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TABLE OF CONTENTS

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Certain Correlates of Burnout among Police Personnel in a Metropolitan City of a Developing Country

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ABSTRACT

Burnout is dysfunctional response to stress. This study investigates the phenomenon of burnout and its relationship to certain demographic, psychological and situational variables. An attempt is also made to find the differences burnout between men and women police. The Maslach Burnout Inventory and demographic profile were administered to a random sample of 220 police personnel in a metropolitan city of a developing country. The results indicated that most of the demographic factors were not related to burnout, however there were significant gender differences in Emotional Exhaustion and Depersonalization dimensions of burnout.

Keywords*: Burn out, Emotional Exhaustion, Gender difference, Depersonalization.*

INTRODUCTION

Burnout is likely to occur to all those people who have constant public interaction like lawyers, nurses, doctors, teachers, police staff and social workers due their regular contact with public at large. Bradley mentioned in 1969 while studying probationary officers dealing with juvenile delinquents. The term 'burnout' was introduced by Freudenberger in 1974 to refer to a phenomenon which he had observed in himself and in co-workers in the free-clinic movement. According to him burnout is a failure wear- out, or complete exhaustion because of excessive demands on one's energy, strength, or resources. He attributed it to the unceasing pressures of working with emotionally needy and demanding individuals (Freudenberger, 1974). Burnout is characterized by emotional exhaustion, depersonalisation and diminished personal accomplishment (Cordes and Doughterty, 1993). Freudenberger (1974) further tuned the term 'burnout' as a progressive loss of idealism, energy, and purpose as a result of work conditions. Other researchers have developed essentially similar definitions like burnout as 'complex issue with its roots in interpersonal, occupational, organizational, historical and social phenomena (Faber,1983), as a process in which individuals feel blocked from reaching goals and objectives that are important to them (Burisch, 1993).

Burnout involves loss of concern for the people with whom one is working. Physical exhaustion, one of the dimensions of burnout leads to even illness. Ryan (1971) points out that burnout is characterized by an emotional exhaustion. Because of this professionals develop negative feelings, no sympathy and loss of respect for their clients, patients and the public who are receiving care. They develop a cynical and dehumanizing process, the clients or patients are as somehow deserve their problems longer have any positive feelings, sympathy or respect for clients or patients or public. A very cynical and dehumanized perception of these people often develops in which they are labelled in derogatory ways and treated accordingly. As a result of this dehumanizing process, these people are viewed as somehow deserving of their

problems. They are blamed for their won victimization (Ryan, 1971). They become inhuman towards their clients. This may lead to deterioration in the quality of care or services offered to the clients. The professional whose burnouts are not able to deal effectively with overwhelming emotional stresses of their work. This failure to cope can be manifested in impaired performance and absenteeism. It can also lead to personal problems, drug abuse, alcoholism and mental health problems. Maslach & Pines (1977) opine that people who are burnout often change professions. They also point out that some of these people seek psychiatric help because they believe to be failure in their personal failures.

Edelwich (1980) posits that people who seek a career in the helping professions are particularly vulnerable to burnout as many enter this field with unrealistic expectations. Such expectations include the belief that the services they provide will decisively improve lives of their clients; they will be highly appreciated by the employing agency and their clients; they will be able to substantially change bureaucracies to be more responsive to client's needs and there may be opportunities for quick advancement in the career. Thus the frustration experienced at work and the gradual un-recognition for the services rendered which is unrealistic and contrary to their expectations, were also contributory factors to burnout.
Burnout is considered as a psychological syndrome that occurs in response to chronic work related stressors (Maslach ET al.2001) and it consists of three dimensions viz emotional exhaustion, depersonalization and reduced personal accomplishment. Emotional exhaustion is characterized by a feeling that one's emotional resources are used up. Depersonalization refers to a cynical, callous and detached attitude towards clients, co-workers and organization. The diminished personal accomplishment is marked by a sense of ineffectiveness and inadequacy in relation to job performance accompanied by negative self-evaluation. Symptoms of burnout can be categorized into five types physical, emotional, behavioural, interpersonal and attitudinal (Kalil Sophia 1988).

In this study we have selected the police personnel who render services to the public day in and day out, throughout the year. Their constant contact with people at large especially criminals may bring more stress in their life. Individual in this profession work intensively, intimately and continually with people who have serious physical, mental, emotional and social problems. The stress associated with processes of helping them involve treating, teaching, counselling and reprimanding, place these professionals at risk for burnout (Rogers & Dodson 1988). It is necessary to study burnout because it is linked to both individual and work related outcomes, both in general (Maslach et al., 2001) and police officers (Martinussen et al. 2007).

RESEARCH METHODOLOGY

Burnout measure – The Maslach Burnout Inventory (MBI) developed by Maslach and Jackson (1986) was adopted for the present study. It contained 22 questions and recorded three dimensions of burnout: emotional exhaustion, depersonalization and low personal accomplishment. A high score on the 9 item Emotional Exhaustion subscale reflects feelings of being emotionally overextended and exhausted by one's work. A high score on the 5 item Depersonization subscale indicates a callous and impersonal response toward the recipient of one's service. A low score on the 8 item Personal Accomplishment subscale signifies feelings of incompetence in one's work. Each subscale yields two scores. The first score indicates the frequency with which feelings occur. The response scale for frequency ranges from 0 (never) to 6 (everyday). The second score indicates the intensity of feelings when they occur. In the present study only the frequency with feelings occur alone has been considered. The scale ranges from 1(hardly noticeable to 7 (very strong). Demographic and background questions concerned with age, designation, sex, marital status, education, experience, department like

Law & order, traffic or Crime, time pressure, exercise, sick leave availed in the past month and past year and information about sleep.

The sample consisted of 450 police personnel working in urban city in India and includes different categories of police personnel such as Inspectors, Sub-inspectors, Head constables and Constables belonging to both sexes. These personnel belong to six different ranges in Chennai city, which is the fourth largest city in India. Out of 450 questionnaires distributed, 241 questionnaires were returned which works out to 53.6 percent response. When these questionnaire were verified for its completeness, 21 questionnaires were rejected due to their incomplete and defects, leaving 220 valid instruments for test.

RESULTS

The demographic test results indicated that out of 220 individuals, 201 were men and 19 were women. The mean age was 40 and the standard deviation 7 years. Ninety percent of them were married means only around 22 were not married. Majority of the respondents (66 percent) comprised of sub-inspectors (66 percent) and most of them were promoted from lower grades. The respondents were in service from 2 to 37 years with a mean of 17.6 years. Most of them (80%) belong to Law and Order department. A substantial number of respondents (75%) were engaged in a regular program of exercise ranging from once a week to everyday. Most of them had not availed of sick leave in the past month but the figure slumped to 67% while considering sick leave not availed in the past year.

The statistical results normative test of burnout indicated that the mean and standard deviations for the three MBI subscales for the frequency dimension are presented in Table 1 below.

Table 1: Means and Standard Deviations

	N = 220	
Dimensions of Burnout	Mean	SD
Emotional Exhaustion	23.22	12.03
Depersonalization	10.9	6.10
Personal Accomplishment	29.18	9.36

According to Maslach and Jackson (1986) the scores on the frequency and intensity dimensions of the MBI subscales are interpreted as Low, Moderate or High. These levels are based on score ranges established from data derived from the normative occupational sample. Scores are considered low if they are in the lower third of the normative distribution, moderate if they are in the middle third and high if they are in the upper third. On the basis of the normative data, the mean scores obtained in this study translate to a moderate level of emotional exhaustion and depersonalization and a low level of personal accomplishment. The scores on emotional exhaustion and depersonalization subscales of the present study were remarkably similar to the scores on the same subscales of the normative sample reported by Maslach and Jackson (1981) with less than 2 point difference in each subscale. However there was considerable disparity in scores between the present and normative samples on the Personal Accomplishment subscale indicating more burnout in the present research sample.

The Pearson correlation coefficients between the three MBI subscale scores and other demographic and situational variables are given in Table 2.

Table 2 Correlation of Burnout among different variables

Variables	N = 220		
	Burnout Dimensions		
	EEF	DPF	PAF
Age	-0.0390	-0.0944	0.0140
Designation	0.1997**	0.1426	0.1302
Marital Status	0.0608	0.0513	0.0197
Education	0.0506	0.0718	-0.0618
Experience	-0.0287	0.1080	0.0648
Branch (Dept.)	-0.0373	-0.0539	0.0125
Locale	-0.1171	-0.0609	0.0168
Time Pressure	0.2382***	0.1516	0.0571
Exercise	0.0539	-0.0096	0.0650
Sick Leave (past month)	-0.0513	-0.0805	0.0207
Sick Leave (past year)	0.0533	0.0044	0.0567
Sleep	-0.0637	0.0594	-0.2618

*Significance **p<0.01; *** p<0.001*
EEF: Emotional Exhaustion frequency;
DPF: Depersonalization frequency;
PAF: Personal Accomplishment frequency.

The significant correlations are highlighted in table 2. It can be seen that only two variables viz designation and time pressure are correlated with emotional exhaustion dimension of burnout. There is no relationship between age, marital status, education, experience, branch (police department) locale, daily exercise, sick leave and sleep and three dimension of burnout viz. emotional exhaustion, depersonalisation and personal accomplishment. It can be noted that two burnout subscales, Emotional Exhaustion and Depersonalization show a higher score burnout but for Personal Accomplishment burnout is indicated by lower scores. The correlation between age and three dimensions of burnout is not significant which indicates that there is no relationship between them. Burnout seems to occur among young employees under the age of 30 or 40 and who had less experience (Byrne 1994) whereas Schaufeli and Van Dierendonck (1994) found higher burnout in older age groups in Netherland. The designation of the position is significantly related to emotional exhaustion. The duties and responsibilities increase with the change in position in police department. In police service, many times there will be interference from political bosses and less autonomy in their work. This can lead to stress and burnout.

In order to find out the difference in burnout between men and women police staff, t-test of the mean scores of burnout dimensions of policemen and policewomen were performed. The test results are shown in Table 3.

Table 3 T-test analysis of Gender differences in Burnout among Police Personnel

Dimensions	Policemen		Policewomen		t-value	p-value
	N = 201		N = 19			
	Mean	SD	Mean	SD		
Emotional Exhaustion	22.54	11.80	28.03	12.74	-2.26	0.029*
Depersonalization	10.35	5.63	14.77	7.72	-3.08	0.004*
Personal Accomplishment	28.97	10.20	30.64	6.90	-1.18	0.244

** p <0.05 ** p<0.01*

The t-test indicates gender differences in Emotional Exhaustion (P<0.05) and Depersonalization (p<0.01). Policewomen are appeared to be more burnout than policemen not with-standing the difference in Personal Accomplishment being insignificant.

DISCUSSION AND CONCLUSIONS

The present study is an attempt to elucidate the relationship between burnout and certain demographic factors. The analyses clearly indicate that age was not correlated with burnout. Although no specific hypothesis was developed it was expected that the age would be negatively related to burnout since normative data suggests that one of the benefits of age is lower burnout. Stevens and O'Neill (1983) found, that in a study of workers in developmentally disabled population, decreases on Emotional exhaustion and Depersonalization with age. However these were accompanied by decreases rather than increases on Personal Accomplishment. Lowered burnout may arise from the replacement over time of less effective coping strategies with more effective ones. The discrepant results imply that coping skills of police personnel were inadequate irrespective of age.

In this study designation appeared to influence Emotional Exhaustion. Police personnel higher up in the hierarchy experienced more Emotional Exhaustion than their subordinates. Could it be that increased responsibility in conjunction with intensive interaction daily with people having different and at the same time serious problems of varied nature leads to burnout? Earlier researcher Burke and Greenglass (1989) noted a reverse trend in burnout in teaching with regard to designation. Teachers reported greater burnout than did department heads or principals. However a more comprehensive examination of the relationship of designation to burnout is recommended to warrant the existence of the positive relationship observed in the present study.

Earlier researchers (Mor & Laliberte, 1984 Maslach & Jackson 1981) linked education with a greater degree of burnout, whereas other researchers (Rogers & Dodson 1988; burke & Greenglass, 1989) evidenced contrary. In this study education was not associated with burnout. It is presumed that the duration of exposure to a stressful situation would increase burnout. Nonetheless, neither the effects of long experience in developmental disabilities (Stevens & O'Neill, 1983) nor the effects of long experience in one position in child care (Maslach & Pines, 1977) supported this logic. Therefore duration of exposure as represented by years of work in police service was not linked to burnout.

The experience of time pressure, that of seldom having enough time to do all that one has to do, was associated with Emotional exhaustion. The police staff can be called for duty at any time even during holidays. Most of the time they have to work more than prescribed work hours, since the ratio of police staff to public in India is very low. In addition, they have to provide security to political leaders, religious leaders and VVIPs in public meetings and other functions. Some of the police personnel are posted at the senior officers, VVIPs and foreign diplomat's residences to provide security services which requires more than the prescribed working hours. They have very little time to be with their families and take part in their social functions. This may result in strained relationships with family members leading to alcoholism, divorce and restless life. Further the bureaucracy and red tape in police organisation coupled with no time for police personnel for leisure activities or for social life. As a result, there is deterioration in performance which in turn results in a higher backlog of personal and professional work. Thus a vicious cycle is set into motion ultimately leading to high stress and to burnout.

Women police staff seems to have higher level of emotional exhaustion and less personal accomplishment when compared to men police staff (Silbert, 1982, Etzion and Pines, 1986). The present study is supported by Him, Zao and Archhold (2002) and Berg et al (2003) who found that female police officers had higher level of burnout than male police officers. Other researchers for example Kop et al. (1999), Newman Rucker-Reed (2004) and Martinussen et al (2007), McCarty et al. (2007) reported no difference between them in burnout. Greenglass (1991) opines that gender is confounded with occupational role and hierarchical position.

