Zimbabwe stock exchange trading automation and its impact on the development of the local capital market — A Zimbabwean perspective

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ABSTRACT

This study investigated the possible impact that trading automation of Zimbabwe Stock Exchange (ZSE) could have on the development of the local capital market from an ex-ante perspective. An assessment of the current level of development of the local capital market was looked at with a view of making recommendations for further improvement from the current levels. In measuring capital market development, four parameters namely, liquidity, volume and value traded, price discovery process and regulation of the market, were used as proxies for capital market development. In determining the current level of capital market development in Zimbabwe, a Capital Market Diagnostic Model was used. A survey was used to collect data from the capital market stakeholders through a structured questionnaire. The results indicated that trading automation has got statistical significant relationships with local market liquidity, volumes and value traded, price discovery process and local market regulation. The study concluded that trading automation of ZSE will result in capital market development, improvement in liquidity, volume and value traded, price discovery process as well as regulation of the local market.

Key Words: Stock Exchange Automation, Capital Market Development, Liquidity, Price Discovery

1. INTRODUCTION

Capital market development in a modern economy hinges on an efficient financial sector and capital market that pools domestic capital and assembles foreign capital for productive investments. Inefficiency can considerably cut development from the levels that might have been possible. Thus the importance of having a developed capital market enhances the efficiency of investments. A well-functioning capital market is generally expected to lead to a lower cost of equity capital for firms allowing individuals to more effectively price and hedge risk (Murinde, 2006). Bruno, Hillion and Spatt, (1997) suggest that automation decreases liquidity because for important transactions, traders cannot negotiate directly and so have no control on trading conditions.

Since the main objective of automation is to create a well-functioning stock market, automation may have positive effects on the capital market's volumes, price discovery mechanisms, regulatory and liquidity aspects. Pirrong (1996) showed that automated exchanges can be deeper and more liquid than open out-cry exchanges. Naidu and Rozeff (1994) noted an increase in liquidity and an improvement in efficiency, but volatility increased following the automation of the Singapore Exchange.

1.1 Background

Zimbabwe Stock Exchange trading automation has been on the drawing board for a long time. However, funding challenges have been the major stumbling block towards the implementation of the automation programme. Notable progress has been witnessed in the automation of settlement and clearing system within the local capital market. Chengetedzai Depository Company Private Limited came on board in December 2010 and started operating fully in 2013. The firm operates a Central Securities Depository (CSD) system in the local capital market. The CSD system is purely a settlement vehicle for transactions that have been traded on a registered Stock Exchange (ZSE Handbook, 2014).

The ZSE was legally established in 1896 as Rhodesian Stock Exchange. It started operating in Harare in 1974 under the ZSE Act Chapter 24:18 and in 2004, the ZSE Act was replaced by the Securities Act Chapter 24:25. By end of December 2014, ZSE had 13 registered and operating stock broking firms, 37 registered and

practicing stock brokers and 59 listed firms (4 Mining and 55 Industrial). It was opened to foreign investors in June 1993, following a partial lifting of exchange control regulation. It is headed by a CEO and has nine committees and these cover listings, executive, surveillance, central securities depository, settlement, disputes, legal and lobbying, finance and budgeting, membership, management and business development. The ZSE is supervised by the Securities and Exchange Commission of Zimbabwe (SECZ) (ZSE Handbook, 2014). SECZ is a statutory board established in terms of the Securities Act of 2009. It was established to act as a regulator of the securities market. SECZ has the power to intervene in the event that irregularities arise in areas of conduct of licensed members, financial difficulties, and rejection of application or termination of members. SECZ monitors the trading processes to ensure transparency and to prevent manipulation of the capital market.

Since its formation, the ZSE has been using an 'open-outcry' system which is a manual and paper based system in its daily trading activities (ZSE Handbook, 2014). This manual based system has been fraught with disputes (some of which are still behind the courts), trading irregularities such as price manipulation and front running of clients by stock brokers which in some instances has affected confidence in the local capital market. As such, the ZSE being the backbone of the local capital market, its current trading system has in some way slowed the development of the local capital market.

1.2 Problem Statement

Despite the relative size of the ZSE in terms of listing and its age in Africa, there is still lack of research on the potential impact trading automation can have on the development of the local capital market. The open out-cry trading call system is no longer in sync with modern day trends and big strides have been made by some African countries in as far as trading automation is concerned. African countries that have already automated their trading systems include (in the order of adopting trading automation), Egypt (1992), South Africa (1996), Tunisia (1996), Morocco (1997), Namibia (1998), Nigeria (1999), Ivory Coast (1999), Mauritius (2001), Tanzania (2006), Kenya (2006), Ghana (2008) and Botswana (2012) (Omuchesi, Bosire and Muiru, 2014). Uganda, Rwanda and Zimbabwe are at an advanced stage of implementing trading automation. While most studies have often focused on the impact that trading automation can have on specific market characteristics such as liquidity and volatility ex post, there is limited research on an ex-ante study regarding the impact that trading automation can have on capital market development. This gap is therefore the motivating factor towards this research study. That is why this study seeks to find out the impact of ZSE trading automation on the development of the local capital market.

