EFFECT OF AUTOMATION OF THE TRADING SYSTEM ON PERFORMANCE OF THE NIGERIAN STOCK EXCHANGE

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Abstract

The research constitutes an empirical study involving historical data sourced from the NSE, which examines the upward trend in the performance of the NSE with the introduction of the ATS in 1999. The Independent T- test was specifically applied to assess the performance before computerisation (introduction of ATS in 1999) and performance after computerisation. The study covers a period of 15 years (from 1992 to 2006). The Capital market performance tools considered for this test include Capitalisation, Turnover by volume of Shares and Turnover by Value of Shares. The Independent T-test revealed that the performance in all the three aspects has significantly impacted on Capitalisation, Turnover by Volume and Turnover by Value of the Nigerian Stock Exchange with the introduction of the Automated Trading System. The SPSS statistical software was used to conduct a pre, and post automation analysis using the key capital market indicators, namely, the market capitalisation, Turnover by Value, Turnover by Volume, and Capitalisation. Findings revealed highly significant improvement in the performance of the three indicators with the introduction of the ATS in 1999.The study therefore recommended amongst others that Automated Trading should be enhanced and improved with the introduction of strategies for its efficiency, and that introduction of remote trading should be encouraged.

Key words: Automated Trading System, Capital Market, Nigerian Stock Exchange

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1.1 INTRODUCTION

The vital role played by capital markets all over the globe cannot be over-emphasied. A capital market is a major barometer for measuring the aggregate performance in Nigeria (Nzotta, 2002:115). Available evidence shows that there is a direct correlation between the level of development of a nation's capital market and her overall social and economic development (Okereke-Onyiuke, 2000:01). There is therefore, the need for a fast growing capital market, through technological innovation so as to facilitate the speedy growth and development of an economy. Computer networks have influenced global stock markets. This is characterised by modern innovation and accompanying liberalisation of global markets, which have influenced such markets. Older trading systems, which rely on personal contact between traders are being replaced by computer networks in which traders throughout the world communicate and trade over microwaves and optical fibres (Wriston, 1999:44). Today it is strange to hear that a Stock Exchange is operating based on the call over system, rather, what is in vogue is the Automated Trading System. Since its inception in 1960 as the Lagos Stock Exchange, the Nigerian Stock Exchange, which was initially operating based on the call-over system facilitates trade in shares on the trading floor of the Exchange through the Automated Trading System, which was introduced in May, 1999. During the call-over system, settlement was made by exchange of cheques every forthnight, which took an average of two months for deliveries to be made. However, the establishment of the CSCS (Central Security Clearing System) Ltd, and the subsequent introduction of the ATS has altered the modus operandi of the scheme of events in the capital market.

This study seeks to empirically assess the performance of the Nigerian Capital market (with specific reference to the Nigerian Stock Exchange), and to examine the extent to which it has improved, with the introduction of the ATS. Thus the study examines how the introduction of the ATS in 1999 has impacted on the performance of the NSE, and attempts to proffer solution towards its improvement. The major performance tools considered here include: Turnover by Volume, Turnover by Value, and Capitalisation.

The study seeks to examine the previous problems experienced prior to the introduction of the ATS as well as review current situation. It will be recalled that during the call-over system, there were delays in getting share certificates, cases of loss of certificates, high risk and other

associated problems which the Stock Exchange was faced with. Also, prior to the introduction of the ATS, most African stock markets, Nigeria inclusive were characterised by low level supply of securities, low liquidity and trading activity, low professionalism, inefficient infrastructural facilities, low market awareness, low level of market automation, and restrictive policies (SEC, 1993:98).

The study covers the performance of the Nigerian Stock Exchange (NSE) and how computerisation in terms of the Automated Trading System has impacted on it. The study covers a period of 15 years (1992 – 2006). This study is significant in the following ways: it will benefit researchers since it will serve as their reference point. It will also serve as a reference point to other emerging stock markets and as a lesson to others that are just starting. Above all, the recommendations, if adopted should go a long way to enhance the performance of the market.