Compared to men, women often less occupy supervisory roles in organisations. This makes them to have less access to job related rewards such as high income, social status and autonomy. The number of women police staff is very negligible in Indian context. Recently only women are willing to serve in police force and they are being recruited by the federal and state governments. Since they are less in numbers and have less opportunities for social support mentoring and less promotional changes in police service in India could be the reason for male domination in this profession and lesser number of women force in police service.

Similarly Streams and Moore (1990) found that female officers experienced more burn out than male staff in the Royal Canadian Mounted Police (RCMP). On the other hand they also reported on personal accomplishment (PA) both male and female officers experienced high burnout. The police women in the present study manifested a similar trend with regard to burnout.

The summary of analysis indicates that the relations among burnout and demographic data suggest that most demographic factors were not associated with burnout. The results of earlier studies also indicated inconsistency among them. The present study findings are consistent with previous research study of Maslach and Jackson, 1981, implicating the primary role of job and work setting characteristics with individual difference playing a lesser role in psychological burnout. It can be stated from organisational perspective, research on burn-out is important, both in terms of responsibility of police organisations to guarantee the well-being of police staff and in terms of maintaining and improving organisational performance, (Jessica, 2007). In India the government has to recruit more police staff to increase public and police ratio. This can enable the police officers to have more time for themselves and for social life.

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A Note on the Role of Bank Capital

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ABSTRACT

This note explores how a bank's balance sheet responds to a capital shock in a simple model of the banking firm where both loan demand and deposits are sensitive to a bank's capital position relative to its competitors. An unconstrained bank shrinks its deposit base in the wake of a capital loss if loan demand is very sensitive to the bank's relative capital position. The deposits of an unconstrained bank expand only if both deposit and loan demands are fairly immune to a bank's relative capital position. In a simple model with reserves we show that in the wake of a capital loss the adjustment of loans and reserves under a binding constraint depends on the parameters of the model while the adjustment of total assets and liabilities does not. Loans decrease by the size of the capital loss plus the increase in reserves. If the constraint is not binding then loans generally decrease by more than the increase in reserves.

Key Words: *deposits, loans, reserves, capital-asset ratio, balance sheet JEL Code: E51, G2*

INTRODUCTION

It has been more than five years since the dramatic Lehman Brothers bankruptcy. Since then there has been a fierce debate inside central banks and regulatory agencies about what constitutes the right balance between two competing objectives. On the one hand, there is an express desire to protect the safety and soundness of the financial system while on the other there is the equally desirable goal of letting financial markets allocate financial resources effectively and smoothly without needless interference. Banks have been at the centre of this raging debate. Of all pressing banking issues the role of capital in regulating banks has probably received the most attention. The new Basel III accord requires a bank to hold more and better quality capital for its risk-weighted assets. In addition, banks are now subject to leverage ratios to mitigate the concern that they had too much leeway in calculating the risk-weighted capital ratios. The new accord also requires banks to maintain liquidity ratios to lessen the risk of fire sales in case of a financial shock.[1,2]

The stricter capital requirements and additional regulatory provisions are intended to make the banking system safer. Incorporating these into a modern theory of the banking firm is a promising avenue for current and future research. Our aim in this note is to examine how a profit-maximizing bank responds to a loss of bank capital. We use a highly simplified one-period model along the lines of Peek and Rosengren (1995) to explore how a bank reacts to a worsening capital position in two scenarios: one where a bank is constrained by a regulatory capital-asset ratio and the other where it is not. They find that the composition and size of a

[1] The Reserve Bank of New Zealand and the Swiss National Bank have also imposed loan-to-value ratios on the banking sector as a precautionary measure to keep house price inflation in check and to lessen the probability of a systemic crisis in the credit market.
[2] For a recent article on policy reforms in financial markets, see Arnold et al (2012).

bank's balance sheet depends on whether or not the bank faces a binding capital constraint. For instance, in the wake of a loss of capital, an unconstrained bank expands its deposit base to avoid haemorrhaging loans while a capital constrained bank sheds deposits thereby shrinking its loan portfolio even more than in the unconstrained case.

This note introduces two important changes to the original model proposed by Peek and Rosengren. The first alteration attributes capital a more prominent role in determining assets and liabilities on a bank's ledger. A bank's deposit base depends on the bank's own capital position relative to its competitors'. A well-capitalized bank attracts more deposits because it is deemed safer by the public. The capital position of a bank relative to its competitors also affects its loan demand because a well-capitalized bank charges a higher lending rate than its competitors. These alterations turn out to have far-reaching consequences for how a bank responds to a loss of capital. In particular, a bank may no longer behave as suggested by the original Peek and Rosengren analysis. Indeed, a bank may shrink its deposit base even if the regulatory capital constraint is not binding and shrink the dollar value of its loan portfolio by more than the loss of capital. The other change to the model expands the set of assets a bank can hold. Apart from making loans, a bank can now also keep reserves which earn interest. In our set-up reserves are not held as a fixed proportion of deposits. Instead, reserves decrease as the difference between a bank's lending rate and the policy rate set by the central bank increases. In this expanded model, we show that in the wake of a capital loss the adjustment of loans and reserves under a binding constraint depends on the parameters of the model while the adjustment of total assets and liabilities does not. The amount by which the loan portfolio shrinks equals the size of the capital loss plus the expansion of reserves.

In the next section we elaborate on an expanded role for capital in the model. Section 3 introduces reserves into the model. Section 4 offers a brief conclusion.

THE MODEL WITH AN EXPANDED ROLE FOR BANK CAPITAL

The bank maximizes profits in a monopolistically competitive market. There is only one asset, loans (L), and one liability, deposits (D). There is only one form of capital, equity capital (K), which for the purpose of this analysis is deemed exogenous. In the event of a capital loss the bank cannot compensate by issuing more equity.[3] The balance sheet constraint is exceedingly simple:

$$L = K + D \tag{1}$$

The bank must maintain a minimum of capital relative to its asset base:

$$K \geq \mu L \tag{2}$$

μ = *Capital-asset ratio set by financial authorities*[4]

The role of capital in the Peek and Rosengren model is extremely limited. Capital appears only in the balance sheet constraint and the capital- asset ratio constraint. It neither affects the bank's loan nor its deposit relation. But a case can be made for capital to affect the two relations directly. We therefore propose the following loan and deposit relations:

[3] On the role of capital, see Berger et al (1995). Why bank regulators care about bank capital is described in detail by Bhattacharya and Thakor (1993).
[4] A typical value would be 8 percent.

$$D = f_0 + f_1\left(r_D - \bar{r}_D\right) + f_2(K - \bar{K}) \qquad f_1 > 0,\ f_2 > 0 \tag{3}$$

$$L = g_0 - g_1(r_L - \bar{r}_L) + g_2(K - \bar{K}) \qquad g_1 > 0,\ g_2 > 0 \tag{4}$$

r_D = *interest rate paid by bank on deposits*
$\bar{r}_D$ = *Interest rate offered by bank's competitors*
r_L = *Interest rate charged by bank on loans*
$\bar{r}_L$ = *Interest rate charged by bank's competitors on loans*
$\bar{K}$ = *capital base maintained by bank's competitors*

For given levels of capital and the deposit rate offered by its competitors, an increase in the deposit rate offered by the bank results in a higher deposit inflow. A bank with higher capital than its competitors also attracts more deposits as it is considered safer in the sense that it has a greater cushion to absorb write-offs. The appearance of capital in the deposit relation implies further that a bank's interest rate on deposit is negatively correlated to its capital base. Having more capital relative to its competitors allows a bank to offer a somewhat lower interest rate on deposits to maintain a given volume of deposits. Simply put, depositors expect lower interest rates on deposits from a capital-rich bank.

The demand for loans is also affected by a bank's capital position relative to its competitors. A bank with a higher capital base faces more pressure from shareholders to earn a higher return. Thus, ceteris paribus, a bank that maintains a higher capital base relative to its competitors charges a higher bank lending rate. Thus while more capital (relative to its competitors) puts the bank in a position to offer more loans, the concomitant pressure to charge a higher lending rate than its competitors tends to reduce loan demand.

The bank maximizes profits subject to the capital-asset ratio constraint. A fraction (ϕ) of loans is not recoverable.

$$\text{Max } \pi = (r_L - \phi)L - r_D D + \lambda\,(K - \mu L) \tag{5}$$

π = *Profits earned by bank*
λ = *Lagrange multiplier*

We next consider two cases. The first case describes the situation where a bank is not constrained by the capital asset ratio as the capital base maintained exceeds the regulatory minimum. This is the unconstrained case where $\lambda = 0$. in the alternative scenario the regulatory constraint is binding. In this case $\lambda > 0$.

A bank can set either quantities or rates. Given the balance sheet constraint it is convenient to let a bank choose the level of deposits *D*. We begin by eliminating *L*, r_D and r_L using (1), (3) and (4).[5] The profit function can be restated as

$$\max_D \pi = \frac{[g_0 + g_2(K - \bar{K}) - K - D + g_1(\bar{r}_L - \phi)](K + D)}{g_1} - \frac{[D - f_0 - f_2(K - \bar{K}) + f_1\bar{r}_D]D}{f_1}$$

$$\text{Subject to} \qquad [K - \mu(K + D)] \tag{6}$$

The Lagrangean for the optimization problem can be stated as follows:

$$\mathcal{L} = \frac{[g_0 + g_2(K - \bar{K}) - K - D + g_1(\bar{r}_L - \phi)](K + D)}{g_1} - \frac{[D - f_0 - f_2(K - \bar{K}) + f_1\bar{r}_D]D}{f_1} + \lambda[K - \mu(K + D)] \tag{7}$$

[5] As stated earlier, *K* is exogenous and the bank cannot issue additional capital to compensate a loss.

The two first-order conditions are:

$$\frac{d\mathcal{L}}{dD} = \frac{g_0+g_2(K-\bar{K})-2(K+D)+g_1(\bar{r}_L-\phi)}{g_1} - \frac{2D-f_0-f_2(K-\bar{K})+f_1\bar{r}_D}{f_1} - \lambda\mu = 0 \quad (8)$$

$$\frac{d\mathcal{L}}{d\lambda} = (1-\mu)K - \mu D = 0 \quad (9)$$

The optimal *D* that maximizes a bank's profit depends on whether or not the bank is constrained by the capital asset ratio.

Unconstrained Case

When the capital requirement is not binding *($\lambda = 0$)* the optimal level of deposits can be obtained by solving equation (8) for *D*:

$$D = \frac{f_1[g_0-g_2\bar{K}+g_1(\bar{r}_L-\bar{r}_D)-g_1\phi]+g_1(f_0-f_2\bar{K})+(f_1g_2-2f_1+g_1f_2)K}{2(f_1+g_1)} \quad (10)$$

In an unconstrained environment the parameters of the model play an important role in determining the profit-maximizing level of deposits as do the deposit and lending rates charged by a bank's competitors and the respective capital bases.

How does a bank's balance sheet respond to a loss of capital? Here we have in mind a scenario where the bank's capital declines (through a loss of retained earnings, payment of fines, etc.) relative to the average maintained by its competitors.

A. The Original Model ($g_2 = f_2 = 0$)

Taking the derivative of equation (10) with respect to a bank's exogenous capital base yields:

$$\frac{dD}{dK} = \frac{-f_1}{(f_1+g_1)} < 0 \text{ but } > -1 \quad (11)$$

In the original model by Peek and Rosengren a bank will unambiguously increase its deposits in the wake of a loss of capital if loan demand and deposits are independent of a bank's relative capital position. Seeking more deposits to partially offset the loss of capital is the optimal response given that a bank is not 'bound' by the regulatory capital requirement.

On the asset side of the balance sheet a bank's loan portfolio shrinks. This result follows directly from the balance sheet constraint:

$$L = D + K$$

Hence

$$\frac{dL}{dK} = \frac{g_1}{(f_1+g_1)} > 0 \text{ but } < 1 \quad (12)$$

A bank's loan portfolio does not fully absorb the loss of capital. It does not shrink on a one-for-one basis with the capital base because a bank increases deposits.

B. The Amended Model: $g_2 > 0$, $f_2 > 0$

Taking the derivative of equation (10) with respect to *K* yields:

$$\frac{dD}{dK} = \frac{f_1(g_2-2)+g_1f_2}{2(f_1+g_1)} \quad (13)$$

The sign of this derivative is now indeterminate. Whether the numerator of the expression is positive, negative, or zero depends on the relative size of the key parameters of the model. It is immediately obvious that the sensitivity of loan demand to the relative capital buffer (g_2) and the sensitivity of deposits to the relative capital buffer (f_2) play an instrumental part in determining a bank's reaction to the loss of capital.

If the sensitivity of loans (g_2) to relative capital is sufficiently large so that the coefficient is greater than or equal to 2, a bank experiencing a capital loss unambiguously reduces deposits.[6] A large g_2 means that the demand for a bank's loans declines rapidly when its capital decreases. Now a bank does not really need to collect deposits to make up the lost capital in order to avoid forgoing profitable lending opportunities. If g_2 is very small, a bank does not lose many profitable lending opportunities even if its capital decreases. In this case, a bank may choose to fund these loans by increasing deposits although it now holds less capital. But even if g_2 is very small, a bank may still choose to shrink deposits when its capital is declining. This happens if the sensitivity of deposits to relative capital (f_2) is very large. If the demand for deposits decreases very fast in a response to a loss of capital a profit-maximizing bank does not recover deposits even if it increases interest paid on deposits. The optimal response is to shrink deposits.

The response of a bank's loan portfolio to a loss of capital is obtained by taking the derivative of the balance sheet constraint with respect to *K* and making use of a bank's deposit response to a decrease in its capital.

$$\frac{dL}{dK} = \frac{f_1 g_2 + 2g_1 + g_1 f_2}{2(f_1 + g_1)} > 0 \tag{14}$$

A bank's optimal response is undoubtedly to shrink its loan portfolio. The size of the loan reduction is, however, less clear. Earlier we pointed out that if g_2 is greater than or equal to 2 the bank shrinks its deposits. Suppose we retain this assumption and set g_2 equal to 2. The response of bank loans to a loss of capital is now given by:

$$\frac{dL}{dK} = \frac{2(f_1 + g_1) + g_1 f_2}{2(f_1 + g_1)} > 1 \tag{15}$$

The dollar value of the loan portfolio shrinks by more than the loss of capital. The reason is simple: if the demand for loans falls severely, then there is no need for a bank to seek more deposits to insulate the supply of loans. A bank shrinks its loans because profitable loan opportunities have evaporated.

