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# INSTITUTIONAL INVESTORS AND DISCRETIONERY ACCRUALS: THE CASE OF LISTED MANUFACTURING FIRMS IN NIGERIA

Shehu Usman Hassan*
Abubakar Ahmed**

## ABSTRACT

Abstract: Institutional Investors has been identified as an important corporate governance mechanism that can discipline and influence managers to act in the overall interest of the firm. The relevance of this mechanism in constraining managerial opportunistic tendencies has been explored in the context of developed countries, neglecting the developing economies which have peculiar corporate governance structures and regulatory frameworks. This paper examines the impact of institutional investors on discretionery accruals in the Nigerian manufacturing companies. Secondary data were extracted from the annual reports of 20 most active quoted firms on the Nigerian Stock Exchange for the period between 2008 to 2010 and OLS multiple regression is used for analysis. The study documents that institutional investors has a strong and positive impact on earnings management in the Nigerian manufacturing firms. Specifically, we find that institutional ownership of total equity shares of the sample firms and institutional presence on the board of directors are inversely related with opportunistic accounting.

**Keywords:** institutional investors, discretionery accruals, opportunistic accounting, earnings management, Nigeria.

**RATIONALE:**

The global corporate scandals that plagued once prestigeous companies posed serious questions about the reliability of financial statements relating to their ability to reflect the true economic situation of firms. One of the reasons put forward for these scandals is that there was an inherrent weakness in governance mechanisms that have either not been identified or that have been overlooked by both regulators and practitioners. It became quite conspicuous that managers are more interested in the realization of self-enhancing objectives than the shareholders' wealth maximization objective. Thus, in a bid to correct these unprecedented corporate failures, the Serbanese-Oxley Act was introduced in the U.S. in 2002 and many other nations followed suit. The new code of best governance prectices was introduced in Nigeria in 2003 with the aim of protecting shareholders' wealth and restoring investors confidence in the quality financial statements. But, in spite of the introduction of new code of best governance practices and its continuous modifications, there are fresh cases of governance malpractices that raise legitimate concerns on the effectiveness of these governance mechanism in alligning the interest of the managers with that of the shareholders.

The need for a good corporate governance structure arose because of the seperation of ownerhip between a firm and its owners, which turns the firm into a nexus of relationship among managers, employees, shareholders, creditors, government and all its stakeholders. The seperation of ownership and control by the sophistication of the modern day business redefines the relationship that exists between the owners and the managers to that of an agent and a principal. Being the agent, the manager is expected not pursue goals that are geared towards the achievement of his own interest at the expense of shareholders' wealth maximization. The existence of conflict of interest between managers and owners naturally compromises the value of the firm. Financial statements play an important role in assessing managers performance by the board of directors, outside investors and external regulators. It is therefore, not unlikely that managers will manipulate financial reports in order to produce a good image of themselves and that of the firms that they manage. Earnings management simply refers to the manipulation of earnings by companies using financial statement elements that are largely at the discretion of the managers to achieve divergent personal goals. These elements are peculiar to industries depending on their nature of operation and their external regulatory framework. The use of discretion by firm managers to influence reported earnings has long being recognized by accountants and financial economists (Beatty, Ke and Petroni 2002: Cornett, Markus & Tehranian 2007).

Such opportunistic tendencies are made possible by the existence of accounting choices and methods. One of such accounting choices is the accrualbased accounting. Although, it is argued to provide the most relevant measure of economic performance and firm financial standing, You, Tsai and Lin (2003) observe that the judgement and discretion involved in this method offers managers variety of choices to manipulate earnings.Institutional investors is an endogeneous governance variable that has been central in corporate governance discussions. The argument to categorize it as an endogeneousmechanism is supported by the fact that corporate disclosure, together with firm characteristics such as size, financial performance, and risk may affect institutional ownership and accruals quality simultaneously (Liu and Peng, 2008). Prior literature have acknowledged that institutional presence can serve as an effective monitoring mechanism in the firm (e.g. Bowen, Rajgopal and Vankatachalam, 2003: Hassan, 2011). Institutions areparticularly important in corporate governance discussions because, in alot of cases, they hold a substantial proportion of total equity shares of a good number of firms and are thus relevant to policy makers. It is therefore, quite possible that these institutions have an effect on firm performance as well as the discretionery behaviour of managers. Perhaps, the predominant view is that because institutions have the required resources and financial expertise to monitor and discipline managers and thereby reducing agency problems(Schleifer and Vishney, 1997: Roodposhti and Chashmi, 2011).

However, it can be argued that if institutions hold a large amount of equity shares of company, that in itself may exert an enormous pressure on the part of managers to manipulate earnings in order to please these institutions.Recent literature document that institutional investors have different incentives to monitor managers depending on the investment scope. According to Liu and Peng (2008), Chen et al. (2008) observe that independent long term investors with substantial ownership effectively monitor merger and acquisition decisions, while short-term investors give managers the latitude to achieve value-decreasing mergers and acquisitions. In this regard Liu and Peng (2008) note that dedicated institutions who are more interested in long term returns have stronger incetives to monitor managers than their transient counterpart.The interraction between corporate governance and financial reporting has also been emperically explored to a considerable extend especially in the developed countries. In this light, Beasley (1996) observe that as institutional investment increases, financial fraud decreases in U.S. firms. This is finding is extended by Schleifer and Vishney (1997) whoconclude that institutional investors in the U.S. effectively resolves agency problems and pressure managers to improve performance in their cross-country study of the phenomenon. On the other hand, both Dabo and Adeyemi (2009) and Alfayoumi Abuzayed and Alexander (2010) fail to find a robust relationship between institutional shareholding and manipulative accounting in their Nigerian and Jordanian samples respectively. From another point of view Cornett et al. 2008 find the both institutional shareholding and institutional representation on the board of dircectors improve firm performance. They perceive that such relationship is still robust even when firm performance is stripped from the discretionery component of accruals. If a negative association emerges between corporate governance and earnings management variables, it will imply that managers act in such a manner that reflects the shareholders' wealth maximization objective of their firms.

If such is the case, it can also be deduced that a positive relationship will emerge between such managers and firm performance. In Nigeria, institutions hold a substantial amount of equity shares of quite a number of firms. The implication of this is not known with certainty, because the previous studies that examined the impact of institutional ownership and earnings management have produced inconsistent results. Moreso, the attention on the developing countries whose economies are rapidly growing and have peculiar corporate control features, capital allocation and regulations have only recently gathered momentum (Bradbury, Mark and Tan, 2006: Firth, Fung and Rui, 2007). The differences in economies and level of sophisticatication of corporate governance mechanisms accross the globe call for such investigations in the Nigerian context. Further, most of the emperical studies of the effect of institutional investors on either corporate performance or opportunistic accounting have considered only one aspect of institutional presence in the firms within the study samples. Such approach can be deemed to be myopic as it may neglect an aspect of institutional involvement that can raise legitimate questions on the

validity of the study results. In order to establish a relationship among variables, and to document reliable policy implication, requires an examination of different aspects of the research phenomena. Hence, the choice to consider four variables to capture the effect of institutional investors in the sample firmson the opportunistic tendencies of managers. The objective of this work, therefore, is to investigate the impact of institutional investors on discretionery accruals in Nigerian manufacturing firms. To achieve this aim, it is therefore hypothesized that institutional investors do not have have a significant impact on discretionery accruals in the Nigerian manufacturing firms. The choice of manufacturing firms is informed by the role that industrial firms play in the development of the Nigerian economy. The contribution of this work is in two ways. Firstly, it adds to the extant literaure that examined the interraction between institutional ownership and earnings management.Secondly, looking at institutional impact from different angles, this work extends the studies of similar nature conducted elsewhere to the developing nations like Nigeria.The remaining of this paper is organized as follows. Section two reviews emperical works that are related this study and presents the theoretical framewok. Methodological issues are raised and discussed in section three and the model is specified. In section four results are presented and major findings are discussed together with their policy implications. Finally, in section five the work is concluded and recommendations are poferred in the light of major findings.

## 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

In this section, related literature on institutional ownership and earnings management are reviewed and the theoretical framework for the study is presented.

Healy and Wahlen (1999) define earnings management as the altering of financial statements through the use of judgement in structuring transactions to either mislead the firm's stakeholders about the true economic picture of the firm or to achieve some contractual benefit that is based on accounting numbers. In the words of Schipper (1989), earnings mangement is the deliberate intervention in financial reporting process to achieve personal goals. This means that earnings mangement is the manipulation of financial statement by managers, using accounting choices, estimates and methods, to achieve some objectives that are largely in conflict with the underlying economic status of the firm. Various methods for the detection of earnings management have been documented. "Empirical studies have found managers engage in earnings management through changing accounting choice, real transactions, total accruals/discretionary accruals, specific accruals, earnings distributions approach and income smoothing" (Sun and Rath, 2010, p122).

Of all these methods, the total accruals approach seems to be the one that has caught the attention of researchers the most. This is because, Al-Fayoumi et al (2010) note that it is the most damaging to the usefulness of accounting information because investors are wary of such accruals. Total accruals, which is the difference between net income and cash flow from operating activities, is further divided into two; non-discretionery and discretionery accruals. Non-discretionery accruals are those adjustments to the firm's cash flows that reflect the underlying economic conditions of the firm and is required by the accounting standard-setting bodies. While discretionery accruals are those adjustment to the cash flow that largely depend on managers' judgement of furure uncertain events.Chang et al. (2008) note three incetives to manage earnings. Firstly, because of capital market motivation, which includes initial public offerings, seasoned equity offerings, management buoyant plans and plans for mergers to meet earnings forecast, to smooth earnings, etc. Secondly, contracts motivation such as management compensation, debt agreement or job security also constitute the incentive for earnings management. Thirdly, laws and regulations such as import regulation, industrial regulation, antitrust laws, e.t.c., also can serve as an incentives. Cornett et al. (2009), note that managers use discretionery accruals for opportunistic earnings mangement. This includes options (the incentive for bonus income by attaining some level of performance) and affecting stock prices to enhance managers'wealth through restricted stock compensation.

Institutional shareholding has emerged as an important exogeneous corporate governance mechanism for protecting minority shareholder's interest. This stems from the fact that institutions have more resources and capabilities to monitor, discipline and influence managers. However, both the incentive and power of the institutions depend on the degree of ownership acquired by the institutions (Roodposhti and Chashmi, 2011: Hassan, 2011). Also, Hartzell and Starks (2003) note that institutions have wealth of financial expertise which gives it a greater latitude to monitor managers. If these argument holds true, we expect institutional shareholding and earnings management to be inversely related, especially that institutions hold a substantial amount of equity shares of alot of quoted manufacturing firms in Nigeria.Previous studies have documented contradictory results regarding the effect of institutional shareholding on opportunistic behavior of managers. Using a sample of 20 randomly selected quoted and active companies on the Nigerian Stock Exchange, Dabo and Adeyemi (2009) examined the relationship between institutional investors and opportunistic behaviour of managers. The study fails to establish any statistical evidence to either accept or fail to accept their hypothesis. This could be due to the use of chi-square, which is a less effective method of data analysis for establishing cause and effect relationship. Similarly, Al-Fayoumi et al. (2010) examine the interaction between ownership structure and managers' discretionery behaviour. Using a sample of 195 firm-year observations, consisting of Jordanian industrial firms for the period between 2001-2005, they fail to find a significant relationship

between institutional shareholding and discretionery accruals. Although, this study was carried out in the context of a developing countries, the differences of economies and regulatory frameworks accross the globe call for an investigation into the Nigerian scenario. Extending prior research, Hassan (2011) investigate the effect of corporate governance on financial reporting quality with a sample of 63 banks listed on the Nigerian Stock Exchange for the period between 2007-2010. The study finds a positive and significant relationship between institutional shareholding and financial reporting quality. This work focused on the banking industry which has different governance structure from that of the manufacturing firms. In the same vain, using 22 non-financial firms listed on Tunis Stock Exchange for the period between 1997 to 2007, klai and Omri (2011) document a positive relationship between institutional investors, who are the major shareholders of Tunisian firms and who are also of significant presence on the board of directors, and financial repoting quality. The major drawback of this research is that it considered only the effect of financial institutions in the study sample on the opportunistic tendencies of managers.In another context, Liu and Peng (2008) examined the interraction between institutional investors and accruals quality. With 24,005 firm-year observations between 1985 to 2003and using different measures of accruals quality, the study documents that dedicated institutional investors have the incentive to monitor managers effectively in terms of their financial reporting decision and that transient institutional investors allow managers to engage in opportunistic earnings manipulation. It is interesting that the paper distinguishes two types of institutional owners: dedicated investors (those that are interested in the long term return on their investments) and transient investors (those that are short term investors). Also, from another direction, Cornett et al. (2008) find a positive and significant effect of institutional shareholding and its presence on the board of directors on firm performance.

They observe that this relationship is also positive and robust when firm performance is adjusted to account of the influence of discretionery accruals. The study used top 100 firms rated by S&P in the U.S. The literature that examines the effect of number of institutions who have equity investments and the ratio of institutional investors on the board of directors on discretionery accruals is sparser . Cornett et al. (2008) find that both have inverse relationship with earnings management. As mentioned earlier, given the peculiar corporate control features, capital allocation and regulations of the developing economies, it is pertinent to exermine these phenomena in the Nigerian context.From the foregoing, the impact of institutional investors on discretionery accruals is inconclusive. This is because, in spite of the fact that institutions have required resources to monitor and discipline managers, this ability can be said to be theoretical. We argue that the dominant ownership can also serve as an incentive for managers to manipulate earnings inorder to please the large equity owners of the firm.

Agency theory provides a natural backdrop upon which this research is based. The theory states that the seperation of ownership from control of the modern day business has turned the relationship between the owners (shareholders) and controllers (managers) to that of an agent and a principal. As such the managers are supposed to treat this fiduciary relationship with utmost sense of transparency and accountability. This means that they are expected to act in such a manner that benefits the shareholders rather than pursuing their own selfish interest. However, in practice, the existence of information asymetry that gives the managers a privilege information may lead to the breach of the agency arrangement as the managers are tempted to use their positions for self enhancement, hence the agency problem. Institutional investors have emerged over the years as an important corporategovernance mechanism that can mitigate this agency problem by effective monitoring of managers and consequently reducing the agency cost.

