcionando información profunda para descubrir, examinar y comprobar las interrogantes que estuvieron presentes en la investigación, además, el instrumento que permitió cotejar la pertinencia del almacenamiento de información fue la ficha de entrevista, desenlace que estuvo sujeto a la objetividad y al análisis significativo en réplica al problema, objetivos y metodologías presentes en el actual estudio.

IV. Resultados

Los resultados obtenidos en los diferentes años analizados, se utilizaron para determinar el incremento porcentual y las variaciones económicas de las obligaciones tributarias que se han venido presentando a través del tiempo. Esto permitió comprobar si existió o no incidencia de la facturación electrónica en la recaudación fiscal de los contribuyentes del Cantón Latacunga.

En la Tabla 1 se observa el número total de sujetos pasivos acogidos al régimen de facturación electrónica por año. En la Tabla 2 y Figura 1 se exponen los resultados de la variación del incremento porcentual anual que han presentado estos contribuyentes al incorporarse a este sistema de facturación.

En la Tabla 3 se muestran los montos anuales de recaudación fiscal percibidos antes de la vigencia del régimen de facturación electrónica, además el monto global recaudado durante los 6 años analizados. En la Tabla 4 y Figura 2 se presentan los resultados de las variaciones económicas al determinar el incremento porcentual anual de los valores económicos anuales recaudados por la administración tributaria del cantón Latacunga.

En la Tabla 5 se observan los valores económicos recaudados por el Estado desde de la vigencia del régimen de facturación electrónica y también se muestra el monto global recaudado durante los 6 años estudiados. Además, en la Tabla 6 y Figura 3 se exponen los resultados de las variaciones

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económicas al establecer el incremento porcentual en los montos anuales percibidos por el fisco.

En la Tabla 7 y Figura 4 se presentan los resultados de las variaciones económicas al determinar el incremento porcentual anual en los años analizados antes y después de la vigencia del régimen de facturación electrónica, develando el valor económico global ingresado al Estado durante los 12 años de recaudo tributario analizados en la presente investigación (2006 al 2017).

Finalmente en la Tabla 8 y Figura 5 se muestran los resultados del valor económico e incremento porcentual recaudado por el SRI antes y después a la vigencia del régimen de facturación electrónica. Así, se compara la incidencia que ha presentado este sistema de facturación y el aporte imprescindible que presenta su utilización en las obligaciones tributarias que están sujetos los contribuyentes frente a la recaudación fiscal.

Tabla 1: Contribuyentes incorporados al régimen de facturación electrónica

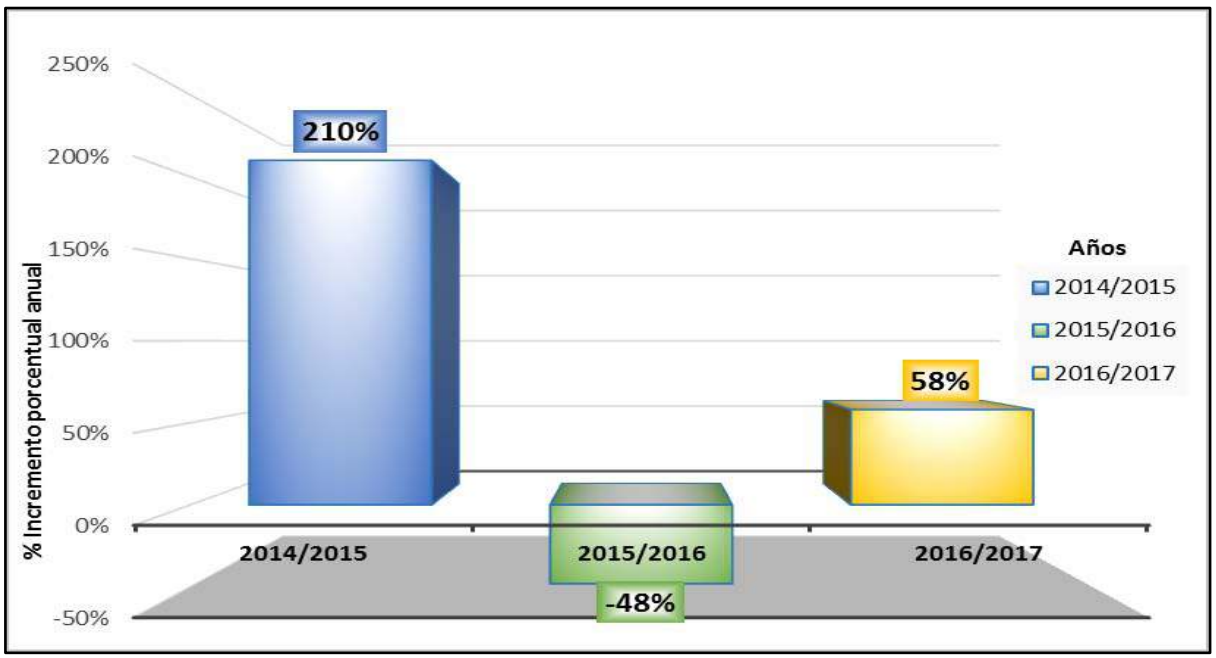
Años	2014	2015	2016	2017	Total
Contribuyentes del Cantón Latacunga	42	130	67	106	345

Fuente: Servicio de Rentas Internas (SRI)/SSTT Zona 3

Tabla 2: Variación de incremento porcentual de los contribuyentes incorporados al régimen de facturación electrónica

Años	2014/2015	2015/2016	2016/2017
Porcentualización	210%	-48%	58%

Fuente: Servicio de Rentas Internas (SRI)/SSTT Zona 3



Fuente: Servicio de Rentas Internas (SRI)

Figura 1: Variación de incremento porcentual de los contribuyentes incorporados al régimen de facturación electrónica en el Cantón Latacunga.

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Tabla 3: Montos recaudados antes de la vigencia del régimen de facturación electrónica

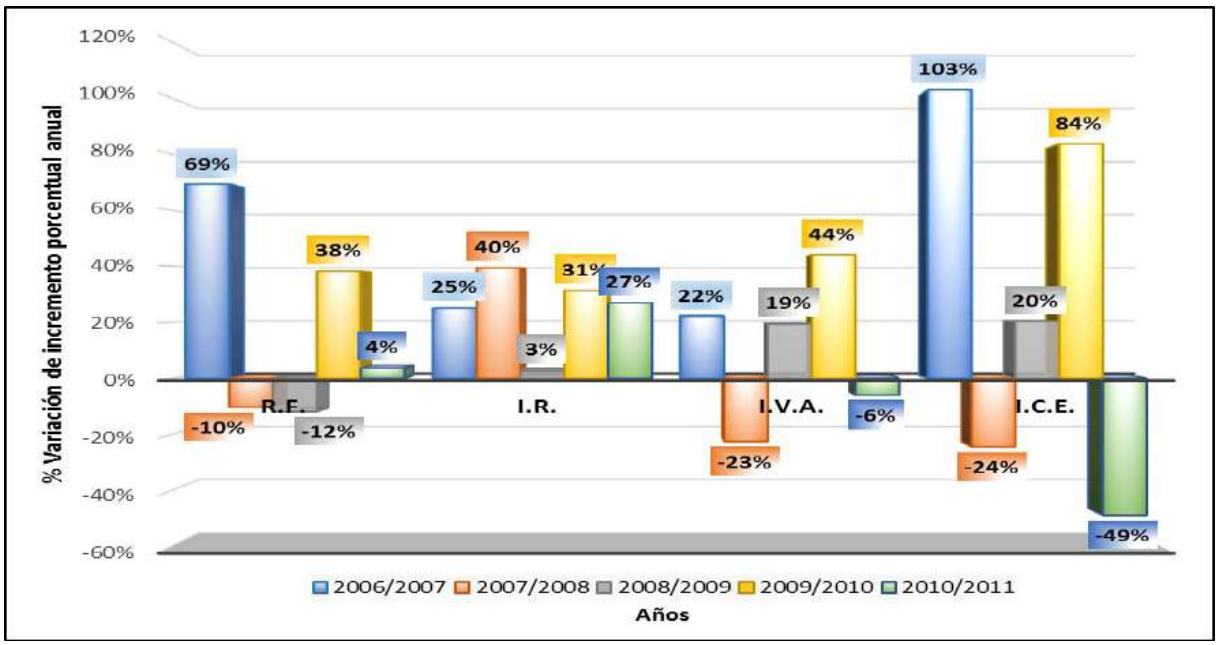
Impuestos		Retención en la Fuente (R.F.)	Impuesto a la Renta (I.R.)	Impuesto Valor Agregado (I.V.A.)	Impuesto Consumos Especiales (I.C.E.)
Años	2006	$2.575.581,33	$1.652.821,90	$3.146.718,78	$139.849,61
	2007	$4.359.476,55	$2.066.562,69	$3.841.379,98	$283.823,85
	2008	$3.912.070,48	$2.882.916,28	$2.972.233,38	$214.467,67
	2009	$3.448.045,49	$2.963.217,70	$3.548.269,45	$257.947,84
	2010	$4.768.748,36	$3.892.055,30	$5.111.637,13	$473.675,67
	2011	$4.947.906,75	$4.938.655,69	$4.805.941,28	$242.101,95
Total		$24.011.828,96	$18.396.229,56	$23.426.180,00	$1.611.866,59
Recaudación Total			$67.446.105,11		

Fuente: Servicio de Rentas Internas (SRI)

Tabla 4: Incremento porcentual de los montos recaudados antes de la vigencia del régimen de facturación electrónica

Impuestos	Abrev.	Variación de incremento porcentual anual				
		2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Retención en la fuente	R.F.	69%	-10%	-12%	38%	4%
Impuesto a la Renta	I.R.	25%	40%	3%	31%	27%
Impuesto Valor Agregado	I.V.A.	22%	-23%	19%	44%	-6%
Impuesto Consumos Especiales	I.C.E.	103%	-24%	20%	84%	-49%

Fuente: Servicio de Rentas Internas (SRI)



Fuente: Servicio de Rentas Internas (SRI).

Figura 2: Variación de incremento porcentualde los montos recaudados antes de la vigencia del régimen de facturación electrónica.

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Tabla 5: Montosrecaudados después de la vigencia del régimen de facturación electrónica

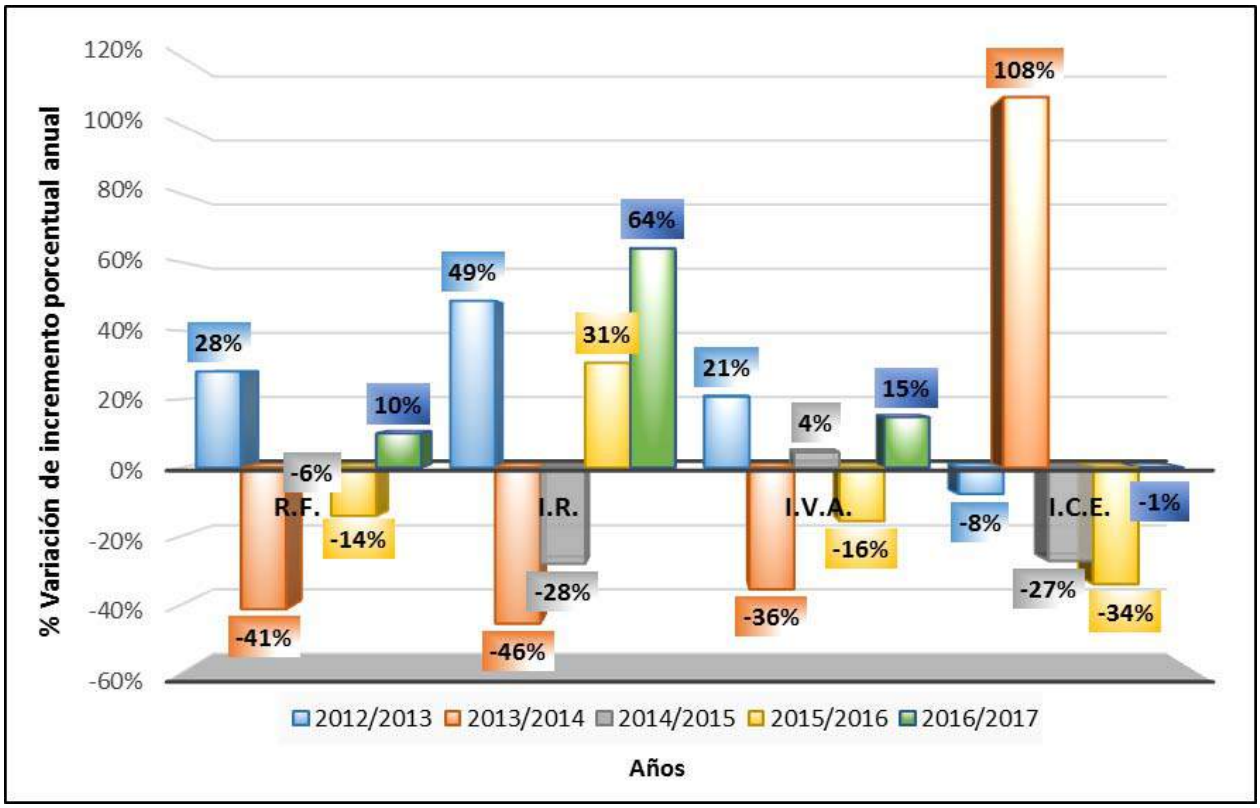
Impuestos		Retención en la Fuente (R.F.)	Impuesto a la Renta (I.R.)	Impuesto Valor Agregado (I.V.A.)	Impuesto Consumos Especiales (I.C.E.)
Años	2012	$6.754.066	$6.293.021	$11.127.957	$1.092.969
	2013	$8.652.671	$9.358.190	$13.433.316	$1.008.721
	2014	$5.069.512	$5.087.130	$8.653.588	$2.101.529
	2015	$4.763.575	$3.655.376	$9.033.546	$1.527.778
	2016	$4.090.410	$4.775.975	$7.622.448	$1.007.182
	2017	$4.498.393	$7.836.939	$8.747.244	$998.465
Total		$33.828.626,78	$37.006.631,78	$58.618.100,19	$7.736.645,25
Recaudación Total		$137.190.004,00			

Fuente: Servicio de Rentas Internas (SRI)

Tabla 6: Incremento porcentual de los montos recaudados después de la vigencia del régimen de facturación electrónica

Impuesto	Abrev.	Variación de incremento porcentual anual				
		2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Retención en la fuente	R.F.	28%	-41%	-6%	-14%	10%
Impuesto a la Renta	I.R.	49%	-46%	-28%	31%	64%
Impuesto Valor Agregado	I.V.A.	21%	-36%	4%	-16%	15%
Impuesto Consumos Especiales	I.C.E.	-8%	108%	-27%	-34%	-1%

Fuente: Servicio de Rentas Internas (SRI)



Fuente: Servicio de Rentas Internas (SRI).

