

**A TOTALLY ELECTRONIC
SHARE TRANSACTION
SYSTEM FOR THE
JOHANNESBURG STOCK
EXCHANGE**

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A TOTALLY ELECTRONIC SHARE TRANSACTION SYSTEM FOR THE JOHANNESBURG STOCK EXCHANGE

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Ek wil graag al my kollegas by Eerste Nasionale Bank bedank vir die tikwerk, taalversorging, hulp met die herontwerp van die tabelle en grafieke nadat ek alles verloor het, en die uitleg van my skripsie. Julle hulp was van ontskatbare waarde.

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OPSOMMING

Aandelemarkte wêreldwyd is die afgelope paar jaar gekenmerk deur groot verandering, waaronder 'n toename in die volume van aandele onder bestuur. Hiermee saam het 'n groot klemverskuiwing plaasgevind na die risiko's inherent verbonde aan die aandelemarkte en die verhandeling van aandele. Laasgenoemde het internasionaal 'n neiging laat posvat om weg te doen met fisiese aandeelsertifikate en om eerder gebruik te maak van elektroniese tegnologie.

Suid-Afrika se hertoetreding tot die internasionale politieke en ekonomiese arena plaas die land in die sektor vir ontwikkelende markte waarin die mededinging om belegging uitsonderlik straf is. Die min verandering en ontwikkeling wat die Suid-Afrikaanse aandelemark sedert die sestigerjare kenmerk, plaas Suid-Afrika in 'n swak mededingingsposisie teenoor ander opkomende markte.

Ten einde die Johannesburgse Aandelebeurs op standaard te bring, is die STRATE (Share TRAnsactions Totally Electronic) komitee deur die Johannesburgse Aandelebeurs in die lewe geroep om ondersoek in te stel eerstens na die moontlike instelling van 'n heeltemal elektroniese transaksiesstelsel vir die Beurs, en tweedens na die uitwerking daarvan op die aandelemark.

As gevolg van die "ontwikkelende marketiket" van Suid-Afrika is dit belangrik om eerstens vas te stel of die Suid-Afrikaanse aandelemark 'n operasioneel-effektiewe mark is. Dit beteken kortliks dat al die rolspelers in die mark oor gelyke geleenthede beskik om 'n wins te maak deur die koop en verkoop van aandele.

Die effektiwiteit van die Johannesburgse Aandelebeurs kan aan die hand van die Effektiewe Markhipotese (EMH) getoets word. Die EMH toets die effektiwiteit na aanleiding van die geredelike beskikbaarheid van inligting op enige gegewe oomblik. Die EMH is gebaseer op die aanname dat die aandelemark outomaties streef na perfekte kompetisie. Aandeelpryse sal dan alle beskikbare inligting reflekteer as gevolg van die kompetisie wat tussen al die rolspelers in die mark bestaan. Al die rolspelers sal oor min of meer dieselfde inligting beskik, dus kan geen individuele rolspeler die mark uitermatig beïnvloed nie. Alle beskikbare inligting word dan onmiddellik deur al die rolspelers geabsorbeer wat die moontlikheid vir een rolspeler om voortdurend uitermatige voordeel uit die mark te trek, verminder. Tans het sommige rolspelers egter toegang tot inligting lank voor ander rolspelers en kan daarom buitengewone voordeel uit die mark put.

Die Effektiewe Markhipotese (EMH) ondersoek en verdeel markte in klasse na aanleiding van hulle effektiwiteit. Hiervolgens kom daar markte voor met 'n swak, semi-sterk of sterk effektiwiteit, waar die effektiwiteit bepaal word deur die beskikbaarheid van inligting. Verdere ondersoek toon dat die klem van die EMH eerder op die graad van effektiwiteit moet val, in plaas van die vorm van effektiwiteit. Verskeie ondersoeke in die verband het laat blyk dat die Johannesburgse Aandelebeurs 'n operasioneel-effektiewe mark is.

Die vraag ontstaan of die werking van die Johannesburgse Aandelebeurs verbeter kan word. Die Groep van Dertig, 'n onafhanklike groep wat die werking van finansiële stelsels ondersoek, het nege aanbevelings gedoen om die funksionering van

aandelemarkte te verbeter. Deur die implementering van die aanbevelings sal markte meer effektief wees en die gepaardgaande risiko's sal ingrypend verminder.

Die STRATE komitee moet ondersoek instel na 'n moontlike elektroniese transaksiestelsel wat Suid-Afrika in lyn gaan bring met internasionale markte. Die STRATE komitee het die nege aanbevelings van die Groep van Dertig as vertrekpunt gebruik.

Belangrike faktore van so 'n moontlike elektroniese transaksiestelsel sal die volgende aandui:

- voortdurende verhandeling,
- verhandeling op transaksie vir transaksie-basis sodat transaksies nie teen mekaar uitgekanselleer word nie,
- die konsep van 'n sentrale depositohuis,
- kontraktuele verhandeling met gelyktydige betaling.

Die STRATE komitee fokus op die kapitaalmark en al die rolspelers in die mark gaan deur die implementering geraak word. Die eerste stap van die implementeringsproses sal gekenmerk word deur die onttrekking van fisiese aandeelsertifikate uit die mark, en die gelyktydige plasing van die sertifikate in 'n sentrale depositohuis. Die depositohuis sal elektronies rekord hou van die sertifikate en hul wettige eienaars. Indien 'n sertifikaat verkoop word, sal 'n elektroniese oorplasing plaasvind in die nuwe eienaar se naam sodra die fondse oorbetal is. Die sertifikaatstelsel gaan aan die betalingstelsel gekoppel word om sodoende te voldoen aan die aanbeveling van gelyktydige betaling.

Die elektroniese stelsel gaan die prosessering vergemaklik deurdat instruksies deur 'n S.W.I.F.T. (Society for World-wide Interbank Telecommunication) stelsel ingevoer word, die transaksie uitgevoer word met gelyktydige betaling wat weer 'n boodskap aktiveer na die sender om die suksesvolle verhandeling te bevestig. Risiko's word deur die proses geminimaliseer.

Verskeie veranderings sal aangebring moet word aan die huidige stelsel om voorsiening te maak vir onder andere die onttrekking van fisiese aandele sertifikate, die plasing daarvan in 'n sentrale aandedepositohuis en kontraktuele verhandeling met gelyktydige betaling. Die implementering van STRATE tesame met die operasionele effektiwiteit van die Johannesburgse Aandelebeurs, gaan egter 'n groot pluspunt vir Suid-Afrika wees in die kompetering om fondse van internasionale investeerders.

Die Suid-Afrikaanse mark benodig die verandering om in totaal meer effektief te wees.

ABSTRACT

Share markets around the world have been characterised by big changes over the past few years, among which an increase in the volume of shares under management. Together with this a shift in focus has taken place to the inherent risks attached to the share markets and the trading of shares. The latter led to an international trend to do away with physical share certificates and to make use of electronic technology instead.

South Africa's return to the international political and economic arena places the country in the sector for developing markets in which the competition for investment is very severe. The little change and development that had characterised the South African share market since the sixties, put South Africa in a poor competitive position against other emerging markets.

In order to bring the Johannesburg Stock Exchange up to standard, the STRATE (Share TRANsactions Totally Electronic) committee was founded by the Johannesburg Stock Exchange to investigate firstly the possible institution of a totally electronic transaction system for the Exchange, and secondly its effect on the share market.

As a result of the "developing market etiquette" of South Africa, it is important to establish in the first place whether the South African share market is an operationally effective market. This means in short that all the role-players on the market have equal opportunities to make a profit through the buying and selling of shares.

The effectiveness of the Johannesburg Stock Exchange can be measured on the basis of the Effective Market Hypothesis (EMH). The EMH tests the effectiveness on the grounds of the ready availability of information at any given moment. The EMH is based on the assumption that the share market automatically strives to perfect competition. Share prices will then reflect all available information as a result of the competition existing between all the role-players in the market. All the role-players will dispose of more or less the same information, therefore no individual role-player can excessively influence the market. All available information is immediately absorbed by all the role-players, which reduces the possibility of one role-player extracting continuous and excessive profits from the market. At the moment some role-players have access to information long before other role-players and can therefore gain extraordinary profits from the market.

The Effective Market Hypothesis (EMH) studies and divides markets into classes on the basis of their effectiveness. According to this classification there are markets with a weak, semi-strong or strong effectiveness, where the effectiveness is determined by the availability of information. Further investigation shows that the focus of the EMH should fall on the degree of effectiveness, rather than the form of effectiveness. Various studies in this regard have indicated that the Johannesburg Stock Exchange is an operationally effective market.

The question arises of whether the operation of the Johannesburg Stock Exchange can be improved. The Group of Thirty, an independent group that investigates the operation of financial systems, had made nine recommendations to improve the

functioning of share markets. The implementation of the recommendations will make the markets more effective and drastically reduce the accompanying risks.

The STRATE committee has to investigate a possible electronic transaction system that would bring South Africa in line with international markets. The STRATE committee used the nine recommendations of the Group of Thirty as point of departure.

Important factors of such a possible electronic transaction system will include the following:

- continuous trading,
- trading on transaction for transaction basis so that transactions would not be cancelled against one another,
- the concept of a central deposit house,
- contractual trading with simultaneous payment.

The STRATE committee focuses on the capital market and all the role-players in the market will be affected by the implementation. The first step in the implementation process will be characterised by the withdrawal of physical share certificates from the market, and the simultaneous placement of the certificates in a central deposit house. The deposit house will keep electronic record of the certificates and their legal owners. If a certificate is sold, an electronic transfer will take place in the name of the new owner as soon as the funds have been paid over. The certificate system is to be linked to the payment system in order to comply with the recommendation of simultaneous payment.

The electronic system will facilitate the processing in that instructions are entered by means of a S.W.I.F.T. (Society for World-wide Interbank Telecommunication) system, the transaction is executed with simultaneous payment which in turn activates a message to the sender to confirm the successful trading. Risks are minimised by the process.

Various changes will have to be effected to the current system to provide for, among other things, the withdrawal of physical share certificates, its placement in a central share deposit house and contractual trading with simultaneous payment. The implementation of STRATE together with the operational effectiveness of the Johannesburg Stock Exchange will be a great plus for South Africa in the competition for funds of international investors.

The South African market needs the change to be more effective in its entirety.

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CHAPTER ONE

1. INTRODUCTION

1.1 The problem statement and motivation

1.1.1 Background

The securities markets have undergone major changes internationally over the past ten years. These changes include the increase in value and number of assets under management, the concern of asset managers regarding safety and security of assets and the role of major developments in the fields of information technology and market communication.

Certain asset managers experienced increases in the asset value under management of six times that of ten years ago. In addition to these increases, fund managers have become increasingly keen to invest in emerging markets, amid a greater global awareness of and the need for security and concern about fraud. According to Thomas and Murray (1995:16) improvements in information technology and market communications make it easier to handle larger volumes and assist in providing a more secure environment.

1.1.2 The problem statement

The above changes in the international securities market highlighted the need to do away with a paper-based shares certificate system due to the risks of lost or stolen certificates. The lead was taken by the Swiss in the early 1970's, gradually introducing to the markets the concepts of electronic trading and electronic shares registrars, thereby reducing both the settlement period and risks of securities transactions.

While emerging markets like Peru and Argentina incorporated change by implementing central securities depositories by 1994 (Anon; 1994:24), the settlement of securities transactions in South Africa has remained the same since 1960 (Singer; 1997(a):1).

South Africa is labelled an emerging market because of it's recent re-entry to the international markets due to the major changes in the political arena. The re-entry has cast the South African market against stiff competition in world markets eager to invest in emerging markets (Thomas and Murray; 1995:15). The outdated local securities transaction system being a major disadvantage, the South African securities market needs to change drastically in order to compete with other emerging markets.

In light of the above it is necessary to establish whether the proposed introduction of a totally electronic share transaction system to the Johannesburg Stock Exchange is likely to enhance its efficiency as an emerging securities market in a global competitive arena.

1.2 Motivation

The recent announcements by the Johannesburg Stock Exchange of the proposed introduction of STRATE (Share TRAnSACTION Totally Electronic) as well as the subsequent appointment of a task team serves as primary motivation for this study. The task team comprise of Investors, Johannesburg Stock Exchange as settlement authority, Johannesburg Stock Exchange member firms, South African Reserve Bank, Banks, South African Bankers Services Company Limited (BankServ), Central Securities Depositories Participants, Issuers, Transfer Secretaries, Financial Service Board (ANON; 1997(b):1).

A totally electronic share transaction system for the Johannesburg Stock Exchange, the South African securities market, is needed in order to bring South Africa in line with international markets like the United States of America and Switzerland regarding settlement and safe custody procedures. This new electronic system should meet the requirements of the Group of Thirty, an independent group who is investigating the functioning of the securities markets. During 1989 the Group of Thirty developed nine recommendations for the improved functioning of the securities market.

STRATE was developed after a Memorandum of Understanding was signed between BankServ (banks) and the Johannesburg Stock Exchange in May 1996. The purpose of STRATE was to establish an electronic settlement system, which will enhance the security of settlement and to bring the South African market in line with the international efficient markets. The electronic settlement process will start with the dematerialisation of equity scrip in a central securities depository, which will facilitate settlement and transfer of ownership by electronic book entries.

The major elements of the electronic settlement system are:

- contractual settlement (that settlement has to take place on a given settlement day)
- rolling settlement
- gross settlement (settlement on trade by trade basis without netting)
- simultaneous, final and irrevocable delivery versus payment (SDVP).