If g_2 is small, a bank's loan portfolio could shrink by less than the dollar value of the loss of capital. In this case loan demand does not respond sensitively to the loss of bank capital and profitable loans do not disappear as fast. But yet again, it may be still optimal for a bank to shrink more than one for one even if g_2 is small. This happens if f_2 is very large. Recall that f_2 is the sensitivity of deposits to its capital relative to its competitors'. A large f_2 means a bank's deposit demand declines fast as its capital shrinks. The only way to counteract the outflow of deposits is to increase the interest paid on deposits. But this may simply not be economical if f_2 is sufficiently large. Hence an optimizing bank is better off shrinking its deposits and shedding loans by more than the loss of capital.

[6] This is a sufficient but not a necessary condition.

Constrained Case

If the capital ratio is 'binding' ($\lambda \neq 0$) then the responses of deposits and loans to a capital shock are determined by equation (9).

$$\frac{dD}{dK} = \frac{1-\mu}{\mu} > 0 \tag{16}$$

$$\frac{dL}{dK} = \frac{1}{\mu} > 1 \tag{17}$$

If a bank is 'bound' by the regulatory capital requirement, it will behave in the same way as in the original model. The binding capital ratio prevents a bank from replacing capital using deposits. So a bank has to shrink deposits and forgo a lot of profitable loans. Adjustment of the balance sheet is governed only by the concern to satisfy the constraint. The parameters of the demand equations have no role to play.

THE MODEL WITH RESERVES

In this section we return to the original model but allow a bank to hold reserves as an asset in addition to bank loans. The central bank operates in the background and determines the policy rate *i*. The central bank remunerates reserves held by a trading bank at the policy rate. The opportunity cost of holding reserves is therefore the difference between the lending rate chosen by a trading bank and the policy rate set by the central bank. Bank reserves held are inversely proportional to the gap between the lending rate and the policy rate, plus a constant:

$$R = h_0 - h_1(r_L - i) \qquad h_1 > 0 \tag{18}$$

R = Reserves and i = exogenous policy rate.

The demand relations for loans and deposits are as in the original model:

$$D = f_0 + f_1\left(r_D - \bar{r}_D\right) \qquad f_1 > 0 \tag{19}$$

$$L = g_0 - g_1\left(r_L - \bar{r}_L\right) \quad g_1 > 0 \tag{20}$$

Because assets can now be held in the form of reserves the balance sheet constraint changes to

$$L + R = D + K. \tag{21}$$

The Lagrangean for the profit maximization problem can now be set up as follows:[7]

$$\mathcal{L} = r_L L + iR - r_D D + \lambda(K - \mu(L + R)) \tag{22}$$

Unconstrained Case ($\lambda = 0$)

In this optimization problem the choice variables are *D* and *R*. Solve equations (18), (19), and (20) for$i$,r_D and r_L, respectively, and substitute them into the Lagrangean. To eliminate *L,* solve the balance sheet constraint for *L* and substitute it into equation (22). This results in:

$$\mathcal{L} = \left(\frac{(-D-K+R+g_0)}{g_1} + \bar{r}_L\right)(D+K) + \left(\frac{R-h_0}{h_1}\right)R - \left(\frac{D-f_0}{f_1} + \bar{r}_D\right)D \tag{23}$$

[7] Asϕ is deemed constant throughout we set it equal to zero to avoid cluttering the analysis.

The first-order conditions are:

$$\left(\frac{2(-D-K)+R+g_0)}{g_1}+\bar{r_L}\right)-\left(\frac{2D-f_0}{f_1}+\ \bar{r_D}\right)=0 \tag{24}$$

$$\frac{D+K}{g_1}+\left(\frac{R-h_0}{h_1}\right)+\frac{R}{h_1}=0 \tag{25}$$

Combining the first-order conditions yields a "rule" which describes how reserves and deposits are related to each other:

$$R=\frac{1}{2}(h_0-\frac{h_1}{g_1}(D+K)) \tag{26}$$

Reserves and deposits move in opposite directions. To expand *D,* r_D must rise. This forces up r_L which in turn induces the bank to decrease reserves. Substituting equation (26) into equation (24) yields the optimal level of deposits maintained by a bank:

$$D=-\frac{1}{(a+2/f_1)}\ (aK+\bar{r}_{\mathrm{D}}-\bar{r}_L-\frac{f_0}{f_1}-(\frac{\frac{h_0}{2}+g_0}{g_1}) \tag{27}$$

$$a=\frac{2}{g_1}+\frac{h_1}{2g_1^2}$$

The balance sheet of the bank responds to a loss of capital as follows:

$$\frac{dD}{dK}=-\frac{f_1\left(2+\frac{h_1}{2g_1}\right)}{f_1\left(2+\frac{h_1}{2g_1}\right)+2g_1}=C\qquad -1<C<0 \tag{28}$$

$$\frac{dL}{dK}=\frac{h_1+2g_1}{f_1\left(2+\frac{h_1}{2g_1}\right)+2g_1}>0 \tag{29}$$

$$\frac{dR}{dK}=-\frac{h_1}{f_1\left(2+\frac{h_1}{2g_1}\right)+2g_1}<0 \tag{30}$$

In the unconstrained case the results for deposits and loans in the original model carry over to the present model, albeit in modified form. The size of $g_1$and $h_1$now figures prominently in the determination of the response of a bank's balance sheet. In the wake of a capital loss, a bank seeks additional deposits but shrinks loans. Reserves increase unambiguously. But the absolute size of the adjustment is generally larger for loans than reserves. In the special case though where $g_1$is very small and $h_1$is very large loans tend to shrink by the amount of the increase in reserves. Total assets remain unchanged. Deposits increase by the size of the capital loss. In the opposite case where $g_1$is very large and $h_1$is very small, loans decrease by the size of the capital loss. Reserves and deposits (and hence total liabilities) remain the same.

Constrained Case ($\lambda > 0$)

In this optimization problem the choice variables are *L*, *R,* and λ.[8] The Lagrangean reads:

$$\mathcal{L}=\left(\frac{(-L+g_0)}{g_1}+\bar{r_L}\right)(L+R)+\left(\frac{R-h_0}{h_1}\right)R-r_D(L+R-K)+\lambda(K-\mu(L+R)) \tag{31}$$

[8] Doing so allows us to eliminate the Lagrange multiplier easily from the first-order conditions. In the current case, we need not worry about $r_D$as it has no role to play in determining *L* or *R*. The bank's deposit rate vanishes as the first-order conditions are combined.

When the constraint is binding, the first-order conditions of the optimization problem are as follows:

$$\frac{d\mathcal{L}}{dL} = -\frac{(L+R)}{g_1} + \left(\frac{g_0-L}{g_1}+\bar{r}_L\right) - r_D - \lambda\mu = 0 \tag{32}$$

$$\frac{d\mathcal{L}}{dR} = \left(\frac{g_0-L}{g_1}+\bar{r}_L\right) + \frac{(R-h_0)}{h_1} + \frac{R}{h_1} - r_D - \lambda\mu = 0 \tag{33}$$

$$\frac{d\mathcal{L}}{d\lambda} = K - \mu(L+R) = 0 \tag{34}$$

Combining equations (32) and (33) eliminates the Lagrange multiplier and the deposit rate. The resulting equation, which describes the optimal trade-off between loans and reserves, is given by

$$R = \frac{h_0}{2+\frac{h_1}{g_1}} - \frac{L}{\left(2\frac{g_1}{h_1}+1\right)}. \tag{35}$$

Substitution of equation (35) into equation (34) yields a bank's optimal provision of loans:

$$L = -\frac{h_0}{2} + \frac{(2\frac{g_1}{h_1}+1)}{2\mu\frac{g_1}{h_1}}K \tag{36}$$

Differentiating equation (36) with respect to *K* allows us to determine the reaction of a bank to a loss of capital:

$$\frac{dL}{dK} = \frac{(2\frac{g_1}{h_1}+1)}{2\mu\frac{g_1}{h_1}} = \frac{1}{\mu}\left(1+\frac{1}{2\frac{g_1}{h_1}}\right) > \frac{1}{\mu} > 1 \tag{37}$$

The dollar value of loans decreases by more than the dollar value of the capital loss. Combining this result with equation (35) gives the response of bank reserves to a loss of capital:

$$\frac{dR}{dK} = -\frac{1}{2\mu\frac{g_1}{h_1}} < 0 \tag{38}$$

In response to a loss of capital a bank's optimal response is to increase its reserves. Compared to the original one-asset model where under a binding constraint a bank's reduction in loans in the face of a loss of capital amounts to$\frac{1}{\mu}$, in the two-asset model

- the bank cuts its loan portfolio by a greater margin. The additional cut-back of loans flows directly into reserves.
- the adjustment in the loan portfolio and reserves depends on the ratio of the sensitivity of $g_1$to h_1.
- The greater (smaller) g_1 relative to h_1, the closer (the less) the response of loans in the two-asset model matches its response in the original model.

While the respective response of loans and reserves to a loss of capital depends on parameters of the model, the response of *total* assets to a loss of capital depends only on the capital asset ratio parameter. To see this, add up the two responses. Letting *A* denote total assets, we obtain:

$$\frac{dA}{dK} = \frac{dL}{dK} + \frac{dR}{dK} = \frac{1}{\mu}. \tag{39}$$

Using the balance sheet constraint, we can further establish that

$$\frac{dA}{dK} = \frac{dD}{dK} + 1 \text{ Or} \tag{40}$$

$$\frac{dD}{dK} = \frac{1-\mu}{\mu}. \tag{41}$$

Thus we see that the response of *total* assets and deposits to a loss of capital in the expanded model is governed only by the capital asset ratio parameter just like in the original model.

CONCLUSION

This note highlights the role of bank capital in financial intermediation. In a simple model of a banking firm we show that an unconstrained optimizing bank shrinks deposits in response to a loss of capital. For this to happen, a bank's loan demand must be very sensitive to its relative capital position. A profit-maximizing bank may also shrink deposits if the loss of capital leads to an outflow of deposits to such an extent that it is not profitable to recoup them by increasing the deposit rate.

This result has an important implication for tests of capital crunches. Based on their findings, Peek and Rosengren (1995) argue that deposits are a better indicator in capital crunch tests than loans. This is because a decrease in capital always reduces loans no matter whether the capital requirement is 'binding' or not. Deposits decrease only if the capital requirement is 'binding'. According to the adjusted model, however, this claim holds only if the sensitivities of deposits and loans to a bank's relative capital position are very small. Hence, just focusing on deposits may not be sufficient to test the severity of a capital crunch.

With reserves in the model, a bank increases reserves in the face of a capital loss. A bank's loan portfolio shrinks more due to a loss of capital if the constraint is binding in the two-asset model compared to the original one-asset model because a bank increases its reserves at the expense of loans. While the size of the contraction of loans and the expansion of reserves depend on both model parameters (g_1, h_1) and the capital asset ratio parameter (μ), the size of the change in total assets and total liabilities is governed only by the capital asset ratio parameter.

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Analysis of Potential Economic Sector on Gowa District, Indonesia

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ABSTRACT

Anwar Ramli 2014 (Analysis Of Potential Economic Sector On Gowa District, Indonesia) The study aims at discovering the superior sector in Gowa district and examining the economic growth in Gowa district. The study is a quantitative research with figures-based regional micro economic that verificative-quantitative in nature, which use the formula on regional economic on date of regional macro in Gowa district. Data were collected by determining the types of data adjusted with quantitative data. The measurement period used time series data with five-year period, from 2008 to 2012. Data were analyzed by employing economic analysis method, namely Location Quotient (LQ) analysis and Shift Share analysis. The results of the study reveal that the result of LQ analysis determined that the basis sectors in Gowa district were agriculture, finance, and services; the non-basis sectors were mining and quarrying sector, processing industry, electricity gas and water supply, building construction, trade, hotel and restaurant, as well as transportation and communication. The results of Shift Share analysis indicated that the sector which have rapid growth in the province level (PS+) were electricity gas and water supply, building construction, trade, transportation and communication as well as finance leasing sector. The economic sectors which have competitive superior or competitiveness (DS+) were mining, transportation and communication, as well as finance and leasing sectors.

Keywords: *Potential Economic Sector, Growth,Location Quotient.*

INTRODUCTION

Gowa as one of the autonomous regions that have the potential of human resources and natural resources in the province of South Sulawesi, also the authority to run the administration and development, in order to exploit the natural wealth and its other potentials, the main attention is devoted to the composition of the economy with I know a donation or contribution of each sector of the economy to the Product Domestic Regional Bruto (PDRB) because PDRB is a tool that can be used to measure the economic growth of a region.

Although the agricultural sector in Gowa still very dominant, but its contribution in 2012 was reduced by about 1.3 points compared to 2011. Meanwhile, sectors such as services and financial services companies showed an increase in contributions. This is an interesting phenomenon to be studied, because the characteristics of a developing region that is in addition to the significant economic growth, as well as a shift in the economic structure.

To determine the economic potential of a region by sector, are used to determine the contribution of each of these sectors to the PDRB and the ability of each of the sector to absorb

labour. The sectors that contributing most capable and at the same time absorbing the highest labour, will be the leading economic potential (sector basis) area.

Therefore in carrying out development with cracked scarce, the consequences should be focused on the development of sectors that impact multiplier (multiplier effect) significantly to other sectors in the economy as a whole. So the core of this research is aimed to assess the economic potential sectors Gowa is expected to be a key driver of economic growth in this area in the future.

Problem

How to shift the economic structure based on the analysis of shift share and Location Quotient?