2.1 LITERATURE REVIEW

The Efficient market Hypothesis, a concept that says security prices fully reflect available relevant information identifies three forms of efficiency: weak-form efficiency, semi-strong efficiency and strong-form efficiency. The works of Fama (1970), Samuel and Wilkes (1980:446), Weston and Copeland 1988:443), Osaze (1997:2003), Horne (1997:51) and Pandey (1999:973) all affirm this position. Most empirical works provide evidence that Nigeria is weak from efficient. One medium through which information could be effectively disseminated is the use of computer. Modern technological innovation have altered the scheme of events of global stock markets in our contemporary society. Alile and Anao (1986:27) recalled MKO Abiola's statement that a Stock Exchange market flourishes in an environment where the telephone, fax and telex work efficiently. In our contemporary society, a stock exchange will attain a desirable level of efficiency in a highly automated and conducive environment. For the Nigerian Capital Market, however, the introduction of computers into its operation did not come until 1997 (Brown, 2002:111).

Determinants of Capital Market Performance

The capital market may be evaluated in different forms depending on the perspective being considered. Alile and Anao (1986:110) identified Capital Mobilisation; Depth of the Market; Accessibility to savers and users of funds; Allocative efficiency; Development of Investment Culture; Security Price Movement; Debt Management; Indigenisation of the Economy; and Investor protection as criteria for evaluating the capital market. Ekine (2000) on the other hand examined the capital market using Equity Market Capitalisation as a factor of the outstanding shares and market price of equities on a stock Exchange, and Trading Value of Equities of stock market. For the purpose of this paper the basic indicators identified are hinged on the classification as presented by the Nigerian Stock Exchange Factbooks for the period under study, which include Capitalisation, Turnover by volume, Turnover by Value, Daily Average Volume, Daily Average Value, Listed Securities, and All-Share Index. A microscopic look at the indicators indicates that Capitalisation, Turnover by Volume, and Turnover by Value adequately capture all the elements for the rest of the variables. This justifies the basis of using the three key variables.

3.1 Methodology

Research design is pre- and post reviewed. This is because of the fact that the paradigm of research is positive in nature, and is a qualitative nature of research. The independent T-test is utilized for the purpose of analysis. There are some basic changes, which shaped the performance of a stock market. The introduction of computer and automation is a very important factor, which has influenced the growth and development of the Nigerian Stock Exchange. The research attempts to consider the extent to which this aspect of technology has impacted on its performance. The data presented in Appendix I will be used for analysing and testing the hypotheses that relate to performance before and after computerisation. The key determinant performance tools, which the paper adopts, include Capitalisation, Turnover by Volume, and Turnover by Value. The statistical tool applied for the analysis is the Independent T-Test.

4.1 Results and Discussion

It is hypothesized that capitalization did not improve after the introduction of ATS in the exchange. The findings of this study provide evidence of rejecting the position. The results reveals' that the mean of capitalization after the introduction of ATS is 1,913,300 which is greater than that of pre (165,271.40) this is equally confirm by the value of standard deviation; (pre 117,645.50; post 1,660,838.23), this emphases that capitalization of NSE increase with 1,158% as a result of ATS introduction. In addition, the Fisher's statistic reveals a significant impact of ATS on the capitalization of NSE. Thus, it is significant at 1% level of significance (<0.058). This can be confirmed by the significant level of t-statistics (0.017) where the equality of variance is assumed. In fact it is even significant at 5% where otherwise. For every increase of ₦1 in automation the capitalization increased by ₦10.11.

Furthermore, the result of the value of shares reveal that ATS has impacted positively on the value of share of NSE over the period of 7 years assumed by this study. The mean statistics after the introduction of ATS increase to 175,115.70 billion from 5,111.29 billion shares an increase of 3,426.05%. The F-statistic which is also significant at 1% level of significant reveals that for every ₦1 increase in automation, the value of shares increase with ₦ 14.38. In addition, the T-statistic is significant at 5% when equality of variance is assumed and even not assumed. Therefore, this produced an evidence to reject the null hypotheses that ATS did not significantly influence the value of shares of the NSE.