1.3 Research Objectives

This study had four principal objectives namely:

1. To enhance the understanding of the relationship between trading automation and capital market development
2. To explore the possible influence that liquidity, volume and value traded, price discovery mechanism and regulation have on capital market development.
3. To examine the level of capital market development in Zimbabwe
4. To recommend ways of how trading automation influences the development of local capital market.

1.4 Research Hypothesis

The following is the hypothesis that the study sought to test:

H0: ZSE trading automation has no significant impact on the development of the Zimbabwean Capital Market.

H1: ZSE trading automation has significant impact of the development of the Zimbabwean Capital Market

2. LITERATURE REVIEW

2.1 Stock Exchange

Berk and De Marzo (2008) define a stock exchange as an organized market on which securities of many corporations are traded. A stock exchange is a place at which securities are bought and sold. Domowitz (1996) explained that an exchange provides ways by which financing is raised by the sale of shares to outside investors. It provides a mechanism for the evaluation of companies through the process of price discovery and a means by which such information is disseminated.

2.2 Stock Exchange Trading Automation

Ajasia and Yartey (2007) state that Stock Exchange Trading Automation involves the implementation of a computerized and electronic system for trading securities and their settlement thereof. An Automated Trading System (ATS) is thus a computer program that accepts orders and automatically submits them to a market centre or exchange where they are matched. For purposes of this study, Electronic trading refers to trading that is conducted on platforms over which clients transact relative to price levels displayed on a screen and orders transmitted via computer systems.

Jian (2005) posits that rapid technological advancements in telecommunications and internet are transforming the basic business model of stock exchanges. Helen, Hawkins and Sato (1997) as cited in Omuchesi and Bosire (2014) point out that security exchanges have always been found in central locations for ease of recording transactions, and the integrated electronic networks powered by modern information and communication technology ensure speed and less transactions costs in the share trading process. In such systems as well, price is basically the first criterion, with priority being accorded to the highest bids and lowest offers (Omuchesi et al., 2014). The issue of trading automation has gained increasing attention in recent years, particularly in Zimbabwe where a need exists to develop the local capital market. Advances in technology have led to the development of highly sophisticated computerized trading systems which can improve liquidity and reduce trading costs in the long run.