LITERATURE

Economic Development

Human capital accumulation has long been regarded as an important factor in economic development. The results obtained in the initial set of regression was therefore somewhat disappointing: When a person is running a Cobb-Douglas specification implied in Jess Benhabib, Mark M. Spiegel (1994) standard production function that includes human capital as a factor, human capital accumulation fails to enter significantly in the determination of economic growth, and even come in with a negative point estimate.

More and better education is a prerequisite for rapid economic development around the world. Education stimulate economic growth and improve people's lives through many channels: By increasing the efficiency of the labor force, by increasing democracy (Barro, 1997 in Thorvaldur Gylfason, 2001) and thus create better conditions for good governance, through the improvement of health, by improving equality (Aghion et al., 1999, in Thorvaldur Gylfason, 2001).

Example, or model, a successful theory is the theory of economic growth, Robert Solow and Edward Denison in (Robert E. Lucas, Jr., 1988) was developed and applied to the twentieth century US experience. This theory will serve as a basis for further discussion in three ways: as an example of the form that is useful aggregative theory should take, as an opportunity to explain what form the theory can tell us that another type theory cannot, and as a theoretical possibility for economic development.

Economic Evolution

The world economy into a seamless, integrated, driven by global market forces, the strength of the world technology, the strength of the global cost and macro political and economic power. The world economy and global competition arena is changing the way in which the company traditionally operated in Shailendrakumar Uttamrao.

From a global perspective, entrepreneurship is the backbone of our economy and our nation's mandate to wealth. It is at the core of our being. This is as well as a source of economic stability and spring also innovation. It is the uniqueness entrepreneurial authors find so appealing: its ability to deliver economic stability at the same time encouraging innovation. All this are from the dream.

Schumpeter (1942) in JoAnn and James (2004) estimate the managed economy that emerged after World War II, with their emphasis on giant corporations practicing economies of scale.

Simply reflect on what we have seen in the world to date. The whole world is shrinking we have seen the power of entrepreneurship, the true wealth of the nation. In a small, developing countries that have seen entrepreneurial take on the role of Prometheus and bring fire to fuel

economy growth. In previously communist countries we have seen entrepreneurial take on the role of Phoenix, up the reborn from a fiery nest to revive economic well-being.

In our own history, we have seen a small band of refugees fleeing religious persecution and economic wilderness to build a nation that spans the globe with the Yankee merchant ships and grow as leaders in the Western World. We have seen a war torn, pressed from the European community to encourage their nation back from the brink of economic disaster into a dynamic, living members of a new world order. In all the stories we've ever seen on the stage of history, one thread appears in every weave, the constant appearing in each function, one aspect appears in each population: the entrepreneurial dream. Let's remove barriers to the dream and watch us bring the world to a brighter future.

Traditional economic development activities have involved local and state government employees actively soliciting and recruiting large employers by offering tax moratoriums, training and relocation assistance, infrastructure development or enhancement, or any of a number of other incentive programs or proposals. This effort is expensive and has been highly praised in the past as a major source of job growth in a country or region (JoAnn and James, 2004).

Intuition quite simple: If market finance backward, then people will choose less productive, but 'Flexible' technology. Given this technology, manufacturers not experience many risk, and therefore there is very little incentive to develop the financial markets. In contrast, when financial markets developed, technology will be special and risk, thereby creating the need for the financial markets. In terminology Cooper and John (In Gilles Saint-Paul, 1992), there complementary strategic among financial markets and technology, as both is an instrument which can be used to diversification.

Reinforcement Economy

Local economic development is a process that local governments and communities to manage resources - existing resources, by establishing a partnership between local government and the private sector to job creation, and can stimulate economic growth in relevant areas (Soeparmoko, 2002).

Since the reform era in 1999, there was a paradigm shift in the system of governance of the pattern into a pattern of centralization or decentralization called regional autonomy imply, the shift of most of the decision-making process in the planning, implementation and evaluation of the organization of the central government to the regions (Armida, 2000). Therefore development potential that each region varies, each region must determine the dominant economic sector (Syafrizal, 1997).

Local economic development is generally defined as a process that causes the per capita income of the population of a region increases over the long term (Arsyad, 1999). Local economic development is a process that includes the establishment of new institutions, the development of alternative industries, improving the capacity of the existing work to produce products and services better, identifying new markets, expert knowledge and the development of new enterprises (Arsyad, 1999).

Two conditions that affect regional development planning process is the pressure that comes from the environment in the country and abroad that affect the needs of the region in the process of economic development, the fact that the local economy of a country is influenced by each sector differently (Kuncoro, 2004).

In this connection regions have autonomous rights. Meanwhile, the regional development planning development activities, funding, and accountability is done by the centre, while the implementation could involve areas where such activity takes place (Munir, 2002).

Regional economic activity is classified into two sectors of activity, the activity of the base and non-base. Activity is the base of export-oriented activities (goods and services) out of bounds territory's economy is concerned, while the non-base activities are locally oriented activities that provide goods and services to the needs of the people within the borders of the economy is concerned.

This theory states that determinant of economic growth of a region is directly related to the demand for goods and services from outside the area. The growth of industries that use local resources, including labor and raw materials for export, will generate local wealth and job creation (Lincoln, 1999).

The theory divides the base production / type of work contained in one area of the sector and the sector of non-base basis. Base activities are activities that are *exogenous* meaning not tied to the region's economy and internal conditions also functions to encourage the growth of other types of employment while non-base activities are activities to meet the needs of people in the region itself. Therefore, growth is dependent on the general economic conditions of the region. It means that the sector is *endogenous* (not free to grow). Its growth depends on the economic condition of the region as a whole (Tarin, 2007).

Activity base has a role as a prime mover *(primary mover)* in the growth of a region. The greater the export of an area to another will be more potential growth in the region, and vice versa. Any changes that occurred in the base will cause multiple effects *(multiplier effect)* in the regional economy (Adisasmita, 2005).

Base sector is a sector that became the backbone of the regional economy because it has a competitive advantage *(Competitive Advantage)* is quite high. While the sector is the basis of other sectors with less potential but serves as a support base or *service* sector *industries* (Sjafrizal, 2008). Sector economic base of a region can be analysed by techniques *Location Quotient* (LQ), which is a comparison of the magnitude of the role of the sector / industry in an area of the size of the role the sector / industry nationally (Tarin, 2007).

According to Glasson (1977), more and more sectors of the base in the region will increase the flow of revenue to the region, increasing the demand for goods and services in it, and give rise to the increase in volume of the non-basis. Glasson also suggests to use the *location quotient* method in determining whether the sector base or not. To determine whether a sector is a sector basis or non-base can be used several methods, namely the direct measurement and indirect measurement methods. Direct measurement method can be done by direct surveys to identify which sector is a sector basis.

Based on these three methods Glasson (1977) suggested the LQ method in determining the base sector. Richardson (2001) stated that the LQ technique is most commonly used in studies of empirical basis. The assumption is that if a region is specialized in producing a particular item, then the area of export goods in accordance with the level of specialization in producing goods.

According Arsyad (1999) the main problems in the area of development is the emphasis lies on the development policies based on the uniqueness of the area concerned with the potential use of human resources. This orientation leads to taking initiatives coming from the area in the development process to create new employment opportunities and stimulate economic improvement. *Shift share* analysis is a very useful technique to analyse changes in the economic structure of the region compared to the national economy. Therefore, if a shift differential of an industry is positive, then the industry competitiveness is higher than the same industry in the economy as the reference. (Arsyad, 1999).

Furthermore, there are few previous studies related to this research are as by Supangkat (2002), making the analysis of sector priorities in the determination of the Regional Development Improvement Asahan District North Sumatra Province ", using PDRB-forming sector approach, found that agriculture and processing industries likely to serve as the priorities for the improvement of the construction sector in the District shavings, especially the plantation sub-sector, fisheries and large industries, as well as medium-sized industries.

Furthermore, Ebtian Rico (2011) found that the PDRB-forming sector approach, the method used is *Klassen Typology, Location Quotient,* and *shift share analysis. Shift share* analysis results indicate that the sector is a competitive sector, namely trade, hotels and restaurants, transport and communications, and the financial sector and leasing and business services.

Beni Harisman year (2007), examines the Economic Structure and Identification Sectors Featured in Lampung Province 1993-2003 period, with a *shift share* analysis methods found that there has been a change in the economic structure in Lampung from the primary sector to the secondary sector. This is demonstrated by the role of the secondary sector continues to increase through the contribution to PDRB of Lampung Province, followed by the primary sector, then the tertiary sector.

Public Policy

Public policy is needed, not least because: 1) Public policy is the regulation; 2) Regulation is a rule which states that the government made the organizers; 3) Thus, public policy is needed to set up or manage society, nation, state, in all aspects of the lives of many people's life; 4) Public policy is one tool or device that is required to achieve the objectives set by the government on behalf of the public interest.

The process of public policy, at least not to include: 1) Formulation of the problem; 2) Forecasting; 3) Recommendation; 4) Monitoring; 5) Evaluation. Innovative public policy should always be: 1) based on the public interest; 2) The planning, implementation, and monitoring and evaluation involving public participation; 3) formulation always moves dynamically in accordance with the development aspirations.

Terminology public policy *(public policy)* it turned out a lot, depending on the point where we perceive it. Easton provides a definition of public policy as *the authoritative allocation of values for the whole society* or as an allocation of values by force of the whole community 2).

Laswell and Kaplan also defines public policy as *a projected program of goals, values, and practice* or something achieving program goals, values in the targeted practices. Understanding public policy is expressed by Anderson stated public policy as *a purposive course of action Followed by an actor on the set early actors in dealing with a problem or matter of concern* or as an action that has a specific purpose that is followed and implemented by a principal or group of offenders in order to solve a problem.

Michael E. Porter in Susilawati Susy (2007) explains that the competitive advantage of each country is determined by how well the country is able to create an environment that fosters competitiveness of every actor in it. In the context of global competition, it is the task of the public sector is to build an environment that allows each development actors are able to develop to become competitive actors.

This environment can only be created effectively by public policy. Therefore, the best public policy is a policy that encourages every citizen to build competitiveness of each and not getting plunged into a pattern of dependency.

Richard Layard (2005) in the John F. Helliwell (2005) argues, the trend of short-term commitments, and increasing monetary and other awards to linking individual performance

targets, particularly the short term, may be having a corrosive effect on trust and loyalty and create unhappiness in process. Having digested the importance of trust and involvement, they may be expected to inform virtually every policy decision regarding the form and public service.

Regional Autonomy

Etymologically, the term "autonomy" is derived from the Latin, meaning *their autos and nomos* meaning *rule.* Based on the etymology, autonomy can be defined as a set or govern themselves. Thus, the notion of autonomy is the delegation of authority and responsibility from central government to local governments. Before the implementation of regional autonomy, all local governments in Indonesia simply accept the program of the central government so that there is uniformity in each program area. However, after the introduction of regional autonomy, the region has the authority to manage their own regions.

According to Law No. 32 of 2004 on Regional Government, the notion of autonomy is an autonomous regional authority to manage and administer governmental affairs submitted by the central government and the interests of society at its own initiative based on the aspirations of the people in accordance with the legislation. The Republic of Indonesia as a unitary state adheres to the principle of decentralization in governance, by providing the opportunity and freedom to the region to conduct regional autonomy. The decentralization policy embodied in the establishment of the autonomous region and the implementation of regional autonomy is directed to accelerate the realization of public welfare.

Regional autonomy is the ability to take care primarily concerned with public administration and development, which was previously taken care of the central government. So, besides the necessary of financial capacity, it required also the presence of qualified human resources, natural resources, capital and technology (Rudini, 1995: 48 in Purbayu and Retno, 2005).

The purpose of decentralization is to improve the human resources needed in order to realize autonomy. Human resources that are needed include (Silalahi, *et al,* 1995: 12 in Purbayu and Retno, 2005):

- Having a container, behavioural, quality, goals and activities based on the specific expertise and skills.
- Creative in the sense of having an innovative spirit, and be able to anticipate challenges and developments, including having a high work ethic.
- Able as a driver has a non-governmental high sense of social solidarity, is sensitive to the dynamics of society, able to work together, and have thought *people centered orientation.*
- Having a high discipline in the sense of thinking consistent with the program, so as to describe the national policies into operational programs in accordance with the local government guidelines stipulated affairs program understanding.

To be able to realize for regional autonomy in order to have the flexibility in the implementation of regional governance, then according to Agus Shamsuddin (In Trilaksono Nugroho, 2000) associated with some of the following:

First, *Self-Regulating Power is* the ability to organize and implement regional autonomy for the welfare of the community.

Second, *Self-Modifying Power is* the ability to make adjustments on the nationally established rules to local conditions.

Third, *Local Political Support,* which held that local government has a broad legitimacy of the public, both in the position of Regional Head as executive element maupu Parliament as the

legislative bodies. Support local political will at the same time ensuring the effectiveness of governance and development.

Fourth, *the Financial Resources* is namely to develop skills in managing resources and sufficient financial income to finance the activities of governance, development and community service which soon became his needs.

Fifth, *Developing Brain Power,* which is building the human resources of the government apparatus and reliable society that rest on the intellectual capability in solving various problems. As the implications of this conceptual framework, the things that is fundamental of the Act No. 22, 1999 which is not found on the previous laws governing the Local Government (Law No. 5 of 1974).

METHODS

This research is a quantitative micro-regional economies located in Gowa. This is a descriptive analytical study that describes the level of each sector potential that would be useful for improving the competitiveness of the sector. The data analysis technique used in this study is analysis of *Location Quotient* (LQ) is used to determine the base and non-base sectors in the economy of the region Gowa. LQ method used to assess the condition of the economy, leading to the identification of specialization of economic activities.

DISCUSSION

The shift in the economic structure based on the analysis of shift share and Location Quotient?