Finally, the result also indicates that, the T-statistic of the value of shares is significant at 1% when the equality of variance is assumed and at 5% when otherwise. Also the F-statistic shows an increase of 17 shares for every ₦1 spend on automation in the NSE. The significance can be confirmed by the increase of the shares volume after the introduction of ATS. It increased from 848 shares to 16,201 as shown by the mean difference, and supported by the standard deviation of 12,053.08 from 653.88. Therefore, the result produced evidence of rejecting the null hypotheses that ATS does not increase volume of shares in the NSE.

All the changed three (3) proxies of performance have all increase positively as well as a proved in quantum. It can be therefore deduced that ATS has highly, positively and significantly impacted on the performance of NSE.

5.1 Observation and Content Review of the Post-Automation Period

There was a tremendous change in trading on computers, with the introduction of the ATS, there by bringing the transaction cycle to T+2, a situation where trading and crediting of transactions investors' account was reduced to three days. This change brought about greater transparency, and encouraged the involvement of more Nigerians at home and abroad in Nigerian Stock Market activities. Besides, certain excesses, and fraudulent acts were reduced.

The introduction of the CSCS (Central Securities Clearing System), brought about greater transparency and equity, through efficient monitoring of stock exchange activities in a computer based environment. This paved way to products like e-bonus, e-allotment, e-dividend and e-IPO, which enhanced operators/investors' easy access to the aforementioned. Another dimension to the development was the introduction of phone-based alert program in 2006, which further strengthened the trust of investors in the Nigerian stock Exchange.

Information in terms of daily official lists, weekly and quarterly reports are provided promptly. Most of the brokers are involved in trading activities frequently. With the introduction of the CSCS Ltd, some of the benefits identified by the NSE include:

i) To the Investor: The introduction of the T+3 transaction cycle, investors are given better opportunity to speculate and enjoy capital appreciation as well as a reduction of risk of loss of certificates.

ii) Quoted Companies:

6.1 Conclusion and Recommendation

This reveals a consistent general increase in the performance of the Nigerian Capital Market. The study reveals that there is a significant improvement on the three performance indicators, with the introduction of ATS. The study also reveals that the general Trading activities are satisfactory; with information in terms of daily official lists, weekly and quarterly reports are provided promptly. All the brokers are involved in trading activities frequently.

Introduction of the ATS as well the internationalisation of the NSE has changed the tide of events with the NSE now developing at a very fast rate. The investors' confidence and general transparency have been enhanced. Dematerialisation has been highly achieved. The volume of stock cleared has significantly increased with the introduction of ATS. The general level of operational efficiency has been significantly enhanced. Capitalisation of the Exchange, which stood at N763.9 billion in 2002 sky-rocketed to 1.359 trillion in 2003, and 5.12 trillion in 2006. This is due to computerisation and the introduction of ATS. Professionalism has increased. Even the regulatory framework has been improved upon with the SEC given more powers and some amendments of some section of CAMA (1990) to enable the smooth operation of the CSCS. Thus the paradigm has been positively altered and we can now say that the NSE has to a high extent in the process of achieving its mission.

Generally, we can conclude that the Nigerian Stock Exchange is highly developed as an emergent market. The volume of transaction, and the volume of stock cleared have significantly increased. The level of operational efficiency is satisfactorily high. It is also established from the study that the introduction of the Automated Trading system has significantly contributed to these achievements. The Capitalisation, turnover by volume, Turnover by value, and the All-Share Index have been significantly and positively enhanced due to the ATS.

However, the Exchange still has room to perform better provided some of the identified problems of its automation like power outage, system breakdown, lack of manpower development, among others, are addressed. Secondly with the early implementation of remote trading, a lot more can be achieved. Some of the key recommendations derived form this work, which should go a long way to change the tide of events in Nigeria capital market are:

1. Introduction of Remote Trading should be hastened. The process of introduction of remote trading should be quickly concluded. This will imply that brokers will be able to access the market (or carry out trading activities) from their offices.

2. Constant Training of Operators and other related users of computer: There should be forum where brokers/dealers, machine control room staff including all CSCS Ltd staff as well as other operators that make use of computer should be trained. This will enhance both effectiveness and efficiency in the transaction as well as clearing processes.

3. Improvement in the monitoring and surveillance of trading activities: This should help in checking fraud and related cases.

4. Using more modern Technology: The Stock Exchange should always adapt to new changes in technology by buying faster computer and related equipment as well as more sophisticated and up-to-date software.