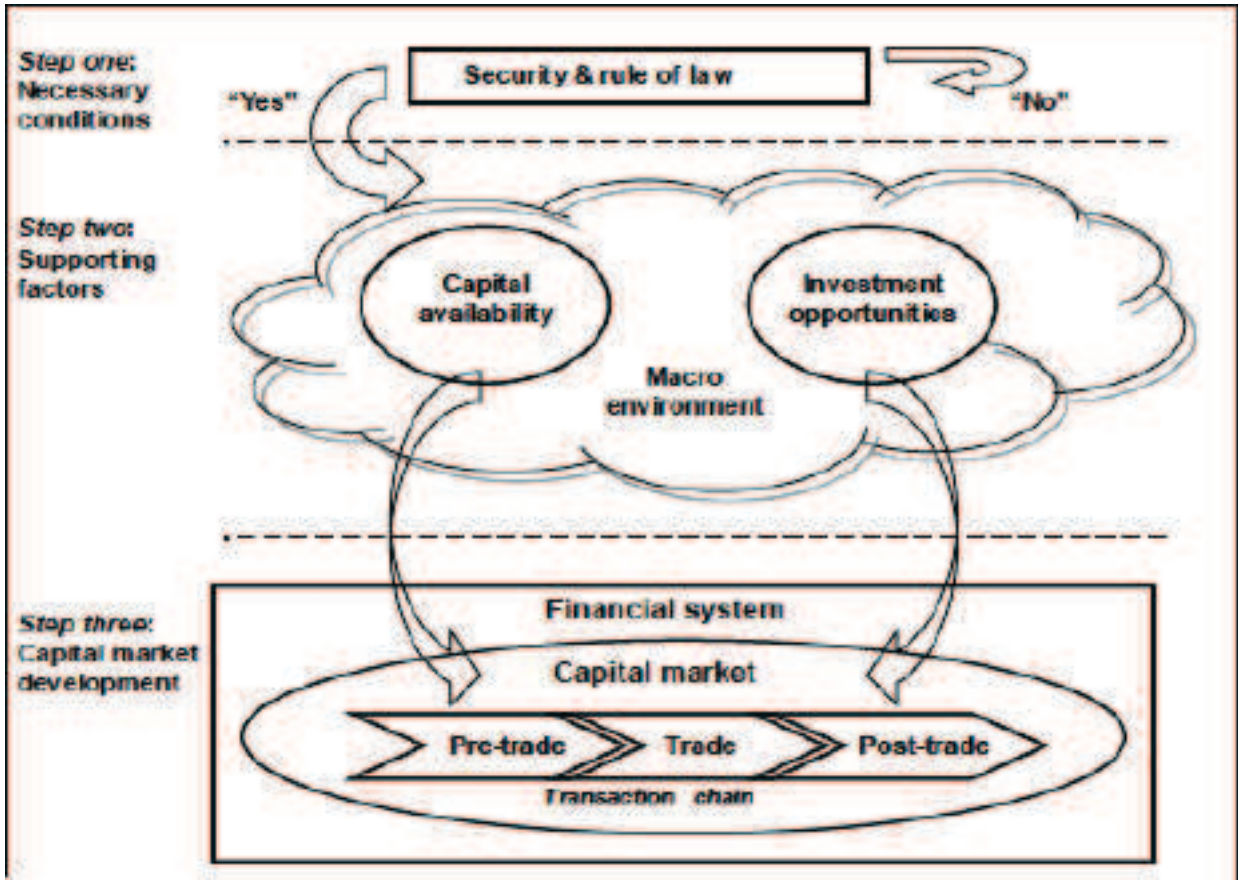
2.3 Capital Market Development

Capital market is an open platform for trading long term financial securities including ordinary shares, long term debt securities such as debentures, unsecured loan stock and convertible bonds (Murinde, 2006). The structure of capital markets has three components, the first being the primary market for new capital issues by private firms and government institutions; followed by the secondary market which is mainly a platform for the exchange of existing securities (Victor, 2006). The third is the derivative market which serves for the exchange of securities created by the particular exchange and whose value is derived from underlying securities (Victor, 2006).

In order to look and examine the aspect of capital market development, this study will make use of Capital Markets Diagnostics model developed by Fredholm and Taghavin-Awal (2006), as diagrammatically illustrated in Figure1.

The primary purpose of examining the level of development in a capital market is to get a measure of how well it is functioning. This is done by examining the institutions that make up the capital market and interact with it. In order to get a clear understanding of the level of development in capital markets, the researchers focused on the third part of the model, taking transaction perspective from investment decision to completion of an investment. Table 1 highlights the model adopted in assessing capital market development:

Figure 1: Capital Market Diagnostics Model



Source: Fredholm and Taghavin-Awal (2006), p28.

Table 1: Capital Market Development

Capital Market Development			
Pre-trade	**Trade**	**Post Trade**	**Regulatory**
Brokerages	Exchange	Clearing	Ministry of Finance
Investment Banks		Settlement	Supervision (SEC)
Insurance Companies	Off-Exchange	Custody	Central Bank
Pension Funds			
Mutual Funds			

Source: Fredholm and Taghavin-Awal (2006)

According to Fredholm and Taghavin-Awal (2006) the financial institutions shown above may be looked at in terms of how they are functioning. For the purpose of this study, a well-functioning capital market means high liquidity, high volumes and value traded, an efficient price discovery process and effective regulatory system.

2.4 Pre-conditions for Capital Market Development

Fredholm and Taghavin-Awal (2006) describe the capital market as a supply-demand relationship for investments and capital. The investor perspective is that, there is a demand for investments that can provide

returns and a supply of potential investments. Conversely, the bond or share issuing entity sees a demand for and a supply of capital. As modelled by Fredholm and Taghavin-Awal (2006), the extent to which this supply and demand relationship can satisfactorily be satisfied, is dependent on key factors such as:

2.4.1 Capital availability

Capital by its own characteristics, always seeks investment opportunities in financial markets. As such, capital availability encompasses factors that described different sources of capital either foreign or domestic. Sources of capital range from domestic savings to foreign portfolio investment (Fredholm and Taghavin-Awal, 2006).

2.4.2 Investment opportunities

Investment opportunities are the financial products and underlying assets available in the capital market which include, but not limited to, the shares of listed companies, government and corporate bonds and other securities. Factors that describe this category range from the number of listed companies in the country to the availability and diversity of government bonds (Fredholm and Taghavin-Awal, 2006).

2.4.3 Macro environment

According to Fredholm and Taghavin-Awal (2006), the level of economic development of a country influences the supply and demand dynamics of the capital market as well as the level of transparency and trust that exist within a country's institutions. Macroeconomic performance parameters such as the Gross Domestic Product (GDP), which is correlated to the amount of capital available in the country; and the level of corruption, which affects trust and in the investor's willingness to take on risk for the promise of future returns are important considerations in the study of capital market development.

2.5 General Impact of Stock Exchange Trading Automation: A Theoretical Evaluation

The automation of the stock exchange trading systems usually either precedes or is preceded by the adoption of a Central Depository System (CDS), which is a stepping stone in reducing costs and losses associated with default risk by financial market institutions (Yartey and Adjasi, 2007). Further, Capital Markets Authority (2007) posits that the implementation of the Automated Trading System (ATS) was a key to achieving enhanced operational efficiency, transparency, reduced cost of doing business, and enhanced market integrity and investor confidence.