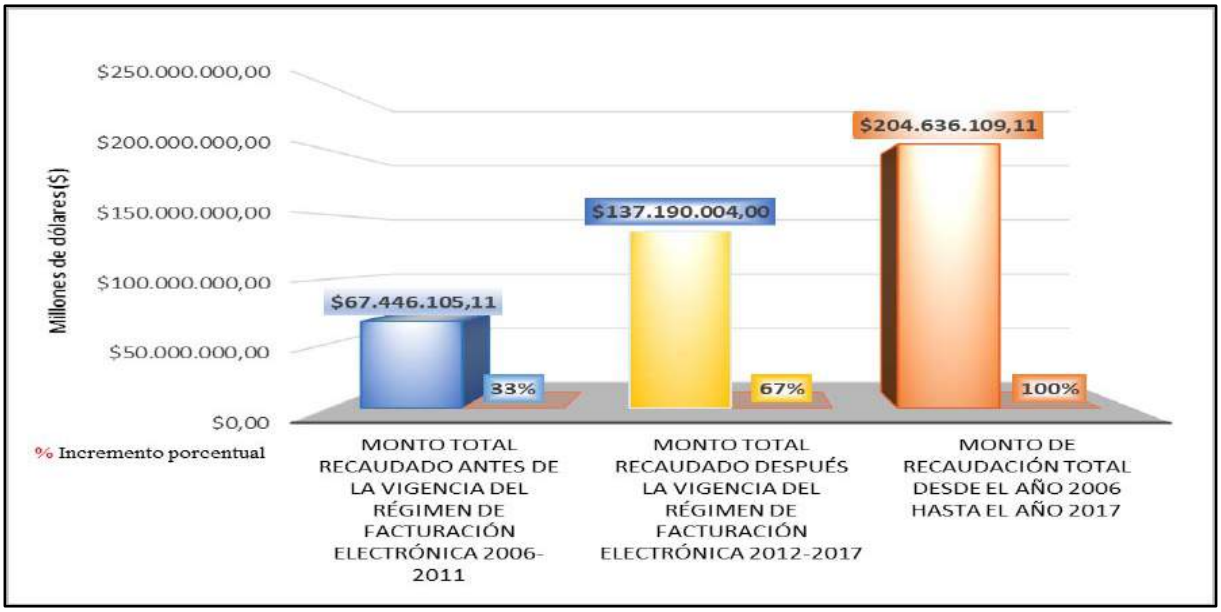
Figura 3: Variación de incremento porcentualde los montos recaudados después de la vigencia del régimen de facturación electrónica.

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Tabla 7: Montos e incremento porcentual recaudados por el SRI, antes y después de la vigencia del régimen de facturación electrónica

Detalle	Total Impuestos	Porcentualización
Monto Recaudado Antes de la Vigencia del Régimen de Facturación Electrónica 2006- 2011	$67.446.105,11	33%
Monto Recaudado Después la Vigencia del Régimen de Facturación Electrónica 2012-2017	$137.190.004,00	67%
Monto Global de Recaudación desde el año 2006 hasta el año 2017	$204.636.109,11	100%

Fuente: Servicio de Rentas Internas (SRI)



Fuente: Servicio de Rentas Internas (SRI).

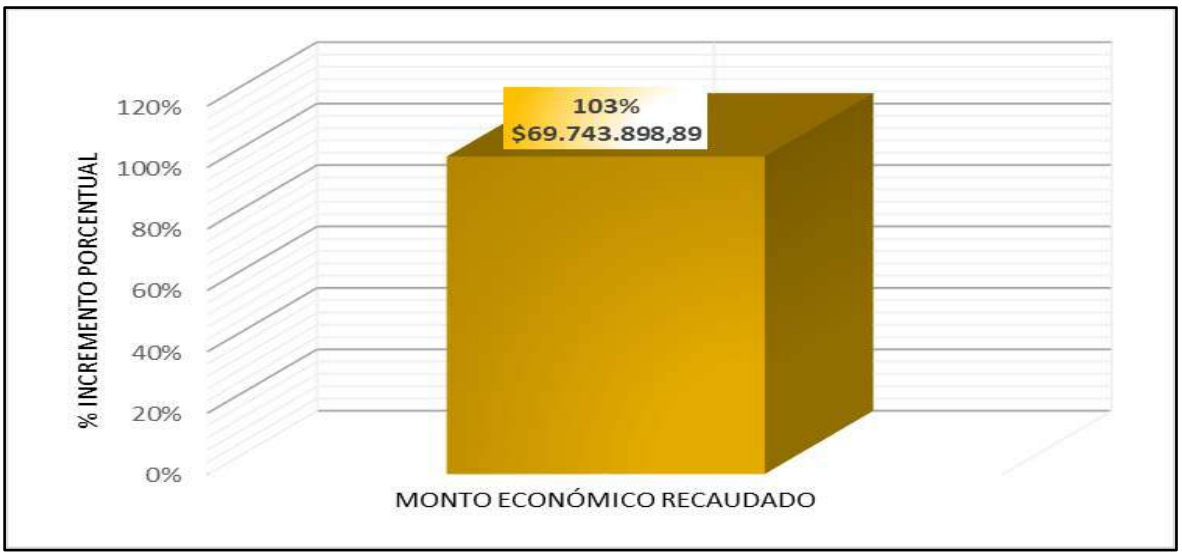
Figura 4: Montos e incremento porcentual recaudados por el SRI, antes y después de la vigencia del régimen facturación electrónica.

Tabla 8: Monto e incremento porcentual entre el antes y el después a la vigencia del régimen de facturación electrónica

Detalle	Total Impuesto Recaudado	Incremento Porcentual
Monto recaudado por el SRI entre el antes y el después de la vigencia del régimen de facturación electrónica.	$69.743.898,89	103%

Fuente: Servicio de Rentas Internas (SRI)

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Fuente: Servicio de Rentas Internas (SRI)

Figura 5: Monto e incremento porcentual entre el antes y el después a la vigencia del régimen de facturación electrónica.

V. Conclusiones

Se determinó que únicamente los contribuyentes obligados a incorporarse al régimen de facturación electrónica se han acogido a la resolución N° NAC-DGRCGC17-00000430 emitida por el SRI del Cantón Latacunga, evidenciando mayor aceptación de los contribuyentes anexados en el año 2015 y en el año 2017; sin embargo, en el año 2016 hubo una considerable disminución en su incorporación. Cabe recalcar, que de los sujetos pasivos que tienen la facultad de integrarse de manera libre y voluntaria, ningún contribuyente acepta el manejo de este sistema de facturación en el desarrollo de sus actividades económicas.

Se estableció que los tributos recaudados por el SRI del Cantón Latacunga antes de la vigencia del régimen de facturación electrónica ascendió a los $ 67.446.105,11 de dólares dentro de los años citados en la investigación, donde el Impuesto al Valor Agregado (I.V.A.) representó la mayor recaudación, a diferencia del Impuesto a los Consumos Especiales (I.C.E.) que figuró con la menor percepción fiscal de los impuestos tratados. Sin embargo, el incremento porcentual empleado a los impuestos anexados al análisis, determinó mayor recaudación en el Impuesto a los Consumos Especiales (I.C.E.) entre el año 2006 y el año 2007, contradictorio a lo que ocurrió con el mismo impuesto que registró el mayor decremento del año 2010 al año 2011 en relación al año que lo precede.

Se evidenció que los valores económicos recaudaos por el SRI del Cantón Latacunga, después de la vigencia del régimen de facturación alcanzó los $137.190.004,00 de dólares comprendidos entre los años citados en el presente análisis, donde el Impuesto al Valor Agregado aportó con la mayor percepción fiscal, mientras que el Impuesto a los Consumos Especiales representó el menor aporte para la recaudación del país de acuerdo a los impuestos citados. No obstante, el incremento porcentual realizado a los impuestos anexados en la investigación, estableció mayor recaudación en el Impuesto a los Consumos Especiales entre el año 2013 y el año 2014, mientras que el Impuesto a la Renta se presentó con el mayor descenso porcentual en el año expuesto.

De acuerdo a los datos citados en el presente estudio, finalmente se comprobó que el monto recaudado por el SRI antes de la aplicación de la facturación electrónica alcanzó los $ 67.446.105,11 de dólares; sin embargo, el valor económico recaudado después de la vigencia del régimen de facturación electrónica ascendió a los $137.190.004,00 de dólares. Determinando un incremento porcentual rotundo del 103% de aumento en la contribución fiscal entre estos dos periodos económicos que han sido investigados, analizados y comprobados.

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The Structuring Role of Network Actor in the Mechanistic - Organic Hybridization of the Quality Approach in Public Hospital

By Dr. Dagou Hermann Wenceslas Dagou
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Abstract- This research is part of the process of adopting innovations in public organizations. It tries to understand how the quality approach implements a hybridization between mechanistic logic and organic logic. Interviews and a literature review examine this issue through four ISO 9001 certifications in a public hospital of last resort. The theory of the network actor is mobilized to infer interpretations. The results show the presence of a mechanical logic based on the application of the precepts of quality. Organic logic, on the other hand, begins with the ability to bridge incompatibilities and build the branch's trust network. Hybridization is a dynamic device linking the project, sponsor, process, feedback, ecosystem and environment.

Keywords: *hybridization, quality approach, sponsor, ecosystem, process.*

GJMBR-D Classification: *JEL Code: M41*



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The Structuring Role of Network Actor in the Mechanistic - Organic Hybridization of the Quality Approach in Public Hospital

Le Role Structurant De L'acteur Réseau Dans L'hybridation Mécaniste - Organique De La Démarche Qualité Dans Un Hopital Public

Dr. Dagou Hermann Wenceslas Dagou

Résumé- Cette recherche s'inscrit dans les approches processuelles d'adoption des innovations dans les organisations publiques. Elle tente de comprendre comment la démarche qualité met en œuvre une hybridation entre logique mécaniste et logique organique. Des entretiens et une analyse documentaire permettent d'examiner cette question à travers quatre certifications ISO 9001 dans un hôpital public de dernier recours. La théorie de l'acteur réseau est mobilisée pour inférer les interprétations. Les résultats montrent la présence d'une logique mécanique fondée sur l'application des préceptes de la qualité. La logique organique, quant à elle, s'amorce par la capacité à combler les incompatibilités et la construction du réseau de confiance de la direction générale. L'hybridation se résume en un dispositif dynamisme liant le projet, le parrain, le processus, les rétroactions, l'écosystème et l'environnement.

Motsclés: hybridation, démarche qualité, parrain, ecosystème, processus.

Abstract- This research is part of the process of adopting innovations in public organizations. It tries to understand how the quality approach implements a hybridization between mechanistic logic and organic logic. Interviews and a literature review examine this issue through four ISO 9001 certifications in a public hospital of last resort. The theory of the network actor is mobilized to infer interpretations. The results show the presence of a mechanical logic based on the application of the precepts of quality. Organic logic, on the other hand, begins with the ability to bridge incompatibilities and build the branch's trust network. Hybridization is a dynamic device linking the project, sponsor, process, feedback, ecosystem and environment.

Keywords: hybridization, quality approach, sponsor, ecosystem, process.

I. Introduction

The conduct of the public organization, as Halachmi (1995) points out, was perceived as ideal because of its efficiency and rationality. However, it has been widely criticized for its rigorous dedication to procedures, which frequently resulted in rigidity and lack of reaction towards users (Wiesel and Modell, 2014). In response to these criticisms, methods and techniques from the private sector have been implemented in the public sector to reflect more empowering performance (Moulton, 2009). But here again, the life cycle of these methods and techniques has not been convincing given the changes in the public sector (Bryson and al., 2013). These changes are partly reflected in public-private partnerships, with an emphasis on collaborative and digital approaches (Bryson and al., 2014; Dreveton, 2017). The notion of hybridity tends to find its place and characterize a large part of the approaches coming from the private sector. Among these, Eve and Sprimont (2016) highlight the quality approach as being governed by technical standards and leave the choice of strategy to the actors. The quality approach and renewed public management continue the commitment to the organization's values through learning and continuous improvement (Halachmi, 1995; Eve and Sprimont, 2016). To ensure that these two approaches are intertwined, Denis and al (2015) propose a hybrid organizational form, between the mechanistic foundations of public organization and the organic foundations specific to private organization. The hybridization between the quality approach and public management renewed by a procedural approach makes it possible to determine their internal consistency and external relevance.