5. Increasing Trading time: The trading time for each trading day (Monday – Friday) should be increased by at least one hour. This will enable brokers to carry out more or better trading activities. Not only that, Saturday trading could be introduced to further give the brokers ample time to trade.

6. More awareness campaign and publicity should be done: There should be intensification of awareness and re-orientation of people towards capital market investment. The government, the regulatory bodies, operators and other stakeholders of the capital market should join hands in creating more awareness and re-orienting people towards investing in the capital market. This implies that there may be need for more workshops and publicity over the various media to that effect. People should also be made to know how automation has enhanced stock clearance, access to stock position, certification, among others.

References

1. Alile, H.I. (1999): "Attracting Foreign Investments through the Nigerian Stock Exchange" The Nigerian Stock Exchange Fact Book, p. 26.

2. Alile, H. I. and Anao, A. R. (1986:110): The Nigerian Stock Market in Operation, Jeromelaiho and Associates Ltd., Ikeja Lagos, 1st Edition.

3. Asika, N. (1991): Research Methodology in the Behavioural Sciences, Emmans Products Limited, Lagos.

4. Babalola, A. (2003): "The Impact of Computerisation on the Performance of Nigerian Stock Exchange" Unpublished MBA Project (University of Lagos).

5. Ball, R. & Brown, P. (1968): "An Empirical Evaluation of Accounting Income Number". Journal of Accounting Research, 6:159-178 (Auturn 1968).

6. Brealey, R. A. and Myers, S. C. (1996): Principles of Corporate Finance, P.329,

7. Brown, T. O. (2002) "Computer Systems: The Need for Security with Special Emphasis on Financial Transactions", The Nigerian Stock Market Annual 2001/2002 edition

8. Dangana, M. A. (2001): Practical Step-by-Step "Approach to Raising Funds in the Nigerian Capital Market (How to make your Business Grow without Falling into Financial Trouble)", Being a paper presented at eh Workshop on the Opportunities in the Nigerian Capital Market for Industrial Development of Kebbi State, held between October 3 and 4, 2001, organised by the Securities and Exchange Commission.

9. Demeigue- Kunt and Rose, L. (1995):"Stock Market, Corporate Finance and Economic Growth The World Bank Economic Review Vol. 10 No.2 May

10. Dixon, R. & Holmes, P. (1992): Financial Markets: The Guide for Business, pp. 15-16, Chapman & Hall, 1st Edition.

11. Edun, O. A. (1998): "Improving the Depth of the Nigerian Capital Market: The Role of Derivatives", Being a paper presented at a conference organised by: The Securities and Exchange Commission and the Nigerian Stock Exchange on Trading in Rights in the Nigerian Stock Market. February 26, 1998.

12. Emnuga, C. (1999) "African Capital Markets in the Global Economy" in Mansah S. (edited) African Capital Markets in a Global Context Proceedings of the International Conference of the African Capital Market Forum 23-25 August pp 100-113.

13. Enns, P. G. (1985) Business Statistics Methods and Applications, Richard D. Irwin Inc.

14. Fama, E. (1970): "Efficient Capital Market: A Review of Theory and Empirical Work", in Journal of Finance, 25 (May), pp. 383-417.

15. _____ "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, 25 (May 1970), pp. 384-87 in Horne, J.C.V. (1997).....(as above)

16. Horne, J.C.V. (1997) Financial Management and Policy, p.51,Prentice, Hall of India, New Delhi, 10th, Edition.

17. Ibru, G. M. (2000) NSE Fact Book P.9

18. Igboanu, Mike and Ekanem, William (2001):"Historical Perspective of the Nigerian Capital Market" The Nigerian Stock Market Annual, 2001/2002 Edition, pp. 18-19.

18. Kabir, L. M. (1993) Organisational and Functional Roles of Nigerian Stock Exchange in the Economic Developments; (August 1993); Being MBA project (unpublished) p. 99.

19. Keave, S.M. (1983): Stock Market Efficiency, Philip Alkan, Oxford.

20. Keane, S. M. (1987) The Efficient Market Hypothesis and the Implication For Financial Reporting; Gee and Co (Publishers) Limited, London; pp, 2-3.