STRATE will be an electronic settlement transaction system for the securities market. Therefore the focus of this study will be on the capital market of South Africa, the market pooling, issuing and trading of claims with a term longer than three years (Falkena et al; 1995:13).

1.3 Research method of this study

As the Efficient Market Hypothesis is one of the most published topics in finance in South Africa (Bhana; 1994:79) a literature study will be conducted. This literature study will be extended to STRATE, a phenomenon still unknown to the South African securities market, but about to be introduced. Due to the unavailability of academic literature on STRATE in these early stages of its development, the primary focus was

on the working documents and publications of the Johannesburg Stock Exchange STRATE committee.

1.4 Exposition of chapters

Chapter two consists of a brief theoretical study of the Efficient Market Hypothesis, with emphasis on its development, the various approaches to security evaluation, the different degrees of market efficiency, the various tests for measuring market efficiency and the implementation thereof on the Johannesburg Stock Exchange.

Chapter three discusses the nine recommendations as set down by the Group of Thirty. These recommendations can be used as guide lines for countries wishing to implement an electronic shares transaction system. The nine recommendations are discussed individually.

Chapter four gives an exposition of STRATE, electronic settlement, the influence of STRATE on the regulation of the Johannesburg Stock Exchange, rights of shareholders, the role of the Transfer Secretaries in South Africa and the payment process. This chapter is concluded with an explanation and example of straight through electronic settlement processing.

Chapter five gives a brief summary of all the chapters. A table highlighting the major changes between manual and electronic settlement is set out in Appendix D.

1.5 Definitions

Before the Efficient Market Hypothesis is discussed in chapter two, a clear definition and brief explanation of the total financial system and the identity of the main participants in the market is necessary. The next section will focus on these two definitions.

1.5.1 The Financial System

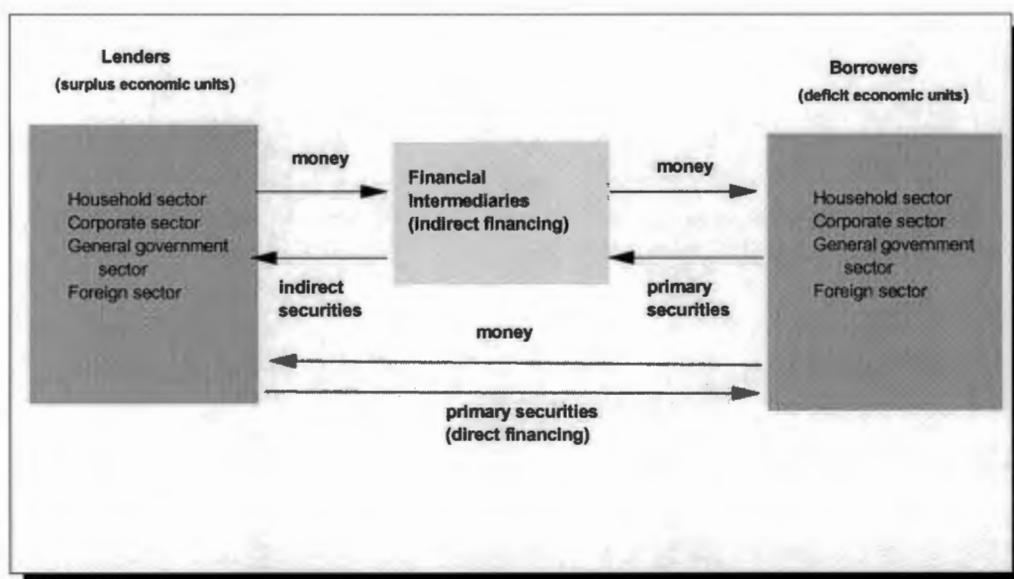
The production of goods and services, the allocation of resources and the distribution of income in a market economy are to a large degree regulated by the price mechanism. This price mechanism can only operate successfully in a market place where supply and demand exists.

A market place can be found within the financial system, which can be defined as a set of arrangements embracing the lending and borrowing of funds by non-financial economic units and the intermediation of this function by financial institutions to facilitate the transfer of funds, to provide additional money when required and to create markets in debt instruments so that the price and allocation of funds are determined efficiently (Falkena et al; 1995:7).

Four elements of the financial system can be identified from the above definition, namely:

- borrowers and lenders (non-financial economic units)
- financial institutions that intermediate the lending and borrowing process
- financial instruments created to satisfy the needs of participants
- financial markets, the institutional arrangements for issuing and trading of financial instruments

Diagram 1.5.1 : The financial system



(Source: Falkena et al; 1995:8)

At some point the surplus income economic units will exceed their planned investments, introducing the lender or seller to the market. At that same point, other units (deficit economic units) are short of funds to meet their finance needs, thereby introducing the borrower or buyer to the market.

The ultimate lender can be described as non-financial economic units, such as the household sector, the corporate sector, the general government sector and the foreign sector.

The excess funds are to be transferred to the deficit units either through direct financing or through financial intermediaries. A broker will distribute claims of the borrowers among the lenders (indirect securities) while the financial intermediaries create markets in order to resolve the conflict between borrowers and lenders (primary securities).

There are a wide range of financial instruments in South Africa. A financial instrument is a claim against a person or institution for the payment of a future sum (Falkena et al; 1995:13).

Financial instruments traded on the South African capital market can be listed as (Kelly; 1993:99) :

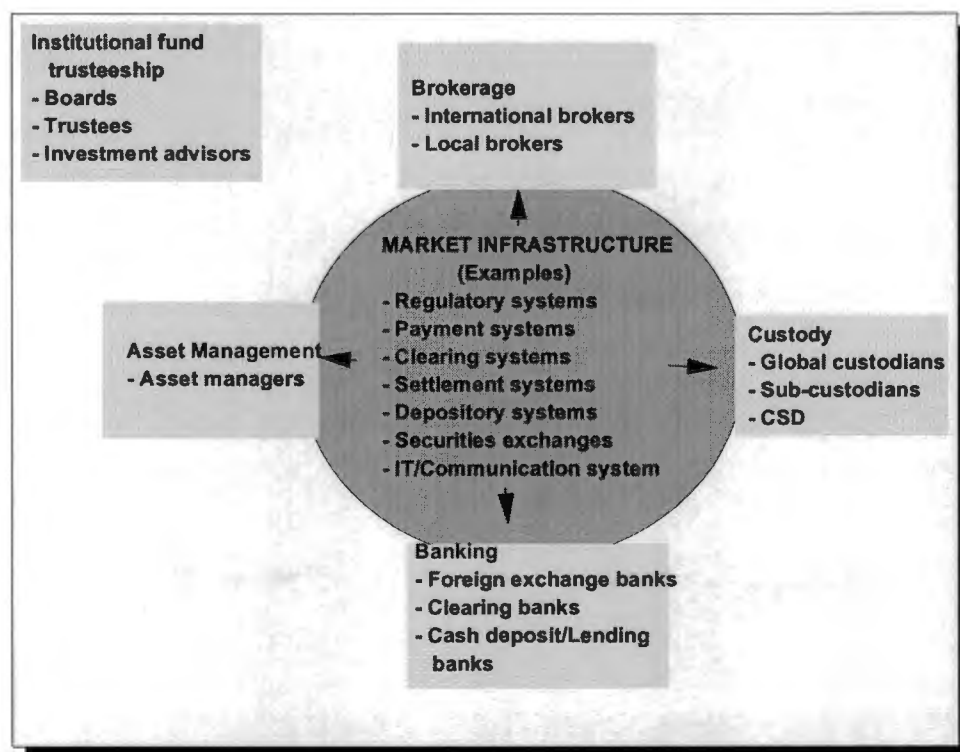
- Fixed income bearing securities
(example : Government issued stock)
- Variable income bearing securities
(example : Securities linked to prime overdraft rate)

The introduction of STRATE to the Johannesburg Stock Exchange will have a profound effect on the transactions in the financial system and the participants of the securities market in particular.

1.5.2 The participants

The main participants in an investment cycle, could be distinguished by means of the different roles they play. Thomas and Murray (1995:44) illustrated the different participants in cross-border transactions as indicated in Diagram 1.5.2.

Diagram 1.5.2 The Main participants



(Source : Thomas and Murray; 1995:44)

1.5.2.1 Institutional Fund Trustees

These are individuals and groups given the ultimate responsibility for safekeeping and administration of a fund's financial investment.

The responsibility of safekeeping and administration is carried out by two groups namely, trustees and board of directors. The trustees agree to safeguard the integrity of the funds' assets and to meet investment guidelines through a formal trust agreement. The board of directors have a similar function, but are not as legally bound as the trustees.

1.5.2.2 Investment Advisors

The investment advisors have an important role in the cycle. Their function includes defining the investment policy based on the fund's objectives. They also assist in the selection of asset managers and custodians.

1.5.2.3 Asset Managers

Their main function is to manage all or a portion of a fund's assets in turn for a fee based on the size of the portfolio. A fund can employ in-house or external asset managers. Large funds normally employ a number of asset managers with different styles.

1.5.2.4 Brokers

Brokers execute trades in exchange for commission. Due to the competition between different brokerage firms, they supply investment research and competitive pricing to asset managers. Brokers are therefore agents for asset managers.

1.5.2.5 Global Custodians or sub-custodians

Global custodians provide custody and administration services to institutional funds with international investments and global assets. Due to the competitiveness of the custody services, custodians also offer sophisticated banking services. The global custodian normally acts as an agent in the investment process, but will be the principal when instructions are issued to pay a sub-custodian. The sub-custodian provides a supportive service to the global custodian.

1.5.2.6 International and Central Securities Depositories

A Central Securities Depository (CSD) exists where the securities are immobilised. The Central Securities Depository (see chapter 3) service includes book entry delivery versus payment, clearing, settlement,

custody and stock lending. Membership is normally restricted to banks and brokers.

1.5.2.7 Banks

The banks play an essential role in the investment cycle. The banks are involved in the handling of payments and the transfer of funds, cash deliveries as part of the settlement, foreign exchange, cash deposit taking and providing credit lines. Banks can also act as custodians in paper based markets.

CHAPTER TWO

2. THE EFFICIENT MARKET HYPOTHESIS

2.1 Introduction and brief outline of chapter two

Keeping in mind the major changes together with the "emerging market" label of South Africa, it would be important to establish if the securities market of South Africa has the characteristics of an operationally efficient market whereby all the participant have an equal opportunity to profit through buying and selling securities in order to compete with other emerging markets.

In order to examine the efficiency of the South African market according to the Efficiency Market Hypothesis (EMH), it is necessary to investigate and explain the theoretical framework of the hypothesis itself. At the outset it can be noted that the EMH measure the efficiency of markets according to the availability of information in the market at any given time. If the same information is available to all the market participants then the market will be a "fair game" where all the participant can attain no more than a fair return for the risk undertaken. The question arising is whether all the market participants have access to the same information.

The availability of information in the securities market is a major factor determining the decisions of market participants to buy or sell securities and whether a passive (buy-and-hold) or aggressive investment strategy is to be adopted. A passive investment strategy is where the investor does not try to beat the market consistently but aims to establish a well-diversified portfolio of securities without searching for over- or under-valued securities (Francis; 1993:405). On the other side aggressive analysts trade actively. Whenever they find mispriced securities, they will buy or sell whatever seems to be profitable (Francis; 1993:405).

An investigation into the efficiency of the Johannesburg Stock Exchange necessitates a discussion of the two most prominent traditional approaches to security evaluation that is the fundamental and technical approaches, highlighting some issues pertaining to the efficient market hypothesis (EMH). Once the EMH is defined, the Johannesburg Stock Exchange is subsequently analysed and evaluated according to the EMH in order to establish whether the Johannesburg Stock Exchange can be characterised as an efficient market.

2.2 Development of the Efficient Market Hypothesis

In the initial stages, prior to the formulation of the EMH, the little research undertaken described share prices in statistical terms. In deviating from the traditional approaches, economists suggested that share prices change independently and behave like random walks, changing randomly and unpredictably (Bhana; 1994:80). Price changes of individual securities were found to be statistically independent, identically distributed random variables and transactions to be more-or-less uniformly spread across time with the distribution of price changes having limited variance (Bethlehem; 1984:15). This implied that prices are as likely to go up as they are to go down on any

particular point in time, regardless of past performance, making it very difficult to forecast future prices. These assumptions formed the basis of what is now known as the EMH.

The above suggested a major challenge to traditional perceptions regarding security prices' changes. According to the traditional approaches these security price changes could be forecasted with sufficient accuracy, enabling positive net returns over and above what could have been earned through implementing the buy-and-hold strategy (see 2.1).

The two traditional approaches to security evaluation and portfolio evaluation as well as the EMH are subsequently discussed in more detail in the following paragraphs.

2.2.1 The Fundamental Analysis Approach

The fundamental analysis approach assumes that a valid distinction can be made between the intrinsic value and the ruling market price of a security. Accordingly a security should be purchased if it is priced below its intrinsic value, but should be sold if its market price exceeds its intrinsic value (Bethlehem; 1984:16).

The variation between the intrinsic value and the market price of a security can be ascribed to the existence of an imperfect market and in particular to the inadequate flow of information. Accordingly the intrinsic value should equal the market price when all the participants in the market are simultaneously in possession of the same information.

