

**THE EFFECT OF INTANGIBLE ASSETS INTENSITY ON
VOLATILITY OF STOCK PRICES FOR FIRMS LISTED AT THE
NAIROBI SECURITIES EXCHANGE**

BY

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DECLARATION

This Research Project is my original work and has not been presented for a degree in any other University.

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This Research Project has been submitted for examination with my approval as the University supervisor.

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Special thanks go to the Almighty God for everything He's done in my life.

DEDICATION

I dedicate this project to my family.

To my late Mum, for the several sacrifices she made to help me realize and achieve a first class education.

And to my Fiancée, Emma Ochieng who held me accountable to complete everything I dared to start.

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
CMA	-	Capital Markets Authority
CPI	-	Consumer Price Index
EMH	-	Efficient Market Hypothesis
GAAP	-	Generally Accepted Accounting Principles
GARCH	-	Generalized Autoregressive Conditional Heteroscedasticity
GDP	-	Gross Domestic Product
HPR	-	Holding Period Returns
IA	-	Intangible Assets
IAS	-	International Accounting Standards
IC	-	Intangible Capital
IPO	-	Initial Public Offer
MPC	-	Monetary Policy Committee
MSCI	-	Morgan Stanley Capital International
NSE	-	Nairobi Securities Exchange
R & D	-	Research & Design
ROE	-	Return on Equity

ABSTRACT

The objective of this study is to evaluate the effect of intangible assets intensity on the volatility of stock prices for firms listed at the Nairobi Securities Exchange. The study checks if the intensity of intangible assets in a firm's balance sheet affects the volatility of their stock price. In most cases, it is expected that intangible assets intensity would result to a positive effect on stock price volatility. The study relies on secondary data of 13 sampled publicly listed companies with data of up to five years from 2010 to 2014. These firms were randomly selected from five different industry groupings namely: banking, energy and petroleum, investments, information & telecommunication and manufacturing. The various analyses of these firms were computed from the data collected and extracted from their audited financial statements for the periods 2010-2014. The data was then analysed using linear regression models in excel to establish if there were any significant effect of intangible assets intensity on stock price volatility. From the results of the data set, the study shows a positive correlation between intensity of intangible assets and volatility of stock prices. However, results from the control variables, company size and debt had negative correlation between them and stock prices volatility. A possible explanation for this finding is the fact that intangible assets activities tend to increase the level of information asymmetry on projects and future earning for a firm and this in turn generates an increase in stock price volatility. Additionally, the findings could be attributed to the impact of uncertainty and expectation on the behaviour of investors in the Nairobi Securities Exchange market due to the increasing high level of intangible assets investment going at NSE. Although, intangible assets intensity had a positive effect on the volatility of stock price at the NSE, the results were inconclusive. The study therefore recommends that further research should be conducted with more details on the specific types of intangible assets like goodwill, R & D, intellectual capital while other variables which were not factored in and identify which are the major factors that affect volatility of stock prices for firms listed at the NSE. This will enable them to control these factors to ensure sustained improvement on stock prices for firms listed at the NSE. In order that we find more reliable and accurate results, the study further recommends that company managers review the existing methods of recognizing and recording intangible assets which would be a step towards a more broad understanding of the effect of book value of intangible assets on the volatility of stock prices.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The rise of intangible assets size and the contribution to corporate growth over the last two decades posed an interesting topic for analysis. Intangible assets have been widely recognized as the driving force of an economy's productivity growth and have become more and more crucial for a firm's survival and prosperity. Goldfinger (1997) suggest that the source of economic value and wealth is no longer the production of material goods but the creation and manipulation of intangible assets. The increase in information complexity of intangible assets increases the difficulty of forecasting earnings of intangibles-intensive firms. Others suggested that companies engaged in high R&D intensity have a distinctive effect on returns using two groups of stocks (Lev & Sougiannis, 1996).

Heiens, McGrath, & Leach (2008) identifies four types of intangibles, namely advertising, research and development (R&D), goodwill and other intangibles and investigated the effect of these types of intangible assets on market-adjusted holding period returns (HPR). Their results seem to indicate that of these four variables, advertising does in fact seem to have a significant and positive impact on HPR. There are observations that the stock market behavior of the so called 'knowledge companies' frequently deviates from that of basic industries. There also exists some evidence supporting a positive correlation between a firm's intangibles and its share market value (Lev & Amir, 1996).

Stock prices are generally believed to be determined by some fundamental macroeconomic variables such as interest rates, money supply, inflation, exchange rate, and Gross domestic Product. Changes in stock prices are linked with macroeconomic behavior in advanced countries (Muradoglu et al., 2000). The increasing importance of intangible assets to investors, analyst and shareholders has increased investment community's needs to understand how companies create and manage their intangible assets, and to know how companies share prices are affected by intangible assets.

1.1.1 Intangible Assets Intensity

In accordance with International accounting standards (IAS-38, 2007) an intangible asset is an identifiable non-monetary asset without physical substance, which is controlled by an entity as a result of past events and which is expected to result in future economic benefits to the entity. Intangible asset intensity refers to the amount of investment in R & D, patent, goodwill and other intangibles that a firm requires to generate sales volume. These changes in information technology as key driving forces have mainly triggered dramatic changes in the structure of companies. These changes in conjunction with increased customer demands challenge companies to shift their perspective from tangible to intangible resources (Edvinson & Kivikas, 2007).

Intangible assets intensity can be classified into a number of distinct types of non-physical assets. These classification schemes aim to give a better understanding of what intangible assets intensity consists of. Although with the issue of these schemes the same problem can be found as with the definition of intangibles discussed above. However, it

appears that the classification of IA into human capital, structural capital and relational capital is increasingly used as a standard perspective (Edvinsson & Kivikas, 2007).

Edvinsson & Kivikas (2007) links intangible assets intensity to a new management perspective that is targeted to long-term rather short-term profit increase. They further claim that this perspective is found in many German SMEs where management behavior is based on a more long-term and ethical view rather than on satisfying financial investors' requirements. According to Nonaka, Toyana & Konno (2001) IA represent the type of resource a potential investor is looking for. This is confirmed by Gupta & Roos (2001) stating that IA are the key motivation behind mergers and acquisitions. Upton (2001) argue that intellectual capital that adopted by one company may not generalize to other companies because it is closely tied to the industry and the specific industry that it serves. This indicates that the stakeholders have their own interest in addressing the issue of management, measurement and reporting intangible assets.

The shortcomings of traditional accounting systems and consequently financial reporting with regard to intangibles have encouraged a mass of research leading to a multitude of approaches. Developments of intellectual capital reporting are closely linked to individuals such as (Sveiby, 1997) and (Edvinsson & Kivikas, 2007) who wished to obtain a better understanding of value creation within the company. Despite the development of a mass of different intangible assets capital reporting approaches, only few companies apply them so far (Zambon, 2006). Another aspect to bear in mind is that the implementation of certain reporting frameworks presupposes that firms are

accustomed to applying management instruments (Bornemann & Alwert, 2007). In the small firm setting it is doubtful that this condition can be fulfilled (Jennings & Beaver, 1997).

The inclusion of intangible assets intensity increases the transparency of companies leading to improved ratings (Edvinsson & Kivikas, 2007). Transferred to company succession, this suggests that a stronger appreciation of intangible assets may enhance a company's creditworthiness. Nonaka, Toyana & Konno (2001) regard the creation and utilization of intangibles as the core activities of a company in order to secure its continuity. This is particularly valid with regard to the current financial crisis

In an attempt record and recongnise intangible assets intensity a firm's books of accounts a great problem still exists. The common language among practitioners and scholars is still missing (Marr & Chatzkel, 2004). One reason for this could be that differences arise from differing viewpoints of different interest groups or disciplines, respectively: strategy and measurement. The former is concerned with optimising the management of knowledge resources in the company in order to improve performance. The latter focuses on the setting of standards for organizational accounting in order to give stakeholders a more comprehensive picture of intangible assets in terms of traditional monetary data (Petty & Guthrie, 2000).