## 3. METHODOLOGY, MODEL SPECIFICATION AND ROBUSTNESS TEST

This work is a correlational research that links institional investors and discretionery accruals. The sample consists of 20 quoted manufacturing firms that are most active on the Nigerian Stock Exchange as at 31st December, 2011 and whose data for the study period,which is 2008 to 2010 are available. Thus, we have 60 firm-year observations. Consistent with prior studies (such as Dechow et al., 1995 and Jaggi and Leung, 2007), a cross-sectional regression of the modified Jones Model (1991) to obtain the discretionery component of accruals. The choice of the modifies Jones model (1991) was informed by Dechow et al. (1995) who argue that the model is more powerful in detecting earnings management among the existing models. Total accruals (*TACC*) is defined as the difference between net income , which is the earnings before taxation and extraordinary item and cash flow from operating activities (*OFC*).

$$TACC_i = NI_i - OCF_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (i)$$

$$TACC_{it}/A_{it-1} = \alpha_t[1/A_{it-1}] + \alpha_{1i}[(\Delta REV - \Delta REC)/A_{it-1}] + \alpha_{2i}[PPE_{it}/A_{it-1}] + \varepsilon_{it} \dots (ii)$$

Where *TACC* is the total accruals($NI - OFC$ ), $\Delta REV$ is change in revenue, $\Delta REC$ is change in receivables, is property, plant and equpment and is the residual. To control for heteroskedasticity, all variables are scaled by previous years total assets. Al-Fayoumi et al. (2010) note that change in revenue is included to control for economic circumstances of each firm in the sample, while gross plant, property and equipment are included to control for the total proportion of accruals relating to non-discretionery expenses.

Earnings management is measured by the discretionery accruals, which is obtained by making the error term from equation (ii) the subject of the formula. Consitent with You et al. (2003), the study uses aboslute abnormal accruals to proxy for earnings management. Thus discretionery accruals is estimated as:

$$|DA_{it}| = TACC_{it}/A_{it-1} - \alpha_t[1/A_{it-1}] + \alpha_{1i}[(\Delta REV - \Delta REC)/A_{it-1}] + \alpha_{2i}[PPE_{it}/A_{it-1}](iii)$$

The larger the value of the absolute discretionery accruals, the higher the presence of earnings manipulation and vice-versa.

Next, the institutional investors variables are presented. The study considers four dimensions of the institutional investors. consitent with Cornett et al. (2005) all variables are defined as follows

*Institutional Shareholding* ( $X_1$): the proportion of equity shares held by all institutions in relation to total equity shares outstanding (lagged one year).

*ln(Number of institutional investors* ($X_2$) : total number of institutions that have equity shareholding in the firm (lagged one year).

*ln(Number of institutional investors on board* ($X_3$): total number of institutions who have representations on the board of directors (lagged one year).

*Institutional presence on the board* ($X_4$): fraction of board composed of institutional investors (lagged one year).

*Firm Size* (D): is used in this study to control for the likely impact of firm size on the discretionery accruals of the sample firms. It is defined as the natural log (ln) of total asset (lagged one year). It is argued that the larger the firm size the higher the expected agency problem that the firm is likely to experience. Also, given the fact that large firms have more resources and earn higher profit, Grey and Clarke (2004) note that they are more likely to avoid managing earnings through discretionery accruals. Quite a number of studies control for firm size including Roodposhti and Chashmi (2011) and Hassan (2011).

The final regression model is therefore:

$$DA_{it} = \alpha_0 + \alpha_1 X_{1it} + a_2 X_{2it} + \alpha_3 X_{3it} + a_4 X_{4it} + D + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (iv)$$

## 4. RESULTS AND DISCUSSION

In this section, the study results are presented and discussed. A set of descriptive statistics are first presented, then followed by the regression result.

4.1 Table 1: Summary of Descriptive Statistics

| | X1 | X2 | X3 | X4 | D |
|---|---|---|---|---|---|
| **Mean** | .2623937 | .06924585 | .462342 | .0968915 | 1.61845 |
| **Std. Dev.** | .1825178 | .03945134 | .4481356 | .1016968 | .01376021 |
| **Minimum** | .043 | 0 | 0 | 0 | 1.181879 |
| **Maximum** | .790099 | .1386294 | .1008612 | .3333333 | 1.795672 |
| **Observation** | 60 | 60 | 60 | 60 | 60 |

Source: Output of data analysis using Stata 9

From table 1 above, the average institutional investment in the sample firms is 26%. This is relatively a low figure considering the fact that institutions have the capacity to make bulk purchases of firms' equity shares and in most cases they represent the lion shareholders. The minimum shareholding is 4.3% which is extremely wide from the maximum of 79%. The average number of institutions who have equity shareholding in the firms is 6%, ranging from 0 to 13%. Institutions who have representatives on the board of directors averages 46% and lying between 0 and 100%. This indicates that there is a fair presence of institutional representatives on the board of directors. The ratio of institutional directors to the total number of directors averages 9.7% with the minimum of 0% and a maximum of 33%. This low figure may be attributed to the low average of institutional equity shareholding in the sample firms. The total assets of the firm averages 1.6 billion Naira, ranging between 1.1 billion to 1.7 billion. Overall, there is no much deviation of the standard deviations from their respective means which means that the data is not skewed and is fit to produce a reliable result.

4.2 Table 2: Correlation Matrix

| | X1 | X2 | X3 | X4 | D |
|---|---|---|---|---|---|
| **X1** | 1.0000 | | | | |
| **X2** | 0.3692 | 1.0000 | | | |
| **X3** | 0.5794 | 0.6775 | 1.0000 | | |
| **X4** | 0.1712 | -0.0029 | 0.1048 | 1.0000 | |
| **D** | 0.1271 | -0.0139 | -0.0386 | 0.0811 | 1.0000 |

Source: Output of data analysis using Stata 9

Table 2 above is the correlation matrix table, a table that shows the correlation between all pairs of independent variables in the model. The result indicates a positive correlation between institutional shareholdind (X1) and all the other independent variables including the control variable (firm size). The correlation between number of institutional investors (X2) is positive with institutional equity shareholding (X1) and institutional representation on the board of directors (X3) but negative with

fraction of board composed of institutional directors (X4) and the control variable (D). Also, institutional representation on the board of directors is positive and fairly strong with all the other independent variable but negative with the control variable. Lastly, the fraction of board composed of institutional directors is positive with all explanatory variables with the exception of the number of institutional investors.

The fairly strong correlation between pairs of explanatory variables calls for an investigation into the possibility of multicollinearity which may lead to incorrect conclusions. The test formulticollinearity using variance inflation factor reveals that excessive correlation does not exist as all factors are above 1.0 and all the tolerance values are below 10. The mean of the variance inflation factor is 1.6. The result is not shown for brevity. Moreso, the diagnostic statistics obtained from White's heteroskedasticity test indicates that the regression model performs properly.

4.3 Table 3: Summary of Regression Results

| Variable | Coefficient | Std. Error | t. test | Probability |
|---|---|---|---|---|
| **Intercept** | .2227611 | .1994289 | 1.12 | 0.272 |
| **X1** | .2552564 | .1204261 | -2.12 | 0.042** |
| **X2** | .1181482 | .0621103 | 1.90 | 0.066* |
| **X3** | -.2002547 | .0638842 | -3.13 | 0.004*** |
| **X4** | .0312646 | .1820918 | 0.17 | 0.865 |
| **D** | .1202753 | 1.245251 | 0.10 | 0.924 |
| **R-Square** | 0.4798 | | | |
| **Adj. R-Square** | 0.4010 | | | |
| **F. Stat.** | 6.09 | | | |
| **Prob.** | 0.0004*** | | | |

Source: Output of data analysis using Stata 9 (***, **, * imply significant levels at 1%, 5% and 10% respectively)

Table 3 above is the summary of the regression results. it indicates that both institutional shareholding and number of institutional investors on the board of directors are negative and significant at 5%. It is also perceived that the number of institutional investors is also inversely related with earnings management and significant at 10%. Fraction of board composed of institutional directors and the control variable do not signify a robust relationship. The model therefore is:

$$DA_{it} = .22 - .25X_{1it} + .12X_{2it} - .20X_{3it} + .03X_{4it} + .12D$$

The interraction between institutional ownership of the equity shareholding of the sample firms and manipulation of earnings by firm managers is negative and robust. This signifies that institutions have the capacity, regarding both resources and financial expertise, to monitor and discipline managers (Roodposhti and Chashmi, 2011) to act in a way that reflects the true economic realities of the firms that they manage. It can also be inferred that these institutions lay a great deal of emphasis on disclosure and quality of financial reports. Interestingly, this study extends the findings of Hassan (2011) who used a sample of 63 firm-year observations to document a positive relationship between institutional investors and financial reporting quality in the Nigerian banking industry. It also supports Cornett et al. (2008) who used 24,005 sample of U.S. industrial firms to document a postive and robust relationship between institutional investors and firm performance even when performance is stripped of the discretionery accruals. However, it contradicts that of Dabo and Adeyemi (2009) who fail to establish a statistically significant association between institutional shareholding and managers' opportunistic behaviour using 20 most active quoted firms on the Nigerian Stock Exchange. Moreso, it conflicts with the finding of Al Fayoum (2010) in their sample of Jordanian industrial firms. It can therefore be concluded that large institutional shareholding in the Nigerian manufacturing firms helps to allay the agency problem and leads to the protection of minority shareholders' interest.

Regarding institutional investors on the board, the result reveals that there is also a negative relationship between it and discretionery accruals. This suggets that the number of institutions that have representation on the board of directors can also serve to constrain the opportunistic tendencies of managers unlike fraction of board composed of institutional investors. The finding supports that of Cornett et al. 2007 who find that earnings management drastically falls with the increase in institutional involvement in the firm regardless of whether involvement is measured by fraction of shares owned by all institutional investors or by the number of institutional investors who are represented on the board of directors. The results also extends Klai and Omri (2011) who established a positive and robust relationship between institutions who are of significant presence on the board of directors of their sample of 22 non-financial firms on the Tunis Stock Exchange and financial reporting quality. Impliedly, the study also confirms the finding of Cornett et al.

(2009) that institutional presence on the board of directors improves firm performance even when performance is adjusted to take into account the impact of discretionery accruals. It can be perceived that multiple number of institutional directors may trigger a competition for competence and integrity among these directors in the discharge of their monitoring role. This finding also implies that institutions have wealth of financial expertise which gives them the latitude to perceive the managerial tactics to conceal the underlying economic conditions of their firms in order to achieve a variety of personal goals.

Overall, the R-square (adjusted) suggests that the institutional investors variables are able to explain discretionery accruals to the extend of 40%, while the remaining 60% are explained by other factors that are not captured in the model. The F Statistics of 6.09 indicates thatthe model is fitted and that the study findings can be relied upon. Based on this we, therefore, reject the null hypothesis that institutional investors do not have a significant impact on discretionery accruals of quoted manufacturing firms in Nigeria.

## 5. CONCLUSION AND RECOMMENDATIONS

Agency theory requires that managers should act in a manner that is consistent with the value maximization objective of the firm. However, in practice, the positions that they hold triggers information asymetry which induces the managers to pursue their own interest at the expense of the firms that they manage. One of the strategies through which managers seek selfish gains is through the exploitation of accounting methods and choices within the regulatory framework. Institutional investors as a corporate governance mechanism has been explored in the literature in relation to earnings management. This study examines the interraction between four aspects of institutional investors and discretionery accruals and it has been statistically documented that firms' equity shareholding by institutions and their representation on the board of directors impact negatively on earnings management. Based on the findings, it is therefore, recommended that industrial regulators should emphasize the need for institutional involvement in firms, both in terms of equity ownership and significant presence on the board of directors they help to allay the agency problems, thereby converging the interest of the managers with that of the shareholders.

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# A COMPARATIVE STUDY ON PERFORMANCES OF STUDENTS ON DISTANCE LEARNING COURSES WITH REGUALR STUDENTS

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Sarpong Appiah**

## A B S T R A C T

Abstract: Students at higher institutions in Ghana offering distance learning courses precisely University of Education perform poorly as compare to their counterpart in regular students. This study asked the question: is this poor performance due to the fact that there is no face-to-face lecture for them, ineffective use of learning resources or static way of delivering the learning resources? In looking for ways of improving their performance the study asked whether a more web-based adaptive learning environment that addressed individual learning styles might assist individual learners un-ravel the learning challenges and enhance their performance.

**Keywords:** Distance Learning Students, Regular Learning Students, poor performance, Adaptive Learning Environment, Static Learning Environment, Dual Coding Theory and Dual Channel Assumption.

**RATIONALE:**

It has become obvious that many students at higher institutions in Ghana offering distance learning perform poorly precisely University of Education (UEW). .At University of Education distance education Unit (DEU) almost all the instructors/lecturers provide instructional materials in book or lecture note format. The problem may be that individual learners have different learning style and the static way of delivering courses material, for it is apparent that different learners have different ways of receiving and assimilating instruction. According to Rundle and Dunn (2000), visual text learners remember material best by reading it. Therefore, the matched media experience was a text-only version of the content, which comprised rich text formatting such as annotated source code sections and highlighted key concepts. The same authors (ibid) have emphasized that visual learners prefer information represented in a pictorial fashion and create mental images according to what they hear or see. These learners were accommodated by supplementing the text with illustrations, diagrams, flowcharts or non-interactive animations. Again, Rundle and Dunn (ibid) have claimed that tactile-kinesthetic learners prefer to physically interact with what they learn, and that auditory learners prefer listening to instructional content.

The main objective of the research reported in this paper was to construct and evaluate an e-learning environment, which adapted itself to individual learners' learning styles. The project sought to address the individual learning styles by constructing web–based learning environments that address individual learning styles of the learner. The project aimed to create an individualized learning environment, which accommodated the specific learning styles of learners and to assess whether this led to an improvement in performance. This learner-centred approach aimed to increase learning motivation, retention of knowledge and understanding and a more positive attitude towards the content being taught. Current learning theories and derived learning techniques were considered the tools to achieve this. The learning environment was a computer-generated and web-based prototype. After a small pilot study with 10 participants, a larger experimental field study with 54 participants was conducted. The aim was to measure the effectiveness of the adaptive learning environment (ALE) in comparison with a static learning environment (SLE).

## LITERATURE REVIEW

The theory behind this research work was based on Paivio (1986) dual coding theory, whichis incorporated in web-based environment to create dynamic environment to learners so as to address learning styles of learners in order to ravel learning challenges of learners.

### Dual Coding Theory

Paivio found strong evidence to support his Dual Coding Theory (Paivio, 1986). He postulated that the human brain works with (at least) two cognitive subsystems, one of which deals with language. According to his theory, instruction is more efficient by presenting information in both visual and verbal form.