Process-based approaches to innovation (Bryson and al., 2013; Alford and Yates, 2014; De Vries and al., 2016) tend to consider experimental tools such as dashboards (Dreveton, 2017), cost calculations, performance measurement systems. However, public organizations in developing countries are confronted with the tools of this new public management without even having mastered traditional tools (Rolland, 2009; Okafor and al., 2014). In particular, Lozeau (1999) pointed out that the implementation of an innovation such as the quality approach meets institutional and cultural specificities. These specificities require an effort of adaptation as pointed out (Wiesel and Modell, 2014), in order to promote substantial rather than symbolic

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integration. The quality approach, focused on standardization and process control, contributes to strengthening the mechanical dimension of organizations, further altering the relationship with users (Leavengood and al., 2012). However, when the approach encourages actors to take the initiative, it requires skills to be rearranged according to the context of action (Fryer and al., 2007). This organic dimension allows, through the capacity of the actors, to develop unique and flexible coupling strategies. The traditional distinction between mechanistic and organic structure should show its potential through hybridization, through partial or total modification of the logic of each structure.

Seeking to understand the concept of hybridity beyond the traditional approach to governance structures and to access broader literatures from organizational studies, Denis and al (2015) builds on the work of Battilana and Lee (2014) and Skelcher and Smith (2015), to propose the dimensions of structure (organizational design), agency (activities), institutional context (environment, culture) and identities (numbers) to characterize the theoretical challenges of hybridity in the public. Denis and al (2015) agree with Dreveton and Rocher (2014) that the dimensions of activities are even less studied and particularly in developing countries (Okafor and al., 2014). Hybridization is likely to occur in high activity contexts characterized by close coupling processes such as hospitals. In particular, one cardiology institute is meeting this challenge, with five quality certification renewals (2005, 2008, 2012, 2015, 2018). In exploring the perspective of hybridization, the question is to know which devices, understood as a set of means, to mobilize to succeed in this hybridization between mechanistic logic and organic logic?

The objective of this article is to understand the progressive implementation of the interaction of quality management systems with the public organization. He wants to contribute to the literature on the hybridization of mechanistic and organic logic. After the presentation of the methodology, the article presents the mechanistic logic of setting up and then the mechanistic logic of maintaining the quality approach, continues with the structuring mechanisms before concluding how to make these quality mechanisms appear generic.

II. A Framework for Describing the Hybridization Experience

As Collm and Schedler (2013) and Dreveton and Rocher (2014) point out, implementation experience studies require integration into the organization through prolonged immersion over time. The challenge in general is to clarify how reports and descriptions are produced in interaction, so that they achieve methodological status (Joannidès and al., 2013). To do this, it should meet three criteria: observation of the reality of a terrain, knowledge of the whole terrain in a practical way, and a description of the current meaning within a group that makes it possible to produce a rigorous knowledge because it is positioned in time and space (Piening, 2011). Access to the public organisation was possible from June 2012 to December 2016, ensuring immersion in the field for a sufficient period of time to acquire formal and informal language and reflexes. All this is coupled with participation in two internal and external customer satisfaction surveys (2013, 2015), and teamwork by members of the quality committee, the communication department and the Executive Board. Deliverables are intermediate and final versions of reports, ensuring that actors acknowledge the facts as they are experienced (Joannidès and al., 2013). According to Denis and al (2015) and Battilana and Lee (2014), there are many theoretical perspectives on hybridity (structures and governance, institutional dynamics, agency practices, and roles and identities...). Each hybridization is a unique experience, because it is the unique translation of the adaptation of a productive model at a given time and in a given context. Attention in this context focuses on the roles played by the different actors in the hybridization process (Bédé and al., 2012; Perray-Redslob and Malaurent, 2015). With a view to understanding the structuring role of the quality approach, the perspective of agency practices, inspired by the basic ideas of the network actor, is mobilized (Callon, 1986; Justesen and Mouritsen, 2011). The basic concept is that of a complex network of actors composed of groups of human and non-human actors (actors), gathered in material semiotic networks. It is through these networks that hybridisation actions would develop (Moulton, 2009; De Vries and al., 2016). As these networks are fragile, diversified and changing, they are considered as a technology that brings together heterogeneous actors and allows for joint actions. Miller and al (2008) felt that, so far, too much attention has been paid to hybrid organizational forms rather than hybrid organizational processes and routines. They showed how accounting practices adapt to hybrid situations, highlighting the need to look beyond the structure and more towards processes. This logic is appropriate to the framework of the quality approach in a public context since it acts as a guide for action in general terms with a certain margin of manoeuvre (Bédé and al., 2012). It uses a mechanistic organizational logic, which is imposed on the existing system by the ISO 9001:2015 standard and has organic organizational elements in the form of quality circles or management reviews. While mechanistic organizational modes involve formal rules, hierarchy, routine and stability, organic mode involves informal coordination, discretion, improvisation and change.

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III. The Mechanistic Logic of Quality Approach Implementation

Presenting the hybridization approach, Pyun (2013, p. 34) first perceived it as static in order to encourage the introduction of the quality approach in the local context; then hybridization becomes dynamic in order to maintain performance and finally it adapts this time to the evolution of the environment. In contrast, mechanistic logic is translated by the organic state, the intensity of the additional effort that the Abidjan Heart Institute will have to make to move forward; the counterpart, the set of elements that contribute to its acceptance of the effort; and facilitation, which makes the effort lighter.

a) The organic state

The organic state consists of the project opportunity study and the responsibility of the management to prepare the introduction.

After ten years of operating difficulties related to technical, financial and organizational problems (1991-1999), its closure and 5 years of rehabilitation, the Abidjan Heart Institute reopened its doors in February 2005. The management, concerned with improving the quality of care and controlling the costs of services, has committed itself to the quality approach with a view to obtaining ISO 9001 version 2000 certification. According to the Director, "we have come a long way, I think we have to do the best we can with what we have available without waiting for help".

As soon as he took up his duties, the General Manager chose the option of certification to lead the destiny of the new organization. Certification can appear as a way to differentiate oneself. The Management Committee (the Chief Executive Officer, the Chief Financial Officer, and the Medical and Scientific Director) in conjunction with an external board, studies the various options available. This committee is joined by a consultant and Master's student in quality research and a Doctor, quality auditor. Before launching its ISO 9001 quality approach, the Institute evaluates and wins the Quality Award at the national level in 2003 and 2004 and at the sub-regional level, the Quality Program Award of the Economic and Monetary Union of West Africa. With these results and compliance with the organisational decree, this management method could make it possible to ensure cardiovascular care and participate in preventive medicine, teaching and university research.

Management responsibility refers, at a minimum, to what the management team must do to bring the Institute into compliance. To this end, the letter of commitment from the management of 01 March 2004 stipulates that "complete customer satisfaction is an essential objective for the Abidjan Heart Institute. By relying on our competence and technical expertise, we want to increase this satisfaction and meet the expectations of our customers and staff. The first step is to formalize a quality policy and objectives, and then to set up a quality structure. The quality policy was the first action management took to explain why and how it was committed to quality. This first official act states that: "the establishment of this quality system should strengthen and improve the organization and functioning of the establishment; it also aims to guarantee our competence and ensure a better quantitative and qualitative match between our service offer and the needs of the population in accordance with the general objective of the national health development plan". Based on this commitment, management then defined what it wants to improve and in which areas. Communications took the form of fairly frequent meetings and facilitation. All this is contained in a participatory managerial approach with an emphasis on recognizing the efforts of staff. The management had just created a full-time communication function for this purpose. In the 2005 initial audit report, it states: "The objectives are defined at the appropriate levels and functions to define the contribution of the organization's various stakeholders. Action plans are being followed. An organisation chart and function sheets make it possible to define roles and responsibilities for the exercise of authority".

b) The counterparties

The elements that contribute to its acceptance of the effort are the sub-entities and the quality documentation of the organization.

The first concerns the management structure, roles and responsibilities for quality, defined by management. The establishment of a quality committee in charge of managing the quality system, the representation within the quality function's organisation chart, and the implementation of function sheets, met the requirements of the standard. It also requires the appointment of a quality manager whose main role is, in relation to the quality committee, to ensure the implementation and development of the system. But the administrative vacuum of that time led the management to assume this role. It therefore provides a framework, at intervals scheduled for specific meetings to "review" the system with a view to improving it. In Memorandum No I75/MEMSP/ICA/DtionGle of 18 September 2003, a steering committee and a monitoring committee were set up to lead the implementation of the quality approach at the ICA, the External Consultations and Explorations services having been retained for the initial experimentation. The steering committee is composed of the Directors (General, Medical and Scientific, Administrative and Financial); the Deputy Directors of Human Resources and Nursing; the Heads of the Consultations, External Explorations, Pharmacy, Biology, and the Autonomous Service for Control and Evaluation;

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the Quality Coordinator and the Chairman of the Quality Committee. The Monitoring Committee is composed of the Quality Coordinator and the pilots for the consultation, five in number, and four for the external explorations. The role of these committees is to define the objectives and results to be achieved and to ensure that activities are properly carried out as part of the quality approach.

The second forms the documentation that constitutes the main basis of a quality management system. Indeed, the quality culture is more, through its formalism, a culture of the written word than an oral culture. In a 2006 official speech, the Director noted that "oral communication is not prohibited... but it is better to set out the accepted rules in writing (and improve them) than to discuss them each time". The Director also insists on documentation as a fundamental requirement of a quality system and the practical advantages of using writing: "writing requires reflection, allows for the homogenization, memorization and verification of information, becomes a reference that can be easily disseminated, allows the classification and archiving of information (the right document in the right place)". The quality manual is at the highest level of the document pyramid. It defines all the processes on which the organization commits itself to its customers, within the framework of ISO 9001 certification. Its drafting was outsourced and then contextualized by the Management. In this way, by describing the processes, the Directorate ensured that the writing of medical procedures and its meanders constituted a "memory" and a common language for agents, thus contributing to describing and clarifying the value chain. Communication and training are crucial because they prove (to auditors, customers...) the effective implementation of the quality approach. They provide tangible evidence of what has been done, i.e., the activities that have been carried out or the results that have been achieved. All information, documents and records affecting product quality are mandatory. The administrative and medical departments are responsible for ensuring that they are consistent and up-to-date.

c) The facilitations

The facilities concern resource management and mediatized activities.

For the first part, management shows that there can be no obstacles to improving the organization's activities due to a lack or insufficiency of resources. It determines the skills required for staff performing work that affects service quality. It then shows that the institute is able to meet skills needs through training in these different forms (individual, group, distance learning, etc.) or through other actions (recruitment, outsourcing, use of consultants, etc.). Memorandum No. 258/MEMSP/ICA/DG/DAF/S-DRH of 22 September 2003 and No. 196/MEMSP/ICA/DG/DG/DAF/S-DRH of 7 October 2003 designate the persons in service at the Abidjan Heart Institute authorized to take part in the training seminar on Initiation to Quality Management, of 25 and 26 September 2003, in accordance with the following programme:

- Group 1: Thursday, September 25, 2003, from 08 H 30 min to 13 H 30 min and from 15 H to 17 H
- Group 2: Friday 26 September 2003, from 08 H 30 min to 13 H 30 min and from 15 H to 17 H
- Group 3: Thursday, October 9, 2003, from 08:30 am to 1:30 pm and from 3 pm to 5 pm.

These two notes show that the Institute is strengthening the skills of its medical and nursing staff. But also, in order to ensure the reinforcement of skills, it sends collaborators on training or internships in partnership with Canadian and Korean structures, with the objective of acquiring the critical skills to come. This allows us to remain open to good sector practices and to capitalize on them in our operations.

The mediatized activities for the second component, are to be carried out as well as the groups in charge of writing the documentary system, their facilitators are planned and executed. The following dates retrace the main points:

- August 1, 2003: Launch of the quality approach by the ICA Director General;
- October 2003: Diagnostic audit of the Ivorian Quality Award;
- September 2003: Installation of the steering committee and monitoring of the quality approach;
- February 2004: Appointment of a quality manager;
- 3 March 2004: Training on service quality and customer service (UNIDO/UEMOA);
- June 11, 2004: Quality Management System Presentation Dinner at PEKIN;
- 11 March 2005: Launch of the certification project;
- 18 March 2005: Audit of the Ivorian Quality Award 2004 (level 2);
- 1 to 3 June 2005: Training of internal auditors by UNIDO/UEMOA (9/15);
- 20-21 September 2005: ISO 9001 version 2000 certification audit;
- 03-07 November 2008: Renewal audit 1 ISO 9001 version 2000;
- 26, 27, 30 and 31 January 2008: Renewal audit 2 ISO 9001 version 2008 ;
- April 13, 2015: ISO 9001 Certification Audit 2008 version;
- 06 August 2015: Presentation of the Ivorian Quality Award (Excellence Level) edition 2015;
- February 13, 2018: Renewal audit 2 ISO 9001 version 2015.

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This chronology shows that management's responsibility is reflected in a set of strengths. First, there is a demonstrated commitment on the part of the general management, driven by a shared vision and values, which are conducive to the change from an "administrative" institutional culture to an "organizational" culture focused on results and client satisfaction. Then a customer listening system based on a reception and information station provided by hostesses, customer appointment cards containing all relevant information, complaint and complaint forms, customer satisfaction surveys, customer information tables.

