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IMPACT OF WORKING CAPITAL MANAGEMENT ON THE PROFITABILITY OF LISTED CEMENT COMPANIES IN TANZANIA

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ABSTRACT

This study analyses the impact of working capital management efficiency on profitability of cement companies listed in Dar Ea Salaam Stock exchange of Tanzania. The study is carried out on the basis of 8 years (from 2006 to 2013) data of two DSE listed companies viz; Tanga Cement Company Ltd(TCCL) and Portland Cement Company Ltd(PLCCL). The measures of working capital efficiency and their expected relationships with profitability are ascertained by review of literature. The measures include the Receivables Turnover Ratio (RTR), Inventory Turnover Ratio (ITR), and Payments Turnover Ratio (PTR). One additional variable, Cash Conversion efficiency (CCE) is also included in this study as it affects operational performance and also profitability. All these measures are taken as independent variables. Current Ratio (CR), size of the firm [measured in terms of natural logarithm of sales(CSLn)] have been used as control variables. Log Gross operating income is taken as dependent variable (GOPLn). Descriptive statistics of variables chosen are calculated and their Pearson's correlations are analyzed. Further OLS regression applied for analyzing the relationship between measures of working capital efficiency and operating profitability. As per the descriptive analysis, the performance of TPCCL is comparatively better in the case of RTR, PTR, CR and CCE when compared to industry and also TCCL. The performance of TCCL is comparatively better in the case of ITR. The correlation analysis showed mixed results. Though most of the relationships between independent variables and dependent variable are as expected but not significant. Industry correlations between RTR CSLn, CCE, PTR and GOP are in required direction. The relationship between ITR and GOP is negative which is against to expectation. The OLS regression analysis results showed that RTR, CCE caused expected positive impact on GOP but significant only in the case of RTR.. In the case of the impact of PTR and ITR on GOP the results are against expectation but not significant.

KEYWORDS
Receivables Turnover Ratio, Payables Turnover Ratio, Inventory Turnover Ratio, Cash Conversion Efficiency, OLS regression.

JEL CODE
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1. INTRODUCTION

The investment in any business especially corporate sector broadly can be classified as investment for creating capacities in the form of noncurrent assets/fixed capital and investment for making use of such created capacities efficiently in the form of current assets/working capital. Both aim at maximizing profitability. In this endeavor working capital plays a pivotal role in making use of the created capacities for getting output and channelizing the same for consumers to generate profitability. Business viability, profitability, growth and prosperity are closely associated with ability to efficiently manage the working capital/short-term financing requirements of a firm. The objective of WCM is to maintain the optimum balance of each of components of working capital viz; receivables, inventory and payables – and using the cash efficiently for day-to-day operations. Optimization of working capital balance means minimizing the working capital requirements and realizing maximum possible revenues. Efficient WCM increases firms' free cash flow, which in turn increases the firms' growth opportunities and return to shareholders.

Working capital is the difference between resources in cash or readily convertible into cash and organizational commitments for which cash will soon be required. It includes all current assets like inventories, receivables, short securities and current liabilities like trade payables and short term commitments. Considerable managerial time and efficiency is required in managing components of working capital because of the very nature of convertibility of Current assets into different forms continuously over a period of operating cycle. They need to be converted from cash to all inputs like material, work in process, finished goods, and receivables and finally cash. Similarly current liabilities are to be honored on time for which efforts are required maintain sufficient liquidity. This necessitates continuous involvement of management not only making decisions but also effective execution. Taking the conversion efficiencies of all the working capital components and managerial philosophy industry nature into consideration, the management has to plan the amount of investment in WC. Over investment in working capital create idle capital without any benefit and under investment may keep the firms credit worthiness at stake.

The relationship between ability of efficient WCM and profitability varies across different industries due to their nature, economic and business environments of countries and approaches followed by the managements in WCM. Firms in an industry that has less competition would focus on minimizing the receivable to increase the cash flow and for firms where there are large numbers of suppliers of materials, the focus would be on maximizing the payable consequently it will have a different impact on the profitability as compared to competitive and restricted input supply economic environments.

The most important components of working capital are the Account receivables, inventory and accounts payable. Efficient management of receivables is closely associated with credit terms, average collection period of receivables and total amount employed in receivables and their turnover. It facilitates to increase the size of the activity by increasing total sales consequently increase in velocity of recycling of funds and generating higher profitability. As against this, if management fails in efficient management of accounts receivables, it results into higher average collection period, reduced velocity in recycling of funds, blocking of funds with debtors without any additional benefits and ultimately effecting profitability and liquidity of the enterprises. A large number of business failures have been attributed to inability of financial managers to plan and control properly the account receivables of their respective firms. The relationship between accounts receivable turnover/average collection period and profits of SMEs indicate the efficiency of management in managing accounts receivable. Similarly efficient management of Inventory is closely associated with terms of purchase, purchase quantity decisions taking into account the nature of inputs and terms of purchase, ability of converting inventory into finally sales and cash and deciding optimum investment in inventories. Over investment may lead to out dated inventory and cause losses and under inventory may lead to shortage and breakdowns in continuous activity. The relationship between inventory turnover or inventory conversion period in days and profits indicate the efficiency of management in managing inventories. Accounts payable or the short term liabilities which have to be paid on time to maintain credit worthiness and at the same time make use of them as an aid to working capital to minimize

investment. Hence, the relationship between payables turnover ratio or average payment period and profits indicate the efficiency of management in managing payables. Adequate liquidity is also essential not only to meet required cash purchases, payment to various factors of production on time but also for meeting short term obligations. Hence the relationship between cash conversion efficiency with profits indicate the managerial efficiency in managing liquidity.

2. AN OVER VIEW OF TANZANIA AND CEMENT INDUSTRY

2.1. AN OVERVIEW OF TANZANIA

Tanzania is located in eastern Africa bordering the Indian Ocean, between Kenya and Mozambique. Other neighboring countries include: Burundi, Democratic Republic of the Congo, Malawi, Rwanda, Uganda and Zambia. The country encloses an area of 947,300 square kilometers with a coastline of 1424 kilometers and is a home of some of the world's greatest landmarks The Kilimanjaro – which is the highest mountain in Africa standing at 5895 meters above sea level, Lake Victoria – the world's second largest freshwater lake and Lake TCCLnyika – the world's second deepest lake. Tanzania is also known for a variety of wildlife with over fifteen national parks and game reserves around the country. In addition to all this, the country has abundant supplies of natural resources which include gold, diamonds, coal, natural gas and a wide variety of gemstones. Population wise Tanzania is home to around 41.05 million among which 21.23 million (2009 est.) are considered to be labor force. All this makes Tanzania one of the world's wealthiest nations from a biological point of view. (CIA World fact book). Despite all this wealth, Tanzania is ranked as one of the world's poorest countries as its population below poverty line was at a record high of 36% (2002 est.),the estimated GDP per capita in 2009 was USD 1400, which is absolutely trivial compared to that of the other member country South Africa which was USD 10,100 in the same year. (Source: CIA Fact book).

2.2. CEMENT INDUSTRY IN TANZANIA

Tanzanian, as a developing country, committed for undertaking planned activities for its economic development relying on the philosophy of LPG. As a part of this program it has included in priority for infrastructure development such as roads, bridges, factories, projects, housing, universities etc which necessities basic inputs like iron and steel, cement etc. Cement makers operating in the country include Tanzania Portland Cement, which is 69.3 per cent owned by a subsidiary of Germany's Heidelberg Cement AG ; TCCL, 62.5 per cent owned by Afrisam Mauritius Investment Holdings Limited; and Mbeya Cement, 62.76 per cent owned by France's Lafarge SA. Lake Cement and Lee Cement Factory are two newest entrants in Tanzania's cement manufacturing and marketing sector with their core products under brand names of Nyati cement and Kilwa cement respectively. Nigeria's billionaire and Africa's richest man, Alhaj Aliko Dangote, is constructing a 3-million tonne capacity cement plant in Mtwara Region. Tanzania expects to double its cement output over the next few years according to a report by the Daily News. The news agency reported that Tanzanian Deputy Minister for Industry and Trade, Janet Mbene expects the country's annual cement production to rise to 6 million tonnes with the future opening of seven new factories. According to the article cement consumption is viewed as a barometer for construction activity, which is one of the main drivers of economic growth in the country. Tanzania's cement output rose 18.9% last year, to slightly above 3 million tonnes on the back of higher demand. Mbene said the rise in output would mean Tanzania would produce a surplus to be exported. {Source : INFRASTRUCTURE NEWS} Out of all the companies existing today only two companies are public companies registered in Dar Es Salaam stock exchange and remaining are private companies. Further from those private companies two companies started their activity in the last year. Hence, this study is confined to two listed companies only.

The paper deals with presentation of an overview of Tanzania and cement companies, motivations and Objectives of study, review of the empirical literature, Methodology in terms of sample size, data source, and variables used, measurement of variables and estimation techniques. It also presents analysis and results of the study, conclusion and suggestion for improvement and scope for future research**.**

3. MOTIVATIONS AND OBJECTIVES OF THE STUDY

3.1. MOTIVATIONS FOR THE STUDY

The following are the motivations for the present study.

- The trend in share of working capital in total assets is fluctuating. The minimum and maximum of CAs to TAs of TCCL and PLCCL are 26.18 - 47.18% and 25.97-57.28% with means of 34.12 and 39.01 and standard deviations of 6.83 and 9.85 respectively.(over 8 years from 2006 to 2013)
- Sales of TCCL ranged between TShs.77626 and TShs.195603 million. In the case of PLCCL it was TShs.80203 and TShs. 249111 million respectively. Except in year 2013 there was continuous increase. Thus in spite continuous increase in sales the currents share in total assets was fluctuating sometimes decreasing which necessitates to examine the efficiency of working capital management
- ROA of TCCL and PLCCL varied between 0.244-0.39 and 0.38 - 0.44 respectively. Fluctuations are frequent. It is normally expected that there should be positive link between change in sales, change in share current assets in total assets and return on assets. In this case it appears that the positive link is missing, may be due to problem of managerial efficiency in working capital management.
- The interaction with residents revealed that the prices of cement are not affordable and if they are reduced internal demand may increase enormously. Whereas the concerned ministry opined that the capacity of cement production will be reaching surplus stage.
- Company reports revealed that they have some inventory problems.

3.2. OBJECTIVES OF THE STUDY

The discussions of the importance of working capital management, the effect of different components on profitability and motivations outlined above, necessitates a study on the managerial efficiency in working capital management and its impact on profitability of under researched corporate sector specially cement industry in Tanzania. The objectives of study include the following:

- To find out the effects of efficiency in different components of working capital management on Profitability
- To find out the impact of size of the Cement companies of Tanzania on profitability.

4. REVIEW OF LITERATURE

The reviewed literature along with findings on the relationship between measures of working capital efficiency and profitability is presented below:

Deloof (2003), in his paper, "Does Working Capital Management Affects Profitability of Belgian Firms?" using correlation and regression tests found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable. On the basis of these results he suggested that managers could create value for their shareholders by reducing the number of days' accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

IoannisLlazaridis, and DbvntriosTtryfonidis,(2006) in their research work "Relationship Between Working Capital Management and Profitability of Listed Companies in the Athens stock Exchange" investigate the relationship of corporate profitability and working capital management using a sample of 131 companies listed in the Athens Stock Exchange (ASE) for the period of 2001-2004 to establish a relationship that is statistically significant between profitability, the cash conversion cycle and its components. The results of the research showed that there is statistical significance between profitability, measured through gross operating profit, and the cash conversion cycle. Moreover managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each different component (accounts receivables, accounts payables, inventory) to an optimum level.

Kesseven Padachi in his paper(2006) "Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms" examined the trends in working capital management and its impact on firms' performance. The trend in working capital needs and profitability of firms are examined to identify the causes for any significant differences between the industries. The dependent variable, return on total assets is used as a measure of profitability and the relation between working capital management and corporate profitability is investigated for a sample of 58 small manufacturing firms, using panel data analysis for the period 1998 –2003. The regression results show that high investment in inventories and receivables is

associated with lower profitability. The key variables used in the analysis are inventories days, accounts receivables days, accounts payable days and cash conversion cycle. A strong significant relationship between working capital management and profitability has been found in previous empirical work. An analysis of the liquidity, profitability and operational efficiency of the five industries shows significant changes and how best practices in the paper industry have contributed to performance. The findings also reveal an increasing trend in the short-term component of working capital financing.

Abdul Raheman and Mohamed Nasr(2007) in their paper "Working Capital Management And Profitability – Case Of Pakistani Firms" studied the effect of different variables of working capital management including the Average collection period, Inventory turnover in days, Average payment period, Cash conversion cycle and Current ratio on the Net operating profitability of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004. Debt ratio, size of the firm (measured in terms of natural logarithm of sales) and financial assets to total assets ratio have been used as control variables. Pearson's correlation, and regression analysis (Pooled least square and general least square with cross section weight models) are used for analysis. The results show that there is a strong negative relationship between variables of the working capital management and profitability of the firm. It means that as the cash conversion cycle increases it will lead to decreasing profitability of the firm, and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. They find that there is a significant negative relationship between liquidity and profitability. They also find that there is a positive relationship between size of the firm and its profitability. There is also a significant negative relationship between debt used by the firm and its profitability.

Venkata Ramana.N; Ramakrishnaiah.K; Chengalrayulu.P (2013) in their study "Impact of Receivables Management on Working Capital and Profitability: A Study of Select Cement Companies in India" collected information from 4 cement companies for the period from 2001 -2010 calculated efficiency of receivables ratios like management Receivables to Current Assets Ratio, Receivables to Total Assets Ratio, Receivables to Sales Ratio, Receivables Turnover Ratio, Average Collection Period, Working Capital Ratio and Profitability Ratio, applied ANOVA to know the impact on working capital and profitability. Working capital and profitability were considered as dependent variables. The investigation reveals that the receivable management across cement industry is efficient and showing significant impact on working capital and profitability.

Vedavinayagam Ganesan,(2007) in his study "An Analysis of Working Capital Management Efficiency in Telecommunication Equipment Industry" analyzed the relationship between working capital management efficiency and profitability using correlation and regression analyses. ANOVA analysis is done to study the impact of working capital management on profitability. Using a sample of 443 annual financial statements of 349 telecommunication equipment companies covering the period 2001-2007, this study found evidence that even though "days working capital" is negatively related to the profitability, it is not significantly impacting the profitability of firms in telecommunication equipment industry

Ghosh and Maji,(2003) in their paper made an attempt to examine the efficiency of working capital management of the Indian cement companies during 1992 – 1993 to 2001 – 2002. For measuring the efficiency of working capital management, performance, utilization, and overall efficiency indices were calculated instead of using some common working capital management ratios. Setting industry norms as target-efficiency levels of the individual firms, this paper also tested the speed of achieving that target level of efficiency by an individual firm during the period of study. Findings of the study indicated that the Indian Cement Industry as a whole did not perform remarkably well during this period.

Smith and Begemann(1997) emphasized that those who promoted working capital theory shared that profitability and liquidity comprised the salient goals of working capital management. The problem arose because the maximization of the firm's returns could seriously threaten its liquidity, and the pursuit of liquidity had a tendency to dilute returns. This article evaluated the association between traditional and alternative working capital measures and return on investment (ROI), specifically in industrial firms listed on the Johannesburg Stock Exchange (JSE). The problem under investigation was to establish whether the more recently developed alternative working capital concepts showed improved association with return on investment to that of traditional working capital ratios or not. Results indicated that there were no significant differences amongst the years with respect to the independent variables. The results of their stepwise regression corroborated that total current liabilities divided by funds flow accounted for most of the variability in Return on Investment (ROI). The statistical test results showed that a traditional working capital leverage ratio, current liabilities divided by funds flow, displayed the greatest associations with return on investment. Well-known liquidity concepts such as the current and quick ratios registered insignificant associations whilst only one of the newer working capital concepts, the comprehensive liquidity index, indicated significant associations with return on investment.

Sushma Vishnani and Bhupesh Kr. Shah(2007) made a pragmatic analysis of Indian Consumer Electronics Industry to determine the impact of working capital policies & practices on profitability for the period 1994–95 to 2004–05. They found a negative relationship between the determinants of WCM and profitability for most of the companies in their sample. The same results were also confirmed in their industry-wide analyses.

Pedro Juan García-Teruel and Pedro Martínez-Solano(2007) were probably the first to make an experimental analysis about the effects of WCM on the Profitability of Small and Medium Enterprises. In their article, "Effects of Working Capital Management on SME Profitability", they took a sample of 8,872 small and medium-sized Spanish firms for the period 1996-2002 for the purpose of constructing an empirical relationship between WCM and profitability. Their correlation analyses displayed a very significant negative relationship between the Return on Assets and the number of days accounts receivable, number of days inventory and the number of days accounts payable. Also, the correlation between the cash conversion cycle and the profitability variable was negative as well as statistically significant. The authors, thus, held that shortening the (CCC) would lead to an increase in profitability.

Azhagaiah Ramachandran and Muralidharan Janakiraman(2009) attempted to devise a significant relationship between the Working Capital Management Efficiency and EBIT. The results of their Regression analysis showed a significant negative relationship of EBIT with Cash Conversion Cycle.

Malaysian authors Zariyawati (et al) also endeavored to investigate the relationship between corporate profitability and working capital management of firms in six different Economic Sectors of the Malaysian Industry. The justification they had to conduct the study was that most of the previous studies, in their opinion, focused on large and/or developed markets. Thus reinvestigating the issue in the emerging markets of Malaysia could provide further insight on the impact of working capital management on profitability. Their results also were indicative of a strong and significant negative association between the two variables of study.

An attempt to explore the relationship between the variables of Working Capital Management and Profitability was made by Haitham Nobanee and Maryam AlHajjar(2009). Their analysis was based on a sample containing 2123 Japanese non-financial firms listed in the Tokyo Stock Exchange for the period from 1990 to 2004. The authors, after analyzing the results, suggested that Japanese firms should focus on shortening their Receivable Collection Period, Inventory Conversion Period and Cash Conversion Cycle to enhance profitability. Lengthening the Payable Deferral Period could also add to profitability, they argued. However, they deemed the over lengthening of the Payable Deferral Period to be equally risky as it could harm the firm's credibility and credit reputation in the long run.

D. Govind Rao and P. M. Rao (1999) researched the relationship of WCM and profitability in Indian cement industry and found a mix of positive and negative connections between the working capital related variables and that of profitability.

J. P. Singh and Shishir Pandey Jr. (2008), in their article "Impact of Working Capital Management in the Profitability of Hindalco Industries Limited" observed a significant effect of the management of working capital on the profitability of Hindalco Industries.

The impact of working capital management on profitability was also observed by Cote and Latham (1999) who discovered that management of inventory, receivables and payables had a direct influence on a company's Cash Flows which could ultimately affect its profitability.

The foregoing review reveals that Deloof (2003),Ioannis Lazaridis et.al (2006),Kessavan Padach(2006),Abdul Rahaman & Mohamed nasr(2007), Veda Vinayagam Ganeshan(1997), Shushuma Vishani et.al(2007), Garacia P.J et.al(2007), Azahagaiah Ramchander et.al(2009),Zariyavati et.al(2009),Hatham Nobanee et.al(2009), Govindarao and PM.rao(1999), Cote and Latham(1999) found the relationship between working capital efficiency ratios in terms of days performance and profitability and came out with mixed results. In all these studies ACP, INTID,CCC,APP are taken as measures of working capital efficiency. With regard to dependent variable (profitability) different proxies like ROA, ROE, EBIT, GOP are used. Some studies used control or intervening variables like CR, Debt ratio, company sales.

Hardly any study is observed to find the impact of working capital efficiency ratios like RTR, PTR, ITR,WCTR and CCE on profitability without expressing them in terms of days performance. Hence, this study is devoted to examine the impact of working capital efficiency ratios on profitability. The independent variables are taken as RTR, PTR, ITR and CCE. Log GOP is taken as dependent variable because the efficiency of Working capital reflects primarily in gross operating profit and it is excludes the effects of overhead costs.

5.0 METHODOLOGY

The research primarily aims at identifying the relation between efficiency in working capital management of cement companies registered in DSE of Tanzania and its relation with Gross operating profit. For the purpose, in this section, the data set and sample, variables used and their measurement, expected relationship of independent variables with dependent variable, hypotheses, model specification and data analysis tools are discussed.

5.1 DATA SET & SAMPLE

The data used in this study was acquired from annual reports of two cement companies listed in DSE of Tanzania browsing the websites of the concerned companies. The period covered by the study extends to most recent 8 years from 1996 to 2013. The confinement to this period is due to limitation of availability of annual reports and other related information. Out of five cement companies existing in Tanzania only two companies are listed in DSE and remaining are in private sector. Among three companies in private sector two companies started their operation in the last year only. Availability of data of private companies is another limitation which necessitated confining to listed companies.

Finally, from annual reports, collected the data relating to required variables of this study and computed the relevant ratios.

5.2 VARIABLES

The choice of variables used in this study is influenced by the gaps in previous studies on working capital management and its effect on profitability. The variables used in this study are given below. In this study RTR, PTR, ITR,WCTR and CCE are taken as independent variables. Log of Gross operating profit is taken as dependent variable because it will not have the effect of overheads and also the impact of managerial efficiency in working capital will be on gross profit and subsequently on other aspects. WCTR is applied for only descriptive and correlation analysis but not for regression, since it bears high correlation with other working capital components efficiency measures.

Receivables Turnover Ratio (RTR): RTR is used as proxy for the efficiency of management in utilizing amount invested on collectables and it is used as an independent variable. RTR is calculated dividing sales with average accounts receivables.

Inventory Turnover Ratio (ITR): ITR is used as proxy for the efficiency of the management in utilizing amount invested on inventories and it is considered as an independent variable. ITR is calculated dividing cost of goods sold with average inventory.

Payables Turnover Ratio (PTR): PTR is used as proxy for the efficiency of the management in trade creditor's repayment policy and it is considered as an independent variable. PTR is calculated dividing purchases with average trade creditors.

Current Ratio (CR): CR which is a traditional measure of liquidity is calculated by dividing current assets by current liabilities. It is used as control variable because the GOP is affected by this proportion.

Natural logarithm of company Sales (CSLn): CSLn is used as proxy for size of the company. It is taken as control variable because the profitability of the company is also affected by this variable apart from the efficiency of working capital management. Many studies have also applied Debt ratio as control variable. Since the companies used in the study do not have any long term debt it is applied.

Cash Conversion Efficiency (CCE): CCE is used as proxy for liquidity of the company which is calculated dividing operating cash flows with sales.

Log of Company sales (CSLn): Company sales is used as proxy for size of the companies in this relationship which is calculated as log of sales of every company.

Gross operating profit (GOPLn): Gross operating profit in terms of their natural logarithms is taken as dependent variable in this stud**y.**

Gross Working capital turnover Ratio (WCTR): WCTR is used as independent variable which is calculated dividing sales by gross working capita**l**

5.3. KEY VARIABLES AND THEIR EXPECTED IMPACT ON GOP

The variables used in this study along with their expected impact on gross operating profit are presented in the following table:

TABLE 5.1: SUMARY OF KEY VARIABLES AND THE EXPECTED IMPACT ON GROSS OPERATING PROFIT

Variable	Variable type	Expected coefficient sign	Rationale
Receivables Turnover ratio(RTR)	Independent variable	positive	RTR↑ ⇨ GOP↑
Payables Turnover Ratio(PTR)	Independent variable	Negative	PTR↑ ⇨ GOP↓
Inventory Turnover Ratio(ITR)	Independent variable	positive	ITR↑ ⇨ GOP↑
Working capital turnover ratio(WCTR)	Independent variable	Positive	WCTR↑ ⇨ GOP↑
Cash Conversion Efficiency(CCE)	Independent variable	positive	CCE↑ ⇨ GOP↑
Company Size (CS)	Control variable	Positive	CS↑ ⇨ GOP↑
Current ratio	Control variable	Positive	CR↑ ⇨ GOP↑

Source: Researchers' conceptualization on the basis of review of literature

5.4 HYPOTHESES TESTING

Since the objective of this study is to examine the relationship between profitability and working capital management, the study makes a set of testable hypothesis {the Null Hypotheses H0 versus the Alternative ones H1}.

HYPOTHESIS 1

H01 : There is no relationship between efficiency in components working capital management and profitability of Listed Cement Companies in DSE of Tanzania.

H11: There is a possible positive relationship between efficiency in components of working capital management and profitability of listed cement companies of Tanzania. Firms more efficient in managing their working capital are expected to pose high level of profitability and vice versa

HYPOTHESIS 2

H03: There is no relationship between size of listed cement companies of Tanzania and profitability.

H13: There may exist a positive relationship between the firm size and its profitability. This may be due to the ability of large firms to reduce liquidity levels and cash gaps.

5.5 MODEL SPECIFICATIONS:

The following OLS multiple regression model is applied in this study.

Model to test the relationship between working capital components efficiency (turnover ratios) and gross operating profitability

$GOPLn\ it = \beta 0 + \beta 1$ (RTR it) + 2 β (ITR it) + 3 β (PTR it) + 4 β (CR it) + 5 β (CCE it) + 6 β (COSLn it) + ε

Where:

GOPLn : Log of Gross Operating Profit
RTR : Receivables Turnover ratio
ITR : Inventory Turnover Ratio
PTR : payables Turnover ratio
CR : Current Ratio
CCE : Cash Conversion Efficiency
COSLn : Natural logarithm of company Sales

E : The error term.

5.6 ANALYSIS USED IN STUDY

Two types of data analysis viz; descriptive and quantitative is applied in this study.

5.6.1 DESCRIPTIVE ANALYSIS

Range, minimum and maximum, average and standard deviations of all the variables applied in this study are calculated using SPSS and analyzed in this study as first step to understand the nature of the variables.

5.6.2 QUANTITATIVE ANALYSIS

In this analysis Pearson correlation applied to measure the degree of association between different Variables under consideration followed by Regression analysis to estimate the causal relationships between profitability variable and other chosen working capital managment efficiency variables.

6. DATA ANALYSIS AND FINDINGS

The calculated data for descriptive analysis, correlation analysis and regression analysis is presented in the following sections along with findings.

6.1 DESCRIPTIVE ANALYSIS

TABLE 6.1: DESCRIPTIVE STATISTICS OF DSE REGISTERED CEMENT COMPANIES VARIABLES (2006-2013)

Variabl	Company	N	Range	Minimum	Maximum	Mean	Std.deviation
CSLn	TCCL	8	0.9200	25.0800	26.0000	25.6050	0.3229
	PLCCL	8	1.1300	25.1100	26.2400	25.8387	0.3744
	INDUSTRY	16	1.1600	25.0800	26.2400	25.7219	0.3587
GPLn	TCCL	8	0.7297	24.1788	24.9085	24.6686	0.2387
	PLCCL	8	1.0459	24.4847	25.5306	25.0927	0.3465
	INDUSTRY	16	1.3518	24.1788	25.5306	24.8806	0.3587
CR	TCCL	8	2.5969	1.4049	4.0018	2.6350	0.8756
	PLCCL	8	4.9527	0.9052	5.8579	2.9976	1.4816
	INDUSTRY	16	4.9527	0.9052	5.8579	2.8163	1.1905
WCTR	TCCL	8	1.5375	2.5699	4.1074	3.3889	0.4954
	PLCCL	8	1.7551	1.8283	3.5834	2.5230	0.6273
	INDUSTRY	16	2.2791	1.8283	4.1074	2.9559	0.7058
RTR	TCCL	8	13.7775	17.2583	31.0358	24.1457	4.8309
	PLCCL	8	41.0145	18.4376	59.4521	39.8029	13.0369
	INDUSTRY	16	42.1937	17.2583	59.4521	31.9743	12.4731
PTR	TCCL	8	11.2027	4.7798	15.9825	7.72848	3.5352
	PLCCL	8	2.6082	3.7142	6.3224	4.8972	0.8676
	INDUSTRY	16	12.2683	3.7142	15.9825	6.3128	2.8846
ITR	TCCL	8	1.6218	3.3317	4.9535	4.09407	0.5823
	PLCCL	8	1.2131	2.7009	3.9140	3.3819	0.5061
	INDUSTRY	16	2.2526	2.7009	4.9535	3.7380	0.6426
CCE	TCCL	8	0.2026	0.1366	0.3392	0.2324	0.0635
	PLCCL	8	0.3498	0.0782	0.4280	0.2681	0.1055
	INDUSTRY	16	0.3498	0.0782	0.4280	0.25023	0.8615

Source: compiled on the basis of annual reports of the companies from 2006 to 2013

The following observations can be made from the table:

- The GOPLn of TCCL, PLCCL ranges between 25.08 and 26.0;25.11 and 26.24 with mean of 25.6, 25.838 and standard deviation of 0.3229 and 0.334 respectively. (in absolute valuesTZs.77627 and TZs.195604; Tzs.80203 and Tzs.249111 million with mean of TZs.137708; 175928 and standard deviation of TZs.41751and 56220) respectively) The mean and standard deviation of PLCCL is comparatively higher than industry where as TCCL is lower than the industry.
- The RTR of TCCL and PLCCL ranges between 17.26-31.04 and 18.44 -59.45 with mean of 24.15 and 39.80 and standard deviation of 4.83 and 13.04 respectively. The mean and standard deviation of PLCCL is more than the industry and also TCCL. As against this the mean and standard deviation of TCCL is comparatively lower than both PLCCL and industry
- The PTR of TCCL ranges between 4.78 and 15.98 with average of 7.73 and standard deviation of 3.54. As against this the PTR of PLCCL ranges between 3.71 and 6.32 with average of 4.89 and standard deviation of 0.88. Comparatively PLCCL is utilizing payables effectively as its minimum and maximum range of APP is less than TCCL as well as industry. TCCL minimum and maximum PTR, its average is higher than PLCCL. It shows that comparatively their performance in utilization of payables is lower with more certainty.
- The ITR of TCCL ranges between 3.33 and 4.95 with average of4.09 and standard deviation of 0.58. As against this the ITR of PLCCL ranges between 2.70 and 3.91 with average of 3.38 and standard deviation of 0.51. Comparatively TCCL is utilizing inventory effectively as its minimum and maximum range, average and standard deviation are more than PLCCL and industry.
- The average CR of PLCCL (2.997) is comparatively higher than TCCL (2.64) and industry (2.816)average. Its standard deviation is lowest compared to TCCL and industry.
- The average WCTR of TCCL(3.39) is higher when compared to PLCCL.(2.52) and also industry(2.96). Its standard deviation is lower compared to others, signifying that comparatively working capital is used effectively.
- The average CCE of PLCCL (.268) which is higher than TCCL.(.232) and also industry(.250). The standard deviations of TCCL and PLCCL are comparatively lower than industry. It shows comparatively the CCE of PLCCL is better than TCCL..

On the basis of above analysis it can be concluded that PLCCL performance is comparatively effective in the case of RTR, PTR, CR AND CCE. TCCL performance is comparatively better in the case of ITR and WCTR.

6.2. CORRELATION ANALYSIS

TABLE 6.2: CORRELATION BETWEEN VARIABLES

RATIO	COMPANY		CSLN	GPLN	CR	WCTR	RTR	PTR	ITR	CCE
CSLN	TCCL	COR	1	.910	.581	-.507	.057	-.486	.106	.130
		SIG		.002	.131	.200	.894	.222	.803	.759
	PLCCL	COR	1	.896	-.378	-.118	-.335	-.637	-.207	.251
		SIG		.003	.356	.781	.417	.089	.623	.550
	INDUSTRY	COR	1	.893	.004	-.414	.038	-.514	.232	.262
		SIG		.000	.990	.111	.888	.042	.388	.327
GOPLn	TCCL	COR	.910	1	.450	-.219	.315	-.726	-.151	.373
		SIG	.002		.264	.602	.448	.042	.721	.362
	PLCCL	COR	.937	1	-.301	.018	-.175	-.554	-.101	.232
		SIG	.001		.468	.966	.678	.154	.813	.580
	INDUSTRY	COR	.893	1	.032	-.427	.352	-.659	-.427	.342
		SIG	.000		.905	.099	.181	.005	.099	.194
CR	TCCL	COR	.581	.450	1	-.764	-.560	-.003	.585	.169
		SIG	.131	.264		.027	.149	.994	.128	.690
	PLCCL	COR	-.378	-.301	1	-.673	-.581	.703	-.521	-.774
		SIG	.356	.468		.067	.131	.052	.178	.024
	INDUSTRY	COR	.004	.032	1	-.631	-.325	.042	-.150	-.474
		SIG	.990	.905		.009	.219	.878	.579	.064
WCTR	TCCL	COR	-.507	-.219	-.764	1	.736	-.143	-.597	.414
		SIG	.200	.602	.027		.037	.736	.118	.307
	PLCCL	COR	-.118	.018	-.673	1	.886	-.483	.568	.498
		SIG	.781	.966	.067		.005	.226	.142	.209
	INDUSTRY	COR	-.414	-.427	-.631	1	.058	.204	.371	.217
		SIG	.111	.099	.009		.830	.449	.157	.419
RTR	TCCL	COR	-.057	.315	-.560	.736.037	1	-.661	-.786	.436
		SIG	.894	.448	.149			.074	.021	.281
	PLCCL	COR	-.335	-.175	-.581	.866	1	-.131	.826	.487
		SIG	.417	.673	.131	.005		.756	.011	.221
	INDUSTRY	COR	.038	.352	-.325	.058	1	-.494	-.182	.488
		SIG	.888	.181	.219	.830		.052	.499	.055
PTR	TCCL	COR	-.486	-.726	.003	-.143	-.661	1	.623	-.174
		SIG	.222	.042	.994	.736	.074		.099	.681
	PLCCL	COR	-.637	.554	.703	-.483	-.131	1	.076	.564
		SIG	.089	.154	.052	.226	.756		.857	.127
	INDUSTRY	COR	-.514	-.659	.042	.204	-.494	1	.621	-.223
		SIG	.042	.005	.878	.449	.052		.010	.405
ITR	TCCL	COR	.106	-.151	.585	-.597	-.786	.623	1	-.226
		SIG	.803	.721	.128	.118	.021	.099		.590
	PLCCL	COR	-.207	-.101	-.529	,562	.826	.760	1	.585
		SIG	.623	.813	.178	.142	.011	.857		.127
	INDUSTRY	COR	-.232	-.427	-.150	.371	-.182	.621	1	.070
		SIG	.388	.099	.579	.151	.499	.010		.796
CCE	TCCL	COR	.130	.373	.169	.414	.436	-.174	-.226	1
		SIG	.759	.362	.690	.307	.281	.681	.590	
	PLCCL	COR	.251	.232	-.774	.498	.487	-.242	.585	1
		SIG	.550	.580	.024	.209	.221	.564	.127	
	INDUSTRY	COR	.262	.342	-.474	.217	.488	-.223	.070	1
		SIG	.327	.194	.064	.419	.055	.405	.796	

Source: calculated on the basis of annual reports of companies

Pearson's Correlation analysis is applied for data to identify the relationship between variables of working capital management and profitability. Pearson's correlation between RTR,, ITR,WCTR,CCE and GOP is expected to be positive because as the turnover increases it indicates receivables, inventory and current assets are employed more effectively in generating higher sales and consequently higher profitability. As against this the expected relationship between PTR and GOP is negative because if the speed in repayment of debts increases the time lag in repayment of current liabilities comes down leading to decrease in funds available for working capital consequently effecting sales and profits negatively. The following observations can be made from the analysis of the information contained in the table.

- The relationship between RTR and GOP of TCCL is positive as expected (.315) but not significant at ά. = 1% (*p value*.448), where as in the case of PLCCL it is negative at (-.175) and not significant at ά. = 1% (*p value*.678). The relationship of both the companies put together (being represented as industry hereafter) is negative as against expectation (-.352) but not significant at ά. = 1% (*p value*.181). With these inferences it can be concluded that TCCL receivables are in the proper direction contributing to profitability though not significant like industry where as PLCC yet to manage them effectively building appropriate relationship between these variables.
- The correlation between PTR and GOP of TCCL, PLCCL and industry are negative as expected showing- .726, - .554 and -.659 respectively. This relationship is significant in the case of TCCL and Industry ά. = 1%(.043 and .005) where as in the case of PLCCL it is not significant (.154). With these results it can be concluded that though both companies are in the direction of usin PTR in required direction similar to that of industry but yet PLCCL has to invest efforts to reach significant level.
- The correlation between ITR and GOP of TCCL, PLCCL and industry are negative as against the expectation showing- .151, - .101 and -.427 respectively, however not significant at ά. = 1%(.721; .813 and .099). These results indicate that the relationship of both companies and the industry is not as expected and they have to concentrate in this area to improve the performance.
- The correlation between CCE and GOP of TCCL, PLCCL and industry are also positive as expected showing .373, .232 and .342 respectively. However the relationships were not significant in all cases at ά. = 1%(.362; 580 and.194).
- The correlation between WCTR and GOP of TCCL and Industry are showing negative coefficients as against expectation (-.219 and -.427 respectively), however they not significant at ά. = 1% (*p value*..602 and.099). In the case of PLCCL the relationship is positive (.018) marking in tune with the expectation,

however not significant (.966). With these results it can be concluded that though both companies performance differ, they have to invest efforts to improve the situation.

- The correlation between CR and GOP of TCCL and Industry are showing positive coefficients as expected (.450;.032 respectively)but not significant(.264;.905). The correlation of PLCCL is negative showing against expectation(.468)
- The correlation between CSLn and GOP is positive in both companies and also industry (.910;.937 and.893) the relationships are significant in all the three at ά. = 1%(.002;.001 and .000)

The above analysis showed mixed results. TCCL correlations with GOP in the case of RTR, PTR, CCE are in required direction but not significant. Similarly its ITR and WCTR are in undesired direction though not significant. PLCCL correlations with GOP in the case of PTR, CCE and WCTR are in desired direction but significant only in the case of WCTR. Its correlations with GOP are not desired directions in the case of RTR and ITR. In the case of industry ITR and WCTR are not in desired direction only PTR is in desired direction significantly.

6.3 REGRESSION ANALYSIS

OLS regression analysis was done for GOPLn with CR, CSLn, RTR,PTR, ITR and CCE to investigate further, the association between the working capital measures and the profitability measures. In this model GOPLn is taken as dependent variable and RTR, PTR, ITR,CCE, WCTR are taken as independent variables and CSLn and CR are taken as intervening variables. The adjusted *R*2 , also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables and is 90.5%. The F statistic is used to test the significance of R. Overall; the model is significant as F-statistics is 24.718 and the significance of F change is .000. Further the Durbin Watson test is 1.347 which is within the limits. The VIF of all other variables are below 10. Hence this model is significant. The following tables give the results of the regression analysis that shows model summary, ANOVA, regression coefficients and the corresponding P-values.

TABLE 6.3

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.971[a]	.943	.905	.1107793	.943	24.718	6	9	.000	1.347

a. Predictors: (Constant), CASH CONV.EFFI., INVENT.TURN,RATIO, COMPANY SALESLN, CUR.RATIO, RECEIVABLES TURN.RATIO, PAY.TURN.RATIO

b. Dependent Variable: GROSS OP.PROFIT LN

TABLE 6.4

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.820	6	.303	24.718	.000[b]
	Residual	.110	9	.012		
	Total	1.931	15			

a. Dependent Variable: GROSS OP.PROFIT LN

b. Predictors: (Constant), CASH CONV.EFFI., INVENT.TURN,RATIO, COMPANY SALESLN, CUR.RATIO, RECEIVABLES TURN.RATIO, PAY.TURN.RATIO

TABLE 6.5

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.475	2.748		.901	.391		
	CUR.RATIO	.038	.028	.128	1.372	.203	.735	1.360
	RECEIVABLES TURN. RATIO	.010	.003	.347	3.033	.014	.486	2.058
	PAY.TURN.RATIO	.011	.018	.085	.596	.566	.315	3.170
	INVENT.TURN,RATIO	-.111	.060	-.199	-1.850	.097	.549	1.821
	COMPANY SALESLN	.866	.105	.866	8.242	.000	.575	1.738
	CASH CONV.EFFI.	.165	.443	.040	.372	.718	.562	1.779

a. Dependent Variable: GROSS OP.PROFIT LN

The C is the constant, where the regression line intercepts the y axis, representing the amount the dependent y will be when all the independent variables are 0. Here C is 2.475. The following observations can be made from the analysis of regression coefficients table:

- The unstandardized coefficient of RTR is positive as in expected direction (0.010) and is highly significant at ά. = 0.05%(0.014). It implies that the increase in RTR resulted into increase in GOP and vice versa.
- The coefficient of PTR is positive (.011) with the GOP indicating increase in PTR increases GOP but not significant at ά. = 0.05%(.764). This result is against to expectation.
- The coefficient of ITR is negative (-.111) which is not in the expected direction indicating that increase in this ratio decreases GOP and vice versa. However it is not significant (.097).

- The coefficient of current ratio is positive (.038) with GOP indicating increase in this ratio increases GOP and vice versa. It is as expected but not significant at (.203).
- The coefficient of CCE is positive with GOP(.165) indicating increase in ratio of CCE increases GOP but not significantly at ά. = 0.05%(.718)
- The company sales coefficient positively significantly vary with GOP(.866) indicating increase in sales increases GOP at ά. = 0.05%(.000)

7.0 CONCLUSIONS AND SUGGESTIONS

On the basis of descriptive analysis it can be concluded that PLCCL performance is comparatively effective in the case of RTR, PTR, CR AND CCE. TCCL performance is comparatively better in the case of ITR and WCTR. The correlation analysis showed mixed results. TCCL correlations with GOP in the case of RTR, PTR, CCE are in required direction but not significant. Similarly its ITR and WCTR are in undesired direction though not significant. PLCCL correlations with GOP in the case of PTR, CCE and WCTR are in desired direction but significant only in the case of PTR. Its correlations with GOP are not desired directions in the case of RTR and ITR. In the case of industry ITR and WCTR are not in desired direction, only PTR is in desired direction and significant. CS is in positive relationship with GOPLn and also significant at 5% level of significance in both companies and also industry.

The regression analysis results show that the impact of RTR, CCE on GOP is positive as expected and the relationship is significant only in the case of RTR. The impact of PTR and ITR on GOP are not as expected and the relationships are not significant. The control variables CR and CSLn have positive impact on GOP as expected but the relationship is significant in the case of CS only.

Thus it can be concluded that the industry as well as both the companies have efficiency in RTR so as to have significant impact on profitability. Further, company sales also have significant effect on profitability. However the efficiency with regard to ITR and PTR are not in desired direction.

The first alternative hypothesis that there is a possible positive relationship between efficiency in working capital management and profitability of listed cement companies of Tanzania though proved in the case of RTR and CCE, it was significant in the case of RTR only. This is so because there is positive significant relationship between RTR and GOP. This result endorses that firms more efficient in managing their working capital is expected to pose high level of profitability and vice versa. With regard to second hypothesis, the study results endorsed that there existed a positive relationship between the firm size and its profitability as the increase in sales resulted significant increase in GOP. This may be due to the ability of firms to reduce liquidity levels and cash gaps.

Since, except in the case of ACP, the impact of most of the efficiency measures on GOP are not significant as per regression analysis, it can be suggested that there is ample scope for both the companies to invest efforts for investigating causes for bearing negative impact of ITR and positive impact of PTR on GOP. Further there is also scope for investigating the causes for not having significant impact of CCE on GOP. Based on the causes there is need to initiate measures to improve the relations ships so as to have significant impact on profitability.

8. SCOPE FOR FURTHER RESEARCH

Based on the findings of this study there is scope for further research on cement companies in Tanzania in the following areas:

- Causes for the impact of PTR and profitability
- Causes for the impact of negative relationship between ITR and profitability
- The impact of every component working capital on profitability separately using some control variables
- The impact of internal and external factors on profitability

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A STUDY ON COST OF REJECTION (REJECTED SAMPLES) IN A NABL ACCREDITED LABORATORY AT A POST GRADUATE TEACHING HOSPITAL IN DEHRADUN, UTTARAKHAND

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ABSTRACT

The Laboratories are committed towards providing the highest quality test results. Quality specimens/samples are integral to quality results. By laying down certain quality indicators (QI) for the same, laboratory management system can monitor continual improvement (e.g., pre-analytical, analytical and post-analytical phases) in the laboratory. In order to get quality samples (may be defined as the blood samples that are true reflection of the actual status of the patient's condition at that moment, when the sample is drawn), almost all laboratories opt for rejecting the blood samples which are not the Quality samples. The Aim was to study the Cost of Rejection (Rejected Samples) in a NABL Accredited Lab in a Tertiary Care Hospital. Further objectives were to a) study the reasons for sample rejections b) to prioritize the reason for rejection samples of the lab in a given period of time through ABC Analysis c) To measure the cost of rejection using the costing method and d) Suggesting ways to reduce the rejection so that the percentage of rejection and then overall cost to the patient and hospital can be reduced. Setting and Design : An Observational Cross Sectional Study was done in the NABL accredited lab of a 700 beds Post Graduate teaching Hospital at Dehradun district, in the state of Uttarakhand, from the period of March – May 2013. Methodology: Total rejected samples which were obtained in the three month period of data collection (inclusive of both inpatients and outpatients) were studied. Results: There were various reasons for sample rejections. The largest number of Sample rejections were in Biochemistry (n= 191 of 599 samples obtained, i.e. 32%), followed by Serology (n = 131 of 599 samples, i.e. 22%) and Hematology (n = 92 of 599 samples, i.e. 15 %). Overall the total Rejection rate in the three month period was less than 1% (= .45 %), which amounts to 599 rejections of total 130877 samples obtained in Lab. The maximum contributing factor for sample rejection was a) sample got hemolysed due to large time gap between collection times and processing time (40%), b) sample collected not matching with the Test requisition form (19%) and c) Vacutainers label not matching with the requisition form (12%). The average cost of rejection of a lab sample was Rs 124/sample.

KEYWORDS
Sample rejections in lab, Sample collection guidelines, Process Pathways, Activity based Costing.

INTRODUCTION

Collecting and analysing data consistently are necessary tasks for assessing quality, monitoring standardized key processes, improving performance and patient safety in clinical laboratories. These influences 70% of medical diagnoses. Laboratory testing, commonly known as total testing process (TTP), is generally subdivided as preanalytic, analytical and post analytical phases. Preanalytic phase errors have been found at the majority of the total errors (46-68.2%) in laboratory and research medicine. Unfortunately, according to the literature which comprises the process from the beginning of laboratory test requests to the delivery of specimens in the laboratory, there is no sufficient data on errors during the initial steps of preanalytical phase. However, the error magnitude depends on the capacity of a system of error reporting.

REVIEW OF LITERATURE

Data on rejected samples due to various types of preanalytical errors is one of the laboratory medicine preanalytical quality indicators. There is a set of significant data including various types of errors such as the appropriateness of test order, patient wristband identification error, timing errors in sampling and preparation, haemolytic, lipemic blood samples and inappropriate transport, inadequate and inappropriate tubes portion of the sample. However, the types of error in the preanalytical phase seem to have changed over time, but distribution of errors among other phases of TTP has remained the same as per many studies published .Poor communications among physicians, nurses and phlebotomists involved in the TTP or poorly designed processes are also counted as laboratory errors in preanalytical phase.

Preanalytical phase errors start to occur at the point of entry for laboratory test requests by clinicians. Rejection reasons of test requests generally include requests for wrong tests, missing input of tests, ordering a medically unnecessary tests, over-ordering, erroneous coding or unintelligible requests. In some conditions, test requests were rejected with the whole test panel, while only a few tests were selected to be rejected within the clinicians' request panel. For example: haemolysis interference, one of the most common reasons, especially affects lactate dehydrogenase, aspartate aminotransferase, potassium and total bilirubin concentration, while other tests are not interfered, since it is possible to perform measurement until a severe level of haemolysis . Additionally, if test requests cannot appropriate for calculating, these tests are obliged to rejection.

Personal impact on specimen collection is important factor and the preanalytical error rate is 2 to 4 times higher for non-laboratory phlebotomists than laboratory staff. Inappropriateness of the samples especially due to blood drawing errors generally occurs when the blood samples are drawn by nurses whose experiences and training are not sufficient for blood drawing in clinics comparing to the phlebotomists who are a group of more stable staff.

The reasons for rejection and their high-level rates might gather into certain tests due to the unique operating characteristics of the test groups during routine work. The aim of this study was to better explain the rates and reasons of rejected samples, regarding to the certain test groups in our laboratory. Their respective rates might provide aid for the planning of the preventive and corrective operations in order to reduce the incidence of these errors. In a study published by By Lourens HYPERLINK "http://www.pubfacts.com/author/Lourens+A+Jacobsz" A HYPERLINK "http://www.pubfacts.com/author/Lourens+A+Jacobsz"Jacobsz, Annalise E HYPERLINK "http://www.pubfacts.com/author/Annalise+E+Zemlin"Zemlin, Mark J HYPERLINK "http://www.pubfacts.com/author/MarkJ+Roos"Roos, Rajiv T Erasmus, in internet (PUBFacts); A total of 32,910 specimens were received during the study period, of which 481 were rejected, giving a rejection rate of 1.46%. The main reasons for rejection were inappropriate clotting (30%) and inadequate sample volume (22%). Only 51.7% of rejected samples were repeated and the average time for a repeat sample to reach the laboratory was about 5 days (121 h). Of the repeated samples, 5.1% had results within critical values. Examination of patient folders showed that in 40% of cases the rejection of samples had an impact on patient care. The evaluation of pre-analytical processes in the laboratory, with regard to sample rejection, allowed one to identify problem areas where improvement is necessary. Rejected samples due to factors out of the laboratory's control had a definite impact on patient care and can thus affect customer satisfaction. Clinicians should be aware of these factors to prevent such rejections.

PREANALYTIC STANDARD OPERATING PROCEDURES

Each laboratory accredited by NABL is required to follow written procedures and divisional standard operating procedures (SOP) for:

- Patient preparation, when applicable,
- Specimen/sample collection,
- Specimen/sample labeling, including patient name or unique patient/sample identifier and, when appropriate, specimen source, specimen date,
- Specimen/sample storage and preservation,
- Specimen/sample transport conditions,
- Specimen/sample processing,
- Specimen/sample acceptability and rejection,
- Specimen/sample submission, handling and referral, and
- Acceptance criteria specific to each assay.

REQUIRED ACCEPTABILITY CRITERIA FOR SPECIMEN/SAMPLES

A. **Test Requisition (or Electronic Test Order)**

1. The approved test requisition must have the following information:

a. The name and address or other suitable identifiers of the authorized person(s), or laboratory requesting the test and, if appropriate, the name and address of the individual responsible for using the test results,

b. The patient's name or unique patient/sample identifier matching what is labeled on the specimen/sample,

c. The test(s) to be performed, and

d. The date of specimen/sample collection

2. When appropriate to the testing system, the following may be required:

a. The source of the specimen/sample,

b. The sex and age or date of birth of the patient,

c. The time of specimen/sample collection, and

d. Any additional information relevant and necessary for a specific test.

SPECIMEN/SAMPLE LABELING

The specimen/sample must be properly labeled and include

1. The patient's name or unique patient/sample identifier matching the test requisition or electronic test order,
2. If appropriate, the date and time of specimen/sample collection, and
3. Any additional information relevant and necessary for a specific test.

SPECIMEN/SAMPLE INTEGRITY

The specimen/sample must be:

1. Collected in the correct, non-expired, intact, container, device or transport media,
2. Transported under the correct conditions,
3. Processed/handled according to approved laboratory procedure,
4. Sufficient quantity to perform testing (includes no specimen/sample received),
5. Received within acceptable time limitation; specific criteria to be determined by each lab.

EXCEPTIONS

1. All requests for exceptions shall be referred up the chain of command to the Supervisor, Division Chief, Deputy Director, and/or Director.
2. Potential exceptions may include but are not limited to:

a. Outbreak investigations,

b. Specimens from deceased patients, or other extenuating circumstances

PROCEDURE FOR REJECTION OF SPECIMENS/SAMPLES

- Evaluate specimens/samples for acceptability,
- Document the reason(s) for rejecting a specimen/sample,
- Maintain records of efforts to resolve problems and all associated documents,
- Maintain a written or electronic specimen/sample rejection log (refer to Section IX),

- Store rejected specimens/samples properly prior to problem resolution/rejection/disposal,
- Hold specimens/samples for a minimum of seven (7) working days following the
- Rejection report.

NEED AND IMPORTANCE OF STUDY

This study shows that it is essential to keep a track of the sample rejection rate in various Sub Units of Laboratory of a hospital. It shows a method to quantify financially the cost of processing and re-processing patient sample in a Lab. Also it brings out the fact that there is a incidence of higher rejections in Biochemistry followed with Microbiology. Also the contributing factors to these rejections has been analysed. The management can take a guidance from this study to bring out salient interventions both at a systemic level in the Lab as well as logistics and training of the Laboratory staff in the NABL guidelines.

STATEMENT OF THE PROBLEM

A Study on Cost of Rejection (Rejected Samples) in a NABL Accredited Lab Of A Tertiary Care Hospital"

OBJECTIVES

- To study the reasons for sample rejections.
- To prioritize the reason for rejection samples of the lab in a given period.
- To measure the cost of rejection using the costing method.
- Suggesting ways to reduce the rejection so that the percentage of rejection and then overall cost to the patient and hospital can be reduced.

RESEARCH METHODOLOGY

The hospital has a Bed Strength of 750 beds commissioned along with a Cancer Research Institute of 150 beds supported under the same banner.
A cross sectional study was conducted in March 2013 using the following tools/Data Sources:

- Review of Process document of NABL and actual observation on sampled cases.
- Internal Departmental Audit & Quality assessment
- Sample Collection procedure
- Checklist tallying and review of Laboratory & Biomedical equipments
- Results Reporting Protocol –Actual & Prescribed
- Records of number of rejected sample per day
- Records of number of sample collected per day.
- Review of Laboratory policy
- Number of staffs
- Working hours in the laboratory
- Number of operational hours (overall each sample on an average)
- Time gap between sample collections to report distribution
- Activities for lab staff for entering the laboratory (universal precautions followed)
- Activities Involved in the Act of rejection samples in lab
- Activities after sample test
- Nursing Activities
- Clerical Procedures
- Log book reading for electrical and water department
- Laboratory indent record from Materials and Maintenance

SAMPLING

This was an cross sectional study which was done on all the rejected requests pertaining to the laboratory in various sections of biochemistry, hematology, clinical pathology, cytology, microbiology, immunology histopathology and serology samples from the inpatient departments of all the specialties and super specialties. In order to establish the system of rejecting inappropriate requests and samples, the laboratory had designed a Rejection Format that had fifteen pre-defined criteria (Table 1.1). Each request and sample sent to the laboratory was scrutinized against these criteria by the staff at the collection room. If any of the request or the sample met any of these rejection criteria, the same was rejected and a record was kept.

CRITERIONS FOR SAMPLE REJECTIONS IN THE LABORATORY UNDER STUDY

TABLE 1.1: CRITERIA UNDER WHICH ALL SECTIONS OF LABORATORY REQUESTS AND SAMPLES WERE SCRUTINIZED IN PRESENT STUDY

S.NO.	CRITERIA FOR REJECTIONS
1	Test marked in requisition form not matching with the test billed in the software
2	Sample is collected in a wrong container
3	Underfilled / overfilled Vacutainers
4	Leaking container
5	Requisition form stained with blood or body fluids
6	Long time gap between collection and submission to lab
7	Dried swabs
8	Sample clotted or sample hemolysed
9	Name of the patient on the label not matching with the requisition form
10	UHID of the patient on the label not matching with the requisition form
11	Name of phlebotomist not mentioned on Vacutainers
12	Name of phlebotomist not mentioned on requisition form
13	Time of sample collection not mentioned on sample container
14	Time of sample collection not mentioned on requisition form
15	Sample not transported in closed box

THE PROCESS PATHWAY FOR LABORATORY FOR ACTIVITY BASED COSTING (ABC) OF SAMPLE RE-RUN IN CASE OF REJECTION

The following protocol is followed by the Laboratory for collection, storage and Processing of samples

- Patient/ Part preparation, when applicable,
- Validation of Requisition form with payment details and samples to be collected

- Specimen/sample collection,
- Specimen/sample labeling, including patient name or unique patient/sample identifier and, when appropriate, specimen source, specimen date,
- Specimen/sample storage and preservation,
- Specimen/sample transport
- Specimen/sample processing,
- Specimen/sample acceptability and rejection,
- Specimen/sample submission, handling and referral, and

COSTING OF SAMPLE – REPEAT PROCESSING

Costing:-Costing in Healthcare is defined as 'the technique and process of ascertaining costs' in providing a comprehensive spectrum of healthcare service or a component of a service. Costing is classifying, recording, allocation and appropriation of expenses for the determination of cost of products or services and for the presentation of suitably arranged data for the purpose of control and guidance of management. It includes the ascertainment of every order, job, contract, process, service units as may be appropriate

There are different costing systems used in practice.