The fundamental analysis approach further assumes that, over time, the increasing flow of information will narrow the gap between the intrinsic value and the market price, to a point of equilibrium. Thus, ceteris paribus, the market price will return to the intrinsic value through the action of market forces time and again (Bethlehem; 1984:17). Critics have questioned these assumptions on the role played by access to information as most information is known to be publicly available thereby decreasing the likelihood of dramatic differences in accuracy between the forecasts of various analysts.

The fundamental analysis approach coincides with the technical analysis (see 2.2.2) approach regarding the central role played by intrinsic values, but the technical analysis approach focuses on the behaviour of market prices that accounts for an important distinction between them.

2.2.2 The Technical Analysis Approach

The technical analysis approach focuses on the behaviour of market prices for its changes. The changes are objectively determined, which lead to the investment performance. Accordingly, if a share appears to have an overvalued intrinsic value, it might still be overvalued tomorrow, if the forces

that account for the overvaluation have not yet run their course (Bethlehem; 1984:17).

This approach question the practicality and efficiency of the fundamental analysis approach (see 2.2.1) because of the market's inherent incompetence to gather information timeously, thereby rendering it useless in influencing market prices. Accordingly trends in share prices are said to be deterministic in character, the present price being determined by past price movements and the future price by those of today (Bethlehem; 1984:17). Thus the price levels of the future may be predicted by examining one or more series of the past data from the securities market (Kelly; 1993:443).

The EMH on the other hand, casts doubt on the argument laying the foundation of the technical analysis approach. Past historical prices and trading volumes are now readily available to the public at minimal cost and all the available information from analysing the past prices has already been reflected in stock prices. Market prices therefore reflect everything there is to be known about all prices (Bethlehem; 1984:17).

The technical analysis approach also held that the market prices of a security are fixed by supply and demand and that the intrinsic value of the security can largely be disregarded. The supply and demand effect could best be described through the Walras equilibrium process : Each new price in the market clears the market of excess supply and demand to equal at an equilibrium price, therefore the market is in equilibrium. The participants in the market will only trade once information is available (Du Toit; 1986:1.10). A new equilibrium price is established, which again clears all excess supply and demand. The process repeats itself as new information becomes available to the market. An efficient market is then a market that is continuously in equilibrium. Each price will be dependant on current prices, but will be independent of previous information (Du Toit; 1986:1.11).

The Walras equilibrium incorporates principles of both the technical analysis and the efficient market hypothesis. The availability of information as described above forms the basis of the EMH theory.

2.3 The Efficient Market Hypothesis.

According to the EMH, the availability of information is central to the valuing of securities. To maximise the benefits of valuing securities, a perfect market is required. The basic requirements for a perfect market are (Thompson and Ward; 1995:34) :

- a homogeneity of goods
- large number of buyers and sellers
- freedom of entry
- unlimited supplies of securities and
- perfect knowledge

The first four requirements do not have serious constraints on a market, however the presence of perfect knowledge is critical for a market to be efficient.

The EMH is based on the assumption that the security market automatically tends towards a state of perfect competition (Kelly; 1993:418). The prices of securities will reflect all available information, due to the competition that exists between the participants. All the participants have more or less access to the same information, thereby disabling any individual market participant to influence the price determination in a significant way. As all information is assimilated immediately, no participant will be able to beat the market consistently. However, in the real market, some participants do acquire information ahead of others and profit from it.

Newly available information is speedily acted upon by the market causing security prices to move instantly from a prior equilibrium price to a new equilibrium price. This new price will fully reflect all available information regarding the value of the security at the latest point in time (Kelly; 1993:418).

Price changes as described in the previous paragraph, will be a random walk in response to information. The random walk model assumes that successive price changes are independent, identically distributed and are governed by some probability distribution (Thompson and Ward; 1995:35).

The two statements from the random walk model (that historical share price data have little value in forecasting future share prices and secondly that historical data can be used to make probabilistic statements about future share prices) require the qualities of stability and stationarity.

Stability can be defined as the market condition whereby the frequency distribution of price changes or returns remains approximately the same except for the origin and scale, across different time intervals.

Stationarity can be defined as the market condition whereby the frequency distribution of price changes remains approximately the same for separate time periods (Bethlehem; 1984:23). If these requirements are not met, then the independence and identical distribution are not met.

The random walk model is very important because it is difficult to establish whether security prices reflect the available information or not. The investigation on the correlation between price changes and information is concerned with publicly available information. Due to an imperfect market, not all the information is publically disclosed. The problem of undisclosed information can be overcome by an investigation into the performance of investors who for whatever reason have the advantage of having access to undisclosed information. If such an investor is able to earn higher returns on his investments, due to having access to undisclosed information, then it would be in conflict with the market efficiency hypothesis. If the investor is unable to earn higher returns despite having privileged access, the market can be said to be efficient because prices do not only reflect publically available information, but also confidential information.

From all the previous discussions dealing with information and security price behaviour, three levels of EMH can be defined (Thompson and Ward; 1995:34) :

- Weak form of market efficiency
where current share prices fully reflect all historical information
- Semi-Strong form of market efficiency
where share prices reflect all publically available information
- Strong form of market efficiency
where share prices reflect all public and private (inside) information.

The EMH predicts the behaviour of security prices in a market where perfect knowledge of all information exists amongst participants. The prices of securities are determined by the degree of availability of information and subsequently the EMH provides for the existence of the above three levels of efficiency in a market namely weak, semi-strong and strong forms of market efficiency.

The essence of the EMH in practice is not determining whether a market is efficient or inefficient, but rather determining the degree of market efficiency.

2.4 Degrees of Market Efficiencies

Bhana (1994:81) argues that the debate should not be whether a market is efficient or not but rather whether the market pricing mechanism is sufficiently unreliable to enable the ordinary investor to use publicly available information, personally or through an agency of professional advisors to identify significantly mispriced securities. Therefore the issue of how efficient the market is, is more relevant. Table 2.4.1 shows the critical information for an investor between the two extremes : an operational efficient market and operational inefficient market. An operational efficient market is a market that provides superior investment returns for those whose expertise and efforts sustain its efficiency. These rewards will usually accrue to those who are able to forecast the divergence between the intrinsic value and the price of securities (Bhana; 1994:82).

Table 2.4.1 also shows the grouping of markets into different classes according to the perceptibility of market efficiency by participants. Class 1 inefficiency markets allow a small group of analysts to profit from market inefficiencies. The general investment community is unable to benefit from those inefficiencies due to the rapid response (adjusting prices) when specialists communicate such knowledge. The market is efficient to the general community, but inefficient to a minority of high skilled investors. Class 1 inefficiency includes public disclosure of information and strong-form inefficiencies such as insider trading and the performance record of unit trust funds.

Class II, the moderate inefficient market, holds that simple 'rule of-thumb guidelines' can be exploited by the general investment community. No analytical skills are required, because research has provided all the knowledge. Class II inefficiencies include the 'week end' and 'small firm' effect.

Class III, the operational inefficient market, holds that inefficiencies can be identified by the reasonably well informed investor as well as the expert. The importance of Class III inefficiencies is due to the transmittability of an expert's superior insight to the ordinary investor. If this transmittability can be demonstrated unambiguously to be a reasonable expectation, one can conclude that the market is operational inefficient (Bhana; 1995:83).

Table 2.4.1 Degrees of Market Efficiencies

0	1	2	3
Perfectly efficient	Operational Efficient (Class 1 inefficiency)	Moderate inefficient (Class 2 inefficiency)	Operational inefficient (Class 3 inefficiency)
No superior returns even to experts.	Inefficiency perceptible only to a few experts but non-transmittable to others because of the rapid market response to its disclosure.	Market quirks identified by professional analysts and other share market researchers that offer simple rule-of-thumb guidelines (e.g. Buy in December sell in January) that can be exploited by even ordinary investors.	Inefficiencies apparent even to inform ordinary investors. The expert's superior insights are transmittable to ordinary investors as a result of delayed market reaction to new information.

(Source : Bhana; 1994:82)

2.5 Testing the Efficient Market Hypothesis

The next section will discuss the published results of various efficiency tests without discussing the test itself in detail.

2.5.1 Tests for a Weak form of Market Efficiency

Two broad categories for testing for a weak form of market efficiency exists namely (Thompson and Ward; 1995:35) :

- tests that measure the statistical dependence of changes in share prices
- testing trading rules that claim to beat a random selection of securities

Two main kinds of tests namely, the serial correlation tests and run tests, are used to measure the dependence of share prices to historical information (Bethlehem; 1984:27). The former will establish whether or not the dependency of the share prices is sufficient to allow investors to predict the future prices by studying the past trends in security prices. In reality a degree

of dependence will exist. If the degree of dependence allows for accurate price movement predictions, allowing investors to earn higher returns than the market is not consistent with the weak form of market efficiency. Should the contrary be true, prices will be assumed to be independent from each other and the market to have weak efficiency.

A trading rule is a strategy to buy or sell securities based on objective signals (Thompson and Ward; 1995:35). This trading rule is then compared to the buy-and-hold strategy. Proof of a successful trading strategy, that consistently earns higher returns, invalidates the weak form of EMH (Thompson and Ward; 1995:36).

2.5.2 Tests for Semi-strong Form of Market Efficiency

Tests for a semi-strong form of market efficiency ask how the market adjusts to new information in terms of speed and quality. A semi-strong form of market efficiency is present when a few insiders trading on short run price changes can earn a return larger than what could have been earned by using a naive buy-and-hold strategy (Francis; 1993:410). The rapid adjustment of security prices in reaction to information generating events such as share splits and new listing on exchanges, is also indicative of the presence of the semi-strong form of market efficiency.

In a market of semi-strong efficiency estimates can readily be made of the direction and speed of expected price movements. Analysis of share splits proves a semi-strong form of market efficiency. Share splits occur when a company announces for example a two-for-one split of the security. The value of a share will reduce to half the price while the total securities issued will increase. Splitting may be aimed at enlarging the security holder group to include investors who do not have large amounts to invest (Francis; 1993:112). The security prices normally change near the time of share splitting. When the price changes do not influence the returns consistently then the semi-strong form holds.

For the semi-strong form to hold, the value of security prices should not change drastically when the company decides to apply for a listing on a stock exchange. The security price will rise slightly during the weeks before the listing and will then diminish to about where it was before the listing. Therefore no investor can earn higher returns than that of others. This effect supports the semi-strong hypothesis.

2.5.3 Tests for Strong Form of Market Efficiency

Tests for strong form market efficiency are concerned with whether certain investors are privileged by having access to unpublished information. First there has to be established who has access to this kind of information and if it can be used to earn higher returns. As insider trading is illegal, it is very difficult to analyse because data is difficult to find. Portfolio performance

tests can show the presence of abnormal returns. However, this test can only uncover an inefficiency, but can not show whether those returns were caused by exceptional skills or special information.

2.5.4 Summary

All the participants in the market act speedily on new information causing the security prices to move to a new equilibrium. Three forms of market efficiency are discussed, the weak form, semi-strong form, and the strong form market efficiency, all dependent on the degree of available information. Tests that prove a certain form of efficiency are mentioned. In the next section, evidence of the outcome of this test implemented on the Johannesburg Stock Exchange are investigated. Evidence of the Class I, Class II, and Class III inefficiencies are then mentioned. Therefore investors will know if they will be able to outperform the market consistently.

2.6 Evidence on the Efficiency of the Johannesburg Stock Exchange

The following discussion will be divided into two categories. The first will mention tests of previous studies while the second section will focus on the evidence of the Class I-III inefficiencies.

2.6.1 Previous studies on Efficiency on the Johannesburg Stock Exchange

2.6.1.1 Weak Form of Market Efficiency

The efficiency of a market cannot be evaluated by itself. Empirical evidence should be gathered through statistical testing. Gilbertson and Roux (1978:230) tested the pricing mechanism of the Johannesburg Stock Exchange 1977 and 1978, analysing twenty-four industrial and mining shares. Their findings indicated that the Johannesburg Stock Exchange's pricing mechanism can be regarded as efficient. Although evidence of dependencies was found, they were too small and random to be constantly exploited to earn superior returns (Thompson and Ward; 1995:39).

Strebel (1978:29) questioned the outcome of the investigation by Gilbertson and Roux and argued that half the shares listed on the Johannesburg Stock Exchange are thinly traded. Strebel showed that companies having highly traded volume, produce share prices that are random in behaviour. There was however consensus between Gilbertson and Roux and Strebel that highly traded shares on the Johannesburg Stock Exchange are at least consistent with the weak form efficiency.

Gilbertson and Roux (1978:21) also tested four trading rules on twenty-four shares on the Johannesburg Stock Exchange. According

to their investigations, the trading rules consistently under performed a buy-and-hold strategy.

2.6.1.2 Semi-Strong Form of Market Efficiency

Findings by Knight and Affleck-Graves (1985:130) indicated that the market reacts fairly rapidly to the earnings information provided in preliminary reports. Investors are then able to isolate poor performing companies before the release that indicate the poor performance. These findings are consistent with the semi-strong form of efficiency.

Biger and Page (1992:15) investigated the return behaviour of shares following share splits and capitalisation issues. They found significant positive abnormal returns for both share splits and capitalisation issues, before and during the week of the announcement. The significant returns the weeks before the announcement were found to be evidential of the leaking of information of the forthcoming announcement to the market. The week before the announcement showed increased interest and trading in the affected shares (Thompson and Ward; 1995:52).

Bhana (1989) studied 40 new equity issues during the new listing boom period of 1985 to 1997 on the Johannesburg Stock Exchange. The investors who have to buy at market price and not the offer price, are interested in the price behaviour due to the over subscription of new listings (Thompson and Ward; 1995:50). The first trading day usually showed large returns indicating that the new listing was under priced. Positive excess returns were also reported for the one-moth and one-year periods, but showed a decreasing tendency with time (Thompson and Ward; 1995:51).