Gowa PDRB growth during 2008-2012 with the details of the increase in the percentage of each field of business / economic sectors as follows:

Business Sector	2008	2009	2010	2011	2012
Agriculture	5,15	5.23	3,19	3.20	4,01
Mining / Quarrying	10.66	15,10	12.74	17.46	16.39
Manufacturing	7.17	5.93	6.23	6,65	6.85
Electricity, Gas and Water	7.08	7.32	7.98	8,16	9,13
Building	8,66	9.40	10,13	9,95	12,90
Trade Hotel and Restaurants	9.42	10.29	9.87	9.72	10,45
Transportation and Communications	11.69	15,19	15.81	10,50	12,90
Financial, Leasing & Services Company	12.5	15.12	11.0	15.0	18.65
Services	5.61	8,32	3,60	3,82	2,94
PDRB	6.92	7,99	6,05	6,20	7,28

Source: BPS Gowa district

In Table 2 portray Gowa district PDRB growth during 2006-2012 with the details of the increase in the percentage contribution of each business field / sector of the economy to the economic structure of Gowa. It can be seen that the percentage of the agricultural sector annually decreased inversely related to mining / multiplication and finance, leasing and corporate services. While the services sector showed an increasing trend was good although in 2010 the services sector decreased from the previous contributions in 2009 amounted to 21.80 per cent decreased to 21.74 percent in 2010, but increased again in the next year.

Table 3: Economic Structure Gowa Year 2006-2012 (Percent)

Business Sector	2006	2007	2008	2009	2010	2011	2012
Agriculture	51.48	50.85	48.78	45.65	44.61	43.31	41.44
Mining / Quarrying	0,62	0,63	0,63	0,64	0,67	0,72	0,77
Manufacturing	3,34	3,31	3,19	3,05	3,08	3,07	3,06
Electricity, Gas and Water	1.74	1,73	1,66	1,56	1,55	1.52	151
Building	2,49	2,50	2,43	2,35	2,42	2.47	2,62
Trade Hotel and Restaurants	13.40	13.61	13.48	13.35	13.87	14.22	14.79
Transportation and Communications	5,77	5.89	5,85	5,76	6,00	5.98	6,26
Finance, Real Estate & Business Services	5,15	5,47	5,68	5,84	6,05	6.53	6,99
Services	16,02	16,02	18,32	21.80	21.74	22.19	22.56
PDRB	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: BPS Gowa district

Location Quotient (LQ)

Location Quotient (LQ) is used to determine the economic sectors in PDRB that can be classified into base and non-base sectors. LQ is a comparison of the magnitude of the role of the sector in Gowa to the role of the sector at the level of South Sulawesi Province.

Table 4: Results of Analysis of LQ Gowa 2008-2012

Business Sector	2008	2009	2010	2011	2012	Median	Classification of sectors
Agriculture	1.65	1.63	1.68	1.65	1.65	1.65	Base
Mining / Quarrying	0:06	0:07	0:07	0:10	0:11	0:08	Non-base
Manufacturing	0:28	0:28	0:29	0:29	0:28	0:28	Non-base
Electricity, Gas and Water	0.96	0.94	0.95	0.96	0.94	0.95	Non-base
Building	0:59	0:56	0:57	0:57	0:58	0:57	Non-base
Trade Hotel and Restaurants	0.87	0.85	0.85	0.86	0.87	0.86	Non-base
Transportation and Communications	0.75	0.77	0.79	0.79	0.79	0.78	Non-base
Financial, Leasing & Services Company	1:11	1:13	1:09	1:11	1:15	1:12	Base
Services	1:47	1:48	1:50	1:48	1:50	1:49	Base

Source: Data processed

Sector which is the sector base or leading sectors namely agriculture, finance and leasing, and Services sectors. While the mining sector, the manufacturing sector, the power sector gas and water, construction, trade hotels restaurants, and transport and communications sector, a sector or a non-base instead of leading sectors. The mining sector is the sector with the lowest LQ is equal to 0.08. Trade sector's restaurant shows LQ of 0.86. The electricity gas and water supply showed LQ 0.95. Manufacturing sector shows 0.28. Transport and communications sector amounted to 0.78. Construction sector shows 0.57. This means that these sectors cannot meet the demand in Gowa district.

Shift Share Analysis

Shift Share Analysis is used to determine the economic growth process Gowa linked to the regional economy as a reference, namely South Sulawesi Province. *Shift Share* Analysis in this study using a variable income that is PDRB growth to elaborate Gowa.

Based on Shift-Share analysis results in Table 5 in 2008-2012, PDRB is changing in Gowa reached 503,019.21 million rupiahs. These changes are caused by factors of PDRB growth in South Sulawesi 561,549.50 million rupiahs. This means that PDRB growth is still highly dependent Gowa in South Sulawesi by the economy.

Table 5: Changes in Sectoral and Economy Affecting Component Gowa 2008-2012 (millions of rupiahs)

No.	Business Sector	Regional Change	Provincial Share	Proportional Shift	Shift Differential
One	Agriculture	130,856.60	269,108.35	(111,811.88)	(26,439.87)
2	Mining	7,316.02	3,216.80	(2,709.56)	6,808.78
3	Manufacturing	18,287.81	22,034.21	(2,925.04)	(821.36)
4	Electricity, Gas and Water	5,922.89	5,477.86	1,536.58	(1,091.55)
5	Building	25,178.15	17,286.97	11,300.39	(3,409.21)
6	Trade, Hotels and Restaurants	105,857.11	76,903.24	37,822.33	(8,868.46)
7	Transportation and Communications	67,448.50	34,561.27	29,366.71	3,520.52
8	Finance and Leasing	87,791.36	40,177.34	45,804.91	1,809.11
9	Services	54,360.78	92,783.47	(35,289.80)	(3,132.89)
	Total	503,019.21	561,549.50	(26,905.36)	(31,624.93)

Source: Data processed

Table 5 shows that the influence of national and provincial policies in the agricultural sector is very large. While the economic condition of the structure at the provincial level, a negative effect on output growth sectors of the economy in the agricultural sector Gowa. The mining sector has a slower growth compared to the same sector in the province of South Sulawesi but this sector has the ability to compete with other regions in the same sector.

The manufacturing sector growth is sluggish compared to the sector same at the provincial level and the industry sector does not have the ability to compete with other regions. The electricity gas and water has a fairly rapid growth compared to the same sector at the provincial level but these sectors are less able to compete with the same sector in other regions.

Then the hotel and restaurant trade, growing faster than the same sectors at the provincial level but the sector is not competitive against other areas with the same sector. Transport and communications sector is also experiencing growth in output, but the effect on the growth of provincial output of this sector while the industry mix factors also have a positive impact on output growth in the transport sector. For finance and leasing sector grew faster than the same sectors at the provincial level and the sector has a fairly strong competitiveness against other regions in the same sector. Service sector output growth.

Based on the results of the calculation of *the shift share* analysis, which includes developing the sector in accordance with Gowa in South Sulawesi *(industrial mix),* which are electricity, gas and water, construction, trade, transport and communications sector, and the financial sector. The sectors that are not appropriated namely agriculture, mining, industry and services sector. The sectors that is competitive in Gowa namely mining, transport and communications, as well as the financial sector leasing while that is not competitive, namely agriculture, manufacturing, electricity gas and water, construction, trade, and services sectors.

Based on the results of the calculation of net shift (*net shift*) which is the sum of the *proportional shift* and *shift differential*, can be seen in Table 6 below:

Table 6: Analysis of *the Shift Share* Shifts Net (millions of rupiahs)

No.	FIELD OF BUSINESS	Proportional SHIFT	SHIFT DIFFERENTIAL	NET SHIFT
One	Agriculture	(111,811.88)	(26,439.87)	(138,251.75)
2	Mining and Quarrying	(2,709.56)	6,808.78	4,099.23
3	Manufacturing	(2,925.04)	(821.36)	(3,746.40)
4	Electricity, Gas and Water Supply	1,536.58	(1,091.55)	445.03
5	Building	11,300.39	(3,409.21)	7,891.17
6	Trade, Hotels and Restaurants	37,822.33	(8,868.46)	28,953.87
7	Transportation and Communications	29,366.71	3,520.52	32,887.24
8	Finance, Real Estate and Business Services	45,804.91	1,809.11	47,614.02
9	Services	(35,289.80)	(3,132.89)	(38,422.69)
	TOTAL	(26,905.36)	(31,624.93)	(58,530.29)

Source: Data processed

By sector in Table 6, a sector that has a value of PB> 0, namely mining and quarrying, electricity, gas and water beverages, construction, trade, transport and communication, finance and leasing. It means that the sector is a sector that is progressive or potential. While the sector has a value of PB <0 is the sector of agriculture, manufacturing and services sector. This means that these sectors including sectors slow.

Quadrant Analysis

By looking at the value of PS and DS, it is a sector / area can be grouped into four quadrants / group.

Table 7: Position Sector Based Approaches PS and DS

***Shift Differential* (DS)**	***Proportional Shift* (PS)**	
	Negative (-)	Positive (+)
Positive (+)	Quadrant IV: tend potential *(Highly potential)*	Quadrant I:Rapid Growth *(Fast Growing)*
	• **Mining and quarrying**	• **Transport and communication sector** • **Financial Sector, leasing and corporate services**
Negative (-)	Quadrant III: Retarded *(Depressed)*	Quadrant II: Thrive *(Developing)*
	• **Agricultural Sector** • **Industrial Sector** • **Services Sector**	• **Electricity gas and water sectors drinking** • **Building Sector** • **Sector Trade, Hotels and Restaurants**

Source of data processed

Quadrant Analysis Based on Table 7, there are two sectors which occupies the first quadrant (positive PS and DS), the transport and communications sector and the financial sector leasing and business services. That means, these two sectors have very rapid growth *(rapid growth industry).*

Quadrant II (PS positive and negative DS) is occupied by three sectors, namely electricity water gas sector, construction, trade, hotels and restaurants sector. That means, these three sectors are in the depressed position but developing (developing *depressed region*). These sectors are

considered to have a rapid growth rate, but the sector cannot compete with other sectors of the economy of the region (low competitiveness).

In quadrant III (PS and DS negative), there are three sectors, namely agriculture, manufacturing, and services sectors. This means that the sector has a growth rate that is depressed and not competitive (depressed region).

In quadrant IV (PS negative and positive DS), there is one sector that is mining and quarrying. This means that these sectors have a tendency as a depressed sector but potentially (*highly potential*). These sectors have a high level of competitiveness, but the rate of growth is slow.

Table 8: Summary of Results of Analysis

Sector base in Gowa namely agriculture, finance, and services while the non-base sectors namely mining and quarrying, manufacturing, electricity gas and water, construction, trade, hotels and restaurants, and transport and communications sectors.

Sectors that have rapid growth at the provincial level (PS +) sector, namely electricity, gas and drinking water, construction, trade, transport and communications sector, as well as finance and leasing sector. The economic sectors that have competitive advantage or competitiveness (DS +), namely mining, transport and communications sector, as well as finance and leasing sector. Sectors that have progressive growth (PB +) is the mining, electricity, gas and water, construction, trade, transport and communications, and finance and leasing sector.

The sector that has four advantages as well there is only one sector namely finance, leasing and corporate services. Sector that has three advantages namely the transport and communications sectors. Sector which has two advantages namely mining and multiplication, gas and electricity sectors of drinking water, construction, and trade, hotel and restaurant. Sector that has one advantage is agriculture.

CONCLUSION

Financial sector development, leasing and business services which are the dominant sector, have a high competitiveness, and classified as progressive sectors in Gowa. In addition, the agricultural sector is also one of the sectors that need to remain a concern because it is one sector which is a sector basis, although not in the fast-growing sector and highly competitive, but the agricultural sector is a sector that contributes the most high percentage compared to other sectors.

Based on the analysis of *shift share* the results and discussion, where there has been a change in the economic structure of the primary sector to the secondary sector, the government should pay attention Gowa and develop the secondary sector, especially electricity, gas, and water through improved public services and infrastructure with the addition of facilities and infrastructure.

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Measuring the Regional Dimension of Innovation through an Economic Model Based on Rectifying Technology Audits according to the AICTT-RTA Protocol

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ABSTRACT

The aim of this paper is to give an answer to the question "how to detect the regional dimension of innovation?". So, in this paper, a method to be used as an operational tool that is able to grasp regional specificities in the innovation process, based on the optimization of measurement activity, is proposed. Evidence in the scientific literature shows that data and indicators are able to quantify the contribution of different regions, identify the different technological profiles of the regions and measure the technological performances of regional systems, the innovative performances of firms and the density and quality of systemic interactions between the main institutional actors, but these items are often not developed through an analytical model of measure control cost based on the optimization of certain influencing factors.

The proposed approach is based on two main points:

1) Define the opportune methodology to detect the innovation level of a single firm. For this aim it has been considered the AICTT-RTA protocol. Each SME, is considered as innovative or as non-innovative according to the outcome of a Technology Audit (TA) conducted in compliance with the AICTT-RTA protocol.

2) Determine, starting only from some of the SMEs in a certain monitored area, if the entire area is innovative or not, through TA on a optimal sample size of SMEs analyzed. For this second point the approach uses a bayesian analysis of the Deming cost model.

This approach considers a wide area, industrial or urban, in which SMEs are present and treats it as a lot of N items.

Through the proposed approach, to characterize the regional innovation it's sufficient to characterize just only some SMEs, however detecting the whole regional innovation profile.

In this paper this aspect is valorized and set in the form of a useful operational tool for regional institutions, innovation managers, entrepreneurs and researchers. Simulation results complement the proposed theoretical model.