Historical Costing:-In this system, costs are ascertained only after they are incurred and that is why it is called as historical costing system. For example, costs incurred in the month of April 2007 may be ascertained and collected in the month of May. Such type of costing system is extremely useful for conducting post-mortem examination of costs, i.e. analysis of the costs Incurred in the past. Historical costing system may not be useful from cost control point of view but it certainly indicates a trend in the behavior of costs and is useful for estimation of costs in future.

Absorption Costing:-In this type of costing system, costs are absorbed in the product units irrespective of their nature. In other words, all fixed and variable costs are absorbed in the products. It is based on the principle that costs should be charged or absorbed to whatever is being costed, whether it is a cost unit, cost center.

Marginal Costing:-In Marginal Costing, only variable costs are charged to the products and fixed costs are written off to the Costing Profit and Loss A/c. The principle followed in this case is that since fixed costs are largely period costs, they should not enter into the production units. Naturally, the fixed costs will not enter into the inventories and they will be valued at marginal costs only.

Uniform Costing:-This is not a distinct method of costing but is the adoption of identical costing principles and procedures by several units of the same industry or by several undertakings by mutual agreement. Uniform costing facilitates valid comparisons between organizations and helps in eliminating inefficiencies.

CLASSIFICATION OF COSTS

An important step in computation and analysis of cost is the classification action of costs into different classify action helps in better control of the costs and also helps considerably in decision making. Classify action of costs can be made according to the following basis.

***A.* Classification according to elements:-** Costs can be classified according to the elements. There are three elements of costing, viz. material, labor and expenses. Total cost of services can be divided into the three elements to find out the contribution of each element in the total costs.

***B*. Classification according to nature:-** As per this classification, costs can be classified into Direct and Indirect. Direct costs are the costs which are identifiable with the product unit or cost center while indirect costs are not identifiable with the product unit or cost center and hence they are to be allocated, apportioned and then absorb in the production units. All elements of costs like material, labor and expenses can be classified into direct and indirect. They are mentioned below.

***C.* Direct and Indirect Material:-** Direct material is the material which is identifiable with the product. For example, in a cup of tea, quantity of milk consumed can be identified, quantity of glass in a glass bottle can be identified and so these will be direct materials for these products. Indirect material cannot be identified with the product, for example lubricants, fuel, oil, cotton wastes etc cannot be identified with a given unit of product and hence these are the examples of indirect materials.

***D.* Direct and Indirect Labor:-** Direct labor can be identified with a given unit of product, for example, when wages are paid according to the piece rate, wages per unit can be identified. Similarly wages paid to workers who are directly engaged in the providing the service (such as Nursing, Medical, Paramedical staff) is identified and hence they are direct wages. On the other hand, wages paid to workers like Hospital administrators, Marketing & HR managers, Security, Housekeeping staff and Maintenance Engineering workers etc. are indirect wages as they cannot be identified with the given unit of production.

***E.* Direct and Indirect Expenses :-**Direct expenses refers to expenses that are specifically incurred and charged for specific or particular job, process, service, cost center or cost unit. These expenses are also called as chargeable expenses. Examples of these expenses are cost of drawing, design and layout, royalties payable on use of patents, copyrights etc., consultation fees paid to architects, surveyors etc. Indirect expenses on the other Hand cannot be traced to specific product, job, process, service or cost center or cost unit. Several examples of indirect expenses can be given like insurance, electricity, rent, salaries, advertising etc. It should be noted that the total of direct expenses is known as 'Prime Cost' while the total of all indirect expenses is known as **'Overheads'**.

ACTIVITY BASED COSTING

The main objective of any costing system is to determine scientifically the cost of a product or service. For facilitating the calculation, costs are divided into direct and indirect. Direct costs are the costs which are traceable to the products/ services offered. On the other hand, indirect costs which are also called as 'overheads' are not traceable to the products/services. Hence these costs are first identified, classified, allocated, apportioned wherever allocation is not possible, reapportioned and finally absorbed in the products/services. Charging the direct costs to the products is comparatively a simple procedure and can be done with remarkable accuracy. However, the indirect costs present problems in charging them to the products and there is a possibility of distortion of costs though the basis of charging them is quite logical. This is one of the limitations of the traditional costing system. For example, one of the methods of absorption of overheads is direct labor cost and this method is quite satisfactory when the overhead costs of indirect activities is a small percentage compared to direct labor component in actual making of products. However, the increased technology and automation has reduced the direct labor considerably and so the indirect activities have assumed greater importance. Therefore, using the direct labor as a basis for absorbing the overheads can lead to distortions in the costs. Distortions in the costs resulting into incorrect cost calculations may lead to following wrong decisions.

- Errors in fixation of selling prices.
- Wrong decisions regarding deciding of product mix.
- Ignoring customer orientation.
- Missing of profitable opportunities

MERITS OF ESTIMATING THE ACTIVITY BASED COST IN LABORATORY

The objectives of Activity Based Costing are

- To remove the distortions in computation of total costs as seen in the traditional costing system and bring more accuracy in the computation of costs of products and services.
- To help in decision making by accurately computing the costs of products and services.
- To identify various activities in the production process and further identify the value adding activities.
- To distribute overheads on the basis of activities.
- To focus on high cost activities.

- To identify the opportunities for improvement and reduction of costs.
- To eliminate non-value adding activities.

RESULTS

The total rejection rate found over the study period was *.45 %* only, i.e. 599 samples were rejected out of 130877 samples processed. The highest number of rejections were in the Department of Biochemistry, followed with Serology and Hematology, of the gross Rejections.

TABLE 1.2: REJECTION RATE DEPARTMENT WISE

S. No.	Department	Total Number of samples Received	Total Number of Patients (Inclusive of Inpatients and Outpatients)	Rejected Samples Count	Department Rejection Rate
1	**Biochemistry**	**73240**	**28548**	**191**	**32%**
2	**Clinical Pathology**	**7064**	**6649**	**39**	**7%**
3	**Hematology**	**29458**	**18334**	**92**	**15%**
4	**Microbiology**	**3182**	**3851**	**37**	**6%**
5	**Cytology**	**1389**	**925**	**25**	**4%**
6	**Immunology**	**1804**	**1227**	**84**	**14%**
7	**Histopathology**	**4104**	**1704**	**0**	**0%**
8	**Serology**	**10546**	**3351**	**131**	**22%**
		130877		**599 (. 45 %)**	

The graph shows the total number of samples collected out of total number of patients in various departments of laboratory. The Department of biochemistry received 73240 samples from 28548 patients and department of hematology received 29458 samples from 18334 patients. Department of clinical pathology, histopathology & microbiology is moderate which is 7064 , 10546,4104 ,3182 samples out of 6649, 3351, 1704, 3851 no. of patients respectively . Other two departments of cytology and Serology received very less number of samples along with patients which is 1389, 1804 number of samples from 925 &1227 number of patients.

COSTING OF EACH SAMPLE PROCESSING IN A HOSPITAL LABORATORY

For estimating the operating cost (direct expenses) for processing each sample till results, all the Cost heads have been derived on basis of actual expenses incurred. For example the electricity cost, Water expenses and the Manpower cost (based on their salaries) of the total study period (3 months) was taken as on actuals. This was then apportioned on the basis of the total number of working hours in a lab, deducting the calibration, control, inspection, audit and lean timings of the lab.

Thereby the average time taken in processing a sample (leaving out Culture and Histopathology) was estimated. The total cost per sample was hence derived as follows:

TABLE 1.3: ESTIMATING DIRECT COST OF SAMPLE PROCESSING IN LAB

Cost Head	**Gross Cost in Three Months (Rs.)**	**Average Cost per Month (Rs.)**	**Apportioned Cost / Sample (Rs.)**
Electricity Cost	72028	24009	0.562
Water Cost	5040	1680	0.04
Manpower Cost	8724000	2908000	68.2
Equipment Depreciation Cost	1853832	617944	15
Consumable cost	5162296	1720765	40
Total cost for running per sample in the Lab (in rupee)	15817189	5272398	124

DISCUSSIONS

The study showed that in the 8 Subunits of the Laboratory consolidated, the average rejection rate of all Outpatients and Inpatients of this NABL accredited Laboratory was less than 1%. Effectively 599 samples out of 130787 were rejected and had to be redone. The major causes of these rejections were attributed to Hemolysed Samples (40% of total Rejections), and Discrepancies in the Requisition form and sample collected (19 %), followed with leaky containers (19 %). Also the largest rate in rejections was found in the Biochemistry Unit (32%), followed with Microbiology (22%). Hematology & Immuno-Molecular Biology had rejection rate of 15 % and 14 % respectively. This can also be correspondingly mapped with their Volume levels , as higher volumes means a higher chance of sample collection, and a greater probability of sample rejections.

In terms of Cost, though the incidence of rejection rate was quite low, the direct cost of reprocessing each sample is around Rs 124. However the cost of reprocessing cannot be measured in financial terms alone. It needs to be seen that in how many of these rejected samples, critical values get reported. In case any of these rejected samples, had critical values result, then the delay in redoing will impact the Morbidity and the length of stay and may impact the clinical outcome quality probability as well.

FINDINGS & CONCLUSIONS

This study shows that it is essential to keep a track of the sample rejection rate in various Sub Units of Laboratory of a hospital. It shows a method to quantify financially the cost of processing and re-processing patient sample in a Lab. Also it brings out the fact that there is a incidence of higher rejections in Biochemistry followed with Microbiology. Also the contributing factors to these rejections has been analysed. The management can take guidance from this study to bring out salient interventions both at a systemic level in the Lab as well as logistics and training of the Laboratory staff in the NABL guidelines.

LIMITATIONS

The sample processing costing took into consideration only the direct recurring cost with respect to the department, other indirect cost are not considered due to the dual role of most of the cost heads. Indirect costs are such that administrative, Housekeeping, security expenses, which are not revenue generating heads and whose costs have to be apportioned suitably across all the processes in a Hospital. Also in a Medical Teaching Hospital Staff, infrastructure, and resources are used both for patient care and teaching purposes; so the direct cost of laboratory staff is being utilized both for Post graduate and graduate students as well as in Laboratory. A time motion study can best derive the % of time or weightage in allocation of resources to Medical College and Hospital.

SCOPE FOR FURTHER RESEARCH

A further study can be done from here to ascertain how many of the rejected samples had critical values reported and if it had any impact on the Clinical morbidity and length of stay (LOS) in the hospital because of time delay in the reporting the results and start of clinical interventions on the patients.

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BORDER GUARDS SYSTEMS USING HYBRID WIRELESS SENSOR NETWORKS

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ABSTRACT

Early days, the conventional border guards systems suffer from intensive human involvement. Recently, unmanned border guards systems employ high-tech devices such as unmanned aerial vehicles, unattended ground sensors and surveillance towers equipped with camera sensors. However, any single technique encounters that cannot be solved the problems such as high false alarm rate and line of sight constraints. There lacks a logical system that coordinates various technologies to improve the system accuracy. In this paper, we discuss the concept of hybrid wireless sensor network architecture for border guards systems, is introduced. It utilizes the most advanced sensor network technologies including the wireless multimedia sensor networks and the wireless underground sensor networks.

KEYWORDS

Border guards, Wireless sensor networks, Multimedia sensor networks, Underground sensor networks.

1. INTRODUCTION

Border guards systems have recently gained interest to address the concerns about national security. The major challenge in protecting long stretches of borders is the need for intensive human involvement in guarding the premises. Conventional border guards system consists of security checkpoints and border troops. The security checkpoints are set up on the international roads where all vehicle traffic is stopped to detect and apprehend illegal aliens, drugs and other illegal activity. Each border troop watches and controls a specific section of the border. The troops guard the border according to predetermined route and time interval. Under the conventional border guards system even modest sized areas require extensive human resources if manual guarding is considered alone.

To monitor the border in real-time with high accuracy and minimize the need for human support, multiple surveillance technologies which complement each other are required. To address the challenges still faced by the existing surveillance techniques, we introduce Border Guards System, a new border guard's system framework based on hybrid wire-less sensor networks which can accurately detect and track the border intrusion with minimum human involvements. Border Guards System utilizes the most advanced sensor network technologies, including wireless multimedia sensor networks (WMSNs) and wireless underground sensor networks (WUSNs).

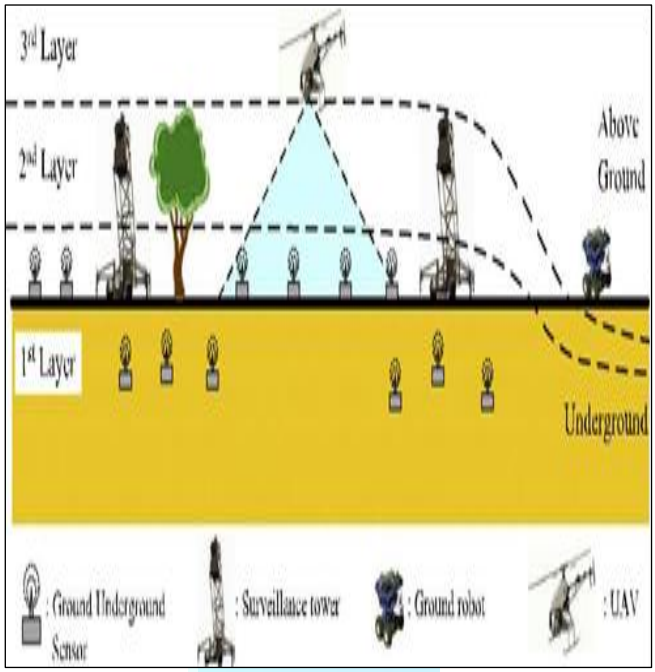
The hybrid WSN consists of three types of sensor nodes:

1. Multimedia sensor nodes that are equipped with video cameras or night vision scopes and deployed on the surveillance towers,
2. Scalar sensor nodes that are equipped with vibration/seismic sensor and deployed on the ground or buried underground, and
3. Mobile sensor nodes that roam throughout the border on the surface or in air. These three types of sensor nodes while the potential benefits of Border Guards System are significant, several research challenges need to be addressed be-fore a practical realization. In this paper, a framework to deploy and operate Border Guards System for border guards is de-scribed. Based on this framework, research challenges and open research issues are discussed.

2. SYSTEM ARCHITECTURE OF BORDER GUARDS SYSTEM

Current WSNs for border guards are based on a flat, homogeneous architecture in which every sensor has the same physical capabilities and can only interact with neighboring sensors .Such a structure results in several shortcomings in border guards such as limited cover-age and high false alarm rate that require additional human intervention. Instead, we consider a hierarchical WSN architecture with heterogeneous sensor nodes as shown in Figure1. In this architecture, three different types of sensors are used in three different layers of the hierarchy.

FIGURE 1: NETWORK ARCHITECTURE OF THE HYBRID WIRELESS SENSOR NETWORKS FOR BORDER GUARDS



As shown in Figure1, the system architecture of Border Guards System has three layers. The unattended ground sensors and the underground sensors constitute the lower layer of the architecture, which provide higher granularity for monitoring. At the second layer, multimedia sensors improve the accuracy of the system through visual information. Finally, mobile ground robots and unmanned aerial vehicles constitute the higher layer that provides additional coverage and flexibility. Advanced WSN Devices are:

1. Ground Sensors and Underground Sensors,
2. Mobile/Stationary Surveillance Towers,
3. Unmanned Aerial Vehicles (UAV's).

2.1. GROUND SENSORS AND UNDERGROUND SENSORS

The ground sensors and the underground sensors in the lower layer are resource-constrained, low-power scalar sensors, which perform simple tasks such as taking seismic/vibration measurements and sending the information to data sink or processing hub. In Figure 2, the underground sensors can either communicate with the ground sensors or other underground sensors.

Due to the complex underground channel characteristics, new physical layer propagation techniques are needed to realize the communications, such as underground electromagnetic wave techniques or magnetic induction waveguides Different from the camera sensors in the surveillance towers or UAVs, the ground/underground sensors can detect non-line-of-sight intruders. However, as discussed in the introduction, based on the limited information acquired by ground/underground sensors, it is difficult to distinguish actual intrusion alarms from false positives. Consequently, the false alarm rate of the ground/ underground sensors is considerably high.

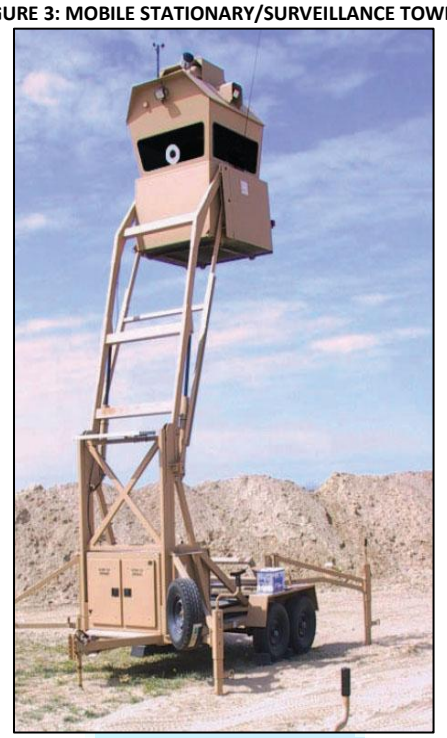
FIGURE 2: UNDERGROUND SENSORS

2.2. MOBILE/STATIONARY SURVEILLANCE TOWERS

As shown In Figure 3, Mobile or stationary surveillance towers can host very powerful and reliable multimedia sensors, i.e., radars, cameras, and sensors, which constitute the second layer of the hierarchy. The multimedia sensors are resource-rich, high-power devices with higher processing ability and larger communication range. As a result, these components are also used as local processing hubs. The multimedia sensors are responsible for more complex tasks such as collecting the sensing reports from the ground/underground sensors, detecting possible intrusion according to the sensing reports as well as the local image/video information.

As a result, the false alarm rate of the ground/underground sensors can be significantly reduced. After the surveillance towers con-firm intrusion detection, they report the detection results to the remote administrator, and inform the mobile sensors the position of the intrusion for target tracking. Furthermore, the measurements and image/ video information are stored for future use. There may also existing cooperation between imaging sensors to detect intrusions collaboratively. In this case, correlation-based camera selection schemes and data compression frameworks are required to reduce the redundancy among correlated cameras.

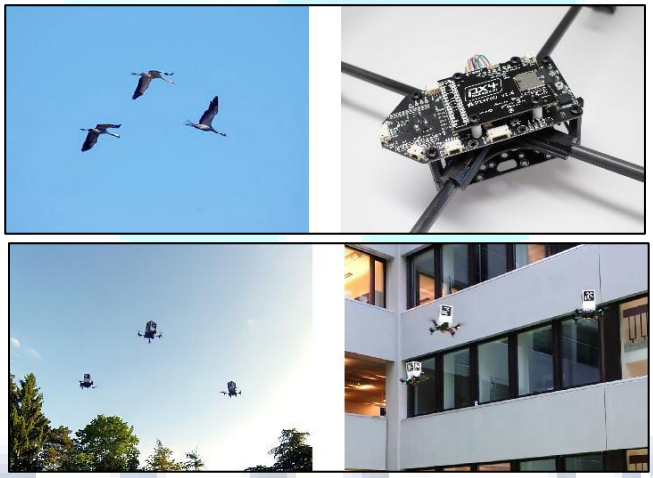
FIGURE 3: MOBILE STATIONARY/SURVEILLANCE TOWERS



2.3. UNMANNED AERIAL VEHICLES (UAVs)

In addition to the stationary components, unmanned aerial vehicles (UAVs) and robots provide additional capabilities at the third layer. As shown in figure 4, UAVs have recently been used for several applications including environmental surveillance and infrastructure maintenance Drones and Remotely Piloted Vehicles(RPVs) are two types of UAVs. Drones are configured for autonomous flight with a pre-determined course and schedule. RPVs are remotely controlled by ground operators. In addition to mobility, UAVs can also be equipped with on board sensors and camera systems to provide additional coverage in an on-demand basis. Furthermore, UAVs can track intruders based on information from stationary sensors and help the border guard's agents catch intruders.

FIGURE 4: UNMANNED ARIAL VEHICLE (UAV)



Due to cost and coverage considerations, the number of sensors in the first layer is much larger than that at the higher layers. Accordingly, the network is divided into several clusters. The ground/underground sensors form several clusters, where the multimedia sensors also act as cluster heads. Similarly, multiple multimedia sensors coordinate with each other to form higher layer clusters that are maintained by mobile nodes. The higher layer information from the multimedia sensors is used at the mobile nodes that are dispatched to locations of intrusion for target tracking.

3. BORDER GUARDS TECHNIQUES

Border guards have extensively been based on human involvement. However, the relative cost for the increasing number of personnel as well as the diminishing accuracy through human-only surveillance has required the involvement of high-tech devices in border guards. Among these, Unmanned Aerial Vehicles (UAVs) for aerial surveillance have recently been used to automatically detect and track illegal border crossing. Due to the large coverage and high mobility of the UAVs, the intensive human involvement in low-level surveillance activities can be reduced. This allows valuable human resources to be allocated to decision management activities based on information from these devices. However, similar to the conventional border guards systems, UAVs alone cannot cover the whole border at any time. There may exist times when certain sections of the border are not being monitored. Moreover, the UAVs have significantly higher costs and accident rates than those of manned aircrafts and require large human footprint to control their activities.

In addition, inclement weather conditions can also impinge on the surveillance capability of UAVs. To complement the UAV activities, recently Fiber Optic Sensors (FOSs) are introduced. Seismic sensors are equipped with FOSs so that they can measure pressure waves in the earth caused by intruders.

However, FOS communication depends on a single wire along the border. As a consequence, any single point-of-failure can affect very long distances. Due to the harsh environmental conditions along a border, wired sensor systems are not robust. Moreover, deployment costs of wired sensors surpass existing costs in long borders limiting their practical application.

Compared to the wired sensors, Unattended Ground Sensors (UGSs) provide higher system robust-ness. UGSs have been intensively used for military Intelligence Surveillance and Reconnaissance (ISR) applications. UGSs can detect vibration/seismic activity or magnetic anomaly, which indicate that people or

vehicles are crossing the border. Moreover, UGSs can pick up moving heavy vehicles (such as tanks) from a distance of 500 m and walking humans from 50 m. However, the information provided by the UGSs can be limited and inaccurate. There-fore, based on the limited information acquired by current ground sensors, it is difficult to distinguish actual intrusion alarms from false positives, i.e., nuisance warnings caused by environment elements (insects, weather, animals, etc.). According to the US department of homeland security, 90% of the alerts are caused by animals or environment impacts instead of illegal immigrants and these results in a significant amount of wasted time for the deployment of agents to check on the provided information. In addition, it has been reported that the existing sensors are of-ten damaged by insects or moisture and hence, are not robust to external impacts.

While scalar sensors such as vibration sensors are important to detect an intrusion, these sensors provide limited information to classify the intruder. To this end, surveillance towers equipped with video monitors and night vision scopes provide high accuracy in human detection and keep false alarms to a minimum. The monitoring range is also much larger than the ground sensors. These systems, however, typically require human interaction to determine the type of intrusion. Moreover, the video monitors require the target within the line of sight. If the monitoring area consists of obstacles such as rocks, brushwood, or trees, the miss rate increases.

The existing techniques for border guards, which include surveillance towers, ground sensors, or unmanned aerial vehicles, are deployed completely aboveground. In certain areas, aboveground components are vulnerable to the effects of the environment, vehicles or large animals. Visible devices may also be easily found, damaged, or avoided by intruders. For instance, for a system with surveillance towers, the intruders will look for areas and times not properly covered by adjacent towers. In addition to these major challenges, the existing solutions for border guards systems lack a coherent system that coordinate various technologies to improve the system accuracy.

4. ADVANTAGES

Compared with the existing border guards techniques provide the following advantages:

- The multimedia sensors provide accurate detection as well as large detection range;
- The ground sensors provide additional information that cannot be detected by the multimedia sensors, e.g. in cases here the intruder is hidden behind an obstacle that cannot be detected by the imaging sensor;
- The underground sensors guarantee the proper system functionalities here aboveground visible devices are not preferred for act of hiding purposes;
- Mobile sensors provide intrusion tracking capability to track the intruders after they have been detected;
- It detect the intrusion and report the results to a remote administrator;

5. DEPLOYMENT OF BORDER GUARDS SYSTEM

In border guard's applications, the established monitoring network should cover a significantly large monitoring area. However, the sensing radius of a single sensor node is normally limited. Thus, a large number of sensor nodes are expected to fulfill the coverage requirement. Moreover, different types of sensor nodes (e.g., underground, ground, camera and mobile sensors) provide different coverage capabilities. The deployment of border guards system such as

- Deployment of ground/underground sensors,
- Deployment of surveillance towers,
- Deployment of UAVs.

6. OPERATION FRAMEWORK

The operation framework is described to realize the basic functionalities of border system. Since the hybrid WSN consists of three types of sensing information are generally complementary to each other. The multimedia sensors provide still image or video information of the border area but the intruder behind any obstacles cannot be detected. The ground sensors can sense the ground vibration as well as the magnetic anomaly caused by the intrusion. The underground sensors can also sense the vibration of the ground but the attribute of the sensing measurements are different from those acquired by the ground sensors. The false alarm rate of underground sensors is also high. Hence, these heterogeneous set of information should be to improve the decision accuracy and minimize the Miss Rate and false alarm rate.

The operation framework of border guards system used to detect the intrusion detection by using detection algorithm. It has consists of the following three parts:

1. Cooperative intrusion detection,
2. Intrusion tracking,
3. Detection-oriented communication.

6.1. COOPERATIVE INTRUSION DETECTION

In Border system, by the cooperation between the ground/underground sensors and the multimedia sensors on the surveillance towers, the false alarm rate can be low while the miss rate can be also kept at a low level. Although the camera sensors have high detection accuracy, the images and videos collected by the cameras still require human involvement. To reduce the human involvement, two methods could be utilized.

- Centralized Object Detection: In this method, cameras take image of the suspicious areas detected by ground/underground sensors, perform image compression locally, and send the compresses data to remote processing center equipped with high computation capacities, where pattern recognition algorithm are performed to automatically detect intrusion based on the received images. Therefore, image data can be divided into priority levels that correspond to those of the resolution. In this way, all image data with the least level of resolution are sent intact, while others can be transmitted partially on demand.
- Distributed Object Detection: In this method, camera sensors collaboratively perform object detection and recognition without involving the remote processing center. Since exchanging images among cameras consume considerable energy and spectrum, light-weight and distributed detection schemes are preferred. Different from conventional cameras, address event image sensors selectively extract and output only a handful of features of interest from the visual scene such as location, motion, direction of motion and lighting. These features form a symbolic representation of the visual scene that is much easier to process on resource camera nodes.

6.2. INTRUSION TRACKING

After an intrusion is detected by the unattended ground/underground sensors and confirmed by the multimedia sensors on the surveillance towers, at least one UAV or ground robot is dispatched to track the intruder so that the border system troops can effectively catch and control the intruder.

In first, the location of the intrusion is reported to the nearest UAV or ground robot through the surveillance towers in a multi hop. Then the surveillance towers continue to monitor the movement of the intruder. Those surveillance towers report the direction and velocity of the Intruder to the dispatched UAV or robot. After receiving the updated information of the intruder, the UAV or robot can adjust its moving direction to track the intruder. The UAV or robot is expected to reach the intruder before the intruder gets out of the monitoring area of the surveillance tower.

6.3. DETECTION-ORIENTED COMMUNICATION

To the facility of timely and accurate object detection, efficient and effective communication protocols are required to support two types of transmissions:

- Sensor-camera transmission
- Camera-remote center transmission

6.3.1. SENSOR CAMERA TRANSMISSION

Sensor camera transmission is based on many to many communication paradigms since multiple events can be detected simultaneously by ground/underground sensors, and these events have to be reported to the corresponding camera towers whose field of views covers the locations of the detected events. The

conventional many too many communication schemes aim to reduce the energy consumption or network congestion when multiple sources send packets to multiple sinks. More specifically the many to many communication problem is modeled as the multi network design problem with an objective to minimize the number of links that constitute source sink paths. This leads to increased network lifetime and reduced contention on the wireless medium. In this scheme, a gird structure is established after the sensor deployment. Then, a cluster head is randomly selected from the sensors within each grid and this cluster head represents the whole grid to receive the updated information regarding the sink mobility.

In contrast to the conventional many to many communication schemes, the sinks in the border system architecture are also camera towers which have limited coverage. This means that ground sensors need to send alarms to the specific towers that cover their location. These approaches significantly reduce the amount of data relayed to the towers and save the spectrum resources.

6.3.2. CAMERA REMOTE CENTER TRANSMISSION

Both centralized and distributed object detection schemes require timely and reliable data/image transmissions from camera towers to the remote control center. To facilitate distributed detection scheme, the scalar data, i.e., the local detection/recognition results are required to be forward to remote control center. Since the camera towers form a one-dimensional chain, this leads to a linear network topology.

Under such topology, the communication protocols are favorable since they are specifically designed for linear networks that deal with scalar data. However, to support the centralized detection scheme, all captured images have to be forwarded to the remote control center.

Example algorithm is shows how to automatically detect and track a face using feature points.

```
1)  oldPoints = points;
2)  while ~isDone(videoFileReader)
3)  videoFrame = step(videoFileReader);
4)  [points, isFound] = step(pointTracker, videoFrame);
5)  visiblePoints = points(isFound, :);
6)  oldInliers = oldPoints(isFound, :);
7)  if size(visiblePoints, 1) >= 2
8)  [xform, oldInliers, visiblePoints] = estimateGeometricTransform(...
9)  oldInliers, visiblePoints, 'similarity', 'MaxDistance', 4);
10) bboxPoints = transformPointsForward(xform, bboxPoints);
11) bboxPolygon = reshape(bboxPoints', 1, []);
12) videoFrame = insertShape(videoFrame, 'Polygon', bboxPolygon, ...'LineWidth', 2);
13) % Display tracked points
14) videoFrame = insertMarker(videoFrame, visiblePoints, '+', ...
15) 'Color', 'white');
16) % Reset the points
17) oldPoints = visiblePoints;
18) setPoints(pointTracker, oldPoints);
19) end
20) step(videoPlayer, videoFrame);
21) end
22) % Clean up
23) release(videoFileReader);
24) release(videoPlayer);
25) release(pointTracker);
```

7. CONCLUSION

In this paper, introduce Border Guards system, a hybrid wireless sensor network architecture for border guards to reduce the intensive human involvement and to improve the detection accuracy of current border guards systems.

Border guards system is coherent system that coordinates various technologies, including unmanned aerial vehicles, unattended ground/underground sensors, and surveillance towers equipped with camera sensors.

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INDEPENDENT ACCESS TO ENCRYPTED CLOUD DATABASES

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ABSTRACT

Placing critical data in the hands of a cloud provider should come with the guarantee of security and availability for data at rest, in motion, and in use. Several alternatives exist for storage services, while data confidentiality solutions for the database as a service paradigm are still immature. We propose a novel architecture that integrates cloud database services with data confidentiality and the possibility of executing concurrent operations on encrypted data. This is the first solution supporting geographically distributed clients to connect directly to an encrypted cloud database, and to execute concurrent and independent operations including those modifying the database structure. The proposed architecture has the further advantage of eliminating intermediate proxies that limit the elasticity, availability, and scalability properties that are intrinsic in cloud-based solutions.

KEYWORDS
Cloud, security, SecureDBaaS, database.

I. INTRODUCTION

In a cloud context, where critical information is placed in infrastructures of untrusted third parties, ensuring data confidentiality is of paramount importance. This requirement imposes clear data management choices: original plain data must be accessible only by trusted parties that do not include cloud providers, intermediaries, and Internet; in any untrusted context, data must be encrypted. Satisfying these goals has different levels of complexity depending on the type of cloud service. There are several solutions ensuring confidentiality for the storage as a service paradigm, while guaranteeing confidentiality in the database as a service (DBaaS) paradigm is still an open research area. In this context, we propose SecureDBaaS as the first solution that allows cloud tenants to take full advantage of DBaaS qualities, such as availability, reliability, and elastic scalability, without exposing unencrypted data to the cloud provider.

The architecture design was motivated by a threefold goal: to allow multiple, independent, and geographically distributed clients to execute concurrent operations on encrypted data, including SQL statements that modify the database structure; to preserve data confidentiality and consistency at the client and cloud level; to eliminate any intermediate server between the cloud client and the cloud provider. The possibility of combining availability, elasticity, and scalability of a typical cloud DBaaS with data confidentiality is demonstrated through a prototype of SecureDBaaS that supports the execution of concurrent and independent operations to the remote encrypted database from many geographically distributed clients as in any unencrypted DBaaS setup. To achieve these goals, SecureDBaaS integrates existing cryptographic schemes, isolation mechanisms, and novel strategies for management of encrypted metadata on the untrusted cloud database.

The SecureDBaaS architecture is tailored to cloud platforms and does not introduce any intermediary proxy or broker server between the client and the cloud provider. Eliminating any trusted intermediate server allows SecureDBaaS to achieve the same availability, reliability, and elasticity levels of a cloud DBaaS. Other proposals based on intermediate server(s) were considered impracticable for a cloud-based solution because any proxy represents a single point of failure and a system bottleneck that limits the main benefits (e.g., scalability, availability, and elasticity) of a database service deployed on a cloud platform. Unlike SecureDBaaS, architectures relying on a trusted intermediate proxy do not support the most typical cloud scenario where geographically dispersed clients can concurrently issue read/write operations and data structure modifications to a cloud database.

II. RELATED WORK

Cloud computing, the long-held dream of computing as a utility, has the potential to transform a large part of the IT industry, making software even more attractive as a service and shaping the way IT hardware is designed and purchased. Developers with innovative ideas for new Internet services no longer require the large capital outlays in hardware to deploy their service or the human expense to operate it. They need not be concerned about over provisioning for a service whose popularity does not meet their predictions, thus wasting costly resources, or under provisioning for one that becomes wildly popular, thus missing potential customers and revenue. Moreover, companies with large batch-oriented tasks can get results as quickly as their programs can scale, since using 1,000 servers for one hour costs no more than using one server for 1,000 hours. This elasticity of resources, without paying a premium for large scale, is unprecedented in the history of IT.

Cloud computing can and does mean different things to different people. The common characteristics most interpretations share are on-demand scalability of highly available and reliable pooled computing resources, secure access to metered services from nearly anywhere, and displacement of data and services from inside to outside the organization. While aspects of these characteristics have been realized to a certain extent, cloud computing remains a work in progress. This publication provides an overview of the security and privacy challenges pertinent to public cloud computing and points out considerations organizations should take when outsourcing data, applications, and infrastructure to a public cloud environment.

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. In cloud computing, the word cloud is used as a metaphor for the Internet, so the phrase-- are delivered to an organization's computers cloud computing means "a type of Internet-based computing," where different services such as servers, storage and applications and devices through the Internet. Presently implementation of cloud computing has increased rapidly in IT industry and in other organization also. Cloud is a collection of distributed database. It provides number of benefit such that low cost and accessibility of data. If a data is store only at single place and unfortunately that data has been lost then there is no

recovery of data. Cloud computing gives us a solution to store a number of copy of data, in this manner if a data is going to be loss at one place that can be retrieved from other place. The problem of service unavailability has been solved by using cloud computing, which was a major concern in single cloud. In recently days use of multi cloud becoming popular because its provide the major benefit of service availability. As much of benefit coming with multi- cloud computing, that much security issues also coming with it. A cloud user is storing their information in clouds, those cloud provider can be untrusted, the information stored by user can be sensitive and in cloud there may be a chances of availability of malicious and anomaly which can harm user sensitive data. So security of data in multi-cloud computing is a major concern. In this paper we are going to discuss about functionality of single and multicloud computing and security threats. In several researches on fact is coming out that the work done for maintainability of multi cloud security concern is less than the cost and work dome for single cloud. This research promotes the use of multiclouds due to ability of reducing security threats that affect the sensitive data of user. In this paper we will give a solution for security concern of data in multiclouds. Here we will show that in respect of storing user actual data, we are going to store encrypted data in cloud for which we will use plain cipher encryption algorithm of cryptography.

In cloud computing, information homeowners host their information on cloud servers and users (data consumers) will access the information from cloud servers. As a result of the information outsourcing, however, this new paradigm of knowledge hosting service additionally introduces new security challenges, which requires associate freelance auditing service to ascertain the information integrity within the cloud. Some existing remote integrity checking strategies can solely serve for static archive information and, thus, can't be applied to the auditing service since the information within the cloud are often dynamically updated. Thus, economical and secure dynamic auditing protocol is desired to convert information homeowners that the information area unit properly holds on in the cloud. Economical and privacy-preserving auditing protocol was proposed to provide data integrity. Then, this scheme extends the auditing protocol to support the information dynamic operations, that is economical and incontrovertibly secure in the random oracle model. Also auditing protocol supports batch auditing for each multiple homeowners and multiple clouds, without exploitation any sure organizer. The analysis and simulation results show that projected auditing protocols area unit secure and efficient, particularly it scale back the computation value of the auditor.

III. PROBLEM DEFINITION

Proposed System lies on protecting sensitive data outsourced to third parties is to store encrypted data on server.

To achieve this goal there are different levels of complexity depending on the type of cloud service.

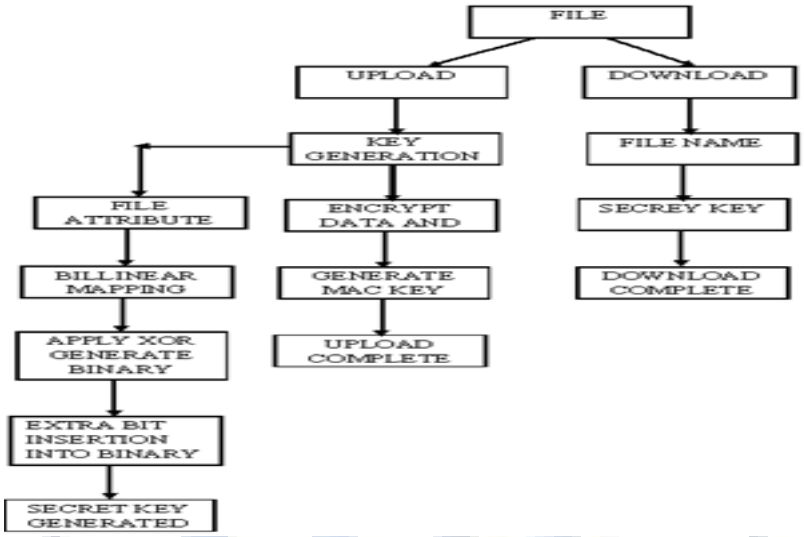
As we cannot apply fully homomorphic encryption schemes because of their excessive computational complexity. This existing approach is not applicable to the DBaaS context considered by SecureDBaas.

The proposed system is a novel architecture that integrates cloud database services with data confidentiality and the possibility of executing concurrent operations on encrypted data. It will include following module.

1. Client Register & login
2. Key Generation, Encrypt File and Metadata then Upload File
3. Metadata Management in cloud
4. Download File & Decrypt

IV. PROPOSED SYSTEM

FIGURE 1: THE PROPOSED SYSTEM



A. CLIENT REGISTER & LOGIN

- In this module, Client wants to login. So First he registered to cloud with his own details, such as username, password, mobile no and address.
- Then he login with his username and password. Then he got his client form. This client form contains two contents. One is upload another one is download.

B. KEY GENERATION, ENCRYPT FILE AND METADATA THEN UPLOAD FILE

- A secure type is composed of three fields: data type, encryption type, and field confidentiality. The combination of the encryption type and of the field confidentiality parameters defines the encryption policy of the associated column.
- The data type represents the type of the plaintext data (e.g., int, varchar). The encryption type identifies the encryption algorithm that is used to cipher all the data of a column. It is chosen among the algorithms supported by the SecureDBaaS implementation.
- SecureDBaaS offers three field confidentiality attributes: Column (COL) is the default confidentiality level that should be used when SQL statements operate on one column; the values of this column are encrypted through a randomly generated encryption key that is not used by any other column.
- Multicolumn (MCOL) should be used for columns referenced by join operators, foreign keys, and other operations involving two columns; the two columns are encrypted through the same key.
- Database (DBC) is recommended when operations involve multiple columns; in this instance, it is convenient to use the special encryption key that is generated and implicitly shared among all the columns of the database characterized by the same secure type.
- Then generate the Key for encryption, next encrypt the file with its metadata and upload to the cloud.

C. METADATA MANAGEMENT

- Metadata generated by SecureDBaaS contain all the information that is necessary to manage SQL statements over the encrypted database in a way transparent to the user.
- Metadata management strategies represent an original idea because SecureDBaaS is the first architecture storing all metadata in the untrusted cloud database together with the encrypted tenant data.

- SecureDBaaS uses two types of metadata. Database metadata are related to the whole database. There is only one instance of this metadata type for each database.
- Table metadata are associated with one secure table. Each table metadata contains all information that is necessary to encrypt and decrypt data of the associated secure table.

D. **DOWNLOAD FILE & DECRYPT**

- In this module the client wants to download file. So he entered the filename.
- Then he give the download request to SecureDBaaS Cloud.
- Finally he gets the Ciphertext then he decrypt and get the original file.

V. ALGORITHM FOR PROPOSED SYSTEM

A. ATTRIBUTE BASED ALGORITHM (ABE)

The concept of attribute-based encryption (ABE) can be considered as a generalization of identity based encryption (IBE) (Identity based encryption), where, as mentioned earlier, the encryption is based on some identity. Thus, ABE is more expressive than IBE. In an ABE system, the plaintext is encrypted with a set of attributes. The KGS (Key Generation Server), which possesses the master key, issues different private keys to users after authenticating the attributes they possess. Thus, these private keys are associated with the set of attributes each user possesses. In its basic form, a user can decrypt a cipher text if and only if there is a match between the attributes of the ciphertext and the user's key. For example, Alice has the attributes "role = doc" and "age > 18". Now Bob encrypts a message using the attributes ("role = student" AND "age > 18"). Alice can decrypt the message as she satisfies both attributes. Bob encrypts another message using the attributes ("role = professor" OR "role = staff"). Alice cannot decrypt the message as she does not satisfy the policy. (The workings of the actual ABE schemes are a little different from the above examples, but they give the essential idea behind the schemes.) The initial ABE system is limited only to threshold policies where there should be at least k out of n attributes common between the attributes used to encrypt the plaintext and the attributes users possess. For example, Bob encrypts a message for any 3 attributes out of the 5 attributes {a1, a2, a3, a4, a5}. Alice has the attributes {a1, a2, a4, a5} and Eve has {a1, a2}. While Alice can decrypt Bob's message, Eve cannot as she does not satisfy the threshold policy. Out of them there are important variants that is Key Policy ABE (KP-ABE)

B. BILINEAR MAPPING

- Attribute based encryption is proceeded by bilinear mapping of attribute information of data owner and the data to be stored in the cloud.
- Bilinear mapping process achieved by multiplicative factors of both Logical AND, XOR operations.
- It is the process of pairing up the attribute information and thus cipher text policy ABE is processed.

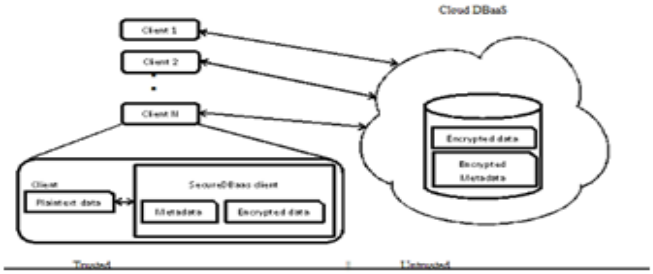
C. MASTER AND SECERET KEY GENERATION

- Master key is generated by doing the Logical AND operations of given attributes of data owner.
- Using the master key, public key is generated and secret key is generated by doing the logical XOR operations.
- Ciphering algorithms are applied using the secret key, thus secured secret key is generated by Attribute based encryption.

VI. IMPLEMENTATION PLAN

SecureDBaaS is designed to allow multiple and independent clients to connect directly to the untrusted cloud DBaaS without any intermediate server. Figure 2 describes the overall architecture. We assume that a tenant organization acquires a cloud database service from an untrusted DBaaS provider. The tenant then deploys one or more machines (Client 1 through N) and installs a SecureDBaaS client on each of them. This client allows a user to connect to the cloud DBaaS to administer it, to read and write data, and even to create and modify the database tables after creation.

FIGURE 2: SECUREDBAAS ARCHITECTURE



The information managed by SecureDBaaS includes plaintext data, encrypted data, metadata, and encrypted metadata. Plaintext data consist of information that a tenant wants to store and process remotely in the cloud DBaaS. To prevent an untrusted cloud provider from violating confidentiality of tenant data stored in plain form, SecureDBaaS adopts multiple cryptographic techniques to transform plaintext data into encrypted tenant data and encrypted tenant data structures because even the names of the tables and of their columns must be encrypted. SecureDBaaS clients produce also a set of metadata consisting of information required to encrypt and decrypt data as well as other administration information. Even metadata are encrypted and stored in the cloud DBaaS.

VII. SUMMARY

We propose an innovative architecture that guarantees confidentiality of data stored in public cloud databases. Unlike state-of-the-art approaches, our solution does not rely on an intermediate proxy that we consider a single point of failure and a bottleneck limiting availability and scalability of typical cloud database services. A large part of the research includes solutions to support concurrent SQL operations (including statements modifying the database structure) on encrypted data issued by heterogeneous and possibly geographically dispersed clients.

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SECURE IMAGE TRANSMISSION USING LOSSLESS ARITHMETIC CODING

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ABSTRACT

Image compression addresses the problem of reducing space required to represent a digital image yielding a compact representation of an image, and thereby reducing the image storage and transmission time requirements. The key idea here is to remove redundancy of data presented within an image to reduce its size without affecting the essential information of it. In this, an efficient lossless image compression arithmetic coding is used to compress the resultant mosaic image to transfer it securely to the receiver. Here, a secure image transmission technique is used which transforms automatically a given large-volume secret image into a so-called secret-fragment-visible mosaic image. The mosaic image is the outcome of arranging of the tile fragments of a secret image in different way so as to disguise the other image called the target image which is already selected from a database. The mosaic image, which looks similar to a randomly selected target image, which is used for hiding of the secret image by color transforming their characteristics similar to the tile fragments of the target image. Such technique is necessary so for the lossless recovery of the transmitted secret image. The information required for recovering the secret image is embedded into the created mosaic image by a lossless data hiding scheme using a key. At the end, the decompression method is performed on the mosaic image to obtain the original secret image.

KEYWORDS
Data hiding, Image encryption, Mosaic image, secure image transmission.

1. INTRODUCTION

Today, images from various sources are frequently utilized and transmitted through the internet for various applications, such as online personal photograph albums, confidential enterprise archives, document storage systems, medical imaging systems, and military image databases. These images usually contain confidential information so that they should be protected from leakages during transmissions. Nowadays, many methods have been proposed for securing image transmission, for which two common approaches are image encryption and data hiding.

In this, a new method is proposed for the transmission of the image securely. This method transforms the secret image into a meaningful mosaic tile image which looks like another image which was preselected as the target image. The process of transformation is done with the help of some relevant information that is embedded and only with the help of this embedded information a person can losslessly recover the transmitted secret image from the mosaic tile image of the same size. The mosaic tile image is the outcome of arranging the tile fragments of a transmitted secret image and it is concealed in another image called the target image which was earlier selected from the database.

Here, the lossless image compression technique that is Arithmetic Encoding is proposed if a person have a very large secret image and small target images for selections then the secret image has to be compressed to become equal with the size of target image. And then a person will be able to transfer his/her secret image securely over the network. Arithmetic Encoding is a flexible. Though this method is slow in processing, it provides better compression ratio.

2. REVIEW OF LITERATURE

1. Ya-Lin Lee, Student Member, IEEE, and Wen-Hsiang Tsai, Senior Member, IEEE in April 2014 presented A New Secure Image Transmission Technique via Secret-fragment-Visible Mosaic Images by Nearly Reversible Color Transformations. In this paper, Ya-Lin Lee shows a technique for the transmission of the secret image securely and losslessly. This method transforms the secret image into a mosaic tile image having the same size like that of the target image which is preselected from a database. This color transformation is controlled and the secret image is recovered losslessly from the mosaic tile image with the help of the extracted relevant information generated for the recovery of the image.
2. Pratibha S. Ghode, Prof. Pragati Patil, Prof. Vinod Nayyar, Prof.Shashank Moghe in May 2014 presented A Keyless Approach to Image Encryption, by Indian Institute of Technology Roorkee. This paper shows a keyless approach to encryption methods which are used to encrypt images. They make the use of this paper to apply the keyless approach in the proposed method. This is done by generating relevant information with the help of some RMSE value which help to rotate the tile images to a certain angle.
3. Ashwind S, Ganesh K, Gokul R, Ranjeeth Kumar C in 2014 presented Secure Data Transmission Using Reversible Data Hiding. In this Paper, they proposed a method that can achieve real reversibility i.e., data extraction and image recovery are free of any error. Their experiments show that this novel method can embed more data for the same image quality as the previous methods, such as for PSNR = 40 db.
4. Rucha R. Raut, Prof. Komal B.Bijwe in October 2014 is presented A Survey Report on Visual Cryptography and Secret Fragment Visible Mosaic Images. In this paper, They had done the literature survey on existing work which used different techniques for image hiding from 2001 to 2014 and also given general introduction about visual cryptography and secret fragment visible mosaic images.
5. Pragati Pal, Sukanya Kulkarni in 2014 is presented Data Hiding based on Color Image Compression Technique. In this paper, they present a color block truncation coding along with data hiding. Block Truncation Coding is one of the lossy compression technique which is basically used to reduce the size of digital image. In this method the computational involved is very simple. The compressed file obtained by BTC is further used to hide the secret data by bit reversal method.
6. Kede Ma, Weiming Zhang, Xianfeng Zhao, Member IEEE, Nenghai Yu, and Fenghua Li in March 2013 presented Reversible Data Hiding in Encrypted Images by Reserving Room before Encryption. In this paper, they proposed a novel method by reserving room before encryption with a traditional RDH algorithm,

and thus it is easy for the data hider to reversibly embed data in the encrypted image. The proposed method can achieve real reversibility, that is, data extraction and image recovery are free of any error. Experiments shows that this novel method can embed more than 10 times as large payloads for the same image quality as the previous methods, such as for PSNR=40 db.

7. JPEG: Still Image Data Compression Standard. Here, author tries to explain that the main obstacle in many applications is the quantity of data required to represent a digital image. For this we would need an image compression standard to maintain the quality of the images after compression. To meet all the needs the JPEG standard for image compression includes two basic methods having different operation modes: A DCT method for "lossy" compression and a predictive method for "lossless" compression.

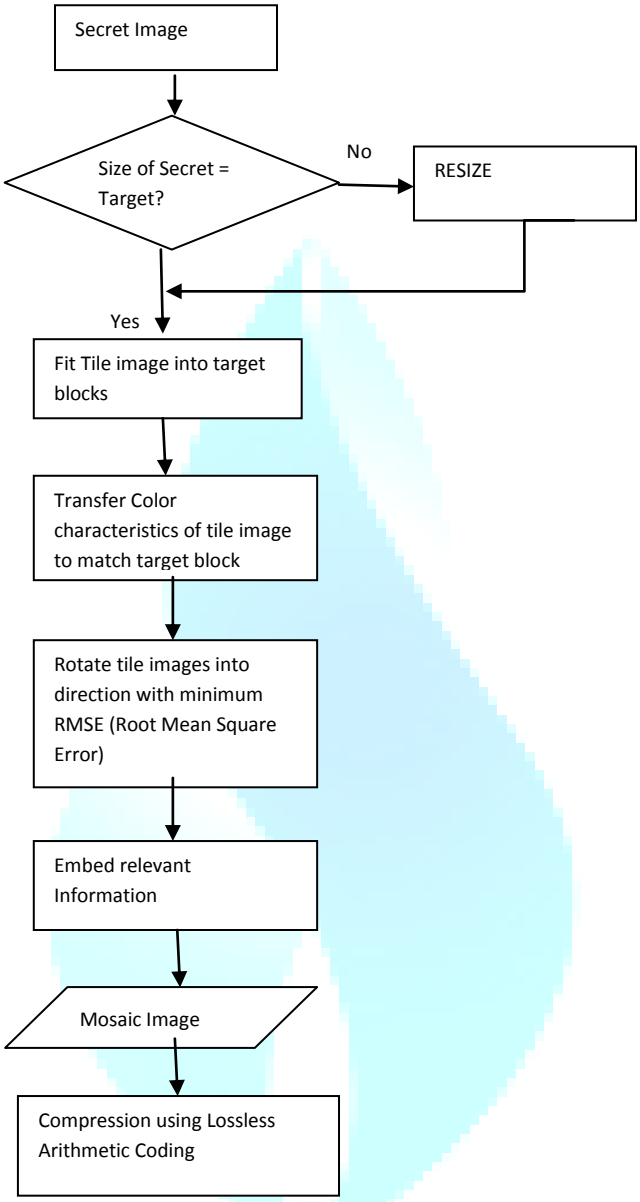
3. PROBLEM DEFINITION

An arithmetic coding, a lossless image compression technique is proposed to secure the image transmission technique via secret-fragment-visible mosaic images by nearly reversible color transformations. The arithmetic coding technique is required to compress the secret images if the size of the secret images are large than that of the target images stored in the database for the selections. The complete system includes the secure image transmission for the different types of image file formats like JPEG (Joint Photographic Experts Group), GIF (Graphics Interchange Format), PNG (Portable Network Graphics) etc. used over the internet. When the sender sends the secret image to the proposed system the system checks for the equal size of the target image present in the database for mosaic image creation. If the size of secret and target image unmatches, the lossless image compression algorithm is used to compress the secret image to make it equal with the target image and then mosaic image creation takes place. Again the information is embedded for the recovery of the original secret image. In order to increase the security of the proposed method, the embedded information is encrypted with a secret key. Only the receiver who has the secret key can decode the secret image.

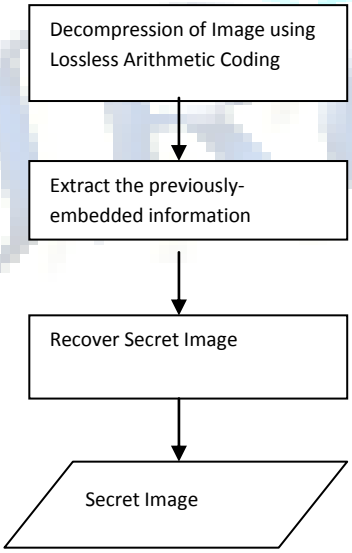
4. METHODOLOGY

FIGURE 1: FLOW DIAGRAM OF THE PROPOSED METHOD

SENDER SIDE



RECEIVER SIDE



The proposed system mainly includes 3 modules namely:

1. MOSAIC TILE IMAGE CREATION

This module includes following four sub-modules.

- Fitting the tile images of the secret image into the target blocks of a preselected target image.
- Transforming the color characteristic of each tile image in the secret image to become that of the corresponding target block in the target image.
- Rotating each tile image into a direction with the minimum RMSE (Root Mean Square Error) value with respect to its corresponding target block.
- Embedding relevant information into the created mosaic image for future recovery of the secret image. In the second phase, the embedded information is extracted to recover nearly losslessly the secret image from the generated mosaic image.

2. COMPRESSION AND DECOMPRESSION USING ARITHMETIC CODING (AC)

Arithmetic coding is the most powerful technique for statically lossless encoding that has attracted much attention in the recent work on lossless techniques. It provides more flexibility and better efficiency than Huffman coding. The aim of AC is to define a method that provides code words with an ideal length. The average code length is very close to the possible minimum given by information theory. In other words, AC assigns an interval to each symbol whose size reflects the probability for the appearance of this symbol. The code word of a symbol is an arbitrary rational number belonging to the corresponding interval.

Properties of Arithmetic Coding are:

- It uses binary fractional number.
- Suitable for small alphabet with highly skewed probabilities.
- Incremental transmission of bits are possible, avoiding working with higher and higher precision numbers.
- This encoding takes a stream of input symbol and it replaces it with floating point number (0, 1).
- It produces result in stream of bits.

3. SECRET IMAGE AND SECRET TEXT RECOVERY

This module includes following two sub-modules.

- Extracting the embedded information for secret image recovery from the mosaic image.
- Recovering the secret image using the extracted information.

5. ALGORITHM OF THE PROPOSED METHOD

The proposed system includes

ALGORITHM 1. SECRET-FRAGMENT-VISIBLE MOSAIC IMAGE CREATION

Input: A secret image S, a pre-selected target image T and a secret key K.

Output: a secret-fragment-visible mosaic image F.