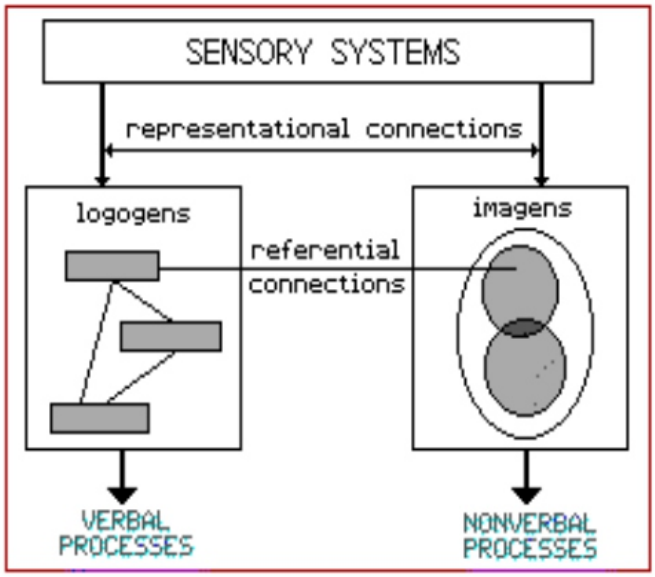


**Fig 1.Paivio's Dual Coding Theory**

Paivio's research has been recently backed up by Mayer's Comprehensive Cognitive Theory of Multimedia Learning (Mayer, 2001). Mayer's theory consists of three assumptions:

• **Dual-Channel Assumption:** This assumption is closely related to Paivio's findings (Clark &Paivio, 1991). It argues that humans possess separate information processing channels for visual and verbal information. Students learn better if both channels are addressed simultaneously.
• **Limited-Capacity Assumption:** The human brain is limited in the amount of information it can process at any one time per channel. This assumption is backed up by Sweller's Cognitive Load Theory (Sweller1999) and argues that appropriate structuring and "chunking" of multimedia content is necessary to facilitate learning.
• **Active-Processing Assumption:** Humans actively engage with what they learn and construct their own mental representations. This process involves paying attention,

organizing new content and relating it to prior knowledge. A multimedia environment should therefore encourage and enable students to actively engage with the content taught.

Curry (1991) has suggested that learning style theories can be generally categorized into three different schools of thoughts or dimensions:

• **Perceptual Modality:** The way our body takes in information with our senses: biologically-based reactions to the physical environment.
• **Information Processing:** The way our brain processes information: distinguishes between the way we think, solve problems, and remember
• **Personality Models:** The way we interact with our surroundings could affect our thoughts.

## HYPOTHESIS

The hypothesis of this research was that distance learning students perform poorly as compare with their counterpart in the regular universities because the resource material are not varied to address individual learning style of the learner at University of Education distance learning Unit. James and Blank (1993) define a learning style as 'the complex manner in which, and the conditions under which, learners most efficiently and most effectively perceive, process, store and recall what they are attempting to learn'.

## DATAAND METHODOLOGY

Data for the study have been collected through a face–to face interview with some of the lecturers who teaches both the distance learning students and the regular students. A sample size of 54 lecturers has

been used in the study. This sample size has been chosen based on the ability to reach the lecturers at the university at time of the research. Thefigure 2 shows the lecturers who were interviewed during the data collection process.

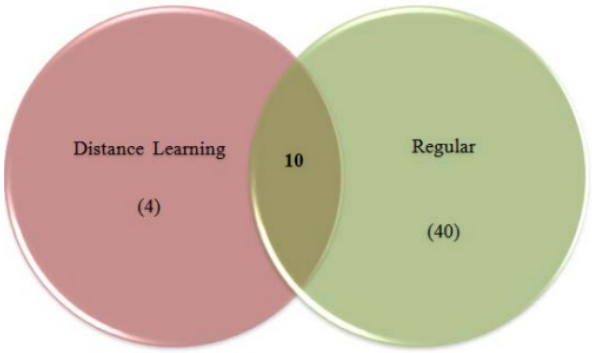


**Fig 2: Lecturers interviewed**

## RESULTS AND DISCUSSIONS

The descriptive statistics of categorical and continuous data have been presented in tables 1 and 2 respectively.

Table 2 displays the descriptive statistics of the categorical data. It shows that out of 54 lecturers were interviewed about the better performance of regular students over distance learning students; 4 lecturers only for distance learning students, 10 lectures for both distance learning students and 40 lectures only for regular students.

**Table 1: Descriptive Statistics of categorical Data**

| Categories | Frequency |
|---|---|
| Distance Learning (DL) | 4 |
| Both distance Learning & Regular(DRL) | 10 |
| Regular Learning (RL) | 40 |

**Table 2: Responses from lecturers on better performance of regular Students over distance learning Students.**

| | DL | DRL | RL |
|---|---|---|---|
| Yes | 2 | 4 | 30 |
| No | 2 | 6 | 10 |

In testing of the hypothesis on better performance of regular students over that of distance learning students a chi square was used. The following gives the details: Table 4 and Table 5 give the Data Contingency table and Expected values contingency table respectively.

**Table 3: Data Contingency table**

| | DL | DRL | RL |
|---|---|---|---|
| Yes | 2 | 4 | 30 |
| No | 2 | 6 | 10 |

**Table 4: Expected Values Contingency Table**

| | DL | DRL | RL |
|---|---|---|---|
| Yes | 2.67 | 6.67 | 26.7 |
| No | 1.33 | 3.33 | 13.3 |

Degrees of Freedom (DF) =(3-1) *(2-1) = 2

Chi Square value Calculated ($X^2$) = 4.95

Chi Square Distribution Table is shown in table 6

Table 6: Chi Square Distribution Table

| Df | 0.5 | 0.10 | 0.05 | 0.02 | 0.01 | 0.001 |
|---|---|---|---|---|---|---|
| 1 | 0.455 | 2.706 | 3.841 | 5.412 | 6.635 | 10.827 |
| 2 | 1.386 | 4.605 | 5.991 | 7.824 | 9.210 | 13.815 |
| 3 | 2.366 | 6.251 | 7.815 | 9.837 | 11.345 | 16.268 |
| 4 | 3.357 | 7.779 | 9.488 | 11.668 | 13.277 | 18.465 |
| 5 | 4.351 | 9.236 | 11.070 | 13.388 | 15.086 | 20.517 |

Since the Chi Square ($X^2$) 4.95 did not exceed critical value for 0.05 probability level (5.991) the hypothesis can be accepted that regular students performance is better than distance learning students.

## CONCLUSION

The study seeks to find evidence of better performance of regular students over distance learning students due to the fact that learning material that instructors/lecturers give to the learners who are offering distance learning course are only text based which satisfy only the visual cognitive subsystem of the perform. Revert to Paivio's Dual Coding Theory (Paivio, 1986; Clark & Paivio, 1991) which suggests that instruction is more efficient by presenting information in both visual and verbal form and also Mayer's Comprehensive Cognitive Theory of Multimedia Learning (Mayer, 2001) on Dual-Channel Assumption which also indicates that humans possess separate information processing channels for visual and verbal information. Students learn better if both channels are addressed simultaneously. This means that the distance learning students performance can be improved if these two theorems are considered when preparing course materials for students especially those who are offering distance learning courses.

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# JOB SATISFACTION DURING RECESSION PERIOD: A STUDY ON PUBLIC & PRIVATE INSURANCE IN PUNJAB

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## A B S T R A C T

This study is on the public and private sector employees of insurance sector to measure the job satisfaction level. The co- existence of two sectors public and private has become demand of the time. The excellence in marketing and customer satisfaction of some extent depends on the employee's job satisfaction. This study is conducted for study the factors which affect the motivation level of employees and effect of monetary and non monetary rewards and job satisfaction level in the public and private insurance sector. Structured questionnaire shall be used to collect data. Stratified quota sampling has been done to have representing from managerial and non- managerial public and private sector insurance companies. The questionnaire consists of 30 questions. It is found that the job satisfaction level differ in some select variable in public and private sectors. If the factors identified through variable are properly redesigned the job satisfaction level can be enhance in the interest of organizational effectiveness.

**Keywords:** Pay Level, job satisfaction, insurance sector, public and private sector employees.

**RATIONALE:**

**Meaning of Job Satisfaction**

Job satisfaction can be approached by identifying related underlying and motivational theories. These theories can be grouped into two categories: content theories and process theories (Chung, 1977: 14; Carlisle, 1982: 411; Dyer *et al.*, 1990: 422). Content theories provide an account of the factors influencing job satisfaction. Included in the content category are: need-fulfillment theory and Herzberg's two-factor theory. Content theories attempt to specify the particular needs or values which must be satisfied or attained (respectively) for an employee to be satisfied with a given job. In the second category are: equity theory and valence theory. The process theories provide an account of how variables such as employees' needs and expectations interact with job environmental characteristics to produce worker satisfaction (Hopkins, 1983: 9; Bennett, 1994:104).Process theories attempt to specify the types or classes of variables (need, values, expectations, and perceptions) considered causally relevant to satisfaction, as well as how these variables combine to determine job satisfaction (Locke, 1976). All variables in a given work situation are considered because of the significant relationship they have with each other (Bennett, 1994: 104).

The concepts of "incentive", "reward" and "recognition" are quite interrelated and complementary in the context of employee motivation. The broadest category is the "incentive" which refers to any means that makes an employee desire to do better, try harder and expand more energy.

**It may be divided into two categories:**

- Monetary incentives
- Non-monetary incentives.

**Monetary incentives** _ involve granting of reward in terms of money such as commissions, bonuses, base pay, variable pay and benefits.

**Non-monetary or non-cash incentives** do not involve direct payment of cash and they can be tangible or intangible. Non monetary rewards are the satisfaction that an individual derives from job in which he/she performs the job. These incentives are assigning challenging duties, improving working conditions, recognizing good work through small gifts, letters of appreciation, tickets to restaurant etc., providing some services for the employees,

organizing social activities in the work place, etc. The difference between an incentive and reward may be noted as while incentive aims to motivate future and encourage certain behavior, reward is the appreciation for the accomplished behavior. Recognition is the addition of monetary and non-monetary rewards and it refers to crediting, encouraging and appreciating individuals and teams who contribute, through their behavior and their efforts, to the success of the organization.

To explore the impact of the factors described above, a comparative study for the insurance companies in public & private sector has been undertaken based on certain select factors as given in the table.

**TABLE FACTORS INCLUDED IN STUDY**

| Motivation | Monetary & Non monetary Rewards |
|---|---|
| Training | Perks like Laptops & mobiles |
| Job Security | Pay |
| Position | Salary |
| Supervision | Benefits |
| Colleagues Relationship | Bonus |
| Career planning | Incentives |
| Appraisal | |

The job satisfaction of an employee is a complex phenomenon which depends upon a variety of job intrinsic and job extrinsic sector. The present study is limited to the employees working in the geographical areas of Jalandhar, Nawanshahar, Mohali and Ludhiana. For research purpose the sample has been drawn from the public sector insurance company, life insurance Corporation of India and private Sector insurance companies HDFC Standard life insurance, ICICI prudential company and Kotak Mahindra - the companies operating in these areas. The research is designed to have a comparative assessment of job satisfaction level in the two sectors. For this purpose appropriate statistical tools will be applied to the data collected by using a structured questionnaire developed with the help of job satisfaction questionnaire. Privatization of the insurance sector has encouraged many overseas insurance companies to open their branch in our country. Introduction of the sector has been changed the employment pattern. The private sector has to compete with the existing public sector companies in terms of the employee satisfaction and retention.

## OBJECTIVES OF THE STUDY

1) To study the factors which affect the motivation level of employees.2) To study the effect of monetary & non monetary rewards on the employees.3) To study the job satisfaction level in public and private insurance sector

## SURVEY DESIGN

The questionnaire consists of 30 items. The items have been evaluated by respondents on five points Likert response scales ranging from 1=strongly agree to 5=strongly disagree.

## HYPOTHESIS

**Ho 2(null)** Perception of employees of public and private sector regarding various factors causing job satisfaction is independent of their Grade.

**HA 2(Alternate)** Perception of employees of public and private sector regarding various factors causing job satisfaction is dependent of their Grade.

**Ho3 (null)** Perception of employees of public and private sector regarding various factors causing job satisfaction is independent of their Gender

**HA 3(Alternate)** Perception of employees of public and private sector regarding various factors causing job satisfaction is dependent of their Gender.

**Ho4 (null)** Perception of employees of public and private sector regarding various factors causing job satisfaction is independent of their Qualifications.

**HA 4(Alternate)** Perception of employees of public and private sector regarding various factors causing job satisfaction is dependent of their Qualifications.

**Ho5 (null)** Perception of employees of public and private sector regarding various factors causing job satisfaction is independent of their Age.

**HA 5(Alternate)** Perception of employees of public and private sector regarding various factors causing job satisfaction is dependent of their Age.

**Ho 6(null)** Perception of employees of public and private sector regarding various factors causing job satisfaction are similar

**HA 6(Alternate)** Perception of employees of public and private sector regarding various factors causing job satisfaction are not similar

## RELIABILITY OF THE QUESTIONNAIRE

The internal reliability of the scales used to evaluate the attitude and behaviour regarding the jobs was tested by the calculation of Cronbach's alpha for each scale. The questionnaire has a reliability measure of 0.79

## FACTOR ANALYSIS

In the present study, 30 attributes which are likely to affect the job satisfaction in the employees of insurance sector where selected on the basis of questionnaire and to ascertain the factors that really have an impact on the job satisfaction. The factor analysis has been carried out. The result of factor analysis is shown in the table.

**RESULT:-** The result of factor analysis as illustrated in the table shows that the variables act in such a tandem that nine groups are created .The groups are summarized below.Factor analysis has been applied on the responses provided by respondents. Factor `analysis is a good way of under laying factors from an array of important variables. (Nargundkar, 2005).Measures of sample adequacy such as Barlett's test of Sphericity and KMO value (refer table 4.2) showed that data was fit for factor analysis. Principal component analysis was used for extracting factors and nine factors were retained depending upon eigen values and variance explained .Eigen value represents the total variance explained by each factor.The standard practice normally used is that all the factors with an eigen value of 1 or more should be extracted. Table 4.3 clearly shows that there are nine factors having eigen values more than 1.Thus, nine factors have been extracted. Total variance explained by extracted nine factor was 65%.The results were obtained through rotations with varimax and all the factors loadings greater than 0.40 were retained. thus, table 4.5 clearly depicts that Factor 1 is linear combination of variable number 5,7,9,11,14,19,22,23,26.Factor 2 is linear combination of variable number 2,4,10,20,30.Factor 3 is linear combination of variable number 12,16,18.Factor 4 is linear combination of variable number25,28.Factor 5 is linear combination of variable number1,21.Factor 6 is linear combination of variable number8,13,27.Factor 7 is linear combination of variable number 3,6,29.Factor 8 is linear

combination of variable number 15,17.Factor 9 is linear combination of variable number 24.

**Salary and Fringe Benefits:-**The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 16.041%.Nine out of thirty variables load on significantly to this factor. Researcher named this factor as salary and fringe benefits as it includes

- For the work I do, the pay is good.
- I am satisfied with the way that this organization is managed.
- I am satisfied with my income
- I make pretty good money compared to others in this field.
- My job is a good use and application of my skills, experience and qualifications
- Services of the career planning and development cell can be gainfully availed to plan career in the organization.
- Perks like mobile phones, car, laptop helps to perform better.
- I am satisfied with the bonuses or incentives available to me.
- I am satisfied with the benefits offered to me through this job.

Hence, it can be concluded that salary and fringe benefits effect on employees job satisfaction.