Keywords: *Regional dimension; Innovation; Bayesan Decision Analysis; Technology Audit.*

INTRODUCTION

It is clear that economic gaps among regions reflect differences in the regions' ability to compete, which increasingly depends upon the innovative capacity of firms and regional systems as a whole (see, among others, Nevenand Gouyette, 1994; Quah, 1996; Fagerberg and

Verspagen, 1996; Fagerberg et al., 1997). It has been shown that technological variables are able to explain a good deal of the diverging trends in the economic growth across European regions (Fagerberg and Verspagen, 1996). The general indications, drawn from the recent theoretical and empirical literature in this field, state that the process of technological accumulation takes place at local or regional level, even in the era of globalization, and that technological spillovers tend to be highly concentrated at the geographical level (Fagerberg et al., 2005). Despite this, the empirical analysis of innovation activities at a sub-national scale is still at an early stage and this is in large part due to the lack of data able to represent the complex and differentiated phenomenon of innovation at a regional level. Two basic families of S&T indicators are commonly used to explore technological innovation at regional level: R&D data — collected through national surveys according to the guidelines set by the Frascati Manual (OECD, 1994) — and patent statistics, the most important body of which is represented by the data provided by the US Patent Office and the European Patent Office. Strengths and weaknesses of R&D and patent indicators are well known (Archibugi and Pianta, 1996a; OECD, 1996). The advantage of using R&D data and patents at regional level is based on the following elements: first, consolidated experience in the collection and use of these indicators by statisticians and analysts; second, their comprehensive statistical coverage across countries, industries and technological fields; third, the availability of long time-series datasets which can be used to analyze the dynamic technological performances of firms and industries across regions. Innovation itself is defined as the implementation or introduction of new products, production processes, and business practices (e.g., organizational or marketing methods) in the marketplace (see paragraph 146, OSLO Manual). On the other hand, innovation activities are defined as "the scientific, technological, organizational, financial, and commercial steps" leading to innovation (paragraph 40). Based on these definitions, R&D and related technological activities are innovation activities in the sense of inputs or precursors to innovation. The OSLO Manual guides the EU community innovation surveys (CIS) and similar surveys in other countries (Arundel et al., 2006). In its desire to acquire expert input, the National Science Foundation held a workshop on June 6–7 2006, entitled "Advancing measures of innovation—knowledge flows, business metrics, and measurement strategies", organized by the NSF's Division of Science Resources Statistics (SRS) with assistance provided under contract by Mary Ellen Mogee, SRI International. The workshop was driven by three main considerations. First, the workshop addressed the challenge by Dr. John H. Marburger III, the Science Adviser to President Bush and Director of the Office of Science and Technology Policy (OSTP), for better data, models, and tools for understanding the US scientific and engineering enterprise in its global context by advancing science and innovation policy research. Second, the workshop was meant to address recommendations in a 2005 study by the National Academies' Committee on National Statistics (CNSTAT) on measuring research and development expenditures in the US economy (NRC 2005b) that SRS should explore the impact of innovation on the US economy and initiate a ''program of measurement and research related to innovation''. Third, the workshop preceded the OECD Blue Sky II, an international conference, partly sponsored by NSF and organized by OECD's working party of National Experts on Science and Technology Indicators (NESTI) to discuss the development of new and better indicators of science, technology, and innovation (STI) (OECD 2007b). Shortly after the workshop, a new NSF research funding initiative, Science of Science and Innovation Policy (SciSIP), started at the Directorate of Social, Behavioral and Economics Sciences (SBE). The initiative is expected to develop the foundations of an evidence-based platform from which policy makers and researchers can assess the dynamics and impacts of the nation's scientific and engineering enterprise and predict its outcomes. In response to the growing importance and complexity of these issues, the National Science and Technology Council, under the auspices of OSTP, has formed the Interagency Task Group on Science of Science Policy. The

task group analyzes federal and international efforts in science and innovation policy, identifying tools needed for new indicators, and charting a strategic road map to improve models, and methodologies (OMB2006). A related federal initiative supporting innovation metrics is a US Department of Commerce (DOC) advisory committee, Measuring Innovation in the 21st Century Economy. The DOC committee is studying ''metrics on effectiveness of innovation in various businesses and sectors and work to identify which data can be used to develop a broader measure of innovation's impact on the economy.'' Lastly, the America COMPETES Act has established, among other measures, a President's Council on Innovation and Competitiveness. In addition to policy monitoring and advice, the Council's duties include''developing a process for using metrics to assess the impact of existing and proposed policies and rules that affect innovation capabilities in the United States'' as well as ''developing metrics for measuring the progress of the Federal government with respect to improving conditions for innovation, including through talent development, investment, and infrastructure development…''

LITERATURE REVIEW

Innovatory capacity is a critical factor for economic growth, especially if we take into account the fact that an important part of productive growth in advanced nations, as measured in terms of Gross Domestic Product, corresponds to innovation (Freeman, 1994). It can therefore be considered one of the key factors of competitiveness, business survival, growth and employment (Cooke et al., 2000:1; Cooke, 1998: vii;OCDE, 1999:3). Thus it is especially important to find out what components of an R&D system are most decisive as engines of innovation and what are the factors determining a system's innovatory capacity. As Edquist (2005:201) points out, "given our limited systematic knowledge about determinants of innovation [. . .] case studies comparing innovation systems of various kinds as well as the determinants of innovation processes within them [. . .] have great potential". Consequently, these questions have particularly captured the attention of academic researchers and those with political responsibilities throughout recent decades. This has given rise to a series of important studies, both theoretical and empirical: the approach of Furman et al. (2002), the growth theory (Lucas, 1988; Romer, 1990); the cluster bases theory of national competitive advantages (Porter, 1990 and, more specifically, 1998) and the concepts of the national and regional innovation system (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Cooke and Morgan, 1994). Based on this literature and theoretical concepts. a broad range of determinants or explanatory factors of the production of new ideas or knowledge can be defined. The innovation systemic approach underpins, in addition to the national and regional context already mentioned, the institutional framework and the fact that its outcome depends on a broad heterogeneous number of aspects. Therefore, the systemic approach induces us to work with a factor analysis that permits the use of a broad number of interdependent correlated explanatory variables. Moreover, the systemic approach considers determinants as interdependent and highlights the difficulty in classifying them between causes and consequences. For example, successful firms, universities and other public research organizations normally coincide in the same regions (Nelson, 1993) and also industries develop in regions that offer qualified human capital and R&D services (Freeman, 1994), although it is not clear who induces who. In such a system in which all factors and agents influence each other, traditional econometric models based on individual variables cannot be used. The literature emphasizes the difficulty and weakness of using individual indicators to measure the global concept of innovation (such as patents, R&D expenditure, the percentage of sales related to new products, etc.). Each of these indicators, although highly correlated, gives a different view of apparently the same subject. It is worthwhile treating the concept and the different elements of an innovation system as something that is not directly observable. A macro-index, AICTT- RTA (Italian acronym for Rendimento Tecnologico Aziendale), has been

proposed (De Falco et al.) to overcome this weakness, but, although we have a macro index that can detect the level of innovation in an SME, the problem remains of how to qualify an innovative whole region starting from its innovative SMEs. How many measures of innovation, here identified with the result of an audit named TA Technology Audit, are needed to be able to state that a whole region is innovative or not ? This is an attribute sampling inspection problem. We consider inspection as the proposed TA. Measuring innovation in the regional lot of SMEs by a continuous scale is a variable sampling inspection problem. A variable sampling inspection problem can become an attribute sampling problem (Chiuh-Cheng Chyu and I-Chung Yu, 2006) if the procedure only counts the number of non-innovative SMES to specify limit(s) in the sample and uses this number to decide whether the remaining SMEs of the regional lot are accepted. To design a variable sampling plan, we need to specify the sample size and the acceptance limit(s). If the measured value from the sampling variables falls within the acceptance limit(s), the regional lot is accepted as an innovative area. Otherwise, the lot is rejected. Usually, the acceptance limit(s) will depend on the probability assumptions of the TA model and the sample size. Moskowitz and Tang (1992) used the cost structure proposed by Schmidt et al. (1974) to develop a Bayesian variable acceptance sampling model with the following probability assumptions: the innovative variable has a normal distribution with an unknown mean which is also assumed to be normally distributed. Tagaras (1994) studied a similar cost structure under the same probability assumptions but assumed that the inspection was destructive and therefore the cost of inspection per SME was greater than the cost of rejection per SME. This is not true for TA because it is never destructive.

AICTT - RTA INDEX

The AICTT, the Italian Association for Technology Transfer Culture (www.aictt.it), filed a trademark, RTA (Performance Technology Company), which, after a series of national successes, including the certification of IBM Italy, the start of the certification process in Autostrade Tech Lauro spa, is exporting abroad by strengthening the paradigm of the importance of the Made in Italy not only in products but also in services and in particular in a certification service that is unique worldwide, such as that of the RTA. The AICTT-RTA is a parameter used to assess the ability of firms to generate innovation and competitiveness through measurement of the number of patents owned, investments in education, R&D, technology tools and intellectual capital. The analysis is structured across four asset evaluations - Knowledge Economy, Knowledge Engineering, Finance Knowledge, Organization of Knowledge - according to a set of key performance indicators (KPIs) with items for each direction: What results can be achieved? We can get a complete overview of the company, assess strengths and weaknesses, gaps, and possible corrective action. The RTA score is distributed within a score featuring seven classes of performance (from G to A +), as shown in figure 1, in which each firm is located according to its ability to innovate. The systemic approach Auditor - Consultant is a rating system that allows the company to compete with competitors and offers web-based photography that can represent not only the present but also the future vision that has to be pursued.

For the internationalization of these activities regarding certification, AICTT has opened a branch office in London and works in close collaboration with the Italian Chamber of Commerce in Barcelona and the certification body, Perry Johnson, for the management of audits in AICTT - RTA USA .

One of the first certifications has been carried out abroad on the company Aton Tech Ltd, located in Woodstock Grove London, which is strongly devoted to innovation in the field of international consulting on "Energy Efficiency" applied to various fields, including the energy

management of cities and applications to railways and local transport, port and airport terminals and rural and isolated areas.

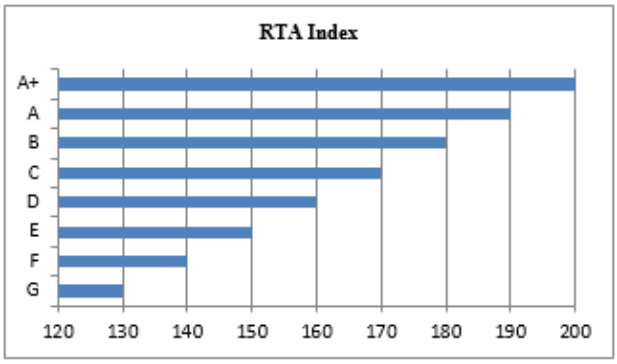

Figure 1 RTA Index

THE PROPOSED APPROACH

This approach, already followed in other field by authors Chiuhchyu and I-Cheng-Chung Yu in their work "A Bayesian Analysis of the Deming Cost Model with Normally Distributed Sampling Data", considers a wide area, industrial or urban, in which SMEs are present and treats it as a lot of N items and each item, i.e., each SME, is considered as innovative or as non-innovative according to the outcome of a Technology Audit (TA) conducted in compliance with the AICTT-RTA protocol. Then the approach uses a method to determine, starting only from some of the SMEs in the monitored area, if the entire area is innovative or not, through TA on a optimal sample size of SMEs.

In order to manage easily (Van Raan, A.F., 1988) the computational burden, we start from a partitioning approach working in a regional geographic area in which SMEs are situated, consisting of local single zones, lsz, and wide multi-zone areas, wms.

Once a proper Cartesian coordinates system has been selected, the horizontal and vertical dimensions of the investigated area in which SMEs are located have to be selected. Then, by choosing the starting width of the grid, an initial mask indicates the location coordinates where the TA have to be placed. There is often a desire to study specific areas in more depth, because of a bigger population density or the presence of research sources (universities and research bodies). The implemented algorithm, once the base grid has been drawn, therefore waits for one of these two inputs: a density of population function f(x,y) of the examined zone or an indication of the sub-area, chosen by the user, that has to be more precisely investigated.

In the first case, the mean of the f function is evaluated and the algorithm automatically thickens the zones where this mean overcomes a fixed threshold value. In the second case, the information on the zone to thicken is furnished by writing the coordinates of a point in the sub-area or by clicking on a point on the graph. Users can choose to continue the thickness process, for a narrower grid, or stop it. Through this algorithm, simple, graphical information on the location where the TA is conducted can be obtained.

In this way, the best configuration of the TA can be designed according to required specifications. Each TA will monitor an independent zone, and the sampling time and the number of TAs are a function of the data confidence level to be obtained.

We have used a cost model using rectifying inspection followed by Chiuhchyu and I-Cheng-Chung Yu in their work "A Bayesian Analysis of the Deming Cost Model with Normally Distributed Sampling Data". The rectifying inspection plan is a useful tool in statistical quality control (SQC) to assure the average product quality between several stages of a production

line. A wma rejected by sampling inspection is subject to 100% inspection. It is also assumed that this inspection is 100% effective and that all non-innovative SMEs discovered during TA are replaced with innovative SMEs. If a non-innovative SME of a lsz inspection results in a bad measurement set data, the lsz can be restored by the replacement of the non-innovative SME. Any non-innovative SME detected in the TA stages will be replaced by an innovative one.

The decision process of the cost model implemented here consists of two stages: (1) D1: determine the sample size n, and (2) D2: after observing the sampling outcome, deciding whether to stop TA at size n (denoted ''Sn'') or continuing to audit the N SMEs of the lot (denoted ''CN'').