1.1.2 Stock Price Volatility

The volatility of share price is the systemic risk faced by investors who possess ordinary shares investment (Guo, 2002). Stock return volatility represents the variability of stock price changes and is perceived as a measure of risk faced by investors. Shiller (1981) argues that stock prices are more volatile than what is justified by time variation in dividends. Schwert (1989) concludes that stock market volatility cannot be fully explained by changes in economic fundamentals. Numerous studies have documented evidence showing that stock returns exhibit phenomenon of volatility clustering, leptokurtosis and Asymmetry. Volatility clustering occurs when large stock price changes are followed by large price changes, of both signs, and small price changes are followed by periods of small price changes (Fama, 1965).

Ajao (2012) notes that a number of recent studies have sought to characterize the nature of financial market return process, which has always been described as a combination of drift and volatility. Volatility may impair the smooth functioning of the financial system and adversely affects economic performance (Rajni & Mahendra, 2007). Stock price volatility is an indicator that is most often used to find changes in trends in the market place.

Rajni & Mahendra (2007) notes that stock price volatility tends to rise when new information is released into the market, however the extent to which it rises is determined by the relevance of that new information as well as the degree in which the news surprise investors. However, economists and financial experts have propounded theories on what

causes volatility. Some financial economists see the causes of volatility embedded in the arrival of new, unanticipated information that alter expected returns on a stock (Engle, 1982). Others claim that volatility is caused mainly by changes in trading volume, practices or patterns which in turn are driven by factors such as modifications in macroeconomic policies shift in investor's tolerance of risk and increase uncertainty (Rajni & Mahendra, 2007). These characteristics are perceived as indicating a rise in financial risk, which can adversely affect investors' assets and wealth. For instance, volatility clustering makes investors more averse to holding stocks due to uncertainty.

Firm-level stock return volatility is important for both managers and shareholders. First, high volatility increase a firm's perceived riskiness, thereby raising its cost of capital (Perold, Stein, & Froot, 1992). Secondly, high volatility could affect the various agency relationships in the firm, exacerbating conflicts between stockholders and bondholders and hindering resolution of stockholder-management problems (Baiman & Verrechia, 1996). Finally, recent research suggests that investment strategy based on volatility can earn statistically and economic significant abnormal returns (Fleming, Kirby & Ostdiek, 2001, 2003)

There exist various shortcomings in measuring volatility of stock prices. First is the fact that the stock return data are not readily available. Secondly is that the most common measure of stock return volatility is a sample standard deviation of returns. The sample size requirements of the standard deviation estimator limits the scope for investigating short-term movements in volatility and the correlation patterns among national market

volatilities. The data used in the analysis are monthly price indices for the sampled firms are obtained from the Nairobi Securities Exchange data base. Some firms were not actively trading while some do not have information for some particular periods. The sampled firm's indices are also different; this may also make our study subjective (Schwert, 1989).

1.1.3 Intangible Assets Intensity and Stock Price Volatility

Various financial literatures provides formal empirical evidences that intangible assets intensity and stock price volatility are positively associated in the most of firms listed in different securities across the world. Research and development effect on stock prices volatility is however more intense in high tech industries. Mazzucato & Tancioni (2006) find that the higher the firm's R&D intensity, the higher the idiosyncratic risk is.

Pastor & Veronesi (2005) provides interesting insights on the relationship between innovation, uncertainty and both the level and volatility of stock prices. They claim that if one includes the effect of uncertainty about a firm's average future profitability into market valuation models, then bubbles can be understood as emerging from rational, not irrational, behavior about future expected growth. Building on the result in (Pastor & Veronesi, 2004) that uncertainty about average productivity increases market value, they extend the model to explain why technological revolutions cause the stock prices of innovative firms to be more volatile and experience bubble like patterns. The basic idea is that when a firm introduces a new technology, its stock price rises due to the expectations regarding the positive impact of the new technology on its productivity.

Connolly & Hirschey (2005) in their study prove positive correlation between R&D expenditures to stock price volatility. The works of (Pamela & Mark, 1993) proved that the intangible capital has contributed to the value of Tobin's Q, but cannot explain it completely, because there are other factors that explain it. However (Daniel & Titman, 2006) proved that the future stock returns are unrelated to the performance of the previous accounting period, but have significant and negative associated with the intangible return.

1.1.4 Firms Listed at the Nairobi Securities Exchange

The Nairobi Securities Exchange had 64 listed companies as of December 2014. The exchange recently got a boost through an increment in its weight in the MSCI frontier markets portfolio index to 4.8% from 3.0%, a move that is expected to boost its visibility and, perhaps, enhanced volumes of portfolio and foreign direct investment flows. The exchange therefore provides a suitable platform to measure the relationship between return and volatility in the frontier markets (Nairobi Securities Exchange, 2013).

Nairobi Securities Exchange has been growing rapidly and has diversified to provide not only the primary role of providing an alternative source of capital for investment, but also many other functions. The NSE has recently adapted an automated trading system, to keep in pace with other major world stock exchanges, and this has greatly increased the volumes of stocks traded in the market. Currently the NSE is trading more than a 100 million shares each month, making it to play a great role in the economic growth of Kenya. This has been facilitated by enabling idle money and savings to become

productive by bringing together the borrowers and lenders of money at a low cost. The market has helped in educating the public about the need to invest in the stock market as well as boosting the confidence of investors through the requirement of listed companies to have published financial reports (Kirui, Wawire & Onono, 2014).

A carefully study of the financial statements of these listed firms indicate a general increasing trend in the recognition and recording of intangible assets. The findings suggest that returns volatility is priced in Kenya's securities market with time-varying premier and that shocks to equity prices arising from intangible assets intensity are highly persistent. The findings have important implications for stock returns predictability and volatility trading strategies that might be useful to asset price researchers and practitioners in the frontier stock markets. This continues to show the increasing importance of intangible assets in improving firm value and hence stock prices (Kirui, Wawire & Onono, 2014).

1.2 Research Problem

The stock market plays a vital role in economic development of a nation, since it acts as mediator between borrowers and lenders. A well-functioning stock market will contribute to development of an economy through two important channels; boosting savings and allowing for more efficient allocation of resources (Junkin, 2012). Furthermore, stock markets allow companies to acquire capital easily and efficiently since they create an enabling environment for business transactions.

Stock market volatility is one of the most important aspects of financial market developments, since it provides an important input for portfolio management, option pricing and market regulation (Poon & Granger, 2003). In Kenya, companies which are listed on the Nairobi Securities Exchange have been experiencing high stock returns volatility with the highest record of 21.1% in the history of NSE in 2000 (Kalui, 2004). In 2011, share prices dropped due to adverse economic conditions which were greatly contributed by depreciation of Kenya shillings touching a low of Sh 107 against US dollar (Nairobi Securities Exchange Limited, 2014). The daily upward and downward movement of security prices being witnessed at the Nairobi Securities Exchange has been behind the assortment of ills that has left market turbulent with stock prices dipping low. A highly volatile market will make the investors lose confidence and shy away from trading in that market. This may lead to shut down of the stock market impacting negatively on the economy (Kirui, Wawire & Onono, 2014).

Intangible assets investment is crucial in the overall performance of a firm. Intangible assets investments reporting and recognition is therefore important. In Kenya, Firms listed in the Nairobi Securities Exchange continue to record Intangible assets in their books of accounts. This has been mainly because of the adoption of the International Financial Reporting Standard IAS 38 which demands for recognition of intangible assets. Although Firms percentage of intangible assets has increased, accounting rules have not kept pace. For instance, if the R&D efforts of a pharmaceuticals company create a new drug that passes clinical trials, the value of that development is not found in the financial statements. It doesn't show up until sales are actually made, which could be several years

down the road. As a result, there is a serious disconnect between what happens in capital markets and what accounting systems reflect (Njuguna, 2004).

An empirical search for literature on the effect of intangible assets intensity on stock price volatility for firms listed at the Nairobi Securities exchange revealed that several studies have been carried out but not conclusive enough. Majority of the studies that have been done to evaluate effect of intangible assets intensity on stock returns volatility is mainly from developed markets (Ratanapakorn & Sharma, 2007). Studies on emerging market especially Kenya is limited. Evaluating the relationship between intangible assets intensity and stock return is of crucial concern for an economy. Policy makers would wish to establish which variables to control and how in order to create an enabling environment for thriving investments (Kirui, Wawire & Onono, 2014).