2.6.1.3 Strong Form of Market Efficiency

Gilbertson and Vermaak (1982:35) analysed the performance of 11 mutual funds over a period of 1974 to 1981 against the JSE Actuaries All Share Index, the JSE Actuaries Industrial Index, the RDM 100 Industrial Index and the 90 day Treasury Bill Discount Rates. They found that the funds generally outperformed the indexes. The findings are inconsistent with the strong form of efficiency.

An investigation on return behaviour on take-overs on the Johannesburg Stock Exchange was done by Bhana (1994:85) during the period 1976 to 1985. The investigation was done on 50 companies involved in take-overs. Bhana found that insiders appeared to take market positions on prospective take-overs 40 trading days before the announcements. He concluded that insider trading rules were abused 15 trading days before the announcements being carried out by third parties to avoid detection, therefore the Johannesburg Stock Exchange was inefficient regarding take-overs.

According to Table 2.4.1 market efficiency is a matter of degree, ranging from perfect efficiency to outright inefficiency. A discussion of evidential factors that establish a certain class of market efficiency follows.

2.6.2 Evidence of the Degree of Market Efficiency

2.6.2.1 Evidence of Class I Inefficiency

For the strong form of market efficiency to hold, insider information should be of no commercial value to the investor. However in practice, company insiders who have access to privileged information related to shares listed on the Johannesburg Stock Exchange derive large benefits from trading in these securities as indicated in the investigation of company take-overs as discussed above.

Lamprechts (1994:1) found that during a 3 year period, ending March 1994, only 3 of 37 unit trust funds were able to outperform their respective market indices. It can be concluded that the unit trust industry as a whole has not been able to outperform the market average.

2.6.2.2 Evidence of Class II Inefficiency

A discussion of Class II Inefficient markets merits an investigation of the so-called January-effect, Monday-effect and Public Holiday-effect, and it's role in establishing market inefficiencies.

The January-effect where investors are supposed to earn above average returns in the month of January, could be found on most international markets such as New York, London, Paris and Brussels (Bhana; 1994:87). Bradfield (1990:9) investigated the seasonality of shares listed on the Johannesburg Stock Exchange. Although no evidence of the January-effect could be found, a significant December-effect is reported (Bhana; 1994:87). During December, which is a traditional holiday season in South Africa, trading is thin on the Johannesburg Stock Exchange, resulting in the volatility of shares over this month. However the December-effect is not an exploitable market inefficiency for trades who have to incur transaction costs.

The Monday-effect can be defined as the tendency for Monday's returns to be relatively low or even negative compared to the generally high returns of the preceding Fridays. Bhana (1994:88) found evidence that the average return for a Monday was negative while the average returns for other trading days were positive with Wednesdays showing the highest returns. Excess returns could be earned when buying at close of Monday and selling at close in Wednesday, when transaction costs are ignored. With the presence of transaction costs,

the day-of-the-week trading rule does not enable an investor to earn abnormal positive returns. Later studies on the Johannesburg Stock Exchange indicated that the Monday-effect is no longer present.

The Public Holiday-effect was investigated by Bhana (1994:88) during the period 1975 to 1990. The investigation indicated that the share prices on the trading day prior to holidays, increased substantially. However selling at the close of a pre-holiday period and repurchasing at the close of a post-holiday period is unlikely to provide superior returns when transaction costs are taken into consideration.

2.6.2.3 Evidence of Class III Inefficiency

Many individual investors rely on research related to expected share price behaviour by stockbroker's analysts and investment advisors. Bhana compiled an empirical evaluation of the effectiveness of share recommendations by stockbrokers and investment advisory services in South Africa. Although this study was done on a small number of stockbrokers and investment advisory services, it does not appear that the investment advisory services provide profitable investment opportunities to its clients (Bhana; 1994:93). This is consistent with an informationally efficient market in which market information is absorbed and distributed through the market remarkably quick and efficiently.

2.6.3 The efficiency of the Johannesburg Stock Exchange

Various studies on the Johannesburg Stock Exchange and its categorisation into a specific Class of market efficiency led to the conclusion that the Johannesburg Stock Exchange can be regarded as an operationally efficient market. Bhana (1994:93) concluded that the Johannesburg Stock Exchange is informational highly efficient with regard to highly traded shares; and that the market acts speedily on published information. Thompson and Ward (1995:60) indicated that the Johannesburg Stock Exchange can be regarded as operationally efficient despite the existence of anomalies like the Monday-, December - and the Public Holiday-effect as investors may not be able to acquire a substantial holding in a security to benefit from the reported market anomalies.

2.7 Conclusion

The Efficiency Market Hypothesis has been one of the most dominant themes in financial research with the availability of information being a determining decision for market participants (Bhana; 1994:79). According to the EMH, share prices change independently and behave like random walks, changing randomly and unpredictably. This implies that historical share price data have little value in forecasting future prices and that historical data can be used to make probabilistic statements about future statements about future share prices (Thompson and Ward; 1995:34) :

Three levels of the EMH are defined which depends on the availability of information. The three forms of market efficiency are (see page 12) :

- Weak form of market efficiency
where current share prices fully reflect all historical information
- Semi-Strong form of market efficiency
where share prices reflect all publically available information
- Strong form of market efficiency
where share prices reflect all public and private (inside) information

The efficiency of the Johannesburg Stock Exchange varies between the weak and semi-strong form of efficiency. Tests to establish the dependence of share prices revealed that a degree of dependence exists, but it is not strong enough to profit from it. Tests on trading rules resulted in conflicting evidence of the weak form efficiency.

The focus of market efficiency changed to the degree of market efficiencies as indicated in Table 2.4.1. Several results of studies were mentioned resulting tin the conclusion that the Johannesburg Stock Exchange is operationally efficient.

The question arising is whether the systems underlying the Johannesburg Stock Exchange can be regarded as efficient. Some critics argue that the EMH are unable to explain for example the crash of 1987. During the week before the "Bloody Monday", prices fell and everybody tried to get out of the market first through selling their securities. Keeping in mind the longest period of expansion during 1987 together with the illiquid balance sheet of the USA, the crash is compatible with the EMH.

The system underlying the operationally efficient market is like the two sides of a coin. The Johannesburg Stock Exchange saw the need to improve the working of the securities market thereby developing a new process for settlement and clearance, STRATE, according to the goals set out by the Nine Recommendations of the Group of Thirty. The Nine Recommendations of the Group of Thirty of 1989 are discussed in Chapter 3.

CHAPTER THREE

3. THE NINE RECOMMENDATIONS OF THE GROUP OF THIRTY

3.1 Introduction

The world's securities markets are becoming increasingly important to all the participants involved with modern business finance and investing. The uneven quality and predominance of local historical traditions and practices in the trading clearing and settlement of different securities markets, is of great concern to the participants (Working Committee; 1989:1). The flow of international investments is therefore inhibited by this uneven quality. In some instances, local practices together with growing volumes represent serious risks to the world's financial network.

Major risks are the result from deficiencies in clearance and settlement of securities transactions. These deficiencies will have an impact on the individual market participant as well as the underlying markets. These deficiencies include (Working Committee; 1989:1) :

- absence of confirmation or matching systems
- different settlement periods for different markets
- lack of delivery versus payment
- lack of standardised trade guarantees
- absence of book entry processing for settlement of securities transactions

Due to these deficiencies, a private sector group, namely The Group of Thirty, who is concerned with the Working of International Financial Systems, held a Symposium in London in 1989 to discuss the state of clearance and settlement practises of the world's principle markets. The Group of Thirty formed a high level international group (Working Committee) to make recommendations in order to improve the functioning of securities markets. The Working Committee introduced nine recommendations for the improvement of all securities markets, local as well as international, realising benefits for all participants. The result will be a more efficient market with less risk.

The objectives of the nine recommendations (discussed fully under 3.2 to 3.10) can be summarised as follows (Working Committee; 1989:iv) :

- match trades by the day after trade date ($T + 1$), settlement of trades on a continuous rolling basis and by $T + 3$
- exchange of value for value
- improve efficiency by using depositories
- netting mechanisms
- a standard numbering system wherever appropriate

The working committee suggested that the above should be in place by 1992.

The nine recommendations can be used as goals by any country whenever the securities market systems are upgraded. In South Africa these recommendations were

used as goals to develop the new STRATE process. Chapter four analyses the new electronic share transaction system according to these recommendations.

In this chapter the background to the formulation of the recommendations as well as their contents are investigated. Recommendations 1 to 7 are in a sequence starting from trade comparison, matching through netting up to settlement. Recommendations 8 and 9 will look at the clearance and settlement process. These recommendations are important for South Africa in order to improve the functioning of the securities market. The recommendations forms the basis for the new STRATE system as indicated in chapter four.

3.2 Recommendation 1

By 1990 all comparisons of trades between direct market participant (i.e. broker, broker/dealers and other exchange members) should be accomplished by T + 1.

A securities market, as defined in paragraph 1.2, cannot operate efficiently without a matching system. Matching is a process whereby individual trades are compared to ensure that both sides of the trade correspond. The absence of a matching system increases the risk of failure in the securities processing cycle.

A failed trade occurs when securities and / or funds are not exchanged on the settlement date (Working Committee; 1989:23). One failed trade can lead to a chain reaction of failed trades and cancellations, which may result in market losses. Prompt matching or comparison is necessary in order to reduce high failure rates.

The ideal would be if matching can be instantaneous. Therefore at the time of trade initiation, the different parties would match the trade details. There are several markets which employ " locked-in trades " where matching is instantaneous. A locked-in trade is a trade that is matched at the time of execution (Working Committee; 1989:26). Locked-in trades save time and the members are certain that the deal will settle unless both parties agree to cancel the deal.

The matching or comparison system will vary from securities market to securities market. Variables like trading volume, structure of the market, transaction values, number and physical location of counterparties will all influence the matching system.

Matching procedures can vary from market to market, but matching should occur not later than trade date plus 1 (T + 1) and must include the following key elements (Working Committee; 1989:30) :

- Market in which the trade was executed
- Trade dates
- Specific security to be traded
- Number of shares or Nominal value of bonds
- Execution price and currency
- Counterparty and clearing broker

- Buy / sell instructions
- Trade conditions (example ex-dividend)
- Settlement date

The above elements should be incorporated into the matching system in order to effect the matching system efficiently. There are basically two matching systems, that is the one-sided matching system and the two-sided matching system. The two-sided system is operated by a securities market place or exchange and is only used by organisation members in larger markets with many participants (Working Committee; 1989:27). A two-sided system will operate in the following manner : The member will enter the details of the trade via an on-line computer system (computer to computer system). The computer will sort all the deals. On the trade date the member firm will be able to see which deals are matched, unmatched or rejected. Unmatched deals usually occur where only one participant enters trade details, or where both sides enter data but some of the information lack. These unmatched deals need to be resolved in order for normal settlement to take place. The same practice will apply for rejected deals where the information is incorrectly quoted for example the incorrect share code is used. The members can access the unresolved deals and are able to correct it for settlement to take place.

Indirect market participants are unable to use two-sided system and will consequently use a one-sided system. Once the investor initiates the trade with the broker, the broker will enter the details of the trade into the entity operating the matching system. The system will match the deals and confirmations will be sent to the brokers.

The importance of matching not later than $T + 1$ is obvious. A good structured matching system forms the basis of the other recommendations. Without a matching system settlement at $T + 3$ will not occur.

3.3 **Recommendation 2**

Indirect market participants (such as institutional investors or any trading counterparties that are not brokers / dealers) should by 1992 be members of a trade comparison system which achieves positive affirmation of trade details.

The absence of a disciplined matching capability for institutional investors in a market is inductive to high risks and an inefficient processing cycle.

It was pointed out above that the institutional investor normally utilises a one - sided matching system. Institutional investors are indirect market participants and include banks, mutual funds, pension funds and other entities that participate in the market only on behalf of the member or participants of their particular organisation (Working Committee; 1989:83). These investors may apply for access to the matching system. They then receive a list of trades to which they are the counterparties and they have to confirm or question these trades within the reasonable time frame. For clearance and settlement purposes indirect participants can also be linked to a central clearing or securities depository through the one -sided matching system. But why the need for a central clearing system ?

A clearance system is a trading accounting system that determines exactly what the counterparties owe and what they should receive on settlement day. Therefore the settlement system allows securities and cash to exchange hands accurately and effectively (Working Committee; 1989:84).

There are basically two types of clearance systems : a trade-for-trade system and a netting system.

3.3.1 Trade-for-Trade

The buyer of securities will confirm sufficient cash holdings or cash equivalent for the seller, upon execution of the trade. The seller holds the securities in a good deliverable and negotiable order. The buyer and seller then agree on a system in order to exchange the securities as well as the funds (Working Committee; 1989:36).

All the trades for settlement on the same day are handled in the same manner as described above. Important to note is that each trade is independent of all the other trades with the same trade date.

A few problems may arise by using this method. In a securities market with high volumes, a sophisticated and automated system is necessary to handle all the transactions because a failed trade can lead to a chain reaction of failed trades. The broker using the trade-for-trade method, requires cash or some kind of cash collateral in order to pay for all the purchasing trades on settlement date. This puts a lot of pressure on the credit facility of the broker. A better option would be netting as this method would lift the burden of cash and collateral and will make the settlement process much easier.