**Training and rewards** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 10.471%.Five out of thirty variables load on significantly to this factor. Researcher named this factor as Training and rewards as it includes

- I receive adequate training to do my job well.
- The orientation I received prepared me well for this work
- If I felt that I needed extra training, it would be made available for me.
- I regularly think/worry about work issues when I am at home.
- Whenever I receive any reward by the organization, then it boosts my morale.

**Supervisor's attitude and incentives** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 7.130%.Three out of thirty variables load on significantly to this factor. Researcher named this factor as Supervisor's attitude and incentives as it includes

- I receive adequate support from my supervisors
- I believe that my supervisors care deeply for me.

➢ I receive good bonus, salary, incentives from the organization.

**Recognization and job security** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 5.898%.Two out of thirty variables load on significantly to this factor. Researcher named this factor as recognization and job security as it includes

➢ I have no need to worry about the termination of job anytime.
➢ In this organization, hard work and achievements are recognized appropriately in various ways.

**Self esteem and rewards** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 5.571%.two out of thirty variables load on significantly to this factor. Researcher named this factor as self esteem & rewards as it includes

➢ I feel that I am valued by this organization.
➢ Any kind of reward increases my efficiency level.

**Individualistic factor** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 5.456%.three out of thirty variables load on significantly to this factor. Researcher named this factor as salary and fringe benefits as it includes

➢ Motivation affects my performance.
➢ I am fully able to use my skills in this position.
➢ Incentives and perks given by the organization, it boost my morale

**Job evaluation and performance** The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 5.425%.three out of thirty variables load on significantly to this factor. Researcher named this factor as job evaluation and performance as it includes

➢ Other people view my job as a valuable profession.
➢ I feel that evaluation by the supervisor affects my motivation.
➢ I believe that my position at work is a professional position.

Inner drive to performance The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 4.737%.two out of thirty variables load on significantly to this factor. Researcher named this factor as inner drive to performance as it includes

- I receive appreciation whenever I perform better.
- I am generally satisfied with the kind of work I do in this job.

Relationship with colleagues The rotated matrix has revealed that respondents have perceived this factor to be the most important with the highest explained variance of 4.474%.one out of thirty variables load on significantly to this factor. Researcher named this factor as salary and fringe benefits as it includes

- Positive working relationship of my colleagues helps me to perform be

In the conducted study ,it is found in table 4.6 that the null hypothesis H0(2) indicating no difference in the perception of employees for above mentioned factors cannot be accepted for the factors 1,2,and 7. These three factors are significantly causing perceptual differences in the employees. Other factors are found to be inert in their effectiveness in differentiating the perception of the employees according to the grade. Table 4.7 indicates that HO (3) null hypothesis is accepted. Table 4.8 indicated that the null hypothesis H0 (4) indicating no difference in the perception of employees for above mentioned factors cannot be accepted for the factors 7. This one factors are significantly causing perceptual differences in the employees. Other factors are found to be inert in their effectiveness in differentiating the perception of the employees according to the qualification. Table 4.9 indicates that the null hypothesis H0 (5) indicating no difference in the perception of employees for above mentioned factors cannot be accepted for the factor 8. This factor is significantly causing perceptual differences in the employees. Other factors are found to be inert in their effectiveness in differentiating the perception of the employees according to the age. Table 4.10 indicates that the null hypothesis H0 (6) indicating no difference in the perception of employees for above mentioned factors cannot be accepted for the factor 1, 2, 3, 4, 5. These factors are significantly causing perceptual differences in the employees. Other factors are found to be inert in their effectiveness in differentiating the perception of the employees.

## CONCLUSION

In the research, it is found that in some variables private sector employees are highly satisfied and in some variables public sector employees are highly satisfied. On the basis of the study, it can be concluded that the employees in public sector have the opinion that they don't get enough opportunities

to upgrade their skills by giving the training .The employees of private sector have more opportunities to upgrade their skills as compared to public sector. The training should be available for all the employees because training is directly co related with job satisfaction. In the conducted study, it is found that private sector employees are highly satisfied than the public sector employees regarding their satisfaction with the income. Income is directly concerned with job satisfaction. Pay level satisfaction, or satisfaction with salary amount is primarily based upon the perceived discrepancy between the salary amount an individual receives and the employee should receive. It is also noted that Subordinate getting adequate support from the supervisor and employees are satisfied from the supervisor.Private sector employees got high training than the public sector employees. In other words, we can say that private sector employees are highly satisfied with the factor of training than public sector employees.

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**Table 4.1 Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | No. of Items |
|---|---|---|
| .790 | .792 | 30 |

**Table 4.2 KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .692 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1694.920 |
| | Df | 435 |
| | Sig. | .000 |

**Table 4.3 Total Variance Explained**

| Component | Rotation Sums of Squared Loadings | | |
|---|---|---|---|
| | Total | % of Variance | Cumulative % |
| 1 | 4.812 | 16.041 | 16.041 |
| 2 | 3.141 | 10.471 | 26.513 |
| 3 | 2.139 | 7.130 | 33.643 |
| 4 | 1.770 | 5.898 | 39.541 |
| 5 | 1.671 | 5.571 | 45.112 |
| 6 | 1.637 | 5.456 | 50.568 |
| 7 | 1.627 | 5.425 | 55.993 |
| 8 | 1.421 | 4.737 | 60.730 |
| 9 | 1.342 | 4.474 | 65.204 |

**Extraction Method:** Principal Component Analysis.

**Table 4.4 Rotated Component Matrix**

| | Component | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| For the work I do, the pay is good. | .811 | .021 | .044 | -.165 | .046 | -.116 | .168 | .143 | .033 |
| I am satisfied with the way that this organization is managed. | .772 | .120 | .036 | .003 | .255 | -.059 | -.175 | -.095 | .030 |
| I am satisfied with my income | .736 | -.128 | .133 | -.074 | -.209 | -.145 | -.109 | .028 | .185 |
| I make pretty good money compared to others in this field. | .721 | -.018 | .239 | .028 | -.136 | .349 | .042 | .030 | .213 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| I have no need to worry about the termination of job anytime | .015 | .040 | .144 | -.651 | .048 | -.190 | .058 | -.130 | .052 |
| In this organization, hard work and achievements are recognized appropriately in various ways | .097 | .284 | .307 | .634 | .149 | -.143 | .100 | -.126 | -.005 |
| I feel that I am valued by this organization. | .072 | -.027 | .085 | .093 | .777 | .116 | .184 | .027 | .109 |
| Any kind of reward increases my efficiency level. | -.099 | .385 | -.007 | .343 | -.386 | -.029 | .191 | .305 | -.080 |
| Motivation affects my performance | -.196 | .070 | .116 | .161 | .167 | .680 | .026 | .116 | .050 |
| I am fully able to use my skills in this position. | .488 | .174 | -.063 | -.018 | .025 | .537 | .065 | -.150 | -.105 |
| Incentives and perks given by the organization, it boost my morale | .271 | .221 | .279 | .343 | .182 | -.408 | .017 | .247 | -.115 |
| Other people view my job as a valuable profession. | -.070 | .070 | .169 | .058 | .104 | -.029 | .760 | -.022 | -.233 |
| I feel that evaluation by the supervisor affects my motivation. | .138 | -.020 | .024 | -.030 | -.051 | .107 | .636 | .025 | .291 |
| I believe that my position at work is a professional position. | -.037 | .107 | -.182 | .039 | .160 | -.366 | .391 | .226 | .263 |
| I receive appreciation whenever I perform better. | -.123 | .091 | .077 | .139 | -.012 | -.073 | -.054 | .776 | .116 |
| I am generally satisfied with the kind of work I do in this job. | .233 | -.046 | -.042 | -.184 | .072 | .172 | .296 | .529 | -.311 |
| Positive working relationship of my colleagues helps me to perform better | .082 | .104 | .166 | -.103 | .177 | .022 | .053 | .029 | .773 |

**Extraction Method:** Principal Component Analysis.

**Rotation Method:** Varimax with Kaiser Normalization a rotation converged in 10 iterations.

**Table no. 4.5 IDENTIFICATION OF FACTORS**

| Factor no. | Factor name | Statement included | Factor Mean |
|---|---|---|---|
| 1 | Salary and fringe benefits(Q1) | For the work I do, the pay is good. | .811 |
| | | I am satisfied with the way that this agency is managed. | .772 |
| | | I am satisfied with my income. | .736 |
| | | I make pretty good money compared to others in this field. | .721 |
| | | My job is a good use and application of my skills, experience and qualifications. | .708 |
| | | Services of the career planning and development cell can be gainfully availed to plan career in the organization. | .699 |
| | | Perks like mobile phones, car, and laptop helps to perform me better. | .533 |
| | | I am Satisfied with the bonuses or incentives available to me. | .531 |
| | | I am satisfied with the benefits offered to me through this job. | .477 |
| 2. | Training (Q2) | I receive adequate training to do my job well. | .832 |
| | | The orientation I received prepared me well for this work. | .745 |
| | | If I felt that I needed extra training, it would be made available for me. | .686 |
| | | I regularly think/worry about work issues when I am at home. | .631 |
| | | Whenever I receive any reward by the organization, then it boosts my morale. | .580 |
| 3 | Supervisors attitude and incentives(Q 3) | I believe that my supervisors care deeply for me. | .848 |
| | | I receive adequate support from my supervisors. | .749 |
| | | I receive good bonus, salary, incentives from the organization. | .500 |
| 4 | Recognizatio n & job security(Q4) | I have no need to worry about the termination of job anytime. | -.651 |
| | | In this organization, hard work and achievements are recognized appropriately in various ways. | .634 |
| 5 | Self esteem and rewards(Q5) | I feel that I am valued by this agency. | .777 |
| | | Any kind of reward increases efficiency level. | .386 |
| 6 | Individualisti c factor(Q6) | Motivation affects on my performance. | .680 |
| | | I am fully able to use my skills in this position. | .537 |
| | | I feel some kind of incentives and perks given by the organization, then it boost my morale. | .408 |
| 7 | Job evaluation and performance (Q7) | Other people view my job as a valuable profession. | .760 |
| | | I feel that evaluation by the supervisor affects on my motivation. | .636 |
| | | I believe that my position at work is a professional position. | .391 |

| | | | |
|---|---|---|---|
| 8 | Inner drive to performance (Q8) | I receive appreciation whenever I perform better. | .776 |
| | | I am generally satisfied with the kind of work I do in this job. | .529 |
| 9 | Relationship with colleagues(Q 9) | Positive working relationship of my colleagues helps me to perform better. | |

**Table 4.6 ANOVA & F test (Between grade and Factor)**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Salary & Fringe Benefits | Between Groups | 1.754 | 1 | 1.754 | 4.396 | .038 |
| | Within Groups | 59.055 | 148 | .399 | | |
| | Total | 60.809 | 149 | | | |
| Training | Between Groups | 4.458 | 1 | 4.458 | 6.626 | .011 |
| | Within Groups | 99.573 | 148 | .673 | | |
| | Total | 104.031 | 149 | | | |
| Supervisors attitude & Incentives | Between Groups | .041 | 1 | .041 | .137 | .712 |
| | Within Groups | 43.885 | 148 | .297 | | |
| | Total | 43.926 | 149 | | | |
| Recognization & Job Security | Between Groups | .323 | 1 | .323 | .415 | .520 |
| | Within Groups | 114.938 | 148 | .777 | | |
| | Total | 115.260 | 149 | | | |
| Self esteem & rewards | Between Groups | .412 | 1 | .412 | .768 | .382 |
| | Within Groups | 79.362 | 148 | .536 | | |
| | Total | 79.773 | 149 | | | |
| Individualistic factor | Between Groups | .186 | 1 | .186 | .935 | .335 |
| | Within Groups | 29.476 | 148 | .199 | | |
| | Total | 29.662 | 149 | | | |
| Job evaluation & Performance | Between Groups | .760 | 1 | .760 | 5.213 | .024 |
| | Within Groups | 21.569 | 148 | .146 | | |
| | Total | 22.329 | 149 | | | |
| Inner drive to performance | Between Groups | .090 | 1 | .090 | .487 | .487 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | 27.259 | 148 | .184 | | |
| | Total | 27.348 | 149 | | | |
| Relationship with colleagues | Between Groups | .361 | 1 | .361 | 1.752 | .188 |
| | Within Groups | 30.499 | 148 | .206 | | |
| | Total | 30.860 | 149 | | | |

**Table 4.7ANOVA (between gender and factor)**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Salary & Fringe Benefits | Between Groups | .144 | 1 | .144 | .351 | .555 |
| | Within Groups | 60.665 | 148 | .410 | | |
| | Total | 60.809 | 149 | | | |
| Training | Between Groups | .633 | 1 | .633 | .906 | .343 |
| | Within Groups | 103.398 | 148 | .699 | | |
| | Total | 104.031 | 149 | | | |
| Supervisors attitude & Incentives | Between Groups | .644 | 1 | .644 | 2.202 | .140 |
| | Within Groups | 43.282 | 148 | .292 | | |
| | Total | 43.926 | 149 | | | |
| Recognization and job security | Between Groups | .003 | 1 | .003 | .003 | .954 |
| | Within Groups | 115.257 | 148 | .779 | | |
| | Total | 115.260 | 149 | | | |
| Self esteem & Rewards | Between Groups | .046 | 1 | .046 | .086 | .769 |
| | Within Groups | 79.727 | 148 | .539 | | |
| | Total | 79.773 | 149 | | | |
| Individualistic factor | Between Groups | .702 | 1 | .702 | 3.587 | .060 |
| | Within Groups | 28.960 | 148 | .196 | | |
| | Total | 29.662 | 149 | | | |
| Job evaluation & performance | Between Groups | .356 | 1 | .356 | 2.401 | .123 |
| | Within Groups | 21.972 | 148 | .148 | | |
| | Total | 22.329 | 149 | | | |
| Inner drive to | Between | .023 | 1 | .023 | .126 | .724 |

| | | | | | | |
|---|---|---|---|---|---|---|
| performance | Groups | | | | | |
| | Within Groups | 27.325 | 148 | .185 | | |
| | Total | 27.348 | 149 | | | |
| Relationship with colleagues | Between Groups | .045 | 1 | .045 | .218 | .641 |
| | Within Groups | 30.815 | 148 | .208 | | |
| | Total | 30.860 | 149 | | | |