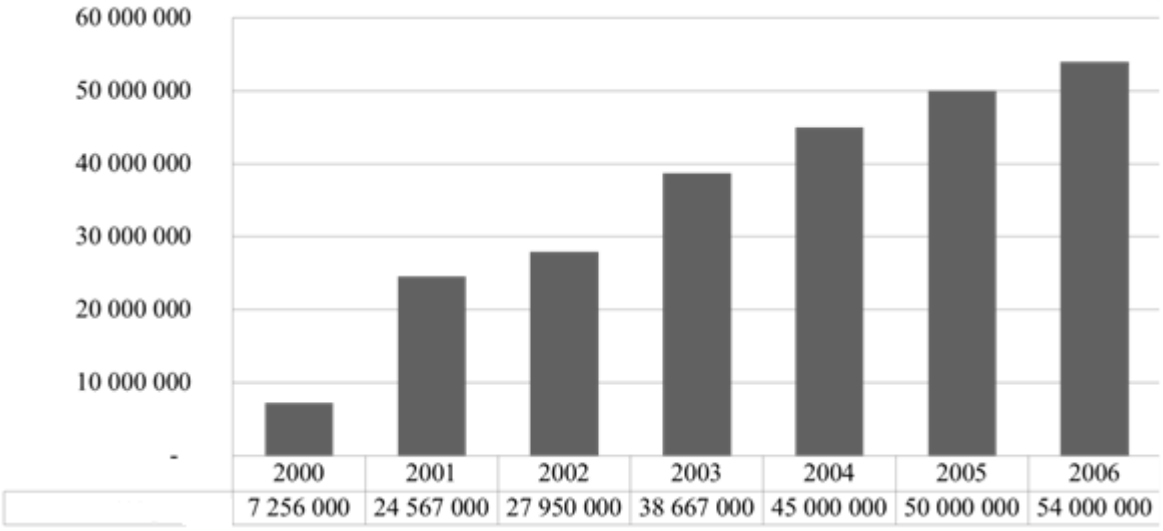
IV. The Organic Logic of Maintaining Quality Approach

Although mechanistic and organic logic is more or less present, coexistence will be made possible by an essentially organic form of adaptation. For Maclouf and de Fabregues (2015), such development occurs not only when the heritage and standards of different sectors merge. Miller and al (2008) point out that multiple actors create new organizational processes and implement new strategies based on hybridity and in response to stakeholder expectations. When coexistence is positive, as in this case, organic adaptation, then cultural and interactive, depends more on the ability to overcome incompatibilities and the trust network built (Eve and Sprimont, 2016).

a) The ability to overcome incompatibilities

Addressing incompatibilities means addressing the challenges that the Heart Institute has as a public organization. The documentary research made it possible to meet the challenges of management commitment, the mobilization of own resources, incentives to be distributed, the satisfaction of staff needs, and the speed with which invoices were processed.

The first element of organic adaptation is management's commitment to the client. Visible through its customer listening system. The Institute monitors client satisfaction using complaint and claim forms, satisfaction forms, process indicators and problem resolution request forms. The second element, resource management, simply reminds us that it is appropriate for the Management to provide the resources compatible with its ambitions. This is not a matter of course for public organizations.



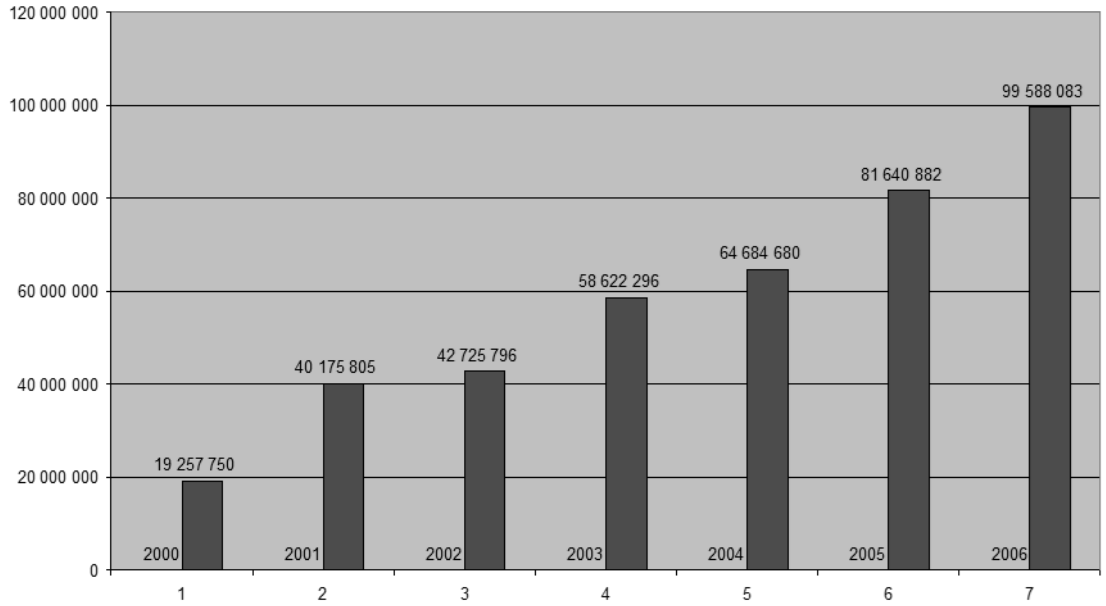
Source: Administrative and Financial Department of the Heart Institute

Figure 1: Own resources mobilized by the Heart[1] Institute

[1] 655 F CFA≈1€

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The Finance Department (Figure 1) indicates that since 2000, own resources have increased from CFAF 7 million to 54 million in 2006, with a steady increase to date. In addition to what is due to them, agents receive special allowances and incentives, which rose from 20 million in 2000 to nearly 100 million in 2006 (Figure 2).



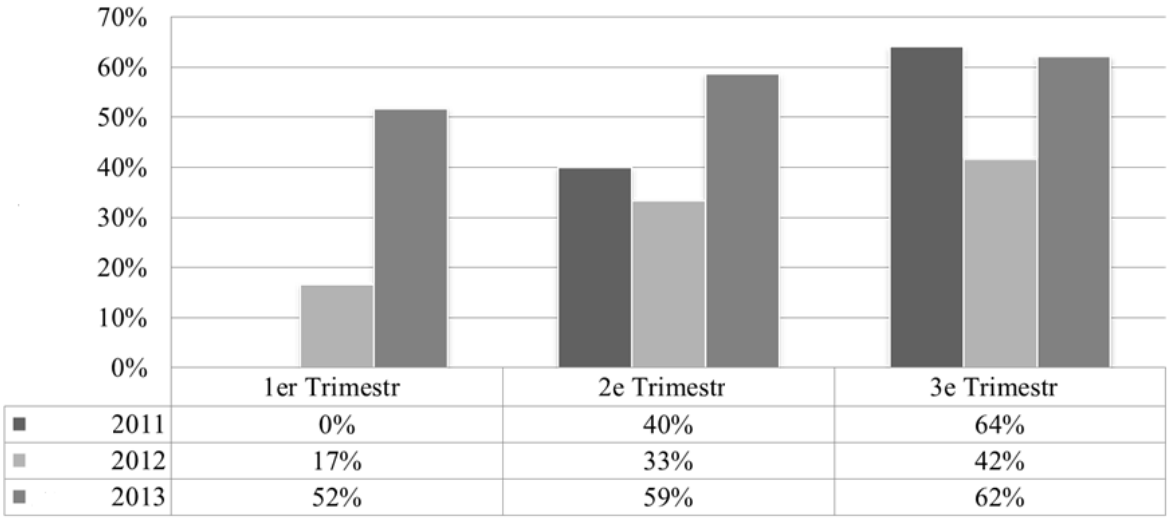
Source: Administrative and Financial Department of the Heart Institute

Figure 2: Evolution of the gross amount of the incentive to be distributed

In the financial reports, it states that "the premium we paid is one of the highest in terms of care EPNs. Where nurses from other university hospitals received about 40,000 FCFA in annual premiums, the minimum amount of the 2016 premium is 237,000 FCA at the Institute.

The third element is related to the provision of the public service. In this case, it is the public service that provides, if necessary, the personnel for all public organizations involving a significant number of employees and the consistent management of a large proportion of the active workforce. However the Institute must ensure that its staff members are aware of the importance of their activities and how they contribute to the achievement of quality objectives. To do so, it must have a choice of these human resources, placing them in a logic of merit and not career. Figure 3 shows that staff shortages have gradually been overcome, supported by the results achieved argument.

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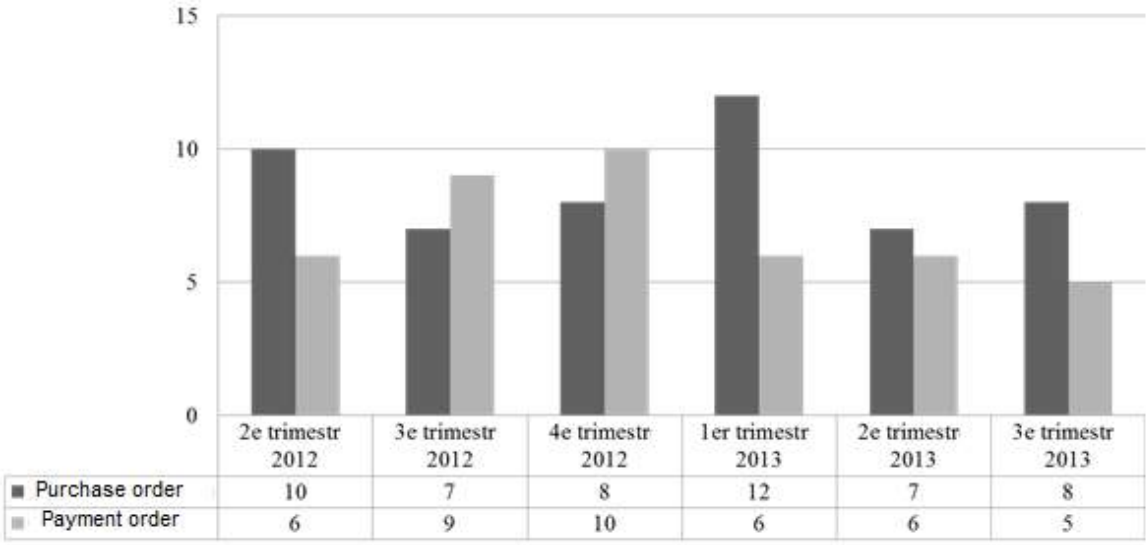


	1er Trimestr	2e Trimestr	3e Trimestr
2011	0%	40%	64%
2012	17%	33%	42%
2013	52%	59%	62%

Source: Administrative and Finacial Department of the Heart Institute

Figure 3: Rate of satisfacation of staff needs

To achieve this level of staff satisfaction, the Institute and the medical services inputs to avoid that the problems generated could lead to a final non-compliance of the service delivered to clients. It does so by committing to minimize the time between the issuance of purchase orders and the payment order between six days and two days with an average of three days (Figure 4).



	2e trimestr 2012	3e trimestr 2012	4e trimestr 2012	1er trimestr 2013	2e trimestr 2013	3e trimestr 2013
Purchase order	10	7	8	12	7	8
Payment order	6	9	10	6	6	5

Source: Administrative and Financial Department of the Heart Institute

Figure 4: Processing time for supplier Invoices

The CFO believes that there would be much to be gained by generalizing this approach because it would avoid a number of time-consuming audits. Here is his speech to the accounting officer: "Do your audit work quickly because behind me I have a supplier waiting for his invoice and an indicator of how long it takes to process invoices! ».

b) The trusted network builds

Trust, the second component of organic logic, makes it likely that hopes for reciprocity will be satisfied. Informal and disruptive mechanisms rely essentially on it to build the network that maintains organic logic (Moulton, 2009; Pyun, 2013). We observe that there is a contingency on the importance of the progress made by the quality approach. To illustrate these cases, the example of pharmacy, communication department, medicine, emergency, medical intensive care and surgical intensive care. Through open-ended interviews, the stories of trust network building seem to be in line with the three perspectives from Eve and Sprimont (2016).

Greater visibility in traceability and thus anticipate problems that may not have been identified.

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Certification has thus obliged the departments concerned to lay the foundations for internal control, which is essential for any deployment of the quality approach (rational perspective).

– Pharmacy: "On the distribution of the drug, we have been warning for years that we are not in the safety conditions provided for by law. Between medical prescription and distribution to the patient, there must be dispensing by the pharmacist: checking the compatibility of products, dosage, making alternative choices if drugs are not available,... and this for each patient. Normally, prescriptions - because the issue is the rupture of a heart and therefore of a life - should arrive at the pharmacy on time. However, everything happens at the stock level with all the possible errors and malfunctions! (Interview with a pharmacist).

– The communication department: "The difficulty of quality is not the objective, it is the means. For example, on the paddle paper, you are told "you have to do both sides", and then when you ask for copies from the reprography department, you are told that you are using too much. For example, in the protocol, it is noted that you have to use 1 package per month, but if you also have to make posters for the other services, then you use 2 or 3, but the protocol says you only need one. (...) So after the countdown, you have more at the end of the month so you ask for more, and you are told that you have already used too much. It's always like that. The economic service deliberately disconnects from the realities on the ground" (Interview with a communicator).

Then a permanent vigilance made mandatory by certification, which makes it possible to report malfunctions and the need for steering tools. The quality approach here plays the role of revealing the need for control tools, which are therefore implemented more quickly (symbolic perspective).

– Surgical intensive care: "What scares us doctors is that when you do an operation that costs you more than expected because the patient stays in hospital two days longer than expected, we are finally told: "The quality is to do less time in hospital". Quality cannot be built on restrictive criteria. The standards scare me a little bit for that. They risk leading to restrictions on medical decisions and this, at the public hospital, is unacceptable" (Interview with a doctor).

– Emergencies: "It's very practical what I'm going to tell you, but see, when you put in infusions for example, you don't follow the protocol, because you don't have the right equipment: you don't always change the infusion tubing, because you don't have the right equipment. So we have to "hurt" in quotation marks. I think it's a little sad. I have the impression that in the Ministry, they do not realize - or else, they realize it and it is even sadder - the seriousness of the lack of personnel and equipment and what it can generate: it is still people's health" (Interview with a doctor).

Finally, a faster integration of both tools and new staff due to the standardised framework it implies, as both the General Manager asserts: "Procedures are not fixed by certification, it makes it possible to go faster because the organisation is more efficient" and one of the deputy quality managers: "Certification allows us to save time, ensure transparency, replace someone quite easily because we are in a framework type" (legitimacy perspective).