These local studies done in the areas of intangible assets as a factor that influence stock return volatility at the NSE have been inconclusive as they have failed to demonstrate any relationship between stock volatility and intangible assets intensity on firms listed at the NSE. These studies have not been comprehensive enough and their findings have been conflictive in some instances.

There is therefore a gap in literature as far as a study on the intangible assets intensity on stock price volatility as far as firms listed at the Nairobi Securities Exchange is concerned. This is the gap that this study seeks to bridge. The following research question was explored: What is the effect of intangible assets intensity on stock Price volatility for

firms listed at the Nairobi Securities Exchange?

1.3 Objective of the Study

The objective of this study is to evaluate the effect of intangible assets intensity on volatility of stock prices for firms listed at Nairobi Securities Exchange.

1.4 Value of the Study

The study is of significance to firms currently listed in the Nairobi Securities Exchange in the sense that they will use the result from this study to recognize the increasing importance of intangible assets as a contributor to improved share price hence improved company value. Understanding the effects intangible assets intensity on volatility of stock prices of the NSE listed firms is important in helping these firms in stimulating the growth of Research and Development, Innovations, Human capital as drivers of company value through improved share price.

The finding of this study will be of importance to academicians since it will add to the knowledge of the researchers in this field of study. The findings are also significant to financial policy makers in that they serve as a guide to them when making accounting and reporting regulations related to Intangible assets investment. The study will prove useful to investors, analysts or shareholders who are interested to know how the size of intangible asset in a firm affects the volatility of the firm's stock price.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review. The chapter develops theoretical review, conceptual framework, empirical review that will be used in the study in regard to each variable in the study.

2.2 Theoretical Review

This study was underpinned on four theories that are relevant to the effect of Intangible Asset Intensity on Stock price volatility. These Theories are Efficient Market Hypothesis theory (EMH), Signaling Theory, Resource Based Theory, and Agency Cost Theory.

2.2.1 Efficient Market Hypothesis

Theory of market efficiency or the efficient market hypothesis provides an appropriate theoretical framework for the study. According to the theory, share prices on the market place react fully and instantaneously to all information available (Fama, 1991). According to the Efficient Market Hypothesis (EMH), an operationally efficient stock market is expected to be externally and informationally efficient, thus security prices at any point in time are an unbiased reflection of all the available information on the security's expected future cash flows and the risk involved in owning such a security (Reilly & Brown, 2003). Such a market provides accurate signals for resource allocation as market prices represent each security intrinsic worth. Market prices can at times

deviate from the securities true value, but these deviations are completely random and uncorrelated.

Lo (1997) argued that with market efficiency hypothesis the price changes are only expected to result from the arrival of new information. Given that there is no reason to expect new information to be non-random, period-to-period price changes are expected to be random and independent. In other words, they must be unforecastable if they are properly anticipated, i.e. if they fully incorporate the expectations and information of all market participants. It is expected that the more efficient a market, the more random the sequence of its price movements, with the most efficient market being the one in which prices are completely random and unpredictable. In an efficient market information gathering and information based trading is not profitable as all the available information is already captured in the market prices. This may leave investors with no incentive as to the gathering and analyzing of information, for they begin to realize that market prices are an unbiased estimate of the shares' intrinsic worth (Fama, 1965; Lo, 1997)

Fama (1970) states that with Efficient Market Hypothesis (EMH) prices at all times fully reflect all available information that is relevant to their valuation. Thus, security prices at any point in time are an unbiased reflection of all available information on the security's expected future cash flow and the risk involved in owning such a security. (Fama, 1970) classified the information items into three levels depending on how quickly the information is impounded into share prices: weak form EMH, semi strong form EMH, and strong form EMH.

Dryden (1970) posits that if the market is efficient in the weak form, then share prices reflect all past market information, hence information on past prices and trading volumes cannot be used for share valuation. Investigating the presence of any statistically significant dependence or any recognizable trend in share prices changes, is traditionally used to directly test weak form efficiency. The weak form of the efficient market hypothesis is such in which the present stock price is as a result of all the past information in the history of the market. A semi strong-form efficient market is a market in which prices fully reflect all publicly available information. This form is concerned with both the speed and accuracy of the market's reaction to information as it becomes available. The semi strong form of market efficiency deduces that the share prices reflect all available information both publicly and privately existing.

The strong form efficiency holds that prices are expected to reflect both public and private information. It seems to be more concerned with the disclosure efficiency of the information market than the pricing efficiency of the securities market. Tests for the strong form efficiency are mainly centered on finding whether any group of investors, especially those who can have access to information otherwise not publicly available, can consistently enjoy abnormal returns (Dryden, 1970). According to (Damodaran, 1997) this implies that no one having private or public information can out beat the market, because the market automatically anticipates in an unbiased manner the stock prices and incorporates the effect of all these information on the share prices

The EMH theory is relevant to our study because of its belief that the market will react according to the available information. Listed firms with all financial information detailing the investments on intangible assets are likely to express less stock price volatility compared to listed firms who provide to the investors discreet information. The stable volatility is also attributed to investor confidence.

2.2.2 Signaling Theory

Dragota & Semenescu (2008) asserts that managers know the true distribution of firm returns while investors do not. Managers benefit if the firm's securities are more highly valued by the market but are penalized if the firm goes bankrupt. Under such circumstances, the level of debt managers chose, serves as a signal on the quality of the company, a signal sent from the managers as possessors of private insider information towards outside investors.

Myers & Majluf (1984) assumed perfect financial markets, except that investors do not know the true value of either the existing assets or the new opportunity. Therefore, investors could not precisely value the securities issued to finance the new investment. The two authors assume that managers act in the interest of existing shareholders and refuse to issue undervalued shares unless the transfer from old to new stockholders is more than offset by the net present value of the growth opportunity.

Alves & Martins (1996) asserts that companies with more intangible asset are characterized by high information asymmetry. Managers of these firms have incentives to disclose their superior information to capital markets. Therefore, the market value of companies will depend on how the managers signal the market. This theory is relevant to our study because companies which are signaling higher intangible asset will have positive response from the market while those signaling decreases investment in intangible assets will experience a decrease in stock price valuation.

2.2.3 Resource Based Theory

Resource-based theory suggests intangible resources as the main drivers of the sustainability of performance differences across firms (Villalonga, 2004). Different contributors to the resource-based theory literature have used different terms, such as capabilities, core competences, or knowledge, to refer to these resources and a variety of definitions has been offered. This research will use intangible assets.

Ghemawat (1991) proposes a specific vehicle through which the characteristics of intangible asset translate into sustainability of competitive advantages for firms. In his view, intangible assets, because of their lower tradability and higher stickiness, are particularly prone to be a source of commitment, which he defines as the tendency of strategies to persist over time. Commitment, in turn, is the only general explanation for sustained differences in the performance of organizations.

Villalonga (2004) shows that asset intangibility is positively related to the persistence of firm-specific profits or losses. The results support the interpretation that intangible assets play an important role in sustaining a firm's competitive advantage, as predicted by the resource-based theory. On the other hand, they also suggest that intangible assets also have similar role in sustaining a firm's competitive disadvantage. Intangibles appear to be a double-edged sword, as a result of their greater stickiness relative to tangible resources.

Ghemawat (1991) found out intangibles-based commitment is driving sustained performance differences. The double-edged effect is a key implication of the resource-based theory, and the finding provides further empirical support for this theory. This theory is relevant to our study because it suggests that with increased investment in intangible assets, a firm's competitiveness increases which has a direct influence on a firm's stock price movement.

2.2.4 Agency Cost Theory

Jensen & Meckling (1976) described agency theory as the relationship between principal and its agent. The problems arise when they have to deal with two big problems. The first is the difference of goal between principal and agent. The second is the different tolerances between agent and principal toward risks valuation. Fama (1980) posits that agency problem tends to occur when the manager does not have 100% of company stocks.