3.3.2 Netting

Through the netting process the counterparties only have one net settlement figure at the end of the trading day. The final net figure is reached whereby the securities transaction is pooled and buys and sells are offset with each other (Working Committee; 1989:84). The number of transactions is therefore reduced as the transactions are not processed on a one by one basis.

The importance of a system in which matching, clearing and settlement can take place with maximum efficiency is evident. The introduction of a central depository offers many solutions in this regard.

3.4 Recommendation 3

Each country should have an effective and fully developed central securities depository, organised and managed to encourage the broadest possible industry participation (directly and indirectly) in place by 1992.

A central securities depository (CSD) introduces efficiency and low risk to the trade securities market. But why the need for a CSD and what does it mean ?

A CSD is a facility for holding securities in a certificated or uncertificated (dematerialised) form, to enable book entry processing for the transfer of securities.

Some securities markets are paper based which means that the trade cannot settle until the physical certificate, representing the security, changes hands. In order to deliver the certificate into the correct denomination, splitting may sometimes be required. The whole process in a paper based market is time consuming and can be frustrating as settlement can be delayed due to various factors. This is labour intensive and costly.

The flow of certificates in a paper based market should be eliminated due to the high risk and costs that paper introduces. An alternative is to immobilise securities into a depository . Immobilisation is the storage of security certificates in a vault in order to eliminate physical movement of securities in the event of transfer due to the change of ownership.

Change of ownership can be recorded in a book entry system. If securities are therefore sold and both counterparties's securities are held in the CSD, a book entry will change the ownership while no physical movement of securities takes place.

The main activities of a CSD include (Working Committee; 1989:53) :

- Safekeeping of physical securities
- Maintenance and operation of a computerised book entry system for both securities and cash
- Maintenance of fund accounts for members and the execution of fund transaction.
- Collection and distribution of dividends interest and redemption payments on behalf of the members
- Functioning as a nominee company
- Maintenance of relationships with CSD's around the world

The above functions of the CSD are discussed in more detail in the following paragraphs.

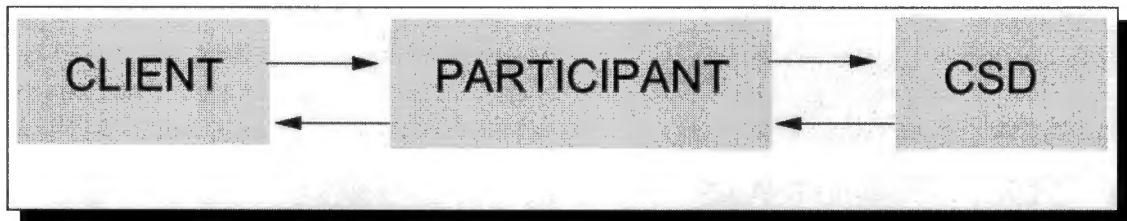
3.4.1 The safekeeping of securities

The safekeeping of securities involves the storage of securities in a safe and secure place. In a market where securities are immobilised, the main function is storage in comparison to a market where the securities are dematerialised (no physical share certificates) where the main function is computerised bookkeeping of securities.

In a paper based market there is still movement of the physical share certificate. The member can deposit or withdraw the share certificate on the client's request. The process will be as follows :

The client sends an instruction to the participant to withdraw the shares and register in the beneficial owner's name. The participant sends the instruction to the CSD to effect a withdrawal. The certificate is registered and ready for collection by the participants.

Diagram 3.4.2 The Withdrawal Process



The withdrawal of physical certificates from a CSD should be limited. Physical certificates introduce risks, probability of certificates getting lost, require splitting in order to ensure that the correct denomination is available which increases the costs and lastly the probability of fraudulent activities.

In order to withdraw shares timeously the shares in a CSD are regarded as a fungible pool. In other words, a specific security is not linked to a specific owner. To accomplish this fungible pool, a CSD can register shares in a Nominee Company. Therefore all the shares are held in Nominee Name and book entries can take place. There are various benefits of a Nominee Company:

- a particular shares can be registered in a jumbo certificate to reduce costs, paper, and risks
- the client does not have to wait for registration to be completed to sell the share
- reduce storage costs and the use of paper
- reduce risks (lost certificates)

The ideal would be a dematerialised securities market where no certificates are issued. A bookkeeping settlement / accounting system is necessary to enable an electronic transfer of funds and securities, therefore no physical movement. By using a bookkeeping system, the efficiency increases due to increased safety and saving of time.

3.4.2 Service of pledging

The CSD should be able to provide a service of pledging. This is a procedure within a CSD that allows securities to be used as a collateral to secure loans or other forms of credit (Working Committee; 1989:58).

In a paper based market, pledging will be as follows : The borrower delivers the pledged share certificate to the lender. The market value serves as the protection to the lender where the borrower fails to pay. In some markets the

shares have to be registered. If the CSD can provide this service, the risk is lower, especially in a high volume market. Labour actions are reduced as there is no movement of securities. Re-registration is not needed as all the shares are held in a Nominee Name.

3.4.3 Corporate actions and income collection

A CSD must have the ability to provide corporate action services as well as income collection services. The CSD will inform all the members of a particular action due to take place. The members issue instructions to the CSD instructing the CSD to act on their behalf. Corporate actions influence the shareholding and are a process that should be carried out with no errors to minimise risks. There are different types of corporate actions for example right issues, redemption, sub-divisions, capitalisation issues, merger, exchanges, unbundling and acquisitions. The CSD has to assist with income collection when payable and should the trade not have settled in time, the CSD will assist with the payment to the members and the claiming process.

3.4.4 Securities Lending

Within a CSD, securities lending would be possible. This refers to a loan of securities to cover settlement obligations of investors. Lendings are generated whenever there are insufficient holdings of securities available in a borrower's account to execute delivery. The reasons for securities lending are as follows :

- to improve efficiency of settlement
- cover short positions
- facilitate back to back transaction where a client sells at a high price and buys later when the price is lower
- to avoid a failed delivery

A CSD must refrain from lending or borrowing for its own account, but must be a facilitator of lendings between its participants.

3.5 Recommendation 4

Each country should study its market volumes and participants to determine whether a trade netting system would be beneficial in terms of reducing risk and promoting efficiency. If netting would be appropriate, it should be implemented by 1992.

Through the netting process the counterparties only have one net settlement figure at the end of the trading day. The final net figure is reached whereby the securities transactions are pooled and purchases and sales are offset with each other (Working Committee; 1989:84). The number of transactions is therefore reduced as the transactions are not processed on a one by one basis. Three types of netting systems are discussed below:

3.5.1 Bilateral Netting

This refers to a netting system whereby all trades executed on the same day, in the same security between the same counterparties are grouped together in a netted final delivery versus payment (Working Committee; 1989: 79). This can be illustrated through the following example: Two counterparties book a number of trades on the same security, Company A has a purchase order of 2000 shares with Counterparty B. If A has a selling order through B to sell 1200 shares, then the net result is B to deliver 800 shares to A against the net funds of all the transactions.

3.5.2 Daily Netting

Daily netting is where all the trades of the counterparties in a specific issue for a single day are netted. This means that counterparties, at close of business, are left with one obligation, regardless of the number of transactions executed.

3.5.3 Continuous Net Settlement

This operates in the same fashion as daily netting with one difference. All open transactions at close of business are offset against the net day's trades. Continuous net settlement is an effective mechanism that removes risks. The clearing organisation become the counterparty for each trade. The different counterparties should owe or should receive shares from the clearing organisation and not from each other.

All trades involving the same securities are combined on settlement day, together with the outstanding deals for the previous day. At the end of the day all the transactions are net to one settlement figure for both shares and cash. The counterparty with an open position, has to pay if there are any price increases, therefore marked to market practice applies. Through this system, settlements' delays are limited and losses reduced.

3.6 Recommendation 5

Delivery versus payment (DVP) should be employed as the method for settling all securities transactions. A DVP system should be in place by 1992.

A major risk in the securities market is when securities are delivered without the simultaneous receipt of funds. The counterparty stands to lose, especially when the prices change and where the delivering party is unable to fulfil his obligation.

A CSD can be very useful if it includes both clearing and depository function. The clearing and depository function can be two different systems. If a CSD does not have access to a payment system, the following steps can minimise the risk :

- Securities should only be delivered if a certified cheque is received in return
- The securities delivering system can be linked to a separate payment system, therefore delivery versus payment

- Net settlement for both cash and securities can be applied

3.7 **Recommendation 6**

Payments associated with settlement of securities transactions and servicing of securities portfolios should be made consistent across all instruments and markets by adopting the ' same day ' funds convention.

Same day funds refer to the funds being available on day of deposit (Working Committee; 1989:86). The payment system within the securities system should be fully automated to enable same day value of funds.

3.8 **Recommendation 7**

A ' Rolling Settlement ' system should be adopted by all markets. Final settlement should occur on T + 3 by 1992. As an interim target, final settlement should occur on T + 5 by 1990 at the latest, save only where it hinders the achievement of T + 3 by 1992.

Rolling settlement refers to a continuous settlement procedure that means that all trades settle within the same time frame, for example three days after trade date (T+3) and therefore settlement occurs on all business days (Working Committee; 1989:80). The objective of rolling settlement is to reduce the time frame between trade date and settlement date and to standardise the settlement time frame.

The ideal would be same day settlement but unfortunately the securities markets are complex and not all the markets are automated and centralised. Within this recommendation, if a country matches trades at T + 1 and the deal only settles six days thereafter, it is recommended for that country to adopt settlement at T + 5. A market that currently settles at T + 5 must strive to settle deals at T + 3. Eventually all the securities markets should settle trades at a standardised T + 3.

3.9 **Recommendation 8**

Securities lending and borrowing should be encourage as a method of expediting the settlement of securities transactions. Existing regulatory and taxation barriers that inhibit the practice of lending securities should be removed by 1990.

Security lending refers to a loan of securities to cover settlement obligations of investors. Lending are generated whenever there are insufficient holdings of securities available in a borrower's account to execute delivery. The reasons for securities lending are as follows :

- to improve efficiency of settlement
- cover short positions
- facilitate back to back transaction where a client sell at a high price and buy later when the price is lower
- to avoid failed delivery

The process of securities lending in a paper based market can be illustrated as in Diagram 3.9.1. A stockbroker buys shares from client A (Leg 1) and sell the same shares again to client B (Leg 2).

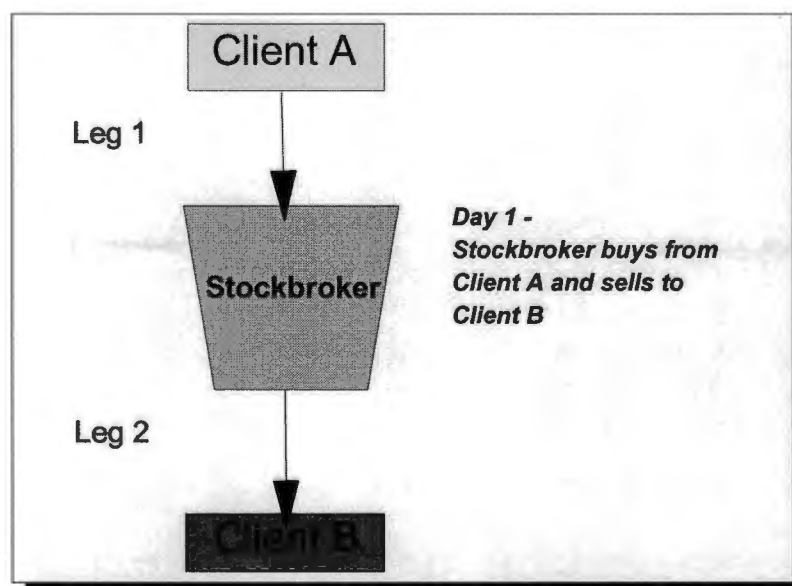
Assume Client A can not deliver the shares to the stockbroker on settlement day (Diagram 3.9.2) due to the registration process. The stockbroker then approaches it's custodian in order to borrow the shares. The custodian acts as an agent between the different borrowers and lenders. The custodian withdraws the shares and the shares can be collected by the broker. The stockbroker then delivers the shares to client B and collects payment. The cash amount is placed as a collateral at the custodian by the stockbroker.

Ten days later, client A delivers the shares to the stockbroker as illustrated in Diagram 3.9.3. The stockbroker in turn delivers the shares to the custodian to return the lending. The custodian repays the collateral to the broker and the broker can pay client A. Leg 1 is finalised and the lending closed.

Restriction and taxation in some countries hinder securities lending. This should be removed in order to allow as many transactions to settle as possible. A securities market that introduces securities lending for the first time should take special precaution to protect both the borrower and the lender through the implementation of credit standards, contracts and practices.