Steps:

STAGE 1.1 - FITTING TILE IMAGES INTO TARGET BLOCKS

1. Divide secret image S into a sequence of n tile images of size NT(size of target image), denoted as Stile = {T1, T2, …,Tn}; and divide target image T into another sequence of n target blocks also with size NT, denoted as Starget = {B1, B2, …, Bn}.
2. Compute the means (μr, μg, μb) and the standard deviations (σr, σg, σb) of each Ti in Stile for the three color channels according to Eqs. (1) And (2); and compute the average standard deviation σTi = (σr + σg + σb)/3 for Ti where i = 1 through n.

$$\mu_c = \frac{1}{n}\sum_{i=1}^{n} c_i \qquad \mu_c' = \frac{1}{n}\sum_{i=1}^{n} c_i' \tag{1}$$

$$\sigma_c = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(c_i - \mu_c)^2} \qquad \sigma_c' = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(c_i' - \mu_c')^2} \tag{2}$$

Do similarly to the last step to compute the means (μr', μg', μb'), the standard deviations (σr', σg', σb'), and the average standard deviation σBj = (σr' + σg' + σb')/3 for each Bj in Starget where j = 1 through n.

3. Sort the blocks in Stile and Starget according to the average standard deviation values of the blocks; map in order the blocks in the sorted Stile to those in the sorted Starget in a 1-to-1 manner; and reorder the mappings according to the indices of the tile images into a mapping sequence L of the form of T1→ Bj1, T2 → Bj2, etc.
4. Create a mosaic image F by fitting the tile images of secret image S to the corresponding target blocks of target image T according to mapping sequence L.

STAGE 1.2 - PERFORMING COLOR CONVERSION BETWEEN THE TILE IMAGES AND TARGET BLOCKS

5. For each pair Ti → Bji in mapping sequence L, let the means μc and μc' of Ti and Bji respectively be represented by 8 bits with values 0~255 and the standard deviation quotients qc = σc'/σc by 7 bits with values 0.1~12.8 where c = r, g, b.
6. For each pixel pi in each tile image Ti of mosaic image F with color value ci where c = r, g, b, transform ci into a new value ci'' by Eq. (3); and if ci'' is not smaller than 255 (i.e., if an overflow occurs) or if it is not larger than 0 (i.e., if an underflow occurs), assign ci'' to be 255 or 0, respectively, and compute a residual value for pixel pi.

$$c_i'' = q_c(c_i - q_c) + \mu_c' \tag{3}$$

STAGE 1.3 - ROTATING THE TILE IMAGES

7. Compute the RMSE values of each color-transformed tile image Ti in F with respect to its corresponding target block Bji after rotating Ti into the directions 0o , 90o , 180o and 270o ; and rotate Ti into the optimal direction θo with the smallest RMSE value.

STAGE 1.4 - EMBEDDING THE SECRET IMAGE RECOVERY INFORMATION

8. For each tile image Ti in F, construct a bit stream Mi for recovering Ti including the bit-segments which encode the data items of:
   1. The index of the corresponding target blocks Bji.
   2. The optimal rotation angle θo of Ti.
   3. The means of Ti and Bji and the related standard deviation quotients of all color channels.
   4. The overflow/underflow residual values in Ti.
   5. The number m of bits to encode the index of a block.
   6. The number k of residual values.
9. Concatenate the bit streams Mi of all Ti in F in a raster-scan order to form a total bit stream Mt; use the secret key K to encrypt Mt into another bit stream Mt'; and embed Mt' into F by reversible contrast mapping.

ALGORITHM 2. COMPRESSION AND DECOMPRESSION USING ARITHMETIC CODING TO COMPUTE OUTPUT NUMBER

1. Low = 0.
2. High = 1.
3. Loop. For all the symbols:
4. Range = high – low
5. High = low + range (high_range of the symbol being coded)
6. Low = low + range (low_range of the symbol being coded)
7. Range keeps track of where the next range should be.

8. High and low, specify the output number.

ALGORITHM 3: SECRET IMAGE RECOVERY

Input: a mosaic image F with n tile images and the secret key K used in Algorithm 1.

Output: the secret image S embedded in F using Algorithm 1.

STEPS

STAGE 3.1 —EXTRACTING THE SECRET IMAGE RECOVERY INFORMATION

1. Extract from mosaic image F the bit stream Mt' for secret image recovery by a reverse version of the reversible contrast mapping scheme and decrypt Mt' using the secret key K into a non-encrypted version Mt.
2. Decompose Mt into n bit streams Mi for the n to-be-constructed tile images Ti in S, respectively, where i = 1 through n.
3. Decode the bit stream Mi of each tile image Ti to obtain the following data:
    1. The index ji of the block Bji in F corresponding to Ti.
    2. The optimal rotation angle θo of Ti.
    3. The means of Ti and Bji and the related standard deviation quotients of all color channels.
    4. The overflow/underflow residual values in Ti.
    5. The number m of bits to encode the index of a block.
    6. The number k of residual values.

STAGE 3.2 — RECOVERING THE SECRET IMAGE

4. Recover one by one in a raster-scan order the tile images Ti, i = 1 through n, of the desired secret image S by the following steps

1. Rotate the block indexed by ji, namely Bji , in F through the optimal angle θo and fit the resulting content into Ti to form an initial tile image Ti
2. (2) Use the extracted means and related standard deviation quotients to recover the original pixel values in Ti according to Eq. (4)
3. Use the extracted means, standard deviation quotients, and Eqs. (5) to compute the two parameters cS and cL
4. Scan Ti to find out pixels with values 255 or 0 which indicate that overflows/underflows have occurred there, and add respectively the values cS or cL to the corresponding residual values of the found pixels, resulting in a final tile image Ti.

$$\mu_c = \frac{1}{n}\sum_{i=1}^{n} c_i \qquad \mu_c' = \frac{1}{n}\sum_{i=1}^{n} c_i' \tag{4}$$

$$\sigma_c = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(c_i - \mu_c)^2}$$

$$\sigma_c' = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(c_i' - \mu_c')^2} \tag{5}$$

5. Compose all the final tile images to form the desired secret image S as output. The time complexity of Algorithm 1 is O (nlogn) because the running time is dominated by sorting the blocks in Stile and Starget. And the time complexity of Algorithm 3 is O(nNT) because it just extracts the embedded information and recovers the secret image back with the extracted data.

6. SUMMARY

A lossless image compression technique is proposed to remove the weakness of new secure image transmission method. The proposed method creates meaningful mosaic image from the variable sizes of secret image. An arithmetic coding technique is used to compress the resultant mosaic image as it is very large in size. By using this one can securely transfer the secret image to the receiver. The proposed method gives a new option to solve the difficulty of hiding images with huge data volumes behind cover images. By the use of proper pixel color transformation as well as skillful scheme for handling overflows/underflows in the converted values of the pixels' colors, secret-fragment-visible mosaic images with very high visual similarities to arbitrarily-selected target images can be created with no need of a target image database. Also, the original secret images can be recovered nearly losslessly from the created mosaic images. This proposed system can be applied to RGB as well as HSV color models. For the analysis purpose, RMSE (Root Mean Square Error) value and metric of MSSIM (Mean Structural Similarity) of mosaic image and secret image of different file formats with different file sizes can be analyzed.

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SPAM ZOMBIE DETECTION SYSTEM

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ABSTRACT

Compromised machines are one of the key security threats on the Internet. The key security threats on internet is compromised machines, which are used to launch security attacks such as spamming and spreading malware, Distributed Denial of Service and identity theft. The compromised machines in the network are identifying using SPOT algorithm. SPOT algorithm is designed on a powerful statistical tool called as Sequential Probability Ratio Test (SPRT). SPOT algorithm is declared as effective and efficient system in automatically detecting compromised machines in network. Spam Zombie Detection and Blocking Mechanism is an online spam zombie detection system in network. Along with the detection it also blocks the zombie system detected within the network. Zombie is defined as a compromised machine within the botnet. SPOT system is mainly implemented over the private mailing system. It also provides the enhanced security mechanism in which if the system which has been hacked gets blocked within the network and the legitimate owner of the system is provided with the secure password changing mechanism so that the possibility of the system getting hacked next time will be reduced. It also provides the strong mechanism which identifies whether the current user is legitimate user of the system or not with the help of some question answer mechanism. The overall proposed system is simply given a name as a Spam Zombie Detection and Blocking Mechanism.

KEYWORDS
spam zombie, security threats, blocking mechanism.

1. INTRODUCTION

In today's computing world, internet plays an important role in our daily lives in almost every aspect. It is the place where we do lot of things just sitting at one place. Internet not only influences the people to do positive works but also influences the people to trouble others by posing many attacks. These attacks are posed by the attackers directly or indirectly. Attacks are generally of two types, one of them is automatic attacks and the other type is manual attacks. Most of the successful attacks are from the automated generated code injected by the attackers. These are very dangerous some of them are Dos, DDos, E-mail Worms, Viruses, Worms, Trojan horses, phishing attacks etc...Attackers control some machines to attack the target machine .These machines are called drones, zombies or compromised machines. Zombies search for the low level secured systems to infect them and can control them through their pre-defined commands to cause an (DDoS) attack. In spamming terminology those are called as spam zombies. It is given that spamming is the major security challenge in the email communication. Report of 2012 march says that more than 75% of all email traffic is occupied by the spam. To detect these spam zombies is tough job for the system administrators.

Spamming is an important threat plaguing the internet from the past decades. More than 75% of traffic is spam and in that 0.4% was malicious. It is done by controlling several hosts to send unwanted messages to some target machines. These compromised machines are called spam zombies. Normally spam is given as UBE/UCE i.e., Unsolicited Bulk or Commercial E-mail. Spam message is an unwanted message to the users because of these reasons. They occupy the network bandwidth, disk space, connection time, money. They could hide viruses inside spam message, can send pornography information and can tempt the users to send their money and the confidential details. E-mail spamming became the major platform for the attackers because of its unique behaviour of low cost and high speed. It is given that spamming is the major resource for the attackers to get the incentives. They are earning around $200 billion dollars per year. In other words it is the cheapest one to one means of communication available today. That is why spamming is attracting the most of the attackers day by day.

There are two types of the botnet architectures that are used for spamming:

1. Centralized Botnet Architecture: Command and Control using IRC channels It is the centralized Command and Control mechanism that makes the use of the Internet Relay Chat channels. One can easily detect and disable this architecture.
2. Peer to Peer based Command and Control architecture: This architecture does not suffer from the single point of failure. Because of the absence of the centralized Command and Control servers, the bots can easily hide their communication. Thus, this architecture is hard to detect and disable.

2. REVIEW OF LITERATURE

ZhenhaiDuan, Peng Chen, Fernando Sanchez ,Yingfei Dong, Mary Stephenson, James Barker mainly focused on the detection of the compromised machines in a network that are involved in the spamming activities, commonly known as spam zombies. He develops an effective spam zombie detection system named SPOT by monitoring outgoing messages of a network. SPOT is designed based on a powerful statistical tool called Sequential Probability Ratio Test, which has bounded false positive and false negative error rates.

Majority of spammers are only active for a short period of time. GuofeiGu, JunjieZhang, and Wenke Lee identified botnet CCchannels in a local area network without any prior knowledge of signature or CC server addresses. Spam Zombie Detection proposes an approach that uses network based anomaly detection. CC servers and infected hosts in the network are identified by this detection approach. This approach is based on the observation that, because of there-programmed activities related to CC, bots within the same botnet will likely demonstrate spatial-temporal correlation and similarity .They engage in coordinated communication, propagation, and attack and fraudulent activities.

M.Vasu, K Munivara Prasad, Dr K VenugopalRao proposed Naive Bayesian approach of the content based method for detecting the spam messages and used SPRT algorithm for identifying the compromised systems in the internet. They compared the results of our approach with existing key word based method and proved that the detection accuracy of spam messages with proposed method improves the detection accuracy of Compromised systems in the internet.

Overview of the state of the art for spam filtering is studied by R.Malarvizhi, K.Saraswathi and the ways of evaluation and comparison of different filtering methods. This research paper mainly contributes to the comprehensive study of spam detection algorithms under the category of content based filtering. Then, the implemented results have been benchmarked to examine how accurately they have been classified into their original categories of spam. Key words: Spam, AdaBoost, KNN, Chi-Square, Black list, White list, Bayesian filters, Cache Architecture.

Ar.ArunachalamV.VevekV.Yogeswaran developed effective spam zombie detection system for detecting compromised machine in a network. SPOT is called Sequential Probability Ratio Test. It is a spam zombie detection system by monitoring outgoing messages, which has bounded false positive and false negative error rates. In addition, they also compare the performance of SPOT with two other spam zombie detection algorithms based on the number and percentage of spam messages forwarded by internal machines, respectively, and show that SPOT outperforms these two detection algorithms.

AmarishChaudhari Ravi Apare proposed the spam zombie detection and blocking with the efficient content filtering and user feedback mechanism is one of the online detection techniques. The system identifies the spam messages and blocks the sender of such messages. Zombie is single compromised machine within the network. The network of such compromised systems is called as a botnet. This system is based on the functionality of SPOT monitoring system which continuously monitors the outgoing messages within the network. The SPOT monitoring system makes the use of the strong statistical tool known as a Sequential Probability Ratio Test.

Manishankar, Sobin E. came up with a novel approach of machine learning to build a tool which predicts an email spam or not with the help of SPOT detection with SPERT algorithm, paper also deals with Zombie attacks and DDOS attacks

3. PROBLEM DEFINITION

Spam Zombie Detection and Blocking Mechanism is an online spam zombie detection system in network. Along with the detection it also blocks the zombie system detected within the network. Zombie is defined as a compromised machine within the botnet. SPOT system is mainly implemented over the private mailing system. It also provides the enhanced security mechanism in which if the system which has been hacked gets blocked within the network and the legitimate owner of the system is provided with the secure password changing mechanism so that the possibility of the system getting hacked next time will be reduced. It also provides the strong mechanism which identifies whether the current user is legitimate user of the system or not with the help of some question answer mechanism. The overall proposed system is simply given a name as a Spam Zombie Detection and Blocking Mechanism.

4. METHODOLOGY

EXISTING SYSTEM

Major security challenge on the Internet is the existence of the large number of compromised machines. Such machines have been increasingly used to launch various security attacks including spamming and spreading malware, DDoS, and identity theft. They are often used to launch various security attacks such as spamming and spreading malware, DDoS, and identity theft.

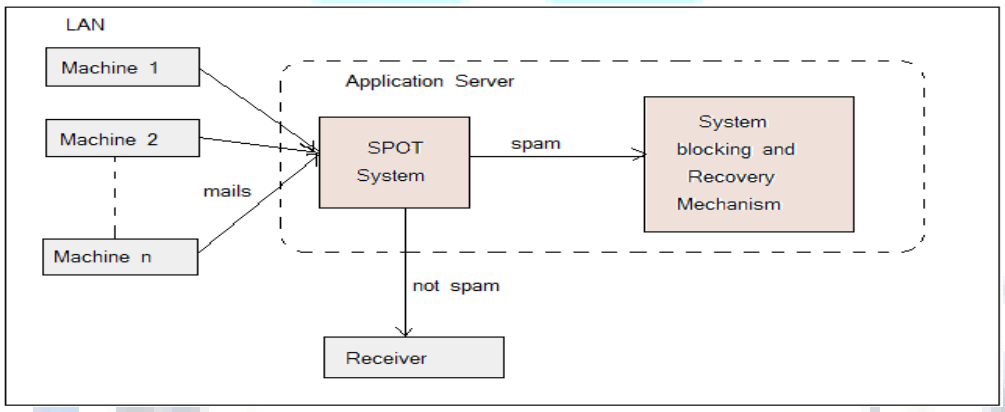
DETECTING SPAM ZOMBIES BY MONITORING OUTGOING MESSAGES

There is need to control the existing compromised systems over the network that perform the various security attacks. This paper mainly focuses on the detection of the compromised machines that send the spam messages which are also known as spam zombies. This system does not require the spamming global characteristics such as the size of the botnets and the spamming patterns of the botnets. This system has tool with the help of which an administrator can detect the compromised machines automatically. Thus this system is known as an online botnet detection system. Here the name given to this spam zombie detection system is SPOT system which monitors the outgoing messages. The statistical method called Sequential Probability Ratio Test (SPRT) is used to design the SPOT system. The SPRT method is used to test the two hypotheses Spam Zombie Detection and Blocking Mechanism which the machine is compromised and the machine is not compromised. This tool helps to minimize the expected number of observations used to take the decision. Here the user can define the threshold limit for the false positive and false negative probabilities required by the SPRT method. Thus the SPOT system can quickly identify the spam zombies within the network

PROPOSED SYSTEM

SPOT system is mainly implemented over the private mailing system. It also provides the enhanced security mechanism in which if the system which has been hacked gets blocked within the network and the legitimate owner of the system is provided with the secure password changing mechanism so that the possibility of the system getting hacked next time will be reduced. It also provides the strong mechanism which identifies whether the current user is legitimate user of the system or not with the help of some question answer mechanism. The overall proposed system is simply given a name as a Spam Zombie Detection and Blocking Mechanism.

FIG. 1: SYSTEM ARCHITECTURE



MODULE DESCRIPTION

Account authentication

- In this module to check the mail id and authenticate using OTP generation.
- If these two fields are valid, the account is authenticated.
- Otherwise is not valid.

Sending mails

- In this module a single person to send one or more mails to other person.
- This mails either spam or non spam.
- Spam means the more copies of the single message are send.
- And it contains more than 20 lines.

SPOT detection

- In this module to capture the IP address of the system.

- That system mails are applied to filtering process using java based Jasen Scanner.
- In this process, the mail content is filtered.

CT detection

- In this module to set the threshold value Cs
- Cs denotes the fixed length of spam mail.
- Also to count the number of lines in each mail.
- If the each mail, counts are greater than equal to threshold value.
- So, these mails are spam mail.

5. ALGORITHM OF THE PROPOSED METHOD

Spam Zombie Detection Algorithm:
1: An outgoing message arrives at SPOT
2: Get IP address of sending machine *m*
3: // all following parameters specific to machine *m*
4: Let *n* be the message index
5: Let *Xn*= 1 if message is spam, *Xn*= 0 otherwise
6: if (*Xn*== 1) then
7: // spam, Eq. 3
8: ¤*n*+ = *ln*μ1
μ0
9: else
10: // no spam
11: ¤*n*+ = *ln*1−μ1
1−μ0
12: end if
13: if (¤*n* ¸ *B*) then
14: Machine *m* is compromised. Test terminates for *m*.
15: else if (¤*n* · *A*) then
16: Machine *m* is normal. Test is reset for *m*.
17: ¤*n* = 0
18: Test continues with new observations
19: else
20: Test continues with an additional observation
21: end if
The recovery and blocking functionalities of the system:
1: System is a Zombie.
2: Let n be the number of the important mails.
3: 'que' be security question and 'ans' be given answer,
4: declare total and threshold value
4: if(selectedQuestion==que) == and (ans== answer)then
5: take first 5 important mails subject.
6: for i=0 to i<5
7: choose the correct mail sender
8: If(choose correct sender) then
9: total++
10: endIf
11: endfor
12: if(total>=threshold) then
13: continue with account.
14: change your password.
15: else
16: block account permanently.
17: senders 'mac' block.
18: endelse
19: else
20: enter correct question and password.
21: endelse.
If the system is found as a Zombie system itis blocked temporarily and the user of that system when tries to login then he is informed that the system has been blocked. if the user wants to recover the system then it works as per the above algorithmIf the user fails to answer the questions correctly or enters the wrong username and OTP then the MAC address of the user is blocked so that the user account will be completely blocked.

6. SUMMARY

The proposed system detects the spam mails by monitoring the outgoing mails. The proposed system uses the Sequential Probability Ratio Test algorithm in order to detect the spam zombies. Depending upon the threshold limit given by the user this system minimizes the number of the required observation for detecting the spam zombies. The proposed system also provides the blocking mechanism in which if the system is identified as the spam zombie then the system gets blocked so that it cannot send the spam messages further. Also the proposed system helps to recover the blocked system in case if the system was hacked by an attacker and was used as a spam zombie.
Spam zombies are the major problem in the internet. It is increasing day by day very rapidly. To detect any machine as compromised, we must first classify the messages coming to that particular machine correctly and then detect the machine. In this paper we have implemented the two spam filters based on keyword based and naïve-Bayesian algorithm to classify a message as spam or non-spam and we have shown that Naïve-Bayesian works efficiently and gives more results when we train more number. We proved that detecting a compromised machine depends on false positives and false negatives generated by the deployed spam filter with SPRT algorithm.

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SECURE AND SCALABLE DATA SHARING IN CLOUD STORAGE WITH KEY-AGGREGATE CRYPTOSYSTEM

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ABSTRACT

Cloud storage means storing of data online in cloud which is accessible from multiple and connected resources. Cloud storage is having important functionality i.e. securely, efficiently, flexibly sharing data with others. Cloud storage can provide good accessibility and reliability, strong protection, disaster recovery, and lowest cost. New Encryption Scheme public–key encryption which is called as Key- aggregate cryptosystem (KAC) is introduced. Key-aggregate cryptosystem produce constant size cipher texts such that efficient organization of decryption rights for any set of cipher text are possible. Any set of secret keys can be aggregated and make the m as single key, which incorporate power of all the keys being aggregated. This aggregate key can be sent to the others for decryption of cipher text set and left over encrypted files outside the set are remains confidential.

KEYWORDS

Cloud storage, Key-aggregate cryptosystem (KAC), Cipher text, Encryption, Decryption, secret key.

INTRODUCTION

Cloud storage is gaining extreme popularity nowadays and became a very popular storage system. The rise in need for data outsourcing demands the strategic management of corporate information. It is also used as a fundamental technology behind many online services for personal applications. Nowadays, it is easy to apply for free email accounts, social networking sites accounts; file sharing or remote access, with storage size more than 25GB. Users can access almost all of their files and emails by a mobile phone in any region of the world. Cloud storage is storing of data off-site to the physical storage which is maintained by third party. Cloud storage is saving of digital data in logical pool and physical storage spans multiple servers which are control by third party. Third party is responsible for keeping data available and accessible and physical environment should b e protected and running at all time. Instead of storing data to the hard drive or any other local storage mediums, we save data to remote storage which is accessible from anywhere and anytime. It decreases the efforts of carrying physical storage to everywhere. By using cloud storage we can access information from any computer through internet which excludes limitation of accessing information from same computer where it is stored.

While considering data privacy, we cannot depend up on traditional technique of authentication; because of unexpected privilege amplification will expose all data. Solution to this is to encrypt data before uploading to the server with user's own key. Data sharing is again an important functionality of cloud storage, because user can share and access data from anywhere and anytime to anyone. For example, organization ma y grant privileges to access part of sensitive data to their employees. But challenging task is that how to share encrypted data. Traditional way is user can download the encrypted data from storage, decrypt that data and send it to share with others, but it loses the importance of cloud storage.

In order to overcome the above problem Cryptography technique can be applied in two ways- one is symmetric key encryption and other is asymmetric key encryption. In symmetric key encryption, encryption and decryption of data is done with same keys, where as in asymmetric key encryption different keys are used, public key for encryption and private key for decryption. Using asymmetric key encryption is more flexible for our approach. This can be illustrated by following example.

Suppose Alice store all data on Box.com and she does not want to reveal her data to everyone. Due to chance of data leakage possibility she doesn't trust on privacy mechanism provided by Box.com, so she encrypts all data before uploading to the server. If Bob ask her to share some data then Alice use share function of Box.com. But problem now is that how to share encrypted data. There are two severe ways: 1. Alice encrypt data with single secret key and share that secret key directly with the Bob. 2. Alice can encrypt data with distinct keys and send Bob corresponding keys to Bob via secure channel. In first approach, there is a chance of unwanted data also get expose to the Bob, which is inadequate. In second approach, number of keys is as many as number of shared files, which may be hundred or thousand, as well as transferring these keys require secure channel and storage space which can be expensive.

Therefore best solution to above problem is Alice encrypts data with distinct public keys, but send single decryption key of constant size to Bob. Since the decryption key should be sent via secure channel and kept secret small size is always desirable. To design an efficient public-key encryption scheme which supports flexible delegation in the sense that any subset of the cipher texts (produced by the encryption scheme) is decrypt able by a constant-size decryption key (generated by the owner of the master-secret key).[1]

RELATED WORK

SYMMETRIC-KEY ENCRYPTION WITH COMPACT KEY

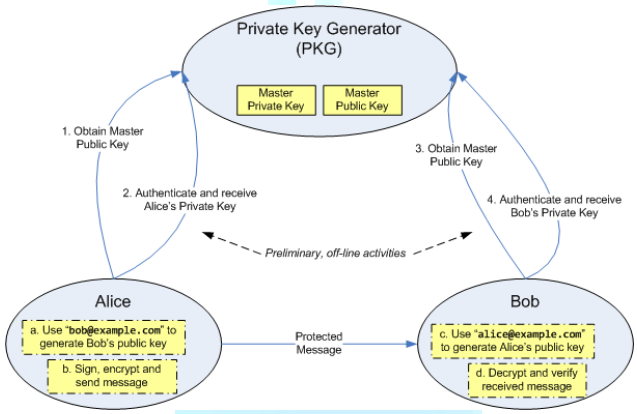
Benaloh et al. [2] presented an encryption scheme which is primarily projected for quickly transmitting large number of keys in broadcast scenario [3]. The creation is simple and we briefly analyze its key source process here for a actual description of what are the desirable properties we want to attain. The derivation of the key for a set of classes (which is a subset of all possible cipher text classes) is as follows. A composite modulus is chosen where p and q are two large random primes. A master secret key is chosen at random. Each class is connected with a distinct prime. All these prime numbers can be put in the public system parameter. A constant-size key for set can be generated. For those who have been delegated the access rights for S can be generated. However, it is designed for the symmetric-key setting instead. The content provider needs to get the equivalent secret keys to encrypt data, which is not appropriate for many applications. Because method is used to generate a secret value rather than a pair of public/secret keys, it is ambiguous how to apply this idea for public-key

encryption scheme. Finally, we note that there are schemes which try to reduce the key size for achieving authentication in symmetric-key encryption, e.g., [4]. However, sharing of decryption power is not a concern in these schemes.

ID-BASED ENCRYPTION WITH COMPACT KEY

Identity-based encryption (IBE) (e.g., [5], [6], [7]) is a public-key encryption is the procedure in which the public-key of a user can be set as an identity-string of the user (e.g., an email address, mobile number). There is a private key generator (PKG) in IBE which holds a master-secret key and issues a secret key to each user with respect to the user identity. The content provider can take the public parameter and a user identity to encrypt a message. The receiver can decrypt this ciphertext by using his secret key. Guo et al. [8], [9] tried to build IBE with key aggregation. In their schemes, key aggregation is controlled in the sense that all keys to be aggregated must come from dissimilar —identity divisions. While there are an exponential number of identities and thus secret keys, only a polynomial number of them can be aggregated.[1] This considerably increases the costs of storing and transmitting cipher texts, which is not possible in many situations such as shared cloud storage. As Another way to do this is to apply hash function to the string denoting the class, and keep hashing repeatedly until a prime is obtained as the output of the hash function. we mentioned, our schemes feature constant cipher text size, and their security holds in the standard model. In fuzzy IBE [10], one single compact secret key can decrypt cipher texts encrypted in many identities which are close in a certain metric space, but not for an arbitrary set of identities and for that reason it do not match up with our idea of key aggregation.

FIGURE 1: ID BASED ENCRYPTION SYSTEM



ID BASED ENCRYPTION FRAMEWORK

- **Setup**: This algorithm is run by the PKG one time for creating the whole IBE environment. The master key is kept secret and used to derive users' private keys, while the system parameters are made public. It accepts a security parameter (i.e. binary length of key material) and outputs:
  1. A set of system parameters, including the message space and cipher text space and,
  2. a master key .
- **Extract**: This algorithm is run by the PKG when a user requests his private key. Note that the verification of the authenticity of the requestor and the secure transport of are problems with which IBE protocols do not try to deal. It takes as input, and an identifier and returns the private key for user.
- **Encrypt**: Takes, a message and and outputs the encryption.
- **Decrypt**: Accepts, and and returns.

ATTRIBUTE-BASED ENCRYPTION

Attribute-based encryption (ABE) [11], [12] allows each ciphertext to be linked with an attribute, and the master-secret key holder can extract a secret key for a strategy of these attributes so that a ciphertext can be decrypted by this key if its associated attribute conforms to the strategy. For example, with the secret key for the policy (1 ᵛ 3 ᵛ 6 ᵛ 8), one can decrypt ciphertext tagged with class 1,3, 6 or 8. However, the major anxiety in ABE is collusion-resistance but not the compression of secret keys. Indeed, the size of the key often increases linearly with the number of attributes it encompasses, or the ciphertext-size is not constant (e.g., [13]).

KEY-AGGREGATE CRYPTOSYSTEM

In key-aggregate cryptosystem (KAC), users encrypt a message not only under a public-key, but also under an identifier of ciphertext called class. That means the ciphertexts are further categorized into different classes. The key owner holds a master-secret called master-secret key, which can be used to extract secret keys for different classes. More significantly, the extracted key can have an aggregate key which is as compact as a secret key for a single class, but aggregates the power of many such keys, i.e., the decryption power for any subset of ciphertext classes.[1]

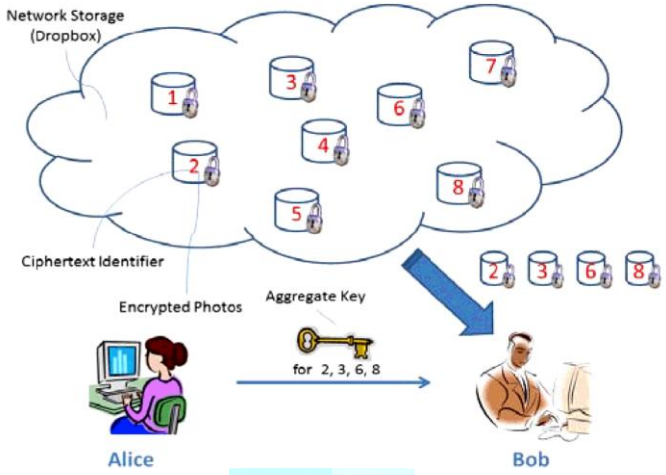
With our example, Alice can send Bob a single aggregate key through a secure e-mail. Bob can download the encrypted photos from Alice's Box.com space and then use this aggregate key to decrypt these encrypted data. The sizes of ciphertext, public-key, master-secret key and aggregate key in KAC schemes are all of constant size. The public system parameter has size linear in the number of ciphertext classes, but only a small part of it is required each time and it can be fetched on demand from large cloud storage.

FRAMEWORK

The data owner establishes the public system parameter through Setup and generates a public/master-secret key pair through KeyGen. Data can be encrypted using Encrypt by any person who also decides what ciphertext class is connected with the plaintext message to be encrypted. The data owner can use the master-secret key pair to produce an aggregate decryption key for a set of ciphertext classes through Extract. The generated keys can be passed to delegates securely through secure e-mails or secure plans Finally, any user with an aggregate key can decrypt any ciphertext provided that the ciphertext's class is contained in the aggregate key via Decrypt. Key aggregate encryption schemes consist of five polynomial time algorithms as follows:

1. Setup (1λ , n) : The data owner establish public system parameter via Setup. On input of a security level parameter 1λ and number of ciphertext classes n , it outputs the public system parameter param
2. KeyGen: It is executed by data owner to randomly generate a public/ master-secret key pair (Pk, msk).
3. Encrypt (pk, i, m) : It is executed by data owner and for message m and index i ,it computes the ciphertext as C.
4. Extract (msk, S): It is executed by data owner for delegating the decrypting power for a certain set of ciphertext classes and it outputs the aggregate key for set S denoted by Ks.
5. Decrypt (Ks, S, I, C): It is executed by a delegate who received, an aggregate key Ks generated by Extract. On input Ks, set S, an index i denoting the ciphertext class ciphertext C belongs to and output is decrypted result m.

FIGURE 2: KEY-AGGREGATE CRYPTOSYSTEM



SHARING ENCRYPTED DATA

A canonical application of KAC is data sharing. The key aggregation property is especially useful when we expect delegation to be efficient and flexible. The KAC schemes enable a content provider to share her data in a confidential and selective way, with a fixed and small ciphertext expansion, by distributing to each authorized user a single and small aggregate key.

Data sharing in cloud storage using KAC, illustrated in Figure 1. Suppose Alice wants to share her data m1,m2,….,mn on the server. She first performs Setup (1λ, n) to get param and execute KeyGen to get the

public/master-secret key pair (pk, msk). The system parameter param and public-key pk can be made public and master-secret key msk should be kept secret by Alice. Anyone can then encrypt each mi by Ci = Encrypt (pk, i, mi). The encrypted data are uploaded to the server. With param and pk, people who cooperate with Alice can update Alice's data on the server. Once Alice is willing to share a set S of her data with a friend Bob, she can compute

the aggregate key KS for Bob by performing Extract (msk, S). Since KS is just a constant size key, it is easy to be sent to Bob through a secure e-mail. After obtaining the aggregate key, Bob can download the data he is authorized to access. That is, for each i ϵ S, Bob downloads Ci from the server. With the aggregate key KS, Bob can decrypt each Ci by Decrypt (KS, S, i, Ci) for each i ϵ S.

TABLE 1: COMPARISON BETWEEN KAC SCHEME AND OTHER RELATED SCHEME

Different Schemes	Ciphertext size	Decryption key size	Encryption type
Key assignment schemes	Constant	Non-constant	Symmetric or public-key
Symmetric-key encryption with compact key	Constant	Constant	Symmetric key
IBE with compact key	Non-constant	Constant	Public key
Attribute based encryption	Constant	Non-constant	Public key
KAC	Constant	Constant	Public key

CONCLUSION

Through this paper i conclude that providing security for the users data stored in cloud storage is important. So here we use public-key cryptosystems which support allocation of secret keys for distinctive cipher text classes in cloud storage No matter which one among the power set of classes, the delegate can always get an aggregate key of constant size. In cloud storage, the number of cipher texts generally grows quickly without any limitations. So we have to reserve enough cipher text classes for the future extension. Or else, we need to increase the public-key. Although the parameter can be downloaded with cipher texts, it would be better if its size is independent of the maximum number of cipher text classes.

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IDENTIFYING LISTENING SKILLS AMONG BOYS AND GIRLS OF ARTS AND SCIENCE COLLEGE STUDENTS

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ABSTRACT

This study aimed at exploring the Listening skills of boys and girls at college level under different managements and locations. The results revealed that there is a slight significant difference between aided and government college students; urban girls from aided college and rural boys from aided college in their Listening Skill.

KEYWORDS
listening skills, student behaviour.

INTRODUCTION

Education in its general sense is a form of learning knowledge, skills and habits of a group of people are transferred from one generation the next through teaching, training, research, or simply through auto didacticism. Higher education is more about acquiring skills than assimilating an inert body of language and the purpose of higher education is to foster and develop potentials in the individual. It offers opportunities for personal enrichment and serves a variety of intellectual, aesthetic and creative interests. The curriculum provides opportunities for introspection and testing one's own values as well for enlarging one's vision. The several kinds of study required in General Education are designed to contribute to the development of higher intellectual skills such as critical thinking, and essential communication skills. In college, students do not just receive their information from books; instead, they must obtain their knowledge by listening to in-class lectures. It will be a prime source of information. Unfortunately students do not instinctively listen well in the class well. In order for college students to obtain the most information during their class time, they must work to improve their listening skills.

Listening is a skill. Listening is an act which needs to be cultivated for effective education. Listening is an integral part of the learning process and is perhaps one of the most basic social skills as "we are given two ears and one mouth so that we can listen more and talk less." Listening can induce better comprehension of personal and professional situations. Students can fare better if they listen attentively to what is being imparted. Thus listening is an active and dynamic process of attending, perceiving, interpreting, remembering and responding to the expressed (verbal and non verbal) needs, concerns and information offered by other human beings. A good listener is always regarded positively.

NEED FOR THE STUDY

Good listening is arguably one of the most important skills to have in today's complex world. Families need good listening to face complicated stresses together. Corporate employees need it to solve complex problems quickly and stay competitive. Students need it to understand complex issues in their fields. Much can be gained by improving listening skills.

When the question of how to improve communication comes up, most attention is paid to making people better speakers or writers (the "supply side" of the communication chain) rather than on making them better listeners or readers (the "demand side"). More depends on listening than on speaking. An especially skillful listener will know how to overcome many of the deficiencies of a vague or disorganized speaker. On the other hand, it won't matter how eloquent or cogent a speaker is if the listener isn't paying attention. The listener arguably bears more responsibility than the speaker for the quality of communication.

Listening is a vital skill in all aspects of life. Being able to listen well will contribute to a person's overall success. Listening is an important skill for students to improve and develop while in college as they are preparing to enter the workforce.

EDUCATIONAL SUCCESS

Students who are active listeners use new information more productively. They are better equipped to access their prior knowledge, which allows them to make connections with new information. It also enables them to decide how to use this information. By activating their schema, they have a framework for understanding new content and whether or not the content is relevant. As a result, they are much better at sifting through all of the information they receive and determining what the main points are and what are extraneous details. Because, good listeners tap into their prior knowledge when hearing new information, they can more readily integrate new ideas into their schemas. Students who use active listening strategies also exhibit better concentration and memory. Active listeners filter information, connect to what is important, use it and store it in a meaningful way. Consequently, they often seem to have a better grasp on academic content than their peers who listen more passively. **Stephen Robbins and David Decenzo,** in Fundamentals of Management, Prentic says that "College-level listening activities help sharpen listening skills. Although thinking, feeling, and doing go hand in hand, the thinking (or cognitive) domain of learning is perhaps the best place to begin. After all, effective listening takes effort—it requires maximum thinking power.

LISTENING

Sheila Steinberg, in her book "An Introduction to communication Studies says that, Listening is more complex than merely hearing. It is a process that consists of four stages: Sensing and attending, understanding and interpreting, remembering and responding. The stages occur in sequence but we are generally unaware of them".

Zeno of Citium says that "the reason why we have two ears and only one mouth is that we may Listen the more and talk the less".

Listening is the process of receiving, constructing meaning from, and responding to spoken and or nonverbal messages. People listen in order to comprehend information, critique and evaluate a message. Effective listening includes both literal and critical comprehension of ideas and information transmitted in oral language.

OBJECTIVES OF THE STUDY

1. To find out the difference in the skill of listening among the Arts and Science College students on the basis of Gender (a) Girls (b) Boys.
2. To find out the difference in the skill of listening among the College students on the basis of Colleges (a) Government (b) Aided.
3. To find out the difference in the skill of listening among the College students on the basis of Location (a) Rural Colleges (b) Urban colleges.

HYPOTHESES

- There will be no significant difference between the college boys and college girls in their listening skill.
- There will be no significant difference between rural college students and urban college students in their listening skill.
- There will be no significant difference between the Aided college students and Government college students in their listening skill.

METHODOLOGY

In order to achieve the objectives of the study, the survey method was used.

SAMPLE

The aims of the study, 340 students (173 boys and 167 girls) at the Rural and Urban Arts and Science College Students from Vellore District are taken as the sample.

TOOL USED

The tool used in present investigation is listening skill questionnaire, prepared by Stowell learning Center-Samonas Net work consisting of 65 items collected from internet. The investigator formed the Questionnaire consisted of sixty five statements (33 Positive statements and 32 Negatively framed) which was distributed to the students and the data were collected personally by the investigator. The 65 question items measures the listening skill level. The items are prepared in relation to boys, girls, class room attention, mind and feelings. It could be answered with the help of Likert – type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

RESULTS AND DISCUSSION

The data for the study were collected by applying standardized Listening skill scale. The collected data were analyzed by applying appropriate statistical tool and the results of the study are discussed below.

HYPOTHESIS – 1

"There will be no significant difference between the college boys and college girls in their listening skill".

TABLE 1: COMPARISON OF COLLEGE BOYS AND COLLEGE GIRLS LISTENING SKILL SCORE USING INDEPENDENT t-TEST

Variables	N	Mean (S.D.)	't' Value	df	p-Value
Boys	173	201.82 (14.59)	0.825	338	0.410
Girl	167	203.16 (15.22)			

From the above table it can be observed that the p-value of the listening skill score 0.410 which is greater than the normal value (0.05). Hence Ho is accepted. It can be inferred that there is no significant difference between college boys and college girls in their level of listening skills.

HYPOTHESIS – 2

"There will be no significant difference between rural college students and urban college students in their listening skill".

TABLE 2: COMPARISON OF RURAL AND URBAN COLLEGE STUDENTS LISTENING SKILL SCORE USING INDEPENDENT t-TEST

Variables	n	Mean (S.D.)	't' Value	df	p-Value
Rural	172	199.92 (13.79)	3.248	338	0.001
Urban	168	205.10 (15.56)			

From the above table it can be inferred that the p-value of the listening skill score is 0.001 which is lesser than the normal value (0.05). Hence Ho is not accepted. It can be inferred that there is a significant difference between Rural and Urban College Students in their level of listening skills.

HYPOTHESIS: 3

"There will be no significant difference between the Aided college students and Government college students in their Listening skill".

TABLE 3: COMPARISON AIDED AND GOVERNMENT COLLEGE STUDENTS LISTENING SKILL SCORE USING INDEPENDENT t-TEST

Variables	n	Mean (S.D.)	't' Value	Df	p-Value
Government	167	200.87 (15.66)	1.967	338	0.050
Aided	173	204.03 (14.0)			

From the above table, it can be observed that the p-value of the Aided and Government College students listening score is 0.050 which is equal to the normal value (0.05). Hence Ho is not accepted. It can be inferred that there is a slight significant difference between Aided and Government college students in their Listening Skill.

CONCLUSIONS

In this study, their Listening scores are classified into the level of listening as very poor, poor, good, very good and Excellent. The information's were collected, the details were statistically treated, analyzed, interpreted and conclusions were drawn. From findings it can be concluded that regarding Listening skill, there is no significant difference between college boys and girls. But there is a significant difference between Aided and Government College students and Urban and Rural college students in their Listening Skill.

While considering the 340 samples and analyzing the findings on the whole the investigator infer that most of the students level of listening skill ranges from 60 to 69.1%with good level, 29.1% are better listeners and 1.8% of the college students are poor in listening, but the saddest finding is the very good level of listening and excellent level is 0%.

IMPLICATION OF THE STUDY

This study is observed that among college students the level of listening score for boys is lesser than the girls and so girls listen better than boys and with regard to Institutions, the level of listening in the Aided Institutions is better that the level of listening of Government Institutions and in the same way with regard to location, the urban college students level of listening is higher than the rural students. The findings show that there is no vast disparity, only slight difference is shown. The majority of students 69.1% of students have moderately good in listening and 29.1% are better listeners and 1.8% are poor listeners.

The reasons may be diverse and variety of reasons, depending on each individuals. The urban college students have many opportunities, and they are exposed to see, hear, and listen educative of programs and they are motivated on all sides to have a higher goals to achieve, the institutions in urban area also arrange lot of exposure programs, extracurricular activities that favor lot of discussions, listening in order to use their creativity. These may be few reasons that their skill of listening is higher, where as the rural students have less exposure and they concentrate more on their academic side, even from the part of the families, they are not highly motivated to go ahead with greater goals. Many seem to be lethargic. So, when the students study in the Institutions, the Institutions also can take sufficient effort to develop the skill of listening among the college students whether it is rural or urban by renewing the method of teaching, making students involve through group discussions, using ICT technologies in teaching and learning in the class room. So the new strategies used by the college professors and making ICT facilities feasible for the students and Professors in the college by the management will surely increase from good listening level to very high level to become more innovative in the society. The Students need to take sufficient effort to lessen their distractions to concentrate in listening,

The Professors must be innovative, to make their classes and lectures more interesting with modern strategies and ICT. The Institutions need to be open to the current Teaching Learning technologies and be forward to make it possible, feasible, and, available for the professors and students, so that the interest will be created for students to listen more actively and effectively to achieve their goals without yielding in to their distractions.

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A STUDY ON FINANCIAL HEALTH OF SELECTED SOFTWARE COMPANIES IN INDIA

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ABSTRACT

This study investigates the financial health of the selected software companies in India. Using the Capitaline Plus database developed by the BSE and Prowess developed by the Centre for Monitoring Indian Economy from 2004-2005 to 2013-2014 for the software companies and employ the data to estimate financial strength. Altman's Z- score analysis has been applied to evaluate the general trend in financial health of the companies over a period. The financial health is analyzed with the help of five accounting ratios such as working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, Book value of equity to the book value of debt and net sales to total asset of the Tata consultancy services, Infosys, Wipro, HCL Technologies. The findings of the study revealed that the companies selected for the study is in the extremely healthy zone.

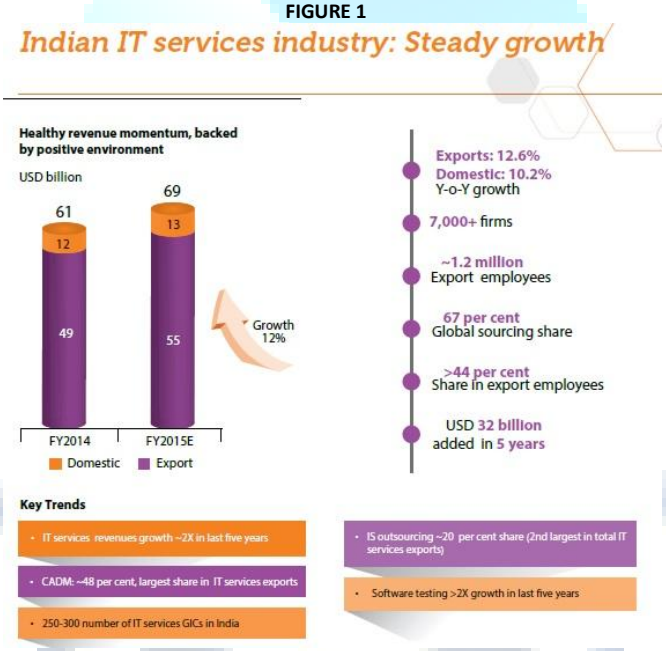
KEYWORDS

Altman's Z- score, Financial Health, Software, Variables.

INTRODUCTION

Indian software industry has been a remarkable success story. The IT industry accounts for 5% of India's GDP. The export of software has also gone up, which has been instrumental in the huge success of the Indian software companies as well as the industry. In fact, software export from India accounts for more than 65% of the total software revenue. The domestic software market largely depends upon sale of software packages and products, which constitute major part of revenues. Products account for almost 40% of the domestic market. On the other hand, more than 80% of revenue from software exports comes from software services like custom software development and consultancy services etc. There are a number of reasons why the software companies in India have been so successful. Besides the Indian software companies, a number of multinational giants have also plunged into the Indian IT market. India is the hub of cheap and skilled software professionals, which are available in abundance. It helps the software companies to develop cost-effective business solutions for their clients. As a result, Indian software companies can place their products and services in the global market in the most competitive rate[1]. The objective of the study is to understand financial strength of the Indian software industry. The software industry in India has been growing at phenomenal rates over the last fifteen years. This paper provides simple frameworks to understand the financial health of this industry. It focuses on long term solvency ratios of the software industry. As per the NASCOM Report 2015, the four top companies such as Tata Consultancy Ltd, Infosys, Wipro and HCL Technologies have been selected and Altman's Z- score has been applied to predict the financial health of the software companies in India.

FIGURE 1



Source: NASCOM Report

REVIEW OF LITERATURE

The Altman's (1968)[2] ,model uses various ratios to consider the factors noted above and Z- score model to analyze the failure of the firms.
Chen and Shimerda, Dugan and Zevgren (1985)[3], have selected seven financial factors that can help to predict financial distress: return on investment, financial leverage, capital turnover, short -term liquidity, cash position, inventory turnover and receivables turnover.
Gupta (2000)[4], attempted a refinement of Beaver's method with the objective of predicting the business failure.
Mulla (2002) [5],made a study in Textile mill with the help of Z-score model for evaluating the financial health with five weighted financial ratios.
Selvam M, S.vanitha and M.Babu (2004)[6], studied financial health of Indian Cement industry with help of Z score analysis.
Bagchi (2004)[7] ,examined the practical implication of accounting ratios in risk evaluation and concluded that accounting ratios are still dominant factors in the matter of credit risk evaluation.
Krishna Chaitanya (2005)[8] ,used Z-score model to measure the financial health of IDBI and concluded that IDBI is likely to become insolvent in the years to come.
Chowdhury and Barua (2009)[9] , investigated the financial attributes of Z- category companies' shares using Z-score analysis and found that ninety percent of those companies are suffering with financial problem.

VARIABLES DEFINITION

All the variables are measured in book values and not in market values because of data limitation. The financial health is analyzed with the help of five variables such as working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, book value of equity to the book value of debt and net sales to total assets.

STATEMENT OF THE PROBLEM

The present research made an attempt to measure the financial health of the Indian Software companies with the help of long term solvency ratios. Its contribution is more in the economic growth and GDP and exports of our country. More over various studies had been carried out to analyze the financial health of industries such as sugar, automobiles, cement, pharmaceutical, steel etc. So the present research concentrated with the financial strength of selected software companies.

OBJECTIVES

To analyze the financial health of the selected software companies in India using Altman's Z- score Model.

SCOPE OF THE STUDY

The study focuses on measuring and predicting the financial health of the selected software companies in India.

RESEARCH METHODOLOGY

The financial data required for the study are drawn from the secondary source. The capitaline database and prowess database have been used as principal sources. The other relevant data are collected from journals, magazines and websites.

SAMPLING DESIGN

Companies listed in BSE and for which the data was available for all the ten years had been selected for the study.

PERIOD OF THE STUDY

The study period is for ten financial years from 2004-2005 to 2013-2014.

LIMITATIONS OF THE STUDY

This study is confined to four software companies in India .As the study focuses on the financial health of selected software companies in India. The result cannot be generalized for the other companies in other industries and the result is only for ten years from 2004-2005 to 2013-2014.

ASSESSMENT OF FINANCIAL HEALTH OF SELECTED INDIAN SOFTWARE COMPANIES USING ALTMAN'S Z-SCORE ANALYSIS

An attempt has been made to have an insight into financial stability and operational health of selected Indian software companies. Altman's Z-score Analysis has been applied to evaluate the general trend in financial health of an enterprise over a period .Some of the accounting ratios used frequently to predict the financial performance of an enterprise may only provide warnings .When it is too late to take a corrective action. Further single ratio does not convey much of the sense. There are no internationally accepted standards for financial ratios against which the results can be compared. The objectives of the study is to predict the financial health and capability of selected software companies in India to improve its operational efficiency and effectiveness .The data collected are first analyzed with the help of five accounting ratios. These ratios were combined into a single measure Z- score analysis with the help of Multiple Discriminate Analysis. The formula used to evaluate the Z- score analysis as established by Altman is

$$\mathbf{Z=1.2X_1+1.4X_2+3.3X_3+0.6X_4+1.0X_5} \quad \text{..... (1)}$$

Where Z is the overall index

X_1-Ratio of Working Capital to Total Assets (WC to TA)

X_2-Ratio of Retained Earnings to Total Assets (RE to TA)

X_3-Ratios of Earnings before Interest and Tax to Total Assets (EBIT/TA)

X_4-Ratio of Book Value of Equity to Book Value of Debt (BVE/BVD)

X_5-Ratio of Net Sales to Total Assets (NS/TA)

The following accounting ratios are used as variable to combine them into a single measure (index) which is efficient in predicting bankruptcy.

X_1-The Ratio of working capital to total assets. It is the measure of net liquid asset of the firm to total capitalization

X_2- The ratio of Retained earnings to total assets. It indicates cumulative profitability overtime and leverages.

X_3- The ratios of earnings before interest and tax to total assets. It is the measure of productivity of assets employed in an enterprise ultimate existence of an enterprise is based on the earning power.

X_4-The ratio of book value of equity to book value of debt. It is reciprocal of the familiar debt-equity ratio. This measure shows how much assets of an enterprise can decline in value before the liabilities exceed the assets and the concern becomes insolvent.

X_5- The ratio of net sales to total assets. It measures the capital turnover ratios which is the standard financial measure for illustrating the sales generating capacity of the assets

MEASUREMENT OF FINANCIAL HEALTH

According to Altman the following three situations are considered for studying financial health of selected software companies in India,

I .The Z- score below 1.8 unit is considered to be bankruptcy zone.Faliure is certain and extremely likely and would occur probably in two years.

II. If a units Z- score is 1.8 or above but less than 3.0, its financial viability is considered to be healthy. The failure in this situation is uncertain to predict.

III. The Z-scores 3.0 and above indicates extremely healthy zone. Its financial health is very viable and not to fall.

TABLE 1: Z-SCORE VALUES

CATEGORY	ZSCORE	ZONE	SITUATION
I	Below 1.8	Bankruptcy	Certain to fall
II	1.8 to 2.99	Healthy Zone	Uncertain to Predict
III	3.0 and above	Extremely Healthy zone	Not to Fall

Source: Inferred from the above

ANALYSIS AND INTERPRETATION

TABLE 2: Z-SCORES ANALYSIS OF TATA CONSULTANCY SERVICES

YEAR	X_1	X_2	X_3	X_4	X_5	Z
2004-2005	0.39	1.33	2.01	1.65	2.33	7.71
2005-2006	0.48	1.37	1.78	0.94	1.91	6.48
2006-2007	0.39	1.37	1.68	0.95	1.84	6.23
2007-2008	0.41	1.37	1.48	3.61	1.65	8.52
2008-2009	0.38	1.37	1.25	1.96	1.66	6.62
2009-2010	0.27	1.35	1.38	2.52	1.52	7.04
2010-2011	0.24	1.36	1.41	2.85	1.47	7.33
2011-2012	0.24	1.36	1.71	1.42	1.51	6.24
2012-2013	0.48	1.36	1.56	1.13	1.45	5.98
2013-2014	0.57	1.36	1.72	2.28	1.43	7.36

Source: Computed

It is evident from analysis that the Z-score for Tata Consultancy Services witnessed more than three during the entire study period .The above table reveals that the company is in the extremely healthy zone. Although Z-scores shows fluctuating trend during the study period, it is always in the extremely healthy zone.

TABLE 3: Z -SCORES ANALYSIS OF INFOSYS

YEAR	X_1	X_2	X_3	X_4	X_5	Z
2004-2005	0.52	1.35	1.38	0.68	1.34	5.27
2005-2006	0.64	1.35	1.28	0.64	1.33	5.24
2006-2007	0.75	1.35	1.22	0.75	1.21	5.28
2007-2008	0.74	1.35	1.22	0.73	1.18	5.22
2008-2009	0.81	1.37	1.22	0.94	1.15	5.49
2009-2010	0.71	1.37	1.22	0.95	0.97	5.22
2010-2011	0.84	1.37	1.15	1.11	1.04	5.51
2011-2012	0.87	1.37	1.28	0.73	1.06	5.31
2012-2013	0.79	1.37	1.12	0.71	1.02	5.01
2013-2014	0.72	1.37	1.05	0.61	1.06	4.81

Source: Computed

It is obvious from analysis that the Z- score of Infosys witnessed more than three during the entire study period .The above table reveals that the company is in the extremely healthy zone. Although Z- scores shows fluctuating trend during the study period, it is always in the extremely healthy zone and it is not to fall.

TABLE 4: Z- SCORES ANALYSIS OF WIPRO

YEAR	X1	X2	X3	X4	X5	Z
2004-2005	0.21	1.45	1.15	4.72	1.45	8.98
2005-2006	0.22	1.47	1.18	0.76	1.58	5.21
2006-2007	0.31	1.47	1.06	2.34	1.43	6.61
2007-2008	0.55	1.92	0.75	1.81	1.13	6.16
2008-2009	0.41	2.02	0.69	1.49	1.22	5.83
2009-2010	0.49	1.86	0.79	1.91	0.98	6.03
2010-2011	0.42	1.77	0.69	2.69	0.98	6.55
2011-2012	0.44	1.75	0.69	2.43	1.05	6.36
2012-2013	0.47	1.79	0.79	2.38	1.08	6.51
2013-2014	0.52	1.65	0.95	3.84	1.13	8.09

Source: Computed

It is evident from analysis that the Z-score for Wipro is not less than 5.21 during the entire study period .The above table reveals that the company is in the extremely healthy zone. Although Z- scores shows fluctuating trend between 5.21 and 8.98 during the study period, it is always in the extremely safer zone.