**Table 4.8 ANOVA & F test (between qualifications & Factors)**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Salary & Fringe benefits | Between Groups | .841 | 2 | .420 | 1.030 | .359 |
| | Within Groups | 59.968 | 147 | .408 | | |
| | Total | 60.809 | 149 | | | |
| Training | Between Groups | 7.939 | 2 | 3.970 | 6.073 | .003 |
| | Within Groups | 96.092 | 147 | .654 | | |
| | Total | 104.031 | 149 | | | |
| Supervisors attitude & Incentives | Between Groups | .954 | 2 | .477 | 1.631 | .199 |
| | Within Groups | 42.972 | 147 | .292 | | |
| | Total | 43.926 | 149 | | | |
| Recognization & job security C | Between Groups | 2.459 | 2 | 1.230 | 1.602 | .205 |
| | Within Groups | 112.801 | 147 | .767 | | |
| | Total | 115.260 | 149 | | | |
| Self esteem & rewards | Between Groups | .316 | 2 | .158 | .292 | .747 |
| | Within Groups | 79.457 | 147 | .541 | | |
| | Total | 79.773 | 149 | | | |
| Individualistic factor | Between Groups | .450 | 2 | .225 | 1.133 | .325 |
| | Within Groups | 29.212 | 147 | .199 | | |
| | Total | 29.662 | 149 | | | |
| Job evaluation & performance | Between Groups | .068 | 2 | .034 | .223 | .800 |
| | Within Groups | 22.261 | 147 | .151 | | |
| | Total | 22.329 | 149 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Inner drive to performance | Between Groups | .435 | 2 | .218 | 1.188 | .308 |
| | Within Groups | 26.913 | 147 | .183 | | |
| | Total | 27.348 | 149 | | | |
| Relationship with colleagues | Between Groups | .080 | 2 | .040 | .192 | .825 |
| | Within Groups | 30.780 | 147 | .209 | | |
| | Total | 30.860 | 149 | | | |

**Table 4.9 ANOVA & F test (between age and factor)**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Salary & Fringe Benefits | Between Groups | .789 | 2 | .394 | .966 | .383 |
| | Within Groups | 60.020 | 147 | .408 | | |
| | Total | 60.809 | 149 | | | |
| Training | Between Groups | 3.814 | 2 | 1.907 | 2.797 | .064 |
| | Within Groups | 100.217 | 147 | .682 | | |
| | Total | 104.031 | 149 | | | |
| Supervisor's attitude & Incentives | Between Groups | .084 | 2 | .042 | .141 | .869 |
| | Within Groups | 43.842 | 147 | .298 | | |
| | Total | 43.926 | 149 | | | |
| Recognization & job security | Between Groups | .961 | 2 | .480 | .618 | .541 |
| | Within Groups | 114.299 | 147 | .778 | | |
| | Total | 115.260 | 149 | | | |
| Self esteem & rewards | Between Groups | 1.451 | 2 | .726 | 1.362 | .259 |
| | Within Groups | 78.322 | 147 | .533 | | |
| | Total | 79.773 | 149 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Individualistic factor | Between Groups | .078 | 2 | .039 | .194 | .824 |
| | Within Groups | 29.584 | 147 | .201 | | |
| | Total | 29.662 | 149 | | | |
| Job evaluation & performance | Between Groups | .408 | 2 | .204 | 1.368 | .258 |
| | Within Groups | 21.921 | 147 | .149 | | |
| | Total | 22.329 | 149 | | | |
| Inner drive to performance | Between Groups | 1.591 | 2 | .795 | 4.539 | .012 |
| | Within Groups | 25.758 | 147 | .175 | | |
| | Total | 27.348 | 149 | | | |
| Relationship with colleagues | Between Groups | .296 | 2 | .148 | .711 | .493 |
| | Within Groups | 30.564 | 147 | .208 | | |
| | Total | 30.860 | 149 | | | |

**Table 4.10 ANOVA & F test (between organization and factor)**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Salary & Fringe Benefits | Between Groups | 21.497 | 1 | 21.497 | 80.930 | .000 |
| | Within Groups | 39.312 | 148 | .266 | | |
| | Total | 60.809 | 149 | | | |
| Training | Between Groups | 37.335 | 1 | 37.335 | 82.848 | .000 |
| | Within Groups | 66.696 | 148 | .451 | | |
| | Total | 104.031 | 149 | | | |
| Supervisors attitude & incentive | Between Groups | 1.273 | 1 | 1.273 | 4.418 | .037 |
| | Within Groups | 42.653 | 148 | .288 | | |
| | Total | 43.926 | 149 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Recognization & Job security | Between Groups | 3.341 | 1 | 3.341 | 4.418 | .037 |
| | Within Groups | 111.919 | 148 | .756 | | |
| | Total | 115.260 | 149 | | | |
| Self esteem & rewards | Between Groups | 5.644 | 1 | 5.644 | 11.268 | .001 |
| | Within Groups | 74.130 | 148 | .501 | | |
| | Total | 79.773 | 149 | | | |
| Individualistic factor | Between Groups | .207 | 1 | .207 | 1.042 | .309 |
| | Within Groups | 29.455 | 148 | .199 | | |
| | Total | 29.662 | 149 | | | |
| Job evaluation & performance | Between Groups | .010 | 1 | .010 | .064 | .800 |
| | Within Groups | 22.319 | 148 | .151 | | |
| | Total | 22.329 | 149 | | | |
| Inner drive to performance | Between Groups | .119 | 1 | .119 | .646 | .423 |
| | Within Groups | 27.230 | 148 | .184 | | |
| | Total | 27.348 | 149 | | | |
| Relationship with colleagues | Between Groups | .442 | 1 | .442 | 2.150 | .145 |
| | Within Groups | 30.418 | 148 | .206 | | |
| | Total | 30.860 | 149 | | | |

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# DEVELOPING A HUMAN

Soni Dhanni*

## ABSTRACT

Abstract: As the year passes by the computer has started becoming more and more powerful. The scientists in the whole world are trying to develop machines and intelligent robots that can smell, touch, sense and interact with humans. Capabilities of a machine are already more stronger and flexible than our sensory organs and muscles allow us to be. This research paper studies the progress done till date in bringing the humans and machine close.

**Keywords:** Human, Language, e-tongue, artificial ear, artificial eye.

It took humans race a thousand years to learn language whereas computer has taken 50 so far. There are similarities between humans and machines in speech processing but the computer works only in sequential order, while the brain processes cross linked information all the time. An extremely complicated system has to piece together words and sentences from the recorded sounds of speech, and then analyze them to recognize meaning. In order to recognize language correctly, sounds are first analyzed and converted into digital signals. The system needs to filter out background noise to process only the voice, and also has to identify individual voices, as a blend of all sounds together would not result in a single understandable word. The human brain also converts sound waves into electric signal, but it can grasp and follow individual voices when several people are talking at the same time. Every speech signal is dealt in the same way. Both computers as well as humans generate a frequency spectrum so as to process the filtered speech signal. Human process is carried out in the ear, but the machine uses Quick Fourier Transformation for the same. The frequencies are analyzed again by the Hidden markov model that checks frequencies in a short period of time so as to identify individual phonemes and combine them meaningfully into words and sentences. The machine falls back on a database of grammatical models and example sentences to differentiate between similar sounding words for instance “see” and “sea” or “weather” and “whether”. Under optimal conditions, the computer can recognize almost 98% of the language. Software has difficulty recognizing dialects and colloquial language.

Many problems related to the mechanical understanding of the language or language recognition can be solved by using a more comprehensive database that saves particular sound frequencies. The machine face a bigger challenge while understanding the meaning of what has been said is concerned: how should a language is interpreted? The computer is not conscious, it follows rules. More complex rules give it a better understanding of the language. With regard to factual knowledge the computer is far superior to humans, as it accesses 100GB of encyclopedia and dictionary entries amongst other things. Using mechanical learning, the computer can store new information link it with what it already knows. Still, it does not do anything other than recalling facts and finding links between them. On the other hand, humans do not pause for ambiguity; the brain simply comes for a solution. Association, events, personal judgments and the environment are taken into consideration. The human brain notices its environment in a selective and deliberate fashion, whereas the computer saves all possible details.A machine can't cope with language recognition as well as interpretation on the level that humans do. Apart from just processing language, many other factors play a role in the interpretation of its intent. Human brains consider several contexts and can understand the intent of the words with reference to situations, as the brain is in continuous contact with its surroundings. The only advantage of the computer is its collected, classified and can be invoked anytime-even the most insignificant side note. Humans retain only a fraction of this information.

**EYE**

The Hubble telescope has captured images of galaxies about 13.2 billion light-years away. The world's most powerful electron microscope, TEAM 0.5 in Berkeley, California, can observe atoms as small as 0.1 Nanometers across. These are the extremes within which cameras can function. The furthest galaxy that can be seen by man is only 2.3 light years away; the smallest discernible object measures some 1000 nanometers across. Those are the limits of the human eye. Machines can store much more detail than the human eye, and every bit of captured information can be stored for future retrieval. Machine can see much more detail than the human eye, and every bit of the captured information can be stored for future retrieval. Yet scientists have been working for years to better emulate human sight, because humans still interpret and extrapolate image information better-even bad image quality can represent something beautiful. The human eye can concentrate on an object and define its sharpness, react to the changes in the brightness in a split-- second and detect the finest of contrast differences. Still, the human sees only a fraction of what the camera immortalizes in a photo, and even that fraction is anything but perfect. The human eye suffers from chromatic aberration, and is further handicapped with a blind spot. In order to minimize errors, most photographic equipment is made up of many converging and diverging lenses of different types, which break up light in such a way that captured image look as clean as possible. Eye also

perceives colors only in the center of the field vision, since the rods responsible for this are concentrated here in the retina. On the other hand the details and colors that a camera saves is decided by a sensor. The more pixels a camera can capture the larger the number of picture dots that the photographer can print on paper. The eye is clearly inferior- yet humans do not see these shortcomings. The brain simply compensates for incomplete information by inventing a good image. That is why the efforts are not concerned with imitating the eye for its recording abilities, but the entire optical neural system for its manner of processing. Machines can capture perfect images, but do not know what is of interest in them. Just like the eye, the camera has a wide range of vision with low resolution. Only when it sees something interesting does it concentrate on it and reproduce it in the best quality. The result in the "saliency map" in which bright areas signify the importance and dark areas signify the unimportant regions of the scene. However, the camera does not recognize objects on its own-further processing can be done by other robots.

Intelligent sight is has interesting applications beyond robots and industrial machines. For e.g., in vehicles, cameras assist the human eye by controlling the headlights, inspecting lanes and recognizing road signs.

Cameras are still a limited solution. They do not measure up to the visual performance of humans. The brain do the actual seeing, and the biggest challenge is to teach the camera to reliably identify the parts of a scene that are relevant to a task.

**EAR**

Human ear is the most perceptive sense organ, and locates sounds quite accurately too. The human ear is highly complex and incredibly accurate measuring instrument. With around 15,500 sensory cells per year, man can differentiate about 4,00,000 sounds- a trained ear can even determine the exact pitch of a tone. And still man hears much less than artificial systems do. For instance, man can listen to what songs only with the help of special equipment, because they "sing" at frequencies of up to 280 Kilohertz. The human ear can hear only between 16 hertz and maximum 20 kilohertz-but this does not mean that the machines hear better. The ear can concentrate on specific sounds and it can even locate a glass bottle shattering on the floor at distances of up to 10 meters.

Whether the voice that we hear is coming from the front, back or side, our ears clearly sense the direction and even the distance. Two essential abilities of binaural hearing are very important for that, and researchers have been trying to use them in machines. The ear

recognizes difference in time and sound pressure between the two ears. These are created by the physical structure of our skulls, which form natural obstacles along which sound isreflected. Our ears can recognize the time difference accurately to within 10 microseconds.Scientists purposefully use this quality of human ears for artificial systems, which is why there are machines for experimental purposes in the shape of a human head, with ear-shaped structures around the microphones in order to capture stereoscopic impressions in most natural way possible. Stereoscopic orientation works properly for machines as long as they are in a test environment prepared especially for the purpose. As soon as they find themselves in everyday situations, however, they are defeated. The essential difference from a human being is the lack of intelligence. A well-known scenario would be a cocktail party: when many people are talking in a room and music is also being played, one can still follow the individual speakers. Machines are overwhelmed in such situations and cannot filter out the irrelevant frequencies. For them, only a non-identifiable noise exists. A robot must know which specific sound source is significant in order to concentrate on it.

Scientists use with various tricks depending on the potential application of artificial hearing, in order to give machines better intelligence. The industry benefits immensely from such solutions and many systems are already in the market. Technology from mobile phones, hands free car kits and even conference room equipment is used. The ideal solution would be to filter out specific frequencies, but all the sounds of a car engine, for example, cannot be eliminated this way, because it would affect the entire frequency band. One must carry the entire frequency band. One must carry out a direction analysis. Everyday noise is still a problem, and artificial haring cannot adjust to every possible situation. Even if a machine does not have any trouble in locating sound in an echo-free room, it would be stretched to its limits in a sound space, such as an empty hall. It would need to be manually optimized for every individual situation. It is easier for simpler systems such as speech recognition programs- the microphone is directly held to the mouth. The system recognizes what is spoken the loudest and thus has a completely different problem; it must recognize that it is concerned with language input, and interpret similar sounding words and inflections. It will take some time for robots to orient themselves in day-to-day life with the help of artificial ears. Any successful system will be able to process all kinds of input signals in parallel, i.e. they will need to be able to link motor-driven, auditory and visual information to pinpoint and focus on specific sound sources.

**NOSE**

The air on a summer morning, flowering meadows, the seats of a new car: such smells remain in or memories and stimulate or repulse us. For machines, smells are nothing but the characteristics of molecules that can be analyzed and evaluated. That the human reacts so emotionally to smells is

surprising, since he does not even smell all that much. Artificial noses are comparatively primitive, with up to 32 sensors, the artificial olfactory cells. These sensors are precise, but need to be re-calibrated for every smell. The machine can access only what has already been stored in its database.We do not have a universal solution, and scientists are working with various systems developed for various tasks. But an e-nose always contains one element: a sensor that catches odor molecules and converts them into electric signals. The technology is very different from a natural nose. While each human olfactory cell only detects a specific type of molecules, the sensor records several different ones. To make a sensor react to individual scents, the scientists use various materials like tin oxide or zinc oxide to detect complete smell patterns like some type of wine. The sensor alone cannot differentiate a fine wine from lead-free gas. It only records the molecules, but does not evaluate them; it represents the chemical detection level. A machine just like humans can detect and qualitatively evaluate a smell only by training. The sensors produce a signal, but to know exactly what they detect, a pattern recognition matrix must be established.

Electronic noses are already becoming standard equipment in some areas. For instances, such a sensor in your car can detect when you are driving in a tunnel, and switch from sucking in fresh air to recirculate air with in the car. In the future , devices will also monitor catalytic converts that burn hazardous carbon monoxide, which Is odorless to human and no matter how high concentration. Electronic sensors, on the other hand, can find even mall concentration and alert us to defective systems immediately.The electronic nose is still at the beginning of its development. Its biggest problem: it takes in too many varied odor molecules, and is not selective enough. A solution could be to develop new sensor materials, which have finer control than today's metallic oxide semiconductors. Moreover, researchers are designing small transportable devices that can be integrated into mobile phones, so a caller could potentially test the alcohol level of the person he is talking to. Such a nose will soon be able to tell you that exact ingredients of a wine , but a machine will still not be able to say for certain how good it is.