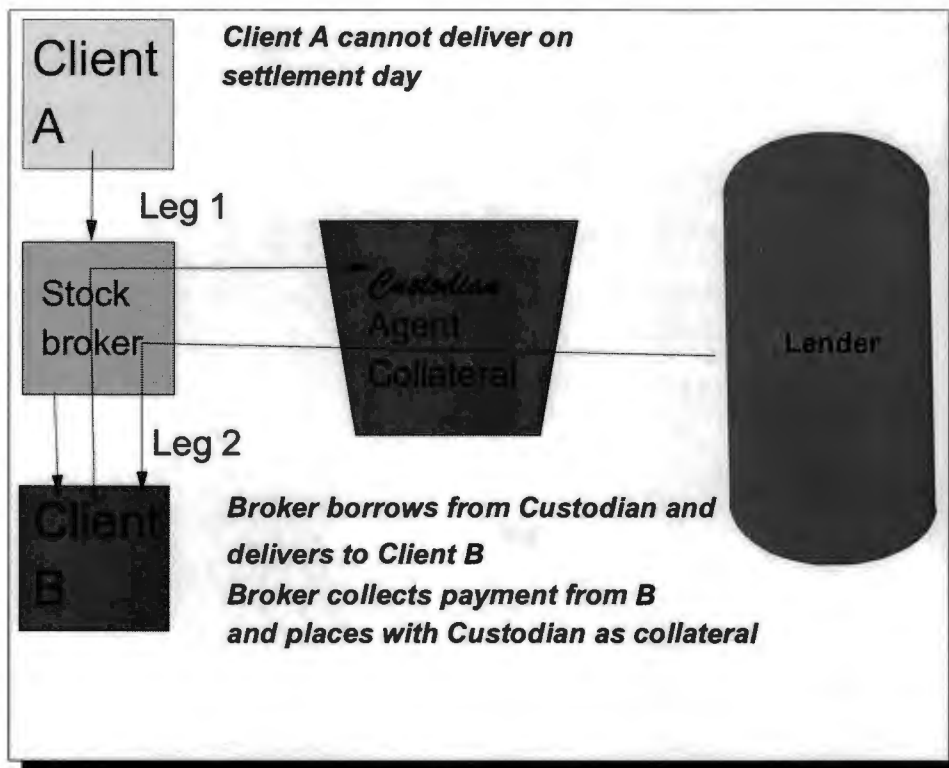
A marked-to-market practice should be implemented for securities out on loan. Through this practise the securities are priced at the current value and should be valued on a daily basis. The objective of securities lending is to improve the efficiency of trade settlement and not to increase risk.

Diagram 3.9.1 The Securities Lending Process. (A)



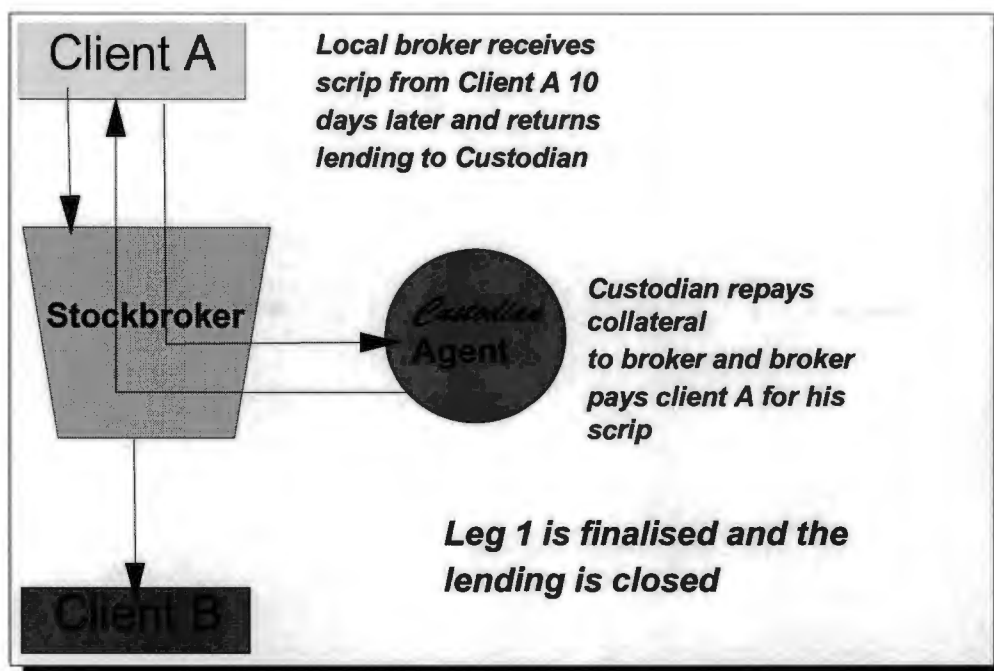
(Source : Anon; 1997(a):1)

Diagram 3.9.2 The Securities Lending Process. (B)



(Source : Anon; 1997(a):2)

Diagram 3.9.3 The Securities Lending Process. (C)



(Source : Anon; 1997(a):3)

The securities lending recommendation will improve the efficiency of the settlement process as all settlements will be able to take place on settlement day.

3.10 Recommendation 9

Each country should adopt the standard for securities messages developed by the International Organisation for Standardisation (ISO Standard 7775). In particular, countries should adopt the ISIN numbering system for securities issued as defined in the ISO Standard 6166, at least for cross border transactions. These standards should be universally applied by 1992.

The International Organisation of Standardisation (ISO) is a world-wide federation of national standard bodies from 100 countries, one from each country. The ISO's function is to prepare international standards containing technical specifications or other precise criteria to be used consistently as rules, guidelines to ensure that materials, products, process and services are fit for their purpose (Anon; 1997(f):1).

Riskier and exiting opportunities in the form of new emerging markets and instruments are presenting themselves and therefore investors seem to be keen to diversify their portfolio's into cross border securities. The need for a standardised and safe process of transferring funds and communicating internationally, 24 hours a day through rapid communication methods, was answered by the development of ISO 7775. The ISO 7775 use one universal language thereby decreasing risk by eliminating errors.

Electronic messages sent via S.W.I.F.T. (Society for World-Wide Interbank Financial Telecommunication) are delivered in a standard electronic format that can be fed automatically into a user's own computer system, thereby enabling straight through processing. S.W.I.F.T. was founded in 1973 by 239 banks of fifteen countries. The S.W.I.F.T. message traffic expanded rapidly among 1996 and 1997 due to the efficiency of communication through S.W.I.F.T. An average of 6.2 million messages was recorded during 1996 while an average of 10 million messages was recorded in July 1997 (Anon; 1997(e):7).

Although S.W.I.F.T. was not originally established for the securities an investment service , it's Category 5 messages (ISO 7775) aims to cover the complete life cycle of a security trade from trading to settlement including custody and reporting (Anon; 1997(e):49). Appendix A outlines the full list of Category 5 messages.

A Technical Committee of the Group of Thirty was responsible for the preparation of international standard ISO 6166 that is known as the International Securities Identification Number (ISIN). The standard provides a uniform structure of ISIN's and designates bodies for the location of these numbers for the securities listed in the domicilium country, resulting in each security issued only bearing one ISIN.

3.11 Conclusion

Due to several deficiencies in the settlement and clearance of securities a private sector group namely the Group of Thirty, established a Working Committee in order to make recommendations to improve the functioning of the securities markets internationally. The Working Committee suggested that nine recommendations that will improve the functioning when implemented.

The new STRATE system to be implemented on the Johannesburg Stock Exchange should use the nine recommendations as goals in order to bring the new system in line with international standards to ensure a competitive advantage above other emerging markets. Chapter four analyses the STRATE system according to these nine recommendations.

CHAPTER FOUR

4. STRATE

4.1 Introduction

At the outset of this study (see chapter one) the importance of the South African re-entry into international markets were highlighted. In order to compete internationally, security market changes should be implemented. The introduction of the Johannesburg Equities Trading System (JET) was the first step in this direction. The second major step will be the implementing of STRATE.

STRATE, the new electronic settlement system conforms with the recommendations of the Group of Thirty as set out in the previous chapter. STRATE will bring South Africa in line with the international markets as the South African system is outdated and contains enormous risks and inefficiencies. All the participants will also be influenced by the implementation.

STRATE will start with the dematerialisation of securities in a central securities depository. With the introduction of a central securities depository, regulations, rights of shares holders and the role of the Transfer Secretary will change with immediate effect.

Electronic settlement will take place once the shares are immobilised in the central depository. Matching will take place on JET while the settlement will take place through the STRATE system. The payment process complementary to the STRATE system will be based on the principle that the delivery of scrip and funds are irrevocable at a certain point on the designated settlement day.

This chapter is devoted to an explanatory analysis of the proposed STRATE system, briefly explaining the effect it will have on the Johannesburg Stock Exchange and the measuring of it's compliance with the nine recommendations (see chapter three) of the Group of Thirty.

4.2 Dematerialisation

The concept of dematerialisation is discussed in paragraph 3.4. Electronic settlement requires that all physical share certificates be dematerialised in a CSD to conform with recommendation three of the Group of Thirty. The CSD will keep an electronic record of each participant's holding. The electronic record will be updated to record the transfer of ownership with each settled transaction.

The advantages of a CSD are that misplaced certificates and fraudulent activities, surrounding the settlement process in a paper based market, will be reduced. A single electronic book entry in the records of the CSD will record the registration and the transfer of ownership.

The CSD provides a service to the CSD Participants being the agents who can deposit or withdraw shares directly from the CSD. This service provided to the CSD Participants include electronic settlement, custody balances of the dematerialised shares, opening and maintenance of accounts within the CSD, acceptance of deposits and withdrawals of securities, inter-participant electronic pledges with the South African Reserve Bank and on-line access for CSD Participants (Anon; 1997(b):1) An investor will therefore approach a CSD Participant for settlement and all the related services thereof.

The electronic records of the CSD will automatically and electronically be updated with each settled transaction, thereby necessitating the dematerialisation of shares in the CSD. Physical shares certificates will not be good for settlement on the Johannesburg Stock Exchange and will have to be dematerialised before settlement will take place. However, physical withdrawals for personal safekeeping of certificates by individual investors will be allowed, but at a cost. The withdrawal process introduces risks and therefore a holding fee will be charged to discourage investors to keep shares in a physical form.

There is doubt that the introduction of a CSD poses drastic changes to the South African securities market in its present form, influencing not only the legal regulation of the CSD, but also the rights and interests of its shareholders (see 4.2.1) and the duties and responsibilities of the Transfer Secretary (see 4.2.2).

4.2.1 Regulation

The proposed introduction a functioning of the CSD will be regulated by the Financial Services Board in terms of the Safe Deposit of Securities Act of 1992 (Anon; 1997(b):7). Independent external auditors will exercise frequent audits to ensure that the CSD adheres to stringent regulations.

The investor will be finally protected by a Computer Crime and Professional Negligence cover. The changes in the local settlement market will be taken into consideration when the cover is reviewed annually.

4.2.2 Rights of Shareholders

Currently, the South African law only recognises the real rights of ownership of those persons whose names are reflected on the register of the shareholders of the company. Therefore only those investors who can provide prima facie proof of ownership through a certificate that carries the investor's name are entitled to exercise their rights as shareholders. The CSD will only have a record of the CSD Participants without knowing who their individual client's are. For this reason, an amendment has been proposed to the Companies Act of 1973 to recognise the records maintained by CSD Participants as sub-registers of the main company. Thus the investor that chooses to deposit shares in his own name, with a CSD Participant, will be recognised as a member. If the investor however, chooses to register the shares in the CSD Participant's nominee account, he will enter into an agreement with the CSD

Participant to exercise rights on behalf of the investor. (Anon; 1997(b)). The CSD will provide statements of holdings to the participants in terms of the Safe Deposit of Securities Act of 1992. The CSD Participants will send similar statements to their respective clients confirming the holding of the client at a certain point in time.

4.2.3 The role of the transfer secretary

The introduction of a CSD to the South African securities market will inevitably change the traditional role of the Transfer Secretary as agents of issuers of securities.

The Transfer Secretary traditionally kept and maintained a register per issuer of all the shareholders in that company, including information for example the investor's name and address, date of the transaction, relevant certificate details and details of held and lost certificates. The Transfer Secretary is responsible for comparing the transfer forms with the details on the certificate when the shares are delivered for re-registration. The new certificate is issued when the register is updated with the change of ownership.

When a sale is matched but the number of shares traded is smaller than or only a portion, of the face value of the certificate, splitting into a smaller denomination is required. The splitting process should be completed within twenty- four hours to enable delivery to take place. The Transfer Secretary is responsible for the splitting process.

The register of shareholders as maintained by the Transfer Secretary (see Appendix C) will at any point in time reflect :

- the total numbers of shares held in the CSD due to the immobilisation of physical paper.
- the total number and names of investors who prefer holding the physical share certificates in their own name, at an extra fee.

The re-registration and certification process will be drastically reduced due to the absence of physical certificates in an electronic settlement system. The change of ownership will only be effected once the entry is reflected in the records of the CSD Participant. The Transfer Secretary will however still keep record of the company's authorised shares capital and the diary of events (for example corporate action events). The total holding of a company in the CSD should be reconciled daily with the Transfer Secretary against the total share capital of the company and the investors holding shares in physical form. (Anon; 1997(c):3)

The whole process regarding merging of companies, scheme arrangements and take over bids will not be as complicated as prior to the electronic settlement system. The CSD will change the records of the share holders and update it to reflect the new balance. The issuer (company) will advise the Transfer Secretary of any event who will then send the information to the

CSD. The CSD participant will receive the information from the CSD and will be responsible to distribute the information among their individual clients.

4.2.4 Summary

The introduction of the STRATE system will undoubtedly see changes in the role traditionally played by Transfer Secretaries as well as the legal rights and interests of shareholders and the regulation of the CSD and its activities.

A shares transaction system usually consists of two phases, the trading and settlement phases. Both these will now be discussed.

4.3 The Electronic Settlement Process

The settlement process on the Johannesburg Stock Exchange starts with an investor initiating a trade. The investor approaches a Johannesburg Stock Exchange member who will place an order on the JET system to allow matching to take place. The deal will only settle once the transfer of funds as well as the transfer of ownership are finalised. It is important to note that the payment system can be a separate system linked to the STRATE system.