TABLE 5: Z-SCORES ANALYSIS OF HCL TECHNOLOGIES

YEAR	X_1	X_2	X_3	X_4	X_5	Z
2004-2005	-0.04	1.32	0.36	1.77	0.48	3.89
2005-2006	-0.07	1.34	0.82	1.15	1.77	5.01
2006-2007	0.18	1.33	1.12	5.02	1.08	8.73
2007-2008	0.06	1.33	0.89	0.75	1.42	4.45
2008-2009	0.51	1.16	0.99	4.07	1.16	7.89
2009-2010	0.46	1.05	0.63	2.11	0.81	5.06
2010-2011	0.26	1.12	0.63	3.41	0.95	6.37
2011-2012	0.19	1.11	0.99	3.81	1.09	7.19
2012-2013	0.33	1.23	1.32	0.97	1.21	5.06
2013-2014	0.59	1.29	1.42	1.66	0.96	5.92

Source: Computed

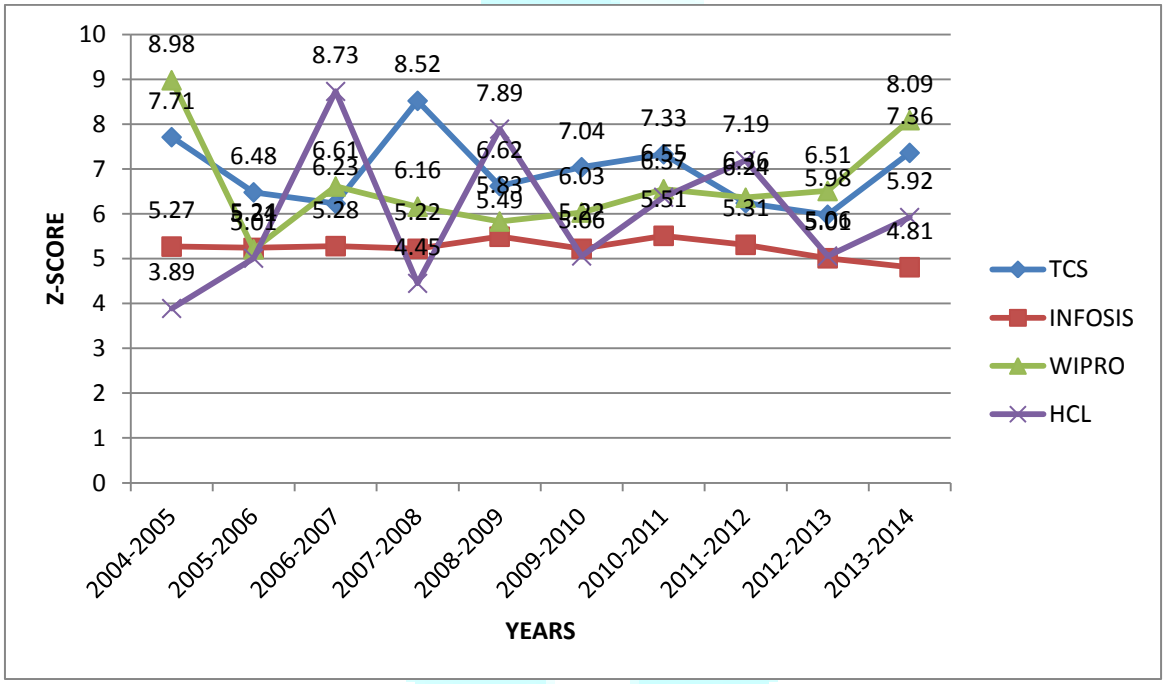
The Z- score of HCL Technologies is more than 3.0 during the study period of ten years. It was fluctuating during the entire period but did not go below the extremely healthy zone. It is obvious from the Z- scores that the company is in the extremely healthy zone.

TABLE 6: Z-SCORES OF SELECTED SOFTWARE COMPANIES IN INDIA

YEAR	TCS	INFOSIS	WIPRO	HCL
2004-2005	7.71	5.27	8.98	3.89
2005-2006	6.48	5.24	5.21	5.01
2006-2007	6.23	5.28	6.61	8.73
2007-2008	8.52	5.22	6.16	4.45
2008-2009	6.62	5.49	5.83	7.89
2009-2010	7.04	5.22	6.03	5.06
2010-2011	7.33	5.51	6.55	6.37
2011-2012	6.24	5.31	6.36	7.19
2012-2013	5.98	5.01	6.51	5.06
2013-2014	7.36	4.81	8.09	5.92

Source: Computed

FIGURE 1: Z-SCORE VALUES OF INDIAN SOFTWARE COMPANIES



Source: Computed

The financial health of all the companies selected for the study was extremely healthy for all the years. In TCS Z-score ranges from5.98 to 7.71 and the Z-scores of Infosys ranges from4.81 to 5.51 and in Wipro Z-scores ranges from 5.83 to 8.98. Only in HCL Technologies more fluctuations were found and Z-scores ranges from 3.89 to 8.73 and other companies also had fluctuations only to some extent.

CONCLUSION

In general, this paper makes an attempt to test the financial health of the selected software companies in India. It highlights the financial health of Indian software companies. Over all the financial health of the selected software companies were in the extremely healthy zone. The Z-scores were above3.0 indicates extremely healthy zone. The financial health is viable and not to fall.

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BORDER PATROL SYSTEMS-USING ADVANCED WIRELESS SENSOR NETWORKING DEVICES

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ABSTRACT

Early days, the conventional border patrol systems suffer from intensive human involvement. Recently, unmanned border patrol systems employ high-tech devices, such as unmanned aerial vehicles, unattended ground sensors, and surveillance towers equipped with camera sensors. However, any single technique encounters inextricable problems, such as high false alarm rate and line-of-sight-constraints. There lacks a coherent system that coordinates various technologies to improve the system accuracy. In this paper, the concept of hybrid wireless sensor network architecture for border patrol systems, is introduced. It utilizes the most advanced sensor network technologies, including the wireless multimedia sensor networks and the wireless underground sensor net-works. The framework to deploy and operate is developed.

KEYWORDS
Border patrol, Wireless sensor networks, Multimedia sensor networks, Underground sensor networks.

1. INTRODUCTION

Border patrol systems have recently gained interest to address the concerns about national security. The major challenge in protecting long stretches of borders is the need for intensive human involvement in patrolling the premises. Conventional border patrol system consists of security checkpoints and border troops. The security checkpoints are set up on the international roads where all vehicle traffic is stopped to detect and apprehend illegal aliens, drugs, and other illegal activity. Each border troop watches and controls a specific section of the border. The troops patrol the border according to predetermined route and time interval. Under the conventional border patrol system, even modest-sized areas require extensive human resources if manual patrolling is considered alone.

To monitor the border in real-time with high accuracy and minimize the need for human support, multiple surveillance technologies, which complement each other, are required. To address the challenges still faced by the existing surveillance techniques, we introduce Border Patrol System, a new border patrol system framework based on hybrid wire-less sensor networks, which can accurately detect and track the border intrusion with minimum human involvements. Border Patrol System utilizes the most advanced sensor network technologies, including wireless multimedia sensor net-works (WMSNs) and wireless underground sensor networks (WUSNs). The hybrid WSN consists of three types of sensor nodes:

1. Multimedia sensor nodes that are equipped with video cameras or night vision scopes and deployed on the surveillance towers,
2. Scalar sensor nodes that are equipped with vibration/seismic sensor and deployed on the ground or buried underground, and
3. Mobile sensor nodes that roam throughout the border on the surface or in air. These three types of sensor nodes While the potential benefits of Border Patrol System are significant, several research challenges need to be addressed be-fore a practical realization. In this paper, a framework to deploy and operate Border Patrol System for border patrol is de-scribed. Based on this framework, research challenges and open research issues are discussed.

2. SYSTEM ARCHITECTURE OF BORDER PATROL SYSTEM

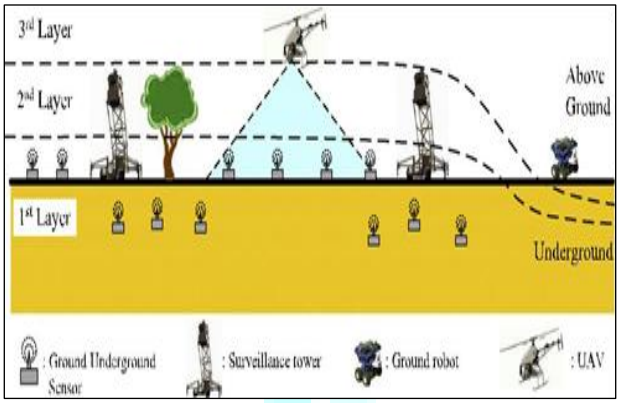
Current WSNs for border patrol are based on a flat, homogeneous architecture in which every sensor has the same physical capabilities and can only interact with neighboring sensors .Such a structure results in several shortcomings in border patrol such as limited cover-age and high false alarm rate that require additional human intervention. Instead, we consider a hierarchical WSN architecture with heterogeneous sensor nodes as shown in Fig. 1. In this architecture, three different types of sensors are used in three different layers of the hierarchy.

As shown in Fig. 1, the system architecture of Border Patrol System has three layers. The unattended ground sensors and the underground sensors constitute the lower layer of the architecture, which provide higher granularity for monitoring. At the second layer, multimedia sensors improve the accuracy of the system through visual information. Finally, mobile ground robots and unmanned aerial vehicles constitute the higher layer that provides additional coverage and flexibility. Advanced WSN Devices are:

2.1. GROUND SENSORS AND UNDERGROUND SENSORS

The ground sensors and the underground sensors in the lower layer are resource-constrained, low-power scalar sensors, which perform simple tasks such as taking seismic/vibration measurements and sending the information to data sink or processing hub. The underground sensors can either communicate with the ground sensors or other underground sensors . Due to the complex underground channel characteristics ,new physical layer propagation techniques are needed to realize the communications, such as underground electromagnetic wave techniques or magnetic induction waveguides Different from the camera sensors in the surveillance towers or UAVs, the ground/underground sensors can detect non-line-of-sight intruders. However, as discussed in the introduction, based on the limited information acquired by ground/underground sensors, it is difficult to distinguish actual intrusion alarms from false positives. Consequently, the false alarm rate of the ground/ underground sensors is considerably high.

FIGURE 1: NETWORK ARCHITECTURE OF THE HYBRID WIRELESS SENSOR NETWORKS FOR BORDER PATROL



2.2. MOBILE/STATIONARY SURVEILLANCE TOWERS

Mobile or stationary surveillance towers can host very powerful and reliable multimedia sensors, i.e., radars ,cameras, and sensors, which constitute the second layer of the hierarchy. The multimedia sensors are resource-rich, high-power devices with higher processing ability and larger communication range. As a result, these components are also used as local processing hubs. The multimedia sensors are responsible for more complex tasks such as collecting the sensing reports from the ground/underground sensors, detecting possible intrusion according to the sensing reports as well as the local image/video information. As a results, the false alarm rate of the ground/underground sensors can be significantly reduced. After the surveillance towers con-firm intrusion detection, they report the detection results to the remote administrator, and inform the mobile sensors the position of the intrusion for target tracking. Furthermore, the measurements and image/ video information are stored for future use. There may also exist cooperation between imaging sensors to detect intrusions collaboratively. In this case, correlation-based camera selection schemes and data compression frameworks are required to reduce the redundancy among correlated cameras.

2.3. UNMANNED AERIAL VEHICLES (UAVs)

In addition to the stationary components, unmanned aerial vehicles (UAVs) and robots provide additional capabilities at the third layer. UAVs have recently been used for several applications including environmental surveillance and infrastructure maintenance Drones and Remotely Piloted Vehicles (RPVs) are two types of UAVs. Drones are configured for autonomous flight with a pre-determined course and schedule. RPVs are remotely controlled by ground operators. In addition to mobility, UAVs can also be equipped with on board sensors and camera systems to provide additional coverage in an on-demand basis. Furthermore, UAVs can track intruders based on information from stationary sensors and help the border patrol agents catch intruders.

3. ADVANTAGES

Compared with the existing border patrol techniques provide the following advantages:

1. The multimedia sensors provide accurate detection as well as large detection range;
2. The ground sensors provide additional information that cannot be detected by the multimedia sensors ,e.g. in cases here the intruder is hidden behind an obstacle that cannot be detected by the imaging sensor;
3. The underground sensors guarantee the proper system functionalities here aboveground visible devices are not preferred for concealment purposes;
4. Mobile sensors provide intrusion tracking capability to track the intruders after they have been detected;
5. It detect the intrusion and report the results to a remote administrator;

4. DEPLOYMENT OF BORDER PATROL SYSTEM

In border patrol applications, the established monitoring network should cover a significantly large monitoring area. However, the sensing radius of a single sensor node is normally limited. Thus, a large number of sensor nodes are expected to fulfill the coverage requirement. Moreover, different types of sensor nodes(e.g., underground, ground, camera and mobile sensors) provide different coverage capabilities. The deployment of border patrol system such as

- Deployment of ground/underground sensors,
- Deployment of surveillance towers,
- Deployment of UAVs.

5. OPERATION FRAMEWORK

The operation framework of border patrol system used to detect the intrusion detection by using detection algorithm. It has consists of three parts

- Cooperative intrusion detection,
- Intrusion tracking,
- Detection-oriented communication.

Example algorithm is shows how to automatically detect and track a face using feature points

```
1)  oldPoints = points;
2)  while ~isDone(videoFileReader)
3)  videoFrame = step(videoFileReader);
[points, isFound] = step(pointTracker, videoFrame);
4)  visiblePoints = points(isFound, :);
5)  oldInliers = oldPoints(isFound, :);
if size(visiblePoints, 1) >= 2
6)  [xform, oldInliers, visiblePoints] = estimateGeometricTransform(...
7)  oldInliers, visiblePoints, 'similarity', 'MaxDistance', 4);
8)  bboxPoints = transformPointsForward(xform, bboxPoints);
9)  bboxPolygon = reshape(bboxPoints', 1, []);
10) videoFrame = insertShape(videoFrame, 'Polygon', bboxPolygon, ...'LineWidth', 2);
11) % Display tracked points
12) videoFrame = insertMarker(videoFrame, visiblePoints, '+', ...
13) 'Color', 'white');
14) % Reset the points
15) oldPoints = visiblePoints;
16) setPoints(pointTracker, oldPoints);
```

```
17) end
18) step(videoPlayer, videoFrame);
19) end
20) % Clean up
21) release(videoFileReader);
22) release(videoPlayer);
23) release(pointTracker);
```

6. CONCLUSION

In this paper, introduce Border Patrol system, a hybrid ireless sensor network architecture for border patrol to reduce the intensive human involvement and to improve the detection accuracy of current border patrol systems.

Border patrol system is coherent system that coordinates various technologies, including unmanned aerial vehicles, unattended ground/underground sensors, and surveillance towers equipped with camera sensors

7. FURTHER ENHANCMENT

The future works involve the simulation evaluations of the purposed deployment and operation framework of border patrol system and also developed many advanced devices are introduced in laterly

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THE NEW SOCIAL CONTRACT FOR GREEN BUSINESS

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ABSTRACT

Over the past few decades, concepts that focus on environmental stewardship have gripped the collective intellect of humankind, and established a common global imperative to respond to critical issues that arise from world- wide climate change and natural resources conservation. The article explores, the way events occurring in the business environment has generated public awareness and reactions towards sustainability. The changed attitude of people finds resonance in the voice of various public action groups. It is further reflected in the government's actions which are sometimes in the form of legislations. Simultaneously, certain leading businesses and brands start initiating changes to fulfill 'the new social contract' for green business as a response to the environment.

KEYWORDS
events, contract, green, sustainability.

INTRODUCTION

There are unwritten social contracts that have to be fulfilled if organisation need to earn the trust and the moral right needed to operate in the society. This is the only way they can create sustained stakeholder value. Organisations are among the highest consumers of resources and also among the largest contributors of emissions. Hence, they have a significant role to play in how they carry the sustainability mandate forward. More importantly, given the influence that organizations have on the society, they should be able to leverage it to bring forth social change. They not only play a prominent role in the creation and distribution of wealth and improving the general standard of living but, also fulfilling the aspirations of society.

We're in an interesting period in history when the relationship businesses have with society is undergoing a fundamental, permanent change. And sustainability, if not the epicenter of that change, certainly exemplifies it. We look at the name of few visionary organizations and brands that took the lead. These are the firms that anticipated and understood the range of likely policy scenarios, and build defensive and offensive strategies to address the environmental concerns of the general public and the government.

LITERATURE REVIEW

From **1920 until the mid forties,** environmental concerns were not on the forefront of the public's mind anymore, as this was the time of both World Wars and the era of the Great Depression. The people in the western world had other battles to fight which is why active environmentalism was largely on hold till the postwar period (Web Ecoist, 2008). Then, a series of disastrous events took place which caused a public outcry in Europe as well as the US. In 1948 the tragedy of Donora, Pennsylvania, which was an air inversion pall of smog, killed twenty people and sickened thousands more. Additionally in the same year, the first of London's 'Killer Fogs' took the life of six hundred people (Environmental History Timeline, n.d.) and only 4 years later in 1952 England faced one of its greatest environmental catastrophes the so-called 'Great Smog'. Approximately four thousand Londoners died within a couple of days of the 'Great Smog' and many more in the aftermath over the course of the next years. These events marked another essential impetus for the modern environmental movement.

Afterward, during the time of the **'Swinging Sixties'**, the public's fascination with technology slowly began to cool (Caldwell, 1991) and a number of threats to environmental quality induced attention from the media, policymakers and the general public (Dunlap, 1991). The book "Silent Spring" by Rachel Carson, which was published in 1962, was probably the leading trigger for environmental debate during that decade. In her book, Carson points out the devastating effects of business excesses and imprudent uses of technology on the environment (Caldwell, 1991; Iyer, 1994). In particular, Iyer (1994) states that the publication of "Silent Spring" caused the public to experience a shift in sentiment towards environmental issues and more and more governmental regulations began to reflect the aforementioned general attitude. Therefore this was the starting point of continuous pressure exertion on local as well as international companies and is today referred to as the initiation of the Green Revolution. One of the best examples of the manifold passed environmental laws and policies was the introduction of the National Environmental Policy Act (NEPA) in 1969 (Caldwell, 1991). The climax of environmental activism during that period was reached in 1970 with the celebrations of the first Earth Day, which was created to raise awareness and appreciation for the planet's environment (Caldwell, 1991; Dunlap, 1991).

During the **seventies**, the green movement abated a little bit as it lost some of its wide ranging public appeal (Dunlap, 1991). Yet, environmentalism as such achieved international and political legitimacy at the 1972 United Nations (UN) Conference on the Human Environment (also known as the Stockholm Conference). Many environmental nongovernmental organizations (NGOs) were present at the conference under the theme of 'Only One Earth' and as a result of the meetings the UN Environmental Programme (UNEP) was established (Caldwell, 1991; Environmental History Timeline, n.d.). Also during the seventies, it was discovered that the stratospheric ozone layer was thinning due to the emission of chlorofluorocarbons (CFCs) commonly referred to as refrigerants (Caldwell, 1991). This finding ultimately led to the 1987 Montreal Protocol which was an international agreement signed by twenty-four countries around the world to phase out the use of ozone exhausting substances (Caldwell, 1991; Environmental History Timeline, n.d.).

OBJECTIVES

The article explores how the events occurring in the business environment generated public awareness and reactions towards sustainability. This changed attitude of people found resonance in the voice of various public action groups. It is further reflected in the government's actions which are in the form of legislations. As a response to the environment, certain leading businesses and brands started initiating changes not only for 'compliance' but to fulfill 'the new social contract' for green business

RESULTS AND DISCUSSIONS

When we start putting down the various environmental disasters, in a chronological order, we find that they gripped the collective consciousness of the mankind and started an immediate chain of reactions. These events occurring in the business environment generated public awareness and reactions towards sustainability. The changed attitude of people found resonance in the voice of various public action groups. It was further reflected in the government's actions which were sometimes in the form of legislations. Simultaneously, certain leading businesses and brands start initiating changes to fulfill 'the new social contract' for green business as a response to the environment. This was not mere compliance. We can look at the tables given (Table 1, Table 2, Table 3, Table 4, Table 5, and Table 6).

The **eighties** were to some extent an ambiguous time for the development of environmentalism. On the one hand, with the Reagan administration in place, several ecological policies were retracted. This step backward was due to President Reagan's political attitude towards a free economy. In his opinion environmental regulations that posed obstacles to business conduction were harming a healthy economy. On the other hand, a number of catastrophic

environmental events generated an international public uproar as people all around the globe started to realize that every environmental problem bore not only theoretical but also personal implications. Disasters such as the escape of toxic gas at Bhopal, India in 1984, the enormous chemical spill in the River Rhine from Sandoz chemical plant in Switzerland in 1986, the diffusion of radioactive material from an accident at a nuclear reactor in Chernobyl, Russia in the same year and the rupture of the oil tanker Exxon Valdez in 1989 made people realize once again how important a balanced environment and hence its protection and preservation is (Caldwell, 1991). On top of that, Caldwell (p.48) maintains that "by the end of the 1980s, global warming and climate change had become the world's most publicized environmental issue" as the public increasingly understood the destructive repercussions of green house gas emissions.

Towards the **end of the 20th century**, with global warming resounded throughout the land, the environmental movement became more and more prominent. During the UN Earth Summit in Rio de Janeiro in 1992 the process for the Kyoto Protocol was started (Environmental History Timeline, n.d.). The United Nations Framework Convention on Climate Change stated "the Kyoto Protocol sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions". This treaty though is only one aspect of the modern green movement today. In addition to several international environmental agreements, the political arena was also shaped by the emergence of numerous ecological parties that have gained substantial influence over the traditional factions throughout the nineties (Capra and Spretnak, 1986) as for example the environmentally-focused party Bündnis 90/Die Grünen in Germany (Bündnis 90/Die Grünen, n.d.). Furthermore, activist groups like PETA and Earth First have gained considerable media coverage throughout the nineties (Web Ecoist, 2008). Yet, extremist fringe groups such as the Earth Liberation Front also harmed the image of diplomatic environmentalism during that time by employing economic sabotage and guerilla warfare (Barcott, 2002).

TABLE 1: ENVIRONMENTAL EVENTS AND REACTIONS DURING THE 1980S AND THE RESPONSE OF BUSINESS AND BRANDS

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• Union Carbide leaks Methyl iso-cyanide in Bhopal. • Chernobyl disaster takes place in a reactor in Ukraine. • Exxon Valdez spills 11 million gallons of crude oil in Alaska.	• US Congress creates superfund to clean up hazardous waste sites. • Moratorium on radio-active waste dumping at sea. • US Congress enacts laws for safe disposal of nuclear waste. • Vienna Convention for the protection of the ozone layer. • 'Our Common Future' published. • Montreal Protocol • US Congress bans ocean dumping of sewage and industrial water.	• Volkswagen begins testing of solar powered cars. • ARDO Solar produces more than one megawatt of photovoltaic modules. • DuPont begins selling substitutes for CFC Refrigerants. • Organic Valley coop of organic farmers formed.

TABLE 2: ENVIRONMENTAL EVENTS AND REACTIONS FROM 1990 TO 1995 AND THE RESPONSE OF BUSINESS AND BRANDS

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• Supertanker Braer spills 26 million gallons of crude oil of the cost of Hebrides. • Contaminated water in Milwaukees sickens 400,000 and kills more than 100. • Russian ship TNT27 dumps 900 tons of low level radioactive waste in Sea of Japan.	• 20th anniversary of 'Earth Day'. • London Protocol: Clean Air Act Amendment passed. • 76% of Americans call themselves 'Environmentalists'. • Federal Organic Foods Production Act passed. • 'Earth Submit' held in Rio. • Pollution Prevention Act and National Environmental Education Act passed in US. • Environment Justice Act of 1992 passed. • EPA launches Energy Star Program and 'Brownfields Program'	• 'Apple' introduces first environmental policy. • ISO 14000 standards established. • Clorox makes 'Fortune' list of top 10 companies in Environ Management. • Nike launches 'Reuse-A-Shoe' program.

TABLE 3: ENVIRONMENTAL EVENTS AND REACTIONS FROM 1995 TO 1999 AND THE RESPONSE OF BUSINESS AND BRANDS.

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• Greenpeace activities occupy Shell company's North Sea offshore rig.	• 'Act Now, Apologize Later' by Adam Werbach is published • EPA requires that home buyers and renters be informed about lead-based paint hazards. • Kyoto Protocol adapted by US and 121 nations. • New emissions standards for automobiles introduced.	• Clorox honored as EPA's Waste Wise Program Champion. • Honda Insight and Toyota Pirus introduced.

TABLE 4: ENVIRONMENTAL EVENTS AND REACTIONS FROM 2000 TO 2003 AND THE RESPONSE OF BUSINESS AND BRANDS

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• Over 300 million gallons of coal sludge is released when a Massey Energy Co. impoundment dam collapses in the Mississippi River. • 'Science' publishes NASA survey of over 2000 glaciers shrinking • Jury rules that Monsanto Chemical Company is responsible for polluting Anniston, Al with tons of toxic PCBs. • Invasion of Iraq leads to widespread oilfield burning and other environmental problems.	• E U bans leaded Gasoline • World Summit on Sustainable Development in Johannesburg.	• USDA certified organic labeling introduced. • Sharp Corporation established a system to develop environmentally sustainable 'green factories' to improve its environmental performance

TABLE 5: ENVIRONMENTAL EVENTS AND REACTIONS FROM 2004 TO 2006 AND THE RESPONSE OF BUSINESS AND BRANDS

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• An 8.9 magnitude quake under the Indian Ocean triggers massive tsunamis that destroy villages and kills more than 140,000 people in a dozen countries • Hurricane Katrina makes landfall in Louisiana. • Earth's overall temperature has reached its highest level in 12,000 years according to research by NASA. • World population reaches 6.5 billion.	• EPA requires cleaner fuels and engines for off-road diesel machinery. • EPA launches CARE program to reduce toxic pollutants • Kyoto Protocol officially goes into force with a majority of worlds nations ratifying. • Former US vice president Al Gore releases "An Inconvenient Truth"	• GE launched its 'ecomagination' division to develop green technologies using the catch phrase 'green is green'.

TABLE 6: ENVIRONMENTAL EVENTS AND REACTIONS FROM 2007 TO 2010 AND THE RESPONSE OF BUSINESS AND BRANDS

Environmental Events & Reactions	Governmental/NGO Actions & Reactions	Brands & Business Response
• Cosco Busan a container ship spills 58,500 gallons of bunker fuel into the San Francisco Bay. • UN Intergovernmental Panel on Climate Change (IPCC) releases report that estimated the cost of reversing the emissions of green house gases. • Live Earth concerts around the world raise awareness of climate change. • Al Gore and the IPCC win the Noble Peace Prize. • Over a billion gallons of coal sludge spill out of a holding dam near Kinsport.	• E.U. agrees to cut CO2 emissions by 20% by 2020. • Barack Obama wins US presidential race with promises to reform governmental misconduct particularly with respect to environmental laws. • Group of Eight (G-8) industrialized nations agree to cut greenhouse gas emissions by 2050. • US Climate Action Partnership presents plan to reduce US greenhouse gas emissions to 20% of 2005 levels by 2050 through cap and trading system.	• Richard Branson sets a $25 million prize for anyone able to devise a way to reduce the amount of greenhouse gases from the Earth's atmosphere by one billion tons per year. • Clorox Green Works products launched. • Dell becomes a carbon neutral company by using offsets and other methods. • Wal-Mart institutes sustainability labeling system.

GOVERNMENT THE REGULATOR

Sometimes, the social license to operate or 'contract' has been an agreement between companies and government, the latter acting on behalf of the public. Some of these social contracts, such as those in highly regulated sectors like utilities or pharmaceuticals, are explicit, active, and central to the strategy and operation of the business. In these situations government is an essential actor, conducting a constant conversation with businesses about prices, product features or service terms, costs and the like; in turn, senior executives in these sectors devote considerable attention to embedding regulatory considerations into their business strategies, and managing their relationship with government agencies.

NGOS AS THE WATCHDOGS

Another, perhaps more important reason has been the rise of non-governmental organizations (NGOs) that are devoted to challenging and changing businesses practices with respect to the environment. They have the charters and the resources to persist in their mission over decades. For much of the past century, issue-oriented groups tended to be temporary, arising around a single piece of legislation, or correction of a particularly pressing social ill. Today, many NGOs are long-lived, robust, ever-active watchdogs and actors. They consistently step in, pressing business to change, even when current laws are being met and government's attention is on other issues.

NGOs have pressed government and business to elevate their commitment to sustainability. Taken as a planet, our economies have a long way to go before we change our behaviors, before society and businesses have sustainable practices that make little or no impact on the global ecosystem. This quest will go on for many years — and it will influence the relationship enterprises have with government, NGOs and society at large. It will require more from businesses to meet these challenges though most companies are not ready at present to deal with this reality.

THE CONSUMER FRANCHISE

The most powerful force that brings about a dimensional change in societal value creation is the power of consumer franchise. The word 'consumer' may include all market participants such as the customers, investors, employees, job seekers and the civil society. Strong multipliers emerge when enlightened consumers exercise a preference in favor of business that contributes significantly to environmental and social sustainability. Buy expressing a direct and distinct choice for the products and services of such enterprises, consumers unleash a multitude of positive actions and innovations. Sustainable business practices emerge as a definitive market differentiator given the large market gains accruing to such companies.

SUGGESTIONS

Many companies are unprepared and ill-equipped. Their corporate cultures, organizational capabilities and processes are not ready to support sustainability as central to their business. If firms don't change, they will stumble into unanticipated crises. It's time to recognize the shift, make changes and deliver on both the responsibilities and opportunities that sustainable business practices represent.

Why are they so ill-equipped? Over the last 20 or 30 years, most firms have, put sustainability issues into "the compliance bucket." They decided there was no advantage to be had from doing better on environmental issues than what the law required. Many corporations set up compliance organizations to meet established rules, and then went back to business as usual.

For vast majority of other firms, however, the social contract is implicit and inactive. Businesses do their best to follow the various rules set up by government regulators for everything from worker safety to payroll deductions. Senior management in these sectors does not look to have any strategy. Their approach is simply that of static compliance and some concern — defined as meeting the requirements of these rules. Once new rules have been understood, and their costs and consequences established, they push responsibility for these activities down in the organization.

This all has to change for both types of firms — and sustainability will have to be at the center of the shift. To overcome this challenge, business leaders will need to treat sustainability as a new dimension of their operating strategy and not as a drag on their effectiveness. They will have to end their fragmented treatment of sustainability issues by creating a high-level, centralized view of green business practices with associated responsibility and accountability to make measurable progress on articulated goals.

Because the nature of sustainability is never-ending, those goals will be a moving target. And because firms pursuing these goals will do so under a new social contract, they will be continuously monitored by people who are outside government, with motivation to inspect every aspect of your company's green record.

For example, when Apple unveiled its MacBook computer notebooks, it took pains to shout they were green ("The world's greenest family of notebooks"). A website also helpfully explained what they mean by this in terms of packaging, materials and energy use and includes a statement about Apple's commitment to

sustainability. Though it all sounds wonderfully responsible, but, it could also be seen as a response in an ongoing dialogue with groups like Greenpeace, which had ranked Apple below average in its guide to green electronics.

CONCLUSION

There is a new social contract which brings new relationships and new demands and for business leaders to navigate around issues of sustainability and environmental resources. Thus organizations, being one of the most significant institutions beyond governments that can drive economic progress and social change, must be seen to be performing in this direction. One reason is the steady increase in the public's interest in, and willingness to act on, sustainability, both as citizens and as consumers. The other reasons are the initiatives by various public action groups and the government. We are entering a time when the question will be not whether you are pursuing such programs, but 'how much' you are doing for your business and the planet. Firms may be surprised by the new demands. Business leaders today must recognize that being in compliance is simply not enough. Until leaders of a firm can say they are engaged in a process of continuous sustainability improvement — akin to continuous improvement and investments in other parts of their business — they are out of step with our changing world. Such an integration of sustainability into business strategy will become compelling to more executives. Certain business leaders have shown the way.

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DATA SECURITY AND PRIVACY PROTECTION IN CLOUD COMPUTING

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ABSTRACT

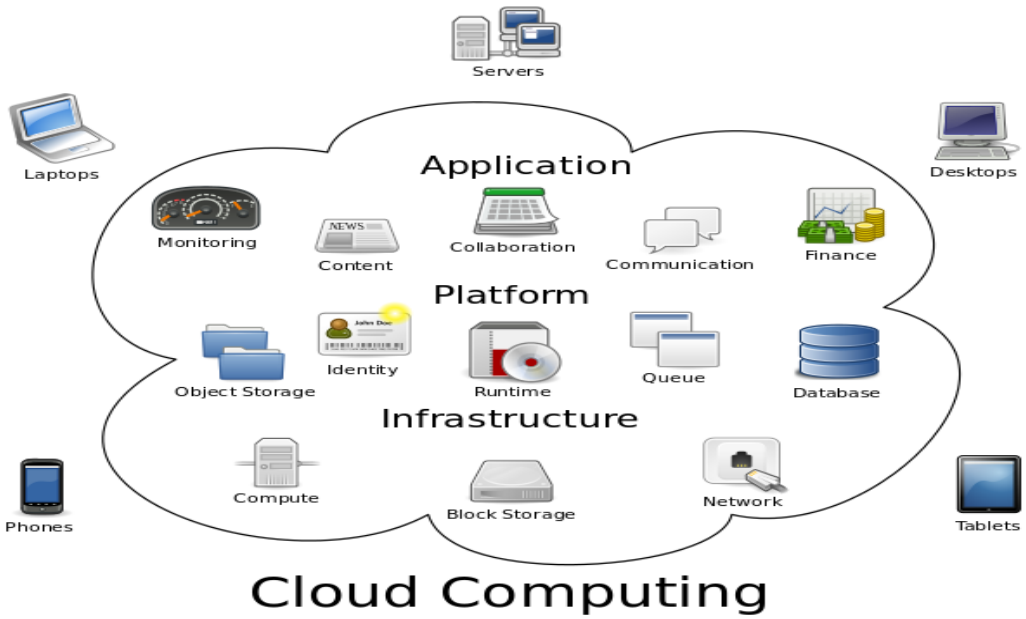
Cloud computing bears everything as a service over the web supports user demand. The benefits of cloud storage are easy access means access to your knowledge anyplace, anyhow, anytime, scalability, resilience, cost efficiency, and high reliability of the data. So each and every organization is moving its data to the cloud, means it uses the storage service provided by the cloud provider. So there is a need to protect that data against unauthorized access, modification or denial of services. Cloud refers to storing, processing and usage of data on server ports rather than local machines. Cloud reduces the load on user's machine significantly. Only thing one needs is a working data connection cloud computing system's interface software. However data handling from a distant port does raise data security concerns which cannot be compromised with. This report deals with the various encryption algorithms used to authenticate and validate the access to the cloud.

KEYWORDS
Confidentiality, Encryption Algorithm, Integrity, Privacy, Security.

1. INTRODUCTION

Cloud computing is defined as the set of resources or services offered through the internet to the users on their demand by cloud providers. It bears everything as a service over the internet based on user demand, for instance operating system, network hardware, storage, resources, and software. As each and every organization is moving its data to the cloud, means it uses the storage service provided by the cloud provider.

FIGURE 1: CLOUD COMPUTING SERVICES



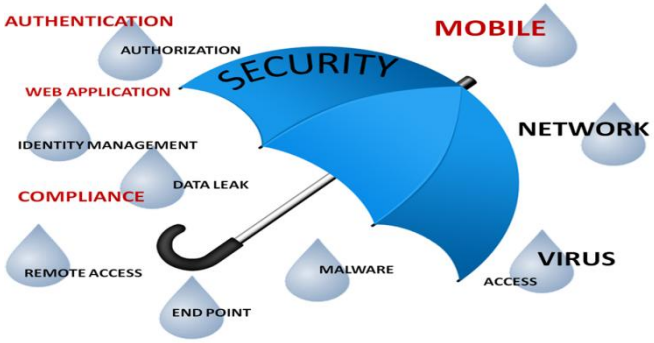
The concept of cloud computing is associated closely with Infrastructure as a Services (IaaS), Platform as a Services (PaaS), Software as a Services (SaaS) all of which means a service oriented architecture. These provide the first benefit of the cloud computing it reduce cost of hardware that cloud have been used at end user. To secure the Cloud means secure the treatments and storage "databases hosted by the Cloud provider". Security goals of data include three points namely: Confidentiality, Integrity, and Availability (CIA). Confidentiality of data in the cloud is accomplished by Encryption/ Decryption process.

2. REVIEW OF LITERATURE

2.1 CLOUD COMPUUTING SECURITY

Cloud computing security is the set of control-based technologies and policies designed to adhere to regulatory compliance rules and protect information, data applications and infrastructure associated with cloud computing use. Because of the cloud's very nature as a shared resource, identity management, privacy and access control are of particular concern. With more organizations using cloud computing and associated cloud providers for data operations, proper security in these and other potentially vulnerable areas have become a priority for organizations contracting with a cloud computing provider.

FIGURE 2: CLOUD COMPUTING SECURITY



Cloud computing security processes should address the security controls the cloud provider will incorporate to maintain the customer's data security, privacy and compliance with necessary regulations.

2.2 GOALS OF CLOUD SECURITY

The goals of cloud security are as follows:

1. Confidentiality
2. Integrity
3. Availability

2.3 ISSUES IN CLOUD COMPUTING SECURITY

There are six types of major issues of data security in the cloud.

1. DATA AUTHENTICATION

A user may gain access within a LAN by entering a cloud identification and password, which may be affirmed by a cloud authentication mechanism. If the authentication mechanism validates the certification, the user identification and password are stored locally for subsequent authentication requests. The authentication mechanism may be applied in both domain and Workgroup LAN and may function in parallel with other users who may have a LAN or client credentials which may not be authenticated from the cloud.

2. DATA PRIVACY AND CONFIDENTIALITY

Once the clients outsource data to the cloud there should be assurance that data is accessible to only authorized users. The cloud computing service provider should make secure the customer personal data is well protected from other service provider's and user. Authentication is the best solution for data privacy because service provider must make sure who is accessing the data and who is maintaining the server; so that the customer's personal data is protected. The cloud customer must be guaranteed that data stored in the cloud will be confidential.

3. DATA INTEGRITY

Data Integrity means data is complete and consistent. The data stored in the cloud may suffer from damage during integration operations. The cloud provider must make the client aware of what particular data are outsourced to the cloud, the native and the integrity mechanisms put in place.

4. DATA LOCATION

The cloud users did not know where the data will be hosted and in fact, their users want to know the location exactly. It requires a contractual agreement between the users that data should stay in a particular location.

5. DATA AVAILABILITY

Data provided by the customer is normally stored in different servers often placing in different locations or in different clouds. Data availability becomes a major legitimate issue as the availability of corrupted and relatively difficult servers.

6. DATA STORAGE, BACKUP AND RECOVERY

The cloud users decide to move their data to the cloud provider should ensure adequate resilience storage systems. The process of recovering and backing up data is simplified. The cloud providers will store the data in several places across many independent servers.

2.4 EXISTING ENCRYPTION ALGORITHMS

1. CAESAR CIPHER

Caesar cipher is a classical substitution cipher and it is one of the simplest examples of substitution cipher. It replaces alphabet of letter in the plain text, with a letter 3 places ahead of it. For example, "HELLO" is a plain text which will be converted into "KHOOR" as cipher text. One can see that such a cipher may be difficult to break. This cipher can be broken by brute force attack because at the end there are only 25 possible available options of key.

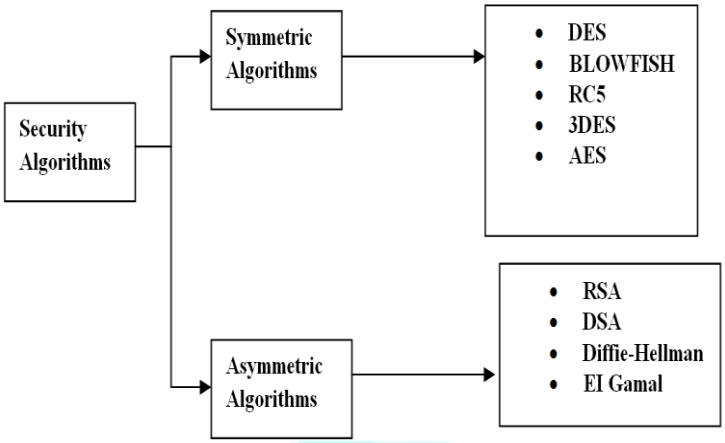
2. PLAYFAIR CIPHER

Playfair cipher which has a square matrix of 5X5 alphabetical letters arranged in an appropriate manner. The user can select a key and place it in the matrix. The remaining letters of English alphabet from the key are then one by one placed in the matrix of Playfair cipher. The plain text is broken into pairs and if a pair has same alphabet then they are separated by introducing a filler letter with "x". Otherwise if the pair is with different alphabetical letters and resides in the same row of matrix then each letter is replaced by the letter ahead of it. If the pair of letters is in same column of matrix then each letter is replaced by the letter below it, and when the pair of letters is neither in same column nor in same row then are they replaced by the letter in their row that resides at the intersection of paired letters.

2.5 MODERN ENCRYPTION

There are two main categories of encryptions used to achieve data confidentiality, integrity, availability, authentication and non-repudiation. Non-repudiation means that when something has been sent from someone, there has to be a way to track back to the sender. These are symmetric and asymmetric encryption algorithms.

FIGURE 3: SECURITY ALGORITHMS



SYMMETRIC ENCRYPTION

Symmetric-key algorithms are those algorithms which use the same key for both encryption and decryption. Hence the key is kept secret. Symmetric algorithms have the advantage of not consuming too much of computing power and it works with high speed in encryption. Symmetric-key algorithms are divided into two types: Block cipher and Stream cipher. In block cipher input is taken as a block of plaintext of fixed size depending on the type of a symmetric encryption algorithm, key of fixed size is applied on to block of plain text and then the output block of the same size as the block of plaintext is obtained. In Case of stream cipher one bit at a time is encrypted.

1. DATA ENCRYPTION STANDARD (DES)

The Data Encryption Standard (DES) is a symmetric- key block cipher published as FIPS-46 in the Federal Register in January 1977 by the National Institute of Standards and Technology (NIST). At the encryption site, DES takes a 64-bit plaintext and creates a 64-bit cipher text, at the decryption site, it takes a 64-bit cipher text and creates a 64-bit plaintext, and same 56 bit cipher key is used for both encryption and decryption. The encryption process is made of two permutations (P-boxes), which we call initial and final permutation, and sixteen Feistel rounds. Each round uses a different 48-bit round key generated from the cipher key according to a predefined algorithm.

2. BLOWFISH ALGORITHM

Blowfish is a symmetric key cryptographic algorithm. Blowfish encrypts 64 bit blocks with a variable length key of 128-448 bits. According to Schneier, Blowfish was designed with the followings objectives in mind:

- Fast- Blowfish encryption rate on 32-bit microprocessors is 26 clock cycles per byte.
- Compact- Blowfish can execute in less than 5 kb memory.
- Simple-Blowfish uses only primitive operation -s, such as addition, XOR and table look up, making its design and implementation simple.
- Secure- Blowfish has a variable key length up to maximum of 448-bit long, making it both secure and flexible.

Blowfish suits applications where the key remains constant for a long time (e.g. Communications link encryption), but not where the key changes frequently (e.g. Packet Switching).

3. ADVANCED ENCRYPTION STANDARD (AES)

Advanced Encryption Standard is a symmetric- key block cipher published as FIPS-197 in the Federal Register in December 2001 by the National Institute of Standards and Technology (NIST). AES is a non-Feistel cipher. AES encrypts data with block size of 128-bits. It uses 10, 12, or fourteen rounds. Depending on the number of rounds, the key size may be 128, 192, or 256 bits. AES operates on a 4×4 column-major order matrix of bytes, known as the state.

ASYMMETRIC ENCRYPTION

Asymmetric encryption algorithm uses two keys instead of one. One is a private key only known to the recipient of the message and the other is a public key known to everyone and can be freely distributed. Either key can be used to encrypt and decrypt the message.

1. RSA ALGORITHM

The most common Public Key algorithm is RSA, named for its inventors Rivest, Shamir, and Adleman (RSA). RSA is basically an asymmetric encryption /decryption algorithm. It is asymmetric in the sense, that here public key distributed to all through which one can encrypt the message and private key which is used for decryption is kept secret and is not shared to everyone. RSA cryptosystem realize the properties of the multiplicative Homomorphic encryption RSA uses modular exponential for encryption and decryption. RSA uses two exponents, a and b, where a is public and b is private. Let the plaintext is P and C is cipher text, then at encryption C = P^a mod n and at decryption side P = C^b mod n, n is a very large number created during key generation process.

2. ELLIPTIC CURVE CRYPTOGRAPHY (ECC)

Elliptic curve cryptography (ECC) is an approach to public-key cryptography based on the algebraic structure of elliptic curves over finite fields. Elliptic curves are also used in several integer factorization algorithms that have applications in cryptography. The primary benefit promised by ECC is a smaller key size, reducing storage and transmission requirements, i.e. that an elliptic curve group could provide the same level of security afforded by an RSA-based system with a large modulus and correspondingly larger key – e.g., a 256-bit ECC public key should provide comparable security to a 3072-bit RSA public key . For current cryptographic purposes, an *elliptic curve* is a plane curve over a finite field (rather than the real numbers) which consists of the points satisfying the equation, y2=x3+ax+b, along with a distinguished point at infinity, denoted ∞.

3. DSA

The Digital Signature Algorithm (DSA) is a Federal Information Processing Standard for digital signatures. It was proposed by the National Institute of Standards and Technology (NIST) in August 1991 for use in their Digital Signature Standard (DSS) and adopted as FIPS 186 in 1993. Four revisions to the initial specification have been released: FIPS 186-1 in 1996, FIPS 186-2 in 2000, FIPS 186-3 in 2009, and FIPS 186-4 in 2013. With DSA, the entropy, secrecy, and uniqueness of the random signature value *k* is critical. It is so critical that violating any one of those three requirements can reveal the entire private key to an attacker. Using the same value twice (even while keeping *k* secret), using a predictable value, or leaking even a few bits of *k* in each of several signatures, is enough to break DSA.

3. REPORT ON PRESENT INVESTIGATION

3.1 CLOUD COMPUTING

Cloud Computing is the ability to access a pool of computing resources owned and maintained by a third party via the Internet. The “cloud” is composed of hardware, storage, networks, interfaces, and services that provide the means through which users can access the infrastructures, computing power, applications, and services on demand which are independent of locations. Cloud computing usually involves the transfer, storage, and processing of information on the ‘providers’ infrastructure, which is not included in the ‘customers’ control policy.

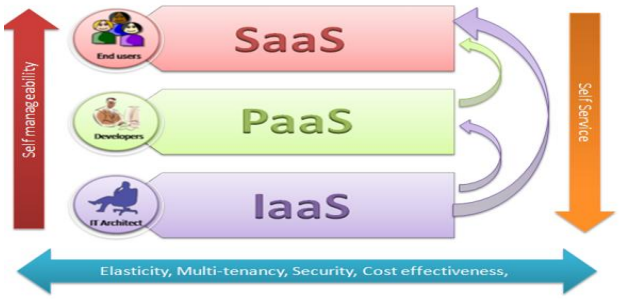
3.2 CHARACTERISTICS OF CLOUD COMPUTING

1. On demand self-services: computer services such as email, applications, network or server service can be provided without requiring human interaction with each service provider. Cloud service providers providing on demand self-services include Amazon Web Services (AWS), Microsoft, Google, IBM and Salesforce.com. New York Times and NASDAQ are examples of companies using AWS (NIST). Gartner describes this characteristic as service based.

2. Broad network access: Cloud Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops and PDAs.
3. Resource pooling: The provider's computing resources are pooled together to serve multiple consumers using multiple-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. The resources include among others storage, processing, memory, network bandwidth, virtual machines and email services. The pooling together of the resource builds economies of scale.
4. Rapid elasticity: Cloud services can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.
5. Measured service: Cloud computing resource usage can be measured, controlled, and reported providing transparency for both the provider and consumer of the utilized service. Cloud computing services use a metering capability which enables to control and optimize resource use. This implies that just like air time, electricity or municipality water IT services are charged per usage metrics – pay per use.
6. Multi Tenacity: is the 6th characteristics of cloud computing advocated by the Cloud Security Alliance. It refers to the need for policy-driven enforcement, segmentation, isolation, governance, service levels, and chargeback/billing models for different consumer constituencies.

3.3 SERVICE MODELS

FIGURE 4: SERVICE MODELS



1. Infrastructure as a Service (IaaS)

Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

2. Platform as a Service (PaaS)

Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Platform as a Service (PaaS) is an outgrowth of Software as a Service (SaaS), a software distribution model in which hosted software applications are made available to customers over the Internet. PaaS has several advantages for developers. With PaaS, operating system features can be changed and upgraded frequently. Geographically distributed development teams can work together on software development projects.

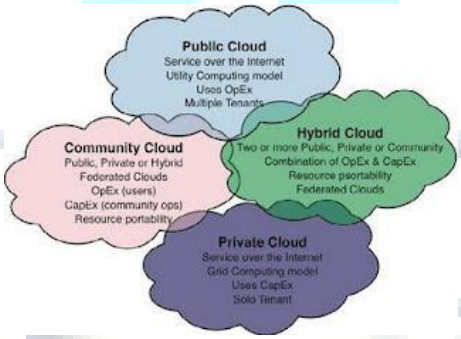
3. Software as a Service (SaaS)

Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. SaaS is becoming an increasingly prevalent delivery model as underlying technologies that support Web services and service-oriented architecture (SOA) mature and new developmental approaches, such as Ajax, become popular. Meanwhile, broadband service has become increasingly available to support user access from more areas around the world. SaaS is closely related to the ASP (application service provider) and on demand computing software delivery models. IDC identifies two slightly different delivery models for SaaS. The hosted application management (hosted AM) model is similar to ASP: a provider hosts commercially available software for customers and delivers it over the Web. In the software on demand model, the provider gives customers network-based access to a single copy of an application created specifically for SaaS distribution.

3.4 DEPLOYMENT MODELS

The four deployment models operated by cloud computing are the: Public Cloud, Private Cloud, Community Cloud, and Hybrid Cloud.

FIGURE 5: DEPLOYMENT MODELS



1. PUBLIC CLOUD

The cloud computing resource is shared exterior, someone can use it and a few payments maybe count. Public organizations assist in supplying the infrastructure to carry out the public cloud.

2. PRIVATE CLOUD

The private cloud resource is boundary to a collection of people, like a staff of a company. Infrastructure of private cloud is perfectly controlled and corporate data are completely supported by the organization itself.

3. HYBRID CLOUD

This is the combination of public as well as private cloud. It can also be explained as multiple cloud systems that are related in a way that permits programs and data to be moved comfortably from one system to another.

4. COMMUNITY CLOUD

The cloud is basically the mixture of one or more public, private or hybrid clouds, which is shared by many organizations for a single cause (mostly security).Infrastructure is to be shared by several organizations within specific community with common security, compliance objectives. It is managed by third party or managed internally. Its cost is lesser then public cloud but more than private cloud.

3.5 SECURITY GOALS

1. **Confidentiality:** Confidentiality refers to the prevention of intentional or unintentional unauthorized disclosure of information. Confidentiality in cloud systems is related to the areas of intellectual property rights, covert channels, traffic analysis, encryption, and inference:
2. **Integrity**: The concept of cloud information integrity requires that the following three principles are met:
   - Modifications are not made to data by unauthorized personnel or processes.
   - Unauthorized modifications are not made to data by authorized personnel or processes.
   - The data is internally and externally consistent — in other words, the internal information is consistent both among all sub-entities and with the real-world, external situation.
3. **Availability:** Availability ensures the reliable and timely access to cloud data or cloud computing resources by the appropriate personnel. Availability guarantees that the systems are functioning properly when needed. In addition, this concept guarantees that the security services of the cloud system are in working order. A denial-of-service attack is an example of a threat against availability.

3.6 CHALLENGES OF CLOUD COMPUTING

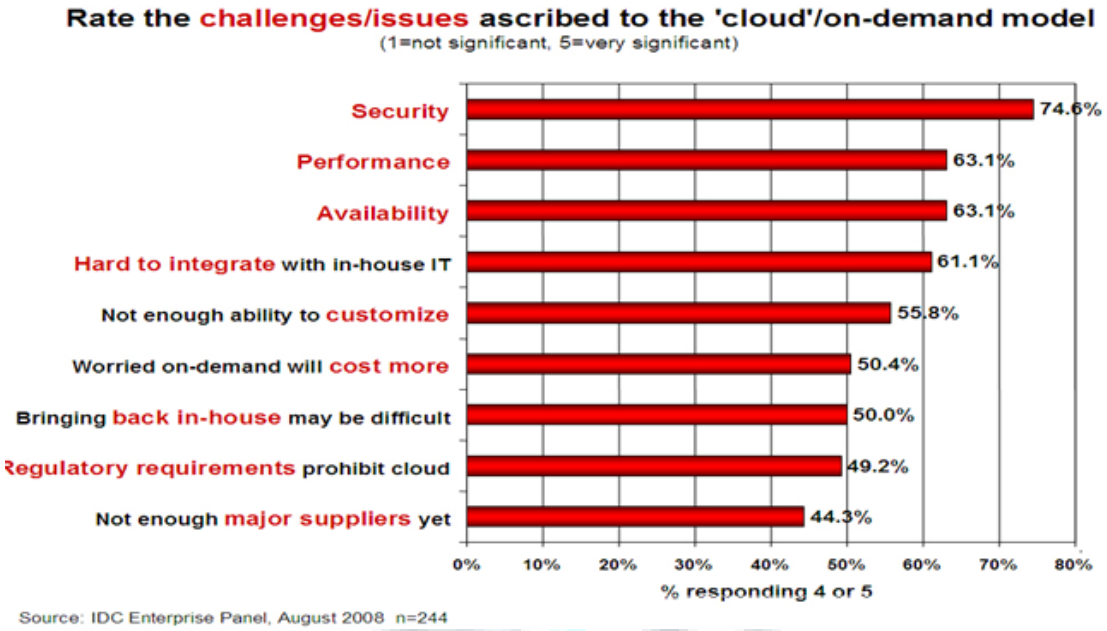
1. SECURITY AND PRIVACY

According to the survey of International Data Corporation (IDC), Security, Performance and Availability are the three biggest issues in cloud adoption. The critical challenge is how it addresses security and privacy issues which occur due to movement of data and application on networks, loss of control on data, heterogeneous nature of resources and various security policies. Data stored, processing and movement of data outside the controls of an organization poses an inherent risk and making it vulnerable to various attacks. The security threats can be of two types viz. internal and external. The external risk is posed by various persons and organizations e.g. enemies or hackers that do not have direct access to the cloud. The internal security risk is a well-known issue which can be posed by organizational affiliates, contractors, current or former employees and other parties that have received access to an organization's servers, networks and data to facilitate operations. Cloud computing poses privacy concerns because the service providers may access the data that is on the cloud that could accidentally or deliberately be changed or even removed posing serious business trust and legal consequences.

2. PERFORMANCE

According to IDC's survey, performance is the second biggest issue in cloud adoption. The cloud must provide improved performance when a user moves to cloud computing infrastructure. Performance is generally measured by capabilities of applications running on the cloud system. Poor performance can be caused by lack of proper resources viz. disk space, limited bandwidth, lower CPU speed, memory, network connections etc. Many times users prefer to use services from more than one cloud where some applications are located on private clouds while some other data or applications being on public and/or community cloud. The data intensive applications are more challenging to provide proper resources. Poor performance can results in end of service delivery, loss of customers, reduce bottom line revenues etc.

FIGURE 6: CHALLENGES IN CLOUD COMPUTING



3. RELIABILITY AND AVAILABILITY

Any technology's strength is measured by its degree of reliability and availability. Reliability denotes how often resources are available without disruption (loss of data, code reset during execution) and how often they fail. One of the important aspect that creates serious problems for the reliability of cloud computing is down time. One way to achieve reliability is redundant resource utilization. Availability can be understood as the possibility of obtaining the resources whenever they are needed with the consideration to the time it takes for these resources to be provisioned. Regardless of employing architectures having attributes for high reliability and availability, the services in cloud computing can experience denial of service attacks, performance slowdowns, equipment outages and natural disasters. Data shows that some of the current cloud computing providers have some frequent outages last year. e.g Amazon EC2 outage. In order to remove FUDD (fear, uncertainty, doubt, and disinformation), probably the reliability, availability and security are the important and prime concern to an organization. Therefore, the level of reliability and availability of cloud resources must be considered as a serious issue into the organization's planning to set up the cloud infrastructure in order to provide effective services to consumers.

4. SCALABILITY AND ELASTICITY

Scalability and elasticity are the most amazing and unique features of the cloud computing. These features provide users to use cloud resources being provisioned as per their need in unlimited amount as required. Scalability can be defined as the ability of the system to perform well even when the resources have been scaled up. Elasticity, on the other hand, is the ability to scale resources both up and down as and when required. Elasticity goes one step further, though, and does also allow the dynamic integration and extraction of physical resources to the infrastructure. The elastic cloud computing means that allocation of resources can get bigger or smaller depending on the requirement. Elasticity enables scalability—which means the system can easily scale up or down the level of services to which the user has subscribed. Scalability can be provided in two ways- horizontally and vertically whereby horizontal scalability (Scale Out) refers to addition of more nodes to the system such as adding a new computer to an existing service provider system while vertical scalability (scale up) refers to addition of resources to a single node in the system, typically involving the addition of memory or processors to a single computer.

5. INTEROPERABILITY AND PORTABILITY

Interoperability is the ability to use the same tools or application across various cloud service providers platforms. The interoperability can be defined at various levels viz. application, service, management and Data interoperability. Cloud users must have the flexibility of migrating in and out and switching to clouds whenever they want without no vendor lock-in period. One of the adoption barriers in cloud computing interoperability is the vendor lock-in risk. The main

problems to realize it are the lack of open standards, open APIs and lack of standard interfaces for VM formats and service deployment interfaces. Cloud portability ensures that one cloud solution will be able to work with other platforms and applications as well as with other clouds.