– A steering committee: "Even now, when I talk about quality in a working group, I often see ironic smiles from doctors, even if they are selected. The notion of quality is still seen as something superficial, whereas it is the basic foundation of the terrain. Quality is not the smile of the hostess, it is time savings, dysfunctions that disappear. For example, the majority of physicians believe that their promotion to the rank has nothing to do with quality. They don't hang it on the word quality: quality is seen as a trick to please the General Manager" (Interview with a department head).

– Medical intensive care: "Financial problems are always present, but you can't save money on everything. If we want better quality of care for the patient, acts that respect protocols, a good welcome and time with the patient, we need more staff and equipment" (Interview with a nurse).

V. The Mechanisms Structuring the Quality Approach

After describing the different logics, the analysis of the role of the actors is carried out for certain critical tasks of the quality approach. The network actor theory makes it possible to reconstruct the chain of arguments to understand how actors define, associate and negotiate what constitutes their social world (Justesen and Mouritsen, 2011). According to this theory, hybridization can take place when different logics or rationalities are "translated" into each other's language to form a network.

a) A theorization based on translation moments

The key concepts of network actor theory (Callon, 1986) in role analysis are primum movens, actants, translation, network, spokespersons and intermediaries. Hybridization becomes viable thanks to trial and error that furnishes either partial or total translation of the quality logic.

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First moment of translation

The primum movens is the general manager. He is at the initiative of the quality approach and decides to create a pilot team in collaboration with the Management. As a sponsor, he analyses the context in which relationships between agents and processes take place. The reinterpretation of the symbols and rules in force is a moment before the problematization. The sponsor makes this reinterpretation using a constant system of ideas that link goals and missions and that must be preserved (Skelcher and Smith, 2015). It thus builds the informal rules for the interpretation of quality terms that allow communication in the public organization. As the level of professionalization has increased, so has the specificity of reinterpreting symbols and rules. The role of the sponsor and the pilot team is to spread communication flows characterized by a set of new symbols and rules. This means that this reinterpretation must be constantly adapted in order to be heard and understood in the organization. The unique and collective form of problematization becomes an obligatory point of passage (Perray-Redslob and Malaurent, 2015). The idea of the primum movens becomes a point of convergence of polarization, where other actors find their interests.

Second moment of translation

The construction of legitimacy is based on the use of new symbols and rules as language and vocabulary to express oneself. It is also promoted by the fact that primum movens belongs to both the medical and administrative hierarchy. This position reinforces the implementation of the quality approach as an irreversible experience. primum movens establishes the anchoring of quality in the organization's codes, formalized strategies and regulations. These forms of concentrated and repeated decisions involve habits, rituals to think the same way over and over again (Lozeau, 1999; Eve and Sprimont, 2016). These rituals allow for greater effectiveness in organizational collaboration, as they make it unnecessary to revisit the specific form of collaboration in a situation. This translator role is initially assigned to the quality manager. When routine behaviour becomes an asset, it can develop into an institution (Bédé and al., 2012). Based on these rituals, it is necessary to imagine a collective interest of the (hospital) actors in terms of improvements in order to establish and stabilize the identity of the other actors that the entity has defined in its problematization.

Third moment of translation

The management and the project team form a first network. Agents (administrative, medical and technical medical) form several networks, per department, with a clear distinction between the back office and the functions of the core business. The role of the primum movens was to build, through the 2004 and 2005 training sessions, the attributions of the persons who must be held responsible. The construction of the role of each actor through quality documentation, in particular process sheets and flowcharts, evokes the concept of "publicness" (Moulton, 2009). This attachment of the organization to public sector values has been the subject of investment in resources to interpenetrate the two logics. This allowed the management and project team to reduce the complexity of publicness by mobilizing allies. The emphasis on increasing profit-sharing bonuses and staff satisfaction as a means of transfer makes it possible to move from a mechanistic logic to an organic one. However, the objective of investing in resources, that of transferring the decision to agents in order to reduce this attachment, can create paradoxes (Bryson and al., 2013). Indeed, the quality approach may not appear to be justified and definitive and needs to be communicated. These mediatized activities strengthen the networks created.

Fourth moment of translation

The creation of organizational memory is based on the use of symbols, rituals and intense communication, and thus the construction of recurrence, in order to restructure the future ecosystem. Recurrence and repetition in communication flows lead to reconfirmation of expectations regarding codes and concepts promoted by quality (Collm and Schedler, 2013). Blank audits, renewal and certification audits are new practices, based on common knowledge and attitudes between stakeholders (Piening, 2011). The creation of new legitimate concepts is based on these repeated audits, training and communication materials for human actors. Non-human actors, represented by the technical dimension of quality, are perceived in the tools in general (dashboards, complaint forms, problem solving sessions, etc.). This strategy creates pressure for the Institute to recognize the relevance of quality and include it in its daily decision-making processes such as process and leadership reviews. Thus, the quality approach opens a cultural and interactive gap at the opposite of the structural and formal by the redundancy of recognized communications. This shift from mechanistic to organic is based on the use of quality semantics, while maintaining practices and routines (Piening, 2011; Leavengood and al., 2012).

Fifth moment of translation

Addressing certain incompatibilities such as above-average incentive and reduction in supplier processing times and the construction of a permanent method review network signals an organic adaptation. The entire quality documentation system highlights the opposition and alliance games followed by the actors to identify, contain and possibly divert the constraints that weigh on them. These include, for example, the management of drug stocks for the pharmacist and paddles for communication in a logic of efficiency. For

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those involved in decision-making, sociomaterial practices such as steering tools for medical services support identity and the construction of a sense of action. Enrolment will therefore aim to convince others, control their behaviour, gather sufficient resources in a given place has been a way of disseminating the statement in time and space (Wiesel and Modell, 2014). For those who were not involved in the decisions, such as the actors as a whole, mediatized activities and written forms of "quality" routines are tools for promotion and legitimization. They stabilize the continuous replication of quality practices and experience (Rolland, 2009). An organic adaptation is underway since the existing modalities now contain mechanisms similar to those of quality and these mechanisms already have an influence.

b) A synthesis of the quality approach mechanisms

When the sponsor presents the project, the project team learns about it through the sharing of experience. This moment continues until the persuasion and the decision to launch the process. Thus, the organic state represents the opportunity study of the project (1. project) and the responsibility of the management (2. sponsor). The actors and the documentary system are led to form themselves for the creation of sub entities after a decision has been taken. They problematize the challenges and actions of translations into processes. Counterparties are transformations due to the creation of sub-entities (3. Processes) and quality documentation (5. ecosystem). Spokespersons carry out routineization by creating a micro-culture for feedback purposes. Facilitations are resource management (4. Feedback) and mediatized activities (6. Environment). The latter will involve suppliers and customers through feedback to achieve continuous improvement. The following figure illustrates their articulation.

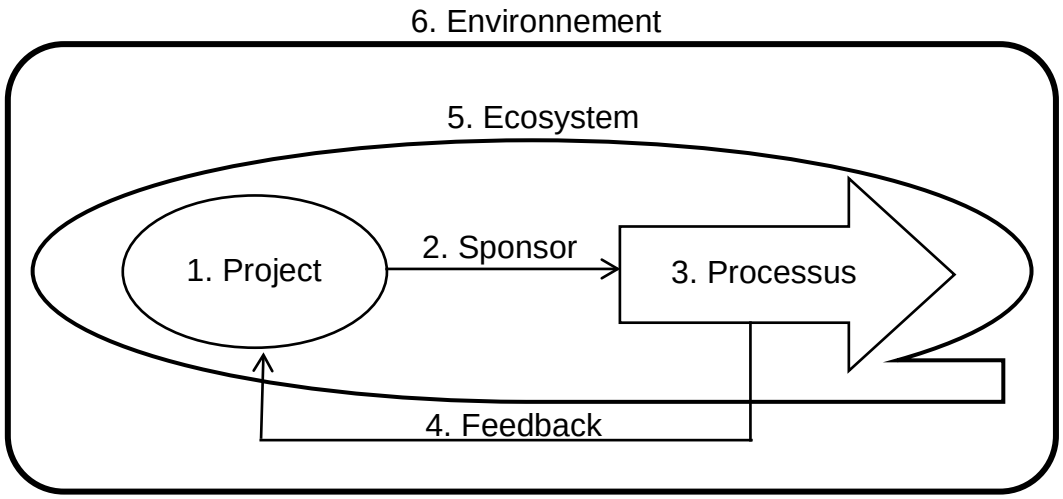


Figure 5: The hybridization system promoted by the quality approach

At first, it remains static to facilitate the introduction of the model into the local context. Once the quality approach has been introduced into the context, hybridization becomes dynamic to maintain or even improve the performance of the approach and to adapt it to the changing environment. Thus, at the beginning of hybridization, new quality practices appear and coexist with the old ones. In the long term, the hybridization observable through certifications goes beyond simple coexistence to innovation.

VI. Conclusion: A Hybridisation System on Consolidation

The proposed hybridization scheme consists of six components: project, sponsor, process, feedback, ecosystem and environment. In the implementation of management systems, Fixsen and al (2012) developed a model with five components: source, destination, communication link, feedback and influence. Collm and Schedler (2013) provide routines, practices, roles, redundancy and semantics as an anchor point. These are elements that must be taken into account by managers when building strategies to ensure adequate hybridization. The starting point is a defined project, quality, the very source of the change that corresponds to the stimuli. Then a sponsor, the general manager and the project team, the communication link that aims to implement change through quality, it constitutes the internal pressure in the sense of Upping and Oliver (2011) These two components are united under the concept of stimulus by Luder (1992). Stimulus refers to events that occur in the first stage of the innovation process and that generate the need for users to improve the existing system. It is up to the sponsor and its

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project team to show that, as Bryson and al. (2014) and Bryson and al. (2013) note, procedures are only of interest when they are the product of controversial exchanges between stakeholders. Perray-Redslob and Malaurent (2015) show that translation is a chaotic process involving multiple times, the initial stages of problematization and profit-sharing. As a first approach, they correspond to temporary sedimentation, which is only of interest if it is continuously reactivated whenever the actors feel it necessary (Fryer and al., 2007). The focal point is the semantics of Collm and Schedler (2013). Then a process that structures the relationships between the recipients of the change leading to changes. Thus, instead of talking about recipients (practitioners or organizations) or obstacles, the concept of process would be appropriate. By communicating on processes, the sponsor avoids data duplication and reduces delays by limiting back and forth between departments (Alford and Yates, 2014). The feedback unanimously mentioned (Fixsen and al., 2012; Alford and Yates, 2014; Eve and Sprimont, 2016) makes it possible to adjust the flow and distribution of information in the public organization. It ensures the adjustment between the processes and the project, allowing information on the approach. We find the idea of redundancy of Collm and Schedler (2013) where the same thing is expressed several times in different forms. The unity constituted by the actors and the non-actors who establish multiple interactions between them through the quality approach builds an ecosystem, a place of mutual influences of the recipients. These are the routines of Collm and Schedler (2013) but with a dynamic orientation. Indeed, a public administration that introduces the quality approach invites its stakeholders to participate in a weakly structured process and thus to develop an innovation. Bryson and al (2013) describe this form of collaboration as open innovation. It is used to achieve agent acceptance of major changes and to improve service and customer orientation, hence the term "dynamic routines". The success of hybridization through procedures must be the continuous expression of a mixture of these conceptions to legitimize itself.

This idea takes up the growing importance of customer requirements towards the quality assurance of the service provided by the implementation of a dedicated quality approach. To evoke this, Luder (1992) refers to structural variables that characterize the social context in the public sector. Upping and Oliver (2011) refer to external pressures. The pretext of the quality approach as a reference framework allows actors to engage in learning but it leads to circular reasoning (Maclouf and de Fabregues, 2015).

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Individual Income Tax Planning Practices in Bangladesh: An Empirical Study

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Abstract- The study strives to explore individual income tax planning practices in Bangladesh using field-level data from 194 assessees. The dichotomous procedure was used to score the items. Analytical results indicate that income tax planning scenario in Bangladesh was in a nascent state as compared to India. In Bangladesh, government and nongovernment employees invested more on investment than on philanthropic items and, they invested more in provident fund, benevolent fund, and group insurance, which were a mandatory for them. Deposit pension scheme (DPS), life insurance, and saving certificate were sequentially top ranking voluntary investment in Bangladesh, whereas life insurance was the highest investment in India. Income tax planning index (ITPI) was towering for tax knowledge seekers, self-return prepares, male and elderly respondents. A positive relationship was observed between tax awareness and individual tax planning that suggests more tax rules conscious individual assessee could enjoy maximum tax rebate in Bangladesh.

Keywords: *income tax planning, income tax planning index, individual assessee, bangladesh.*

GJMBR-D Classification: *JEL Code: H20*



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Individual Income Tax Planning Practices in Bangladesh: An Empirical Study

Dr. Shakhawat Hossain Sarkar [α], Sabuj Chandra Bhowmik [σ] & Dr. Mohammed Hider Ali Miah [ρ]

Abstract- The study strives to explore individual income tax planning practices in Bangladesh using field-level data from 194 assessees. The dichotomous procedure was used to score the items. Analytical results indicate that income tax planning scenario in Bangladesh was in a nascent state as compared to India. In Bangladesh, government and nongovernment employees invested more on investment than on philanthropic items and, they invested more in provident fund, benevolent fund, and group insurance, which were a mandatory for them. Deposit pension scheme (DPS), life insurance, and saving certificate were sequentially top ranking voluntary investment in Bangladesh, whereas life insurance was the highest investment in India. Income tax planning index (ITPI) was towering for tax knowledge seekers, self-return prepares, male and elderly respondents. A positive relationship was observed between tax awareness and individual tax planning that suggests more tax rules conscious individual assessee could enjoy maximum tax rebate in Bangladesh.