2.6 Challenges of Stock Exchange Trading Automation

2.6.1 Mechanical failures

Mechanical failures in automated trading systems can be caused by a loss of an internet connection. This usually results in trading orders not being sent and executed in the market thereby creating high chances of loss of income and inefficiencies in trading processes (Amalga Trader Magazine, 2014). Discrepancy between the theoretical trades generated by a certain strategy and the order entry platforms component that turns them into real trades, are common features in automated trading system.

2.6.2 Monitoring

Automated trading systems may experience anomalies because of the potential for mechanical failures such as internet connectivity issues, power losses and computer or system crashes. Such anomalies do require monitoring to minimize the negative impact on automated trading systems. In essence, automated trading systems may require expensive monitoring and alert systems to avoid potential losses from mechanical failures.

2.6.3 Over-optimization

It refers to excessive curve-fitting that produces a trading plan that is unreliable in live trading. Back testing techniques are usually employed by traders who can create systems that look great on paper and perform poorly in a live market. As a result, a tweak strategy may be used to achieve exceptional results on the historical data on which it was tested. Thus, falsification of the entire trading process is possible.

2.7 Impact of Stock Exchange Trading Automation on Capital Markets: An Empirical Overview

Stock exchange trading automation has been implemented in many economies over the years. The development of global financial markets has created new opportunities for trading automation, however, with mixed results and diverse experiences.

2.7.1 Effects of Trading Automation Systems on Developed Capital Markets

Frend and Pagano (2000) discuss the mechanics of automated trading systems and the effects of automation on price efficiency. Frend et al. (2000) examine the pre and post trade results of the impact of exchange automation relative to price efficiency on the United States' New York Stock Exchange (NYSE) and the Toronto Stock Exchange (TSE). Although they find that automation is associated with an improvement in market efficiency on the Toronto Stock Exchange relative to New York Stock Exchange, they do not detect any changes in the non-random pattern in returns before and after automation at the TSE, which led them to conclude that automation did not result in price efficiency on the Toronto Stock Exchange.

The transfer to continuous trading enhanced market liquidity on the Paris bourse (Muscarella and Piwowar, 2001). The study by Muscarella and Piwowar (2001) also found out that the stock price increased as a result of market quality improvement following the shift, and increased liquidity by providing affordable remote access to investors and improved efficiency as transaction costs went down and the availability of information improved.

2.7.2 Effects of Trading Automation Systems on Emerging Capital Markets

In a study of the effects of automation on stock market liquidity, volatility, stock returns and efficiency in Tunisia, Sioud and Hmaied (2003) found out that trading automation systems had positive effects on the aforementioned parameters especially micro structure-related characteristics such as volume and volatility as well as deeper and increased liquidity compared to open outcry exchanges in neighbouring Morocco. In that same study of call and continuous markets on the Morocco Stock Exchange, Sioud and Hmaied (2003) found out that trading automation resulted in a permanent stock-price increase for securities transferred, but volatility and efficiency improved only for securities transferred to the call-based trading system.

Naidu and Rozeff (1994) noted an increase in liquidity and an improvement in efficiency, yet detrimental volatility experiences following the automation of the Singapore Stock Exchange. They advance that automation speeds up the dissemination of prices, making it likely that volatility will increase especially when information is hitting the market. The increased speed with which prices and trading volume are available, incites investors to trade to exploit the published information which is likely to improve market efficiency. Sukcharoensin, Srisopitsawat and Chuenjit (2004) found evidence of increased trading volume and reduced asymmetric information among market participants after the implementation of the automated trading systems on the respective stock exchange.

Dicle and Lavendis (2012) assessed the impact of technological improvements on the Johannesburg Stock Exchange (JSE) after incorporating the Stock Exchange of Thailand (SET) trading platform from the London Stock Exchange. It was found that the JSE became more liquid and cheaper after the SET, nearly doubling its trading activity.

In Nigeria, Sunday, Omah and Oladimeji (2012) evaluated the effect of changing from manual trading system to the automated trading system on the trading effectiveness in the Nigerian Stock Market from

1999-2011. The study revealed that the automated trading system was an effective trading system and that it had brought an efficient settlement system and fostered new trading opportunities. Additionally, Okereke-Onyiuke (2000) reported evidence of a direct correlation between the level of development of a nation's capital market and overall social and economic development. The study results thus prompted Mailafia (2011) to posit that there is therefore need for a fast growing capital market through technological innovation to facilitate the speedy growth and development of an economy.

Further, Mailafia (2011) found out that there was a highly significant improvement in the performance of the turnover by value, turnover by volume and capitalization on the Nigeria Stock Exchange with the introduction of the ATS in 1999. He concludes that investor confidence and general transparency have been enhanced while the volume of stock cleared has significantly increased with the introduction of ATS and the general level of operational efficiency has been significantly enhanced. Mailafia (2011) notes that the regulatory framework in Nigeria has been improved upon with the SEC given more powers and some amendments of some sections of its relevant statutes to enable the smooth operation of the Central Securities Clearing System in Nigeria. This thus led to the conclusion that the ATS paradigm has been positively driving the NSE towards achieving its mission.