3.7 COMPARITIVE ANALYSIS

METRICS OF CLOUD COMPUTING SECURITY

1. FLEXIBILITY

So many Peoples love to use the cloud computing because of the great advantage of flexibility, users can access stored data anywhere in the world, but the thing is you need a computer/laptop/smart phone/Android /Blackberry and other applicable devices with internet connections. Staff can access the data and files outside the office at any time.

2. LOW COST

This is the very great advantages for organizations to reduce their cost by having the cloud computing service. And also Organization can concentrate more to expand their business rather than concentrating on Software and hardware updates. Everything is stetted up in host, which automatically saves the time and money for any organizations.

3. HIGHLY AUTOMATED

No need to purchase updated soft wares, everything has been set – up and ready to use. Here you can also cut an employee, who takes care of software updates, this result to hire another employee to expand/improve business. It's a like G-Mail or Hotmail, which can use by creating account within in seconds/minutes. In other hand it's tough to download software and again have to install then use it, also have to update software by paying extra money.

4. FAST SERVICE

Cloud computing service providers having infrastructure so server always in up-time. This results you no destruct ions in business. Depending upon business needs have to choose plans for fast access service.

5. MORE STORAGE CAPACITY

No need to worry about your lot of data and files to store, this provides more data to save the files in server. Here depending upon the data and usage you can choose the plans, available in different modes. Everything is online, store your entire data in cloud and can access at any time in browser.

6. COST SAVINGS

Companies can reduce their capital expenditures and use operational expenditures for increasing their computing capabilities. This is a lower barrier to entry and also requires fewer in-house IT resources to provide system support.

TABLE 1: COMPARISION OF ENCRYPTION ALGORITHM

Features	AES	RSA	BLOWFISH	DES	3DES	RC5	ECC
Platform	Cloud Computing	Cloud Computing	Cloud Computing	Cloud Computing	Cloud Computing	Cloud Computing	Cloud Computing
Key Size	128,192,256 bits	1024 bits	32- 448 bits	56 bits	168,112bits	Max 2040	135bits
Scalability	Scalable	Not Scalable	Scalable	Scalable	Scalable	Scalable	Less Scalable
Security	Secure for both provider and user.	Secure for user only	Secure for both providers and user/client side	Security applied to both providers and user	Adequate	Secure for both provider and user	Less Secure
Data Encryption Capacity	Used for encryption of large amount of data	Used for encryption of small data	Less than AES	Less than AES	Less than AES	Less than AES	Used for encryption of small data
Authentication Type	Best authenticity provider	Robust authentic implementation	Comparable to AES	Less authentic than AES.	Less authentic than AES	Less authentic than AES	Robust authentic implementation
Memory Usage	Low RAM needed	Highest memory usage algorithm	Can execute in less than 5 kb	More than AES	More than AES	More than AES	High memory usage
Execution Time	Faster than others	Requires maximum time	Lesser time to execute	Equals to AES	Very Slow	Slow	Fastest

4. CONCLUSION

In this encryption algorithms have been proposed to make cloud data secure, vulnerable and gave concern to security issues, challenges and also comparisons have been made between AES, DES, Blowfish and RSA algorithms to find the best one security algorithm, which has to be used in cloud computing for making cloud data secure and not to be hacked by attackers. Encryption algorithms play an important role in data security on cloud and by comparison of different parameters used in algorithms, it has been found that AES algorithm uses least time to execute cloud data. Blowfish algorithm has least memory requirement. DES algorithm consumes least encryption time. RSA consumes longest memory size and encryption time. In today's era demand of cloud is increasing so the security of the cloud and user is on top concern. Hence, these algorithms are helpful for today's requirement. In future several comparisons with different approaches and results to show effectiveness of proposed framework can be provided.

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SURVEY OF VARIOUS CRYPTOGRAPHIC TECHNIQUES

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ABSTRACT

Cryptography and encryption have been used for secure communication for thousands of years. Throughout history, military communication has had the greatest influence on encryption and the advancements thereof. The need for secure commercial and private communication has been led by the Information Age, which began in the 1980's. Although the Internet had been invented in the late 1960's, it did not gain a public face until the World Wide Web was invented in 1989. The World Wide Web is an electronic protocol which allows people to communicate mail, information, and commerce through a digital medium. This new method of information exchange has caused a tremendous need for information security. A thorough understanding of cryptography and encryption will help the people to develop better ways to protect valuable information as technology becomes faster and more efficient.

KEYWORDS
Cryptography, Encryption, Security.

1. INTRODUCTION

1.1 OVERVIEW OF CRYPTOGRAPHY

Cryptography a modern encryption technology, comprising of different mathematical processes involving the application of formulas (or algorithms) was conventionally designed to secure discretion of military and diplomatic communications. With the Rapid growth of Information Technology and science of encryption, an innovative area for cryptographic products has stimulated. Cryptography plays a major role in securing data. It is used to ensure that the contents of a message are confidentially transmitted and would not be altered. Network security is most vital component in information security as it refers to all hardware and software function, characteristics, features, operational procedures, accountability, access control, and administrative and management policy. Cryptography is central to IT security challenges, since it underpins privacy, confidentiality and identity, which together provide the fundamentals for trusted e-commerce and secure communication. There is a broad range of cryptographic algorithms that are used for securing networks and presently continuous researches on the new cryptographic algorithms are going on for evolving more advanced techniques for secures communication.

1.1.1 DEFINITION

1. Cryptography: It is defined as the subdivision of cryptology in which encryption/decryption algorithms are designed, to guarantee the security and authentication of data which passes over the interconnected networks.
2. Computer Security: Generic name for the collection of tools designed to protect data and to thwart hackers.
3. Network Security: Measures to protect data during their transmission.
4. Internet Security: Measures to protect data during their transmission over a collection of interconnected networks.

1.2 OBJECTIVES OF CRYPTOGRAPHY

In data and telecommunications, cryptography is necessary when communicating over any un trusted medium, which includes just about any network, particularly the Internet. Within the context of any application-to-application communication, there are some specific security requirements, including:

1. CONFIDENTIALITY

- The principle of confidentiality specifies that only the sender and the intended recipients should be able to access the contents of a message.
- User A sends a message to user B and another user C gets access to this message, without the permission of A and B. This type of attack is called as interception.

2. AUTHENTICATION

- It helps to establish proof of identities; it ensures that the origin of an electronic message or document is correctly identified.
- User C sends an electronic document over the internet to B But C posing as User A, sending a fund transfer request(From A to C's a/c) to bank B. Bank transfer the funds from A to C's a/c ,it would think that user A has requested the fund transfer. This type of attack is known as fabrication.

3. INTEGRITY

- When the contents of a message are changed after the sender sends it, but before it reaches the intended recipient, i.e. integrity of the message is lost.
- Suppose you write a cheque for Rs.1000 to pay the goods. However, when you see your next account statement that the cheque is resulted in a payment of Rs.10000.This is the case for loss of message integrity. This type of attack is known as modification.

4. NON-REPUDIATION

- User sends a message and later on refuses that he had sent the msg.
- User A send a fund transfer request to bank B over the internet. After the bank perform the fund transfer as per A's instruction. A could claim that he never sent the funds transfer instruction to the bank i.e. A denies the fund transfer instruction.
- Thus non-repudiation defeats such possibilities of denying something, having done it.

5. ACCESS CONTROL

- It determines who should be able to access what.
- It means we should be able to specify that user A can view the records in the database but cannot update them.
- It is related to two areas: role management and rule management.
- Role management concentrates on the user side (which user can do what).
- Rule management focus on resources side (which resources is accessible and under what circumstances).

6. AVAILABILITY

- It states that resources should be available to authorized parties at all times.
- For example: Due to the intentional actions of an unauthorized user C, an authorized user A may not be able to contact a server computer B.
- This would defeat the principle of availability. Such an attack is called as interruption.

1.3 NEED OF CRYPTOGRAPHY

- Information Security requirements have changed in recent times.
- Traditionally provided by physical and administrative mechanisms.
- Computer use requires automated tools to protect files and other stored information.
- Use of networks and communications links requires measures to protect data during transmission.

1.4 SECURITY ATTACK

1.4.1 MODERN NATURE OF ATTACKS

1. AUTOMATING ATTACKS

- The speed of computers makes several attacks.
- Someone creates machines that can produce counterfeit coins producing so many coins on a mass scale which will affect the economy.
- This is quite different with computers. Attacker can steal a half a dollar from million bank accounts in few minutes which would give him a half million dollars possibly without any major complaints.

2. PRIVACY CONCERN

- Collecting the information about the people and later misusing it is turning out to be a huge problem.
- Every company (shopkeepers, banks, airlines, insurers) are collecting and processing the huge amount of information about us, without we realizing when and how it is going to be used.

3. DISTANCE DOES NOT MATTER

- Thieves would earlier attack banks because they had money.
- Now Money is in digital form inside computers and moves around by using computer network.
- And it is very easy and cheaper to attack on the computer systems of the bank by sitting at the home.

1.4.2 TYPES OF SECURITY ATTACKS

General Types of Security Attack are:

1. CRIMINAL ATTACK

- The main aim of the attacker is to maximize financial gain by attacking computer systems.

2. PUBLICITY ATTACK

- An attacker wants to see their names appear on television, news channel and newspaper.
- They are not hardcore criminals.
- Such as students in universities or employees in large organizations, who seek publicity by adopting a Nobel approach of attacking computer systems.
- One form of publicity attack is to damage the webpages of a site by attacking it.
- One of such attack was occurred on the US department of Justice's website in 1996.

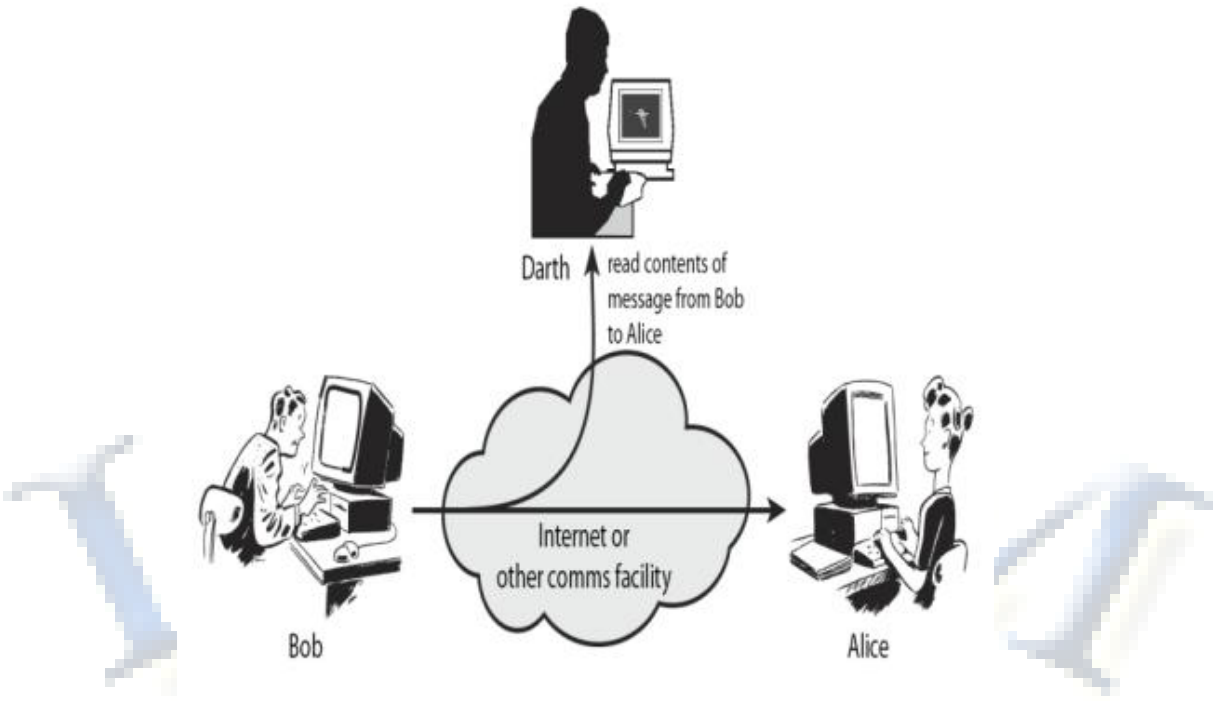
3. LEGAL ATTACK

- The attacker tries to make the judge or the jury doubtful about the security of a computer system.
- The attacker attacks the computer system and the attacked party manages to take the attacker to the court.
- In court attacker tries to convince the judge that there is weakness in the computer system and he has done nothing wrong.
- The aim of the attacker is to exploit the weakness of the judge and the jury in the technological mattes.

Main types of Security Attack are:

1. Passive Attacks

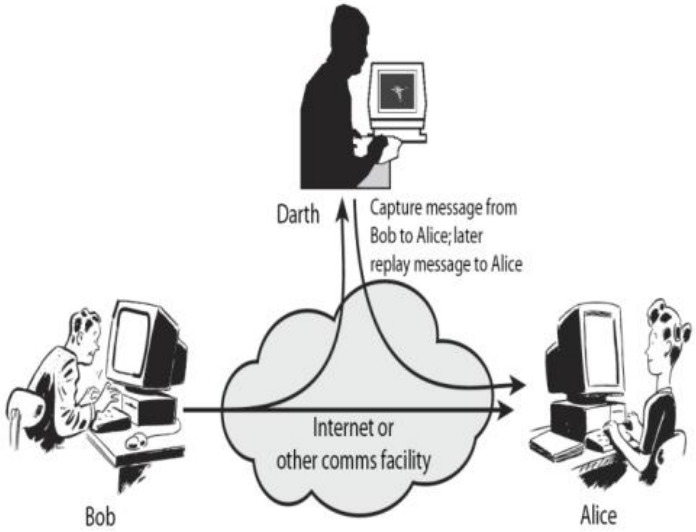
FIGURE 1: PASSIVE ATTACKS



- Eavesdropping or monitoring of data transmissions to obtain message contents.
- Passive attacks do not involve any modification to the contents of an original message.
- Thus the general approach to deal with the passive attack is to think about the prevention rather than detection or corrective actions.
- It is further classified into two sub categories. That is Release of message contents and Traffic analysis.
- Release of message contents: When we send confidential email message to our friend we desire that only he should be able to access it. Otherwise the contents of message are released against our wishes to someone else.
- Traffic analysis: We encode messages using a code language so that the only desired party understands the message. It may happen that a passive attacker could try to figure out similarities between them to come with some sort of pattern that provides him some clues regarding the communication takes place. Such attempts of analysing the encoded messages to come with likely patterns are the work of the traffic analysis attack.

2. ACTIVE ATTACKS

FIGURE 2: ACTIVE ATTACKS



- Active attacks are based on the modification of the original massage in some manner or the creation of false message.
- These attacks can be in the form of interruption, modification and fabrication.
- Trying to pose as another entity involves masquerade attacks.
- Masquerade is a type of attack where the attacker pretends to be an authorized user of a system to gain access to it.
- Modification attack can be classified into replay attacks.
- In this a user captures a sequence of events or some data units and resend them and alteration of messages.
- It involves some changes to the original message.

2. REVIEW OF LITERATURE

2.1 BASIC CONCEPTS OF CRYPTOGRAPHY

1. CRYPTOGRAPHY

- Cryptography is the study of Secret (crypto) writing (graphy).
- Concerned with developing algorithms.
- Conceal the context of some message from all except the sender and recipient (privacy or secrecy).
- Verify the correctness of a message to the recipient (authentication).
- It is the art and science of achieving security by encoding messages to make them non readable.

2. CRYPTANALYSIS

- It is the technique of decoding the messages from a non-readable format back to readable format without knowing how they were initially converted from readable format to non-readable format.

3. CRYPTOLOGY

- It is the combination of cryptography and cryptanalysis.
- That is: Cryptography + Cryptanalysis = Cryptology.

4. CIPHER

- An algorithm for transforming an intelligible message into unintelligible by transposition, substitution, or some other techniques.

5. PLAIN TEXT

- It is a message in clear text which is understood by human.

6. CIPHER TEXT

- When a plain text message is codified using any suitable scheme, the resulting message is called as cipher text.

7. ENCIPHER (ENCODE)

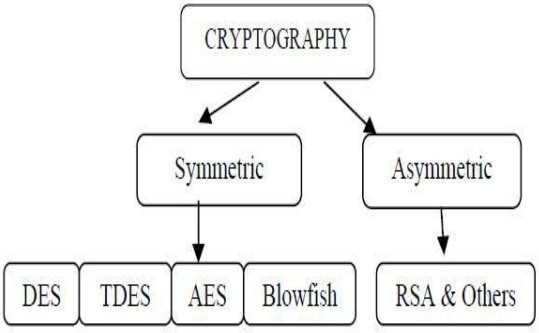
- The process of converting plaintext to cipher text.

8. DECIPHER (DECODE)

- The process of converting cipher text back into plaintext.

2.2 EXISTING TECHNIQUES OF CRYPTOGRAPHY

FIGURE 3: CLASSIFICATION OF CRYPTOGRAPHY



On the basis of number of keys Cryptographic algorithms are divided into two parts.

1. Symmetric Key Cryptography: When the same key is used for both encryption and decryption, then that mechanism is known as Symmetric Key Cryptography. It is also called as Secret Key Cryptography (SKC).
2. Asymmetric Key Cryptography: When two different keys are used, that is one key for encryption and another key for decryption, then that mechanism is called Asymmetric Key Cryptography. It is also called as Public Key Cryptography (PKC).

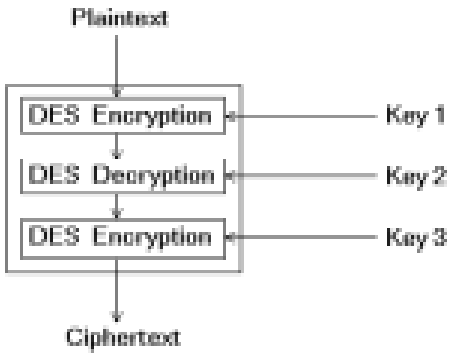
2.2.1 TYPES OF SYMMETRIC KEY CRYPTOGRAPHY

1. DES (DATA ENCRYPTION STANDARD)

It is a symmetric algorithm, means same key is used for encryption and decryption. DES is a block encryption algorithm. It uses one 64 bit key. Out of 64 bits, 56 bits used as independent key, which determine the exact cryptography transformation and 8 bits are used for error detection. The main operations are permutation and substitution. Bits permutation and substitution are performed in one round of DES. Six different permutation operations are performed both in key expansion and cipher part. Decryption process of DES algorithm is similar to encryption, only the round keys are applied in reverse order. The drawback of this algorithm is, it can be easily prone to Brute force Attack. It is easy for the hacker to break the key by applying all possible combinations. In DES, there are only 2^256 possible combinations which are easy to crack. So DES is not secure.

2. 3DES (TRIPLE DATA ENCRYPTION STANDARD)

FIGURE 4: 3DES ENCRYPTION



Triple DES is replacement for DES due to advances in key searching. 3DES uses three rounds of DES encryption and has a key length of 168 bits. It uses either two or three 56 bit keys in the sequence Encrypt-Decrypt-Encrypt(EDE). Initially, three different keys are used for the encryption algorithm to generate cipher text on plain text message..

C(t) = Ek1(Dk2(Ek3(t))) (1)

Where, C(t) is cipher text produced from plain text t, Ek1 is the encryption method using key k1, Dk2 is the decryption method using key k2 and Ek3 is the encryption method using key k3. Another option is to use two different keys for the encryption algorithm which reduces the memory requirement of keys in TDES.

C(t) = Ek1(Dk2(Ek3(t))) (2)

TDES algorithm with three keys requires 2^168 possible combinations and with two keys requires 2^112 combinations. It is practically not possible to try such a huge combinations, so TDES is a strongest encryption algorithm. The disadvantage of this algorithm it is too time consuming.

3. AES (ADVANCED ENCRYPTION STANDARD)

AES is replacement of DES. AES is a variable bit block cipher and uses variable key length of 128,192 and 256 bits. In AES, there are number of processing rounds. These rounds are based on the key size. If the key length is 128 bits, AES will perform nine processing rounds. If key is of 192 bits, AES perform 12 rounds and if the key size is 256 bits then AES perform 14 processing rounds. Each processing round involves four steps:-

- Substitute byte: A non-linear substitution step where each byte is replaced with another according to a lookup table.
- Shift rows: A transposition step where each row of the state is shifted cyclically a certain number of steps.
- Mix column: A mixing operation which operates on the columns of the state, combining the four bytes in each column.
- Add round key: Each byte of the state is combined with the round key using bitwise XOR.

AES encryption is fast and flexible. It can be implemented on various platforms especially in small devices.

4. BLOWFISH

Blowfish is a 64 bit block cipher and have variable length key from 32 bit to 448 bits. This algorithm has two parts – key expansion and data encryption. The key expansion part converts 448bit key into 468bytes A P array of size 18 and four S boxes whose size is 256, each of which are initialized to hexadecimal digits of π. XOR each entry in P array and S boxes with 32 bits of the key. There are 16 rounds of data encryption. In each round a 32 bit sub key is XORed with leftmost 32 bits of plaintext and the result is then passed to the F function of Blowfish. Now, this result becomes rightmost 32 bits for the next round and the output of F function is XORed with the original rightmost 32 bits of plaintext becomes leftmost 32 bits for next round and so on. The f function is distinguishing feature of Blowfish. In Blowfish, key length is 448 bits, s it requires 2^448 combinations to examine all keys. The advantage of this algorithm is, it is simple to implement as all operations are XOR and addition.

2.2.2 TYPES OF ASYMMETRIC KEY CRYPTOGRAPHY

1. RSA

RSA is most widely used public-key cryptosystem. It provides data confidentiality, key exchange and digital signature. The strength of RSA is factoring large numbers. It is a block cipher. In RSA, the plaintext and cipher text are integers between 0 and n-1 for some n. The description of the RSA algorithm is as follows. Plaintext is encrypted in blocks, with each block having a binary value less than some number n.

Public key components:

n = product of two large primes, p and q

e = a random number relatively prime and less than (p-1) (q-1)

Primary key components:

D = e-1 mod ((p-1) (q-1)), the multiplicative inverse of mod ((p-1) (q-1))

Encryption:

C = Me mod n

Decryption:

M = Cd mod n

Digital Signature:

S = Md mod n

M = Se mod n = Med mod n (to verify the signature)

The following requirements must be met for RSA to be satisfactory.

1. p and q , two large primes must remain secretive.
2. It is possible to find value of n, e, d such that,

Med mod n for all M<n.

3. It is infeasible to determine d, given e and n.
4. It is easy to calculate me and C for all values of M<n.

2. OTHER ASYMMETRIC KEY ALGORITHM

Other asymmetric key algorithms are used in conjunction with RSA. These other algorithms have their limitations. These algorithms are Diffie–Hellman, Digital Signature Algorithm, ElGamal and Elliptic Curve Cryptography. The disadvantage of Diffie-Hellman (DH) algorithm is that it is not as versatile as RSA and key generation might be too computationally expensive for the mobile device. Digital Signature Algorithm (DSA) is not as versatile as RSA. Another problem is that the key varies from 512 to 1024 bits, so requiring a strong key size beyond 1024 bits is not possible. DSA is slower than RSA in terms of signature verification. In ElGamal, the cipher text generated is twice the size as the plaintext; therefore it is not suitable in an environment with high latency and low bandwidth. ECC provides equal security for a smaller key size, thereby reducing processing overhead.

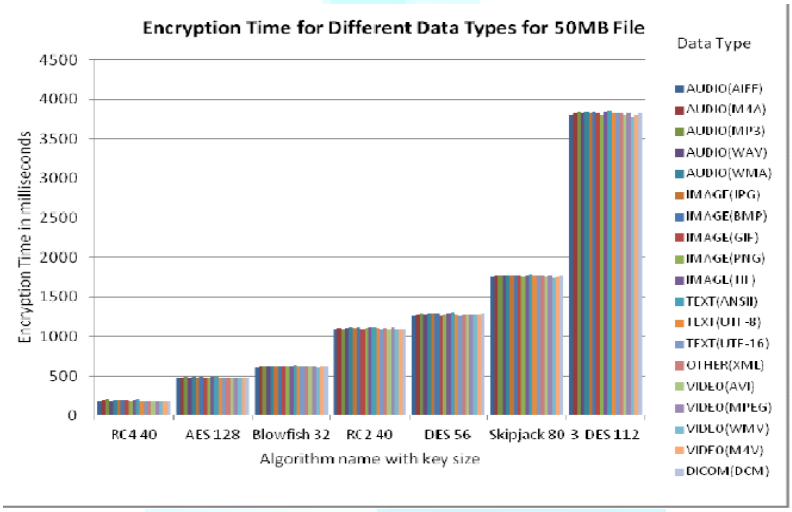
3. ANALYSIS

3.1 ANALYSIS AND COMPARISON OF SYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS BASED ON VARIOUS FILE FEATURES

3.1.1 FILES WITH DIFFERENT DATA TYPES

This study has taken to check whether the encryption has dependency on type of data. Different data type files like audio, image, textual and video of nearly 50MB in size are chosen and encryption time of different cipher algorithms is calculated for these data types. For all executions of a specific cipher algorithm, varying parameter is data type and constant parameters are key size and block cipher mode. Key size and block mode are at kept at bare minimal parameters. The key size of AES, DES, and 3-DES, RC2, Blowfish, Skipjack, and RC4 are kept at minimum values as 128, 56, 112, 40, 32, 80 and 40 bits respectively. Block cipher mode used is ECB with PKCS#5 padding scheme. Figure shows the execution time of the algorithms for different data type files.

FIGURE 5: ENCRYPTION TIME VS. CIPHER ALGORITHM FOR FILES OF DIFFERENT DATA TYPE



Observation: In Figure it can be clearly seen that encryption time for all the data type is almost same. The result shows that the encryption time does not vary according to the type of the data. Encryption depends only on the number of bytes in the file and not on the type of file. Encryption time of AES is quiet low compared to other block ciphers. RC4 with key size 40 is fastest among the cipher algorithms tested.

3.1.2 DATA FILES OF SAME TYPE WITH DIFFERENT SIZES:

This case study is taken to ensure once again the observations obtained in case study 1. Case study 1 revealed that encryption time depends on number of bytes in the file. To ensure this another study is made in which different files (BMP and FLV) of same types but different sizes are given for encryption and their encryption time is calculated. For all executions key size and block mode are kept at bare minimal parameters. Figure 3.4 show the execution results for BMP and FLV file formats of different sizes respectively.

FIGURE 6: FILE SIZE Vs. ENCRYPTION TIME FOR BMP FILE OF DIFFERENT SIZES

File Type	Varying Parameters (Data Size)	Constant Parameters
BMP	10.7MB, 50MB, 100MB	Data Type, Key size
FLV	50MB, 100MB, 482MB	

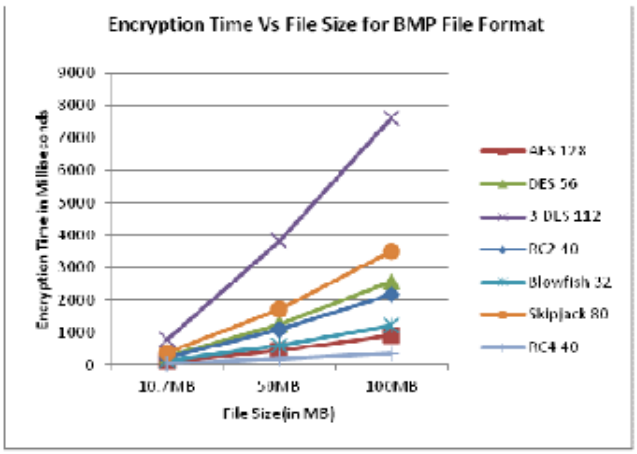
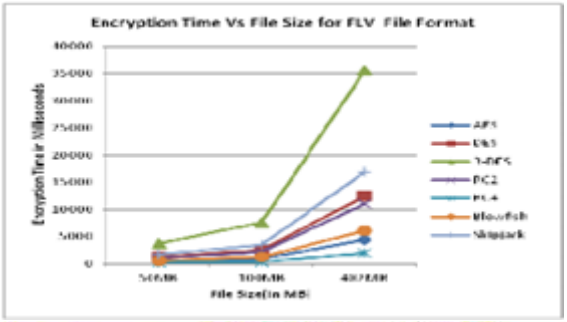


FIGURE 7: EXECUTION PARAMETERS FOR FILES OF DIFFERENT SIZE



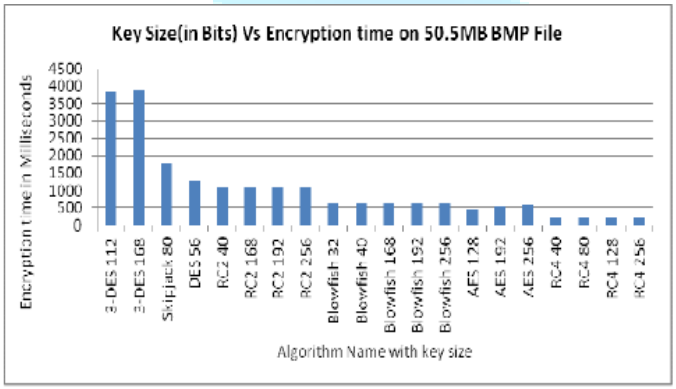
File Type	Size (In MB)	Encryption Time in Millisecond						
		AES 128	DES 56	3-DES 112	RC2 40	Blowfish 32	Skipjack 80	RC4 40
BMP	10.7	101	272	788	238	133	381	40
	50	455	1253	3804	1095	614	1729	198
	100	909	2595	7628	2189	1223	3505	372
FLV	50	456	1268	3810	1112	629	1731	196
	100	918	2586	7631	2224	1267	3515	360
	482	4518	12529	35654	11038	6087	16941	1972

Observation: For each encryption algorithm same parameters are used for files of different sizes. Figure 3.5 shows encryption time of different sizes of files of same type. From the results in figure we can find that the result for different size of data varies proportional to the size of data file. Encryption time increases as file size increases in multiples of data size.

3.1.3 ENCRYPTION ALGORITHMS WITH DIFFERENT KEY SIZES

This case study is to analyze the effect of changing the size of encryption key on encryption time. BMP file of 50.5MB is taken and different cipher algorithms are executed for different size of keys supported by them in ECB mode with PKCS#5 padding scheme. The various key sizes mentioned in Table 1 are used during experimentation. Figure 3.6 shows the result of execution for key size variation.

FIGURE 8: VARIATION OF KEY SIZES FOR DIFFERENT CIPHER ALGORITHMS



Observation: The execution results show that for all ciphers algorithms, the encryption time varies with the change in the size of the of the key. Encryption time increases with increase in key size for block ciphers. The variation in time is very small. AES dominates in the block cipher. RC4 is fastest among all algorithms tested.

From the simulated results it is concluded that encryption time is does not dependent upon data type and date density of the file. The research revealed that; encryption only depends upon the number of bytes present in the file. It also revealed that encryption time and data size is proportional to each other. As the size of data increase the encryption time also increase proportional to data size and vice versa. For all block cipher algorithms that are analyzed, with increase in key size, encryption time also increases, but reduces with increase in key size for stream cipher like RC4. AES is appears to be fastest block cipher with encryption rate of 108MB/sec at bare minimal parameter, but RC4 stream cipher with encryption rate of 270MB/sec comes out to be fastest among all analyzed cipher algorithms.

3.2 CONSTRAINTS FOR SELECTING RIGHT CRYPTOGRAPHIC SCHEME

The selection of right cryptographic technique relies on following constraints:

1. TIME

How much time will be needed for encrypting and decrypting the data and how much time is need to fulfill the prerequisites before starting an encryption how much time is need to fulfill the pre-requisites before starting an encryption.

2. MEMORY

How much memory will be needed especially in case of small devices like PDAs, smart cards, RFID tags.

3. SECURITY

Selected encryption scheme should meet the confidentiality, integrity (authentication, non-repudiation) and availability.

4. NATURE OF DATA

Nature of data means the communicating information is how much confidential or important. If the information is small in size and not too much important; then any encryption scheme is suitable. If information is highly secret or important then joint hybrid combination of symmetric + asymmetric scheme will be suitable.

5. TYPE OF DATA

In case of video data the privacy is more valuable and considerable constraint. If the data is small and in video format the previous described constrains (Time, memory, security) suggest the use of asymmetric scheme but this selection is not sufficient because the third party especially in case of Identity based Public Key Cryptography (ID-PKC) can view the video clip as they have all information (key(s), encrypted data). So in this case the privacy is nothing. That's why the type of data constraint is highly important constraint which should not be neglected in case of right selection of cryptographic scheme. If data type is confidential multimedia (personal video clip) then the symmetric scheme is good but hybrid encryption method (symmetric + asymmetric) can provide all security objectives.

3.3 PERFORMANCE FACTORS OF CRYPTOGRAPHIC ALGORITHMS

Various important factors on which performance of cryptographic algorithms depend are:

1. TUNABILITY

It could be very desirable to be able to dynamically define the encrypted part and the encryption parameters with respect to different applications and requirements. Static definition of encrypted part and encrypted parameters limits the usability of the scheme to a restricted set of applications.

2. COMPUTATIONAL SPEED

In many real-time applications, it is important that the encryption and decryption algorithms are fast enough to meet real time requirements.

3. KEY LENGTH VALUE

In the encryption methodologies the key management is the important aspect that shows how the data is encrypted. The image loss the encryption ratio is based on this key length. The symmetric algorithm uses a variable key length which is of the longer. Hence, the key management is a considerable aspect in encryption processing.

4. ENCRYPTION RATIO

The encryption ratio is the measure of the amount of data that is to be encrypted. Encryption ratio should be minimized to reduce the complexity on computation.

5. SECURITY ISSUES

Cryptographic security defines whether encryption scheme is secure against brute force and different plaintext-cipher text attack? For highly valuable multimedia application, it is really important that the encryption scheme should satisfy cryptographic security. In the analysis cryptographic security is in three levels: low, medium and high.

3.4 COMPARATIVE ANALYSIS OF CRYPTOGRAPHIC TCHNIQUES

TABLE 1: COMPARATIVE ANALYSIS OF VARIOUS CRYPTOGRAPHIC TECHNIQUES

Distinguishing Parameters	DES	3DES	AES	Blowfish	RSA
Designers	IBM	IBM	Vincent RijmenJoan Daemon	Bruce Schneier	Ron Rivest, Adi Shamir, and Leonard Adleman
Published in	1977	1978	1998	1998	1977
Cipher Type	Symmetric	Symmetric	Symmetric	Symmetric	Asymmetric
Key Used	Same key used for Encryption and Decryption	Same key used for Encryption and Decryption	Same key used for Encryption and Decryption	Same key used for Encryption and Decryption	Different key used for Encryption and Decryption
Key Sizes	56 bits (+8 parity bits)	168 bits	128,192,256 bits	32-448 bits	1024-4096 bits
Block sizes	64 bits	64 bits	128 bits	64 bits	Blocks having binary values less than some number n
Structure	Balanced Feistel Network	Feistel Network	Substitution Permutation Network	Feistel Network	Mathematical based
Rounds	16	48	10, 12 or 14 (depending on key size)	16	1
Attacks	Brute Force Attack	Theoretically possible	Side channel attacks	Not yet	A 768bit key has broken
Security	Proven Inadequate	Still Insecure	Secure	More Secure	Secure
Speed	Low	Moderate	High	Very high	High

4. CONCLUSION

Cryptography is an emerging technology which is important for network security. Some well-known cryptographic algorithms have been analyzed in this report. This report gives a detailed study of the popular symmetric key encryption algorithms such as DES, Triple DES, AES, Blowfish and asymmetric key encryption algorithms such as RSA etc. AES is appears to be fastest block cipher with encryption rate of 108MB/sec at bare minimal parameter, but RC4 stream cipher with encryption rate of 270MB/sec comes out to be fastest among all analyzed cipher algorithms. Asymmetric encryption algorithms are more secure than symmetric key algorithms.

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CYBER SECURITY TRENDS, ISSUES AND ANALYSIS OF TOOLS

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ABSTRACT

As a response to the changing threat landscape today, most governments are looking to establish some form of Cyber security strategy. This report aims to study trends and issues in cyber security and analyze the cyber security tools. These cyber security tools are basically to overcome one major type of cyber crime known as malware attack. Here we focus on one of the malware known as Rootkit which resides in the kernel of the operating system and study various types of Rootkits. Based on the Rootkit malware, study and analysis of various anti-rootkit tools is performed. Comparative study of various anti-rootkit tools is done to select best tools based on different parameters used for comparison. Finally tools best for naïve users as well as IT professionals are analyzed based on the analysis of different tools in the report.

KEYWORDS
Cyber-security, rootkit, malware.

1. INTRODUCTION

Cyber security is rightly a priority for governments globally. The phenomenal expansion of cyberspace has brought unprecedented economic growth, opportunity, and prosperity. However, it also presents bad actors with completely new threat and crime opportunities.

The interests of industry and governments in securing and facilitating cyber-based transactions and activities are fundamentally aligned. All companies want a secure digital infrastructure for commercial transactions. To ensure the continued viability of the infrastructure and growth of their sector, technology companies are highly motivated to design and build security into the DNA of their products and systems. Governments need a secure global digital infrastructure for economic growth, prosperity, efficiency, and protection.

Even the latest technologies like cloud computing, mobile computing, E-commerce, net banking etc also needs high level of security. Since these technologies hold some important information regarding a person their security has become a must thing. Enhancing cyber security and protecting critical information infrastructures are essential to each nation's security and economic wellbeing. Making the Internet safer (and protecting Internet users) has become integral to the development of new services as well as governmental policy. The fight against cyber crime needs a comprehensive and a safer approach. Every individual must also be trained on this cyber security and save themselves from these increasing cyber crimes.

2. REVIEW OF LITERATURE

The issue of cyber-crime is one that has been discussed by many people with various perspectives on the issue, most coming at it from different sides than the others. Cyber-crimes have gone beyond conventional crimes and now have threatening ramifications to the national security of all countries, even to technologically developed countries as the United States. According to a publication in which states that "the adoption by all countries of appropriate legislation against the misuse of Information and Communication Technology (ICT), for criminal or other purposes, including activities intended to affect the integrity of national critical information infrastructures, is central to achieving global cyber security". The illegal act may be targeted at a computer network or devices e.g., computer virus, denial of service attacks (DOS), malware (malicious code). The illegal act may be facilitated by computer network or devices with target independent of the computer network or device. Cyber-crime is complex and committed mostly from remote locations making it difficult to police. The absence of enabling law makes policing even more difficult.

2.1 TRENDS CHANGING CYBER SECURITY

2.1.1 WEB SERVERS

The threat of attacks on web applications to extract data or to distribute malicious code persists. Cyber criminals distribute their malicious code via legitimate web servers they've compromised. Web servers are especially the best platform for these cyber criminals to steal the data.

2.1.2 CLOUD COMPUTING AND ITS SERVICES

World is slowly moving towards the clouds. This latest trend presents a big challenge for cyber security, as traffic can go around traditional points of inspection. Additionally, as the number of applications available in the cloud grows, policy controls for web applications and cloud services will also need to evolve in order to prevent the loss of valuable information. Though cloud services are developing their own models still a lot of issues are being brought up about their security.

2.1.3 APT's AND TARGETED ATTACKS

APT (Advanced Persistent Threat) is a whole new level of cyber crime ware. For years network security capabilities such as web filtering or IPS have played a key part in identifying such targeted attacks (mostly after the initial compromise). As attackers grow bolder and employ more vague techniques, network security must integrate with other security services in order to detect attacks.

2.1.4 MOBILE NETWORKS

Mobile networks security is a very big concern. These days' firewalls and other security measures are becoming porous as people are using devices such as tablets, phones, PC's etc all of which again require extra securities apart from those present in the applications used. Further mobile networks are highly prone to these cyber crimes a lot of care must be taken in case of their security issues.

2.1.5 IPv6: NEW INTERNET PROTOCOL

Protecting IPv6 is not just a question of porting IPv4 capabilities. [6] While IPv6 is a wholesale replacement in making more IP addresses available, there are some very fundamental changes to the protocol which need to be considered in security policy. Hence it is always better to switch to IPv6 as soon as possible in order to reduce the risks regarding cyber crime.

2.1.6 ENCRYPTION OF THE CODE

In an encryption scheme, the message or information is encrypted using an encryption algorithm, turning it into an unreadable cipher text. This is usually done with the use of an encryption key, which specifies how the message is to be encoded. Encryption at a very beginning level protects data privacy and its integrity.

2.2 ISSUES IN CYBER SECURITY

2.2.1 MOBILE DEVICES AND APPS

The exponential growth of mobile devices drives an exponential growth in security risks. Every new smart phone, tablet or other mobile device, opens another window for a cyber attack, as each creates another vulnerable access point to networks. This unfortunate dynamic is no secret to thieves who are ready and waiting with highly targeted malware and attacks employing mobile applications. Similarly, the perennial problem of lost and stolen devices will expand to include these new technologies and old ones that previously flew under the radar of cyber security planning.

2.2.2 SOCIAL MEDIA NETWORKING

Growing use of soc media will contribute to personal cyber threats. Social media adoption among businesses is skyrocketing and so is the threat of attack. To combat the risks, companies will need to look beyond the basics of policy and procedure development to more advanced technologies such as data leakage prevention, enhanced network monitoring and log file analysis.

2.2.3 CLOUD COMPUTING

More firms will use cloud computing. A well designed architecture and operational security planning will enable organizations to effectively manage the risks of cloud computing [10]. As cloud use rises, new breach incidents will highlight the challenges these services pose to forensic analysis and incident response and the matter of cloud security will finally get its due attention.

2.2.4 PROTECT SYSTEMS RATHER INFORMATION

The emphasis will be on protecting information, not just systems. As consumers and businesses are like move to store more and more of their important information online, the requirements for security will go beyond simply managing systems to protecting the data these systems house. Rather than focusing on developing processes for protecting the systems that house information, more granular control will be demanded - by users and by companies - to protect the data stored therein.

2.2.5 NEW PLATFORMS AND DEVICES

New platforms and new devices will create new opportunities for cybercriminals. Security threats have long been associated with personal computers running Windows.

2.2.6 EVERYTHING PHYSICAL CAN BE DIGITAL

The written notes on a piece of paper, the report binder and even the pictures on the wall can be copied in digital format and gleaned for the tools to allow a activist-type of security violation, and increasingly this will be a problem.

2.3 ROOTKITS

In the paper focus is on one of the cyber crime which is malware known as Rootkit.

A rootkit is a type of malware that has the capability to conceal itself from the Operating System and antivirus application in a computer. A rootkit provide continuous root level (super user) access to a computer where it is installed. Rootkits, or more generically stealth malware, are software components used to hide objects inside a computer system. Generally, the objects hidden by rootkits are processes and files.

2.3.1 TYPES OF ROOTKITS

Application Level Rootkits: Application level rootkits operate inside the victim computer by changing standard application files with rootkit files, or changing the behavior of present applications with patches, injected code etc.

Kernel Level Rootkits: Kernel is the core of the Operating System and Kernel Level Rootkits are created by adding additional code or replacing portions of the core operating system, with modified code via device drivers (in Windows) or Loadable Kernel Modules (Linux). They can have a serious effect on the stability of the system if the kit's code contains bugs. Kernel rootkits are difficult to detect because they have the same privileges of the Operating System, and therefore they can intercept or subvert operating system operations.

Hardware/Firmware Rootkits: Hardware/Firmware rootkits hide itself in hardware such a network card, system BIOS etc.

Hypervisor (Virtualized) Level Rootkits: Hypervisor (Virtualized) Level Rootkits are created by exploiting hardware features such as Intel VT or AMD-V (Hardware assisted virtualization technologies). Hypervisor level rootkits hosts the target operating system as a virtual machine and therefore they can intercept all hardware calls made by the target operating system.

Boot loader Level (Bootkit) Rootkits: Boot loader Level (Bootkit) Rootkits replaces or modifies the legitimate boot loader with another one thus enabling the Boot loader Level (Bootkit) to be activated even before the operating system is started. Boot loader Level (Bootkit) Rootkits are serious threat to security because they can be used to hack the encryption keys and passwords.

3. REPORT ON PRESENT INVESTIGATION

3.1 ANALYSIS OF CYBER SECURITY TOOLS

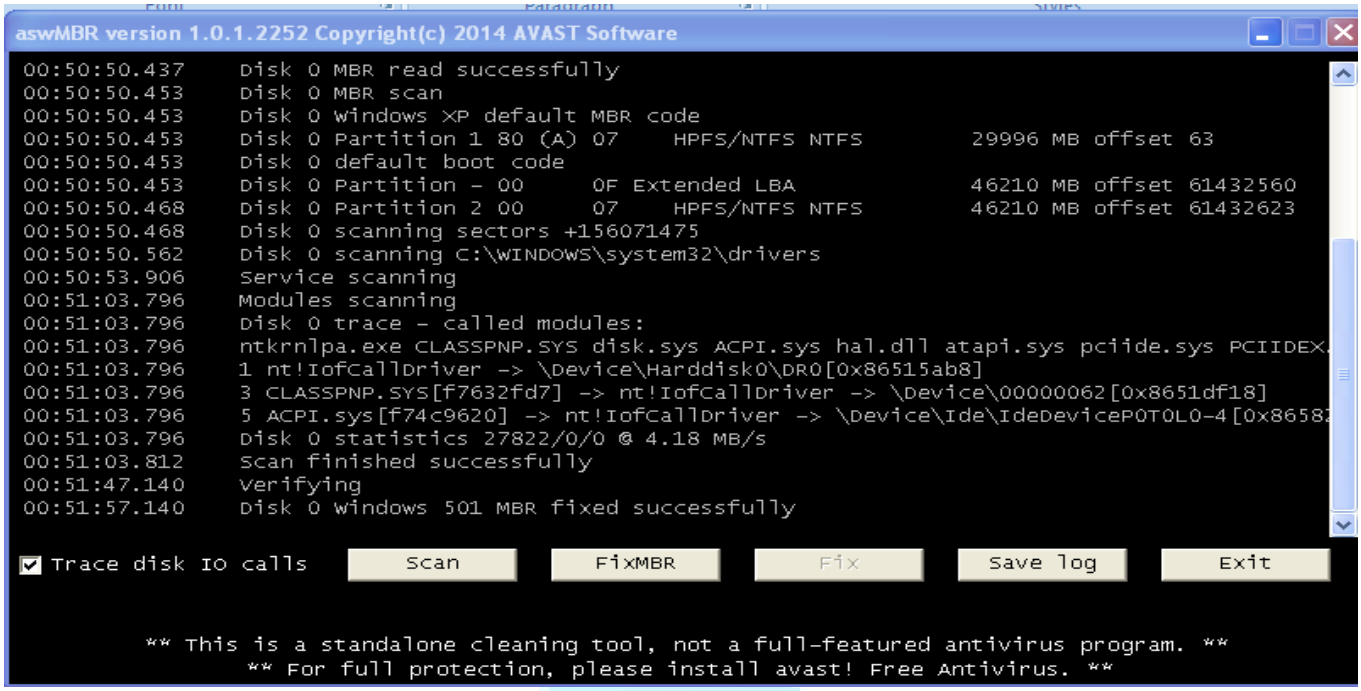
There are different tools in the field of cyber security like firewall analyzers, antivirus programs, anti malware programs, anti root kit tools, debugger tools, monitoring tools. Here in this report we mainly focus on various anti rootkit tools as it is major cyber attack which directly affects the kernel of the operating system.

3.1.1 aswMBR

aswMBR is the Rootkit scanner that scans for MBR/VBR/SRV rootkits. It can detect TDL4/3(Alureon), ZAccess, MBRoot (Sinowal), Whistler, SST, Cidox, Pihar and other malware.

The current version of aswMBR uses Virtualization Technology to improve detection of stealth malware. It lets you scan your computer and MBR for rootkits and even fixes any issues. Removal on the other hand was not as good as some of the other tools. Normally one would have to boot to a Windows XP disc or Windows 7 recovery disc to perform this command but Avast Anti-Rootkit has a built in 'FixMBR' button that with one click will write a new Master Boot Record which is often necessary in the removal of rootkits. Avast aswMBR is a portable program for Windows. The program offers to download the latest antivirus definitions from Avast servers on first start. Those definitions are then used to scan and identify potentially dangerous files that have been discovered by the rootkit scanner. A click on the Scan button starts the scan of the system. Potentially dangerous files are highlighted in yellow and red colors on the screen. Suspicious or infected files are declared as those directly in the interface. The Fix or Fix MBR buttons are used to disinfect the system and remove the rootkit from it. The Windows Registry and local hard drives are automatically selected for the scan next to the running processes.

FIGURE 1: SCANNING AND FIXMBR VERIFICATION



FEATURES

- Quick and efficient
- Avast antivirus compatibility

3.1.2 RootRepeal

RootRepeal is an easy to use utility that detect all the rootkits in order to protect your entire system as well as prevent from crashing all the important information and data in your computer. It shows all drivers that are loaded or hidden rootkits, it will analyze the locked files and scan any drive on the system. Also, it will show all the processes that are currently running and inform you if one of them is hidden or locked as well as determined by looking for typical symptoms if the rootkits are active

FIG. 2: SSDT SCAN OF ROOTREPEAL

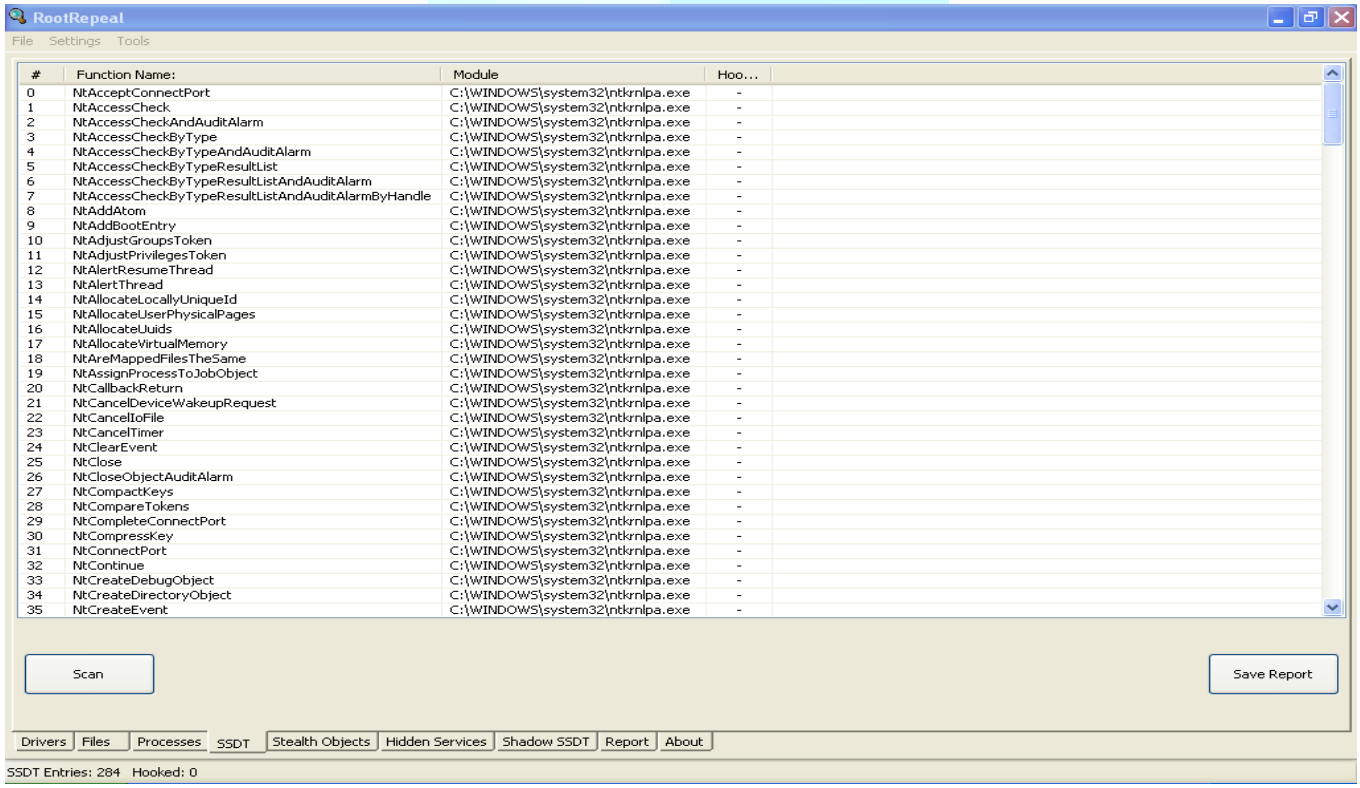
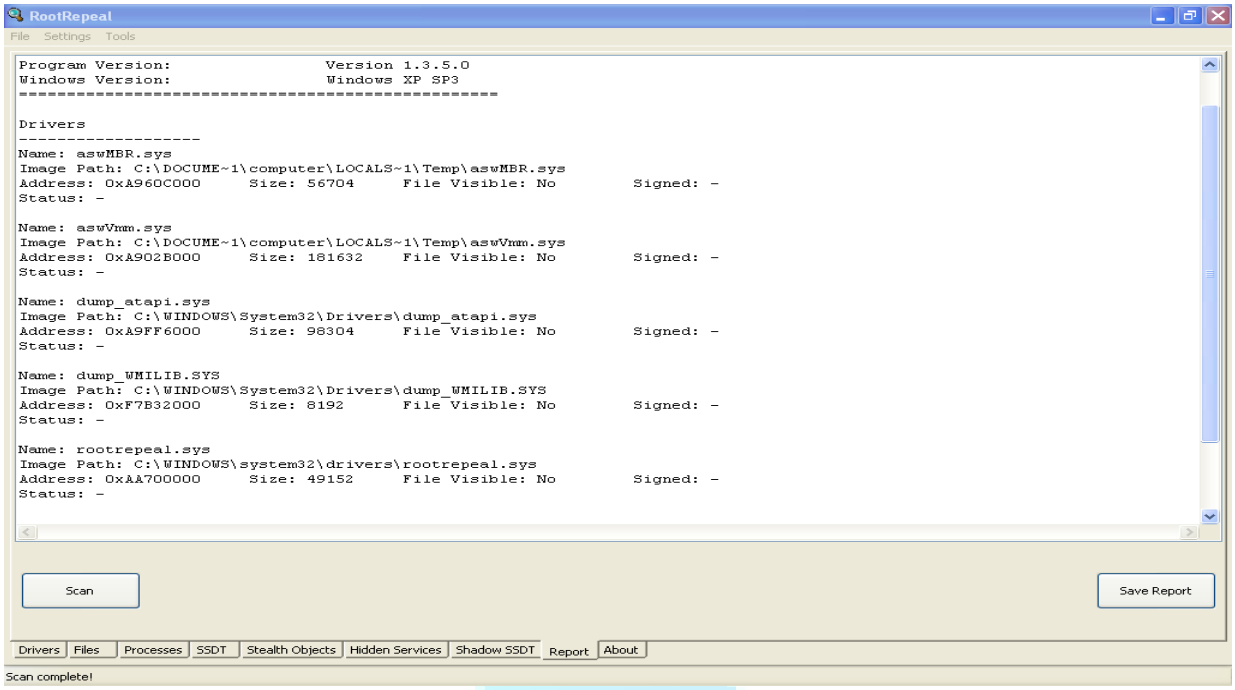


FIG. 3: REPORT OF SCAN ROOT REPEAL



FEATURES

- Easy to use
- Powerful
- Stable
- Safe
- Driver Scan
- Files Scan
- Processes Scan
- SSDT Scan
- Stealth Objects Scan
- Hidden Services Scan
- Shadow SSDT Scan

3.1.3 SanityCheck

SanityCheck is an advanced Rootkit and Malware detection tool for Windows which thoroughly scans the system for threats and irregularities which indicate Malware or Rootkit behavior. By making use of special deep inventory techniques, this program detects hidden and spoofed processes, hidden threads, hidden drivers and a large number of hooks and hacks which are typically the work of Rootkit and Malware. It offers a comprehensible report which gives a detailed explanation of any irregularities found and offers suggestions on how to solve or further investigate any situation.