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I. Introduction

Tax is a compulsory payment of assessee to the government with no expectation of direct benefits. The government imposes a tax in different forms to meet its expenditure. Based on impact and incidence, taxes are classified into direct and indirect, wherein the former is charged directly on the income or wealth of individuals and firms, but the latter is imposed on the price of goods and services. As a direct tax, the burden of income tax cannot be shifted to others. Income tax is imposed on the total income of an assessee for an income year in the relevant assessment year (subsequent financial year of the income year) at promulgated rates, ranges, and areas of income. There are some well-defined areas on which investment is considered as allowable investment, and there is an option for an individual assessee to get a tax rebate on that invested amount. Investment by an individual assessee on a limit in any or more of the circulated areas in an income year is a way to minimize her/his tax burden within the legal framework. Tax planning is a way to reduce the tax burden of an assessee through investing in the pronounced areas and philanthropic giving under the tax rules. The concept of tax avoidance is also known as tax planning if it is done with the legal framework. Literature support that tax planning is very common among assessees in India. Conversely, individual tax planning picture in Bangladesh is not so due to insufficient literature. In this context, it is imperative to investigate the present tax planning scenario in Bangladesh using field-level data.

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II. Background of the Study

Taxes are a compulsory payment to the government without any expectation of direct return in benefit to the assessee (Taylor cited in Shil, Masud & Alam, 2016). Direct and indirect are two types of tax based on the impact and incidence of tax. Direct tax is paid entirely by those citizens on whom it is imposed, and it cannot be shifted to others. Income tax is one of the significant direct taxes that contributes up to 35.3 percent of the total tax revenue in Bangladesh (Shil et al. 2016) as against up to 52 percent in India (Dey & Varma, 2016). Paying income tax by individuals is always a matter of inconvenience, and hence, every individual tries to minimize their tax liabilities through legal means (Dey & Varma, 2016). Tax planning is a strategy of reducing tax liability of individuals or firms by evaluating the tax implications of various options in an income year (Shil et al. 2016). Tax planning is the arrangement of one's financial affairs in such a way that full advantage is taken in the form of tax exemptions, deductions, concessions, rebates, allowances and other reliefs or benefits permitted under the Income Tax Act (Vasanthi, 2015). Efficient tax planning enables an assessee to reduce her/his tax liability to the minimum. This is done by taking legal advantage of all tax exemptions, deductions, rebates, and allowances while ensuring that investments are in line with long-term financial and strategic goals (Savita & Gautam, 2013). The tendency of savings and investment through proper tax planning by individuals is increasing gradually. The small investments of individuals greatly contribute to the development of a nation. In India, households are the largest contributor (around 70 percent of domestic savings) to the national pool of savings (Rajeswari, 2014). That is why it is essential to observe individual tax planning practices so that the tax burden of individual assessees can be reduced within the legal framework through increased use of investment allowance on the pronounced areas. In this regard, this study area has

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been selected to explore and address individual tax planning issues.

III. Justification

Government expenditures for economic growth and development as well as balances and social equality heavily depend on tax levy and tax payment mechanisms of a country. There are lots of available opportunities for tax avoidance within the legal framework through contributing to human welfare and investing in different pronounced areas which induce further economic growth and development. From the theoretical and practical point of view the study is important for several reasons. First, this study will enrich the existing stock of knowledge in the field of taxation in Bangladesh. Second, findings would help the policy planners/ decision levels authorities to make suitable policy measures to drive maximum benefits from the increased number of welfare activities by individual assessees. Finally, findings would help to form capital through reducing the tax liability of individual assessees.

IV. Objective and Scope of the Study

The study is an attempt to evaluate the tax planning practices of individual assessees in Bangladesh. The study also strives to track different tax savings schemes available for individual assessees in Bangladesh. Thus the scope of the study is limited to tax planning measures adopted by individual assessees in Bangladesh.

V. Methodology

It is empirical research based on both primary and secondary sources of data. It is also a mixed method of research as both qualitative and quantitative data, and methods of analysis have been used. Individual assessees in Bangladesh were the population of the study. The sample size of the study was 194 individual assessees. The primary data was collected through administrating semi-structured questionnaire with the combination of both open ended and close ended questions relating to tax planning practices of individuals.

To find out the levels of income tax planning (ITP) scenario, 28 items (Appendix-1) were selected through a review of related literature and income tax laws. The study considered 'Income Tax Planning Index (ITPI)' as the dependent variable. There are various approaches available to develop a scoring scheme for determining tax planning practices. Among the alternative, unweighted disclosure index approach was used to measure the extent of income tax planning practices. All items of information (compliance information) in the index were considered equally important to the average users. To compute ITPI, a dichotomous procedure was followed where each of the compliance items awarded a score of 'one' if the assessee complied with the concerned item and '0' otherwise. Comprising the score of the compliance items a dependent variable was determined as Income Tax Planning Score (ITPS) for each assessee was obtained through accumulating the score of all compliance items of an assessee as follows:

$$ITPS = \sum_{i=1}^{n} di$$

Where,

d= 1 if the assessee practiced the item d_i

d= 0 if the assessee did not practice item d_i

n= number of items

ITPI of each assessee was computed by using the following formula:

$$ITPI = \frac{\text{ITPS of Individual Assessee}}{\text{Maximum Possible Score Obtainable}} \times 100$$

Data were analyzed by using different statistical tools to disclose the results. Frequency and percentile were used through STATA version 14 to get results. As stated earlier, the dependent variable of the study was ITPI.

VI. Review of Literature

Related and relevant available literature at home and abroad was reviewed to find out the research gap, formulating research questions, and to limit the scope of the research. The outcome of the review of literature is summarized below.

Tax planning means to create situations and investment portfolios, which are tax efficient. It is about taking maximum advantage of exemptions, deductions, rebates, and reliefs allowed for under the act to reduce the tax liability to its minimum (Mathew, 2016). Tax planning involves efficient use of various provisions and loopholes of tax laws to reduce the rate of tax and tax burden of an assessee (Pallavi & Anuradha, 2017). Tax planning is an assortment of financial activities in such a way that could maximize tax benefit by making the use of all beneficial provisions in the tax laws; it entitles an assessee to avail certain exemptions, deductions, rebates and reliefs to minimize her/his tax liability (Mansuri & Dalvadi, 2012). Tax planning can be defined as an arrangement of one's financial and business affairs by taking lawful benefit of all deductions, exemptions, allowances, and rebates to reduce the tax liability to its minimum (Saravanan & Lakshmi, 2017). Based on the tax benefit received by the assessee, tax planning can be divided into two types: short range tax planning and long-range tax planning. The act of long-range tax planning is more beneficial for assessee as well as for the government (Pallavi & Anuradha, 2017). Tax avoidance is the legal exploitation of the tax rules to one's advantage and to reduce tax burden within the

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law (Shil et al. 2016). Tax evasion is unlawful, tax avoidance is not an offense, but tax planning is ethical and lawful. Tax planning is vital for every assessee to reduce their tax liability and compliance with the income tax rules (Dey & Varma, 2016). Tax planning is not for a few, but all honest and prudent assessees. A wrong choice may lead to an agonizing burden while a right step in the right direction through proper tax planning may lead to tax savings (Metha cited in Vasanthi, 2015). All transactions in respects of tax planning must be by the true spirit of statute and should be correct in form and substance (Savita & Gautam, 2013). Tax planning doesn't mean not paying taxes, it just means being smart about where to place money to get maximum investment allowance (Mansuri & Dalvadi, 2012). Tax planning does not mean skipping the payment of income tax; it is just an efficient allocation of earned income in different tax savings investment instruments to attain maximum benefits by an assessee (Kalgutkar, 2018). Tax planning is a process of evaluating the financial profile of individuals and businesses to reduce the tax amount on business income or personal earnings (Mgammal & Ismail, 2015).

In India, households are the largest contributors to the national pool of savings. Their share in net domestic savings in India remains around 70 percent on an average (Rajeswari, 2014). The highest number of respondents invested in the life insurance policy (41 percent) and the second most preferred tax savings investment is in public provident fund (21 percent) (Jose & Joseph, 2016). In another study on India shows that 88.3 percent of the respondent assessees have invested in the life insurance policy (Arara & Gupta, 2017). Individuals in higher age group, state, and central government employees, and more skilled employees are very cheerful with their tax planning schemes. The level of satisfaction also does not vary among the educational level (Vasanthi, 2014). The most used tax saving device in India is the life insurance policy followed by the provident fund (Savita & Gautam, 2013).

Thus it is evident from the review of available literature that many research works have been done on individual tax planning in India. There is some literature on corporate tax evasion and avoidance in Bangladesh. But there is hardly any literature on individual tax planning in Bangladesh context. Here is a research gap, and that's why the present study is an attempt to fill in this gap.

VII. Results and Discussion

The results on individual tax planning practices with a brief discussion are presented in this section. An item-wise frequency distribution on tax planning practices relating to investment and donation is presented in tables, and a brief explanation is given after that. Tax planning practices are analyzed through descriptive statistics.

a) Actual Investment and Donation

Table-1 demonstrates that the individual tax planning practices in investment items were higher than donation/ philanthropic items in the promulgated areas. Most of the assessees under the study contributed to benevolent fund (60.31 percent), provident fund for government employees (53.61 percent), group insurance scheme (45.36 percent), and recognized provident fund (39.18 percent). It should be mentioned here that all of the above mentioned four items were under mandatory investment for individuals employed in government organizations and some private organizations. So, the credit for investment in the above-mentioned areas should not go to individual assessees. There were several voluntary investment schemes available to individual assesses, and that should be the focal point of tax planning practices. From this viewpoint, highest investment was made by individual assessees in deposit pension scheme (40.72 percent) followed by life insurance premium (36.60 percent), and investment in saving certificate (31.44 percent) in that order. In India, life insurance was the first tax saving instrument, and the provident fund was the second most adopted tax saving instrument (Savita & Gautam, 2013). A few individual assessees invested in a superannuation fund (13.40 percent), in stock, shares, etc. (13.40 percent), in the desktop computer (20.10 percent), in laptop computer (19.59 percent), and in Government Treasury Bond (0.52 percent).

It is also evident from table-1 that the actual scenario of donation by individual assessees was very insignificant in Bangladesh. Highest by individual assessees was in Zakat Fund (5.67 percent) followed by jointly in prime minister's relief fund (3.09 percent) and welfare institutions for disabled people (3.09 percent). No donation was made to Aga Khan Development Network, ICDDRB, CRP Savar, and Asiatic Society of Bangladesh. Only 0.52 percent individual assessees invested in a charitable hospital approved by National Board of Revenue (NBR), *Muktijuddho Jadughor*, *Ahsania* Mission Cancer Hospital, National level institutions set up for the commemoration of the liberation war, Science and Technology Fund under the Ministry of Science and Technology, etc.

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Table 1: Distribution of tax planning practices

Investment and donation are made in the assessment year	Frequency			Percent		
	Yes	No	Total	Yes	No	Total
Investment						
Payment of life insurance premium	71	123	194	36.60	63.40	100
Contribution to provident fund of government employees	104	90	194	53.61	46.39	100
Employers and employees' contribution to recognized provident fund	76	118	194	39.18	60.82	100
Contribution to benevolent fund	117	77	194	60.31	39.69	100
Contribution to group insurance scheme	88	106	194	45.36	54.64	100
Contribution to superannuation fund	26	168	194	13.40	86.60	100
Contribution to deposit pension scheme	79	115	194	40.72	59.28	100
Investment in savings certificate	61	133	194	31.44	68.56	100
Investment in stocks, shares, mutual fund or debenture of listed company at stock exchange in Bangladesh	26	168	194	13.40	86.60	100
Investment in government treasury bond	1	193	194	0.52	99.48	100
Investment in desktop computer	39	155	194	20.10	79.90	100
Investment in laptop computer	38	156	194	19.59	80.41	100
Donation/ Contribution to-						
National level institutions to commemorate the Father of the Nation	5	189	194	2.58	97.42	100
Zakat Fund (giving to poor Muslims)	11	183	194	5.67	94.33	100
Charitable Hospital approver by NBR	1	193	194	0.52	99.48	100
Institutions set up for welfare of disabled people	6	188	194	3.09	96.91	100
Muktijuddho Jadughor	1	193	194	0.52	99.48	100
Prime Minister's Relief Fund	6	188	194	3.09	96.91	100
President's Relief Fund	3	191	194	1.55	98.45	100
Aga Khan Development Network	0	194	194	0	100	100
ICDDRB	0	194	194	0	100	100
CRP, Savar, Dhaka (Hospital for paralyzed & disabled people)	0	194	194	0	100	100
Philanthropic or Educational Institutions	2	192	194	1.03	98.97	100
Asiatic Society of Bangladesh	0	194	194	0	100	100
Ahsania Mission Cancer Hospital	1	193	194	0.52	99.48	100
National level institutions set up to commemorate the liberation war	1	193	194	0.52	99.48	100
Science and Technology Fund of the Ministry of Science and Technology	1	193	194	0.52	99.48	100
Others	1	193	194	0.52	99.48	100

Source: Analysis of primary data

b) Tax Planning Index

Tax planning index is analyzed from different viewpoints, and a brief explanation is presented below.

i. *Summary of ITPI*

It is evident from Table-2 that the mean ITPI was 14.08, which was very low in Bangladesh as compared to India because 81 percent of Indian respondents had planned their tax (Mansuri & Dalvadi, 2012). There are high variations of ITPI among the individual assessees as the standard deviation (7.34), and range (50) are high. It should be mentioned here that the minimum practice index is zero (0) under the study. The variation implies that the mean alone is not able to represent the overall scenario due to the high standard deviation of ITPI among the respondents.

Table 2: Summary statistics of tax planning

Statistics	Result
Mean	14.08
Standard Deviation	7.34
Standard Error	.53
CV	.52
Maximum	50.00
Minimum	0
Range	50.00

Source: Analysis of primary data

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ii. *ITPI based on Profession*

It is evident from table-3 that the ITPI of other professions is the highest (20.54) followed by engineers (19.64), government job holders (15.95), and lawyers (17.86) in that order. ITPS of these four categories respondents is higher than the overall ITPI of 14.08. ITPI of all other professions is less than overall ITPI under the study.