**TONGUE**

Taste is a survival mechanism, alerting us to potential harmful or potential nutritious substances. Approximate 10,000 taste buds reside on the tongue. These taste buds fall into 5 basic categories: sour, bitter, salt, sweet and unani with grouped receptors dissipalated over the surface of the tongue for each stimulus.Physiological factors such as temperature and texture clearly affect the perception of taste. Several industries-chemical, pharmaceutical, agricultural & food have interest in developing and efficient, low cost instrument to fast analyze and classify complex chemical solutions. There is a vast range of pplications for the e-tongue, for instance: continuous control on product quality , detection of pollutants in water detection of analysis in low concentration solutions difficult to be distinguished by humans being or even impossible.

The e-tongue system is composed by hardware and software components. The hardware is used for the capacity measurements of sensorial units of and the software controls the data acquisition, perform the calculations and analyze the electric signals. The taste of cyanide can also be known by e-tongue which is impossible for humans.

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# FARMERS INDEBTEDNESS IN HARYANA: AN SSESSMENT

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## ABSTRACT

Farmers Indebtedness in the State has emerged as a central issue. This is because, the problem of indebtedness, damaged the social status of a farmer and triggered to commitsuicide. In India, on an average, there is one farmer suicide in every 30 minutes since 2002 [Sainath: 2008a], while in case of Haryana, the suicide rate of farmers is 4.8 per cent per one lakh farmers [NCRB]. Therefore, the issue of farmers' indebtedness becomes a matter of intense debate for whole of the country and as well as for Haryana. In this background, the present study is made to attempt the status of farmers' indebtedness in the State in detail.The results of the study indicate that the informal mechanism of credit delivery is playing an important role for marginal and small farmers in meeting their credit requirements in the State. Seventy one per cent loans to total loan were used in productive activities in Haryana, while in case of India the same ratio was found 73.10 per cent. The marriage & ceremonies was the major unproductive expenses in Haryana, which was higher as compared to aggregate India. In addition, the maximum debt burden was found to be Rs. 25289 on the 615-775 MPCE class farmer households in the State and the status of Scheduled Cast and Backward Class farm households is not better, while on an average the status of farm households those belong to other social group of farming community is better in the State ascompared to aggregate India. The size of land holding is also negatively associated to informal borrowing. On the basis of foregoing analysis, we suggest that the State government should monitor the informal mechanism of credit, increase the awareness among farmers in general and marginal and small in particular, about the disadvantages of utilization of loan in unproductive activities and strengthen the Co-operative movement in the State.

**Keywords:** Farmers' Indebtedness, MPCE Class, Social Groups, Informal & Formal Credit, Productive Activities

## INTRODUCTION

In Haryana, the contribution of agriculture sector in total Net State Domestic Product [NSDP] has been decreasing over the period due to high growth in manufacturing & service industry, and slower rate of growth in agriculture sector of the State. The Central Statistical organization [CSO] data indicates that the ACGR of agriculture NSDP of the State was 4.86 per cent during the period from 1983 to 1994 and has decreased to 1.77 per cent from 1993 to 2004. The share of agriculture employment has also decreased due to expanding of non-farming activities1 in the State. But, the absolute number of persons has engaged in agriculture sector in the State increased significantly. The census of Haryana also shows that number of persons engaged in agriculture activity has increased to 4322234 in 2001.

Further, Situation Assessment Survey (SAS: 2003) revealed that in Haryana, aggregate 39 per cent farmer[2] [s] don't like farming due to many reasons such as- no-profitable, high risk, etc.In addition, National Crime Record Buru (NCRB) indicates that the suicide rate among one lakh farmers in Haryana is 4.8 per cent. The proportion of farmers' suicide is 0.5 incomparison to general suicides of the State. The above symptoms indicate that the agriculture sector of the State has been shifting from accelerating to decelerating since 1990s. Although, there are a number of reasons [i.e., marketing, cost of cultivations, indebtedness, climate, surge in food grains prices, reduced per capita food grain availability,etc.] behind slow down in agriculture sector of the State. But, indebtedness of farmers in the State has emerged as a central issue. This is because, the problem of indebtedness, damaged the social status of farmers and triggered to commit suicide. In India, on an average, one farmer commit suicide every 30 minutes since 2002 [Sainath: 2008a], while in case of Haryana, the suicide rate of farmers is 4.8 per cent per one lakh farmers [NCRB]. Therefore, the issue of farmers' indebtedness becomes a matter of intense debate for whole of the country and as well as for Haryana. In this background, the present study is made to attempt the status of farmers' indebtedness in the State in detailed. The study has been divided into six sections. The first section of the study highlights the objectives, hypotheses, research methodology, data sources and tools and techniques that have been applied in the study. The second section of the study describes the overview of farmers in the State along with aggregate India. In section three, the farmers' indebtedness in Haryana and India by sources along with size of land holdings is discussed. Section four presents the loan utilization pattern of farmers, while in section five; we discussed the debt burden on farmers in Haryana along with India; and concluding remark in the last section of the study.

## OBJECTIVES OF THE STUDY

1. To find out the farmers' indebtedness by source in the State.
2. To search the utilization pattern of loan by farm households in the State.
3. To examine the loan burden on farm households in the State.
4. To compare the position of farmers' indebtedness of the State to aggregate India.

## HYPOTHESES OF THE STUDY

❖ There is no significant difference in farmers' indebtedness by source in Haryana and India.

❖ There is no significant different in loan burden on various social groups farm households according to different MPCE classers between Haryana and India.

❖ There is a negative association between size of land holding and informal borrowing.

## RESEARCH METHODOLOGY

The nature of research is exploratory. The study is based on secondary data, which were collected from the Farmers Satiation Assessment Survey [2003], Indebtedness of Farmer Households Survey [2003], National Crime Record Bauru [various issues], Census of India & Haryana [various issues], Economic Census of Haryana [1998 & 2005], and Agriculture Statistics at a Glance [2008].

## PLAN OF ANALYSIS

The collected data have been transcribed into long sheets from, tables have been formulated and analyzed using a wide range of appropriate techniques such as; mean, S.D., C.V and Regression Method.

## SIMPLE LINEAR REGRESSION ANALYSIS

Simple linear regression represents a logical extension of between two variables analysis. Under it one independent variable is used to estimate the values of a dependent variable. The simple regression equation describes the average relationship between two variables and this relationship is used to predict or control the dependent variable. The formula for calculating multiple regression is as follows

$$Y = a_0 + a_1 X_1 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots [1]$$

Where $X_1$, is regressor variable, $a_1$ is the parameter to be estimated from the data and $\varepsilon$ is the error term following classical ordinary least square {OLS} assumptions i.e., the deviation $\varepsilon$ is assumed to be independent and normally distributed with mean 0 and standard deviation ($\sigma$).

**Table 1**

**Estimated No. of Rural Households in Haryana and India**

| Particular | Estimated No. of Rural Households | Estimated No. of Farm Households |
|---|---|---|
| Haryana | 3147400 [100] | 1944500 [61.78] |
| India | 147898800 [100] | 89350400 [60.41] |

*Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003*

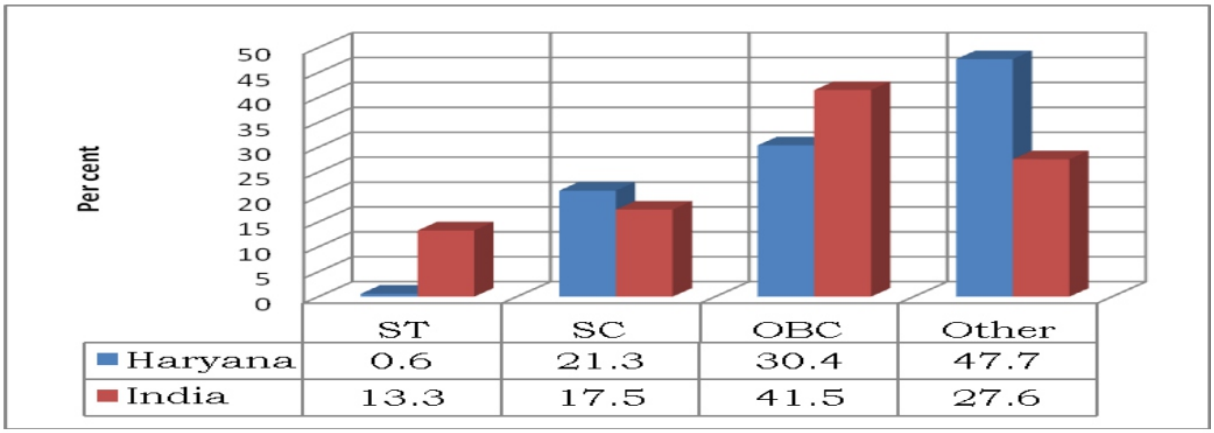
Table 1 reveals that the rural and farm household[3] [s] in Haryana are 3147400 and 1944500, which is only 2.12 and 2.17 per cent of the total rural and farm households of whole of India. The per cent share of farm households to total rural households in Haryana is 61.78 per cent, while the same ratio is 60.41 per cent in context of aggregate India. It means, the rural economy of the State is more dependent on farm

activities as compared to aggregate rural economy of the country.

**Figure 1**

**Farmer Households According to Social Group in Haryana and India**

*[In per cent]*




*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Figure 1 shows the farm households in Haryana and India according to the social groups. The figure clearly shows that only 0.60 per cent farm households belong to ST, 21.30 per cent to SC, 30.40 per cent to OBC and 47.70 per cent to Other category in the State, while in case of India, these ratios of farm households are 13.30, 17.50, 41.50 and 27.60 per cent respectively.

**Table 2**

**Farm Households According to Size of Land Holding**

*[In per cent]*

| Size of Land Holding | Haryana | India |
|---|---|---|
| <0.01 | 0.38 | 0.13 |
| 0.01 to 0.40 | 30.50 | 29.90 |
| 0.41 to 1.00 | 18.00 | 29.80 |
| 1.01 to 2.00 | 18.30 | 18.90 |
| 2.01 to 4.00 | 19.70 | 12.50 |
| 4.01 to 10.00 | 8.80 | 6.40 |
| Above 10.00 | 9.00 | 12.00 |
| All Size | 100 | 100 |

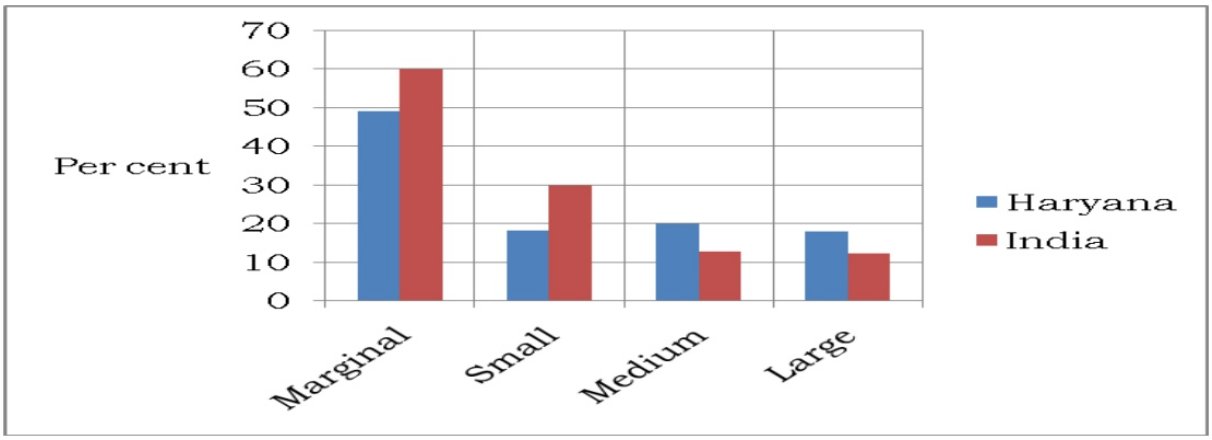
*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Table 2 represents the per cent share of farm households according to the size of land holding in Haryana and India. It is clear from table 2 that the majority of farm households have land size between 0.01 to 0.40 in Haryana and India. To make the analysis simpler, all sizes of land holdings have been categorized into

four categories [i.e., Marginal (up to .01), Small (1.01 to 2.00), Medium (2.01 to 4.00) and Large (above 4.01) see figure 2].

**Figure 2**

**Broad Category of Farm Households According to Size of Land Holding**




*Source: Calculation by Authors from Table2*

Figure 2 depicts that in Haryana the marginal, small, medium and large farm households are 48.88, 18.0, 19.70 and 17.80 per cent are respectively. In case of India, these ratios of farm households are 59.83, 29.80, 12.50 and 12.00 per cent respectively. But, the fact is clear from figure 2 that the marginal farm households are in in Haryana as well as India.

**Table 3**

**Indebted Farm Households**

| Particular | Estimated No. of Indebted Farm Households | Indebted Farm Households as per cent to Total Farm Households |
|---|---|---|
| Haryana | 1033000 | 53.00 |
| India | 43424200 | 48.60 |

*Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003*

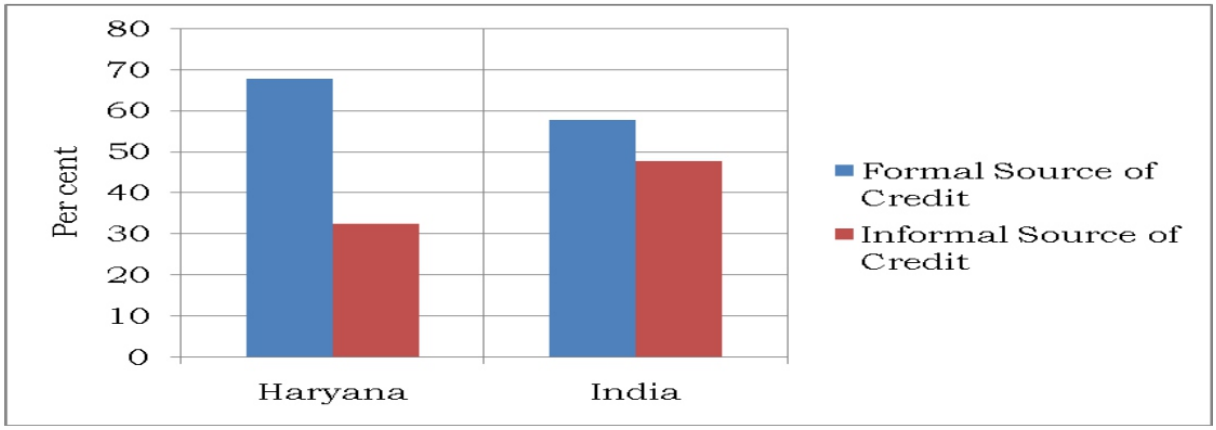
Table 3 expresses the estimated number of indebted farm households and indebted farm households as per cent to total farm households of Haryana and India. The ratio of indebted farm households as per cent to total farm households in Haryana is 53.00 per cent, while in case of India it is only 48.60 per cent. The main cause high indebtedness of farm households in Haryana is easy availability of credit as compared to other States and aggregate India. The

CMIE data base [2010] also shows indicate that population per bank office in Haryana is only 11145.07, in comparison to 14107.23 of aggregate India.