FIG. 4: ANALYSIS OF SANITY CHECK

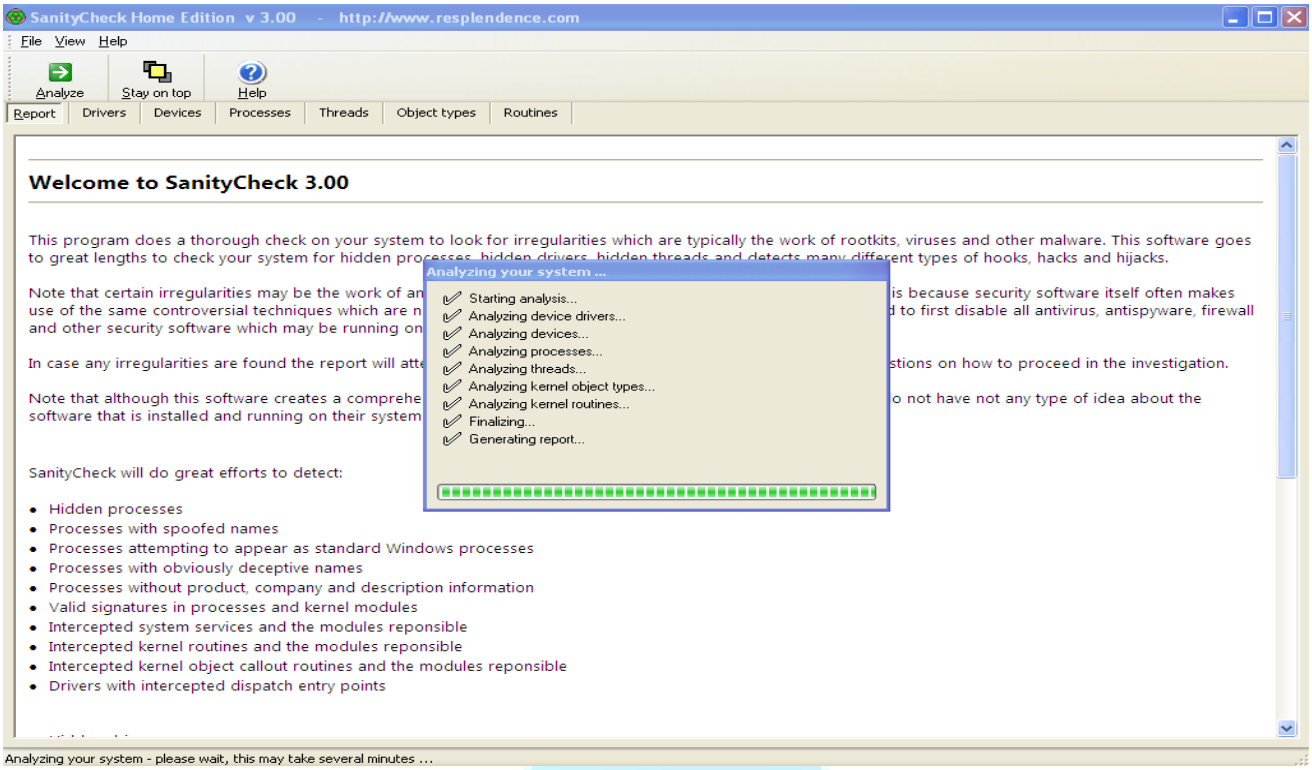
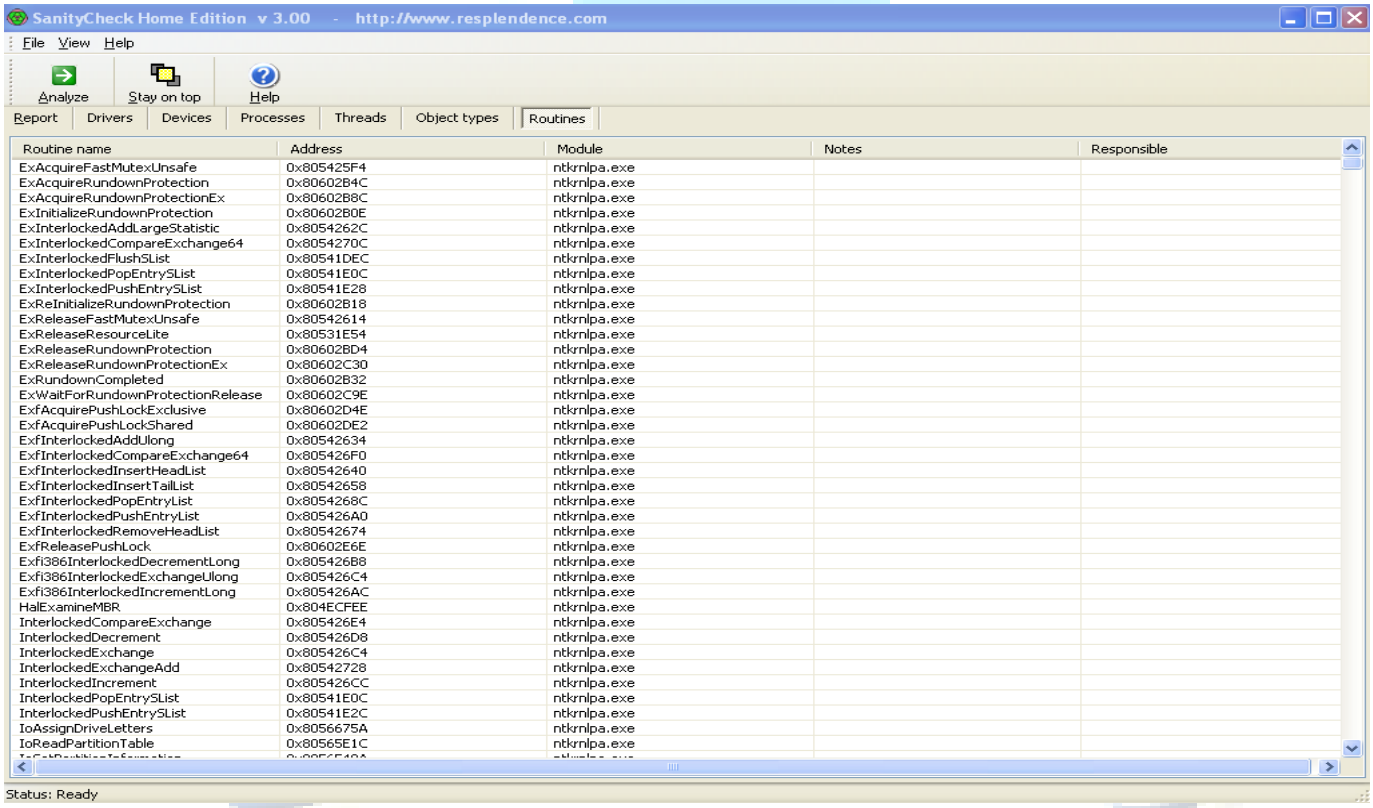


FIG. 5: ROUTINE SCAN OF SANITY CHECK



FEATURES

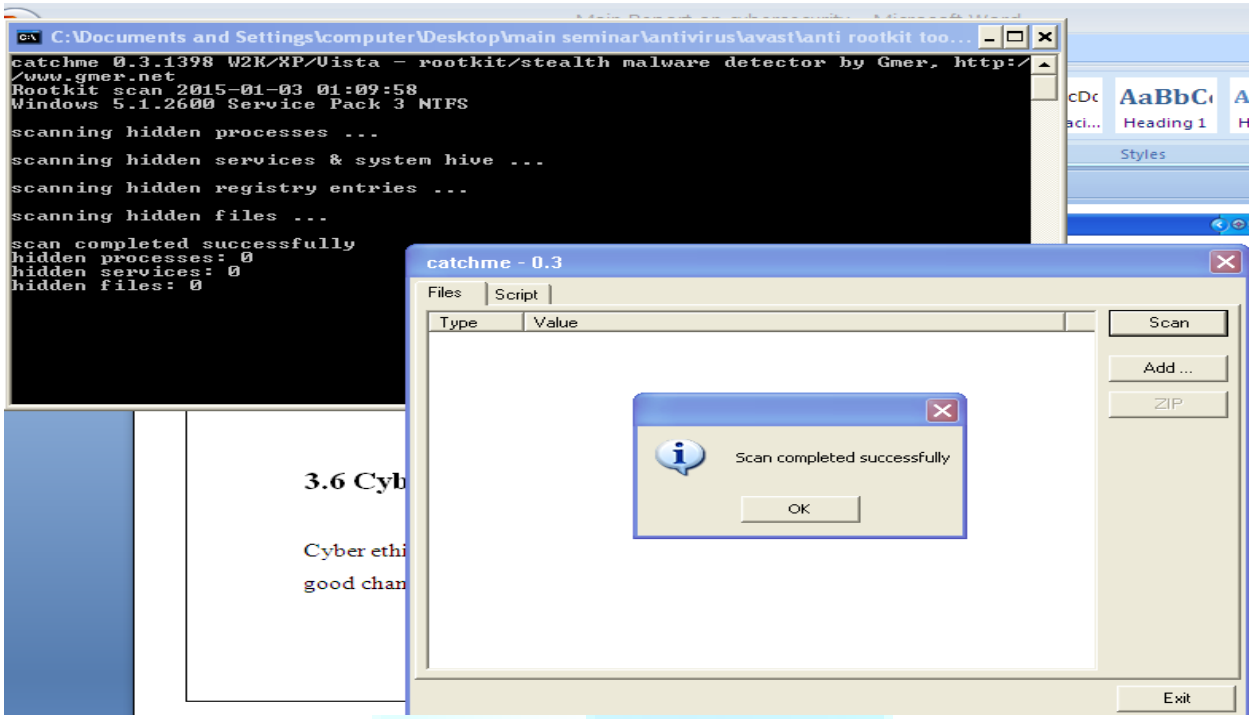
- Runs on almost all Windows versions
- Makes use of special deep inventory techniques
- Detect hidden processes
- Detect obfuscated processes
- Detect processes attempting to appear as common system processes
- Detect processes with obviously deceptive names
- Detect processes without product, company or description information
- Verify signatures and checksums of processes and kernel modules
- Detect SSDT hooks
- Detect Import Address Table hooks

- Detect kernel object callout hooks
- Detect hidden drivers
- Detect hijacked driver entry points
- Comprehensible report
- Optional expert mode

3.1.4 CATCHME

Catchme is the rootkit/stealth malware scanner that scans for hidden processes, hidden registry keys, hidden services, hidden files. Catchme can also delete, destroy and collect malicious files.

FIG. 6: SCAN OF CATCHME



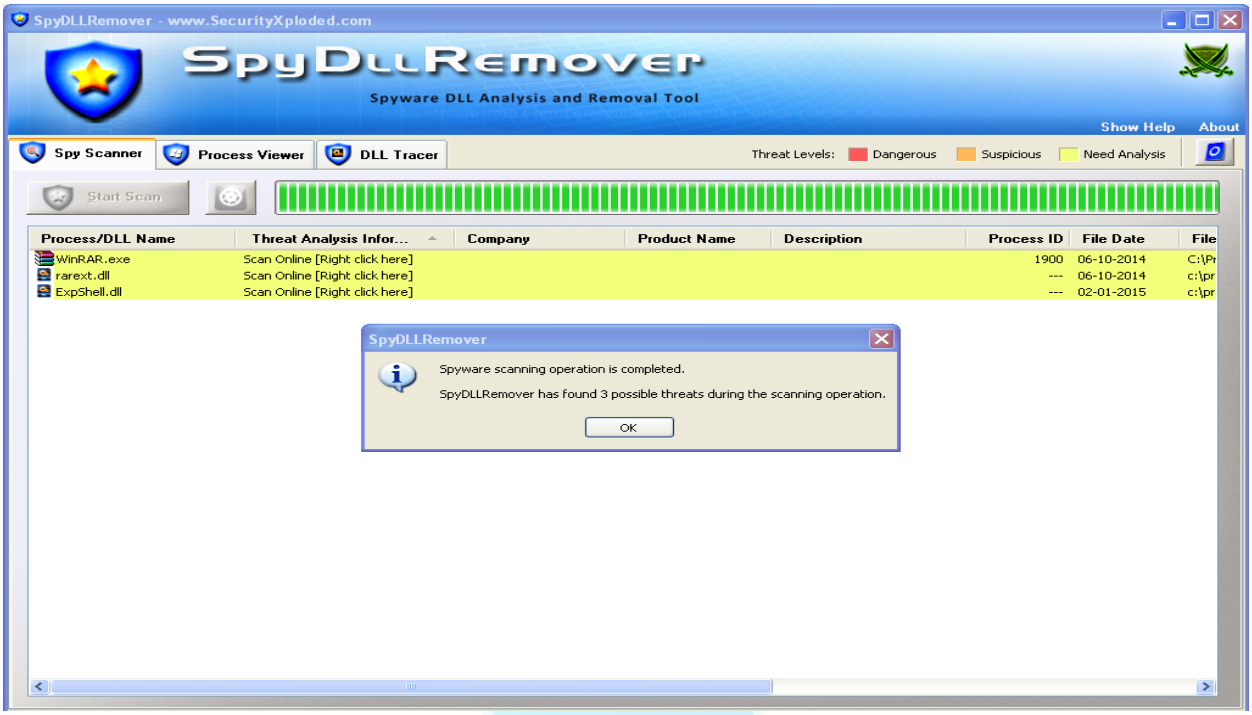
FEATURES

- It scans for hidden processes, hidden registry keys, hidden services, and hidden files.
- Catchme can also delete, destroy and collect malicious files.

3.1.5 SpyDllRemover

SpyDllRemover is the specialized tool for detecting Spyware & Hidden Rootkit Dlls in the System. SpyDLLRemover is one of the apps that could add a new security layer to your computer, trying to detect spyware and hidden rootkits DLLs on your computer. SpyDLLRemover is indeed a handy tool and does its job very fast, scanning the system and letting you act accordingly in case some suspicious files are found on your computer. It's far from being a resource hog and it runs smoothly on all Windows versions, without even asking for administrator privileges when used on Windows 7. Overall, SpyDLLRemover is undoubtedly a very handy piece of software, running on low resources and providing advanced tools to detect any malicious file that may hide on your system.

FIG. 7: SCAN RESULT OF SPYDLLREMOVER



FEATURES

- Advanced spyware scanner
- Hidden rootkit detection and removal
- Unique 'Advanced DLL Ejection' technology
- Sophisticated auto-analysis
- Color-based representation
- Excellent user interface
- Advanced removal reports
- Integrated installer
- Available as a portable app

3.1.6 ROOTKIT UNHOOKER

Rootkit Unhooker is a straightforward utility that gives you the possibility of scanning and removing rootkits from your system. It also lets you terminate processes and drivers, among others. After a brief and uneventful setup procedure that does not require special attention from the user, you are greeted by a standard window with a well-structured layout. It is not eye-catching but easy to navigate. The main window includes multiple panels dedicated to SSDT, shadow SSDT, processes, drivers, stealth code, files, code hooks, and a report.

FIG. 8: CODE HOOKS SCAN OF ROOTKITUNHOOKER

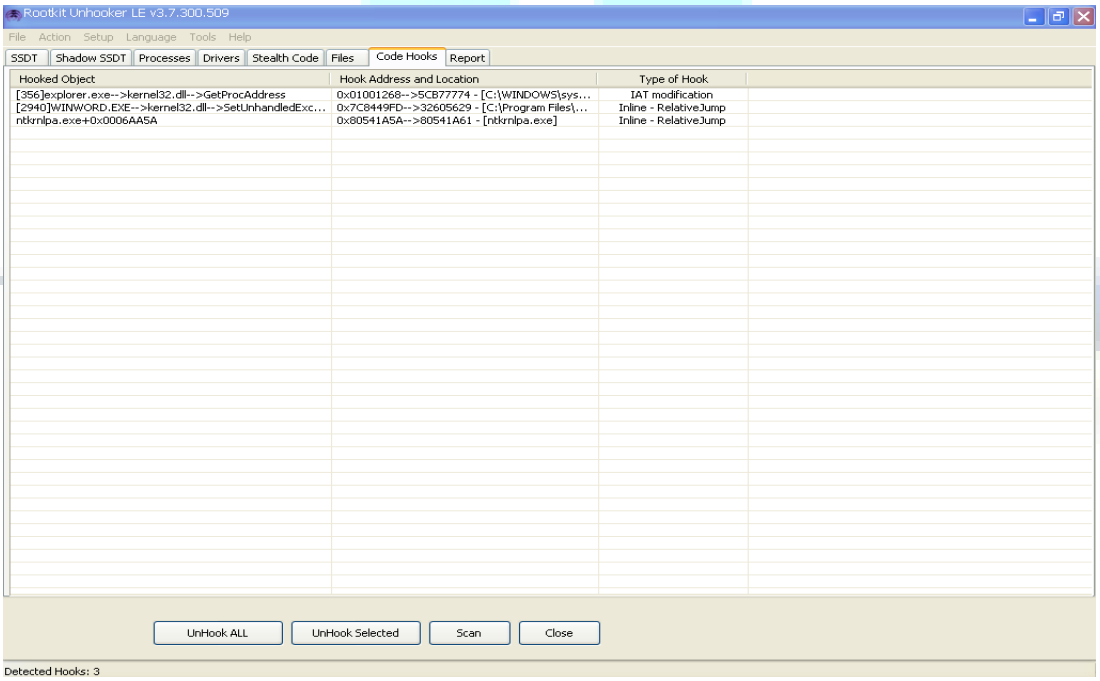
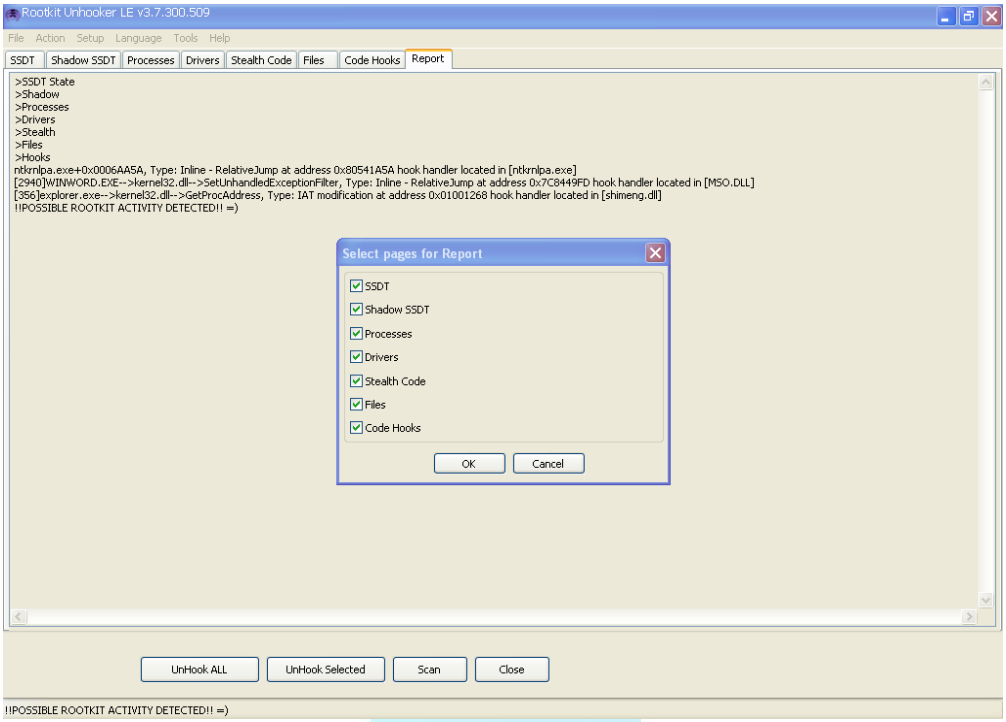


FIG. 9: REPORT OF SCAN OF ROOTKITUNHOOKER



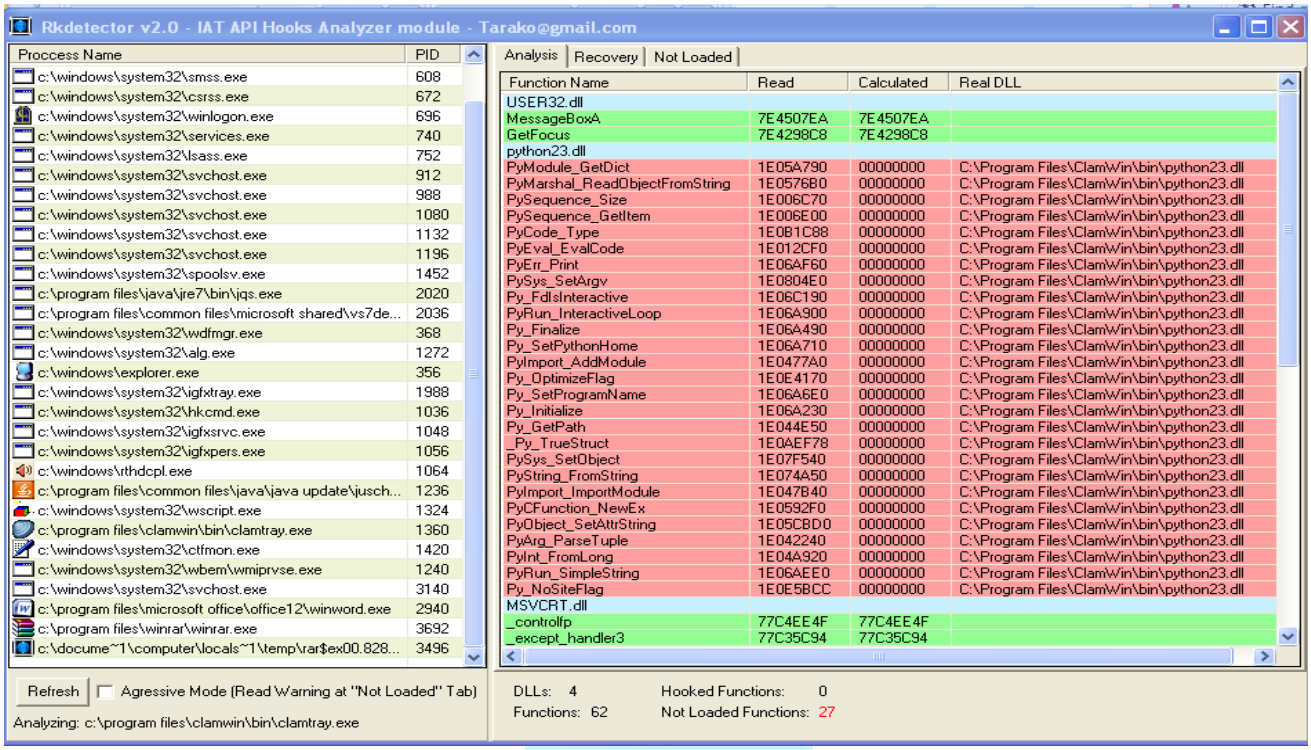
FEATURES

- It scans for SSDT, shadow SSDT, processes, drivers, stealth code, files, code hooks, and provides a report.
- You can unhook one or more selected files, terminate processes (with or without force), view corresponding DLLs, dump all process memory, wipe or copy the file.
- It creates a report with log activity and provides options for exporting it to file for further evaluation.
- User can change the background and text colors, show only hooked functions, hide grid lines, and use standard Disk I/O.
- Settings may be restored to their factory values at any time.
- The application is low-demanding when it comes to CPU and RAM. It has a good response time and finishes a task quickly and without errors.

3.1.7 RKDETECTOR

RKDetector is a diagnostic tool that provides information about hidden process and services hooked by an NT rootkit such as Hacker Defender. After hidden handles are identified, RKDetector will try to kill those hidden tasks and rescan the service database in order to detect hidden services installed by hackers and hidden regkeys (Run, Runonce...). Another feature is that RKDetector have their own internal MD5 database with signatures about known rootkits, exploits and hacking tools that are used to identify malware running in your system. Rkdetector was the first new generation rootkit detector tool, offering same features as the most known sysinternals Rootkit revealer software

FIG. 10: ANALYSIS OF RKDETECTOR



FEATURES

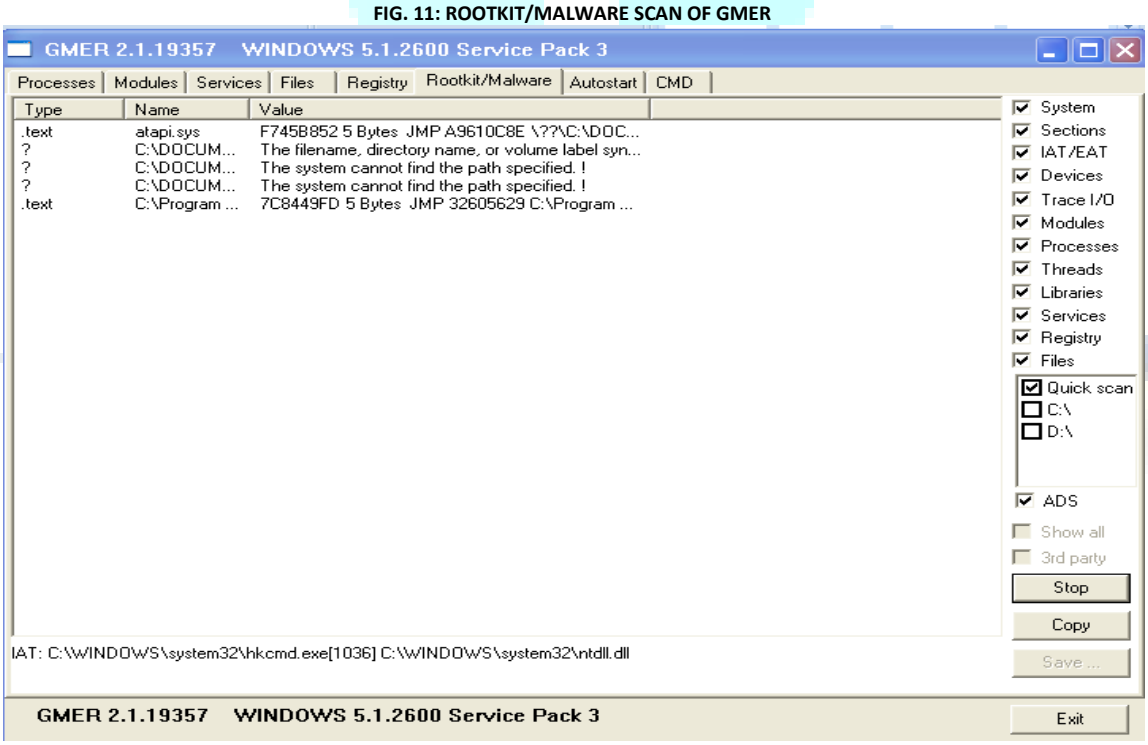
- Hidden file detection.
- Hidden registry keys detection.
- ADS (Alternate Data Streams) detection.
- Rootkit deletion by wiping the used binary files and rebooting the system.
- Data recovery for both FAT32 and NTFS file system.
- File system browser.

3.1.8 GMER

GMER is an application that detects and removes root kits.

It scans for hidden processes, hidden threads, hidden modules, hidden services, hidden files, and hidden disk sectors (MBR), hidden Alternate Data Streams, hidden registry keys, drivers hooking SSDT, drivers hooking IDT, drivers hooking IRP calls, inline hooks. GMER also allows monitoring the following system functions: processes creating, driver's load, libraries loading, files functions, registry entries, TCP or IP connections.

FIG. 11: ROOTKIT/MALWARE SCAN OF GMER



FEATURES

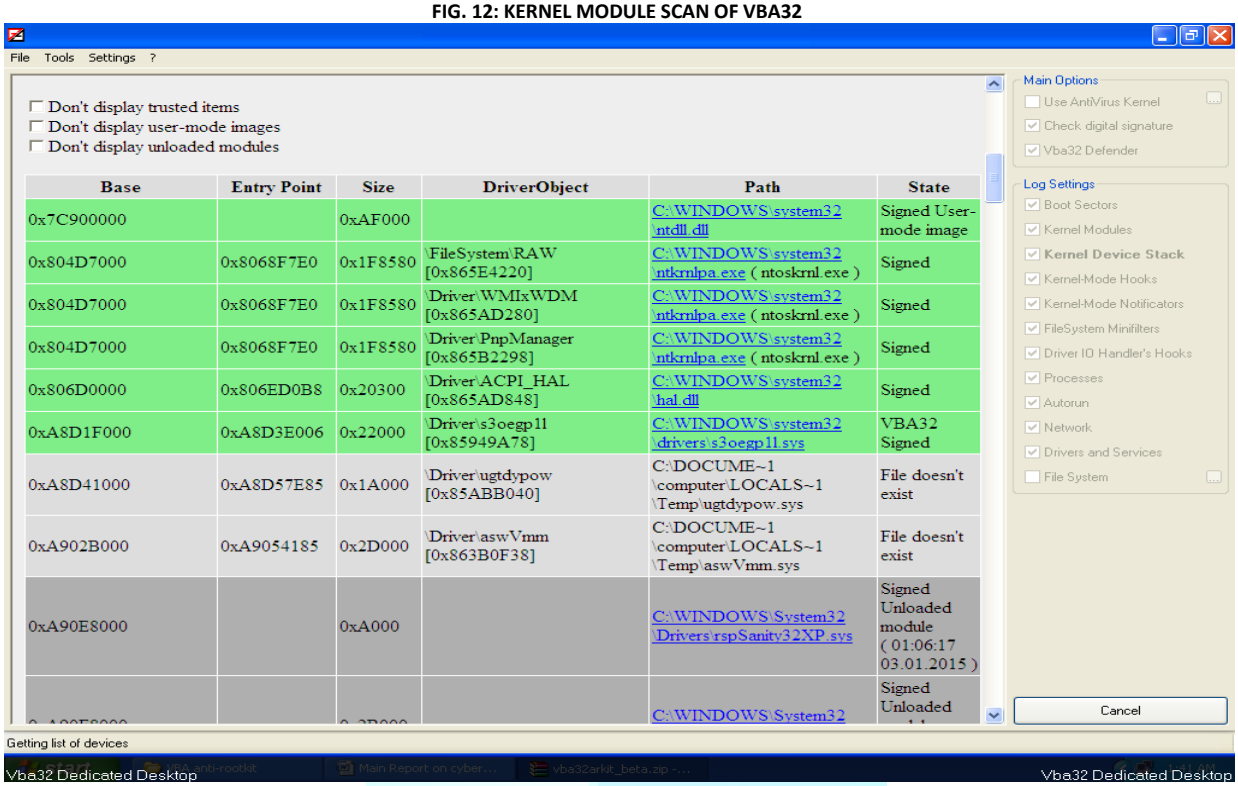
- Intuitive environment

- Scan the computer for malware
- Monitor processes and TCP/IP connections
- Evaluation and conclusion

3.1.9 Vba32 AntiRootkit

Vba32 AntiRootkit is designed to analyze the computer for the anomalies that arise due to the presence of malware in the system. Due to this, you will be able to detect and neutralize both the known and unknown viruses that are present in your system in active state. This program is a good assistant in the work of a specialist struggling with complicated infections.

FIG. 12: KERNEL MODULE SCAN OF VBA32



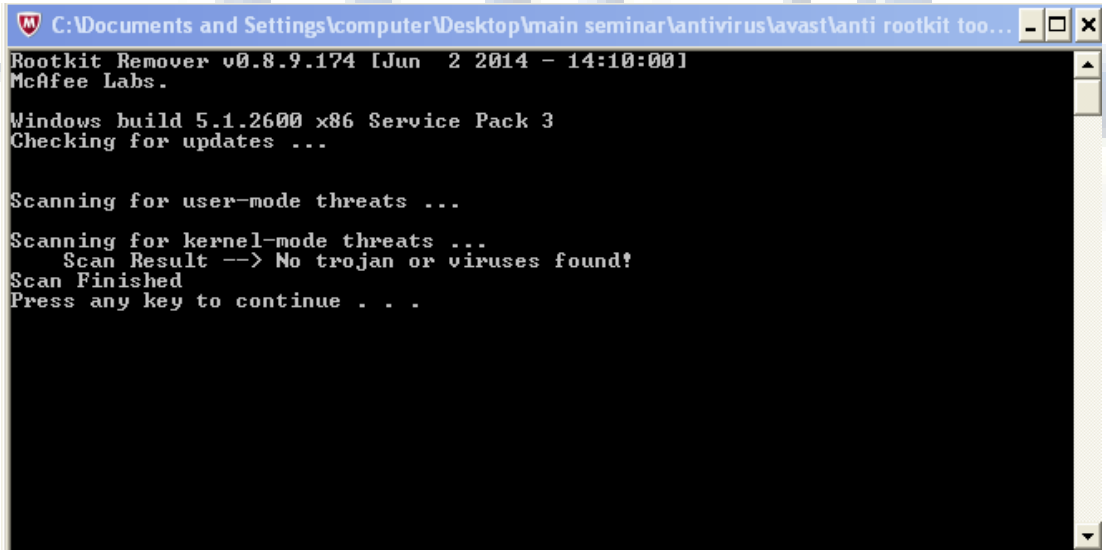
FEATURES

- Free of charge
- Does not require installation
- Can be used with any antivirus software installed on your computer
- Uses a unique feature of the detection of "clean" files
- Can be used in several modes
- Supports the maintenance of a system status report in html format
- Treatment of the system may be done using a scripting language
- Supports Windows 7 XP VISTA
- Help files in Russian and English languages
- Part of Vba32 Personal and Vba32 Check

3.1.10 McAfee Rootkit Remover

McAfee Rootkit Remover is a 538kb standalone freeware 'command-prompt-look-alike' tool that can be used to detect and remove complex rootkits and associated malware. Currently it can detect and remove ZeroAccess, Necurs and TDSS family of rootkits. McAfee Labs plans to add coverage for more rootkit families in future versions of the tool.

FIG. 13: SCAN OF MCAFEE ROOTKIT REMOVER



FEATURES

- Scans, detects and removes rootkits
- Works alongside your existing antivirus
- Open source

4. COMPARATIVE ANALYSIS

On the basis of comparison of the tools following is the table:

TABLE 1

Anti-Rootkit tools	Version	Active	Memory Scanning	Register Scan	Driver Scan	SSDT Scan	Scan Time(min)	Hooking detection	Removal	Best Features
aswMBR	1.0.1.2252	Yes	Yes	No	No	No	0.23	No	yes	Memory Scan
RootRepeal	1.3.5.0	Yes	Yes	No	Yes	Yes	0.50	No	Yes	All Scans
SanityCheck	3.00	Yes	Yes	No	Yes	No	0.20	No	No	Driver Scan
Catchme	0.3	Yes	Yes	No	No	No	0.15	No	Yes	Removal
SpyDllRemover	6.0	Yes	Yes	No	No	No	0.10	No	No	Memory Scan
Rootkit Unhooker	3.7.300.509	Yes	Yes	No	Yes	Yes	7.30	Yes	Yes	Hooking
RKDetector	2.0	Yes	No	No	No	No	1.00	No	Yes	Hooking
GMER	2.1.19357	Yes	Yes	Yes	Yes	Yes	9.05	Yes	Yes	Removal
Vba32 AntiRootkit	3.12.5.4	Yes	Yes	No	No	No	12.05	Yes	No	Hooking
McAfee Rootkit Remover	0.8.9.174	Yes	Yes	No	No	No	1.00	No	Yes	Removal

As per the above table we identified the best tools to be used for detecting rootkits. They will fall under two categories:

FOR NAÏVE USERS

For the beginners or naïve users who does not have any knowledge related to hooking and various types of scan such as SSDT, SPYDLLRemover and GMER are the best tools to work with as they does not include complex terms like hooking and SSDT kernel modules which are not user friendly and user is easily able to view processes, modules, files in the system.

FOR PROFESSIONALS

For the IT professionals who have thorough knowledge of various terms used in security, RootkitUnhooker and VBA32 Anti Rootkit are the best tools to use as Rootkit Unhooker provided ability to unhook the Rootkit attached to the code and VBA32 provides all the kernel modules driver files location size related information which can be used to detect rootkits residing in the kernel of the system.

5. CONCLUSIONS

Cyber security is the ongoing process of exercising due care and due diligence to protect information, and information systems, from unauthorized access, use, disclosure, destruction, modification, or disruption or distribution. In the report various anti Rootkit tools are studied and analyzed on the basis of different parameters and reached to the conclusion that for the beginners or naïve users who does not have any knowledge related to hooking and various types of scan such as SSDT, SPYDLLRemover and GMER are the best tools to work with as they does not include complex terms and for IT professionals who have thorough knowledge of various terms used in security, RootkitUnhooker and VBA32 Anti Rootkit are the best tools to use as Rootkit Unhooker provided ability to unhook the Rootkit attached to the code and VBA32 provides all the kernel modules driver files location size related information which can be used to detect rootkits residing in the kernel of the system.

Based on the results of the Anti Rootkit scans, further research should focus on developing an optimal set of heuristic-based rules to detect rootkit activity, which maximizes the rate of detection while minimizing the rate of false positives. By focusing on dynamic behavior, it is likely that an ARK developer will keep up with the latest threats and provide better overall security.

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DETERMINANTS OF THE CUSTOMER LOYALTY IN ETHIOPIAN BANKING INDUSTRY (WITH REFERENCE TO PRIVATE COMMERCIAL BANK)

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ABSTRACT

The main purposes of present stuey are to identify determinants of the customer loyalty in Ethiopian banking industry with reference to private commercial bank. To collect the necessary data the researcher mainly conducted using primary data collected using a questionnaire survey conducted with 168 samples selected customers in Addis- Ababa and employed a descriptive statics for data analysis.. The findings result from this study discloses that customer satisfaction, service quality, customer value corporate image, and trust were the most determinant of customer loyalty in the bank.

KEYWORDS
Customer locality, corporate image, customer value, trust, Addis Ababa.

1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Banking has traditionally operated in a relatively stable environment for decades. However, today the industry is facing a dramatically aggressive competition in a new deregulated environment. Government of Ethiopia has privatized quite a number of banks which further increases the competition and complexity among the banks. The net result of the recent competition and legislation is that traditional banks have lost a substantial proportion of their domestic business to essentially non-bank competition. Competition will undoubtedly continue to be a more significant factor to handle the existing and attract a lot of customer.

So many researches directly or indirectly reveal that customer retaining and attracting are a powerful weapon to win the competitor and to attain bank objectives. Because customers are the source of profits to be earn by a profit making organization. i.e the survival of organizations depends on its customers. Thus, customers are the backbone and lifeline of organizations. Often it is said that without customers there is no business (Shifera B. 2011). So, Companies increasingly look to quality, satisfaction and loyalty as keys to achieving market leadership. Understanding what drives these critical elements, how they are linked (Cronin et al. 2000, p. 210).

Another research Jones (2002) support that Success of a service provider depends on the high quality relationship with customers which is determines customer satisfaction and loyalty.

Loyalty to a bank can be thought of as continuing patronage over time. The degree of loyalty can be gauge by tracking customer accounts over defined time periods and noting the degree of continuity in patronage (Shifera B. 2011).

In the new market place, the occurrence of committed and often inherited relationships between a customer and his or her bank is becoming increasingly scarce (Lee and Feick, 2001).Several strategies have been attempted to retain customers. In order to increase customer loyalty, many banks have introduced innovative products and services (Alam and Khokhar, 2006). Marketing success requires understanding and frequently monitoring the product and service attributes which increase loyalty and share of wallet.

The purposes of this research are to identify the determinant/factors to influencing the customer loyalty within Ethiopian private commercial banks. In order to do this, the previous studies were reviewed. According to (Beerli et al., 2004) the factors which have influenced the customer loyalty in banking industry have been selected which are perceived quality, satisfaction and switching cost.

1.2 STATEMENT OF THE PROBLEM

During the past decade, the financial service sector has undergone drastic changes, resulting in a market place which is characterized by intense competition, little growth in primary demand and increased deregulation. Government of Ethiopia has allowed to be privatized; quite a number of banks which further increase the competition and complexity among the banks. This by itself creates a strong
competition between banks. To compete and win the competitors, the marketers are forced to look beyond the traditional 4Ps of marketing strategy (Shifera B. 2011).

In the banking industry, the ultimate objective is to maximize profit of the firm. To maximize the dividend of the shareholder, offering quality services is unquestionable tasks of the banks. Quality of services has the power to create customer satisfaction and leads to the customer to be loyal for banks. On the other hand poor quality of services results in customer dissatisfaction and customer defection by going to other competitors (Shifera B. 2011).

Retaining the profitable customers has become increasingly difficult in a competitive environment where other financial institutions specialize in offering attractive services and prices to this rewarding segment (Leverin and Liljander, 2006).

Sustainable and continuous survival of an organization mainly depends on its business relation with its customers. It means that the customer loyalty is the basic determinant factors of the bank success. Therefore when business firms direct their resources and all their efforts for better accomplishment of their intended purposes, growth and profitability is entirely influenced by the quality and reliability of their service. These could be done through delivering a service that could increase the acceptance of the organization in the face of the customers.

To do all the above mentioned issues, or generally to maximize the dividend of the shareholder, banks need to know the basic determinates of the customer loyalty. To know the determinants of customer loyalty the researcher wants to raise the following basic questions.

1. What are the key drivers' factors of customer loyalty in private commercial banks in Ethiopia and how they are going to affect?
2. What are the relationships between these factors?

1.3. OBJECTIVES OF THE STUDY

GENERAL OBJECTIVE

The general objective of this study is to identify the basic determinants of the customer loyalty in Ethiopian banks.

SPECIFIC OBJECTIVES

The specific objectives of the study are as follows:

1. To identify the factors that affect customer loyalty in private commercial banks of Ethiopia
2. To identify the relationships between these factors

1.4. SIGNIFICANCE OF THE STUDY

Customers' loyalty is important to any organization in terms of enhancing their profit. Without customers it is impossible for organization to enhance or grow their businesses. By observing and studying their customers' behavior, bank can develop strategies which can give them more profit. In the service sector like banking industry, really need to be more alert of their customer needs and wants. In order to sustain their competitiveness in the marketplace, each bank needs to provide the excellent service towards their entire of customers. If the firms failed to maintain and enhance their services, it is impossible for them to achieve their targets. In general to be attaining profit maximize objective, financial service providers like banks should know the basic determinants of the customer the customer loyalty. This study gives a clear cut pictures for the banks on the basis determinants of customer loyalty. . Besides adding a brick to the body of knowledge on the subject, the output of the study could also be informative for development practitioners interested to operate and strengthen private commercial bank of Ethiopia. Furthermore, the study will contribute to the literature of the country on the subject and use as a boulevard and interested researchers to carry out more extensive studies for further research work.

2. REVIEW OF RELATED LITERATURE

Bei and Chiao (2001) have made study an integrated model for the effects of perceived product, perceived service quality, and perceived price fairness on consumer satisfaction and loyalty. The finding confirmed that when consumers perceive that the price of a service or product is reasonable, they are likely to respond through repeat purchase behavior, whereas if the worthwhile in relation to their sacrifices, they are likely to avoid future repurchase behavior, even when they are satisfied with the quality of the service or product.

Gronholdt et al., (2000) have conducted a study on Loyalty –attitude behavior and good Science. The main finding revolves on satisfaction has a direct and powerful impact on customer loyalty.

Ndubisi (2007) finding suggested that the greater the trust in the bank, the higher the level of the bank's commitment, the more reliable and timely its communications and the more satisfactorily it handles conflicts, the more loyal its customers will tend to be. Effective communication affects customers to stay with a provider of banking services.

Fornell (1992) investigate different methods that help to improve the customer satisfaction. under this study the researcher try to measure the impacts on profitability .from the finding can get that customer satisfaction is one the important determinants, positively related to customer locality

Fornell, Johson, Anderson, Cha and Bryant (1996) under this thesis the researchers try to see the America customer satisfaction index. They pointed out that increased customer satisfaction is immediately followed by decreased customer complaints and increased customer loyalty.

Cronin, J.J., Brady, M.K., & Hult, G.T.M. (2000) Assessing the effects of quality, value and customer satisfaction on customer behavioral intentions in service environments. They assured that Customer satisfaction has received considerable attention due to its importance in the customer relationship management literature and indeed its impact on customer loyalty.

Zeithaml, V.A., Berry, L.L. and Parasuraman, A. (1993) investigate the nature and determinants of Customer expectations of service. The researchers are taken four service providers as a sample. They observed a significant relationship existing between service quality and loyalty; and also considerable evidence suggesting that service quality functions as an antecedent to customer satisfaction and consequently to customer loyalty.

Holbruk (1994) conduct a study on the nature of customer value: an axiology of services in the consumption experience, in service quality. The finding of the study shows that customer perceived the fundamental basis for all marketing activity as better value constitutes a key motivation for customer repurchase intentions.

Woodruff (1997) has made a study on Customer value and its competitive advantage. The investigation result explain that Customer value is a strategic weapon in attracting and retaining customers and has become one of the most significant factors in the success of both manufacturing and service providers .

Yang and Peterson (2004) conduct a study Customer Perceived Value, Satisfaction, and Loyalty: The Role of Switching Costs. Under this study the researchers was investigated online consumers. The result show that all found perceived value to be a strong predictor of customer satisfaction and behavioral intentions or customer loyalty.

Bloemer, J., & De Ruyter, K. (1998) examine the relationship between store image, store satisfaction and store loyalty on their own research. From their own journal a vast body of literature has indicated that firms possessing good corporate image are better able to strategically differentiate themselves since image is linked to a core aspect business success such as customer repurchase or loyalty.

Burnham et al, (2003) conducted a the study on Consumer Switching Costs: A Typology, Antecedent, and Consequences, the finding to the study was suggest that Switching costs are related to the act of switching the provider and have been shown to influence loyalty positively.

Morgan, R.M. & Hunt, S. (1994) has made a study on the commitment –trust theory of relationship marketing. The finding of the study confirmed that Trust is one of the determinants of loyalty which has recently received much attention and has been claimed to be a better predictor of loyalty than satisfaction.

3. RESEARCH METHODOLOGY

3.1. INTRODUCTION

This section presents the research methodology and methods employed to conduct the study. The section includes: the study area and period, target population, source of data, method of data collection, sampling technique and sample size, and method of data analysis.

3.2. STUDY AREA AND PERIOD

The study was conducted in Addis Ababa charted city of Ethiopia, Addis Ababa status of both city and state. It is where the African union and its predecessor the organizations of African union are based. It also hosts the headquarters of the united nation economic commission for Africa (UNECA) and numerous other continental and international organizations. Addis Ababa is therefore often referred to as 'the political capital of Africa' due to its historical, diplomatic and political significance for the continent.

3.3. TARGET POPULATION

The study was conducted to identify the determinants of customer loyalty in Ethiopian private commercial banks. The study was consider private commercial banks, which are established from 2000 E.C that are exists in Addis Ababa and the customer who has been up to 2012. The numbers of banks has 7. Those are Awash International Bank(1994) taken as a sample Leghar branch, Bank of Abyssinia (1996) taken as a sample Abinet , Wegagaen Bank (1997) taken as a sample Arada branch, United Bank(1998) taken as a sample Urael branch, Nib International Bank(1999) take as a sample Bisrate Gibrele branch, Dashen Bank (1995) take as a sample Lideta branch, Lion International Bank (1998) take as a sample Sengatera, Oromia International Bank(2000) take as a sample Mesalemia branch. The total populations are 67252.

3.4. SAMPLE SIZE

Use of sampling can save time and money (economical) and enable the researcher to obtain detailed information as the number of sample unit is fairly small, these can be studied intensively and elaborately. For the purpose of the study, the sample size was taken based on the following formula.

$$No = \frac{(t)^2 * (p)(q)}{(d)^2}$$

Where t = value for selected alpha level of .025 in each tail = 1.96.

d = acceptable margin of error for proportion being estimated = 0.05

(p)(q) = estimate of variance = 0.25 (Taking P=0.5 gives the maximum sample size)

No $= \frac{(1.96)^2 * (0.5)(0.5)}{(0.05)^2} = 384$

Therefore, since the initial sample size is greater than 5% of the population (329*.05=16.45) Cochran's (1977) correction formula should be used to calculate the final sample size.

These calculations are as follows:

$n_1 = \frac{384}{(1+384/67252)} = 381$

Where the population size = 67252

No = required return sample size according to Cochran's formula (1977)

n_1=required return sample size because sample greater than 5% of population.

Accordingly, the researcher distributes the questionnaires by looking their list of the trade participant.

3.5. SAMPLING TECHNIQUE

It is fact that, if the population to be studied is large and infinite it is very difficult to undertake a census survey. Therefore, taking sample (sampling) is necessary. In this study the researcher was used two probability sampling techniques. Such as: stratified and simple random sampling techniques. The researcher was used stratified sampling techniques make strata among branches in Addis Ababa. After creating strata the researcher was used simple random Sampling technique to select the customers. Simple random sampling technique was used in this research because it provides an equal and nonzero chance of being selected for each customers of the bank.

3.6. METHOD OF DATA COLLECTION

The study was mainly conducted using primary data. Basically in any field of research, selection of data collection method depends on the nature and type of research, the type of data. Accordingly, primary data was collected by using structured questionnaire from the sample customers. Primarily, the questions were prepared in English language and converted to local languages (Amharic). To collect data from respondents a trained data collectors, who speak the three languages used in the data collection instrument, conducted a face to face interview with sampled managers. Moreover, secondary data relevant to the study were collected through a review and analysis of documents and related literatures, including, journal articles, conferences papers and other materials.

3.7. METHOD OF DATA ANALYSIS, PRESENTATION AND INTERPRETATION

After gathering the data from the respondents, the researcher classified and coded the data according to their similarity to make it suitable for analysis. Then, the data entered to computer software, SPSS version 20, used to perform the data analysis. The study followed descriptive statistics to univariately describe the study variables and inferential statistical techniques (Correlation coefficient and Pearson Chi Square) to explore the relationship the between the factors were used to achieve the research objectives.

4. RESULT AND DISCUSSION

This section presents the results of data analysis and discussion of findings made in light of the reviewed literatures.

4.1. DESCRIPTION OF STUDY VARIABLES

The variables under study include respondents' socio demographic, income and the years of the customer that you stay in a bank.

4.1.1 SOCIO –DEMOGRAPHICS OF RESPONDENTS

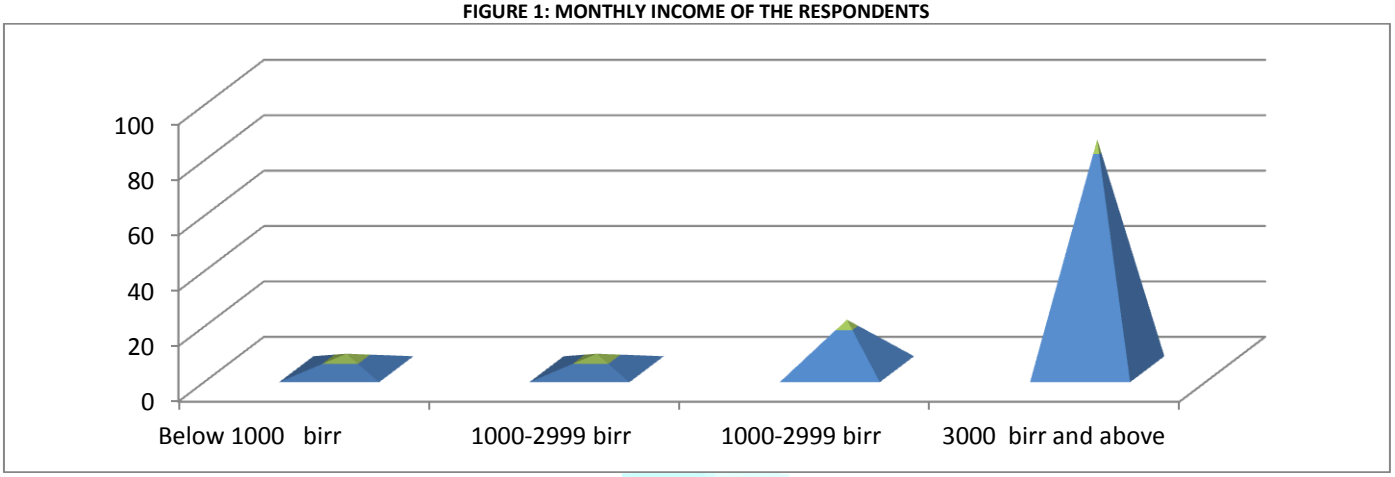
TABLE 1

Gender	**Category**	Frequency	Percentage	valid percentage
	Male	90	53.6	53.6
	Female	78	46.4	46.4
	Total	**168**	**100.0**	**100.0**
Ages of the respondents	18-30	78	46.4	46.4
	31-40	84	50.0	50.0
	41-50	5	3.0	3.0
	Above 50	1	.6	.6
	Total	**168**	**100.0**	**100.0**
Educational status	Illiterate	0	0	0
	Read and write	0	0	0
	Primary level	4	2.4	2.4
	secondary level	123	73.2	73.2
	Tertiary	41	24.4	24.4
	Total	**168**	**100.0**	**100.0**
Occupation	Category	Frequency	Percent	Valid percent
	Merchant	131	78.0	78.0
	Student	6	3.6	3.6
	Government employee	6	3.6	3.6
	Farmer	25	14.9	14.9
	Other	0	0	0
	Total	**168**	**100.0**	**100.0**

Source: own computation from survey data

Table 1 showed that of the total sample53.6 % were male and the remaining 46.4 % of them were female. Observations from table 1 also indicated that most of the respondents (50%) fall in the age category of 31 – 40, whereas 46% of the respondents were in the age category 18-30 the remaining 3 % and 1 of the respondent were the age category 41-50 and above 50 respectively. It was also shown on table 1, of the total sampled, customer educational status , 73.2% of the respondents were secondary level completed, 24% 0f the respondents were tertiary level completed the remaining 2.4% of the respondents were primary level completed from the data can understand that majority of the respondent were secondary completed. Regarding the occupation of participants, majority of the respondents 78% were found to be full time merchants. The rest of the respondents 25%, 6% and 6 % were farmers, government employees and student's respectively. This implies that respondents were participating in the Ethiopian commodity exchange as par timers.

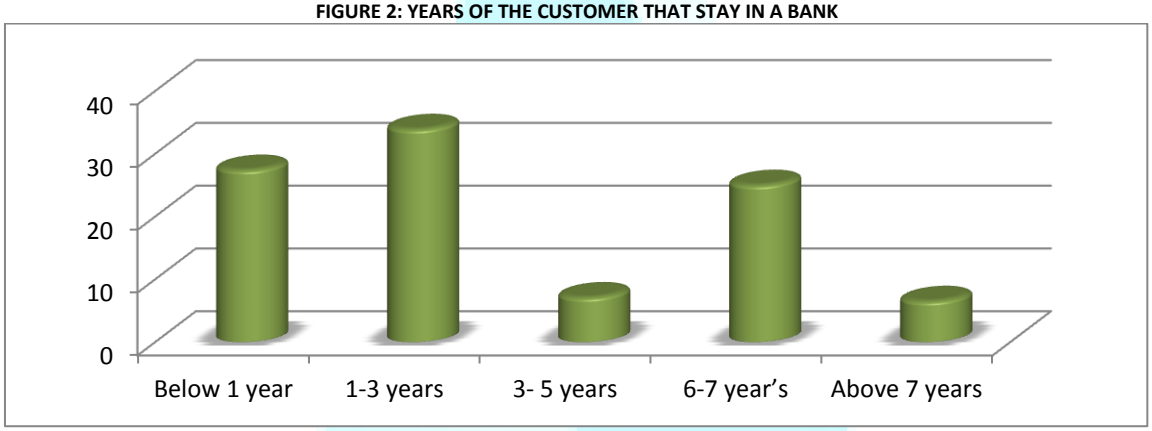
FIGURE 1: MONTHLY INCOME OF THE RESPONDENTS



Source: own computation from survey data

The above figure 1 show that the income of the respondents, 78% of the respond monthly income were above 3000 birr, 14.9 % were the income 1000-2999 birr, the remaining 3.6% , 3.6% of the respondent have generating income 1000-2900 and below 1000 respectively.

FIGURE 2: YEARS OF THE CUSTOMER THAT STAY IN A BANK



Source: own computation from survey data

The above figure 2 shows that the time period that the customer stayed in a bank as a customer, 27.4%,33.9%, 7.1%,5%, 6.5% of the respondents were below 1 year,1-3 years,3-5 years and 6-7 years, above 7 years customer respectively.

4.1.2 CUSTOMER SATISFACTION

TABLE 2: CUSTOMER SATISFACTION

	Category	Frequency	Percentage	valid percentage
1. Over all, I am very satisfied with the service offered by the bank?	Strongly agree	46	27.4	27.4
	Agree	57	33.9	33.9
	No opinion	12	7.1	7.1
	Disagree	42	25.0	25.0
	Strongly disagree	11	6.5	6.5
	Total	**168**	**100**	**100**

Source: own computation from survey data

The above table 2 shows that the satisfactions of customer by the existing service, from the given respondents 61.3% assured that are satisfied by the service of the bank. Whereas 7.1 % of the respondents were keep in silent to say anything about the satisfaction level offered by the bank. The remaining 31.5% respondent's confirm that they are not satisfied by the existence service.

From the open ended question the researcher also asked that the continuity as a customer of the bank and the readiness to recommend others, majority of the customer said that until the banks are satisfied me, I will proceed as a customer of the bank and recommended to the others to use the bank service.