There are two perspectives in seeing the agency conflict which is caused by investment in intangible asset. The first is the relation between manager and principal. Manager as the executor of intangible investment plan will increase their role by holding strategic position in the project. The benefit for managers is they can improve their bargaining power, namely manager specific investment (Alves & Martins, 1996). Since innovation projects are risky, unpredictable, long term, and labor intensive, it turns out that contracting manager under this set of circumstances is particularly demanding and as a consequence the agency cost associated with innovation are likely to be high. This means that intangible asset can be considered as the long term commitment between manager and principal. The uncertainties about when the company can take the benefit from this investment become such an important issue within their relation. There is allegation that a company will not able to fulfill their liabilities from the profit that they had. In financial world this problem was called solvency problem (Holmstrom, 1989).

Alves & Martins (2010) stressed that consequently as the scope for discretionary behavior is higher in more intangible asset intensive sectors than in traditional industries, the asset substitution and under investment problem increase, exacerbating adverse selection problems. From this perspective debt holder are the party who has highest risk within information asymmetry and high bankruptcy costs, the consequence is debt holders will limit their credit to intangible asset intensive firms (Alves & Martins, 2010).

Agency cost theory is relevant to our study because as firm managers invest in intangible assets like innovations research and design, they face conflict from the shareholders who may want immediate returns as a result of increased share price. With this huge investment, these firms face little trading activity because of decreased liquidity thereby reducing their stock prices. On the other hand, once these innovations and investment in Research and Design begin to impact on the industry, as in Pharmaceutical Firms, there is increased trade volumes which result to improved share price.

2.3 Determinants of Stock Price Volatility

Evidence from the financial theory suggest that as the global financial markets become more liberalized, there has been a close relationship between stock returns and the macroeconomic variables including interest rates, exchange rate, Gross Domestic Product (GDP), inflation, money supply, etc. These variables have been viewed as the most important determinants of stock market behavior as they are used to describe the state of macro economy that an investor must monitor and forecast in order to make choices regarding their investment decisions (Junkin, 2012).

2.3.1 Interest Rates

First, if an investor considers interest rate as cost of capital, an increase or a decrease in interest rate may affect the investment decision of the investors. For example, when there is a rise in interest rate and the opportunity cost goes up, individual investors would prefer to invest in non-fixed income securities such as bonds (Adam & Tweneboah, 2008). This may result either in profit or loss which is reflected in the firm's balance

sheet. When the profit or loss of a firm is immediately announced, the stock price of a firm will increase or decrease. This implies that the valuation of a firm would either increase or decrease its stock price hence stock returns.

Ajayi, Friedman & Mehdian (1998) observed that when the stock prices decrease, it is expected that the wealth of the domestic investors also go down. Moreover, it may also lead to a lower demand for money hence interest rate decreases. *Ceteris paribus*, the lower the interest rates the higher the stock prices. Higher stock prices may in turn lead to a surge in capital outflows. This will lead to depreciation of domestic currency. This is a clear indication that there exists interrelationship among stock market, interest rate, and exchange rate. In Kenya, interest rates have been rising and falling depending on the economic situation of the economy.

2.3.2 Money Supply

The effect of money supply on stock prices can either be positive or negative. Since the rate of inflation is positively related to money growth rate, as noted by (Fama, 1981) an increase in the money supply may lead to an increase in the discount rate and lower stock prices. However, this negative effect may be countered by the economic stimulus provided by money growth, which would likely increase cash flows and stock prices (Mukherejee & Naka, 1995). The Central Bank of Kenya has been regulating the amount of money circulating in the economy. This affects the growth of the money hence influencing stock prices and it may have a subsequent on the stock returns in the NSE.

2.3.3 Inflation

A high inflation rate raises the cost of living and results to a shift of resources from investments to consumption. The demand for market instruments falls leading to reduction in the volume of stock traded. This will force the monetary policy authorities to respond to the increased rate of inflation with economic tightening policies, which in turn increases the nominal risk-free rate and hence raises the discount rate in the valuation model (Adam & Twenoboa, 2008).

Defina (1991) asserts that nominal contracts disallow the immediate adjustment of the firm's revenues and costs prevent cash flow to grow at the same rate as inflation. The Kenyan economy has witnessed some significant changes in inflation over time. Consumer Price Index (CPI) increased by 0.95 percent from 137.96 to 139.28 in April 2013. There was subsequent effect on stock returns as a result of these inflationary changes. (Republic of Kenya, 2013).

2.3.4 Exchange Rates

The currency volatility has effects on the stock returns. When currency appreciates, in a situation where the country is export-oriented, it is expected that there will be a reduction in the competitiveness of her exports, and would therefore have a negative impact on the domestic stock market. This is because the export-oriented companies quoted on the stock exchange market would be less profitable and this may in turn become less attractive to investors (Muthike & Sakwa, 2012). The opposite happens in a scenario where currency depreciates as exports become competitive. The witnessed fluctuations in

Kenya shilling will have an effect on the stock prices depending on whether it appreciates or depreciates. As of May 16th 2013 the Kenya shilling exchange rate remained fairly stable against major international world currencies. The Kenya shilling firmed up against US Dollar to trade at an average rate of Ksh 83.81 (Republic of Kenya, 2013). This change in exchange rates may have a bearing on stock returns in NSE depending on the behavior of currency, whether it appreciates or otherwise.

2.3.5 Intangible Assets

The global economy has evolved over the decades from a loose collection of closed agrarian economies to an integrated knowledge economy. Intangible Assets are a company's "weightless wealth" that helps it to obtain real profit. Every company therefore understands the importance of paying much attention to value-based management in general and mainly on intangible assets as they are the key drivers of value creation in the economy of the 21st may help to create and develop its core competences and thus yield competitive advantage on the market hence improved stock prices (Abdelawahab & Bashir, 2013).

Hall (2001) states that the value of tangible assets is typically just a fraction of the market value, which means that the rest of the value comes from intangible assets and that intangible assets generate cash flows which affect a firm's future earning power. For him an unusually high value of intangible assets investment is an indicator that the stock has reached a point of excess valuation hence this stock is at risk of suffering significant price volatility and this stock will have lower subsequent returns once the price reversal is

realized in the stock market hence a clear effect of intangible assets investments on stock price volatility

2.4 Empirical Studies

Mazzucato & Tancioni (2003) assessed stock price volatility and patent citation dynamics in the UK. They specifically wanted to establish whether there is indeed a positive relationship between firm's specific volatility and firm level innovation in biotechnological and pharmaceutical industries. The study used firm level R & D and patent data for the analysis. The study found out that both the level and volatility of stock prices is in fact related to innovation. In particular, the positive correlation between innovation and idiosyncratic risk provides us with important insights on how changes in the real structure of production affect stock price volatility, beyond common explanations related to irrational exuberance and 'animal spirits. The study found out that volatility is higher in the case of small firms and in the post 1985 period, characterized by a more guided search regime due to scientific and organizational changes. The higher volatility in the latter period is most likely related to the fact that this period is characterized by an inflation of patents which reduces their reliability as a 'signal' of real innovation hence more mistakes made by investors.

Ogum et al., (2005) investigated the emerging market volatility using Nigeria and Kenya stock return series. From their study, the results of the exponential GARCH model indicated that asymmetric volatility found in U.S. and other develop markets was also present in Nigeria, but Kenya showed evidence of significant and positive asymmetric

volatility, meaning that positive shocks increase volatility more than negative shocks of equal magnitude.

Salleh & Selamat (2007) examined the intellectual capital management in Malaysian public listed companies. Specifically it examined the differences in the degree to which firms of different industries, types and sizes acknowledge and adopt intellectual capital management in their business models. They found that no significant differences related to industries, types and sizes between the firms in adopting intellectual capital management. The highest adoption of intellectual capital is non-bumiputra controlled companies followed by Bumiputra-controlled companies and government-linked companies. For foreign-affiliated companies, European-affiliated companies tend to adopt higher human capital; Singapore-affiliated companies tend to adopt higher structural and customer capital than their Japanese counterparts. Overall, business firms in Malaysia do practice intellectual capital management.