3. RESEARCH METHODOLOGY

3.1 Research Design

A descriptive, exploratory and quantitative design was used in order to find out whether or not trading automation can lead to capital market development. Since data on more than one factor were collected using a questionnaire, a cross sectional design was used in the study. The research recorded information about the targeted subjects without manipulating the study environment. The study was exploratory because it explored on whether or not trading automation can result in the development of the local capital market. Exploratory research studies what has not been previously studied and attempts to identify new knowledge, new insights, new understandings, and new meanings and explores factors related to the study topic (Brink and Wood, 1998). The researchers deemed this approach to be suitable for gaining a better understanding of stock exchange trading automation and its effect on the development of the local capital market

3.2 Research Strategy

The study is descriptive. Presentation of facts concerning the nature and status of a situation as it exists at the time of the study as well as a description of present conditions of events or systems, form a descriptive research. The researchers opted to use this kind of research considering the desire of the research to obtain first hand data from the representation of the local capital market. A descriptive research utilises surveys. Surveys are useful in describing the characteristics of a large population and are relatively inexpensive.

3.3 Population and Sampling Techniques

The population of the study comprises stakeholders within the local capital market which include stock brokers, asset management companies, regulator (SEC), custodians, ZSE, Chengetedzai (CSD), pension funds, central bank (RBZ), insurance companies and the Ministry of Finance.

3.3.1 Sampling for this study

In this study, a stratified random sampling was used because capital market stakeholders have distinct backgrounds/characteristics emanating from their work experience in the capital market.

3.3.2 Sample Size

A sample size of 175 respondents was used and the details of the sample are highlighted below.

Table 2: Respondents Structure

	Respondent	No of Questionnaires
1	Stockbroking firms	51
2	Asset Management Firms	48
3	Pension Funds	15
4	Insurance Firms	30
5	Zimbabwe Stock Exchange	5
6	Securities Exchange Commission Zimbabwe	5
7	Ministry of Finance	5
8	Custodians	6
9	Chengetedzai (CSD)	5
10	Reserve Bank of Zimbabwe	5
	Total	**175**

3.4 Data Collection Procedure

3.4.1 Questionnaire

A structured questionnaire with different types of closed ended questions was used. The questionnaire reviewed the current level of development of the local capital market based on the perceptions of the respondents. Ideas were sought as to how trading automation could lead to the development of the local capital market as well as determine the current level of capital market development. A five point Likert Scale was used to measure concurrence or non-concurrence of the respondents on the statement provided.

3.4.2 Secondary Data

A significant amount of published data pertaining to trading automation at the academic level was required for this study. The availability and source of the data have been verified. Empirical results and a considerable amount of data were available from the ZSE, SEC and IPEC as well as academic journals and databases for local capital market stakeholders.

4. FINDINGS

4.1 Aggregate influence of Trading Automation on Capital Market Development

The aggregate influence of trading automation on each of the four dimensions is presented below. From the analysis above, assessed on a 5-point Likert scale, it was established that the greatest influence of trading automation would be on price discovery with a mean rating of 4.39 from a maximum of 5 (based on a 5-point Likert scale). The significance of price discovery can further be validated by the observed kurtosis statistic of 3.608.

Table 3: Aggregate influence of Trading Automation

	N	Mean		Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Local Market Liquidity	132	3.99	.047	.540	.116	.211	.003	.419
Volumes and Traded Values	132	4.24	.043	.490	.439	.211	-1.835	.419
Price Discovery	132	4.39	.054	.624	-1.465	.211	3.608	.419
Regulatory Improvement	132	4.33	.051	.585	-.548	.211	-.630	.419
Valid N (listwise)	132							

In essence, positive kurtosis statistics depict a rather leptokurtic distribution, one characterized by a significant peakedness, or rather high concentration of the respondents about some central tendency. In this case, it was a sign of the coherence among the respondents being marginally higher for price discovery than for the other variables. The second significant influence of trade automation was observed with regulatory improvement which had a mean rating of 4.33, while volumes and traded values had a mean of 4.24, with the least being local market liquidity with the least mean of 3.99.

The respondents agreed that trading automation will result in an improvement in all the four parameters used to measure capital market development. In essence, by automating the local capital market, there should be an improvement in the price discovery process, regulation of the market, liquidity and volumes and value traded. This has an overall effect of boosting investment and trading confidence amongst capital market participants as well as increase market transparency when it comes to reporting aspects.

4.2.1 Trading Automation and Local Market Liquidity

With regards to the link between trading automation and local market liquidity, to test whether there was an association between the two, the Chi-square analysis was done at the 95% confidence interval - and the results are presented below.