**Figure 3**

**Indebtedness of Farm Households By Source**

*[In per cent]*




*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Figure 3 shows the contribution of formal and informal sources[4] of credit in indebtedness of farm households in Haryana along with India. It is clear from figure 3 that the formal source of credit to total demand of credit by farm households contributes 67.60 and 57.70 per cent in Haryana and India respectively. Further, NSS Report No. 498 [Indebtedness of Farmer Households: 2003] also shows that the commercial banks are dominant in formal source of credit in Haryana as well as India, while, agriculture professional money lenders havedominated at informal source of credit in both places. The contribution of commercial banks in total formal debt has been 63.01 and 61.69 per cent Haryana and India respectively, while the contribution of agriculture professional money lenders have been 74.38 per cent in Haryana and 60.75 per cent in aggregate India in total informal supply of credit.

**Size of Land Holdings and Indebtedness by Source**

*[In per cent]*

| Size of Landing Holding | Haryana | | | India | | |
|---|---|---|---|---|---|---|
| | Formal | Informal | Total | Formal | Informal | Total |
| <0.01 | 14.60 | 85.4 | 100 | 22.60 | 77.4 | 100 |
| 0.01 to 0.40 | 46.50 | 53.5 | 100 | 43.30 | 56.7 | 100 |
| 0.40 to 1.00 | 71.00 | 29 | 100 | 52.80 | 47.2 | 100 |
| 1.01 to 2.00 | 62.00 | 38 | 100 | 57.60 | 42.4 | 100 |
| 2.01 to 4.00 | 86.40 | 13.6 | 100 | 65.10 | 34.9 | 100 |
| 4.01 to 10.00 | 59.40 | 40.6 | 100 | 68.80 | 31.2 | 100 |
| Above 10.00 | 74.70 | 25.3 | 100 | 67.60 | 32.4 | 100 |

*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Table 4 depicts the loan taken by different size of land holder farm households by sources [i.e., formal and informal] in terms of per cent. It is understandable from table 4 that the informal mechanism of credit supply is playing a significant role for the farm households having size of land holding up to 0.40 acre in Haryana as well as India. Jointly, both categories [i.e., <0.01 and 0.01 to 0.40] farm households fulfils their 70 [Haryana] and 67 [India] per cent credit requirements by informal mechanism of credit supply in general and agriculture/professional money lender in particular [54.25 per cent in Haryana and 39.55 in aggregate India]. The per cent share of less than 25000 credit limit size class loan has been continuous decreasing since 1990. The share of above credit limit size was 58.70 per cent in 1990 and it decreased to 13.30 per cent in 2006 [BSR-RBI: 2007], while at same time, the share of marginal farmers to total farmers has significantly decreased from 43.70 per cent to 39.60 per cent. To know the impact of average size of landing holding on borrowing of informal lending, we applied simple regression equation model. A log-linear regression model[5] has been designed to explain it. The model is

$$Y = a + \beta_1 x_1 + \varepsilon \ldots\ldots\ldots [2]$$

Where

Y = (Informal borrowing as per cent to total borrowings)

$X_1$ = average size of land holding and ε: stands for error term

Informal Borrowing = 1.541 – 0.180

[21.775]* [-2.447] **

$R^2$ = .545, Adjusted $R^2$ = .454, SE = .18702, F = 5.987 [.058] **

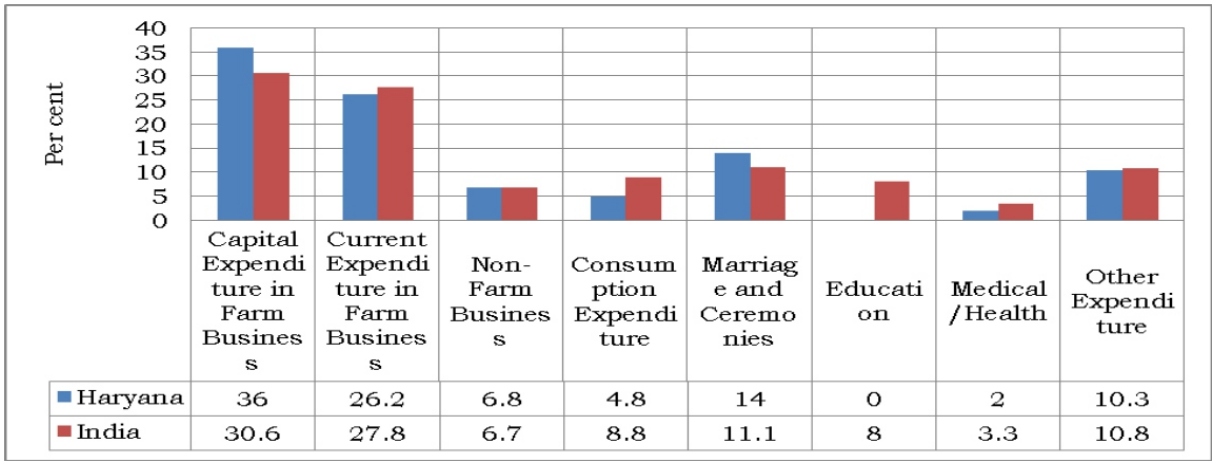
Note: * 1 per cent and ** 10 per cent level of significance respectively

The regression equation reveals that, the average size of land holding is negatively associated with informal borrowings in the state. The value of $R^2$ is .545 or 54.50 per cent. It means 54.50 per cent variation in informal borrowing is arising due to the average size of land holdings. So, for popularizing the formal borrowing the State should be reduce the value of collateral security, develop the low cost financial products for marginal and small farmers [Chhikara and Kodan: 2011]; and reduce paper work and lowering the costs of access {transaction costs, especially in terms not only of fee and charges but also requirements for documentation are the main area for attention in context of formal financial exclusion} [Johnson and Zarazua: 2011]. In short, we can say that the informal credit in general and professional money lenders in particular, play a significant role to farmer community in general and marginal & small farmers in particular for lending in India as well as Haryana. In this context, strengthen

of the Co-operatives may be a possible step. Because, at one hand Co-operatives will fight to professional money lenders in villages and it will increase the supply of formal credit in villages on the other. Moreover, the rate of interest on Co-operative loan/advances is less by 2 per cent as compared to commercial banks loan. So, definitely the loan burden on farm households can be reduced in future.

**Figure 4**

**Loan Utilization Pattern of Farm Households**




| | Capital Expenditure in Farm Business | Current Expenditure in Farm Business | Non-Farm Business | Consumption Expenditure | Marriage and Ceremonies | Education | Medical /Health | Other Expenditure |
|---|---|---|---|---|---|---|---|---|
| Haryana | 36 | 26.2 | 6.8 | 4.8 | 14 | 0 | 2 | 10.3 |
| India | 30.6 | 27.8 | 6.7 | 8.8 | 11.1 | 8 | 3.3 | 10.8 |

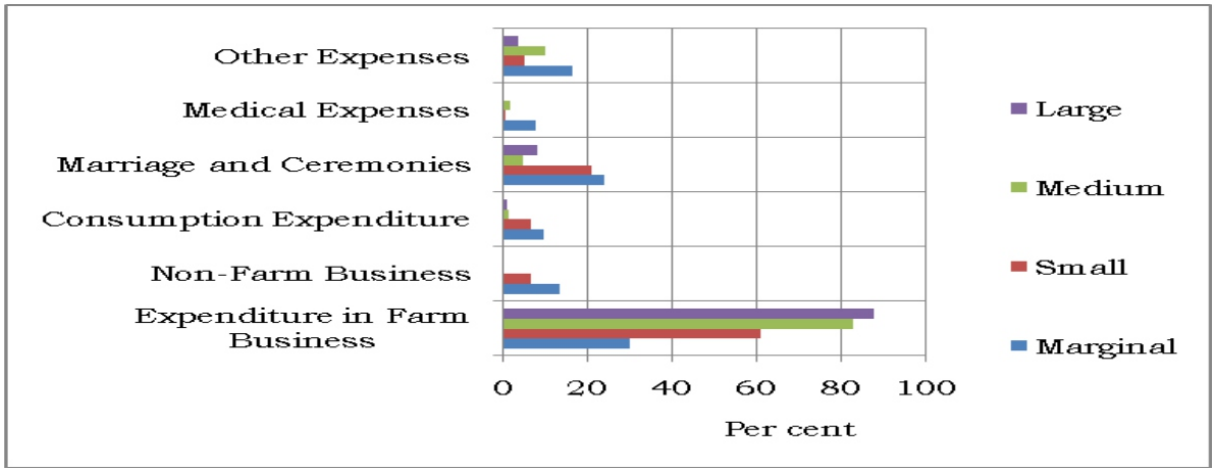
*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

The study of loan utilization pattern is very important aspect in context of indebtedness measurement. Since, the level of debt burden on a person depends on the utilization pattern of debt. So, the study of loan utilization pattern of farmers is of great significance for the study. Figure 4 reveals the loan utilization pattern of farmers Haryana as well as in India. The figure clearly shows that jointly 62.20 per cent loan amount was used in farm activities [either capital or current expenditure] by Haryana farmers, while in case of India the ratio was 58.40 per cent in 2003. The figure also depicts that 6.8 per cent and 6.7 per cent amount of loan was used in non-farm business by Haryana and aggregate Indian farmer community in 2003. Figure 4 also expresses that, jointly 18.80 and 19.10 per cent amount of loan was used in consumption and marriage & ceremonies by Haryana and aggregate India farmers respectively during the same period. At aggregate level of India, 8 per cent amount of loan was used on education, while in case of Haryana the expenditure was nil during the period under consideration. In sum, we can say that 71 per cent amount of loan was utilized by farmers of Haryana in productive activities; while in case of India the ratio was 73.10 per cent. But, in context of aggregate India, the debt for productive purposes as a per cent of total debt declined from 72 per cent in 1981 to 63 per cent in 2002. Similarly, the share of debt used for farm business declined from 64 per cent in 1981 to 53 per cent in 2002.

Within farm business expenditure, the share of capital expenditure declined from 45.3 per cent to 34.3 per cent. The increase in capital expenditure for non-farm business could not fully compensate the fall in farm business expenditure, which resulted into a fall in the share of overall productive expenditure between 1981 and 2002 [Radhakrishna: 2007]. Thus, we can say that the productivity of loan in aggregate India has somewhat better as compared to Haryana.

**Figure 5**

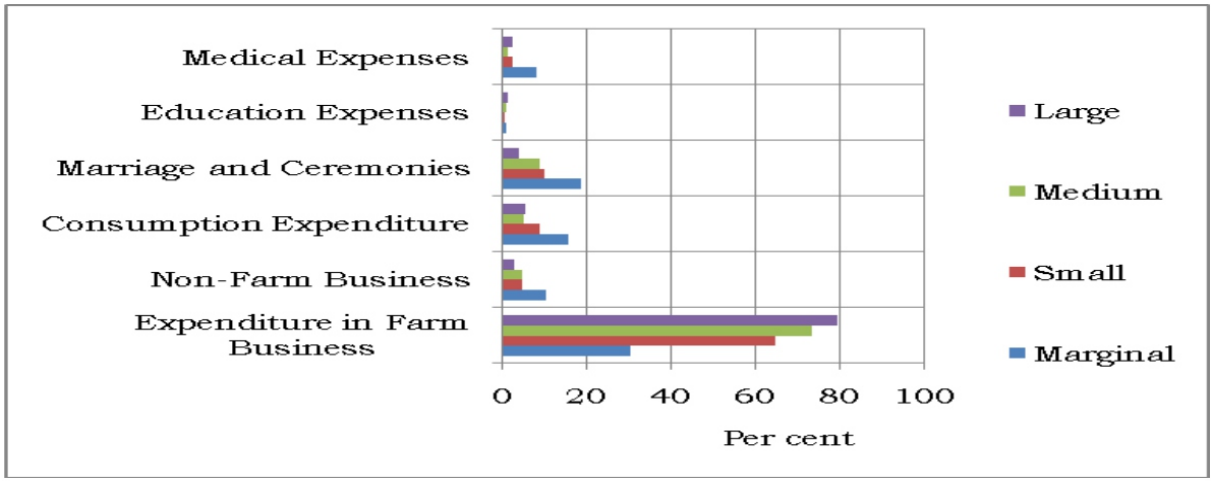
**Size of Land Holding and Loan Utilization Pattern in Haryana**




*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

**Figure 6**

**Size of Land Holding and Loan Utilization Pattern in India**




*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Figures 5 and 6 reveal the association between size of land holding and purpose of loan taken by farm households of Haryana as well as of India. The figures 5 and 6 shows that the farm expenditure (capital and current) was the common purpose of loan taken by different size of land holding farmers in Haryana

along with India. The next important purpose of loan taken by marginal [23.70 per cent], small [20.70 per cent] and large [8.50 per cent] farmers was marriage and ceremonies, while other expenses [9.70 per cent] was important purposeof loan taken by medium farm households in Haryana in 2003. In case of India, the next important purpose of loan taken by marginal [18.60 per cent], small [90.90 per cent] and medium [8.90 per cent] farmers was also marriage and ceremonies except large farmers [5.35 per cent to total loan was taken for consumption] in same period.