4.3 SERVICE QUALITY

TABLE 3: SERVICE QUALITIES

1. Overall service quality is excellent	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	18	10.7	10.7
	Agree	111	66.1	66.1
	No opinion	14	8.3	8.3
	Disagree	22	13.1	13.1
	Strongly disagree	3	1.8	1.8
	Total	**168**	**100.0**	**100.0**
2.Easy to access service	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	24	4.8	4.8
	Agree	8	4.8	4.8
	No opinion	31	18.5	18.5
	Disagree	5	3.0	3.0
	Strongly disagree	100	59.5	59.5
	Total	**168**	**100**	**100**
3.Quality of customer care services	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	21	12.5	12.5
	Agree	110	65.5	65.5
	No opinion	6	3.6	3.6
	Disagree	27	16.1	16.1
	Strongly disagree	4	2.4	2.4
	Total	**168**	**100**	**100**

Source: own computation from survey data

The above table 3, implies that the quality of service provided by the bank, from the given respondents 76.8% are they agree getting a quality service from the bank, whereas 8.3% of the respondents are no opinion about this issue. The reaming 14.9% of the respondents are not agrees with getting quality service by the bank. Form the finding can understand that most of the respondents are agreed that the banks are offering quality service. Concerning to the accessibility of the service of the bank, from the given respondents 9.6% are they agreed that the accessibility of the service offered by the bank are good whereas the 18.5% of the respondents are no opinion about the issue. The reaming 62.5% of the respondents were disagreed for the accessibility of the service. Regarding to customer care service, from the sample population 78% of the respondents said that the bank give a proper care for the customer while 3.6% of the customer said no opinion about customer care service and the reaming 18.5% respondents said that the banks are not give a proper care service for the customer.

From the open ended question the researcher also asked that are the sustainability of the customer, they said that until they get good quality service, accessibility of the service and getting customer care service we will continue as a customer of the bank and the reverse is true.

4.1. 4 CUSTOMER VALUE

TABLE 4: CUSTOMER VALUE

1.Ready to amend the customer needs, Made any discrimination between the customer by the bank	**Category**	**Frequency**	**Percentage**	**valid %age**
	Strongly agree	19	11.3	11.3
	Agree	112	66.7	66.7
	No opinion	10	6.0	6.0
	Disagree	24	14.3	14.3
	Strongly disagree	3	1.8	1.8
	Total	**168**	**100.0**	**100.0**
2.Made any discrimination between the customer by the bank	**Category**	**Frequency**	**Percentage**	**valid %age**
	Strongly agree	36	21.4	21.4
	Agree	109	64.9	64.9
	No opinion	3	1.8	1.8
	Disagree	17	10.1	10.1
	Strongly disagree	3	1.8	1.8
	Total	**168**	**100**	**100**
3.Giving high value for the customer	**Category**	**Frequency**	**Percentage**	**valid %age**
	Strongly agree	22	13.1	13.1
	Agree	114	67.9	67.9
	No opinion	18	10.7	10.7
	Disagree	11	6.5	6.5
	Strongly disagree	3	1.8	1.8
	Total	168	100.0	100.0
4.Promptness in complaint handling	**Category**	**Frequency**	**Percentage**	**valid %age**
	Strongly agree	21	12.5	12.5
	Agree	110	65.5	65.5
	No opinion	6	3.6	3.6
	Disagree	27	16.1	16.1
	Strongly disagree	4	2.4	2.4
	Total	168	100.0	100.0
5.Variety of service plans that meet my needs	**Category**	**Frequency**	**Percentage**	**valid %age**
	Strongly agree	6	3.6	3.6
	Agree	29	17.3	17.3
	No opinion	2	1.2	1.2
	Disagree	102	60.7	60.7
	Strongly disagree	29	17.3	17.3
	Total	168	100.0	100.0

Source: own computation from survey data

As depicted in the above table 4 shows that the customer value results. In the first finding 78% respondents are agree that the bank always ready to amend the customer needs whereas 6% of the respondents kept silent to say anything. The remaining 16.1% of the respondents were disagreed by the bank always ready

to amend the customer needs. Based on the above finding, the researcher can understand that most banks are ready to amend the customer needs. Regarding to discrimination between the customers by the bank, 76.3% of respondents said the bank made discrimination between the banks. While the 1.8% of the respondents keep silent to say anything. Finally, 11.9% of the respondents said banks are not discriminates between the customer. This implies that most of the respondents assure that at the time of delivering the service banks made discrimination between the customers. Concerning to giving high value for the customer, out of 168 respondents 81% respondents confirmed that the bank give a high value for the customer. Whereas 10.7% keep silent to say anything and 8.2% of the respondents confirmed that bank are not give high value to the customer. It implies that majority of the respondents assure that the bank give a high value to the customer. The above table 4.4 show variety of service plans that meet the customer needs, Out of 168 respondents 20.9% of the respondents said that banks prepare variety service plan to meet the customer need whereas 1.2% of the retain in quiet and 78% of the respondent said bank are not prepare variety service plan to meet the customer needs. It implies that majority of the respondent's the bank are not prepare variety plan to meet the service.

From the open ended question the researcher also asked that if you are not getting a variety service are you willing to continue as a customer. Most of the respondents said that even if banks giving high value for the customer and good complaint handling service until they are not providing different service and equal opportunities to the customer make sure that will find and change other bank.

4.5 CORPORATE IMAGE

TABLE 5: CORPORATE IMAGES

1.Your bank has a good image	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	46	27.4	27.4
	Agree	60	35.8	35.8
	No opinion	12	7.1	7.1
	Disagree	42	25.0	25.0
	Strongly disagree	11	6.5	6.5
	Total	**168**	**100.0**	**100.0**
2.The image of the banks is an influence to be a customer	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	19	11.3	11.3
	Agree	112	66.7	66.7
	No opinion	10	6.0	6.0
	Disagree	24	14.3	14.3
	Strongly disagree	3	1.8	1.8
	Total	**168**	**100.0**	**100.0**
3.I am confident enough by service provider (bank)	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	18	10.7	10.7
	Agree	118	70.2	70.2
	No opinion	10	6.0	6.0
	Disagree	18	10.7	10.7
	Strongly disagree	4	2.4	2.4
	Total	**168**	**100.0**	**100.0**
4.I am a loyal customer because of the bank have good Corporate image for the public	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	11	6.5	6.5
	Agree	114	67.9	67.9
	No opinion	11	6.5	6.5
	Disagree	25	14.9	14.9
	Strongly disagree	7	4.2	4.2
	Total	**168**	**100.0**	**100.0**

Source: own computation from survey data

As depicted in the above table 5 the image of the bank on the eyes of customer. In the first finding, 63.2% respondents are agreed that the bank have a good image whereas 7.1% of the respondents kept silent to say anything. The reaming 31.5% said that the banks are not a good image. It implies that majority of the respondents agreed that the banks had a good image on the eyes of the customer. The second result in the above table 5 shows the image of the banks is an influence to be a customer.76.8% said the image of the bank that influence to me to be customer. Whereas, 8.3% of the respondents are respondents keep silent to say anything. The reaming 14.9% of the respondents said that the images of the bank are not influenced to me to be a customer. Form the finding can understand that most of the respondents are said that the good image of the bank is influenced to be customer. The third result in the above table 5 show that the confidence of the customer by the bank. Among the given respondents 80.9% are confident enough by the service provider .While 6% respondent keep quit to say anything more and 13.1%, respondents are not confident enough by their own customer. It indicates that majority of the respondents are confident enough by the service provider. The last result in the above table 5 implies that the loyalty of the customer because of the existence of good image of the. From the given respondents 74.4% are agreed that they are loyal because of good image of the bank. While 6.5% of the respondents are keep silent to say anything. The reaming 19.1% of the respondents agreed that they are not loyal because of the good image of the bank.

4.6 TRUST

Honesty is the most important element to be considered by the service provider especially banks. The customer needs the utmost good faith behavior from service provider .Otherwise the customer have lack of trust by their own provider there is a possibility easily shift another service provider.

TABLE 6: TRUST

1.The bank fulfills its obligation to customers, My bank is always honest to me	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	19	11.3	11.3
	Agree	112	66.7	66.7
	No opinion	10	6.0	6.0
	Disagree	24	14.3	14.3
	Strongly disagree	3	1.8	1.8
	Total	**168**	**100.0**	**100.0**
2.My bank is always honest to me	**Category**	**Frequency**	**Percentage**	**valid percentage**
	Strongly agree	46	27.4	46
	Agree	60	35.8	60
	No opinion	12	7.1	12
	Disagree	42	25.0	42
	Strongly disagree	11	6.5	11
	Total	**168**	**100.0**	**168**

Source: own computation from survey data

The above 6 table the first result implies that the obligation of the bank to fulfill the customer need. Among the given respondents 78% of the respondents said that the ban fulfill the obligation. While 6.0% respondents are keep silent to say anything. The reaming 16.1% said the banks are not fulfilling the customer obligation. This indicted that majority of the respondents are said that the banks fulfill the obligation. The above table 6 second result implies that the honesty of the bank to the customer. Out of the total 168 respondents 63.2% said that bank are honest to me. While 7.1% said keep silent to tell anything. Whereas 31.5% of the respondents said the bank are not honest to me. This implies that majority of the respondents said the bank are honest to me.

From the open ended question the researcher also asked that if the banks are not honest to you, what your action is. The customer also said that I will find and change another honest bank.

5. CONCLUSION

The study was conducted determinants of the customer loyalty in Ethiopian banking industry: with the reference of private commercial bank. From the finding the study identifies the determinants of customer loyalty such as customer satisfaction, quality of service, customer value, corporate image and trust. Customer satisfaction is one of the major factors of customer loyalty. Form the finding Majority of the customer 61.3 % were satisfied by the service provider (bank) and majority of the customer said that until the banks are satisfied me, I will proceed as a customer of the bank and recommended to the others to use the bank service. The quality of service provided by the bank, from the given respondents majority of them (76.8%) are they agree getting a quality service from the bank. Concerning to the accessibility of the service of the bank, majority respondent (62.5%) of the respondents was disagreed for the accessibility of the service. Regarding to customer care service, from the sample population 78% of the respondents said that the bank give a proper care for the customer Majority of the respondent said that until they get good quality service, accessibility of the service and getting customer care service we will continue as a customer of the bank and the reverse is true. Customer value is another important factor which determines the customer loyalty. The study was raising the customer value ideas. The finding also show that from the study can get that 78% respondents are agree that the bank give higher customer value and always ready to amend the customer need. But sometimes the bank made discrimination between the customers and there is a problem to provide a variety of service. Corporate images one of the determinants to be loyal of the customer. The finding show that majority of the respondent have a good image, even influenced to me a customer of the bank The last but not the least elements that determine the customer loyalty is Trust. Majority of the respondents said bank are honest to me and fulfill its obligation. If the bank is not trust and fulfill obligation the customer will change another service provider

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KNOWLEDGE DISCOVERY IN DATABASES

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ABSTRACT

Knowledge discovery in databases((Data Mining) is a rapidly growing field, whose development is driven by strong research interests as well as urgent practical, social, and economical needs. While the last few years knowledge discovery tools have been used mainly in research environment. Sophisticated software products are now rapidly emerging. In this, we provide an overview of common knowledge discovery tasks and approaches to solve these tasks. We propose a feature classification scheme that can be used to study knowledge and data mining software. This scheme is based on the software's general characteristics, database connectivity and data mining characteristics. Finally, we specify features that we consider important for knowledge discovery software to possess in order to accommodate its users effectively. This research work, first of all, focuses on analyzing different processes of supervised learning. Secondly, it proposes a new improved process for developing knowledge extraction.

KEYWORDS

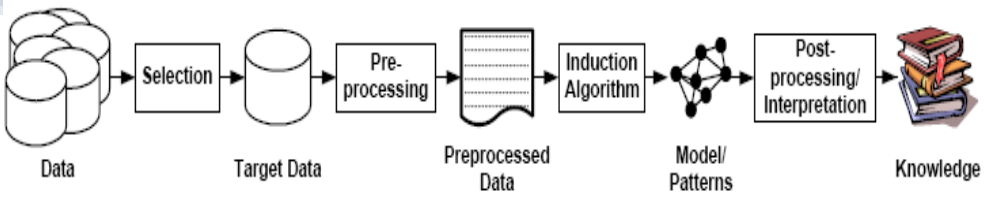
Data Mining, Knowledge Discovery in Databases, Supervised learning algorithms, Stacking, Classification, Regression.

INTRODUCTION

Data mining involves the use of sophisticated data analysis tools to discover previously unknown, valid patterns and relationships in large data sets. These tools can include statistical models, mathematical algorithms, and machine learning methods (algorithms that improve their performance automatically through experience, such as neural networks or decision trees). Consequently, data mining consists of more than collecting and managing data, it also includes analysis and prediction. Data mining can be performed on data represented in quantitative, textual, or multimedia forms. Data mining applications can use a variety of parameters to examine the data. They include association (patterns where one event is connected to another event, such as purchasing a pen and purchasing paper), sequence or path analysis (patterns where one event leads to another event, such as the birth of a child and purchasing diapers), classification (identification of new patterns, such as coincidences between duct tape purchases and plastic sheeting purchases), clustering (finding and visually documenting groups of previously unknown facts, such as geographic location and brand preferences), and forecasting (discovering patterns from which one can make reasonable predictions regarding future activities, such as the prediction that people who join an athletic club may take exercise classes).As an application, compared to other data analysis applications, such as structured queries (used in many commercial databases) or statistical analysis software, data mining represents a difference of kind rather than degree. Many simpler analytical tools utilize verification-based approach, where the user develops a hypothesis and then tests the data to prove or disprove the hypothesis. For example, a user might hypothesize that a customer who buys a hammer, will also buy a box of nails. The effectiveness of this approach can be limited by the creativity of the user to develop various hypotheses, as well as the structure of the software being used. In contrast, data mining utilizes a discovery approach, in which algorithms can be used to examine several multidimensional data relationships simultaneously, identifying those that are unique or frequently represented. For example, a hardware store may compare their customers' tool purchases with home ownership, type of automobile driven, age, occupation, income, and/or distance between residence and the store. As a result of its complex capabilities, two precursors are important for a successful data mining exercise; a clear formulation of the problem to be solved, and access to the relevant data. Data mining, popularly known as Knowledge Discovery in Databases (KDD), it is the nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases. Though, data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms, data mining is actually part of the knowledge discovery process.

A lot of research efforts are performed around the world to find unknown facts hidden in millions of records, stored in huge databases. As databases are growing in size, there is a need to explore new patterns from existing database(s) and there is a need to develop new techniques that are efficient enough to find such patterns and should also be able to fulfill future needs of the companies demanding such solutions. There are different perspectives, why we search for such new patterns e.g. sales/marketing, customer retention, buyer behaviour, cost/utilization, quality control, inventory and fraud detection *etc.* Most important among them is marketing department(s) of the organizations, who are always looking for such patterns, which can furnish new prospects for marketing managers to think upon new trends, aspects and emerging scopes to take decisions at different managerial levels. Data mining techniques can be categorized in different ways. One of the most important categorization is based on kind of problems solved. Classification, Clustering and Association rules are most important kind of problems that are solved by data mining. Present work concentrates upon classification tasks. A large number of techniques and algorithms have been devised for extracting knowledge from databases. A large part of these techniques and algorithms concentrate upon classification problems. Classification task comprises of assigning objects to classes (groups) on the basis of measurements made on the objects. Classes of data are predefined, a set (the train set) of labeled objects are used to form a model through classifier for classification of future observations (or the test set). Such a processing is named as supervised learning. Supervised learning techniques are usually used for the solution of classification problems. Usually a general process is recommended for supervised learning as shown in Figure[1].

FIGURE 1: THE GENERAL KDD PROCESS



LITERATURE REVIEW

The amount of data continues to grow at an enormous rate even though the data stores are already vast. The primary challenge is how to make the database a competitive business advantage by converting seemingly meaningless data into useful information. How this challenge is met is critical because companies are increasingly relying on effective analysis of the information simply to remain competitive. A mixture of new techniques and technology is emerging to help sort through the data and find useful competitive data. By knowledge discovery in databases, interesting knowledge, regularities, or high-level information can be extracted from the relevant sets of data in databases. It is investigated from different angles, and large databases thereby serve as rich and reliable sources for knowledge generation and verification. Mining information and knowledge from large database has been recognized by many researchers as a key research

topic in database systems and machine learning. Companies in many industries also take knowledge discovering as an important area with an opportunity of major revenue (Fayyad., 1996. Piatetsky-Shapiro.1991, Silberschatz.,1995). The discovered knowledge can be applied to information management, query processing, decision making, process control, and many other applications.

For example, Fayyad stated KDD process as follows (1996):

1. Learning the application domain 2.Creating a target dataset 3.Data cleaning and preprocessing 4.Data reduction and projection 5.Choosing the function of data mining 6.Choosing the data mining algorithm(s) 7.Data mining 8.Interpretation 9.Using the discovered knowledge

As the KDD process shows, data mining is the central of knowledge discovering, it requires complicated data preparation work. Data cleaning and preprocessing includes basic operations, such as removing noise or outliers, collecting the necessary information to model or account for noise, deciding on strategies for handling missing data fields, and accounting for time sequence information and known changes, as well as deciding DBMS issues, such as data types, schema, and mapping of missing and unknown values. Useful data are chosen from the formatted data to increase the effectiveness and focus on the task.

SUPERVISED LEARNING AND CLASSIFICATION

Different studies have been conducted from time to time for accounting the development of supervised learning techniques and algorithms. Data mining itself has emerged from other disciplines like Machine Learning, Artificial Intelligence and Statistics etc. Hence, it is obvious to get initial references related to comparisons of algorithms from its parent disciplines. Many researches were being performed before the time data mining was coined as a separate discipline for study. Fahrmeir et al., compared the results of a point awarding approach with the results obtained by the linear discriminate[4]. Gorman et al., reported that back-propagation outperformed nearest neighbour for classifying sonar targets[5], whereas Shadmehr et al., showed that some Bays algorithms were better on other tasks[118]. Kirkwood et al., developed a symbolic algorithm ID3, which performed better than discriminant analysis for classifying the gait cycle of artificial limbs[7].

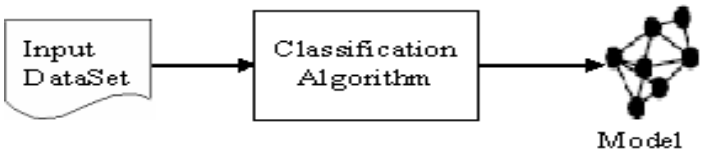
VARIOUS PROCESSES FOR SUPERVISED LEARNING

Supervised learning processes can vary from simple processing to very complex processing. Different techniques and algorithms are used to extract knowledge from data. These algorithms involve certain criteria to extract knowledge. A particular technique or algorithm may be suitable for a segment of problems only, but may not be suitable for others. There is no unique technique or algorithm that solves all types of problems. Supervised learning involves the use of the train set to train algorithms for the creation of a model of that technique or algorithm. This model is then applied on the test set to generate and compare results. Different supervised learning processes as discussed by Witten et al.[8], are as follows:

(i) SIMPLE SUPERVISED LEARNING

In its simplest form, input data is applied to classification algorithm and result is generated. It is also called Fixed Split experimentation as data is divided into the train and the test set. Such experimentation suffers with over fitting and under fitting model and results may not fulfill the reliability criteria. So there is need for pre-processing and post-processing of data.

FIGURE 2: SIMPLE SUPERVISED LEARNING PROCESS



(ii) PREPROCESSING OF THE DATA

A data set collected is not directly suitable for induction (knowledge acquisition); it comprises in most of cases noise, missing values, the data are not consistent, the data set is too large, and so on. Therefore, we need to minimize the noise in data, choose a strategy for handling missing (unknown) attribute values, use any suitable method for selecting and ordering attributes (features) according to their informative (so-called attribute mining), discretize/fuzzify numerical (continuous) attributes and eventually, process continuous classes.

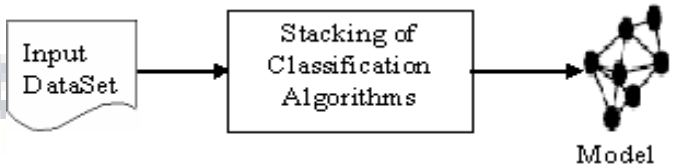
(iii) POST PROCESSING OF THE KNOWLEDGE DERIVED

The pieces of knowledge extracted in the previous step could be further processed. One option is to simplify the extracted knowledge. Also, we can evaluate the extracted knowledge, visualize it, or merely document it for the end user. There are various techniques to do this. Next, we may interpret the knowledge and incorporate it into an existing system, and check for potential conflicts with previously induced knowledge.

(iv) STACKING

Stacking combines the output of a number of classifiers. Stacked generalization, also known as Stacking in the literature. It is a method that combines multiple classifiers by learning the way that their output correlates with the true class on an independent set of instances. At a first step, N classifiers Ci, i = 1..N are induced from each of N data sets Di, i = 1..N. Then, for every instance ej , j = 1..L of an evaluation set E, independent of the Di data sets, the output of the classifiers Ci(ej) along with the true class of the instance class(ej) is used to form an instance mj , j = 1..L of a new data set M, which will then serve as the meta-level train set. Each instance will be of the form: C1(ej), C2(ej), . . . , CN(ej), class(ej). Finally, a global classifier GC is induced directly from M. If a new instance appears for classification, the output of all local models is first calculated and then propagated to the global model, which outputs the final result. Any algorithm suitable for classification problems can be used for learning the Ci and GC classifiers. Independence of the actual algorithm used for learning Ci, is actually one of the advantages of Stacking, as not every algorithm might be available for each data set and not the same algorithm performs best for every data set.

FIGURE 3: STACKED SUPERVISED LEARNING PROCESS.



COMPLEX PROCESSING

Different pre-processing, Post-processing and stacking of different algorithms may be combined to extract knowledge from databases. Such complex criteria may involve parallel processing of different algorithms as well.

OUTLINE OF THE METHOD

It is often observed that human beings deal with new and old situations or problems which they face, by first composing relevant queries from the information available about the situation or the problem at hand and its domain, and then posing these queries to the reserved knowledge in their minds. They then use their reasoning techniques to collect the relevant knowledge and try to make links among this knowledge in a way to help them dealing with the situation.

Reasoning is the process of drawing new conclusions from some premises which are known facts and/or assumed hypotheses. In general, a reasoning comprises a number of arguments or inferences. In any valid argument of human logical thinking, the premises must be relevant to the conclusion. Informally, we say a

reasoning is ***relevant*** if and only if in every argument or inference of that reasoning the premises is relevant to the conclusion; a reasoning is ***irrelevant*** if and only if it **is** not relevant.

The previous observation inspires us to propose a new integration method to integrate the already exist domain knowledge bases into the KDD process. The key idea behind the proposed method, which is acquired from the previous observation, is that the relevancy among knowledge is dynamically changing and the most important factor which decides it is the situation or the problem at hand. Some knowledge in the knowledge base are relevant to each other in the current situation but are not relevant in another one. Therefore, in our proposed method the characteristics of relevant knowledge are identified from the application information and the database meta-knowledge (e.g.biases in data collection and data-base schema). Then, these characteristics are compiled automatically to a set of queries posed to the knowledge base. In order to solve the relevancy problem and assure the generality of the method, the queries and the knowledge base have to be rendered to a domain-independent form which both permits automated relevant reasoning and overcomes the language gab exist between the terminology of the knowledge base and of the queries' description. In the method we suggest that this form will be the relevant logic form and the reasoning engine will be the relevant reasoning based on strong relevant logic, which **is** proposed by Cheng recently [9]**.**

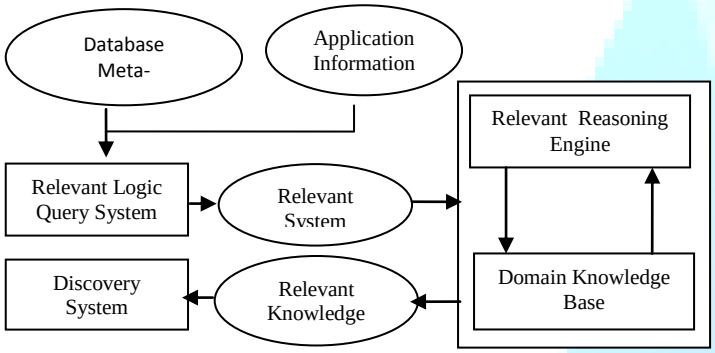
The method is shown in Figure, it consists exactly of three phases:

Phase 1: Specify the characteristics of the relevant knowledge by using the KDD task or application at hand and the database meta-knowledge.

Phase 2: Design relevant queries from the above characteristics in the form of relevant logic language.

Phase 3: Pose these queries to the domain knowledge base and use the relevant reasoning engine to collect the relevant knowledge.

FIGURE 4



Relevant reasoning based on Strong Relevant Logic(SRL) is preferred rather than any other reasoning techniques, e.g., those which are based on Classical Mathematical Logic (CML), because our aim is to get the relevant Knowledge automatically but the conclusions reasoned and/or deduced based on CML from the premises may be irrelevant at all, in the sense of meaning, to the premises. In the framework of the CML, there is no guarantee that the conclusion of a reasoning is necessarily relevant to its premises, even if the reasoning is valid in the sense of CML. As a result, for a conclusion reasoned and/or deduced based on the CML, we have to investigate whether it is relevant to its premises or not by ourselves. Obviously, the more information and/or knowledge we have, the more difficult investigation task we do. SRL gives us high level evidences that the reached conclusions are relevant to the given premises.

AN APPLICATION OF THE METHOD

Many of the existing KDD systems produce knowledge in the form 'If ... Then . . . ' represented as attribute-value rules[10] or relational rules[11] based on the similarities and differences between vectors of attributes. These attributes are static and exist in the initial description language of the examples in the database. In this section we present an algorithm designed under the framework of the proposed method. The goal of this algorithm is to use the prior domain knowledge bases where the knowledge is represented in the form of propositional rules to create new k relevant attributes, not already present in the attributes originally exist, for KDD systems to use. This algorithm works by using the attributes originally exist in the database schema to design relevant queries in the form of propositional rules and use the relevant reasoning engine to retrieve all their relevant rules which define new attributes. The new attributes are used to augment the description language a standard KDD system can operate with.

Algorithm (Task): Creating new k relevant attributes from the prior domain knowledge bases where the knowledge are represented in the form of propositional rules.

Input: An array of the old attributes A_i, ..., An,; and the required number k of new attributes.

Output: Array of the old and new attributes A_1, ..., A_n, A_{n+i}....,A_{n+k}.

Method: The algorithms proceed in the following manner. For each encountered old attribute A, in the attributes array a relevant query ***SQ,*** in the form of propositional rule, is designed from it. In general,

suppose SQ = $A_i \rightarrow A_i$ is the most recently designed query. The relevant reasoning engine takes this query (rule) and finds all its relevant rules from the knowledge base. There are two forms of relevant rules important to the task, namely,

- A_i (=,< >,<,>)value → B(=,< >,<,>)value
- A_i (=,< >,<,>)value ^ H(=,< >,<,>)value
→ B(=,<>,<,>)value

where H is an attribute in the schema (new or old),

this can be tested by comparing H with the attributes

A_{i+1},...,A_f only, where A_f is the last constructed attribute. The previous rule's forms are produced from the reasoning engine as a result of applying the two inference rules Modus Ponen and Adjunction on the old and most recently constructed attributes. The algorithm is continued by selecting a rule from the list of ***SQ's*** relevant rules. If the rule has been previously selected, a new one is selected. When the new rule defines a new attribute, i.e., **(**B(=,<>,<,>)value) is new, this attribute is constructed, and a new SQ= **(**B(=,<>,<,>)value →B(=,<>,<,>)value) is designed from it. The algorithm starts again from the new SQ. After trying all the relevant rules of the new SQ, the algorithm return to the list of (A_i + A_i **)'s** relevant rules. This process of selecting a rule is continued until the list of these rules is exhausted. The overall process repeatedly works until the required attributes k are defined for most of the examples in the database or the last old attribute is reached in the array. The method is summarized as follows:

Step 1: Initialization: ***i*** := *1* (**i** is a counter on the old

attributes); l := 0 (l is a counter on the completely defined new attributes for most examples); ***f*** := *n+l;*

Step 2: REPEAT

SQ (Starting query):= $A_i \rightarrow A_l$

Relevance (SQ);

i := *i+l;*

UNTIL

l :=k OR *i:=n.*

The procedure Relevance is described as follows:

PROCEDURE Relevance (RULE: string);
begin
Find all the rules which are relevant to RULE;
FOR each rule R relevant to the task **DO**
CASE (R consequent variable) **OF**
New attribute and not constructed : {
CV := R antecedent;
A_f := R consequent variable;
f:= f+1
Assign R's consequent to all the examples
that satisfy CV;
SQ := R consequent → R consequent;
Relevance ***(SQ)*** }
New attribute and constructed before :{
CV := R antecedent;
Assign Rs consequent to all the examples
that satisfies CV;
IF (R consequent variable (=,<>,<,>)
value) is new value
THEN {
SQ := R consequent → R consequent;
Relevance ***(SQ)}}***
end CASE
end; FOR
IF most of the examples in the database is defined for the new attribute A_{n+1}
THEN ***l :=*** *l +1;*
end

Working Example: To illustrate how the algorithm works, consider the attributes list with their characteristics given in Table 1 and the rules given in Figure **.** These rules are constructed and given to the induction system CHARADE[12] by the knowledge shown in Table 2**.** Let these rules be exist in the domain knowledge base in a scattered form, Table **3** shows how the algorithm finds these rules and directly constructs new attributes from them. The column SQ's RELEVANT RULES in Table 3 contains all the relevant rules to the task. The assignment operations can be carried out on the examples given in [12].

TABLE 1: LIST OF ATTRIBUTES WITH THEIR CHARACTERISTICS

ATTRIBUTE	TYPE	DOMAINE
Humidity(H)	ordered set	low < high < very-high
Hygiene(h)	ordered set	very-bad < bad < average < good
Location(L)	string	NA
F_fruits/vegt.	Boolean	yes, no
Year(Y)	integer	NA
Temperature(T)	ordered set	severe-cold < cold < average < hot < very-hot
food-quantity (FQ)	ordered set	starvation<severe – restrictions < restrictions<ok
food-variety (FV)	ordered set	low < average < high
type-of-location (TL)	unordered set	land, sea
affection-severity(AS)	integer interval	[0,5]

IF (humidity = high)**THEN** (p e r s p i r a t i o n >= hard)

IF (hygiene = good) (humidity <= high) **THEN** (p e r s p i r a t i o n <= hard)

IF (humidity >= very--high) **THEN** (p e r s p i r a t i o n >= blocked)

IF (p e r s p i r a t i o n <= hard) **THEN** (f l u i d s <= healthy)

IF(fresh-fruits/vegetables = yes) **THEN** (f l u i d s <= healthy)

IF(fresh-fruits/vegetables <> yes) **THEN** (f l u i d s >= corrupted)

IF (hygiene <= average) (l o c a t i o n = sea) **THEN** (humidity >= very-high)

IF (hygiene = good) **THEN** (humidity <= high) **THEN** (humidity <= high)

TABLE 2: DEFINITIONS OF THE TWO NEW ATTRIBUTES

ATTRIBUTE	TYPE	DOMAINE
perspiration (P)	ordered set	normal < hard < blocked
fluids (P)	ordered set	healthy < corrupted

TABLE 3

ITERATION OF STEP 2	SQ	SQ'	RELEVANT RULES	NEW ATTRIBUTES	ATTRIBUTES DOMAIN
1	H→H	H=high→ p>=hard		p	p>=hard
		H=very high p>=blocked			p>=blocked
		H<=high ∧ H>=good→p<=hard			p<=hard
	p>=hard→ p>=hard		no		
	p>=blocked→ p>=blocked	p>=blocked ∧F/V yes →+ F>=corrupted		F	F>=corrupt
	F>=corrupt→ F>=corrupt		no		
	P<=hard→p<=hard	p<=hard→F<=healthy			F<=healthy
2	h→h	h<=average ∧ L=sea →+ H>=very high h>=good -+ H<=high			
3	L→L	no			
4	F/V→F/V	F/V=yes →+ F<=healthy			

CONCLUSION

In this paper a new and general integration method for integrating the prior domain knowledge bases into the KDD process based on relevant reasoning to solve the relevancy problem and simulate the human way of thinking when one face a new or old situation. According to human being thinking, the principle factor which decides the relevancy among his knowledge is the situation or the problem at hand. The same idea is used by the integration method in order to increase the power and versatility of the KDD systems. This versatility is achieved by searching for and getting the relevant prior knowledge according to the application and KDD task at hand. This integration method can be considered as a step toward a full automatic discovery (including KDD) systems in the future. All discoveries made by current computer programs have been characterized as human/computer discoveries because the discovery process is far from being completely automated [13]. As we see one area where the human component has been vital is in guiding the KDD systems based on the relevant prior knowledge. Here an algorithm designed under the framework of the proposed method. This algorithm uses the prior domain knowledge bases where the knowledge are represented in the form of propositional rules to create new ***k*** relevant attributes, not already present in the attributes originally exist, for KDD systems to use. This algorithm can be integrated with any inductive learning methodology to increase its autonomy and improve learning.

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GREEN MARKETING: PATH TO SUSTAINABLE DEVELOPMENT

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ABSTRACT

Generally, green marketing is a concept related with products that are presumed to be environmentally safe. Tough, it's very tough to define green marketing, but through this paper it is tried to understand the concept of GREEN MARKETING. Green marketing incorporates abroad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Other similar terms used are Environmental Marketing and Ecological Marketing. Thus "Green Marketing" refers to holistic marketing concept wherein the production, marketing consumption, disposal of products and services happen in a manner that is less detrimental to the environment with growing awareness about the implications of global warming, non-biodegradable solid waste, harmful impact of pollutants etc. Both marketers and consumers are becoming increasingly sensitive to the need for switch in to green products and services. In the modern era of globalization, it has become a challenge to keep the customers as well as consumers in fold and even keep our natural environment safe and that is the biggest need of the time. Environmental pollution is a buzz word in today's business environment. The Paper aims at finding out what actually Green Marketing is all about and how can a business firm be more competitive by using green marketing strategies to gain a competitive edge over others.

KEYWORDS

Environmental pollution, Green Marketing, Globalization, Global Warming, Sustainable Development.

INTRODUCTION OF GREEN MARKETING

According to the American Marketing Association, green marketing is the marketing of products that are presumed to be environmentally safe. The development and marketing of products designed to minimize negative effects on the physical environment or to improve its quality. The effort by organization to produce, promote, package and reclaim products in a manner that is sensitive or responsive to ecological concerns. Green marketing emphasizes environmental stewardship. Alma T. Mintu and Hector R. Lozada define green marketing as "the application of marketing tools to facilitate exchanges that satisfy organizational and individual goals in such a way that the preservation, protection and conservation of the physical environment are upheld." The term Green Marketing came into prominence in the late 1980s and early 1990s. The American Marketing Association (AMA) held the first workshop on "Ecological Marketing" in1975. The proceedings of this workshop resulted in one of the first books on green marketing entitled "Ecological Marketing". The Corporate Social Responsibility (CSR) Reports started with the ice cream seller Ben & Jerrys where the financial report was supplemented by a greater view on the company's environmental impact. In 1987 a document prepared by the World Commission on Environment and Development defined sustainable development as meeting —the needs of the present without compromising the ability of future generations to meet their own need, this became known as the Brundtland Report and was another step towards widespread thinking on sustainability in everyday activity. Two tangible milestones for wave of green marketing came in the form of published books, both of which were called Green Marketing. They were by Ken Peattie (1992) in the United Kingdom and by Jacquelyn Ottman (1993) in the United States of America.

The evolution of green marketing can be described in three phases:-

FIRST PHASE: Ecological green marketing: during this period all marketing activities were concerned to help environment problems and provide remedies for environmental problems.

SECOND PHASE: Environmental & green marketing: the focus shifted on clean technology that involved designing of innovative new products, with taken care of pollution and waste issues.

THIRD PHASE: Sustainable & green marketing. It came into prominence in the late 1990s and early 2000. Its concentrated on needs of the present without compromising the ability of future generations to meet their own needs.

OBJECTIVES OF THE STUDY

Basically the study of green marketing revolves around three key questions, the main objective of this is to find out answers of these questions:-

1. What is Green Marketing?
2. What is a green product?
3. Why are firms going green?

Hence, objectives of Green marketing revolve around the following studies:-

- To understand the concept of Green marketing
- To analysis present scenario and potential of Green marketing and Green products in India
- To analysis opportunities and challenges faced by Green marketers
- To find out plans and strategies for successful implementation of Green marketing in India
- To discuss the need and importance of Green marketing from different prospective in India

MEANING OF GREEN MARKETING

Green or Environmental Marketing consists of all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs with minimal detrimental impact on the natural environment.

Thus, the process of Green Marketing involves: -

- Manufacturing and providing products to the consumers which are of good quality and at the same time not harmful to them even in long run.
- Use the resources for development in such a manner which will enable the future generations to avail the resources to meet their needs leading to Sustainable Development.
- Framing and implementing policies which will not have any detrimental effect on the environment i.e. at present as well in future.

Thus "Green Marketing" refers to holistic marketing concept wherein the production, marketing consumption an disposal of products and services happen in a manner that is less detrimental to the environment with growing awareness about the implications of global warming, non-biodegradable solid waste, harmful impact of pollutants etc.

NEED OF GREEN MARKETING

Need of Green marketing can be explained through the following points:

1. **Our resources are limited-** our resources are limited due to scarcity is created and scarce resources are not reproduced easily. We have to retain and procure them very consciously so that our future generation can too enjoy their utilities.
2. **But Human wants are Unlimited-** But human wants are unlimited i.e. these cannot be satisfied in every case. That's why it becomes more necessary to utilize resources in best ways to satisfy their wants.
3. **Utilization of limited resources by firms in such a way that consumer satisfaction is achieved along with firm's selling objectives-** Scarce resources are having alternative uses. It's a challenge for every firm to manage its business in such a way that consumer is satisfied and firm achieves its selling objectives that is maximization of profits.
4. **Increasing cut throat competition-** In today's era, it's not easy to run business so efficiently as it has to face cut throat competition from others firms in the market. A firm has to be very conscious while fixing its prices, policies, products etc.
5. **Cost reduction by adopting environmental friendly techniques-** to survive in market, it's very vital for a firm to decrease its cost of production permanently to have an advantage edge over other firms in the market which can be achieved through green marketing.
6. **Social responsibility-** Today many laws are created to aware peoples and businesses about their responsibility towards society. For social responsibility purposes, green marketing is best method to serve its objective.

In the present scenario, challenge is to keep the customers as well as consumers in fold and even keep our natural environment safe – which is the biggest need of the time. Companies may lose many loyal and profitable customers and consumers due to absence of green management. In today's innovative business world of high technology due to growing community and consumer interests in green and socially responsible products, increased community pressure on companies to internalize externalities, such as health issues, neighborhood amenity, climate change; environmental and governmental legalizations and initiatives; innovative technologies and approaches of dealing with pollution, improved resource and energy efficiency, and to retain old (loyal and profitable) customers and consumers, it is very much urgent to implement green marketing.

FUNDAMENTAL RULES OF GREEN MARKETING-KEY TO SUCCESS

There are some basic fundamental rules of green marketing which leads the companies to success. Every company should follow these rules along with basic business strategies and policies to effectively emphasize the process of success by using green marketing. These rules will go a long way to shape the future successful picture of a business in coming years. By the way, the fundamental strategy is adoption of 4 Green P's but the following points should also be remembered for smooth running of business:-

1. **Knowing the Customer:** Means making sure that the consumer is aware of and concerned about the issues that your product attempts to address, without which success in green marketing will be difficult to achieve.
2. **Educating the customer**: Means educating the people the reasons as to whatever you're doing is not only to protect the environment, but also matters of letting them know why it matters. Otherwise, for a significant portion of your target market, it's a case of "So what?", —Does it matter to me? And your green marketing campaign goes nowhere.
3. **Genuineness & Transparency to the customer:** It shows that a) In reality you are actually practicing, what you claim to be doing in your green marketing campaign and b) your business policies are in lieu with whatever you are doing that's eco friendly. Both these conditions have to be met for your business to establish the kind of environmental credentials that will allow a green marketing campaign to succeed.
4. **Reassuring the Buyer:** Means that the customers must be made to believe that the product being offered shall fulfill the objective or purpose for which it has been purchase i.e.-no compromise in product quality in the name of the environment.
5. **Pricing for the customer:** Means making sure that consumers can afford the premium and feel it's worth it, which is being charged for your product, as many environmentally preferable products cost more due to economies of scale and use of higher-quality ingredients.
6. **Giving the customers an opportunity to participate:** Means personalizing the benefits of your environmentally friendly actions, normally through letting the customer take part in positive environmental action, at same time keep in view the changed expectations of the customers.

THE FOUR Ps OF GREEN MARKETING

Just like Traditional marketing techniques, the main strategies of Green Marketing also revolves around the 4P's of marketing:-

Product

- Product Design- product design is very important for development of business. It helps in identifying consumer's environmental needs and develops products to address these needs; or develop environmentally responsible products to have less impact than competitors.
  - Identification of consumers' environmental needs
  - Development of environment friendly products.
- Product Line- product line is a group of closely related products which are able to satisfy a similar class of needs. The increasing wide varieties of products in product line should emphasize more on those products which will support sustainable development and are good for health also.
- Product Qualities- product quality depends on design, material used, manufacturing process, workmanship process, packaging, etc.
  - Products should be made from recycled goods.
  - Products that can be recycled or reused.
  - Efficient products, which save water, energy or gasoline, save money and reduce Environmental impact.
  - Products with environmentally responsible packaging.
  - Products with green labels, as long as they offer substantiation.
  - Organic products — many consumers are prepared to pay a premium for organic products, which offer promise of quality.
  - A service that rents or loans products – such as toy libraries.
  - Certified products, which meet or exceed environmentally responsible criteria.

PRICE

Price is value of a product expressed in terms of money. It is a matter of vital importance to the buyer and seller. It includes pricing policies, pricing objectives, price determination, terms of credit, discount policy, terms of payment etc.

- Customers may be ready to pay premium price for green products it they feel that it will reward them positively.
- Firm charges premium price because they provide improved performance, better designs, good taste, visual appeal etc.
- We normally choose product on basis of value derived from it and quality of product. But due to green marketing, it adds environmental benefits as bonus to the products.
- But, real fact is that when we consider product life circle cost of green products, they prove less expensive in comparison to other products.

PLACE

It better can be called distribution of goods and services. It is concerned with smooth flow of goods and services from producer the consumer by creating time, place and possession utility.

- The choice of where and when to make a product available has a significant impact on the customers being attracted. Very few customers go out of their way to buy green products merely for the sake of it.
- Marketers looking to successfully introduce new green products should, in most cases, position them broadly in the market place so they are not just appealing to a small green niche market.

- The location must also be consistent with the image which a company wants to project.
- The location must differentiate a company from its competitors.
- This can be achieved by in-store promotions and visually appealing displays or using recycled materials to emphasize the environmental and other benefits.

PROMOTION

- Promotion leads to communication process includes promoting goods and services to target markets through advertising, public relations, sales promotions, direct marketing and on site promotions.
- Businesses should use such tools and practices which will reinforce sustainable marketing and environmental credibility. Firms should develop themselves as smart green marketers like saving trees by using more electronic transactions e.g. e-mails.
- Retailers are selling shopping bags in place of plastic bags as a commitment to green environment, under the banner of GO GREEN ENVIRONMENT FUND.
- Marketing is converted into E-marketing through which printed material can be reproduced using recycled materials and efficient processes.
- The key to successful green marketing is credibility. Never overstate environmental claims or establish unrealistic expectations, and communicate simply and through sources that people trust.
- Promote your green credentials and achievements. Publicize stories of the company's and employees'green initiatives.
- Enter environmental awards programs to profile environmental credentials to customers and stakeholders.

CHALLENGES IN GREEN MARKETING

1. NEED FOR STANDARDIZATION

It is found that only 5% of the marketing messages from —Green‖ campaigns are entirely true and there is a lack of standardization to authenticate these claims. There is no standardization to authenticate these claims. There is no standardization currently in place to certify a product as organic. Unless some regulatory bodies are involved in providing the certifications there will not be any verifiable means. A standard quality control board needs to be in place for such labeling and licensing.

2. NEW CONCEPT

Indian literate and urban consumer is getting more aware about the merits of Green products. But it is still a new concept for the masses. The consumer needs to be educated and made aware of the environmental threats. The new green movements need to reach the masses and that will take a lot of time and effort. By India's ayurvedic heritage, Indian consumers do appreciate the importance of using natural and herbal beauty products. Indian consumer is exposed to healthy living lifestyles such as yoga and natural food consumption. In those aspects the consumer is already aware and will be inclined to accept the green products.

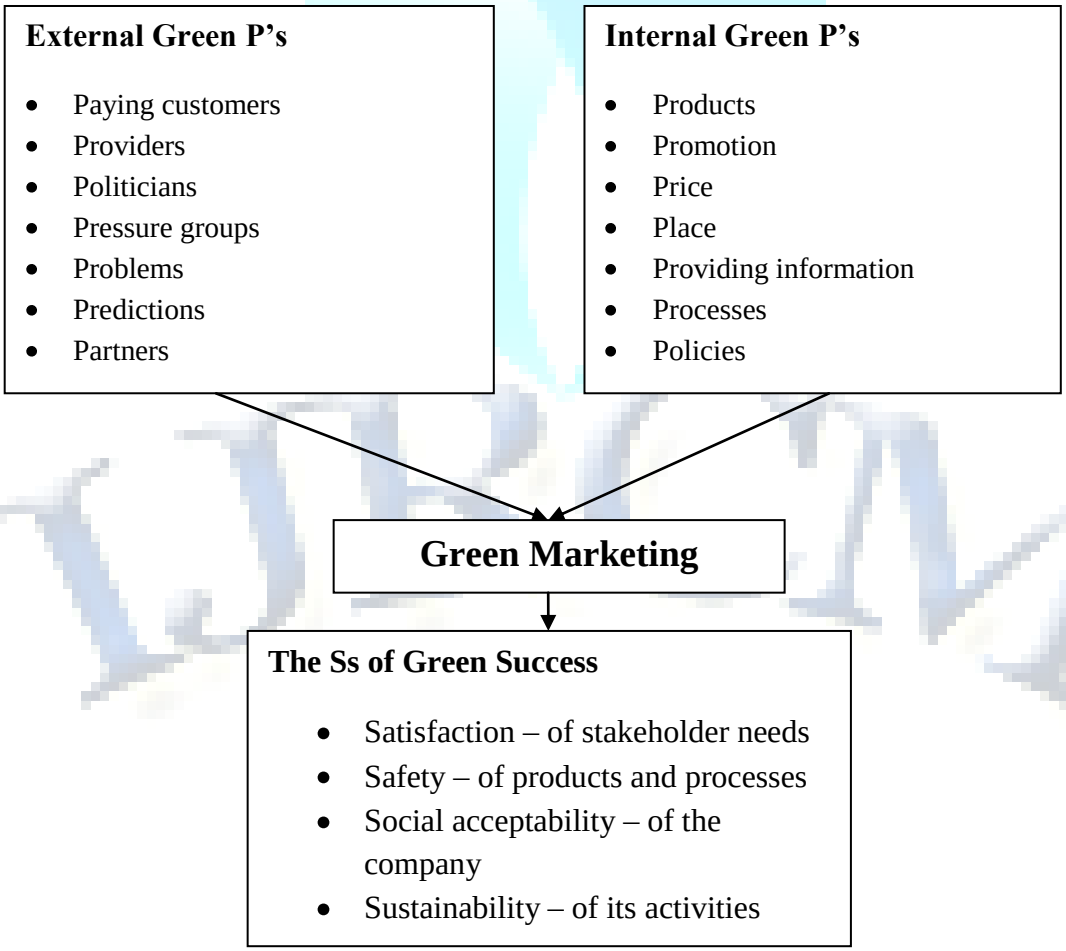
3. PATIENCE AND PERSEVERANCE

The investors and corporate need to view the environment as a major long-term investment opportunity, the marketers need to look at the long-term benefits from this new green movement. It will require a lot of patience and no immediate results. Since it is a new concept and idea, it will have its own acceptance period.

4. AVOIDING GREEN MYOPIA

The first rule of green marketing is focusing on customer benefits i.e. the primary reason why consumers buy certain products in the first place. Do this right, and motivate consumers to switch brands or even pay a premium for the greener alternative. It is not going to help if a product is developed which is absolutely green in various aspects but does not pass the customer satisfaction criteria. This will lead to green myopia. Also if the green products are priced very high then again it will lose its market acceptability.

FIGURE 1: THE GREEN MARKETING PROCESS



Source: (Peattie (1992), p. 104)

SIGNIFICANCE OF GREEN MARKETING

Green marketing offers business bottom line incentives and top line growth possibilities. While modification of business or production processes may involve start-up costs, it will save money in the long term. For example the cost of installing solar energy is an investment in future energy cost savings. Companies that develop new and improved products and services with environmental impacts in mind give themselves access to new markets, substantially increase profits and enjoy competitive advantages over those marketing non environmentally responsible alternatives. When looking through the literature there are several suggested reasons for firms increased use of Green Marketing. Five possible reasons are as follows:

1. Organizations perceive environmental marketing to be an opportunity that can be used to achieve its objectives.
2. Organizations believe they have a moral obligation to be more socially responsible.
3. Governmental bodies are forcing firms to become more responsible.
4. Competitors' environmental activities pressure firms to change their environmental marketing activities.
5. Cost factors associated with waste disposal, or reductions in material usage forces firms to modify their behavior.

CONCLUSION

- Green product development is more than just creating products that are environmentally friendly, it is about systemic change in society that includes consumers, producers and the general commercial structure within which they negotiate
- By widening & deepening the meaning of green, relevant actors will have an economic incentive to pursue green product development.
- Harnessing the market forces that favour green product development will lead to mainstream green.

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IMPLICATION OF REGULATION ON THE DEVELOPMENT OF MICROFINANCE IN THE NIGERIAN ECONOMY

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ABSTRACT

The paper examines the impact of regulation and regulatory framework on the performance of microfinance banks in Nigeria. Findings reveal inconsistency in policy implementation and inflexibility by the Regulators have had adverse effects on the performance of regulated Institutions thereby impeding their capacity to perform statutory roles in the economy. The paper therefore recommends improvement in regulation through progressive policies , flexible regulation, microfinance friendly policies, better policy execution and a more friendly business environment for microfinance institutions to thrive. As the potentials of Microfinance are enormous for the growth and development of the economy through access to finance and also at the same time facilitating financial inclusion. And it is only in a well coordinated environment that these microfinance institutions can thrive to achieve the envisaged goals and objectives. Obviously there is a linkage between regulatory framework and performance of Microfinance Institutions, while over regulation stifles growth and competitiveness on the other hand a liberal and market friendly or progressive regulatory environment build up the systems.

KEYWORDS

Microfinance, Microfinance Policy, Regulatory and Supervision Framework, Regulation, Microfinance Banks, Performance, Economic development.

INTRODUCTION

Microfinance is the provision of financial services such as loans, savings insurance or transfer services to low income households and small business owners who lack access to finance to do their business. It involves the provision of financial services to the economically active poor individuals and micro or small scale enterprises. The target market is those who are financially excluded from the conventional banking sector. It is reported that over 80 percent of households do not have access to financial services due to their inability to satisfy credit requirements of the conventional banking systems, this has resulted into socio economic problems like poverty, health hazards , unemployment, starvation, malnutrition, diseases, crimes and violence among developing countries. Considering the statistical data from the world bodies on the level of poverty and related issues in the globe. Obviously there is need for unconventional approach to address the global problem of poverty in the world. The World has deep poverty amid plenty, out of world's 6 billion people, 2.8 billion almost half live on less than $2 a day, and 1.2 billion a fifth live on less than $1 a day (World Development Report 2000/2001). The global poverty has spur discussions and programmes that would help reduce the level of penury and poverty in the world. The goal of such discussion is reducing income poverty and human deprivation especially among developing nations. The Millennium Development Goals (MDG) is equally directed at solving this problem with Microfinance as a tool for attaining the Millennium Development Goals. Briefly stated the goals of the MDG include; eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS malaria and other diseases, ensure environmental sustainability, and develop a global partnership for development.

The microfinance services to the poor are not only for business investment in their microenterprises but also to invest in health and education, to manage household emergencies and to meet the wide variety of other cash needs that they encounter. Elizabeth Littlefield et al (CGAP Focus Note January 2003).These services include loans, savings insurance payment transfer, and even micro pension. Evidence from the millions of microfinance clients around the world demonstrates that access to financial services enables poor people to increase their household income, build assets, and reduce their vulnerability to the crises that are so much part of their daily lives. It should be noted that access to financial services translates into better nutrition and improved health outcomes such as higher immunization rates for beneficiaries of microfinance clients. There is huge demand for microfinance across the Globe due to the failure of the formal financial system to meet the financial requirements of the neglected groups in many development. The mismanagement of economic resources and corruption has partly contributed to the problem of poverty in the World today. It is estimated that there are more than 3 billion potential clients in the microfinance market and only about 500 million people are currently being served by socially oriented financial institutions ranging from cooperatives to postal savings banks that extent financial services beyond the traditional clients of commercial banks, nonetheless a significant number of potentials clients remain un served CGAP (2003). Basically the problem of unemployment, economic poverty and low standard of living globally is caused by financial exclusion whereby many economic active poor or low income people are not able to access finance for productive activities. This account for the growing realization and recognition of Microfinance as a potent tool for poverty alleviation. Microfinance has therefore been accepted all over the world as one of the tools to attack poverty especially in the developing countries of the World.

Empirical evidence from research work has shown that Microfinance has significantly contributed to development of economies of the world through financial empowerment of the low income group and small scale businesses around the globe. The proponents of Microfinance believe that the importance of Microfinance cannot be overemphasized as a tool to drive the economy of any nation especially with the failure of the formal financial system to give the necessary financial support to the active poor and small business firms across the world particularly the economically poor nations.

The debate on the significance and sustainability of Microfinance has divided its proponents into two major camps. Microfinance, in the 1990s was marked by a major debate between two leading views, the financial system approach and the poverty lending approach. (Ademu 2012). The financial systems approach are in support of the commercialisation of Microfinance for sustainability and wider outreach. Its emphasis is on large scale outreach to the economically active poor who has the capacity to repay loans. The goal of the financial systems approach is institutional self-sufficiency which is key to regular supply of service and expansion. To this group every Microfinance Institution must develop products for savings mobilisation and adequate funding of loan products accordingly. On the other hand, the Poverty lending approach focuses on credit disbursement for poverty alleviation only whether by the private sector, government agencies or donor groups. The aim is to extend micro credits to the poor to overcome poverty and gain employment. Under the Poverty lending approach savings mobilisation is not the key factor except where the savings is mandatory. The private sector is key to the sustainability of financial leading approach because the private sector is driven by profit making. Unfortunately the Poverty lending group are not comfortable in allowing the industry to be dominated by profit operators. Sustainability of Microfinance industry is imperative and this is a function of viability, more so as Microfinance business cannot survival mainly on donors and government subsides. Often times Government funding and grants are politically motivated which might further endanger the operations of Microfinance Institutions.

Microfinance service providers can be classified into three categories namely formal Microfinance institutions, semi-formal Micro finance Institutions and informal microfinance sectors. The major distinction is the level and extent of external regulation. (Craig C, Cheryl F, 2006). ***The formal Microfinance Institutions*** *are subject not only to general laws, but also to specific regulation and supervision by the Central Bank , Ministry of Finance or an agency thereof like commercial banks, Development banks ,Savings banks, Non-bank financial Institutions, Finance companies, leasing companies and Insurance companies.* ***The semiformal Microfinance institutions*** *are registered entities subject to all relevant general laws, but not usually subject to oversight by a banking or Finance authority. Though authorised by governments but are monitored by their board of directors, a federation or other stakeholders. Like non- governmental organisations, Community based organisations, credit unions, savings and credit cooperatives and private companies.* ***Informal microfinance services*** *providers are typically not*

registered nor recognized by government bodies and are motivated only by their members or the community they serve, like village banking self-help groups, Financial Service Associations, ROSCAs, ASCAs, Burial societies, Pawn shops, and individual money lenders.

Globally Microfinance industry has equally evolved models or approaches for outreach and sustainability over these decades. These business models are; ***Individual Lending Methodology*** - *Loan given on individual basis.* ***Group Solidarity Lending Methodology /Grameen Group lending*** - *loan given to members on group basis or individual in a group.* ***Village banking*** - *Villagers organisers themselves and raise money and management committees to give loans to members of the Village community.* ***Cooperative System*** – *People coming together to support each other through shareholding and profit sharing arrangement.*

THEORETICAL CONCEPT AND LITERATURE REVIEW

Regulation in its simplest meaning is control. Governments regulate businesses to ensure uniformity in standards and practices. Generally there are reasons for business regulation which include, to exercise powers over a defined territory, people and resources, to protect her citizens from exploitation from foreigners who dump inferior and expired products to kill infant industries, to ensure that competitors in business enterprises understand the rules and regulations concerning each method of business operations to avoid unfair competition, to ensure that revenues due to the government in form of taxes are paid , to ensure compliance with International best practices in business operations, to prevent domination of business environment by foreign firms and to protect local infant business firms.