Table 4: Chi-Square Test - Trading Automation and Local Market Liquidity

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.326a	2	.000
Likelihood Ratio	32.401	2	.000
Linear-by-Linear Association	22.694	1	.000
N of Valid Cases	132		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.75.

Decision: The p-value of 0.000 is less than 0.05. Therefore, we conclude that sufficient statistical evidence was found at the 95% confidence level to validate that trading automation would have an influence on local market liquidity.

4.2.2 Trading Automation and Traded Volumes and Values

To test whether there was an association between trading automation and local market liquidity, the Chi-square analysis was done at the 95% confidence interval, and the results are presented below.

Table 5: Chi-Square Test - Trading Automation and Traded Volumes and Values

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	30.694a	1	.000		
Continuity Correctionb	28.725	1	.000		
Likelihood Ratio	31.521	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	30.461	1	.000		
N of Valid Cases	132				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 21.67.

b. Computed only for a 2x2 table

Decision: The p-value was 0.000. Being less than 0.05, therefore, we conclude that sufficient statistical evidence was found at the 95% confidence level to validate that trading automation would have an influence on the traded volumes and values.

4.2.3 Trading Automation and Price Discovery

Again, to test whether there was an association between trading automation and price discovery, the Chi-square analysis was done at the 95% confidence interval, and the results are presented in Table 6.

Table 6: Chi-Square Test - Trading Automation and Price Discovery

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.504a	2	.000
Likelihood Ratio	22.242	2	.000
Linear-by-Linear Association	18.217	1	.000
N of Valid Cases	132		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.25.

Decision: The p-value was found to be 0.000, and being less than 0.05, we concluded that sufficient statistical evidence was found at the 95% confidence level to validate that trading automation would have an influence on Price Discovery.

4.2.4 Trading Automation and Local Market Regulation

The Chi-square analysis was done at the 95% confidence interval, to test whether there was an association between trading automation and local market regulation, and the results are presented below.

Table 7: Chi-Square Test - Trading Automation and Local Market Regulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.298a	2	.000
Likelihood Ratio	32.290	2	.000
Linear-by-Linear Association	28.172	1	.000
N of Valid Cases	132		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.50.

Decision: The p-value was found to be 0.000, we therefore, concluded that sufficient statistical evidence was found at the 95% confidence level to validate that trading automation would have an influence on local market regulation.

It can be concluded that trading automation has been statistically validated to be having a significant relationship with local market liquidity, volumes and values traded, price discovery process and local market regulation.

4.3 Antecedents of Capital Market Development

From the empirical studies, it has been theorized that besides the economic factors, there are five key socio-political antecedents to capital market development, and these are peace, internal security, government control, rule of law and property rights. In this research, the respondents were asked to identify the degree of importance of each of these antecedents in the Zimbabwean context, on a scale of 1-5, with 1 being the

least important and 5 being the most important. The descriptive measures of central tendency and dispersion for the ratings by the respondents are presented in Table 8.

Table 8: Antecedents of Capital Market Development

	N	Mean		Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Peace	132	1.97	.089	1.018	.986	.211	.462	.419
Internal Security	132	2.28	.097	1.114	.635	.211	-.247	.419
Government Control	132	2.25	.101	1.162	.388	.211	-.683	.419
Rule of Law	132	4.43	.068	.783	-1.512	.211	2.118	.419
Property Rights	132	4.59	.057	.653	-1.844	.211	4.020	.419
Valid N (listwise) 132								

Table 8 shows that the highly rated factor was property rights which had an average rating of 4.59 off a maximum of 5.0. The greater degree of harmony among respondents can be qualified by the relatively low standard deviation of 0.653, along with a high kurtosis statistic of 4.020. The second rated antecedent was the issue of the rule of law, whose mean rating was 4.43. Once more, there was a greater degree of harmony among respondents as can be seen with the rather low standard deviation of 0.783, along with the leptokurtic nature of the distribution, with a positive kurtosis of 2.118.

4.3.1 Factor Analysis

From the foregoing, to further investigate these antecedents and establish the major factors that underlie capital market development, Factor Analysis was considered as befitting. However, to qualify the use of Factor analysis, the KMO Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Tests of Sphericity were run and the results are presented below:

Table 9: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.558	
Bartlett's Test of Sphericity	Approx. Chi-Square	118.595
	df	10
	Sig.	.000

The acceptable KMO statistics should be greater than 0.5, while the significance levels of the Bartlett's test should be less than 0.05. From the results above, both assumptions for the use of Factor analysis were met, and hence the conclusion that the data collected was sufficient for the use of Factor Analysis.

Basing on factor loadings greater than 0.4, the rotated component matrix for the analysis of the extracted factors is presented in Table 10.