Table 3: ITPI based on profession

Profession	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Government Job	15.95	8.78	1.13	.55	50.00	0	50.00	60
Private Job	11.52	6.05	.83	.53	28.57	3.57	25.00	53
Doctor	13.69	7.29	2.98	.53	25.00	3.57	21.43	6
Engineer	19.64	10.31	5.15	.52	28.57	10.71	17.86	4
Teacher	13.89	6.16	.78	.44	28.57	0	28.57	63
Business	8.52	4.12	2.38	.43	14.29	7.14	7.14	3
Lawyer	17.86				17.86	17.86	0	1
Others	20.54	3.42	1.71	.17	25.00	17.86	7.14	4
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

iii. *ITPI based on Study Discipline*

Table-4 indicates that ITPI of the respondents of law educational background (23.21) is the highest, followed by science educational background (15.73), business education background (14.77), medical education background(14.73), arts education background (13.54), social science education background (13.13), others (8.33) in that order. ITPI of law, science, business, and medical, educational are above the overall ITPI, while ITPI of the respondents of all other education backgrounds is lower than the overall ITPI of 14.08.

Table 4: ITPI based on study discipline

Study Discipline	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Science	15.73	5.80	.89	.37	28.57	3.57	25.00	42
Engineering	12.38	8.52	2.20	.69	28.57	0	28.57	15
Medical	14.73	8.63	3.05	.59	28.57	3.57	25.00	8
Law	23.21	7.58	5.36	.33	28.57	17.86	10.71	2
Business	14.77	8.28	1.15	.56	50.00	3.57	46.43	52
Social Science	13.13	7.24	1.19	.55	35.71	0	35.71	37
Arts	13.54	6.57	1.22	.48	28.57	0	28.57	29
Others	8.33	3.99	1.33	.48	14.29	3.57	10.71	9
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

iv. *ITPI based on Education Level*

Table-5 demonstrates that ITPI of the respondents of other education levels (Ph.D., MPhil, Second Masters, etc.) is the highest (16.90). ITPI is very low for the respondents who had Higher Secondary education. It should be mentioned here that the ITPI of the respondents of the graduation level education (11.16) and master's level education (13.98) are less than the overall ITPI of 14.08 under the study. In India, the satisfaction level on tax planning schemes did not differ among the educational level (Vasanthi, 2014).

Table 5: ITPI index based on the education level

Education Level	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
HSC	8.93	2.53	1.79	.28	10.71	7.14	3.57	2
Graduation	11.16	6.10	1.52	.55	21.43	0	21.43	16
Masters	13.98	7.52	.61	.54	50.00	0	50.00	150
Others	16.90	6.35	1.25	.38	28.57	3.57	25.00	26
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

v. *ITPI based on Gender*

It is evident from table-6 that the ITPI of male respondents (14.38) is higher than the female respondents (12.48) under the study. But the variability of ITPI among male respondents is higher than female respondents in terms of SD, CV, and range but lower in

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terms of SE of mean. So, the male respondents had applied more tax planning than female respondents under the study. Similar results were observed in the India context, where male respondents used more tax planning measures than female (Vasanthi, 2014).

Table 6: ITPI based on gender

Gender	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Female	12.84	6.27	1.03	.49	28.57	3.57	25.00	37
Male	14.38	7.55	.60	.53	50.00	0	50.00	157
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

vi. *ITPI based on Age Group*

It is evident from table-7 that ITPI of the respondents under the age group of 55 to 60 years is the highest (17.35), the second position goes to the age group of 50 to 55 years (16.07), and the third position goes to the age group of 40 to 45 years (15.70). It should be mentioned here that ITPIs of the above mentioned three age groups respondents is higher than the overall ITPI of 14.08. ITPI of 25 to 35 years and 45 to 50 years respondents are lower than the overall ITPI of 14.08 under the study.

Table 7: ITPI based on age group

Age group (in Year)	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
25-30	11.58	5.54	1.03	.48	21.43	0	21.43	29
30-35	13.34	7.74	1.11	.58	28.57	0	28.57	49
35-40	14.21	6.45	.95	.45	28.57	3.57	25.00	46
40-45	15.70	7.31	1.19	.47	35.71	3.57	32.14	38
45-50	14.04	11.09	2.86	.79	50.00	3.57	46.43	15
50-55	16.07	6.79	2.15	.42	25.00	3.57	21.43	10
55-60	17.35	6.33	2.39	.36	28.57	10.71	17.86	7
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

vii. *ITPI based on Tax Payment Period*

Table-8 demonstrates that the assessees who have been paying tax from 9 to 12 years (18.03) showed the highest ITPI followed by 13 to 16 years (15.91), and 5 to 8 years (14.85) in that order. It should be mentioned here that ITPI of the above mentioned three groups of respondents is higher than the overall ITPI of 14.08. ITPI of the respondents of 1 to 4 years and 17 to 20 years under the study are lower than the overall ITPI of 14.08.

Table 8: ITPI based on the tax payment period

Period of tax payment (in Year)	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
1-4	12.77	6.47	.64	.51	28.57	0	28.57	101
5-8	14.85	8.08	1.07	.54	50.00	3.57	46.43	57
9-12	18.03	8.02	1.75	.45	35.71	3.57	32.14	21
13-16	15.91	7.88	2.38	.50	25.00	3.57	21.43	11
17-20	10.71	2.92	1.46	.27	14.29	7.14	7.14	4
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

viii. *ITPI based on Return Prepared by the Assessee*

Table-9 indicates that ITPI of the respondents is higher who prepare their tax return (14.31) than who do not their tax return (13.49) under the study. So there is a positive relationship between income tax return preparation and ITPI.

Table 9: ITPI based on a return prepared by the assessee

Self Return Filled Up	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Yes	14.31	7.17	.61	.50	35.71	0	35.71	140
No	13.49	7.78	1.06	.58	50.00	3.57	46.43	54
Total	14.08	7.34	.53	.52	50	0	50.00	194

Source: Analysis of primary data

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ix. *ITPI based on Seeking Tax Knowledge*

It is evident from table-10 that ITPI is higher for the respondents who seek tax knowledge (14.54) than who do not tax knowledge (12.16) under the study. So the level of tax planning is dependent on the interest of acquiring tax knowledge.

Table 10: ITPI based on seeking tax knowledge

Seeking Knowledge	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Yes	14.54	7.86	.63	.54	50.00	0	50.00	157
No	12.16	3.99	.66	.33	21.43	3.57	17.86	37
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

x. *ITPI based on Getting Maximum Tax Rebate in AY 2017-2018*

Table-11 testimony that ITPI is higher (15.03) for the respondents who got a maximum tax rebate in the assessment year (AY) 2017-2018 than who did not maximum tax rebate (12.84) during the same period. So, the amount of tax rebate depends on the level of tax planning (ITPI) by the assessees.

Table 11: ITPI based on getting a maximum tax rebate

Getting Maximum Rebate	Mean	Standard Deviation	SE (Mean)	CV	Maxima	Minima	Range	Number
Yes	15.03	8.32	.79	.55	50.00	0	50.00	110
No	12.84	5.60	.61	.44	28.57	0	28.57	84
Total	14.08	7.34	.53	.52	50.00	0	50.00	194

Source: Analysis of primary data

VIII. Findings

After analysis and interpretation of results, some mentionable findings are summarized. ITPI was very low in Bangladesh as compared to India. ITPI of an engineer, government job holders, lawyers, and other professions were higher than overall ITPI. Income tax planning on donation items was very insignificant as compared to investment items for the tax rebate. There was a positive relationship between income tax planning and seeking tax knowledge as well as between income tax planning and preparers of own tax return. ITPIs of the respondents in the categories of business, science, and medical education background was higher than the overall ITPI whereas ITPIs of all other education disciplines were lower than overall ITPI. Male respondents were involved in more tax planning than female respondents to reduce tax burden through investing in the pronounced allowable investment areas. ITPI was higher for the respondents who got maximum tax rebate than who did not get a maximum tax rebate. Aged respondents were involved in more tax planning than low aged respondents. ITPI was higher of the respondents who had been paying tax for a long period under the study.

IX. Conclusion

Individual tax planning is the process of reducing the tax burden by investing in the pronounced allowable sector within the legal frame. The objective of public finance is to meet the funding requirements of the government. A mentionable part of public finance comes from taxes. An individual assessee tries to reduce her/his tax burden in different ways. Some of the ways are within the legal frame, and some of those are not supported by tax laws, rules, etc. By using primary sources of data, collected through administering the semi-structured questionnaire, the study has strived to find out the level of individual tax planning practices following tax laws.

The study results indicate that the ITPIs of different categories of individual assessee is very low and fluctuating in Bangladesh as compared to India. Increased number of tax planning may help augment capital formation, enhance tax payment propensity, and rapid development of the country because individual assessees get the chance of tax reduction through tax planning. The study has discovered a new avenue of research on tax planning of individual assesse in the context of developing countries like Bangladesh. Future researches may research to measure the impact of tax planning on individual assessees, the contribution of tax planning in capital formation, corporate tax planning practices, the impact of corporate tax planning on firm performance and value.

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Appendix-1

List of income tax planning information items are-

No.	Information Items
1.	Payment of life insurance premium
2.	Contribution to provident fund of government employees
3.	Employers' and employees' contribution to recognized provident fund
4.	Contribution to benevolent fund
5.	Contribution to group insurance scheme
6.	Contribution to superannuation fund
7.	Contribution to deposit pension scheme
8.	Investment in savings certificate
9.	Investment in stocks, shares, mutual fund or debenture of listed company at stock exchange in Bangladesh
10.	Investment in government treasury bond
11.	Investment in desktop computer
12.	Investment in laptop computer
13.	Donation to national level institution set up in memory of Father of the Nation
14.	Donation to Zakat Fund
15.	Donation to Charitable Hospital approver by NBR
16.	Donation to the institution set up to welfare of disable people
17.	Donation to *Muktijuddho Jadughor*
18.	Contribution to Prime Minister's Relief Fund
19.	Contribution to President's Relief Fund
20.	Contribution to Aga Khan Development Network
21.	Contribution to ICDDRB
22.	Contribution to CRP, Savar
23.	Contribution to Philanthropic or Educational Institution
24.	Contribution to Asiatic Society of Bangladesh
25.	Contribution to *Ahsania* Mission Cancer Hospital
26.	Donation to National level institution set up in memory of the liberation war
27.	Donation to science and technology fund, Ministry of science and technology
28.	Others

Source: Review of related literature and income tax laws

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Effect of 2014 PRA on Management of Retirement Benefits in Public Sector Organizations

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Abstract- The study is on the effect of 2014 Pension Reform Act in management of retirement benefits of selected public sector organizations (federal parastatals in Anambra state). The study examined the appropriateness of documentation by Pension Fund Administrators and its effects on the time lag before pensioners receive their lump sum (gratuity).It also determined the level of accuracy in computation of pension. To streamline the study, two research questions and two hypotheses were formulated. A descriptive survey research design was adopted for the study. The population of the study consisted of 128 pensioners from NIPOST, INEC and NPC Anambra state who retired under 2014 Pension Reform Act. Due to the smallness of the population size, the entire population was used as the sample size. Data for the study was collated through primary source (questionnaires).The reliability of the instrument was ensured using pilot test and analyzed using Cronbach Alpha, it yielded a reliability co-efficient of 0.85. Analysis of variance was used to analyze the data collated. The result of the analysis revealed that the level of accuracy in computation of pension is not very satisfactory.

Keywords: pension reform act (PRA), management, retirement benefits and public sector.

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Strictly as per the compliance and regulations of:

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Effect of 2014 PRA on Management of Retirement Benefits in Public Sector Organizations

Molokwu, Ifeoma Mirian [α], Uchenu Chimezie Ada [σ] & Ufoaroh, Ebele Theresa [ρ]

Abstract- The study is on the effect of 2014 Pension Reform Act in management of retirement benefits of selected public sector organizations (federal parastatals in Anambra state). The study examined the appropriateness of documentation by Pension Fund Administrators and its effects on the time lag before pensioners receive their lump sum (gratuity).It also determined the level of accuracy in computation of pension. To streamline the study, two research questions and two hypotheses were formulated. A descriptive survey research design was adopted for the study. The population of the study consisted of 128 pensioners from NIPOST, INEC and NPC Anambra state who retired under 2014 Pension Reform Act. Due to the smallness of the population size, the entire population was used as the sample size. Data for the study was collated through primary source (questionnaires).The reliability of the instrument was ensured using pilot test and analyzed using Cronbach Alpha, it yielded a reliability co-efficient of 0.85. Analysis of variance was used to analyze the data collated. The result of the analysis revealed that the level of accuracy in computation of pension is not very satisfactory. This means that pensioners are still being under paid. Furthermore, the analysis also showed that payment of pension is irregular. The study recommended that the PFAs should improve on the level of accuracy in computation of pension contributions to eliminate the underpayment of pensioners. Finally, the payment of pension under 2014 Pension Reform Act should be made regular.

Keywords: pension reform act (PRA), management, retirement benefits and public sector.

I. Introduction

Management of retirement benefits is one of the problems facing Nigerian financial sector. Several efforts in the form of reforms have been made towards solving the problems but they still persist. Pension undoubtedly constitutes one of the bedrocks of public service in Nigeria. It was with this understanding that federal government has continuously embarked on reforms in the sector not only to save it from collapse but also to improve on its operations, especially the management of pensioners and their retirement benefits. Although Nigeria got her independence from the British Colonial Master, she still retained the colonial system of paying pension and gratuity to her retirees. The civil war in Nigeria ended in 1970 but because of the declaration of no victor no vanquish, the Federal Government took over the payment of pensions and gratuities throughout the Federation. However, on March 31st 1976 the Federal Government relinquished the payment of pensions and gratuities to state government except those of federal workers.