The Banking sector are the most regulated Institutions all over the world due largely to their intermediary role of payments systems and provisions of credits in the economy. (Nwankwo 1990) stated that the objectives of regulation is to ensure a sound and healthy banking and financial system , protect depositors effectively, address the indigenous community's savings and investment requirements and accelerate the economic development of the country . Furthermore the objectives of financial systems regulation is developing the banking habit , the financial system and manpower for the banking industry. Timothy (1991) identified four fundamental reasons for Bank regulation namely, (i) safety and soundness of banks and financial instruments, (ii) Provision of monetary stability, (iii) Provision of an efficient and competitive financial system and (iv) Protection of consumers from abuses by credit granting institutions. According to Ezike, (2003) Economic regulation embraces all types of controls which government imposes on economic and business activities in an attempt to foster competition and improve economic efficiency.

The aim of bank regulation is to provide sound and stable operating guidelines and policies that will help bank directors and management to operate in a friendly economic environment. **However it is important to note that regulation alone cannot prevent bank failure , it cannot eliminate the risk in the economic environment or in a bank's normal operations , nor does it guarantee that bankers will make sound management decisions.**

"The literature on Microfinance identifies the legal and regulatory framework as one factor that influences the emergence of different kinds of institutional providers of microfinance and especially , their development into self sustaining, commercial microfinance capable of reaching growing number of poor clients especially in rural areas " . While regulation is desirable for the development of the Microfinance in any particular economy , however the nature and content of such regulatory framework is more important as to its ability to facilitate growth of microfinance. This is rightly noted that "diversity of microfinance finance institutions and microfinance products is facilitated by a flexible regulatory environment in which they can develop innovative methodologies for reaching different markets not banked by commercial banks "(Williams F.S et al 2003).

Financial institutions are generally subject to prudential and non prudential regulation (Austin H , 2010) as such regulation provides legal and operational framework to ensure stability and growth of the financial system. Microfinance regulation is intended to facilitate financial soundness of the microfinance institutions and secure public confidence in the microfinance subsector.

Regulation of microfinance involves licensing, supervision, monitoring and issuing prudential and non prudential guidelines. Microfinance regulation has cost implications both on the regulators and operators. Regulation increases costs, limits operations and reduce the feasible scope for microfinance institutions generally. Hence the need for regulations of microfinance to be friendly to achieve the greater objectives for the economy. Regulatory framework alone cannot stop failure of a financial institution as there are other endogenous and indigenous variables like board oversight functions, management competence, socio economic environment , Government policies , infrastructure all add to the survival and sustainability of the system.

Microfinance regulation is gradually evolving into a more flexible regulatory framework that accommodate the peculiarities of operating environment with the goal of creating enabling business environment for the sustenance of microfinance institutions for formal Microfinance institutions, semi formal Microfinance institutions and the informal Microfinance sector. This is what is known as progressive regulation.

FINANCIAL REGULATORY AGENCIES IN NIGERIA

In Nigeria the institutions charged with financial regulation include, Central Bank of Nigeria, (CBN), Nigeria Deposit Insurance Corporation (NDIC), Securities and Exchange Commission (SEC), Nigerian Stock Exchange, National Insurance Commission (NAICOM), National Pension Commission (PENCOM), Nigerian financial Intelligence Unit and Federal Ministry of Finance (FMF). Apart from the above stated bodies there are other statutory bodies like Corporate Affairs commission, Federal Inland Revenue Service or the their State counterparts, Financial Reporting Council that have reporting relationship with financial institutions. The Central Bank of Nigeria is the primary Regulatory Apex body of banking/ Financial industry- Monetary Regulation. The Capital Market is being regulated by the Securities & Exchange Commission. The Insurance sector is under the supervision of the National Insurance Commission while the National Pension Commission regulates Pension matters or business in the Country.

MICROFINANCE REGULATION IN OTHER NATIONS

Ghana with a population of over 18 million people ,which has been growing at about 3 % per year operates a tiered approach for microfinance regulation. The overall Policy framework for microfinance is informed by the poverty reduction strategy which seeks to balance growth and macroeconomic stability with human development and empowerment in such a way as to positively reduce the country's poverty level in the medium term. Ghana has evolved different licensing and regulatory structures for different segments of the financial system including rural and microfinance and administering them in a flexible manner with periodic revision of regulatory standards and introduction of new legislation with relatively high tolerance for traditional financial mechanism and NGOs that are behaving in a responsible manner. (Williams F.S et al 2003).

The microfinance sector in Kenya has faced a number of constraints due mainly to lack of specific legislation and set of regulation to guide the operations of the microfinance sector. Microfinance institutions in Kenya are registered under eight different Acts of Parliament before the proposed Amendment Bill on Microfinance to streamline the industry. The rationale for regulation and supervision of microfinance institutions under the proposed Amendment Bill is to enhance quality growth, broaden the funding base of the microfinance institutions that eligible to mobilize and administer deposits, credit facilities, other financial services and initiate the process of integrating these institutions into the formal financial system. The Government of Kenya is proposing a 3 tiered approach for the microfinance sector for deposit taking microfinance institutions, credit only microfinance institutions (under the purview of the Ministry of Finance) and informal sector microfinance institutions not to be supervised by an external agency of the Government. (George Omino 2005).

In South Africa, Microfinance institutions are only indirectly regulated and all subject to regulatory requirements of the Exemption Notice under the Usury Act, they are subject to the very strict interest rate ceilings of the Usury Act . One of these regulatory requirements is registration with an approved regulatory institution, the Microfinance Regulatory Council (MFRC) – (Stefan Staschen, 2003)

Tanzania has 17 commercial banks , 10 non bank financial institutions, 1 Regional Bank, 2 Rural unit banks which are under the regulation of the Bank of Tanzania by the provision of the Bank of Tanzania Act (1995). Bank of Tanzania exercises prudential oversight on the licensed banks providing microfinance services in the form of savings deposits and microfinance loans directly to individuals and households and indirectly through SACCOs. In regulating and supervising microfinance operations, Bank of Tanzania is mandated to apply the same fundamental principles that it applies to other parts of the financial system principally the protection of depositors and of the financial systems through the application of prudential financial standards. There are two categories

of institutions providers of microfinance which are not subject to prudential regulation namely Savings and credit cooperatives societies SACCO and the financial NGOs. (Bikki R, Joselito G , 2003)

The National Bank of Ethiopia is the regulatory body for microfinance institutions in the country. There are different government policies, laws and directives in Ethiopia which affect directly or indirectly the development of microfinance industry such as Proclamation No 83/1994, Proclamation No 84/1994, Proclamation No 40/1996. Proclamation No 84/1994 focuses on licensing and supervision of incorporated institutions for microfinance business. In Ethiopia microfinance institutions are exempted from Income and Sale tax in order to protect the infant industry (Getaneh G, 2005)

Uganda has a population of nearly 24 million and 86% of its working population is self employed. Close to 1.5 million people or 90% of the non farming active population are employed in micro and small enterprises which is a significant market for microfinance . Microfinance in Uganda has been built on the foundation of entrepreneurship clients. Microfinance in Uganda has followed a typical pattern of market development .It progressed smoothly from an emerging market to a growth market and is now poised to reach the developed microfinance stage. Bank of Uganda is the regulatory agency for licensing, and supervision of microfinance in the country. The Regulatory body uses four tier microfinance sector that focuses on the development of microfinance deposit taking institutions (Ruth Goodwin –Groen, Till Britt, Alexia Latortue, CGAP , 2004)

REGULATION OF MICROFINANCE IN NIGERIA

Nigeria with a population of over 170 million people comprising of 36 Federating states and the Federal capital Territory and with official 774 Local Government Areas. The Financial system consists of 21 Commercial banks, 5 Development banks, 2 Merchant banks, 795 Microfinance banks , 2,920 Bureau De Change, 3 ,Discount Houses, 64 Finance companies, 40 Primary mortgage banks and 1 Non interest bank. As at 2009 there are over 5000 branches of Commercial banks alone in the country. The SMEs coordinating agency, Small and Medium Enterprises Development Agency (SMEDAN) reported in 2012 there are 17,261,753 micro enterprises (SMEs) in the country employing 34.4 million people Nationwide.

The Federal Government of Nigeria, through the Central Bank of Nigeria introduced the Microfinance Policy, Regulatory and Supervisory Framework for Nigeria in December, 2005 and later revised it in 2011 "to enhance the access of micro entrepreneurs and low income households to financial services required to expand and modernize their operations in order to contribute to rapid economic growth " (Revised CBN Microfinance Regulatory Policy ,2011). It is therefore expected that the revised National Microfinance Policy framework would facilitate the delivery of **diversified microfinance services** on **a sustainable basis** for the **economically active poor and low income households** in the country. The Regulatory Authority recognises the contributory role of the small and medium enterprises towards the economic development, according to CBN , the microfinance policy provides the window of opportunity and promotes the development of appropriate (safe, less costly and easily accessible) savings products that would be attractive to rural clients and improve the savings level in the economy. The policy objectives as stated in the policy guidelines include among others; (i) Provision of timely, diversified affordable and dependable financial services to the economically active poor, (ii) Creation of employment opportunities and increasing the productivity and household income of the active poor in the country, thereby enhancing their standard of living, (iii) Promotion of synergy and mainstreaming of the informal microfinance subsector into the formal financial system, (iv) Enhancement of service delivery to micro, small and medium enterprises (MSMEs), (v) Mobilisation of savings for intermediation and rural transformation, (vi) Promotion of linkage programmes between microfinance institutions (MFIs), Deposit money Banks (DMBs), Development Finance Institutions (DFIs) and specialized funding institutions, (vii) Provision of dependable avenues for the administration of the microcredit programmes of government and high net worth individuals on non recourse basis and (viii) Promotion of a platform for microfinance services providers to network, exchange views and share experiences.

In order to achieve the aforementioned Policy objectives the Regulatory framework highlighted the following strategies towards realising its policy goals and mission . The followings are the summarised steps as enumerated in the Policy documents ,(i) Licensing and Supervision of Microfinance service Providers, (ii) Continuous Professional Development. (iii) Promotion of savings and banking culture among low income households, through Financial literacy and consumer protection programmes, (iv) Government Participation by encouraging the three tiers of Government to devote at least one (1%) of their annual budgets to microcredit initiatives, (v) Participation of NGO Microfinance Institutions , (vi) Collaboration with Development Partners, (vii) Clearly defined roles of Microfinance Stakeholders in the Microfinance policy, (viii) Submission of periodic returns by Microfinance Banks , (ix) Institutional Linkage among Deposit Money Banks, Development Finance Institutions, NGO- MFIs and MFBs as well as other micro enterprise finance institutions to increase the flow of funds to clients.

Under the Microfinance policy , the Central Bank of Nigeria is charged with the responsibility of regulating and supervising all deposit taking institutions that are involve in the provision of microfinance services. The Policy recognizes the existence of credit only , membership based microfinance institutions which are not required to come under the regulatory and supervisory purview of the CBN. They are however supervised by the appropriate Ministry/Agency but still required to forward periodic returns on their activities to the CBN primarily for statistical purposes.

The CBN is fully responsible for the implementation of the Microfinance Policy , Regulatory and supervisory framework for Nigeria. Both the Apex Bank and NDIC carry out monitoring and supervisory directly on the MFBs in the country.

Other regulatory institutions having Statutory or oversight responsibility on Microfinance banking institutions in Nigeria are Nigerian Deposit Insurance Corporation (NDIC), Federal Inland Revenue Service , Relevant State Revenue Authority, Corporate affairs commission (CAC), Securities & Exchange commission/ Nigerian Stock Exchange (for only Quoted MFBs) and Nigerian Financial Intelligence unit,

ROLES AND RESPONSIBILITIES OF REGULATORS IN THE POLICY DOCUMENT

The roles and responsibilities of respective stakeholders shall include but not limited to those performed by Government , Central Bank of Nigeria, apex association of microfinance banks and institutions, It is noteworthy that under the role for stakeholders , there was no specific mention of Nigerian Deposit Insurance Corporation as a stakeholder which is a serious oversight.

GOVERNMENT

Government shall be responsible for; Ensuring a stable macroeconomic environment, providing basic infrastructure (electricity, water, road, telecommunications etc) political and social stability. Creating an efficient land administration system to facilitate ease of transfer of land titles and other property rights to serve the collateral needs of borrowers and financial institutions. Promoting policy in support of consumer protection and financial literacy for microfinance clients. Setting aside an amount not less than 1% of annual budgets at Federal ,State and Local Governments levels for Microcredit initiatives.

CENTRAL BANK OF NIGERIA

Continue to oversees the operations of the National Microfinance Policy Consultative committee. Ensure the implementation of the microfinance policy framework to achieve the stated objectives, targets and strategies. Ensure the emergence of a sustainable microfinance subsector through appropriate institutional regulatory and supervisory framework. Establish the Microfinance Development Fund to provide wholesale funding for on-lending activities of microfinance institutions. Develop and support appropriate capacity building programmes for regulators, directors, operators and practitioners in the subsector, in collaboration with other stakeholders. Promote financial literacy and consumer protection in partnership with relevant public and private sector development institutions, as well as Civil Society Organisations (CSO) . Undertake periodic reviews of the Microfinance Policy and the Regulatory Guidelines to address emerging issues.

PUBLIC SECTOR POVERTY ALLEVIATION AGENCIES

The Microfinance policy framework recognises the roles of public sector MFIs and poverty alleviation agencies such as the National poverty eradication Programme (NAPEP), Small and Medium Enterprises Development Agency of Nigeria. National Directorate of Employment (NDE) etc in the development of the subsector. Their roles include; Provide non commercial (social security) resources targeted at difficult to reach clients and the vulnerable groups, Support capacity building for stakeholders. Nurture new MFIs to sustainable levels. Collaborate or partner with other relevant stakeholders to achieve the objectives of this policy.

DEVELOPMENT PARTNERS

Development Partners that provide capital and support for the development of the microfinance industry in Nigeria shall be required to operate within the relevant provisions of this policy.

OBSERVATIONS ON NIGERIAN MICROFINANCE REGULATION

(1) Multiple regulatory authorities might be counterproductive and hinder the development and growth of the industry.
(2) The CBN seems to be overloaded with much regulatory functions considering its oversight roles on the number of financial institutions being supervised by the Apex bank apart from their branches. The regulatory capacity of the Apex Bank is definitely overstretched and the consequential effects is on the economy under performance.
(3) Over regulation of the microfinance industry is already killing market innovativeness
(4) Failure of Regulators and Public Stakeholders (Government agencies) to fulfil their statutory obligations as stipulated in the Microfinance Policy guidelines.
(5) A critical assessment of the justification or rationale mentioned by the Apex Bank for the revision of Microfinance Regulatory framework in 2011 have not been addressed till date. The issues raised are still common today simply due to regulation deficiency.
(6) The multiplicity of reporting relationship for Microfinance institutions may not fast track the development of the industry, and in fact it poses a serious challenge for the subsector in terms of cost and resources usage.
(7) The constrictive guidelines for the microfinance hinders organic growth and expansion of the sector.
(8) Non availability of incentives like as it is practice in Ethiopia where Microfinance are exempted from revenue and sale taxes does not auger for the system. The microfinance sector needs protection for stability and growth at the same time.

A lot of institutional reforms and recommendations have been suggested by different scholars and researchers on how to reposition the Microfinance industry in Nigeria for optimal performance for economic growth and development through poverty reduction. The following suggestions should be considered along with other options;

(i) Progressive/flexible regulation. Regulatory constraints in forms of over regulation and rigidity or multiple reporting relationship might endanger this fragile industry that has the potentials of revolutionizing the economy.
(ii) There is the need for tiered regulation for the formal microfinance , semi formal microfinance and the informal microfinance sectors.
(iii) Urgent need to separate monetary regulation from Financial Regulation. It is not compulsory to commit both monetary and financial regulation in the same Institution. This might be possible or feasible in smaller economies with lesser population. The Apex bank is presently having too much functions and it is absolutely impossible to expect maximum efficiency from the executive management of CBN with this overload function.
(iv) Establishment of a Financial Regulatory Authority of Nigeria (FRAN) to regulate , license ,supervise and monitor financial Institutions in the country. The FRAN should be responsible for designing appropriate regulatory framework for Banking Institutions Commercial banks, Merchant banks, Microfinance banks, Mortgage Banks, Discounts Houses, Non banking Finance Institutions, Development Finance institutions, or specialised finance institutions , venture capital firms etc. A fragmented financial systems is obviously needed to drive the Nigerian economy.
(v) Limiting the Central Bank of Nigerian to monetary regulation and management would considerable improve the performance of the Central Bank of Nigeria . Let the Apex body focuses on its traditional functions of central banking, monetary and fiscal policies, management of economic and development functions, and financial advisers to the Government. The financial regulation function presently saddled with the CBN is causing distractions and the economy is worst for it.
(vi) Government should create an enabling environment for business to thrive through infrastructural development and provision of necessary social amenities thereby reducing cost of doing business generally.
(vii) Establish the Microfinance Development Fund (MDF) as stipulated in the Policy Regulatory Framework.
(viii) Public awareness campaign should be jointly carried out on regular basis by all the stakeholders.
(ix) Regulators should encourage mergers or acquisition of distressed MFBs instead of outright liquidation.
(x) Government through the regulators should invite and encourage International funding for the subsector. Microfinance industry is ripe for external funding and both the Apex Bank and the Government must take the lead to encourage the Development Partners to attract such needed financial resources.
(xi) A review of the yearly International microfinance conference programme by allowing its impact to reach rural people. If it must be held both the content and location should be reconsidered.
(xii) Refinancing window is needed for the subsector.
(xiii) The legal systems should be strengthened to protect all the stakeholders in the subsector
(xiv) There is the need to periodically measure the performance of the sector with regulatory objectives and targets so as identify challenges that should promptly be addressed.

CONCLUSION

Microfinance is a tool that can assist to bridge the finance gap for the low income economic active as well as the micro enterprises. Microfinance is also an instrument to realise the 8 points agenda of the Millennium Development Goals. The potentials of microfinance are numerous such as access to financial services, poverty reduction, positive effect on productivity, employment generation, improved standard of living, wellness of individuals and family units, rural economic transformation and other benefits. It is therefore needful for this sector to be effectively supervised through appropriate regulation but not over regulation, and provision of an enabling environment. The Government through its various agencies should render all support for the survival and sustainability of the Industry.

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AN ASSESSMENT OF TAX EVASION LEVEL AMONG NIGERIAN TAXPAYERS

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ABSTRACT

Taxation is a system of a collective effort by individual and corporate entities toward contribution made to the government as income to undertake the affairs of a nation. Tax evasion is a deliberate and wilful intention by a taxpayer not to pay his taxes. The main objective of this study is to assess the level of tax evasion among the Nigerian public and private sector taxpayers. The research adopts survey method. The study was conducted in Gombe state with a population of study 26,313 taxpayers. The sample size was 379 and questionnaires were self-administered in which 303 were retrieved and useable. The findings of the study indicate that many Nigerians are evading tax, and the acceptance level of the tax evasion among taxpayers is very high. It also shows that tax evasion is high among the private sector taxpayers and moderate among the public sector. The study recommends that government should revise its tax policies and laws that will assist to improve the tax system as a whole. Also, the government should increase improvisation of infrastructure and social amenities that will encourage more compliance and discourage tax evasion.

KEYWORDS

Tax Evasion, Nigeria, Taxpayer, Assessment.

INTRODUCTION

Tax is an important instrument and main source of incomes to the various governments in the world. Incomes which are required to finance public infrastructure and services such as healthcare, education, security, construction of road and social welfare. Worlu and Emeka (2012) government use tax revenue as a basis for providing developmental projects in developing nations as well as the developed world. Tax evasion is a deliberate and mindful practice of not unveiling and filing completely taxable income by a taxpayer in order not to pay tax (Soyode & Kajola 2006). Moreover, tax evasion is a violation of tax laws whereby the amount due by a taxable person and entity is not remitted after a required minimum period. Similarly, tax evasion is apparent in a state where the tax burden is dishonestly lessened, or wrong claims are filed on the tax form. Therefore, challenging tax evasion is a thoughtful task to overcome illicit financial cash flows and dying passages of corruption and misconduct (United Nation, 2007). Furthermore, persistent of tax evasion in developing and developed nations represents the complexity of the problem. Additionally, resistant from the taxpayers in partaking their civil obligation is very critical to the nation prosperity (Tijjani & Mathias, 2013). Tax evasion is, therefore, characterized as a deliberate wrongful approach or as deeds involving a direct ruin of tax laws, ethics, and norms by a taxpayer to escape the tax burden. The purposeful underreporting of earnings and over-claiming of a tax relief (exemption) is a clear evidence of tax evasion (Adebisi & Gbegi, 2013).

REVIEW OF LITERATURE

Tax evasion involves the act of deliberate and conscious activity of not disclosing the tax to the relevant authority. Soyode and Kojola (2006) state that tax evasion as a deliberate and awake practice of not illuminating complete taxable income by the taxpayer. According to Temitope et al., (2010) tax evasion is an act of ruin tax laws whereby the due tax is unpaid after a required minimum period. Among the early studies of tax evasion was that of Allingham and Sandmo (1972). Their study was primarily focused on studying the attitude and behaviour of taxpayers in terms of income tax evasion. The study detected that there exist positive association between tax rates and evasion. The finding of this study was later confirmed by Soyode and Kojola (2006).

According to Pashev, (2005), the displeasure of taxpayer with the Government to provide essential basic facilities that may be endowed by the taxes being collected may encourage tax evasion. Lack of honesty and responsibility in the deployment and management of revenue from taxes has the influence of building doubt both in the tax structure and as well the Government. Hence, this is known to increase the level of tax evasion (Pashev, 2005). Some of the studies on tax evasion have a diverse scope and opinion in examining the phenomenon. For example, Morale (1998) examined tax evasion from a philosophical viewpoint by interfered with social affairs among the Mexican specialists. The study concludes that Mexican specialists are more committed to their family than the country. Therefore, they simply evade tax to satisfy their family needs with the amount due to the government through tax payment. On the other hand, they are more committed to their family affairs than the prosperity of the country collectively. Several studies have clearly indicates that tax evasion may increase whenever the tax rate, corruption, lack of confidence in government and tax officials and cost of tax compliance are high and continue increasing simultaneously (Clotfelter, 1983, Alm & Mckee, 1992, Saracaghu, 2008; James & Moses, 2013; Adebisi, 2013). Moreover, several factors were studied on tax evasion and identified as the main reason why taxpayers are evading taxes. For example, demographic factors such as Age, gender, educational level, marital status and economic factors such as tax burden, a source of income, income level. Other factors include psychological factors such as tax morale, tax education, tax mentality tax penalties, public expenses and finally institutional factors such as, tax audit, tax system, tax administration, tax compliance cost and public services (Crane & Nourzaid, 1990; Alm & Mckee 1992; Nor Ghani, 2012; Bashar Haitham, 2008; Davos, 2006, Richardson 2006; Nor Aziah, 2006 and Gurama, Mansor & Adamu).

Nigeria is among the few nations in the world where evading tax is becoming fashionable among the taxpayers. The different institution of government and bodies which are required by laws to work in harmony to make tax evasion complex are not appropriately coordinated (Gurama et al., 2015). For example, all corporate business entities are required by law to register with the Corporate Affairs Commission (CAC) and at the same register with the Federal Inland Revenue Services (FIRS) which is one of the required conditions in the firm registration process. However, unfortunately, this requirement is not fulfill all the time. A company may register with CAC but failed to do so with FIRS in an attempt to evade taxes. Therefore, this study is aimed to determine the perception of taxpayer level and their degree of acceptance toward tax evasion in the country.

IMPORTANT FOR THE STUDY

This study is aimed at assessing and examines the perception of the tax evasion level in Nigeria. The topic of the study is very critical as tax evasion activities are undermining the capability of the government in providing fundamental needs of the public. In reality, if tax evasion continues un-assessed, it may result in the failure of any public institution, as every government needs adequate funds to finance its activities (Gurama et al., 2015). Thus, assessing the level of tax evasion would assist the government in developing strategies to fight the phenomenon.

PROBLEM STATEMENT

Tax evasion is a universal phenomenon that has been experienced in various developed and developing nations in the world. Murphy (2011), the worth of global tax evasion is beyond 5.1% of the total gross domestic product (GDP) or US$3.1 trillion. In a country like Nigeria, tax evasion was identified as a strong indicator related to low revenue turnover from the taxes (Ariyo, 1997). It is because non-formal sector (self-employed) and private sector of the country's taxpayers are evading their taxes although; they are important players in the economy (James & Moses, 2012). Nigerian government sources indicate that about 350,000 small

and medium enterprises are evading taxes (Yerima, 2013). It was unveiled by introducing e-payment of tax collection by the State Minister of Finance. However, tax system and practice in Nigeria is structured toward the achievement of an economic goal because due to the government at various levels heavily relied on the income revenues from crude oil (Popoola, 2009). Nigerian Economic and Financial Crime Commission (EFCC), disclosed that about ₦21 trillion Naira ($129 billion dollars) loss as a result of tax evasion, corruption and excessive tax avoidance from year 2003 to 2013 (Muhammad, 2013). Therefore, it is very important to know how Nigerian perceived the level of tax evasion among the taxpayers. Chiumya (2006), eliminating tax evasion is among the complex task in any sound tax administration.

OBJECTIVES OF THE STUDY

The objective of this study is to assess the perception level of tax evasion among the public and private taxpayer in Nigeria. The study explains and provides the level of tax evasion acceptability among the Nigerian populace from the public and private taxpayers point of view. Therefore, the study set to

i. Examine the acceptance level of tax evasion among Nigerian taxpayers.
ii. Evaluate the percentage level of taxpayers among private and public sector taxpayers.

RESEARCH QUESTION

This study was developed to answer the following research question

i. To what extend tax evasion is acceptable among the taxpayers in Nigeria?
ii. What is the percentage level of tax evasion between private and public sector taxpayers?

RESEARCH METHODOLOGY

The study adopts survey research design with open-ended measurement scale. The respondent were asked to rate the tax evasion level in Nigeria by giving a scale from one percent to one hundred percent (1 – 100%). The measurement scale was adopted from (Amirah, 2011 & Lutfi, 2009). The population of the study was 26, 313 public, and private sector taxpayers of Gombe state. The sample size from which data was randomly collected is 379. However, only 303 representing 80% of the questionnaire were retrieved and usable. The questionnaire consists of questions and statements requiring the respondent to decide the percentage of the tax evasion and insert opinion concerning the problem. Simple percentage, frequency, and descriptive analysis were employed to determine the respondent perceptions. The questionnaire was designed to suit the research questions.

RESULT AND DISCUSSION

TABLE 1.1: PROFILES OF THE RESPONDENTS

	Frequency (n=303)	Percentage %
Gender		
Male	192	63.4
Female	111	36.6
Age		
18-29	91	30
30-49	134	44.3
50 and above	78	25.7
Marital status		
Single	54	17.8
Married	225	74.3
Others	24	7.9
Education		
Did not complete high school	33	10.8
High school	69	22.8
Diploma/NCE	139	45.9
B.Sc./HND	49	16.2
Postgraduate	13	4.3
Source of income		
Government sources	185	61.1
Private source	118	38.9
Income level		
N 220, 000 and below	29	9.6
N 221, 000 - N 250, 000	73	24.1
N 251, 000 - N 400, 000	141	46.5
N 401, 000 - N 700, 000	48	15.8
N 701, 000 and above	12	4

Source: Field Survey (2014)

The profile table indicates that male respondent got 63.4 percent while the female occupy the remaining 36.6 percent of the total sample tested. The age distribution indicates that respondent with age 30-49 representing 44.3 percent was the highest then followed by those with age 18-29 representing 30 percent and those with 50, and above age has 25.7 percent. It indicates the working class is the highest respondent. Marital status indicates that married taxpayers are the highest respondent with 74.3 per cent then followed by single with 17.8 per cent and others 7.9 per cent. This show majority of the respondents are responsible taxpayers. Education of the respondent indicates that those with diploma/NCE are the highest respondent with 45.9 per cent then followed by high school holders. The lowest is respondent with postgraduate education with 4.3 per cent. It shows that intermediate education holders are the highest respondent. Source of income of the respondent indicates that those with government sources are the highest among the respondent with 61.1 per cent and those with the private sources is 38.1 per cent. Finally, income level of the respondent indicates that those with medium-level income representing 46.5 per cent are the highest among the sample tested. The lowest was those with highest representing 4 per cent. That indicates that the respondent profile is mix up with different categories with characteristics.

TABLE 1.2: DESCRIPTIVE SUMMARY OF THE RESPONDENT ANALYSIS

	N	Minimum	Maximum	Mean	Std. Deviation
Age	303	1.50	5.00	2.7441	0.68422
Gender	303	1.00	2.00	1.5412	0.49977
Marital status	303	1.00	3.00	1.6824	0.55920
Education	303	1.00	6.00	3.1412	1.29773
Source of income	303	1.00	3.00	2.1059	0.76959
Income level	303	1.00	6.00	3.1765	1.31605

Source: Field Survey (2014)

From the above Table, it indicates that Age of the respondent has a minimum value of 1.50, a maximum of 5.0 and a mean value of 2.7441. Whereas, Gender, has a minimum value of 1.00, a maximum of 2.00 and a mean value of 1.5412. Also, marital status has a minimum value of 1.00, a maximum value of 3.00 and the mean value of 1.6824. Education level has a minimum value of 1.00, a maximum of 6.00 and a mean value of 3.1412. Source of income has a minimum value of 1.00, a maximum of 3.00 and a mean value of 2.1059. Finally, income level has a minimum value of 1.00, a maximum of 6.00 and a mean value of 3.1765 respectively. That shows that age, gender, marital status, education level, a source of income and income level of the respondent are all moderates.

TABLE 1.3: ANALYSIS OF THE RESPONDENT TO THE RESEARCH QUESTIONS

S/No	Statements/Variables	N	Mean	Frequency	%	Standard deviation
1.	The acceptance level by people on tax evasion	303	2.92	56	8.06	1.68
2.	Percentage of the people in Nigeria who evades tax	303	3.07	77	8.19	1.92
3.	The level of tax evasion in Nigeria	303	2.77	60	7.67	1.82
4.	Percentage of public service who evade tax	303	2.63	38	5.23	1.13
5.	Percentage of private service who evade tax	303	2.90	72	7.09	1.32

Source: Field Survey (2014)

The analysis and result of responses to statements/variables indicate that most of the respondents agreed the percentage of Nigerian, who evades taxes is up to 80.19%. While the percentage of public service taxpayers who are evading taxes are very low 50.23% if compared to other variables under study. However, percentages of people who evade taxes from the private sector were 70.09, the level of tax evasion in Nigeria is 70.67, and the acceptance level of tax evasion was 80.06. The findings of this study are supported by previous studies of Lutfi (2009), Amira (2011), James & Moses, (2012) & Gurama et al., (2015). This indicates that Nigerian taxpayers are clearly, mostly, not complying with the tax authorities. That may be due to many reasons and opinion that the government is not doing enough to make judicious utilization of the fund raise from their taxes (Leyira, Chukwuma & Asian, 2012). As such they see no reason to continue paying the tax instead evading is the right option (Ariyo, 1997). This problem may arise as a result of high bribery and corruption, inadequate accountability in the tax process, lack trust and confidence in the tax administration and above all inability to realize the impact of tax collected from the taxpayer's point of view (Afuberoh & Okoye, 2014). Other reasons may include understaff, unqualified and competent tax officials.

FINDINGS

The main objective of this study is to assess the taxpayer's perception among the taxpayers in Nigeria. Most taxpayers evade tax as a result of different reasons. The reasons may be of bribery and corruption practices among tax and government officials that have a negative effect on the revenue generation (Gurama & Mansor, 2015). The main findings of this study are that:

- Many Nigerian is tax evaders. It may be due to a high percentage of the problem and other reasons that are associated with the activity such as mismanagement and proper utilization of tax collected by the government.
- Negligence by the government to the tax collection especially personal income tax by over-relying more on crude oil revenues. Ariyo, (1997) over-reliance on crude oil revenue by government bring about neglect to other sources of government revenue like as taxes.
- More than half of private sector employees are not complying in paying their tax that result in high evasion. This is because some are not registered with tax authorities while some their employers are not deducting the taxes on behave of the tax authorities from their wages and salaries or even not remitting accordingly due taxes to the government.
- Public sector employees have high compliance rate with tax authority although a little bit more than half. These may be their compliance is not voluntarily because their taxes are been deducted by the government before receiving monthly salaries and payment. On the other hand, other sources of their income are not available for assessment and taxed accordingly.
- The acceptance level of tax evasion among taxpayer was extremely not favorable. Because the rate is too high, and many factors may result in a contributing element to the problem. Some of the factors may be a lack of tax knowledge, enlightens and important of paying taxes to the authorities, inadequate benefit from the tax collected and lack of trust and confidence in government.
- Obsolete tax policies and ignorance of tax laws. These are because of low awareness of the government and tax authorities on the important of an individual to contribute to the prosperity of the country collectively through taxation rather than personally.
- Other factors that contribute to the high tax evasion in Nigeria may include economic factors, personal and bias interest, inability to detect and prosecute the evaders and reluctant and unwillingness by the stakeholders to participate fully in the tax process as well as tax system.
- The study also found that the tax system is not totally efficient in which no any database kept by the federal, state and local government for their eligible taxpayer's particularly personal income tax. That may bring about the escalation of the problem where evaders are to be found in any sector of life earnings. If the problem continues unchecked, it would last for a long period and cripple the income revenue required to provide infrastructure and other social amenities to the public.

RECOMMENDATIONS

Due to the above findings of the study, it is, therefore, recommended that crucial and necessary steps must be reserved for the tax authority, government officials and public representatives and stakeholders. Therefore, this study recommends the followings:

- The government should update its tax policies and tax laws that would be simple to understand, implement and user-friendly to the taxpayers and tax administrators.
- The government should provide awareness and educate taxpayers on how to assess and remit their taxes and furthermore the important and need for voluntary compliance. Moreover, assured taxpayers of properly and judicious utilization of the collected revenue from tax.
- Government, as well as tax officials, should be honest, accountable and transparent to curb tax evasion, corruption and try to restore taxpayer's confidence while discharging their civic responsibility. These will also change the perception of taxpayers toward government and behavior of evasion in particular.
- Moreover, government should endeavor in providing and making infrastructure available to the public via the provision of fundamental social needs to the citizen such as good health care, roads, schools, job opportunity and above all security and safety of its populace to discourage evasion. These will provide an enabling environment and improved standard of living which in turn encourage tax compliance and curb the evasion attitudes.

- There is a need to have a comprehensive database system that would incorporate all the eligible taxpayers which will contain the source of income and other bio data that are relevant and would lead to access the individual's taxpayers. Moreover, all the interrelated bodies such as corporate affairs commission, federal, state and local government tax agencies should work in harmony and share information about the tax and tax related matters.

CONCLUSION

Tax evasion typically has effects on revenue loss to the government. These may cause inevitable distraction to the right performance of the public sector, threatening its competence to finance public expenditure. This study assesses the perception of taxpayer toward tax evasion among Nigerian taxpayers. The findings of the analysis show that many Nigerians are not paying their taxes and hence viewed that the acceptance level of the menace is about 80%. It is not surprising in a country where people are fashionable in evading tax (Olowookere & Fasina, 2013). Furthermore, inadequate accountability and transparency over the public establishment, a high level of corruption, extravagance, unnecessary spending by government officials positively may handle tax evasion in the country. Misused of tax collected, lack of trust and confidence in government and tax official may also be some of the motivational factors encourage the taxpayers for inadequate compliance behaviour. However, Good tax system and effective tax administration together with honest and competent tax body does positively discourage tax evasion and facilitate more compliance in Nigeria. There is a need for government to take new measures and review it tax policies, laws and edicts that will curb the problem from the grass root. Because of effective measures of tackling of the issues will increase the tax revenue.

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AUTOMATIC PROFILE CHANGING USING ANDROID PHONES AS PER GPS LOCATION

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ABSTRACT

On the way to educational institutions, corporations, meeting rooms etc. we have to change the profile you need manually. Sometimes we forget to do, we made an automatic application changing profile in android phone application here. We use to monitor the position by GPS (global positioning system). Hypothetically, if you work for a company, forget to keep your phone in silent mode. Automatically mobile changes its profile to silent mode. When we get out of that office, mobile profile will change to General (normal) modes automatically. In the same way it will change the profile by environmental sense (location) in android phones. Our main objective is to design simple, intuitive interface with limited screens for the Automatic Profile Change action.

KEYWORDS
GPS, Android, Google-map, Location update [4], Automatic Negation.

INTRODUCTION

Now a days, since the usage of phones increased, the demand for creative applications are increased.
On the way to educational institutions, corporations, meeting rooms, etc. need to keep profile change it manually. To overcome this problem the ' automatic profile changing project was did for that issue.
When you enter the official places where we profile is an application that helps you to automatically change. Here to monitor the position of the GPS (global positioning system) you are using the settings. If we are working in a company, where there is an application that we assume our phone silent mode, forget it. Automatically in this situation came to silent mode silent mode is required. We get out of that environment, when will the General (normal) modes automatically. In the same way is changing the profile of environmental sense and android phones.
GPS [1] settings by using this application, the environment, and using the concept called ' service ' in the background, all operations are made. Features of this application are smart phone you can register only one time.
The most important feature of this project is that the application does not need any special indication or transaction, the details of the location changes the location to find and automatically switches to a Profile Manager using.
In General, most of the time we forgot to change the profile, and then go to silent mode automatically. Profile automatically modifies the General mode it will come out from the environment.

EXISTING SYSTEM

When changing existing phone where there are only manually from the phone profile, and it will take a break to change the profile. If we forgot to silent mode disturb us will continue. This application automatically profile is changing and this monitoring location is not an easy task.

PROPOSED SYSTEM

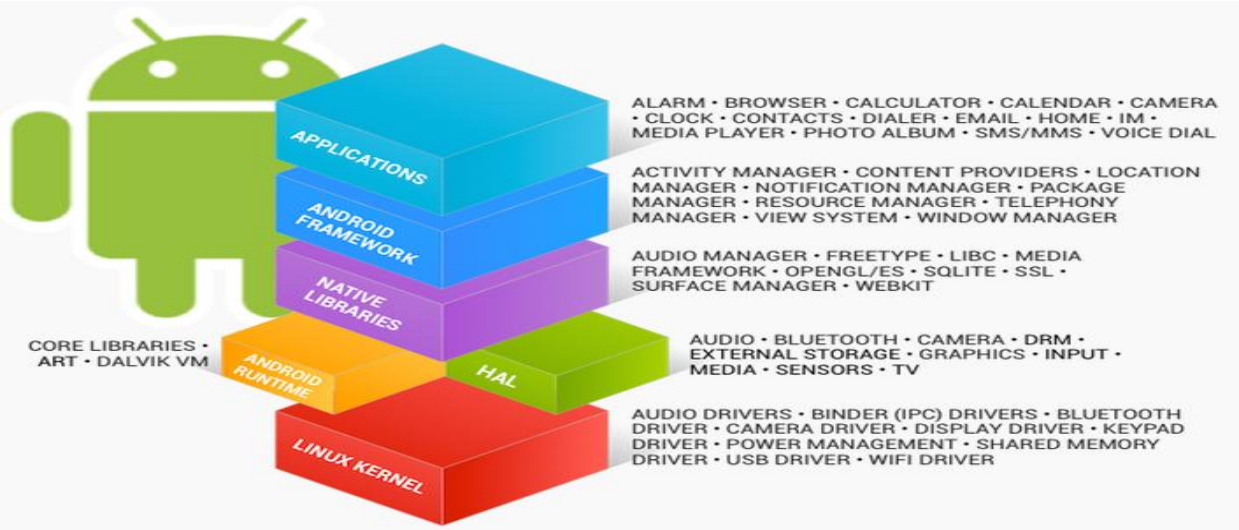
When you enter the official places where we profile is an application that helps you to automatically change. I forgot to change the user profile as soon as possible, GPS location manager and location of audience-based tracks. According to latitude and longitude values here which location is used to display, use the editor to change the voice and Profile Manager. Besides location, track and this application, latitude and longitude will be showing the details and save details settings.

BACKGROUND

ANDROID

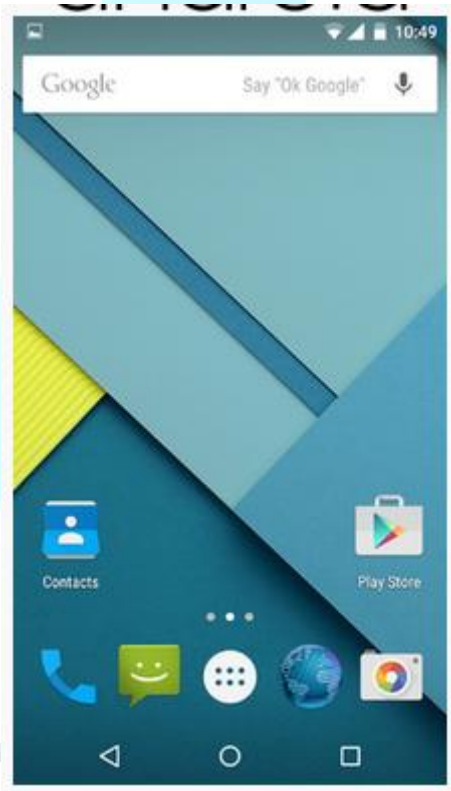
Android is a mobile OS. Which is developed and maintained by Google Inc. Android is developed especially for touchscreens, tablets& etc.
Android [2], ready for high-tech devices, low cost and requires an operating system that can be customized is popular with technology companies. The open nature of Android developers and enthusiasts a great community open-source code, community-oriented projects, advanced users to add new features to encourage you to use as a base or other officially published Android operating systems brings devices. The success of the operating system, the so-called patent litigation as part of a ' target for the smartphone wars ' among technology companies.

FIG. 1: ANDROID STACK



In Android basic Applications are alarm, browser, calendar, calculator, camera, clock, contacts, dealer, email, home, IM (Instant Messaging), media player, photo gallery, SMS/MMS, voice dial.

FIG. 2: ANDROID 5.0 HOME SCREEN



The main advantage of adopting Android application is that it offers a holistic approach to development. Developers just develop for Android and applications using Android-powered devices should be able to run a number of different devices, as well. The successes in the world of smart phones are the most important part of the chain. Device manufacturers therefore Android best as the base of a wide range of applications which I already commands the phone, I see hope challenge an attack.

FEATURES OF ANDROID

Android is open source software where there is no limitation of developing application and there is no specific hardware Configurations. The main features [3] of Android mobiles are:

General features

Messaging: SMS/MMS& C2DM are part of Android push messaging system.

Web Browser: Coupled with Chrome's V8 JavaScript engine, web browser, Android is available open source Blink (previously Web Kit) scheme is based on the engine. After 100/100 on the Acid3 test-scored using the Android Web Kit browser and Android 4.0 now has support for better standards Blink-based browser.

Voice Based Features: Google search through voice has been available since the first version, etc., navigation, voice actions for texting calling is supported on Android 2.2 onwards. With the ability to talk back as Android 4.1, Google has expanded Voice Actions When questioned by certain commands and read the response from Google's Knowledge Graph. The ability to control the hardware has not yet been implemented.

Multi Touch: Was initially presented to the use of handsets such as the HTC Hero Android has native support for multi-touch. Initially feature (probably time to avoid breaking the touch screen technology on Apple's patent) was disabled at the kernel level. Google Nexus One has been providing multi-touch natural and has released an update for Motorola Droid.

There are other main features for android like Multi-Tasking, Screen shot, video calling, Multi language support, Accessibility Connectivity features like Bluetooth, Tethering and Media feature like Streaming media support (adobe flash streaming, apple HTTP plugin, RTP/RTSP streaming), Media support (WebM, H.263, H.264, AAC(MP3 and MP4), Ogg, JPEG, PNG, BMP, WebP, WAV, FLAC), External storage(FAT32, EXT3,4, NTFS, HFS Plus, exFAT). Other supporting features like java support, Handset layouts, Storage.

ACTIVITIES

Activity is an application component that provides a screen for users to do activities. Search users with a screen such as a phone to take pictures, send an email or to view a map application allow component can interact is an activity. Each activity is given to draw the user interface in a window. Window usually fills the screen, but the screen and float of other Windows may be smaller.

An application usually coupled to each other and tied consists of multiple activities. Typically, the application is starting for the first time an activity within an application is presented to the user is specified as ' master ' activity. Each activity, to perform different actions you can start another activity later. A new activity each time the service is started, stopped, however the system activity in a previous activity on the stack (stack ' back ') preserves. When a new activity is pushed back stack and take user focus. Rear stack ' Finally, the first ' core stack fits into the mechanism, when the user presses the back button and you are done with the current activity, it has been popped off the stack (none) and earlier remain in effect. (Rear stacks back more tasks and that are described in the document.)

Creating an Activity: Activity to create a child activity (or an existing alt), you must create it. Effectiveness of your child class is created when, for example, between the various situations in their life-cycle transitions when the system calls the call-back methods you need to implement continue, or destroyed. The two most important call-back methods are as follows:

onCreate()	You must implement this method. The system calls for creating this event. In your implementation of the main components of the activity to start. Most importantly, this is where the activity is to define the layout of the user interface, you must call setContentView().
onPause()	The system, though (always does not mean extinction event), leaving the first indicator of user activity for this method calls. This is usually where (the user can come back, because it is not) the current user session handle permanent changes.

SERVICE

You can perform long-running processes in the background and is an application that provides a user interface component. Even so, the user continues to work in the background, you switch to another application and another application component, you can start a service. In addition, with a component, you can connect to a service to perform the interaction and even process communication (IPC) between. For example, a service network operations, game music, file i/o, or the content provider, all from the past interact.

EPICALLY SERVICES HAVE TWO FORMS

Started: 'An application component (activity) that is started by calling StartService(), started a service '. Even if no component started once started, you can run indefinitely on a service in the background. Generally, only an started service does not return to the caller, performs an operation, and returns a result. For example, download or upload a file over the network. When it's done, the service itself should stop.

Bound: 'An application component for the call bindService() by a service connected ' when it is connected to. Interact with a service that is associated with the service, you can send requests, get results and processes with inter process communication (IPC) even across components offers a client-server interface. Dependent services only as long as it is connected to another application, component works. You can connect to the service, once more than one component, but all of them unbind the time service does not exist. This document describes two types of services usually these separately, but you can work in either direction service it can be started (to run indefinitely) or binding. This is a matter of only a few implement call-back methods: on StartCommand() and onBind() connection and allows components to start.

MENUS

- **OPTIONS MENU AND ACTIONS BAR**

The primary options menu is a collection of menu items for an event. Here is the app ' search ' as ', ' create the e-mail is a global effect is involved in the actions and ' settings ' If you are developing Android 2.3 or lower, users pressing the menu button in the options menu panel can reveal. Android 3.0 and above as a combination of elements from the options menu on the screen, the action bar is served by the action items and overflow options. Starting with Android 3.0, menu button is not recommended (exist on some devices), actions, and to provide access to the other options, you must migrate towards using the action bar.

- **CONTEXT MENU AND CONTEXTUAL ACTION BAR**

Click on the user context menu item performs a long floating menu is displayed. Actions that affect the selected content or provides a context frame. When developing the Android 3.0 and above, the selected content on the contextual processing mode to enable the actions you need to use instead. In this mode, an action item, at the top of the screen shows the selected content and the user's toolbar affects to select multiple items.

DIALOGS

- ***AlertDialog***

Zero, one, two, or three buttons and check boxes, and radio buttons can contain, you can manage a list of items that can be selected in the dialog. Alertdialog is capable of constructing most of the user interface and the suggested dialog type.

- **Process Dialog**

The progress wheel or progress bar that displays the dialog box. Alert Dialog is an extension Also supports buttons.

- **Date Picker Dialog**

Where (user) we can choose or select date.

- **Time Picker Dialog**

Where (user) can choose or select date.

- **Custom Dialog**

Where developer design the window as per the design we use and use according to the user tastes.

FEASIBILITY

Technical Feasibility: In this study, the Technical feasibility, in other words, the technical requirements are made to control the system. Any system has developed; existing technical resources must have a high demand on it. This existing technical resource will lead to high demands on it. This will lead to the most discerning client placed. Only minimal or null if this system changes as required to implement advanced system must have a modest requirements.

Operational Feasibility: System user by working to control the level of direction is accepted. To use this system effectively contains the training process. The user must not feel threatened by the system, instead you must accept as a necessity. Users can add only user level system adopted by train and depends on the methods used to become familiar with him. So he is open to the end user of the system, it is possible to do some constructive criticism, it is necessary to be raised to the level of his trust.

Economic Feasibility: In this study, the system will have to be made to control the economic effects. Pour the amount of funds the company may be in research and development system is limited. Must justify expenditures. One of the most used technologies are freely available, so that advanced system is provided in the budget and that it. I just had to purchase a customized product.

DESIGN AND CODING

Modelling language

UML has four structural diagram to visualize, specify, construct, and document system are static aspects. The existence and static aspects of a home, walls, doors, Windows, pipes, cables and ventilation covers the placement of such things. The presence of a software system to make the static aspects and such things to cover the Docking interfaces classes, collaborations, components and nodes

CODING

Profile page.java

```
package example.profilemodechangingusinggps;
import android.app.Service;
```

```
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.media.AudioManager;
import android.os.Bundle;
import android.os.IBinder;
public class ProfilePage extends Service {
LocationManager lm;
LocationListener ll;
SharedPreferences sp;
AudioManager am;
@Override
public IBinder onBind(Intent arg0) {
		// TODO Auto-generated method stub
		return null;
	}
@Override
public void onCreate() {
		// TODO Auto-generated method stub
		super.onCreate();
		lm=(LocationManager)getSystemService(Context.LOCATION_SERVICE);
		sp=(SharedPreferences)getSharedPreferences("profile",Context.MODE_PRIVATE);
		am=(AudioManager)getSystemService(Context.AUDIO_SERVICE);
}
		@Override
public void onDestroy() {
// TODO Auto-generated method stub
super.onDestroy();
lm.removeUpdates(ll);
}
@Override
@Deprecated
public void onStart(Intent intent, int startId) {
		// TODO Auto-generated method stub
		super.onStart(intent, startId);
		ll=new LocationListener() {
			@Override
public void onStatusChanged(String provider, int status, Bundle extras) {
// TODO Auto-generated method stub
}
@Override
public void onProviderEnabled(String provider) {
// TODO Auto-generated method stub
}
@Override
public void onProviderDisabled(String provider) {
		// TODO Auto-generated method stub
		}
@Override
public void onLocationChanged(Location location) {
// TODO Auto-generated method stub
double lat=Double.parseDouble(sp.getString("lat",null));
			double long1=Double.parseDouble(sp.getString("long", null));
Location loc1=new Location("src");
		loc1.setLatitude(lat);
		loc1.setLongitude(long1);
	Location loc2=new Location("dest");
		loc2.setLatitude(location.getLatitude());
		loc2.setLongitude(location.getLongitude());
		int dist=(int) loc1.distanceTo(loc2);
				if(dist<=20)
				{
am.setRingerMode(AudioManager.RINGER_MODE_SILENT);
				}
		else
			{
am.setRingerMode(AudioManager.RINGER_MODE_NORMAL);
				}
				}
			};
lm.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0,ll);
}
```

```
}
```

Tracking.java

```
package example.profilemodechangingusinggps;
import android.app.Activity;
import android.content.Context;
import android.content.Intent;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.Toast;
import android.widget.ToggleButton;
public class TrackingPage extends Activity {
		ToggleButton gps;
		Button settings;
		LocationManager lm;
		LocationListener ll;
		@Override
protected void onCreate(Bundle savedInstanceState) {
			// TODO Auto-generated method stub

	super.onCreate(savedInstanceState);
		setContentView(R.layout.trackingpage);
		gps=(ToggleButton) findViewById(R.id.toggleButton1);
			settings=(Button) findViewById(R.id.button1);
			lm=(LocationManager) getSystemService(Context.LOCATION_SERVICE);
			ll=new LocationListener() {
			@Override
public void onStatusChanged(String provider, int status, Bundle extras) {
// TODO Auto-generated method stub
}
@Override
public void onProviderEnabled(String provider) {
// TODO Auto-generated method stub
}
@Override
public void onProviderDisabled(String provider) {
			// TODO Auto-generated method stub
		}	@Override
public void onLocationChanged(Location location) {
		// TODO Auto-generated method stub
Toast.makeText(TrackingPage.this,"",Toast.LENGTH_LONG).show();
		}
		    };
lm.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0,0,ll);
settings.setOnClickListener(new OnClickListener() {
				@Override
public void onClick(View v) {
// TODO Auto-generated method stub
gps.setVisibility(View.VISIBLE);
			}
			});
gps.setOnClickListener(new  OnClickListener() {
@Override
public void onClick(View v) {
// TODO Auto-generated method stub
if (gps.getText().toString().equals("ON")){
Intent set=new Intent(TrackingPage.this,LocationPage.class);
startActivity(set);
}
}
});
}
}
```

Location.java

```
package example.profilemodechangingusinggps;
import android.app.Activity;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.content.SharedPreferences.Editor;
import android.location.Location;
```

```
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
public class LocationPage extends Activity {
		EditText lan,lat;
		Button save,off;
		LocationManager lm;
		LocationListener ll;
		SharedPreferences sp;
		Editor ed;
	double mylat,mylong;
		@Override
		protected void onCreate(Bundle savedInstanceState) {
			// TODO Auto-generated method stub
			super.onCreate(savedInstanceState);
			setContentView(R.layout.location);
			lan=(EditText) findViewById(R.id.editText1);
			lat=(EditText) findViewById(R.id.editText2);
			save=(Button) findViewById(R.id.button1);
			off=(Button) findViewById(R.id.button2);
	sp=(SharedPreferences)getSharedPreferences("profile",Context.MODE_PRIVATE);
		lm=(LocationManager)getSystemService(Context.LOCATION_SERVICE);
			ll=new LocationListener() {
				@Override
public void onStatusChanged(String provider, int status, Bundle extras) {
// TODO Auto-generated method stub
				}

		@Override
public void onProviderEnabled(String provider) {
// TODO Auto-generated method stub

}
@Override
public void onProviderDisabled(String provider) {
// TODO Auto-generated method stub
				}
@Override
public void onLocationChanged(Location location) {
// TODO Auto-generated method stub
mylat=location.getLatitude();
mylong=location.getLongitude();
lan.setText(mylat+"");
lat.setText(mylong+"");
				}
			};
lm.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0,ll);
save.setOnClickListener(new OnClickListener() {
@Override
public void onClick(View v) {
// TODO Auto-generated method stub
ed=sp.edit();
ed.putString("lat", mylat+"");
ed.putString("long", mylong+"");
ed.commit();
lm.removeUpdates(ll);
Intent pp=new Intent(LocationPage.this,ProfilePage.class);
startService(pp);
}
		});
off.setOnClickListener(new OnClickListener() {
@Override
public void onClick(View v) {
// TODO Auto-generated method stub
Intent pp=new Intent(LocationPage.this,ProfilePage.class);
stopService(pp);
				}
			});
		}
}
```

TESTING

Android test framework, an architecture and an integral part of the development environment powerful tools at each level of the Framework implementation provides test every aspect of your units.

KEY FEATURES OF FRAMEWORK

- Android is based on JUnit test packages. Android's Android API or plain JUnit JUnit extension to test Android components cannot call class, you can use for testing. If you are new to the Android test, AndroidTestCase start with General-purpose test case classes and more advanced classes continue to use.
- Android JUnit Extensions provides the component-specific test case classes. These classes are fake objects provides methods and help you to create a component lifecycle methods that help control.
- A number of new tools or test suite tests don't need to learn techniques to create so it is similar to the main application packages are contained within the test suite
- SDK tools to build and test with ADT Eclipse and also other IDE for use with the command line in the form are available. These tools, Project information and application under test will be automatically set up file, the manifest file and directory structure to use this information to create a test suite.
- SDK, monkeyrunner, Python programs, equipment test API and UI/application exerciser monkey, of sending a device of random events when stress-testing for user interfaces, provides a command-line tool.
- This document is the structure of the tests, the tests used to develop APIs and run the tests and tools that you use to display results including Android test framework describes the basics. Document, Android application programming and JUnit test methodology assumes a basic understanding.

ANDROID TEST CASE

General test case class is AndroidTestCase[5] useful, especially if you are just starting with Android test. TestCase extends Assert and. JUnit standard setUp () and tearDown () methods, like all JUnit's Assert method provides. In addition, permissions, and clearing the class references specific protection against memory leaks method provides methods for testing.

CONCLUSION

On the way to educational institutions, corporations, meeting rooms etc. we have to change the profile you need manually. Sometimes we forget to do, we made an automatic application changing profile in android phone application here. We use to monitor the position by GPS (global positioning system). Hypothetically, if you work for a company, forget to keep your phone in silent mode. Automatically mobile changes its profile to silent mode. When we get out of that office, mobile profile will change to General (normal) modes automatically. In the same way it will change the profile by environmental sense (location) in android phones. Our main objective is to design simple, intuitive interface with limited screens for the Automatic Profile Change action.

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Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

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