Table 10: Rotated Component Matrixa

	Component	
	1	2
Government Control		.826
Rule of Law		-.813
Internal Security	.877	
Peace	.839	
Property Rights	-.645	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

From the analysis above, Component 1 comprised of peace, internal security and property rights whereas Component 2 comprised of government control and rule of law. In a nut shell, the factor behind Component 1 is stability. The factor behind Component 2 is justice. Property rights were negatively correlated to peace and internal security because even if a country has peace and internal security, that alone is not a guarantee that property rights will be upheld. Rule of law and government control were negatively correlated because a government might be in control of its territory but that alone is not a guarantee that there will be independent legal institutions to enforce laws of the country.

4.4 Supporting Factors for Capital Market Development

The study shows that local capital market stakeholders believe that out of the five necessary conditions for capital market development, property rights and rule of law are the most important factors necessary for capital market development. In addition, stakeholders do not believe that there is capital adequacy to support capital market development. This could be a result of the current macro-economic environment which stakeholders believe is not supportive of capital market development. Despite the lack of supportive factors for capital market development, some local capital market stakeholders believe that there are investment opportunities on the local capital market. This could be a result of some operational inefficiency on the local capital market which presents profitable investment opportunities ahead of an inevitable market correction.

4.5 Extent of Capital Market Development in Zimbabwe

Table 11: Rotated Component Matrix - Capital Market Development in Zimbabwe

	Component	
	1	2
Sufficiency of pre-trade institutions in Zimbabwe	.729	
Acceptability of off-exchange trade in Zimbabwe	.478	
Timeliness and ease of clearing and settlement of trades in Zimbabwe	.775	
Sufficiency of custodians in Zimbabwe and affordability of custodial fees	.869	
ZSE playing a central role in the capital market of Zimbabwe		.772
Sufficiency of laws regulating the capital market in Zimbabwe		.830
Sufficiency of supervision on the capital market in Zimbabwe		.795

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

From the analysis above, Component 1 comprises of:

- Sufficiency of pre-trade institutions in Zimbabwe
- Acceptability of off-exchange trade in Zimbabwe
- Timeliness and ease of clearing and settlement of trades in Zimbabwe
- Sufficiency of custodians in Zimbabwe and affordability of custodial fees

Component 1 comprises of the operational efficiency factors of capital market development as it constituted the trading processes from pre-trade right up to settlement of transactions.

On the other hand, Component 2 comprises of:

- ZSE playing a central role in the capital market of Zimbabwe
- Sufficiency of laws regulating the capital market in Zimbabwe
- Sufficiency of supervision on the capital market in Zimbabwe

Component 2 comprises of the regulatory factors behind capital market development as it constituted the formal platform for trading/transacting with rules and regulations being enforced by separate and independent institutions.

It follows from the foregoing that the determination of the extent of capital market development is dual-pronged, and should be measured from an operational perspective and from a regulatory perspective. With this in mind, the corresponding variables for each factor were aggregated and the mean rating of the extent of capital market development is presented below, from both an operational standpoint to a regulatory standpoint.

Table 12: Mean Ratings – Extent of Capital Market Development

	N	Mean		Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Operational Factor	132	2.6818	.05495	.63137	-.740	.211	.318	.419
Regulatory Factor	132	3.2551	.04490	.51584	-.113	.211	-.414	.419
Valid N (listwise)	132							

Table 12 shows that the highest mean rating was noted for the regulatory factor, being 3.2551, while that for the operational factor was 2.6818. Recalling the ranked measures of capital market development, vis-à-vis the extracted components from factor analysis, we can therefore classify the ranked contributions as:

Table 13: Categorized Ranked Measures of Capital Market Development

Rank	Factor	Nature of Control
1.	ZSE playing a central role in the capital market of Zimbabwe	REGULATOTY
2.	Sufficiency of laws regulating the capital market in Zimbabwe	REGULATOTY
3.	Sufficiency of supervision on the capital market in Zimbabwe	REGULATOTY
4.	Sufficiency of pre-trade institutions in Zimbabwe	OPERATIONAL
5.	Sufficiency of custodians in Zimbabwe and affordability of custodial fees	OPERATIONAL
6.	Timeliness and ease of clearing and settlement of trades in Zimbabwe	OPERATIONAL
7.	Acceptability of off-exchange trade in Zimbabwe	OPERATIONAL

Table 13 shows that in as much as capital market development is concerned, in Zimbabwe, we are more developed regulation-wise, but however, in as much as the operational issues are concerned, there is need

for improvement. In essence, from an operational perspective, the local capital market is not yet fully developed. There is need for custodial fees which were deemed high by stakeholders to come down and for settlement and clearing time to be shortened from the current levels. High custodial fees are contributory to high transaction costs on the local capital market and as such, they erode investment returns. A longer than deemed appropriate settlement time affects the speed at which new and relevant information is incorporated in security prices and in some way affect the capital market's pricing efficiency. As such, management needs to take this into consideration when making trading decision on the market.

5. CONCLUSIONS

5.1 Trading Automation and Capital Market Development

The researchers conclude that trading automation has got a significant positive relationship with capital market development and that trading automation on the ZSE will result in an improvement in volumes and value traded, liquidity, price discovery process and regulation of the local capital market. The expected improvement in the four parameters after automation will lead to the development of the overall capital market.