Pension and gratuity which are under exclusive establishment matters have seen several reviews. The first was the Pension Act No.102 of 1974 which came as the legislation guiding the reorganization of the pension program in the public service. The second reform was in 1992 empowering the Parastatals to establish separate boards of trustees for management of their own Schemes. The third reform came as Decree 77 of 1993 and it established the Nigeria Social Insurance Trust Fund (NSITF) which replaced the old National Pension Fund managed by the Federal Government for the Private Sector. This Pension reform also known as Defined Benefit Scheme in the public sector has increasingly become unsustainable and further compounded by increase in salaries and pensions as costs constitute a significant proportion of personnel cost of various tiers of government. The Scheme was therefore fiscally unsustainable. On 25th June, 2004, a New Pension Reform Act bill was passed by the National Assembly and granted assent by our President (National Pension Commission 2004). President Obasanjo in his explanation after signing the bill into law, said that the New Pension Reform Act would help workers to secure their future and live comfortably after retirement.

However, none of these reforms could satisfactory improve the management of the retirement benefits to an appreciable level. Retired workers are still complaining of not being adequately catered for by the Scheme. It was against this backdrop that Nigerians whole heartedly welcomed the 2014 Pension Reform Act which established a higher contributory pension system.

II. Statement of Problem

There are some problems militating against the smooth operation of the2014 pension scheme. One of such problems is improper documentation which could

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be the discrepancies that arose in the registration of retiring workers into the scheme. Secondly, sometimes Pension Fund Administrators (PFA) may miscalculate someone's actual financial entitlements. The investments made by Pension Fund Managers as a result of capital market crises could not yield much and some of them lost the capital they invested. All these among others created problems in the implementation of the program.

III. Objectives of the Study

The main objective of this study is to examine the effect of 2014 Pension Reform Act on Management of Retirement Benefits in Public Sector Organization. In order to achieve this, the study was guided by the following specific objectives:

1. To determine the level of accuracy in the computation of pension contributions.
2. To examine whether payment of pension is regular.

IV. Research Hypotheses

1. Improper documentation has no significance effect on the time lag before pensioners receive their lump sum (gratuity).
2. There is irregular payment of pension under the new scheme.

V. Conceptual Framework

Conceptually, Pension is the amount paid by government or company to an employee after working for some specific period of time, considered too ill to work or have reached the statutory age of retirement (Ojiya, Ajie & Isiwu, 2017). It is a monthly sum paid to a retiree until death, because the person has worked for the organization paying the sum.

Nnanta and Ugwu (2011) also defined pension as a method whereby a person pays into pension scheme a proportion of his earning during his working life. The contributory pension provides an income (or pension) on retirement that is treated as earned income. On the other hand, gratuity is a lump sum of money payable to a retiring officer who has served for a specified minimum period of time.

It can also be seen as an arrangement whereby an employer provides benefits to employees after they retire from service. The essence of pension payment or income is to help the retiree to continue enjoying the basic standard of living that he could afford during his active working life to enable him live longer. Olanrewaju (2011) opined that the purpose of the pension is to provide officers of an organization with a means of securing on retirement, a standard of living reasonably consistent with what they enjoyed while in service. However these benefits could also be paid in the event of death or total disability.

Amadeo (2018) sees pension as investments pool that pay for employee's retirement commitments. Corporations and all levels of government provide pensions. The fund managers invest these contributions conservatively. They must avoid losing the principal and beat inflation. Pension can be defined as a steady income given to a person usually after retirement from active service, payment made in form of guaranteed annuity to a retired or disable employee. It could also come in form of death benefits which is amount paid to someone's widow, widower, children or next of kin at the death of the employee on active service.

VI. Brief History of Pension Scheme in Nigeria

The pension scheme was established by the colonial administration in 1951.The law that established it was called Pension Ordinance of 1951, this law which was promulgated in 1951 had a retrospective effect from 1st January 1946.It is also necessary to note that after the introduction of the pension scheme in 1951, there were pension increment in the subsequent years. The first increment was in 1974, the changes it introduced in the pension payments were as follows:

Pensioners earning less than #720 per annum had their rates increased by 50% subject to a minimum of #360 per annum

Pensioners earning #720 and above had theirs increased by 40% or #400 whichever is higher.

Those earning over #3000 were to receive 30% or #900 per annum whichever is higher.

Another increment came in June 1979 before the first reform that came in September of the same year. This was 10% flat upgrading in all pension sums. The reform was introduced before the Nigerian second republic; it was in the exercise of the exclusive powers of the federal government over matter relating to pensions and gratuity scales devised for the public officers by Udoji Public Service Review Commission in 1974.The Pension Act No. 102 of 1979 was the basic pension law from which other pension laws in public service of Nigeria have developed. The other laws which originated from the Pension Act No 102 of 1979 are:

The Armed forces Pension Act No 103 of 1979.

The Pension Right of Judges Act No 5 of 1985.

The Amendment Act No.51 of 1988

After the pension reforms Act 102 and 103 of 1979, there were increase in pension in the subsequent years. The second reform came into effect on 1st June 1992 under the administration of Nigeria Head of state General Ibrahim Babangida. This reform authorized the parastatals to introduce a separate Board of trustees for the management of their own schemes. It came with 5% increase across board.

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The third reform came under Decree 77 of 1993 and from the same administration that introduced the 1992 reforms. It took effect from 1st June 1993 and established the Nigeria Social insurance Trust Fund (NSTIF) to replace the old National pension Fund managed by the federal government for the private sector. This reform equally brought an increase of 10% to that of 1992 (Njuguna, 2010).The innovation included the Private sector in the Pension matters and followed by other increments such as

New pension increment of 1st October, 1993 moved the rate up to 45% of the value of old increase.

Another increase came on 1st October, 1999 and moved the rate by 5%.

The next increase was actually made which increased the rate by 30%.

Exactly four months after the last pension increase, another outstanding one came on 1st May 2000 and it increased the rate by 142%.

In spite of all these efforts by the successive governments to improve on the conditions of the pensioner, so many problems still affect the achievement of this objective. The pension Scheme was not fully funded and it means by implication that the pension funds and assets did not match pension liabilities. As a result of that, it failed and the pensioners suffered it most.

Furthermore, Eme and Sam(2011) identified two other problems which are administrative bottlenecks and corruption. These impediments led to malfunctioning in the scheme. Some people in the bid to get rich quick, usually deposit the pension funds into banks for months with the callous aim of benefiting from the accruing interest before such funds are released if at all. Many pensioners have either died of starvation or got knocked down by vehicle while waiting for transport to the designated places for pension payment. Worse still, others have been reported to have slumped and died in queues while waiting their turn to be paid. Taking a reflective look at the pension administration in this country, it becomes very sad and painful that those who suffered in one way or the other to maintain peace and generate revenue to the economy are the ones suffering most (Barrow 2008).

The consequence of these tales of woes and scenarios, the emergency of the new pension scheme known as Contributory Pension Scheme. This policy which makes it mandatory for workers to contribute part of their earnings for their retirement also lifted the pension burden from the government/employer and places it on the employee/pensioners.

a) Contributory Pension Scheme of 2004

The 2004 Pension Reform Act is a paradigm shift from the 1979 Pension Act. Under the new scheme, employers and employees alike are to contribute 7.5 percent of employees' monthly emolument which include basic salary, housing and transport allowance (Dada 2014). However, military personnels are to contribute 2.5 percent of their monthly emolument while the Federal Government contributes 12.5 percent of the employees' monthly emolument (Pension Reform Act, 2004). The scheme covers the private sector with five or more employees. The only exceptions are public employees who have three years or less to retire with effect from the date of enactment of the Pension Act being 30th June 2004 (National Pension Commission, 2004). Fapohunda (2015) posits that the employer may elect under the 2004 Pension Act to bear the full burden of the pension by contributing not less than 15 percent of the employees' monthly emolument. The objective of the new pension scheme include among others to ensure that every employee in the private and public sectors receives his/her benefits as and when due; to establish uniform rules, regulations, standards and laws for the administration, management and payment of pension funds in the country. According to Orifowomo (2006), the scheme was also established to assist employees by ensuring that they save to cater for life after retirement. More so, the scheme is to address the huge unsustainable pension deficit estimated at about two trillion naira which characterized the former Pay-As-You-Go (PAYG) Pension Scheme. Nyong and Duze (2011), also posit that the contributory pension scheme would address the pension deficit of the past in Nigeria; that the scheme as at July, 2010, has an asset of 1.7 trillion naira (11.3 billion dollars) across the country. The contributory pension scheme is expected to have a multiplier effect on workers attitude towards retirement, commitment to duty, and labour retention as well as negative attitude towards corruption especially in the civil or public service. This is because the uncertainty of receiving pension and gratuity after retirement was largely responsible for high labour turnover in the civil service. Agba and Ushie (2010), posits that, poor remuneration, delay in payment of fringe benefits and poor condition of service among other things are jointly responsible for the exodus of medical personnel from Nigeria to the United States and United Kingdom.

b) 2014 Pension Reform Act

On 1st July 2014, President Goodluck Jonathan signed into law the "Act" which repealed the Pension Reform Act 2004.The 2014 Pension Reform Act expanded the scope of participation of the contributory pension scheme and among others, upward review of penalties and sanctions to pension defaulters and employers which implies that the new Act is an improvement of the former and offers more assurance and safety to workers and retirees. Some of the key changes include increase in the minimum number of employees required to make contributions under the Act, mandatory increase in the scheme's minimum contribution (Employer: 10% Employee: 8%) and the

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imposition of fines and penalties on the Pension Fund Administrators (PFA) for failure to meet their obligations to contributors and violation of the provision of the Act (2014 Pension Reform Act).

The crux of the matter is to encourage participation in the contributory pension scheme. The Scheme applies to two categories of employees of private organizations in which there are 15 or more employees. The Act also provides that in the case of private organizations with less than 3 employees participation in the scheme would be governed by guidelines issued by the National Pension Commission (PENCOM).However; the Act is silent on the applicability of the scheme to private organizations with more than 3 but less than 15 employees. Persons exempted under the Act are substantially the same as under the repealed Act.

The Act also provides that an employer can take full responsibility of the contribution of both employee and employer. In that case the contribution shall not be less than 20% of the employee's monthly emolument. The penalties for misappropriation have also been increased. In addition to a prison term of 10years and a fine of three times the amount misappropriated, a convicted person would refund the misappropriated fund as well as forfeit to the federal government any property, asset or fund with accrued interest or the proceeds of any unlawful activity under the Act in his/her possession.

The Act further criminalizes any reimbursement or payment by a Pension Fund Administrator (PFA) or Pension Fund Custodian (PFC) to a staff, officer or director upon whom a fine has been imposed under the Act. The penalty prescribed for this a minimum of 5million naira. In addition to the above and with particular reference to PFCs, the Act imposes a penalty of at least 10million naira, upon conviction, where the PFC fails to hold the funds to the exclusive preserve of the PFA and PENCOM or where it applies the funds to meet its own financial obligations (in the case of a Director, 5million naira or a term of 5 years imprisonment or both).

VII. Theoretical Framework

Ottong (2005) posits that theories in sociology such as structural functional theory and conflict theory are used as framework in analyzing societal problems. It can also provide prediction on how society can be reordered. The structural functional theory is a perspective in sociology that sees society as a complex system whose parts work together to promote solidarity and stability. Each social structure has social functions or consequences for the operation of the society as a whole. Therefore Pension is one of the social structures that needs to be adequately addressed for a smooth societal operations. Conflict theory developed by Karl Marx, purports that due to society's never-ending competition for finite resources, it will always be in a state of conflict. The implication of this theory is that those in possession of wealth and resources will protect and hoard those resources while those without will do whatever they can to obtain them. Governments have several mechanism for influencing the distribution of resources which include progressive taxes, minimum wages, special or social programs (pension) and regulation (investopedia).

VIII. Methodology

Survey research design was the design adopted for the study. The population of the study was made up of 128 pensioners from Nigeria Post (NIPOST) Independent National Electoral Commission (INEC) and National Population Commission (NPC) Anambra state that retired under the 2014 pension reform Act in these public sector organizations. The entire populations were used for the study due to the smallness of the population size. Therefore, the population remains the sample for the study. Questionnaire was the major instrument used for data collection for the study. Cronbach Alpha was used to test the reliability of the instrument. Analysis of Variance (ANOVA) was employed to test the null hypothesis at 0.05 level of significant level.

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IX. Results

Ho1: There is no accuracy in the computation of pension contributions

This hypothesis was tested using Friedman's ANOVA as shown below:

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of SA, A, D and SD are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.856	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

From the above analysis, the result is positively and statistically insignificant. We therefore accept our Null Hypothesis as suggested in the table above which contends that there is no accuracy in the computation of pension contributions.

Ho_2: There is irregular payment of pension under the new scheme.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of SA, A, D and SD are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.172	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

From the above analysis, the result is positively and statistically insignificant. We however accept our Null Hypothesis as suggested in the table above which contends that there is irregular payment of pension under the new scheme.

X. Conclusion

This paper x-rayed the effectiveness of 2014 Pension Reform Act in management of retirement benefits in selected Public Sector Organizations (Federal parastatals in Anambra state).The provision of this Act marks an improvement in pension management process by provision of stiffer penalties for PFAs and PFCs. So far, they could be given a pass mark but there is still room for improvement in documentation of pension matters and computation of pension contributions, so that pensioners should not be under paid.

XI. Recommendations

The study recommends that:

The PFAs should improve on the level of accuracy in computation of pension contribution to eliminate loss of benefit being incurred by pensioners. The payment of pension under 2014 Pension Reform Act should be made more regular to reduce the suffering of pensioners.

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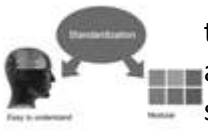
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Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Management Research Paper

Techniques for writing a good quality management and business research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of management and business then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.
Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.



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- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.



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Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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