Omondi & Olweny (2011) investigated the effects of Micro-economic factors on stock return volatility on the NSE. The study's focus was on the foreign exchange rate, interest and inflation rate fluctuations on the stock return volatility at the NSE. Monthly time series data for the period between January 2001 and December 2010 was used. The study applied Exponential GARCH and Threshold GARCH models. The results showed that stock returns are symmetric but leptokurtic and thus, not normally distributed. There was evidence of relatively low though significant impact of Foreign exchange rate on stock returns. Stock return volatility was also affected by Interest rate and Inflation rate.

Leverage effect was also observed. This means that volatility rise more following a large price fall than following a price rise of the same magnitude.

Mgbame & Ohiorenuan (2014) analysed the effect of accounting information on stock volatility of Nigerian Capital Markets. The study examined if book value per share, dividend per share and earnings per share have a sign effect on stock volatility in Nigeria. In order that they capture stock returns volatility clustering, leptokurtosis and leverage effects on share prices, the GARCH models were used. They specifically used the GARCH, TGARCH and EGARCH and randomly sampled 10 quoted companies in the Nigerian capital markets that had operated between 2000-2010. The results from models showed that accounting information explains and accounts for stock volatility in the Nigerian stock market. Specifically, release of information on book values, earnings per share and dividend per share is found to be related to stock volatility. On the overall, the results from this study provide evidence to show volatility clustering, leptokurtic distribution and leverage effects for the Nigeria stock returns data.

Owiredu & Quarmyne (2014) assessed the overall the intensity of intensity of firms intangible assets on the volatility of their stock prices in Ghana. The population of the study was from all the listed firms in Ghana Stock market. Data for this analysis was obtained from the sampled firms financial statements and reports for a period of 5 years. OLS regression model was used for the study. Based on industry groups, we examine the relation between the intensity of book value of intangible assets of four industry groups and the volatility of their stock prices. They found a positive correlation between the

pharmaceutical industry book value of intangible assets and the volatility of their stock prices which is supported by previous studies in this area.

Titi (2014) examined the effect of R&D expenditures on stock returns, price and volatility for US firms. The paper examines how stock returns are affected by R&D expenditures for biotechnological and pharmaceutical firms in the US during the period of 2012-2013. The study focused on these two industries due to the high collaboration between them. The study examined three hypotheses on whether R & D had any effect on stock returns, whether R & D expenditures and volatility are linked and finally whether R & D expenditures have a positive effect on stock prices. OLS regression model was used for the analysis and the findings showed that R & D to market value had a positive effect on returns, stock prices and volatility.

2.5 Summary of Literature Review

This study attempted to gain insight into the treatment of intangible assets and their relationship with volatility of stock prices of firms listed at the Nairobi Securities Exchange. The literature shows that intangible assets have a direct relationship with the extent of stocks performance. Investment in such assets is therefore deemed to promote high performance of organizations which will be reflected in the stock performance. It has also been argued that these provide the basis of competitive advantage and hence their valuation and management are key to designing strategy in financial performance of an organization. This study explored to establish the relationships by utilizing the research method explained in the following chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods that were used in the collection of data pertinent in answering the research questions. It is divided into research design, population and sample design, data collection, and data analysis methods.

3.2 Research Design

Research design refers to the way the study is designed, that is, the method used to carry out a research (Mugenda, 2008). This research problem was studied through the use of exploratory research design, which includes quantitative and qualitative approaches. A quantitative approach is strongly linked to deductive testing of theories through hypotheses, while a qualitative approach to research generally is concerned with inductive testing (Mugenda & Mugenda, 2003). The main focus of this study was qualitative. This approach was used in order to gain a better understanding and possibly enable a better and more insightful interpretation of the results from the qualitative data.

3.3 Population of the Study

Mugenda & Mugenda (2003) defines a population as a sum of all the items considered under a study. The population for this study included all the 64 companies listed on Nairobi Securities Exchange (NSE) as at December 2014.

3.4 Sample Design

The research problem posed was studied using descriptive design (standard deviation, variance and ANOVA). Secondary data was obtained from listed companies financial statements and Nairobi Securities Exchange financial bulletins for the period 2010-2014. The sample included 13 companies from five industry groups with financial statements for the last 5 years as at December 2014 thereby representing a total of 65 panel observations. The sample was drawn from Banking, Energy and Petroleum, Investments, Technology and Telecommunications and Manufacturing industry groups.

3.5 Data Collection

For purposes of this study, secondary data was used. Secondary data was obtained from websites of these sampled companies, the Central Bank as well as that of the Capital Markets Authority. The financial statements for the sampled firms were the main sources of financial data.

3.6 Data Analysis

Regression analysis was used to determine the relationship between the dependent variable in this case volatility of stock prices and independent variables in this case intangible assets intensity. The analytical model is as described below.

3.6.1 Analytical Model

To examine the effect of intangible asset intensity on volatility of stock prices for firms listed at the NSE, the analytical regression model below was applied.

$$\mathbf{Vot}_t = \alpha + \beta_1 \mathbf{BI}_t + \beta_2 \mathbf{S}_t + \beta_3 \mathbf{D}_t + \varepsilon$$

\mathbf{Vot}_t is the stock price volatility. It is calculated using the formula below.

$$\text{Hence } \mathbf{Vot}_t = \mathbf{Ln} \left(\frac{\mathbf{V}_t}{\mathbf{V}_{(t-1)}} \right)$$

\mathbf{V}_t represents present month's average stock prices, \mathbf{V}_{t-1} represents previous month's average stock price. \mathbf{BI}_t represents the intensity of annual average of booked value of intangible assets on the firm's balance sheet. It is a ratio of intangible assets to total assets. Company size (\mathbf{S}_t) and Debt ratio (\mathbf{D}_t) are the control variables. Company size (\mathbf{S}_t) was estimated by determining the logarithmic of market capitalization $\mathbf{Log}(\mathbf{S}_t)$ while debt ratio (\mathbf{D}_t) was estimated by determining the ratio of long-term debt to total assets. β is the coefficient estimate of the intangible variable and will inform whether the volatility of the stock prices are related to firm's intangible intensity

ε is the error term

3.6.2 Test of Significance

The F test was used to test the significance level of the study. A coefficient of determination (\mathbf{R}^2) was performed to determine how much the dependant variable comes about as a result of the independent variables. The study used \mathbf{R}^2 at 95% level of significance. The study used ANOVA to test the significance of the findings.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter analyses the findings of the study as set out in the research objectives and methodology. The study findings are presented on the effects of intangible assets intensity on the volatility of stock prices for firms listed at the NSE. The study begins by showing the descriptive statistics then discusses the correlation analysis and then finishes with the regression results from ordinary least squares estimates. The analysis was done in sections 4.3, 4.4 and 4.5 below.

4.2 Response Rate

The study sampled 13 firms from 5 industry groups. All the sampled firms had complete data being their audited financial statement. This sample was representative enough for the study.

4.3 Descriptive Statistics

The result of the descriptive statistics is as shown in table 4.1 below.

Table 4.1: Descriptive Statistics summary for all sampled firms

Units in (% age)	Stock Price Volatility (Vot)	Intangible Assets Intensity (BIt)	Company Size (St)	Debt Ratio (Dt)
Mean	0.1261	0.0349	4.3105	0.1422
Standard Error	0.0173	0.0057	0.1242	0.0199
Median	0.0831	0.0137	4.4740	0.0878
Standard Deviation	0.1393	0.0458	1.0012	0.1603
Sample Variance	0.0194	0.0021	1.0023	0.0257
Kurtosis	17.3833	1.4186	2.6668	1.5350
Skewness	3.8797	1.6128	-1.4051	1.4459
Count	65	65	65	65

Source: Researcher.

The findings revealed that the data used had little variations as shown in the table 4.1 above. In particular, the mean and standard deviation for the stock price volatility (0.1261, 0.1394) intangible assets intensity (0.0349, 0.04576) and debt ratio (0.1422, 0.1603) during the period 2010 to 2014 for the NSE listed firms averaged at 12.61% for V_t , 3.49% for BI and 14.22 for D_t and varied thinly over the period 2010 to 2014. The study also showed that mean values for stock price volatility (V_{0t}), intangible asset intensity (BI_t) and debt size (D_t) were higher than their medians indicating substantial concentration in a subset of firms with higher intangible assets. The low values for skewness and kurtosis for intangible assets intensity, Company size and debt size, were deemed acceptable for normal distribution.