4.3.1 Trading

Trades originate basically in three ways, an investor who wishes to trade, approaches his Johannesburg Stock Exchange member with a request to place an order on the JET system. Secondly, an investor can empower a member firm to act on his behalf. The member firm will then place an order on the JET system at its own discretion. Thirdly, a member firm will place an order when the firm is trading for its own account. All the buy and sell orders are then matched and the member firms have 24 hours to allocate it to the correct parties. Therefore recommendation 1 in chapter three is met as matching will be at $T + 1$.

The matching process of orders is managed by the JET System (Johannesburg Equities Trading System) and has been automated since March 1996. Orders from investors to buy are matched with orders from investors to sell through JET (Anon; 1996:2). The centralised automated trading systems of JET can be described as " On-screen trading floors " where dealers can enter buy or sell orders into the trading system via a remote terminal (workstations).

The essence of this automated trading system is a central electronic order " book ". This book is divided into a buy-side (left) and sell-side (right) as illustrated in Table 4.3.1. Buying orders with the highest price is placed on the top-left of the order book while the selling order with the lowest price, is placed on the bottom right of the order book. Each order is time stamped simultaneously when the order is placed. All the orders can be viewed on the summary display and the orders which can be matched (fully or partially) by an opposing order, are traded automatically. This order book is further

organised on the principle of price and time priority where orders when registered in the book, are ranked first at best price and then in time sequence of entry. Therefore, the first order entered at a specific price has priority over orders that's placed later at the same price (Anon; 1996:2) An example of a trade on the JET system on trading day is illustrated in Appendix B.

Table 4.3.1 The Order Book

<i>Order Book - XYZ Limited</i>					
<i>Buy</i>			<i>Sell</i>		
Member Firm	Quantity	Price	Price	Quantity	Member Firm
			103	16 000	C
			102	1 500	D
			101	12 000	E
A & B	5 000	100			
F	4 500	99			
G	10 000	98			

(Source : Anon; 1996:2)

A weekly account period is used by the Johannesburg Stock Exchange for trading and settlement, which means that trades are entered into the system for one calendar week. At the end of the week, all trades are netted and marked to market. Settlement can therefore take place from the Tuesday the following week. All the deals that do not settle by the Friday the following week, form part of the netting process, the week thereafter. STRATE is moving to rolling and contractual settlement (Anon; 1997(b):7) Thus settlement will have to take place on the designated settlement day being a set number of days after trade day. STRATE will employ settlement on T + 5, 5 days after the trade day.

4.3.2 Settlement

For an electronic deal to be finalised, both the transfer of funds and ownership is required. The transfer of funds will be done via the South African Reserve Bank and the banks, while the transfer of share ownership will be changed via the CSD and the CSD Participants (Singer; 1997(a):1)

Settlements will be rolling and contractual at T + 5 from T + 1 up to T + 5. Flagging of trades by both brokers and CSD Participants will take place. Flagging is a process where the brokers and CSD Participants "flag" the trade thereby indicating that all the details is correct and that the participant will be able to settle the deal. Once a trade is flagged, the shares are freezed therefore the shares cannot be withdrawn or pledge prior to settlement. During this

period, both the banker and the CSD Participant will review their ability to settle the trade as instructed by the investor. If the CSD Participant has sufficient holdings, he will flag the trade for settlement. The bank will act similarly by investigating the buyer's account balance and overdraft facilities. If the requirements are met, then the bank will also flag the trade for settlement (Singer; 1997(b):1). Through the process of flagging, the participant indicates responsibility for settlement on behalf of their client, resulting in settlement taking place on settlement day (S). Thus $S = T+5$.

If transactions do not settle on contractual settlement day, a penalty will be charged to the participant who is responsible for the failed trade. The penalty will exceed costs of borrowing funds or shares. The Johannesburg Stock Exchange will be responsible for the imposing of penalties and the monitoring of failed trades (Anon; 1997(b);3). The failed trades will be visible on $S + 1$ and will be taken off the system and the participant responsible for the failed trade will be penalised.

A timetable of the settlement process is set out in table 4.3.2.

Table 4.3.2 Time table of events :

T	Trade Day
T + 1	All trades allocated where desired, and with final settlement instructions are available from the equities electronic settlement system
T + 1 to T + 5	Flagging of trades by brokers and CSD participants to indicate acceptance of responsibility for settlement on behalf of client
S	Settlement (T + 5)
S at time to be announced	Settlement is a continuous process which starts on S
S at time to be announced	Settlement is complete. Bankers, CSD Participants and brokers have access to those trades which have not settled. The JSE, as the settlement authority, has access to all transactions.
S + 1	The failed transactions are dropped from the system, and are handled within the JSE's failed trade procedure, outside of the settlement system.

(Source : Singer; 1997(b):5)

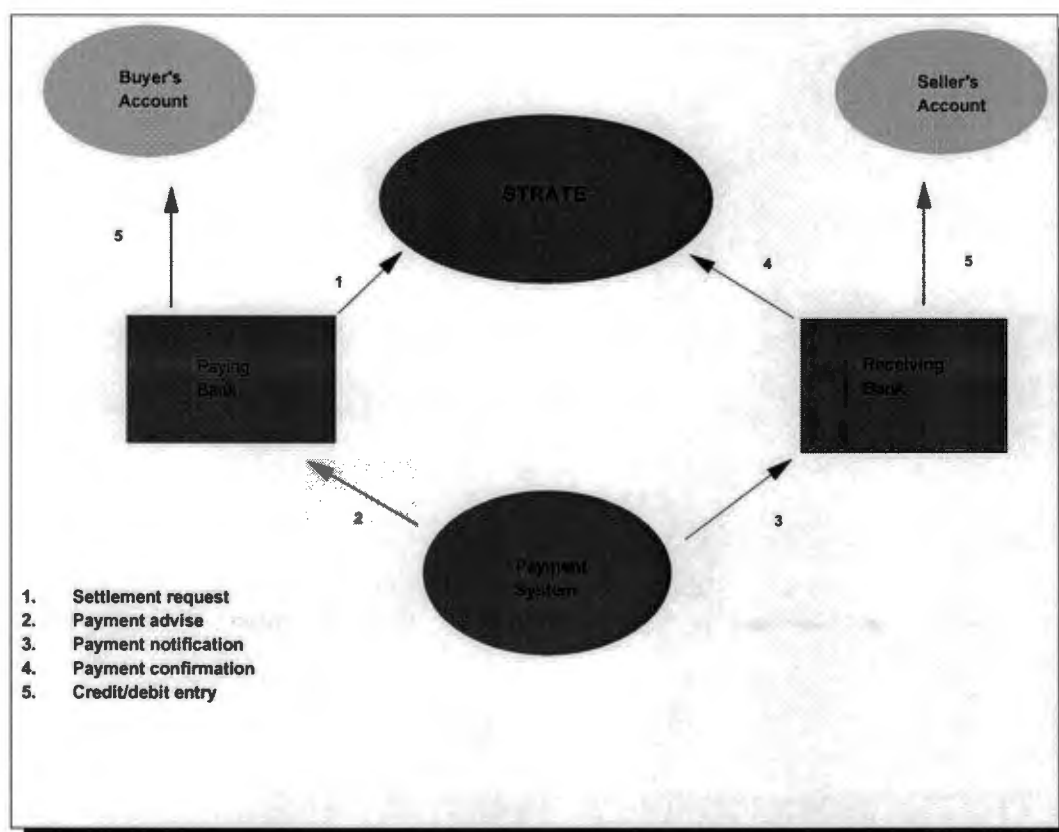
4.4 The Payment Process

The electronic settlement model and payment process is based on the principle that for any trade to settle, the obligation to deliver scrip and funds must be irrevocable at a certain point on the designated settlement day (Wilson; 1997:1).

In order to establish the above, the settlement process requires a confirmation supplied to STRATE indicating the inter-bank fund movement for a specific settlement request, has taken place. Each confirmation must quote a identification number of the settlement that initiated the payment thereby making reconciliation easier when funds can be tied to the specific settlement. However, no partial payment will be allowed therefore resulting in delivery versus payment, compliance with recommendation five in chapter 3.

Delivery versus payment will be accomplished through STRATE by the paying bank initiating the payment and the receiving bank confirming payment to STRATE. Therefore STRATE is not responsible for the payment process.

Diagram 4.4.1 The Payment process :



(Source : Wilson; 1997:5)

Diagram 4.4.1 illustrates the payment process. STRATE grosses the transactions to be settled by paying/receiving bank combination. The settlement request will be forwarded to the paying bank supplying the transaction details, who in turn will

forward the payment request to the South African Reserve Bank (SARB). Upon receipt of the confirmation of payment from the SARB, the receiving bank forward a confirmation of payment to STRATE. Only then can STRATE initiate the share movement at the CSD. Confirmations are forwarded to the receiving and paying bank and both the CSD Participant informing them of the component trades that make up the payment. The process will be closed once the above parties involved debit and credit their individual clients (Wilson; 1997:5).

The receiving bank may for example decide to grant credit to the paying bank resulting in a receipt of funds confirmation to STRATE by the receiving bank. Therefore share movements will take place although actual funds have not moved (Wilson; 1997:6).

4.5 Straight Through Processing

STRATE is aiming for straight through processing which can be defined as trade information, once entered into the system, should not have to be re-keyd into a secondary system and should as far as possible be automated (Talmer; 1997:80).

Straight through processing was originally meant for the improvement of internal work flow and cutting the costs and operational risks associated with failed trades. As 20 % of the 94 000 cross border settlement attempts by global custodians fail each day, substantial resources are still devoted to routing, repeating and investigating the reasons for failed trades which significantly increase the cost of a transaction (Anon; 1997(d):377).

The means of straight through processing has been extended. It is no longer only a means to improve internal workflow but is now also regarded as a method by which risks and costs associated with failed trades can be minimised in the communication between the different participants (Talmer; 1997:80).

This intra-company straight through processing with the implementation of STRATE will be accomplished by the using of S.W.I.F.T. and the ISO 7775 messages (see 3.10). Electronic messages sent via S.W.I.F.T. are delivered in a standard electronic format that can be fed automatically into a user's own computer system, thereby enabling straight through processing.

The straight through electronic settlement process and the main activities of the participants are explained in the next section. This will form the basis of the South African settlement process.

4.6 The main activities in the investment cycle

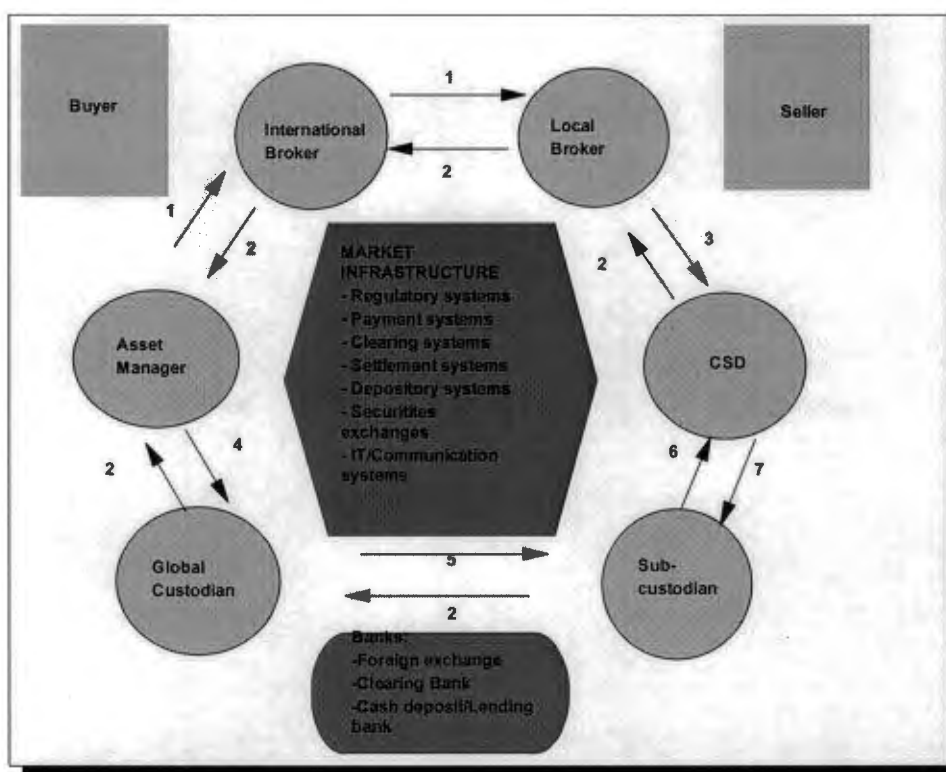
Diagram 4.6.1 summarises the main activities carried out by the participants in a simulated South African market where STRATE has already been introduced and a central securities depository established.

A client, institutional fund or asset manager makes a decision to buy a security. A buy order will be issued (Leg 1) to the broker who will confirm (Leg 2) that the instructions are correct. The instructions will then be forwarded to the custodian (Leg 4). The instruction to the custodian is needed because the custodian does not purchase or sell the shares directly, but this role is handled by the client's broker network (Morris; 1997:3). The international broker forwards the instruction to the local broker (Leg 1) and confirmation will be sent back to the international broker.

The instruction from the client can be sent via fax, telex or S.W.I.F.T. The global custodian computer network receives the message and activates steps in order to allow cash to be available at the appropriate time should the client wish to buy a security. The instruction is passed on to the sub-custodian in preparation of settlement of the trade (Leg 5). The sub-custodian instructs the CSD to settle the trade and to pay the broker. The trade can only settle when all the information matches (Leg 3). The newly bought security is transferred electronically to the client's account in the depository (when physical certificate is deemed to be dematerialised) upon receipt of the message confirming the movement of funds.