5.2 Extent of Capital Market Development in Zimbabwe

The researchers concluded that the determination of the extent of capital market development was dual-pronged, and would have to be measured distinctly from an operational perspective and from a regulatory perspective. From further analyses, it was established that in as much as capital market development is concerned, from a regulatory perspective, the local capital market was deemed developed through the high ratings. However, in as much as the operational issues are concerned, there is need for improvement on the local capital market and as such, was deemed under-developed. Since the determination of the extent of development on the local capital market is dual pronged, the researchers can conclude that the local capital market is not yet fully developed from an operational perspective whilst from a regulatory perspective, the market is developed. This is attributed to an unfavorable macro-economic environment and unavailability of capital on the market. High levels of indebtedness at government, household and company levels, elevated levels of corruption, de-industrialization, rapid informalisation of the economy, negative Balance of Payment and high unemployment levels, are all factors negatively impacting on the economic environment. On lack of capital availability, the absence of pension capital (coming on the back of massive company closures) and high country risk rating are impeding on the development of the capital market. However, despite the present market conditions, the capital market institutions operate well enough and cannot be regarded as a limiting factor to capital market development.

6. RECOMMENDATIONS

In order to improve and develop the Zimbabwean Capital Market, the researchers recommend the following initiations from the local capital market stakeholders:

6.1 Government

The government, through the Ministry of Finance is a key stakeholder on the local capital market. As such, government needs to create an investment environment that attracts capital into the economy. Investment policies should be realigned to uphold property rights and observe the rule of law. Money is a very timid resource and as such, attractive polices are needed if the government is to boost funds inflows on to the local capital market. From an administrative perspective, the ministry seems to be doing a good job on formulating government policies. However, the development of the local capital market seems not to be a priority for government as the strengthening of the banking sector seems to be more important than the development of the local market. This is because the capital market is generally seen as an independent entity and does not need support for its development. This is worrisome as government's active role may lead to the development of the local capital market.

The government also needs to create and promote a conducive macro-economic environment. Specifically, the government needs to deal with the issue of policy clarity and implementation, high debt levels – which are affecting the country's credit risk standings, high unemployment levels –which are affecting the propensity to consume and save, stop the rapid informalisation of economy, stop de-industrialisation and reverse the negative BOP position. A conducive macro-economic environment is one of the key supporting factors to capital market development.

6.2 Securities Exchange Commission

The Securities and Exchange Commission (SEC) should appear professional, independent and focused and play an active and positive role in the development of the local capital market. However, emphasis on enforcement activities seems to be focused mainly on reporting timeliness and too little on insider trading – this has a potential to damage the credibility of the market. Thus the researcher recommends that SEC broadens its scope of enforcement activities in order to further strengthen its regulatory role on the market.

6.3 Zimbabwe Stock Exchange

Zimbabwe Stock Exchange should automate its trading platform so that the price discovery process, liquidity, volume and value traded can be improved from the current levels. However, it is important to note that, trading automation has to be accompanied by the necessary and supportive conditions for capital market development in order for noticeable changes in price discovery, liquidity, volume and value as well as regulation to be witnessed. In terms of turnover and liquidity, the exchange is not yet fully developed. However most of the challenges causing this situation are outside the control of the exchange namely; lack of capital and a difficult macro-economic environment. Management at the ZSE is professional and active if not successful in promoting the capital market and the exchange's ambitions. In essence, the exchange should not be considered itself to be a limiting factor for capital market development.

6.4 Chengetedzai Depository Company (CDC)

The CDC should review its operational set up in order to support the development of the local capital market. In terms of settlement and clearing, the current operational set up of CDC which requires investors or participants to deposit funds and securities ahead of trading result in a cumbersome procedure that most likely decreases trading activity to some extent. This is mainly due to illiquidity nature of the market and CDC's inability to take on risk. However, despite this shortcoming, operations at CDC seem to be efficient and sufficient given low current market activity.

6.5 Pre-Trade Institutions

There should be sufficient asset management firms and mutual funds in the local capital market for trading automation to be efficient. Pre-trade institutions should come up with permissible new investment products in order to improve the depth of the local capital market. In addition, looking at brokerage firms, there are 37 registered and practicing stockbrokers in the capital market. As at 31 December 2014, they were 13 registered and operating stock broking firms and they offer differentiated services like trading, analysis and consultancy services. Since dollarization, the number of brokers and brokerage firms slightly went down to the current level due to revoked licenses (Remo Stockbrokers) and insolvency (Interfin Securities) but the compliance to rules by the remaining firms is perceived to be high. The low availability of dedicated analysts is currently an issue regarding the provision of a good and relevant informational framework. As such, there is need to improve the availability of analysts in order to ensure well informed investment decisions prevail on the market as well as improve the informational framework.

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