4.4 Correlation Analysis

Correlation coefficient indicates strength and direction between variables. Specifically, partial correlation coefficient shows correlation between two variables holding others constant. Table 4.2 shows Pearson correlation coefficients of variables of our interest.

Table 4.2: Correlation Matrix.

	Stock Price Volatility (Vot)	Intangible Assets/Total Assets (BI_t)	Company Size (St)	Debt Ratio (Dt)
Stock Price Volatility (Vot)	1			
Intangible Assets/Total Assets (BI_t)	0.205434137	1		
Company Size (St)	-0.238033863	-0.179205291	1	
Debt Ratio (Dt)	-0.147816165	0.096358834	-0.021421638	1

Source: Researcher.

In table 4.2 above, the findings showed that the volatility measures and intangible assets intensity are insignificant positively correlated with correlations coefficient at about 0.2054. The result from control variables, company size (St) and debt ratio (Dt) suggested that there was negative correlation between them and the independent variable, stock price volatility.

4.5 Regression Analysis and Hypothesis Testing

In addition to the above analysis, the researcher conducted a multiple regression analysis so as to test the relationship among independent variables. The researcher applied the excel regression to aid in computation of the measurements of the multiple regressions for the study. The findings are as shown in the table 4.3 below

Table 4.3: Statistics summary of OLS regression for Sampled Firms

SUMMARY OUTPUT FOR ALL SAMPLED FIRMS						
Regression Statistics						
Multiple R	0.33568747					
R Square	0.11268608					
Adjusted R Square	0.06904769					
Standard Error	0.13444208					
Observations	65					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	3	0.14002102	0.046674	2.5823	0.05149331	
Residual	61	1.10255504	0.018075			
Total	64	1.24257605				
	Coefficients	Standard Error	t-Stat	P-value	Lower 95%	Upper 95%
α (Constant)	0.25263537	0.07998921	3.158368	0.0025	0.09268707	0.412584
Intangible Assets/Total Assets (BI _t)	0.5616436	0.3749831	1.497784	0.1393	-0.18818145	1.311469
Company Size (St)	-0.02903585	0.01706213	-1.70177	0.0939	-0.06315369	0.005082
Debt Ratio (Dt)	-0.14779649	0.10531073	-1.40343	0.1656	-0.35837832	0.062785

Source: Researcher

From the results in table 4.3 above, the estimated regression equation below was found.

$$\text{Vot}_t = 0.2526 + 0.5616\text{BI}_t - 0.02903\text{S}_t - 0.1478\text{D}_t$$

The results for the study was grouped into three sections as shown in table 4.3 above and included the coefficient of determination, the Analysis of Variance (ANOVA) and the coefficient of determinations section. The coefficient of determination explains the extent to which changes in the dependent variable (stock price volatility) can be explained by the changes in the independent variables (intangible assets intensity, company size and debt ratio of NSE listed firms). The three independent variables that were studied explain on 11.26% of the changes in the volatility of stock prices for firms listed at the NSE represented by adjusted R square of 6.904%.

The Multiple R represents the multiple correlation coefficients which measures the quality of the prediction of the dependent variable. In this case, the value of R is 0.3357 which shows a weak level of prediction. However R^2 which is the coefficient of determination is 0.1127 indicating that only 11.27% of the stock price volatility for firms listed at the NSE can be explained by the intangible assets intensity, company size and debt ratio. The other 88.73% can be explained by other factors which were not included in the model.

To test the existence of a linear relationship between intangible assets intensity and stock price volatility, Analysis of Variance (ANOVA) was employed. The results from the analysis of variance as per table 4.3 above shows that the regression relationship between BI_t , S_t and D_t with Vot equals to about 0.05, suggesting that the beta coefficients are statistically significant at 5% level of significance ($F = 2.5822$, $p\text{-value} = 0.05149 > 0.05$). This means that there is might be some negligible significant effect of intangible assets

intensity on stock price volatility. This can be shown by the significant level which is 0.05149 which is slight more or about 0.05.

From table 4.3 above, the study showed that even though the relationship between stock price volatility and the independent variables is not statistically significant at 5% level, the regression equation was not necessary. From the findings, the variables indicated that when all the factors are held at zero, the stock price volatility will increase by 0.2526 units. This relationship is significant at 5% confidence level because of the fact p-value is $0.002468 < 0.05$.

The estimated coefficient for intangible assets intensity BI_t is 0.5616, its p-value is 0.139 > 0.05 hence the study coefficient is not significant. This suggests that with one unit increase in intangible assets intensity, stock price volatility will tend to increase by 0.5616. The positive beta coefficient for intangible assets intensity result correlates with the results of Chan *et al.* (2001) and Fung (2006) who found a positive correlation between overall volatility and the degree of R&D investment in an American setting.

The model also established that there exist negative relationship between stock price volatility and company size and debt ration. This was shown by the coefficients of company size of -0.029 and that of debt of 0.1478. For company size, it means that as the company size decreases by one unit, the stock price volatility will tend to decrease by 0.029. The same applies for debt ratio where as the company size decreases by one unit, the stock price volatility will tend to decrease by 0.1478.

4.6 Discussion of Research Findings

Decisions on investments in intangible assets are vital decisions with great implications for the firm's stock price volatility. The study used both descriptive and inferential statistics (correlations and regression) to undertake data analysis. The findings in this study indicate that there is a significant relationship between intangible assets intensity and stock price volatility but negative relationship with company size and debt for firms listed at the NSE.

The study established a positive beta coefficient between stock price volatility and intangible assets intensity although not statistically significant as the p-value $0.1393 > 0.05$. The positive relationship means that as more investments is done for intangible assets, the volatility of stock prices for firms listed at the NSE will tend to increase. The results are consistent with Villalonga (2004) and Ghemawat (1991) in the resource based theory who observed that investments in intangible assets can translate into sustainability of competitive advantages to firms. This is also consistent with Dragota & Semenescu (2008) who observed that managers make investments in some assets like intangible assets that because of their value may signal a rise stock price.

This negative relationship observed may be due to the fact that there seem to be little or no significant impact of booked intangible asset on the volatility of the firm share prices which are driven by uncertainty and expectation of future growth. The company size and debt levels in particular established negative beta coefficients suggesting that these variables have no effect on the volatility of these firms' stock prices.

In general, investments in intangible assets seem to have significant effect on stock price volatility but when controlling for firms, an insignificant negative effect of company size and debt levels is observed. A possible explanation could be that firms with more intangible assets expenditures have more diversified investments portfolios. According to Xu (2006), Firms that have diversified drug portfolios are associated with lower share price volatilities.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions made from the study, limitations of the study, recommendations for policy and practice, and areas for further research.

5.2 Summary of Findings

Stock price volatility for firms listed at the NSE is affected by different factors as reviewed in the study. The study shows a positive correlation between the intensity on firm's intangible assets and the volatility of their stock prices. The control variables, company size and debt levels had negative correlation between them and stock price volatility. This suggested that other factors outside the model had effects on these stock prices. The negative correlation could also be indicative that the data for company size and debt used in the study were book values which are lower than the actual value.

The analysis of each of the coefficients of determination shows that the p-values for intangible assets intensity though positive, was not significant. This was also seen for control variables company size and debt ration which recorded negative relationships, with p-values greater than 0.05 hence not significant for both of the independent variables.

5.3 Conclusions

This study aims to investigate the effect of intangible assets intensity on stock price volatility for firms listed at the NSE during the period 2010 to 2014. The results show that intangible assets investment has a positive effect on the volatility of stock prices for the NSE listed firms. The control variables presented negative effect on volatility of stock prices for firms' listed at the NSE. The results of the intangible assets intensity, company size and debt ratio were however not significant. It can therefore be concluded that apart from the intangible assets intensity, there are other major factors which affect the volatility of stock prices for firms listed at the NSE. These other major factors may have major effects on volatility of stock prices of these firms at the NSE hence they should be included in the other studies relating to factors that affect stock price volatility at the NSE.