**Table 5**

**Debt Burden on Farm Households: According to different Monthly Per Capita Expenditure Classes**

| MPCE Class | Haryana | India | Col. [2] - Col. [3] |
|---|---|---|---|
| Col. [1] | Col. [2] | Col. [3] | Col. [4] |
| 0-225 | 4489 | 4446 | 43 |
| 225-255 | 2701 | 6127 | -3426 |
| 255-300 | 14812 | 8591 | 6221 |
| 300-340 | 23237 | 8544 | 14693 |
| 340-380 | 16629 | 9100 | 7529 |
| 380-420 | 10764 | 9510 | 1254 |
| 420-470 | 25159 | 12873 | 12286 |
| 470-525 | 32248 | 15178 | 17070 |
| 525-615 | 20195 | 16529 | 3666 |
| 615-775 | 35289 | 20537 | 14752 |
| 775-950 | 34586 | 27630 | 6956 |
| 950+ | 26109 | 39058 | -12949 |

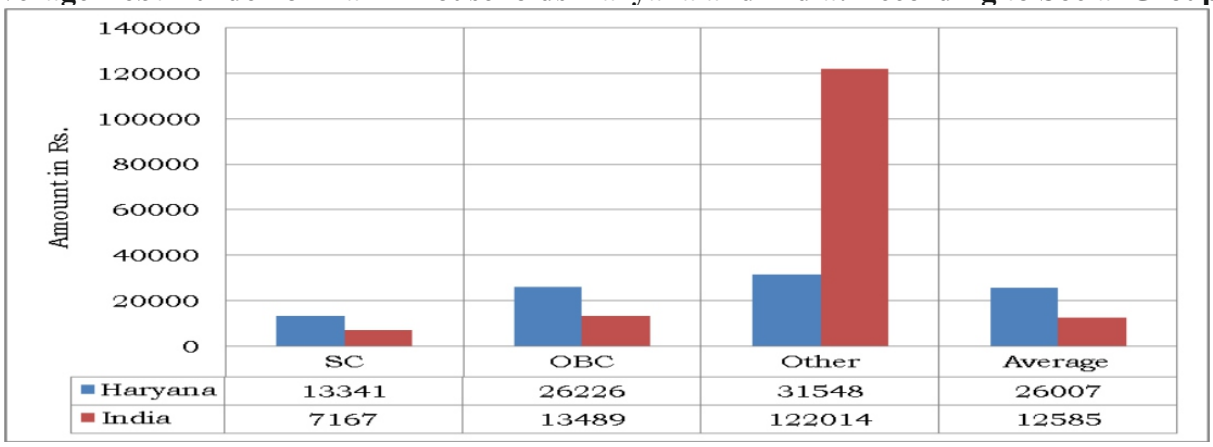
*Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Table 5 expresses the debt burden on farm households [in Rs.] according to different Monthly Per Capita Expenditure6 [MPCE] classes of farmers in Haryana as well as in India. Debt burden on farmers {0 to 225 MPCE Class} has been lowest MPCEC less in India and 225 to 255 MPCE Class of Haryana. Further, the table 5 shows that the debt burden on Indian and Haryana farm households has been more belong to 950+ and 615 to 755 MPCEC respectively. The debt burden according to the per cent of average MPCE[7] has been more on those belonging to 300-340 MPCEC and minimum on 225-255 MPCEC in the State, while in case of India maximum was observed in 950+ and minimum in 380-420 MPCE classes. The Pearson correlation coefficient was found positive and significant between high debt burden on farmers and high MPCE class in India as well as in Haryana. In addition to that there was no significant difference found between debt burden on farmers according to differentMPCE classes between Haryana and India. It is clear from column 4, the status of Haryana farmers is best as compared to aggregate India belonging to 225-255 and 950+ MPCE classesin the milieu of debt burden in both

terms [amount in Rs. and per cent to AMPCE]. To show the clear picture of debt burden on farmers of Haryana as compared to aggregate level of India, t-test was also applied. The calculated value of t-test is 2.226, while tabulated value is2.09. Therefore, to conclude, we can say that there is no statistically significant difference between debt burden on Haryana and aggregate Indian farmers, but the problem of indebtedness of Haryana farmers is somewhat worse as compared to aggregate farmers of India.

**Figure 8**

**Average Debt Burden on Farm Households Haryana and India: According to Social Group**



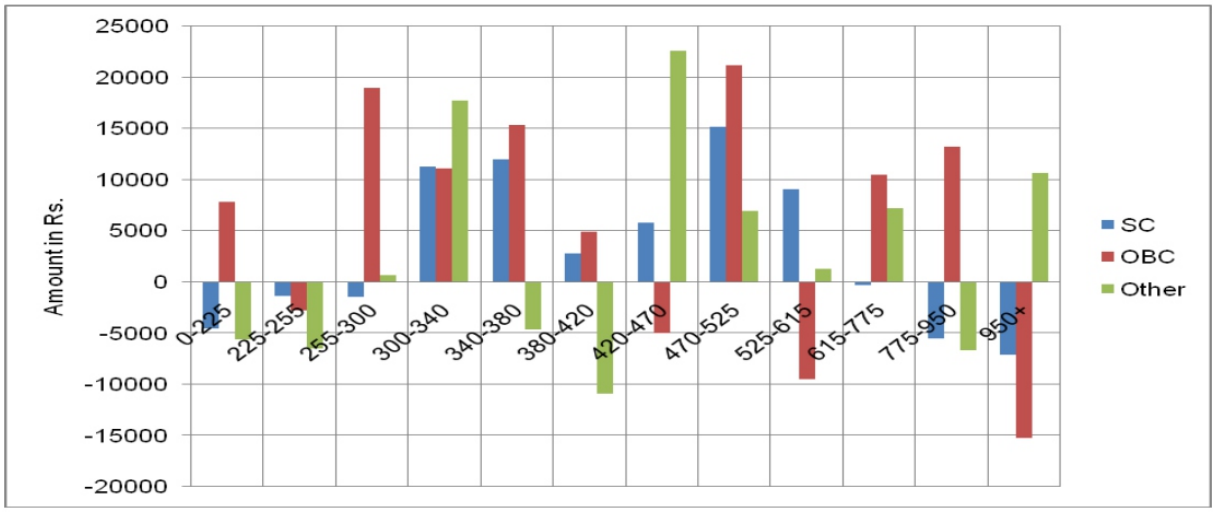

*Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Figure 8 illustrates the average debt burden on various social groups' farmers of Haryana along with India. It is clear from figure 8, the status of Scheduled Caste [SC] and BackwardClass [BC] farmers are not better, while Other Class [OC] farmers was better as compared to same social group of aggregate Indian farmers in context of debt burden in 2003. The major explanation behind the worse status of SC and BC farmers is utilization of loan in unproductive activities [i.e. marriage, consumption, etc.]. The SAS [2003] data shows that 19.00 and 21.10 per cent loan was used in marriages and ceremonies by SC and BC farmersrespectively of the State, while in case of aggregate India, 17.30 and 12.10 per cent respectively loan was used in same head by same social groups of farmers. Further, SAS [2003] also reveals that 26.40 and 62.0 per cent loan was used by SC and BC farmers in productive activities [either farm business or non-farm business] in Haryana, while in case of aggregate India, the same ratio of SC and BC farm households was 50.0 and 62.20 per centrespectively during the period under consideration. Further, the SAS [2003] depicts that the maximum debt burden was on SC, BC and Other social group of farmers belonging to 470-525, 775-950 and 0-225 MPCE class respectively, while minimum debt burden was on SC, BC and Other social group of farmers belonging to 470-425, 775-950 and 615-775 MPCE class respectively in the State. In case of India, the maximum and minimum debt burden onfarmers, according to same social groups belonging to 225-255, 0-225 & 0-225 respectively and 950+, 950+ and 775-950 MPCE Class, respectively.

**Figure 9**

**+/- Burden of Loan on Haryana Farm Households**

*[In Rs.]*

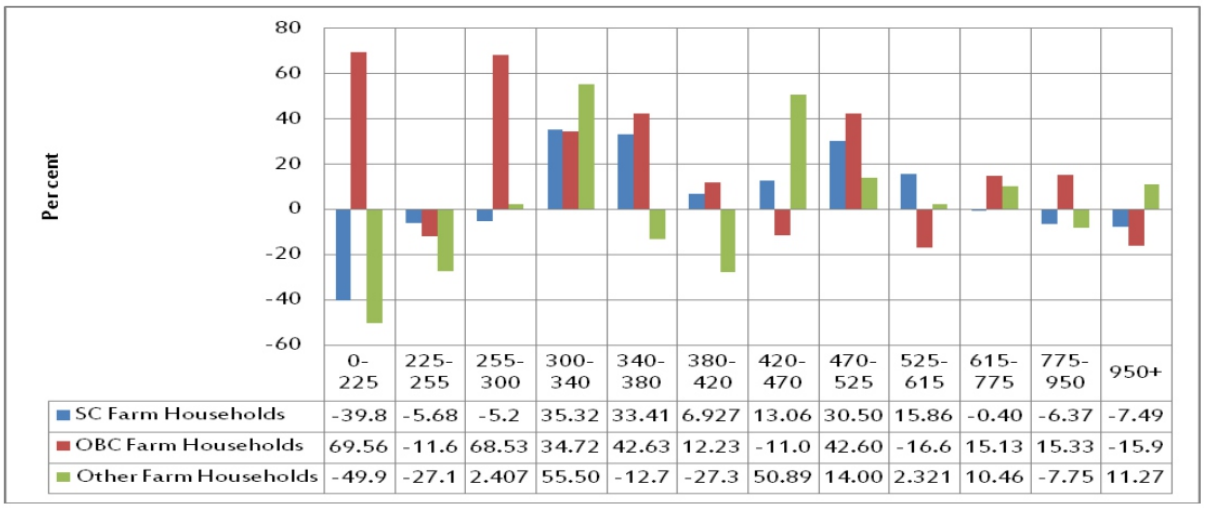



*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

**Figure 10**

**+/- Burden of Loan on Haryana Farm Households**

*[As per cent to AMPCE]*




| | 0-225 | 225-255 | 255-300 | 300-340 | 340-380 | 380-420 | 420-470 | 470-525 | 525-615 | 615-775 | 775-950 | 950+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC Farm Households | -39.8 | -5.68 | -5.2 | 35.32 | 33.41 | 6.927 | 13.06 | 30.50 | 15.86 | -0.40 | -6.37 | -7.49 |
| OBC Farm Households | 69.56 | -11.6 | 68.53 | 34.72 | 42.63 | 12.23 | -11.0 | 42.60 | -16.6 | 15.13 | 15.33 | -15.9 |
| Other Farm Households | -49.9 | -27.1 | 2.407 | 55.50 | -12.7 | -27.3 | 50.89 | 14.00 | 2.321 | 10.46 | -7.75 | 11.27 |

*Source: Calculation by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003*

Figure 8 shows the excess/low debt burden on farm households in the State according to their social groups of farmers as compared to aggregate India in terms of Rs. while, Figure 9 shows the excess/low debt burden on farm households in the State according to their social groups of farmers as compared to aggregate India in terms of per cent to AMPCE[8]. It is clear from figure 8 and 9, the loan burden on Scheduled Caste farmers belonging to 0-225, 255-300, 615-775, 775-950 and 950+ MPCE Classes was

found to be low, and OBC community

farmers' loan burden was found low those belonging to 225-255, 420-470, 525-615 and 950+ MPCE Classes as compared to aggregate India. It is also observed from figure 8 and 9that other farmer community belonging to 0-225, 225-255, 340-380, 380-420 and 775- 950 MPCE Class the loan burden was low as compared to aggregate India. To conclude, we can say that the debt burden is low in terms of Rs. on Haryana farm households of all social groups, but it is very high as per cent to average per capita monthly expenditure [APCME].

**MAJOR FINDINGS**

Through the study, we analyzed the problem of farmers indebtedness in Haryana in detail and also compare the status of Haryana farmers to aggregate Indian farmers in the milieu of indebtedness with the help of Situation Assessment Survey [2003] data along with appropriate statistical tools and techniques. The data shows that jointly 62.20 per cent loan amount was used in farm activities [either capital or current expenditure], while total 71 per cent loan to total loan taken was used by Haryana farmers in productive activities [i.e., farm and non-farm activities]. But, the ratio was low as compared to aggregate India [73.10 per cent]. Definitely, farm expenditure (capital and current) was the common purpose of loan taken by different size of land holding farmers in Haryana, but, marginal and small farmers used a significant amount of loan in marriage and ceremonies expenditure, that was 23.70 and 20.70 per cent respectively to total amount of loan taken. Further, the debt burden on farm households belonging to 950 + MPCEC in India has been more, while in case of Haryana, it has been high among 615 to 775 MPCEC farmers. The Pearson correlation coefficient conformed a positive and significant relation between high debt burden on farmers and high MPCE class in India as well as in Haryana, although there is no significant difference was found between debt burdens on farmers of Haryana and India according to different MPCE Classes.

The status of Scheduled Caste [SC] and Backward Class [BC] farmers are not better, while Other Class [OC] farmers of Haryana were found to be better as compared to same social group of aggregate Indian farmers in case of debt burden. The NSS Report No.496: 'Some Aspects of Farming' {2003} reveals that 74 per cent male and only 31 per cent female farmers in India are educated, but the rank of Haryana is 3$^{rd}$ in male farmer education and 9th in female farmers. The report further shows that only 9, 62 and 12 per cent farmers are not aware about the bio-fertilizer, MSP and WTO respectively in the State. In addition, 69 per cent farmers are not the members of Co-operative in Haryana. Moreover, 41 per cent farmers are not aware about crop insurance and 42 per cent said that the facility of crop insurance has not been available. The study also found that the average size of land holding and informal credit lending are negatively associated, while due to population growth and single family trends, the average size of land

holding has been decreasing in the State as well as in aggregate India, which is a matter of concern.

**SUGGESTIONS**

On the basis of foregoing analysis we suggest that: 1] the State government should monitor the informal mechanism of credit, 2] increase the awareness among farmers in general and marginal and small in particular, about the disadvantages of utilization of loan in unproductive activities, and 3] strengthen the Co-operative movement in the State. In addition, 4] the government should also strengthen the self help group moment in the State, as only one per cent of farmer households belong to a self-help group (SHG) while, indebted farmer households holding land up to 2 hectare are seventy per cent in the state.Moreover, 5] the government should boost the dairy farming in the State as it is more suitable to marginal and landless farmers in support of income generation. 6] Banks should implement low-cost financial products through the generalized use of electronic payment methods, which enable financial institutions to improve their efficiency ratios, facilitate the use of low-cost distribution channels and enable application of credit risk monitoring system that decrease the default rate, 7] the State government should take strict action against who do not disburse 100 per cent agriculture credit limit in the State in a prescribed year, 8] the state government should also set up credit counselling centre with the help of commercial banks for advising public on gaining access to financial systems.

Income, Expenditure and Productive Assets of Farmer Households Survey [2003] reveals that farmers belonging to the lowest monthly expenditure class or the poorest category have only 31 buffaloes per 100 households, whereas the highest monthly expenditure class has 113 buffaloes per 100 households in India. Therefore, 9] the government of the State should also boost the animal husbandry as a profession among poorest people through providing better atmosphere, subsidized cattle food, better health treatment for animals, better training of animal husbandry, etc. in the State. 10] The state government should also boost the NonFarming Activities in the state for enhancing the income of farmer-households for sustainable livelihood. 11] The farmers' grief and sorrow can be visualized by adding one more invisible factor in the form of daily wages {Rs. 179 per day per person in Haryana under MNREGA} according to which a farmer can earn Rs. 64,440 per annum or 17,900 for 100 days which they never count/receive while calculating their cost of produce; accordingly a family of five persons is under a loss of Rs. 3, 22,200 p.a. or 89,500 p.a. for 100 days. Therefore, we suggest that a minimum of Rs. 17, 900 p.a. per person {an unemployed major who works on fields} should be given a to farmer family under MNREGA to relieve the family from the debt and for a sustainable smooth life capable of capitalizing the available resources rather than consuming them.

## CONCLUSION REMARK

Today, the farmer community faces many challenges [i.e., marketing, cost of cultivations, indebtedness, an adequate supply of money at affordable cost, climate, surge in food grains prices, reduced per capita food grain availability etc.] and out of these factors provision of proper supply of credit is one of the most important issues for the sustainable development of the sector [Chhikara and Kodan: 2011; Golait: 2007]. So, the rural credit delivery system must be compatible with the goal of higher growth with better equity [Kainth: 2007].

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