The model can be represented as the decision tree shown in figure 2. The notation and definitions of parameters or variables used are as follows:

N: wma size
n: Sample size
X_j: Innovative RTA measure of the j_{th}lsz in the wma
X_n: Random vector (X_1;X_2; . . . ;X_n)
U: Mean value of innovative RTA variable, an unknown parameter
τ: Prior mean of U
γ: Standard deviation of the prior distribution of U
τ': Posterior mean of U
γ': Standard deviation of the posterior distribution of U
Z_n: Number of ''non-innovative'' SMEs in the samples
y: Realization of Z_n
Z_{N-n}: Number of ''non-innovative'' SMEs in the remainder of the wma
$\underline{x}$: Mean of measured values from the samples
L_{Sn}: Total cost due to making decision ''Sn'' on the remainder of the wma
L_{CN}: Total cost due to making decision ''CN'' on the remainder of the wma
M(y): Number of additional TAs to find y innovative SMEs
M(Z_{N-n}): Number of additional TAs to find Z_{N-n} non-innovative SMEs
P(U): Probability of an SME being innovative, a function of U

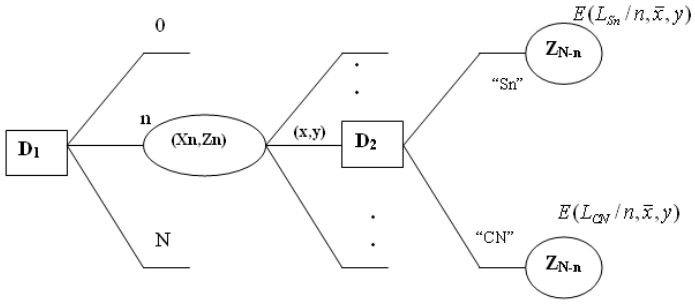

Figure 2 Decision tree of the problem

In this paper, as in most studies in variable sampling plans, it is assumed that the variables have conditional normal distributions, that is X_1; . . . ;X_N|U= u ~i.i.d.N (u,σ^2). The prior of the unknown mean is also normal, U~.N (τ,γ^2).

The conditional distribution for the sample mean is normally distributed, $\overline{X}$ |U= u ~i.i.d.N (u,σ^2). The unconditional distribution for $\overline{X}$ is also normal, which can be shown as follows:

$\mathrm{X} - U \approx N(0, \sigma^2 \ / \ n)$ is independent of U and $\overline{X}$ = $\overline{X}$ – U + U ~ N(τ, λ^2 + σ^2/n).

Since the number of non-innovative SMEs, y, is a function of $\underline{x} = (x_1; x_2; \ldots; x_n)$, we have $f(u/x_1; x_2; \ldots; x_n; y) = f(u/x_1; x_2; \ldots; x_n) = f(u/n, x)$.

According to Bayes' theorem, the posterior of U given data $(x_1; x_2; \ldots; x_n)$ is as follows:

$$f(u/x_1, x_2, \ldots, x_n) \propto \prod_{i=1}^{n} \frac{1}{\sqrt{2\pi\pi}} e^{-\frac{1}{2}\frac{x_1-\alpha}{\sigma}} \times \frac{1}{\sqrt{2\pi\pi}} e^{\frac{-1}{2}(\frac{\alpha-\tau}{\lambda})} \propto e^{-\frac{1}{2}(\frac{x-\alpha}{\sigma}1)^2}$$

Where $\tau^1 = ((\sigma^2 \tau + n\lambda^2\underline{x})/(\sigma^2 + n\lambda^2))$ and $\lambda^1 = (n/\sigma^2 + 1/\lambda^2)^{-1/2}$. Therefore, the posterior of U is again normally distributed with mean τ' and standard deviation λ', and sufficient statistics is $(n; \underline{x})$ because the posterior of U depends on the data, $(x_1; x_2; \ldots; x_n)$, only through the sample mean $\underline{x}$.

In the case of double specification limits, [a, b], the probability of an SME being innovative given U = u, $P(u) = \Pr\{a <= Xj <= b/U = u\} = \Phi(b - \mu/\sigma) - \Phi(a - \mu/\sigma)$ and the distribution of Zn given U = u is binomial (n, P(u)), where Φ (.) represents the probability of the standard normal distribution.

Although the sampling outcome is (n, $\underline{x}$, y), the total costs for decisions "Sn" and "CN", respectively, are as follows:

$$(L_{Sn}/n, \bar{x}, y) = n \times k_1 + M(y) \times k_1 + Z_{N-n} \times k_2 + M(Z_{N-n}) \times k_1 \quad (1)$$

$$(L_{Cn}/n, \bar{x}, y) = n \times k_1 + M(y) \times k_1 + (N-n) \times k_1 + M(Z_{N-n}) \times k_1 \quad (2)$$

By taking the expected total cost as the comparison criterion, decision *"Sn"* is superior to decision *"CN"* if $E(L_{Sa}\backslash n, \underline{x}, y) < E(L_{cn}/n, x, y)$. Note that this conclusion remains valid if the lsz is free of the extra TA cost because both terms (1) and (2) contain $M(y) - k_1 + M(Z_{N-n}) - k_1$. After some algebraic operations we obtain:

$$E(L_{Sn}/n, \bar{x}, y) \leq E(L_{CN}/n, \bar{x}, y)$$

If and only if

$$1 - E(P(U)/n, \bar{x}) \leq \frac{k_1}{k_2} \quad (3)$$

Where $E(P(U)/n, \underline{x}) = \int_{-\infty}^{\infty} \left[\int_a^b (1/\sqrt{2\pi\sigma}) e^{-\frac{1}{2}(x-\mu)^2 \times \sigma^2} dx \right] f(u|n, x)\, du = \Pr\{a <= Xn+1 <= b|n, \underline{x}\}$.

The distribution of $Xn+1|n; \underline{x}$ is $N(\tau^1, \sigma^2 + (\lambda^1)^2)$ because $X_{n+1}|n, \underline{x} = X_{n+1} - U + U|n, \underline{x}$ and $X_{n+1} - U/n, \underline{x} \sim N(0, \sigma^2)$ is independent of the data $(n; \underline{x})$ and the random variable $U|n; \underline{x} \sim N.\tau', (\lambda')^2)$.

Thus, we have:

$$E(P(U)/n, \bar{x} = \Phi((b - \tau')/(\sqrt{\sigma^2 + (\lambda')^2 t}) - \Phi((a - \tau')/\sqrt{\sigma^2 + (\lambda')^2}$$

Furthermore, because $\tau' = ((\sigma^2 \tau + n\lambda^2 x)/(\sigma^2 + n\lambda^2))$ and (λ') is independent of $\underline{x}$, $E(P(U)/n, \underline{x})$ reaches maximum when $\tau^1 = (a + b)/2$ which gives $\underline{x} = ((a + b) + (\sigma^2 + n*\lambda^2) - 2\sigma^2\tau)/(2n*\lambda^2)$. The value of $E(P(U)/n, \underline{x})$ goes down as τ' moves further away from $(a+b)/2$. The interval, $[x_L, x_R]$, for choosing decision "Sn" under the sample size of n can be computed as follows:

$$\bar{x}_L = \min\left\{\bar{x} : E(P(U)/n,\bar{x}) \geq 1-\frac{k_1}{k_2}, \bar{x} \leq \bar{x}^*\right\} and$$
$$\bar{x}_R = \max\left\{\bar{x} : E(P(U)/n,\bar{x}) \geq 1-\frac{k_1}{k_2}, \bar{x} \leq \bar{x}^*\right\} \quad (4)$$

In other words

$$1-E(P(U)/n,\bar{x}) \leq \frac{k_1}{k_2} \text{ if and only if } \bar{x} \in [\bar{x}_L, \bar{x}_R] \quad (5)$$

The objective function of the model can be obtained by applying the Bayesian decision rule to the decision tree given in Figure 2.

$$\underset{0\leq n\leq N}{Min}\int_{-\infty}^{\infty}\Big[\sum_{y=0}^{n}\{Min[E(L_{sn}/n,\bar{x},y),E(L_{cn}/n,\bar{x},y)]\} \times \Pr\{y/n,\bar{x}\}\Big]\times g(\bar{x}/n)d\bar{x} \quad (6)$$

where g(x/n) is the **p.d.f.** of the sufficient statistic x. We want to determine a sample size n* between 0 and N that finds the Minimum Expected Total Cost (METC) with respect to Eq. (6). This sample size n* is referred to as the Optimal Sample Size (OSS). Equation (6) can be simplified further as follows:

$$\begin{aligned}&\{\ \underset{0\leq n\leq N}{Min}\{n\times k_1+(N-n)\times\left[E\left(\frac{1}{P(U)}\right)-1\right]\times k_1\\&+(N-n)\times\int_{-\alpha}^{\alpha}Min[(1-E(P(U)/n,\bar{x}))\times k_2,k_1]\\&\times g(\bar{x}/n)\times d\bar{x}+n\times k_1\times\int_{-\alpha}^{\alpha}E\left(\frac{1}{P(U)}/n,\bar{x}\right)\times\\&(1-E(P(U)/n,\bar{x}))\times g(\bar{x}/n)\times d\bar{x}\ \}\end{aligned} \quad (7)$$

If the lsz is free of the extra TA cost, Eq. (7) does not contain the second and the fourth terms. The computation for Eq. (7) determines the OSS. After observing the sampling outcome (x_1; ... ,x_{oss}), we compute $\underline{x}_{oss}$ =(x_1,....,x_{oss})/OSS.

If 1- E(P(U)/OSS, $\underline{x}_{oss}$<= k_1/ k_2 or x_{oss} Є [x_L, x_R]_, we should choose D_2 = ‘‘Sn.’’ Otherwise, we choose D_2 =‘‘CN.’’

There is no closed form for Eq. (7) and Simpson’s three-eighths integration approximation rule is applied to compute the integrals in this formula. During the computations, an accurate numerical table for standard normal distribution is helpful in computational efficiency because the posterior distribution of parameter U and the marginal distribution of sample mean $\bar{X}$ have normal distributions. Let's suppose that $(\bar{x}_1,\cdots\bar{x}_M)$ are used to represent the values of $\bar{X}$ in the numerical integration. The value of the third term of Eq. (7) for a sample size of n can be computed as follows:

Sum3 = 0;{Begin}
For j = 1 to M
If $\bar{x}_j \in [\bar{x}_L, \bar{x}_R]$, *compute* $(1-E(P(U)/n,\bar{x}_j)\times k_2$ *And add it to Sum3*
Else Sum 3 = Sum3 + k_1;
*Sum3 =(N-n) * Sum3.{End}*

The value of Eq. (7) as a function of sample size n behaves in the same way as Figure 2, but the curve may not be smooth locally. Binary search for finding the METC and its corresponding OSS is not suitable for application in such a situation. To reduce computational time and avoid missing the METC and its corresponding OSS, we adopt the following search strategy.

We start with n = 0. We compute the values of Eq. (7) for sample sizes with multiples of 10. If the value goes up for three consecutive searches or to the lot size N, then the algorithm stops searching further and takes the sample size with minimum value up to the present search. If

the sample size with minimum values 10 * k, then the algorithm searches the OSS within [10 * (k -1), 10 *(k + 1)] for 1 <= k < N, [0,10*(k + 1)] for k = 0, and [N -10;N] for k = N.

The proposed method allows an attribute sampling model based on the variable measurement data to be established. In other words, the model will use the information on the number of non-innovative SMEs that comes from the variable measurement data in the sample. This attribute sampling model needs the probability of a component being conforming, P(U), which is a function of parameter U and is a random variable of the following form:

$$P(U) = \int_a^b \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{1}{2}(\frac{x-U}{\sigma})} dx$$

There is no closed form for the continuous distribution of P(U). The following method computes an approximate discrete probability distribution of P(U).

The conditional probability under U = u, P(U)= Φ((b-u) / σ) - Φ((a-u) / σ) is maximum when u = (a + b)/2 and decreases as u moves away from (a + b)/ 2. Partition the interval, [0,1], into M subintervals of equal length with p_m = m/M, (m = 1, 2,. . ., M). Let u_m^L = Min{u : P(u) >= m/M}and u_m^U= Max {u : P(u) >= m/M. We have Pr{P(U) >= p_m }= Φ(u_m^U – τ) / λ) - Φ(u_m^L – τ) / λ) and Pr{P(U) = p_m}= Pr{P(U)>= p_{m-1}}-Pr{P(U)>= p_m}.

After obtaining the approximation discrete distribution for P(U), we observe the sampling data (x_1, x_2, . . . , x_n) and compute the number of non-conforming units in the sample, y = $\sum_{k=1}^{n} y_k$ where y_k = 0 if a <= x_k<= b and y_k = 1 otherwise. In the attribute sampling model, (n, y) are sufficient statistics, and the probability distribution of Y/n, p_m is binomial. Using the decision analysis similar to the variable sampling model, we conclude the following statements:

(S1) Model objective is $Min_{0\le n\le N} \sum_{0\le y\le n} [Min(E(L_{SN} / n, y), E(L_{CN} / n, y))] \times \Pr\{y / n\}$.

(S2) Decision "Sn" is superior to "CN" if and only if $(1 - E(P(U) / n, y) \le \frac{k_1}{k_2}$

The posterior distribution of P(U) has the following property.

For any prior distribution of P(U), E(P(U)/ n, y) increases in n (y fixed) and E(P(U)/n, y) decreases in y (n fixed). We can use this property to facilitate the computations for the attribute sampling model.

By (S2) and the property stated previously, if 1 – E(P(U)/n, 0) > k1 / k2, then decision ''CN'' is better regardless of the sampling outcome. Likewise, by (S2) and the property, if 1 – E(P(U)/n, n) <= k1/k2, zero TA is better than taking sample size n because any sampling outcome in this sample size will not change the decision ''Sn.'' For the other case, there exists an acceptance number, c, 0< c < n, satisfying 1 – E(P(U)/n, c) <= k1 / k2 and 1 – E(P(U)/n, c +1) >= k1 / k2. We choose ''Sn'' if y<= c and choose ''CN'' otherwise.

SIMULATION RESULTS

We characterize the innovation profile of an area through 500 SMEs on which a TA according to AICTT-RTA methodology is been conducted.[1]

Therefore, N = 500 for the wma.

1The TA, based on AICTT-RTA methodology, can also be conducted off-line through databases available to the Association AICTT (http://www.aictt.it/) relative to the profiles of companies that have participated in regional and national bids for funding. Without conducting a real TA, the AICTT-RTA methodology is applied through a picture of the company detected from these databases and then by simulation, we can verify which RTA score is assigned to these companies.