Once this procedure is completed successfully, the settlement data flows back up the chain via computer link workstations to inform clients of the successful settlement of the trade. STRATE will thus enable so-called straight through processing whereby the different legs in the above-mentioned process will activate each other electronically, thereby limiting manual intervention.

Diagram 4.6.1: The main activities involved in buying securities in an overseas market.



(Source : Thomas and Murray;1995:44)

4.7 Benefits of STRATE

The benefits of the implementation of STRATE is enormous. It will bring South Africa in line with the international norm. It will impose improved efficiency, reduced risk and costs. The specific benefits are:

- Risk of tainted scrip is reduced
- Simultaneous final irrevocable electronic settlement replaces the time consuming physical delivering of share certificates
- The equities market will be in line with international norm and will therefore be more attractive
- Transfer of ownership is immediate on settlement, securing all rights as a shareholder
- Risk of misplaced tainted or forged share certificates will be reduced
- There will be no need for all the participants to handle volumes of shares and cheques (Anon; 1997(b);8)

4.8 Summary

STRATE, according to the nine recommendation of the Group Of Thirty as indicated in chapter three are summarised below.

4.8.1 Recommendation 1

By 1990 all comparisons of trades between direct market participant (i.e. broker, broker/dealers and other exchange members) should be accomplished by T + 1.

This is already achieved in the market through the JET System in which orders are automatically matched and therefore confirmed between the Johannesburg Stock Exchange member firms on a real time basis.

4.8.2 Recommendation 2

Indirect market participants (such as institutional investors or any trading counterparties which are not brokers / dealers) should by 1992 be members of a trade comparison system which achieves positive affirmation of trade details.

These investors will provide independent settlement instructions to their bankers and custodians which will be compared to the transaction details in STRATE.

4.8.3 Recommendation 3

Each country should have an effective and fully developed central securities depository, organised and managed to encourage the broadest possible industry participation (directly and indirectly) in place by 1992.

A CSD depository already exists in the South African market and is operating effectively in the bond market, with more than 80% of the bond market physical scrip already immobilised. Electronic settlement that will be implemented in the equities market will require that all equities be lodged in a CSD by the CSD Participant.

4.8.4 Recommendation 4

Each country should study its market volumes and participants to determine whether a trade netting system would be beneficial in terms of reducing risk and promoting efficiency. If a netting would be appropriate, it should be implemented by 1992.

Although local trades in the bond market are netted, it is envisaged that STRATE will process settlements on a gross basis.

4.8.5 Recommendation 5

Delivery versus payment (DVP) should be employed as the method for settling all securities transactions, a DVP system should be in place by 1992.

DVP already exists, but through STRATE simultaneous final and irrevocable electronic delivery of securities against real-time gross settlement of funds will be facilitated by the National Payment System of the South African Reserve Bank.

4.8.6 Recommendation 6

Payments associated with settlement of securities transactions and servicing of securities portfolios should be made consistent across all instruments and markets by adopting the ' same day ' funds convention.

Real-time gross settlement of funds will be facilitated by the National Payment System of the South African Reserve Bank.

4.8.7 Recommendation 7

A ' Rolling Settlement ' system should be adopted by all markets. Final settlement should occur on T + 3 by 1992. As an interim target, final settlement should occur on T + 5 by 1990 at the latest, only where it hinders the achievement of T + 3 by 1992.

With the introduction of electronic settlement, the Johannesburg Stock Exchange will change its settlement rules from the current account settlement period to contractual rolling settlement. This will initially move to T + 5 as and when each company is immobilised/dematerialised, but will move to T + 3 as soon as the role players in the equities market have adjusted to the new environment. The Johannesburg Stock Exchange intends to amend its rules to make settlement of transactions on the designated settlement day compulsory.

4.8.8 Recommendation 8

Securities lending and borrowing should be encourage as a method of expediting the settlement of securities transactions. Existing regulatory and taxation barriers that inhibit the practice of lending securities should be removed by 1990.

The process of securities lending already exists in South Africa and it is not expected to alter initially. As the systems become more integrated, however, the situation could change.

4.8.9 Recommendation 9

Each country should adopt the standard for securities messages developed by the International Organisation for Standardisation (ISO Standard 7775). In particular, countries should adopt the ISIN numbering system for securities issued as defined in the ISO Standard 6166, at least for cross border transactions. These standards should be universally applied by 1992.

ISIN numbers already exists for equities as well as bonds. The equities are prefixed by "ZAE" followed by seven numbers. The bonds are prefixed by "ZAG" followed by nine numbers.

CHAPTER FIVE

5. CONCLUSION

The introduction of a totally electronic share transaction system is the latest effort in upgrading the Johannesburg Stock Exchange as the centre for all the security transactions in an emerging South African market. The introduction of STRATE (Share TRAsactions Totally Electronic) system will improve the global competitiveness of the South African securities market by rendering it much more efficient and by lowering the general risks of trading on a paperbased market drastically.

Chapter one provided a brief introduction to the environment of the South African securities market, discussing both the challenges it faces on re-entering the global security market and the concept of electronic share transactions. It was followed by a definition and explanation of the total financial system and the identification of the main participants in the securities market. These discussions identified the market areas, the market participants and the investment activities on which the implementation of STRATE would have far reaching consequences.

Chapter two dealt with the Efficiency Market Hypothesis (EMH) as criteria for the measurement of efficiency of a specific securities market, covering both the traditional approaches to security evaluation (being the fundamental and technical analysis). A discussion of the development of the EMH followed. The role of the availability of accurate and timeous market information in determining the efficiency of a certain market, was investigated. Three levels of market efficiency were subsequently defined and discussed. The three levels are the weak form, semi-strong form and the strong form of market efficiency. Tests were set down for the determining of each form of market efficiency. The direction of market efficiency change from which form of market efficiency to the degree of market efficiency. Finally the degree of market efficiency of the Johannesburg Stock Exchange was measured by using the EMH and the Johannesburg Stock Exchange was subsequently found to be an operationally efficient market.

Chapter three contained discussions of each of the nine recommendations as set down by the Group of Thirty.

The nine recommendations can be used as guidelines for the electronic share transaction systems of Stock Exchanges in order to improve efficiency and to reduce risks.

In Chapter four the practical impact and effect of STRATE on the Johannesburg Stock Exchange was investigated. Major changes were anticipated to the present system including the dematerialisation of physical share certificates and the subsequent necessity for amendments to the present Companies Act, the diminishing role of the transfer Secretary, the electronic settlement process and its combined effect with the JET and National Payment System. This was followed by a detailed discussion of the payment process of the South African electronic system, the straight through

processing concept, the electronic settlement process and the benefits of STRATE for the Johannesburg Stock Exchange, with brief references to the nine recommendations.

It can be concluded that the Johannesburg Stock Exchange is an operational efficient market whereby new information is readily available to all participants and such information is acted upon rapidly. Within this framework, the STRATE system will introduce to the Johannesburg Stock Exchange the modern age concepts of contractual rolling settlement thereby reducing risks and specific credit risks as delivery versus payment will be compulsory.

The introduction of STRATE will upgrade the South African securities market in line with the international standard and will enable the South African market to compete with other emerging markets more successfully for big corporate investments. The major changes to the securities settlement system are summarised in table 1 in Appendix D.

The implementation of STRATE together with the operationally efficient Johannesburg Stock Exchange will be a major benefit for South Africa when competing for investments with other emerging markets. This will further bring South Africa in line with other international markets by complying with the nine recommendations. In total the functioning of the securities market in South Africa will be more efficient.

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APPENDIX A

S.W.I.F.T. CATEGORY 5 MESSAGE TYPES

STANDARD

MT 500	Order to buy
MT 501	Order to sell
MT 502	Order to buy or sell
MT 510	Conformation of purchase or sale
MT 512	Securities trade conformation
MT 513	Client advice of execution
MT 514	Trade allocation instruction
MT 515	Client confirmation of purchase and sale
MT 516	Securities loan confirmation
MT 517	Client confirmation affirmation
MT 518	Market-side securities trade confirmation
MT 519	Advice of execution
MT 520	Receive free
MT 521	Receive against payment
MT 522	Delivery Free
MT 523	Delivery against payment
MT 526	General securities lending/borrowing message
MT 530	Confirmation of receipt free
MT 531	Confirmation of receipt against payment
MT 532	Confirmation of delivery free
MT 533	Confirmation of delivery against payment
MT 534	Notice of settlement problem
MT 539	Advice of receipt/delivery of securities
MT 550	Notice of rights
MT 551	Notice of event
MT 552	Notice of offer to privilege
MT 553	Instruction to a custodian
MT 554	Advice of money income
MT 555	Advice of income in the form of securities
MT 556	Advice of redemption
MT 557	Advice of securities proceeds
MT 559	Paying agents claim

MT 560	Notice of bond or shareholders meeting
MT 561	Proxy or authorisation and instructions to vote
MT 562	Corporate action status report
MT 563	Corporate action confirmation
MT 570	Request for statement
MT 571	Statement of holding
MT 572	Statement of transactions
MT 573	Statement of pending actions
MT 574	Statement of open orders
MT 576	Statement of open orders
MT 577	Statement of numbers
MT 579	Certificate numbers
MT 580	Instruction to an international clearing system
MT 581	Collateral adjustment message
MT 582	Reimbursement claim or advice
MT 583	Depot management advice

(Source : Anon1997(e))

APPENDIX B

THE TRADING DAY

<i>Order Book XYZ Limited</i>					
<i>Buy</i>			<i>Sell</i>		
Member Firm	Quantity	Price	Price	Quantity	Member Firm
			103	16 000	C
			102	1 500	D
			101	12 000	E
A & B	5 000	100			
F	4 500	99			
G	10 000	98			

Buy orders making up the 5 000 shares @ 100 cents are :

Member Firm	Time Placed	Quantity
A	10:00	3 000
B	10:30	2 000

The JET system continuously attempts to match the bids and offers, comparing the orders and generating trades whenever the terms of the orders match. The dealers are advised of the trades immediately following matching.

Example : member Firm H enters a sell order of 4 000 shares @ 100 cents :

<i>Order Book XYZ Limited</i>					
<i>Buy</i>			<i>Sell</i>		
Member Firm	Quantity	Price	Price	Quantity	Member Firm
			103	16 000	C
			102	1 500	D
			101	12 000	E
			100	4 000	H
A & B	5 000	100			
F	4 500	99			
G	10 000	98			

The highest buy orders and lowest priced sell orders are matched first. orders at the same price are ranked according to their time of entry into the system.

The status of the order book after execution of the orders is :

Order Book XYZ Limited					
Buy			Sell		
Member Firm	Quantity	Price	Price	Quantity	Member Firm
			103	16 000	C
			102	1 500	D
			101	12 000	E
B	1 000	100			
F	4 500	99			
G	10 000	98			

Outcome :

Member Firm A purchases 3 000 shares.

Member Firm B (which ranks after firm A in time priority) purchases 1 000 shares and remains a buyer of 1 000 shares.

Member Firm H sells 4 000 shares.

(Source : Anon; 1996(b))

APPENDIX C

TOTAL REGISTER OF SHAREHOLDERS

Name	Number of shares
Mr. AAX	xxx
Mr. AAB	xxx
Mr. BBC	xxx
Ms CCB	<u>xxx</u>
Share capital in paper form	xxxx
Share capital dematerialised in CSD	<u>xxxx</u>
Bank Nominee	xxx
Broker Nominee	xxx
Investor A	xxx
Investor B	<u>xxx</u>
	—
Total share capital	<u>xxxx</u>

APPENDIX D

TABLE 1 THE MAJOR CHANGES TO THE SETTLEMENT SYSTEM

PHYSICAL SCRIP AND REGISTRATION OF SHAREHOLDERS

MANUAL	ELECTRONIC SETTLEMENT
The delivery of physical scrip required to settle a sale	Physical scrip will no longer be eligible for settlement of a sale
Scrip held either by the investor or in a nominee account, and delivered on or after settlement day	Scrip deposited by the investor, in a central securities depository via a CSD Participant, a prescribed time before a sale, to enable settlement of the sale on a specific date
Ownership represented by the physical possession of a share certificate	Ownership represented by an electronic entry in the records of the CSD Participant. The total of the CSD Participant records will equal the holding of that participant in the records of the CSD
Registers are updated with new ownership details upon the submission of the certificate by the new owner or the owner's agent, to the transfer secretary	Registers are updated on a real-time basis on settlement day when the records of the CSD Participant reflect the change in ownership upon the electronic settlement of the scrip.

DELIVERY VERSUS PAYMENT

MANUAL SETTLEMENT	ELECTRONIC SETTLEMENT
Same settlement trades (available for set-off) take place during a calendar week. Settlement of the netted transactions takes place from Tuesday of the following week on a non-contractual basis and positions not delivered by Friday are carried forward to the following week.	Shares and funds are due for settlement a set number of business days after the trade, resulting from rolling settlement. Settlement has to take place on the given settlement day, resulting from contractual settlement.
Settlement takes place by the manual exchange of cheques and share certificates. Deals not settled by Friday of the following week form part of the new netting process for settlement the following week.	Settlement takes place through real-time transfer of value via national Payment System and simultaneous electronic transfer of ownership within a CSD.

(Source : Singer 1997(b))