From empirical analysis, it was noted that there were significant relationship between intangible assets intensity especially research and design on stock price volatility. Intangible assets intensity is an important determinant of volatility of stock prices of our study as revealed in the regression analysis in table 4.3. Our study has also revealed that the control variables, company size and debt levels cannot significantly explain the extent of the effect they have on stock price volatility.

From the empirical study, the expectations that there is a positive and significant effect between intangible assets intensity and stock price volatility have been proved substantial. The study has found that there was a positive relationship 0.5616 between stock price volatility and intangible assets intensity meaning that as intangible assets

increases by one unit, the stock price volatility also increases by one unit if all other factors are kept constant.

In conclusion, the empirical evidence from this study suggests that the intangible assets intensity has minimal and positive significant effect on firms listed at the NSE. Company size and debt ratio both have no and negative effect on volatility of stock prices for firms listed at the NSE. The study therefore concludes that investments in intangible assets by NSE listed firms are an important component to improving a firms share prices and hence company value.

5.4 Recommendations

In this study, it can be observed that the intangible assets intensity has significant effect on the volatility of stock prices for firms listed at the NSE. Therefore, the study recommends that company managers for firms listed at NSE should evaluate and review the methods of recognizing and recording of intangible can be a first step towards a more broad understanding of the effect of book value of intangible assets on the volatility of share prices.

Identifying the other factors that affect the volatility of stock prices is also important for management because it will help the company managers in identifying where decision should be taken and motivating the investors to help achieve the high level of firm's stock price performance. The firms managers should take into account the norms adopted by the successful firms when developing their growth strategy. Intangible assets intensity

of comparable companies in the market should be considered because they may reflect the unique risks inherent in the market and industry.

Since some of firms listed at the NSE have failed to record their investments in intangible assets despite being a requirement under IAS 38, the regulatory authority like the Capital Markets Authority put in place strict measures to ensure adherence and recognition of the component of intangible assets. This would improve comparability and decision making among the analyst and investors.

5.5 Limitations of the Study

There were various limitations which related to this study and which need to be mentioned to ensure that a researcher puts them into consideration when planning for a research project. Some of these limitations include. The study used only three independent variables in establishing their effect on stock price volatility for firms listed at the NSE and except for intangible assets intensity, the other two variables, company size and debt do not seem to have much effects on the volatility of stock prices and hence there is need to carry out the study with other different factors both qualitative and quantitative in order to be able establish which are the major factors that affect volatility of stock prices for firms listed at the NSE.

Firms listed at the NSE are obliged to disclose their financial information. Those firms that disclose their financial statement may decide to disclose partially and incomplete financial records with no or clear records on the level of investment in intangible assets.

This could lead to misleading information to investors and analyst. The study therefore could not independently verify the information given by management but only relied on financial reports and in some instances some failed to show the amounts attached to intangible assets intensity.

Data for this study is randomly selected from listed companies of five industry groups namely banking, energy and petroleum, investments, Telecommunication and technology and manufacturing having between 5-10 years of consolidated balance sheet. Thus the results we get are based solely on the data used for this study

5.6 Suggestions for Further Research

The study can be a first step towards a more broad understanding of the effect of book value of intangible assets on the volatility of share prices. Future studies should consider all intangible assets to specific industries especially pharmaceutical and the role of R&D on the overall performance. It should also look at the behavior of investors with respect to general intangible assets as investor's behavior is a major factor of stock price volatility.

Intangible assets intensity increases the riskiness of stocks regardless of the accounting method used. This paper offers implications for company leaders who need to back up their intangible assets investment with an effective communication strategy to help reduce the information asymmetry and improve stock prices.

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APPENDICES

Appendix 1: NSE Listed Firms in Kenya

AGRICULTURAL	COMMERCIAL AND SERVICES	ENERGY AND PETROLEUM
Eaagads Limited	Express Limited	Kengen Limited
Kapchorua Tea Company Limited	Kenya Airways Limited	Kenya Power & Lighting Co. Limited.
Kakuzi Limited	Nation Media Group Limited	Umeme Limited
Limuru Tea Company Limited	Standard Group Limited	
Rea Vipingo Plantations Limited	TPS Easter Africa (Serena) Ltd	INVESTMENT
Sasini Limited	Scangroup Limited	Home Afrika Limited
Williamson Tea Kenya Limited	Uchumi Supermarket Limited	Kurwitu Ventures
	Hutchings Biemer Limited	
AUTOMOBILES AND ACCESSORIES	Longhorn Kenya Limited	INVESTMENT SERVICES
Car and General (K) Limited	Atlas Development & Support Services	Nairobi Securities Exchange Limited
Sameer Africa Limited		
Marshalls (E.A) Limited	CONSTRUCTION AND ALLIED	
	Athi River Mining Limited	MANUFACTURING AND ALLIED
BANKING	Bamburi Cement Limited	British American Tobacco Kenya Ltd
Barclays Bank Limited	Crown Berger Limited	Carbacid Investments Ltd
CFC Stanbic Holdings Limited	E.A Cables Limited	East African Breweries Limited
I & M Holdings Limited	E.A. Portland Cement Limited	Mumias Sugar Company Ltd
Diamond Trust Bank Kenya Ltd		Unga Group Limited
Housing Finance	INSURANCE	Eveready East Africa Limited
Kenya Commercial Bank Limited	Jubilee Holdings Limited	Kenya Orchards Ltd
National Bank Limited	Pan Africa Insurance Holdings Limited	A.Baumann Co Ltd
Equity Bank Limited	Kenya Re-Insurance Corporation Limited	Flame Tree Group Holdings Ltd.
Co-operative Bank of Kenya Ltd	Liberty Kenya Holdings Limited	
	British-American Investments Co. Ltd	TELECOMMUNICATION & TECHNOLOGY
INVESTMENT	CIC Insurance Group Limited	Safaricom Limited
Olympia Capital Holdings Ltd		
Centum Investment Company Ltd		
Trans-Century Limited		

Appendix 2: Data set sorted by Stock Price Volatility, Intangible Assets Intensity, Company Size and Debt Ratio.