21. Mayo, H. B. (1998) Financial Institutions, Investments and Management – An Introduction; The Dryan Press; Sixth Edition; p. 228.

22. Mendenhall, W. and Renmuth, J.E. (1982) Statistics for Management and Economics, Duxbury Boston.

22. NSE (1998) (The Nigerian Stock Exchange and You) Presentation Notes p.3

23. NSE Fact Book (2003) p 55

24. Nzotta, S. M. (2002) "The Nigerian Capital Market: Challenges and Opportunities" Journal of Professional Administration, April – June, 2002 pg 15.

25. Okereke-Onyiuke, N. (2000) Workshop on "Legislation for the Capital Market in a Democratic Environment"; Organised by the Securities and Exchange Commission for Senate and House of Representatives Committee. Thursday, October 12, 2002.

26 _____ (2003) The NSE (The stock Market in 2003: A Review of the Performance of the NSE in 2003),

27. Oladejo, R. A. (2000): "Current Development in the Nigerian Stock Market", (Being a paper presented at a Seminar organised by the Institute of Chartered Accountants of Nigeria (Lagos District Society) in association with the Nigerian Stock Exchange held at Lagos Sheraton Hotels and Towers, Ikeja, Lagos, May 18, 2000.

. 28. Onwioduolut, E.A. (1999): 'International Capital Mobility in the Next Millennium: Prospect for Nigeria', NDIC Quaterly, Vol. 9, Number 12.

29. Osuala, E. C. (1987) Introduction To Research Methodology, African-Fep Publishers Limited Onitsha

30. Pandey, I.M. (1999) Financial Management, Vikas Publishing House PVT Ltd, pp 973-77)8th Edition.

31. Randhawa, D. S. (2002): "Impact of IT on Firm Performance in Korea Jong-Il Kim", 13th NBER-EASE Conference: Productivity Commission, Melbourne Draft of Discussion Comments. http://www.nber.org/books/ease13/randhawa7-14-02comment-on-Kim.pdf

32. Roberts, H.V. (1967): "Statistical Versus Clinical Prediction of the Stock Market", Unpublished Paper Presented to the Seminar on the Analysis of Security Prices, University of Chicago; in Brealey R.A. & Myers, S.C. (1996) Principles of Corporate Finance, p. 329, The McGraw-Hill Companies, Inc. 5th Edition.

30. Samuel, A. A. (1999): "The Role of The Nigerian Capital Market in Business Financing: A Case of the Nigerian Stock Exchange", (Unpublished) Undergraduate Project Submitted to the Department of Business Administration, Ahmadu Bello University, Zaria.

31. SEC (1993) "The Capital Market: Outlook for the 1990's", Issues in Capital Market Development, a Publication of SEC. Pg. 105

32. SEC 1993: "A Survey of Africa's Emerging Capital Markets" in Issues in Capital Market Development, A Publication of SEC. P 98.

33. Stock Exchange (2004): Interview Conducted with Head of

34. Vutumu, A. (1999) "Security Price Behaviour in the Nigerian Stock Exchange: An Empirical Study", M.Sc. Accounting and Finance Thesis (Unpublished), A. B. U. Zaria.

Appendix II

Group Statistics

	Period	N	Mean	Std. Deviation	Std. Error Mean
Capitalization	Pre	7	165271.4286	116745.48834	44125.64698
	Pos		1913300.0000	1660838.22712	627737.84527
Value of Shares	Pre	7	5111.2857	5488.43835	2074.43471
	Pos	7	175115.7143	157546.90559	59547.13315
Volume of Shares	Pre	7	848.2857	653.88091	247.14375
	Pos	7	16201.4286	12053.07765	4555.63514

Independent Samples Test

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
		Lower	Upper	Lower	Upper	Lower
Capitalization	Equal variances assumed	10.110	.008	-2.778	12	.017
	Equal variances not assumed			-2.778	6.059	.032
Value of Shares	Equal variances assumed	14.384	.003	-2.853	12	.015
	Equal variances not assumed			-2.853	6.015	.029
Volume of Shares	Equal variances assumed	16.863	.001	-3.365	12	.006
	Equal variances not assumed			-3.365	6.035	.015