Year	Sampled Firms	Intangible Assets (IA) Billions (KSh)	Total Assets (TA) Billions (Ksh)	Debt (D) Billions (Ksh)	Shares outstanding (Millions)	Share Price (Ksh)	Stock Price Volatility (Vot)	IT/TA (BIT)	Company Size (St)	Debt Ratio (Dt)
2010	Equity Bank	1,928.00	143,018.00	27,204.00	3,702.78	26.50	0.2036	0.0135	4.9918	0.1902
2011	Equity Bank	2,237.35	196,294.00	14,792.00	3,702.78	16.40	0.0798	0.0114	4.7834	0.0754
2012	Equity Bank	2,301.52	243,170.00	26,568.81	3,702.78	23.75	0.0879	0.0095	4.9442	0.1093
2013	Equity Bank	2,956.00	277,728.82	26,736.00	3,702.78	30.75	0.0701	0.0106	5.0564	0.0963
2014	Equity Bank	4,312.00	344,571.65	30,242.00	3,702.78	50.00	0.0831	0.0125	5.2675	0.0878
2010	Kenya Commercial Bank	1,319.37	223,024.56	1,763.73	2,968.75	21.75	0.0803	0.0059	4.8100	0.0079
2011	Kenya Commercial Bank	1,516.68	330,663.96	8,525.00	2,968.75	16.85	0.0696	0.0046	4.6992	0.0258
2012	Kenya Commercial Bank	1,173.95	368,018.79	8,923.31	3,025.21	29.75	0.1039	0.0032	4.9542	0.0242
2013	Kenya Commercial Bank	1,403.18	390,815.58	7,719.65	3,025.21	47.25	0.0727	0.0036	5.1552	0.0198
2014	Kenya Commercial Bank	1,374.22	414,704.77	12,734.85	3,025.21	57.00	0.0831	0.0033	5.2366	0.0307
2010	Barclays Bank of Kenya	3,448.00	170,876.00	4,351.00	5,431.36	62.50	0.0849	0.0202	5.5308	0.0255
2011	Barclays Bank of Kenya	3,364.00	165,994.00	4,474.00	5,431.36	13.05	0.1605	0.0203	4.8505	0.0270
2012	Barclays Bank of Kenya	3,452.00	184,825.00	4,499.00	5,431.36	15.75	0.2011	0.0187	4.9322	0.0243
2013	Barclays Bank of Kenya	2,858.87	206,736.93	3,109.00	5,431.36	17.60	0.0649	0.0138	4.9804	0.0150
2014	Barclays Bank of Kenya	2,490.93	225,845.44	2,117.00	5,431.36	16.65	0.0572	0.0110	4.9563	0.0094
2010	Standard Chargetered Bank of Kenya	4,739.68	142,880.03	-	287.08	258.00	0.0682	0.0332	4.8696	0.0000
2011	Standard Chargetered Bank of Kenya	4,373.31	164,181.64	-	287.08	160.00	0.0728	0.0266	4.6621	0.0000
2012	Standard Chargetered Bank of Kenya	3,999.56	195,493.00	-	309.16	235.00	0.6560	0.0205	4.8613	0.0000
2013	Standard Chargetered Bank of Kenya	3,593.00	220,523.87	-	309.16	304.00	0.0609	0.0163	4.9731	0.0000
2014	Standard Chargetered Bank of Kenya	3,180.13	222,495.80	-	309.16	335.00	0.0389	0.0143	5.0152	0.0000
2010	Kenol Kobil	867.07	11,493.50	94.97	1,471.76	10.50	0.2046	0.0754	4.1890	0.0083
2011	Kenol Kobil	891.25	13,180.13	1,529.67	1,471.76	9.95	0.1833	0.0676	4.1657	0.1161
2012	Kenol Kobil	871.61	32,684.17	15,947.22	1,471.76	13.55	0.0903	0.0267	4.2998	0.4879
2013	Kenol Kobil	6.40	32,561.91	13,651.23	1,471.76	10.10	0.0936	0.0002	4.1722	0.4192
2014	Kenol Kobil	0.01	27,652.22	9,571.37	1,471.76	8.70	0.0825	0.0000	4.1074	0.3461
2010	Total Kenya	416.68	30,375.68	702.00	175.03	29.00	0.0461	0.0137	3.7055	0.0231
2011	Total Kenya	416.68	35,198.17	702.00	298.54	15.75	0.0506	0.0118	3.6723	0.0199
2012	Total Kenya	416.68	32,980.60	-	629.54	13.80	0.0886	0.0126	3.9389	0.0000
2013	Total Kenya	416.68	32,541.80	-	629.54	25.00	0.0910	0.0128	4.1970	0.0000
2014	Total Kenya	417.00	32,541.00	-	629.54	24.00	0.1061	0.0128	4.1792	0.0000
2010	KENGEN	695.28	136,641.62	59,639.84	2,198.36	17.00	0.1201	0.0051	4.5725	0.4365
2011	KENGEN	663.55	160,993.29	64,166.53	2,198.36	8.45	0.0950	0.0041	4.2690	0.3986
2012	KENGEN	896.34	163,144.87	61,850.22	2,198.36	8.80	0.1427	0.0055	4.2866	0.3791
2013	KENGEN	1,079.69	188,673.28	73,934.31	2,198.36	13.55	0.1134	0.0057	4.4740	0.3919
2014	KENGEN	1,066.05	250,205.52	122,324.11	2,198.36	10.30	0.0938	0.0043	4.3549	0.4889
2010	Centum Investment Co	0.60	8,255.97	0.00	549.95	23.00	0.1435	0.0001	4.1021	0.0000
2011	Centum Investment Co	5.40	12,301.58	1,987.98	604.95	13.50	0.0772	0.0004	3.9121	0.1616
2012	Centum Investment Co	1.93	11,567.70	1,000.00	665.44	12.35	0.0937	0.0002	3.9148	0.0864
2013	Centum Investment Co	5.30	18,961.55	4,149.53	665.44	33.00	0.1047	0.0003	4.3416	0.2188
2014	Centum Investment Co	988.76	29,597.22	4,201.03	665.44	61.00	0.0724	0.0334	4.6084	0.1419
2010	Olympia Capital Holdings	166.36	974.48	73.01	40.00	5.95	0.3917	0.1707	2.3766	0.0749
2011	Olympia Capital Holdings	164.54	1,074.24	69.59	40.00	3.25	0.0991	0.1532	2.1139	0.0648
2012	Olympia Capital Holdings	134.17	1,620.96	61.97	40.00	3.65	0.9000	0.0828	2.1644	0.0382
2013	Olympia Capital Holdings	80.42	1,897.41	75.18	40.00	4.55	0.2667	0.0424	2.2601	0.0396
2014	Olympia Capital Holdings	79.68	1,538.34	116.61	40.00	5.20	0.2177	0.0518	2.3181	0.0758
2010	Trans - Century Ltd	371.13	11,236.48	2,755.24	280.28	0.01	0.0000	0.0330	0.4476	0.2452
2011	Trans - Century Ltd	2,054.19	21,742.26	2,965.30	267.04	27.25	0.2177	0.0945	3.8619	0.1364
2012	Trans - Century Ltd	2,429.59	21,845.75	3,179.17	267.04	23.50	0.0953	0.1112	3.7976	0.1455
2013	Trans - Century Ltd	2,457.86	23,840.27	3,786.67	280.28	28.75	0.0772	0.1031	3.9062	0.1588
2014	Trans - Century Ltd	2,539.12	19,463.66	1,797.70	280.28	19.35	0.0577	0.1305	3.7343	0.0924

Appendix 2: Data set sorted by Stock Price Volatility, Intangible Assets Intensity, Company Size and Debt Ratio.

Year	Sampled Firms	Intangible Assets (IA) Billions (KSh)	Total Assets (TA) Billions (Ksh)	Debt (D) Billions (Ksh)	Shares outstanding (Millions)	Share Price (Ksh)	Stock Price Volatility (Vot)	IT/TA (BI)	Company Size (St)	Debt Ratio (Dt)
2010	Safaricom Ltd	3,061.77	70,300.88	7,610.37	40,065.42	4.70	0.4150	0.0436	5.2749	0.1083
2011	Safaricom Ltd	2,941.86	79,737.04	12,104.93	40,065.42	2.95	0.0758	0.0369	5.0726	0.1518
2012	Safaricom Ltd	2,314.10	84,283.78	12,104.93	40,065.42	5.00	0.0641	0.0275	5.3017	0.1436
2013	Safaricom Ltd	1,409.33	92,265.13	12,000.00	40,065.42	10.85	0.0542	0.0153	5.6382	0.1301
2014	Safaricom Ltd	945.57	96,338.36	7,513.00	40,065.42	14.05	0.0582	0.0098	5.7504	0.0780
2010	East Africa Breweries Ltd	1,179.89	26,534.05	-	790.77	201.00	0.0628	0.0445	5.2012	0.0000
2011	East Africa Breweries Ltd	4,520.22	34,010.18	1,229.97	790.77	172.00	0.0627	0.1329	5.1336	0.0362
2012	East Africa Breweries Ltd	4,389.85	31,687.49	6,048.54	790.77	265.00	0.0623	0.1385	5.3213	0.1909
2013	East Africa Breweries Ltd	4,564.27	31,113.62	19,841.92	790.77	290.00	0.0745	0.1467	5.3605	0.6377
2014	East Africa Breweries Ltd	4,574.64	35,405.29	22,294.10	790.77	308.00	0.0876	0.1292	5.3866	0.6297
2010	BOC Kenya	2.92	1,755.08	359.80	19.53	132.00	0.0486	0.0017	3.4112	0.2050
2011	BOC Kenya	1.64	1,604.51	401.16	19.53	100.00	0.0588	0.0010	3.2906	0.2500
2012	BOC Kenya	3.53	1,994.87	523.23	19.53	99.50	0.0739	0.0018	3.2884	0.2623
2013	BOC Kenya	3.64	2,633.09	557.03	19.53	125.00	0.0684	0.0014	3.3875	0.2116
2014	BOC Kenya	3.56	2,300.32	553.13	19.53	125.00	0.1132	0.0015	3.3875	0.2405