For example, we assume that the tolerance range considered for the RTA measures is characterized by a specification of (a, b) = (23.95, 24.05) relative to the worst class of RTA, the G class[2]. The audit cost per SME is k_1 = €9.25, and the low innovation cost (the cost related to the not achieving of the RTA level) of k_2 is estimated at €72.40 each. The low innovation cost includes old equipment, absence of a system for documentation of innovation, lack of proper training, no tracking of projects, and so on. We want to refer to three RTA auditors (A, B, and C). We assume that the purchase cost per SME is the same for all three auditors. Based on the technologies and data, we consider the values of three parameters,(σ, τ, γ) with respect to the three auditors as shown in Table I.

Table I METC and OSS for RTA TA by RTA Auditors A,B and C

RTA Auditor	σ	τ	γ	OSS	METC [€]
A	0.0231	24.0241	0.00962	42	4.835
B	0.0282	24.0137	0.01260	40	4.807
C	0.0235	24.0249	0.01270	37	5.063

The value of τ could refer to the total mean performance Technology Audits in previous lots, and γ could refer to the lot-by-lot variability of the mean performance Technology Audit. The computational results show that the best auditor is B with METC at € 4,807 and an optimal sample size OSS = 40. In addition, by Eq. (4), we obtain [x_L; x_R] = [23,9801; 24.0165]. Assuming that after TA the samples of 40 lszs by the auditor B, the sample mean and the number of non-innovative SMEs are $\underline{x}$ = 23:985 and y = 7, respectively. Because $\underline{x}$ = 23:985 is within the interval [x_L; x_R], we could stop TA and close the remaining lszs of the lot. Another computation results in the two expected total costs E(L_{Sn}/OSS; $\underline{x}$) = €4,675 and E(L_{CN}/OSS; $\underline{x}$) = €5,424, respectively. The expected number of extra TAs for compensation is E(M(y)/OSS; $\underline{x}$) + E(M(Z_{N-n}/OSS; $\underline{x}$) = 86,3. All three values are obtained by applying the Simpson's three-eighths approximation integration rule to the formulae given in the following.

The objective function is:

$$\underset{0\le n\le N}{Min}\int[\sum_{y=0}^{n}\{Min[E(L_{Sn}|n,\bar{x},y),E(L_{CN}|n,\bar{x},y)]\}\Pr\{y|n,\bar{x}\}]g(\bar{x}|n)d\bar{x}$$

By taking expectation on Eqs. (1) and (2) we obtain:

$$E(L_{sn}/n,\bar{x},y)=n\times k_1+E(M(y)|n,\bar{x},y)\cdot k_1$$
$$+E(Z_{N-n}|n,\bar{x},y)\cdot k_2+E(M(Z_{N-n})|n,\bar{x},y)\cdot k_1$$

$$E(L_{cn}/n,\bar{x},y)=n\cdot k_1+E(M(y)/n,\bar{x},y)\cdot k_1$$
$$+(N-n)\times k_1+E(M(Z_{N-n})/n,\bar{x},y)\cdot k_1$$

We need to compute:

(i) $E(Z_{N-n}|n,\bar{x},y)$:The expected number of "non-innovative" SMEs in the remaining N-n SMEs of the wma given the information $(n,\bar{x},y)$

(ii) $E(M(y)|n,\bar{x},y)$: The expected number of extra TAs to obtain y "innovative SMEs" given the information $(n,\bar{x},y)$

(iii) $E(M(Z_{N-n})/n,\bar{x},y)$: The expected number of extra TAs to obtain ZN-n "innovative SMEs" given the information $(n,\bar{x},y)$

[2]The scores are normalized, by which we mean class G with a score from 20 to 30.

(iv) $\sum_{y=0}^{n} E(M(y)y|n,\bar{x}) \cdot \Pr\{y|n,\bar{x}\}$

We have:

(i) $$E(Z_{N-n}|n,\bar{x},y) = (N-n)(1-E(P(U)|n,\bar{x})$$

For any U=u, we have:

$$E(Z_{N-n}|n,\bar{x},y,U=u) = E(Z_{N-n}|n,u) = (N-n)(1-P(u))$$

Therefore:

$$E(Z_{N-n}|n,\bar{x},y,U) = (N-n)(1-P(U))$$

$$E(Z_{N-n}|n,\bar{x},y) = E[E(Z_{N-n}|n,\bar{x},y,U)|n,\bar{x},y)] = (N-n)(1-E(P(U)|n,\bar{x},y)) = (N-n)(1-E(P(U)|n,\bar{x},))$$

(ii) $$E(M(y)|n,\bar{x},y) = y \cdot E((1/P(U))|n,\bar{x})$$

$$E(M(y)|n,\bar{x},y,U=u) = y \cdot 1/P(u)$$

$$E(M(y)|n,\bar{x},y) = E[E(M(y)|n,\bar{x},y,U)|n,\bar{x},y)] = E(y \cdot 1/P(U)|n,\bar{x},y)$$

$$= y \cdot E(1/P(U)|n,\bar{x},y) = y \cdot E(1/P(U)|n,\bar{x})$$

$$= y \cdot \int_{-\infty}^{+\infty} \frac{1}{P(u)} \cdot f(u|n,\bar{x})du$$

(iii) $$E(M(Z_{N-n})/n,\bar{x},y) = (N-n)\left[E\left(\frac{1}{P(U)}/n,\bar{x}\right)-1\right]$$

$$E(M(Z_{N-n})/n,\bar{x},y,U=u) = (N-n)\frac{1-P(u)}{P(u)} = (N-n)\left(\frac{1}{P(u)}-1\right)$$

$$E(M(Z_{N-n})/n,\bar{x},y) = E[E(M(Z_{N-n})/n,\bar{x},y,U)/n,\bar{x},y) = (N-n)\left[E(\frac{1}{P(u)}/n,\bar{x})-1\right]$$

(iv) $$+ \sum_{y=0}^{n} E(M(y)y|n,\bar{x}) \cdot \Pr\{y|n,\bar{x}\} = \sum_{y=0}^{n} y \cdot E(\frac{1}{P(U)}|n,\bar{x}) \cdot \Pr\{y|n,\bar{x}\}$$

$$= E(\frac{1}{P(U)}|n,\bar{x}) \cdot \sum_{y=0}^{n} y \cdot \Pr\{y|n,\bar{x}\} = E(\frac{1}{P(U)}|n,\bar{x}) \cdot n \cdot (1-E(P(U)|n,\bar{x})$$

The expected extra TA ratio at the second stage decision is 0.1765 which is obtained by dividing the expected number of extra TAs by the lot size N = 500. The user will pay the extra TA cost but no extra purchase cost.

In the following, a numerical analysis for RTA Auditor B under the Deming cost model is proposed.

The model parameters considered in the analysis are cluster size N, cost ratio k_1/k_2, and probability model parameters (σ, τ, γ). A comparison on METC and OSS between the variable sampling model and the corresponding attribute sampling model under the same probability assumptions and cost structure is also presented.

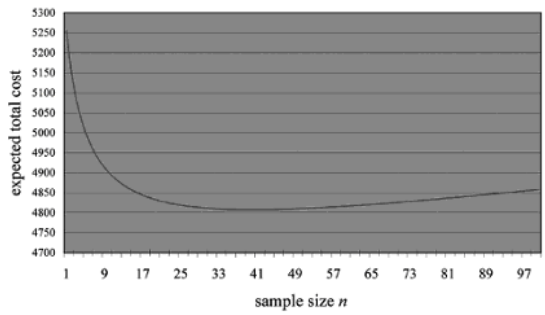

Figure 3 Expected cost for RTA Auditor B in sample size n

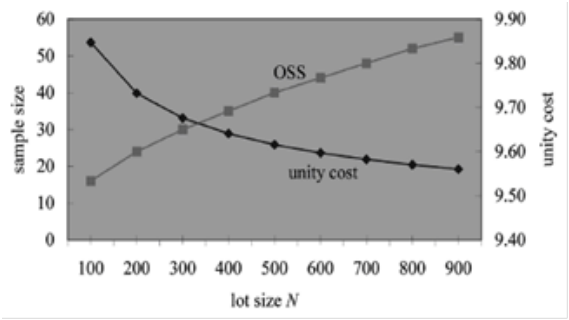

Figure 4 OSS and unity cost versus lot size N.

Figure 3 shows the variation of expected total cost with respect to different sample sizes for RTA Auditor B under lot size N = 500. Our experimental results show that the expected cost as a function of the sample size behaves in the same way as the curve shown in Figure 4. This result provides a good reference for us to develop an efficient algorithm for finding the METC and its corresponding OSS. Unity cost is defined as the METC per unit, that is, METC = N.

Figure 4 illustrates the behavior of the unity cost and the OSS as the value of N varies. The unity cost decreases and is convex in N, which implies that the marginal effect on the cost saving of this model decreases as the lot size N becomes larger and larger. On the other hand, the OSS is concave and increases in lot size N. In other words, the marginal increase of the OSS slows down as N increases.

Figure 5 depicts the effects of the cost ratio k1=k2 with fixed k2 and N = 500. The OSS decreases approximately linearly whereas the unity cost increases approximately linearly as the cost ratio increases. It is quite sensible that the increase in k1 will increase the METC and reduce the size of OSS.

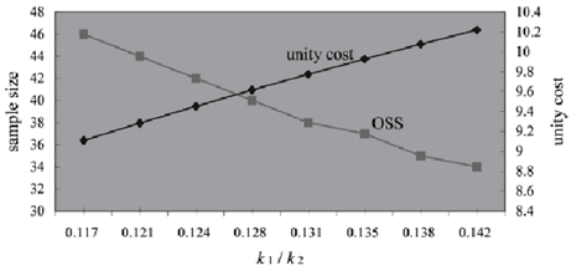

Figure 5 OSS and unity cost versus cost ratio k1/k2 with k2=72.4

Figure 6 presents the effect of the standard deviation σ of the TA for the SMEs when the process mean τ does not deviate much from the center of RTA specification limits. For RTA Auditor B, τ = 24,0137 and ((a + b) / 2) = 24. When σ increases, the probability of an SME being conforming becomes smaller and this will make both the OSS and the unity cost increase.

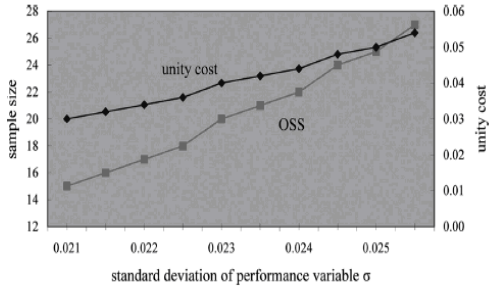

Figure 6 Oss and unity cost versus standard deviation σ

A similar situation with the same reasoning happens as the prior mean τ moves further away from the specification mean as shown in Figure 7. The parameter, γ, represents the degree of uncertainty for the unknown mean, U.

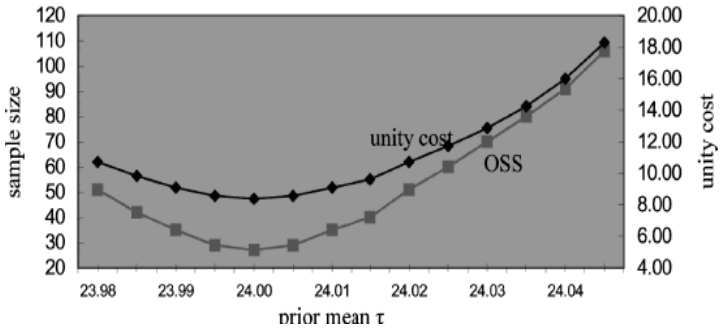

Figure 7 Oss and unity cost versus prior mean τ

Figure 8 indicates that the increase of γ reduces the probability of an SME being innovative and thus the METC increases, but the OSS is insensitive to the variation of γ. Table II shows that the METC and the OSS for the variable sampling model are smaller than those for the corresponding attribute sampling model under the same probability model and cost structure.

Table II Comparison between two sampling models for RTA TA by Auditor B

Wma size N	OSS	Acceptance limits [x_L; x_R]	Unity cost	OSS	Acceptance number [c]	Unity cost
100	16	[23.9754, 24.0161]	9.85	25	4	10.18
200	24	[23.9780, 24.0162]	9.73	46	7	10.02
300	30	[23.9791, 24.0163]	9.68	61	9	9.94
400	35	[23.9797, 24.0164]	9.64	68	10	9.88
500	40	[23.9801, 24.0165]	9.62	83	12	9.84
600	44	[23.9804, 24.0165]	9.60	91	13	9.81
700	48	[23.9807, 24.0165]	9.58	98	14	9.78
800	52	[23.9809, 24.0165]	9.57	106	15	9.76
900	55	[23.9810, 24.0165]	9.56	114	16	9.74

This is because in this study the attribute information is derived from the variable information. In such a situation, the same power can be achieved with a sample size in a variable acceptance sampling plan that is far smaller than the sample size for a derived attribute acceptance sampling plan.

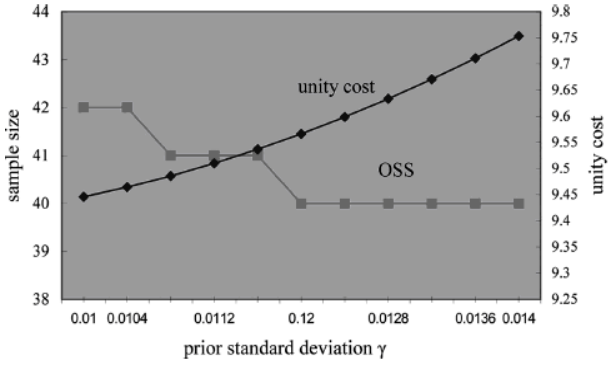

Figure 8 Oss and unity cost versus prior standard deviation γ

IMPLEMENTATION FOR RTA MONITORING

A remote measurement system that is characterized by mobile distributed architecture could be implemented to monitor the RTA index, refreshing it, according to the economic requirements described in the paper and sending it to a central data collector.

For this purpose, an industrial or urban zone could be portioned as reported in Figure 9 and mapped by a distributed system of mobile probes that continuously pick RTA values from SMEs that are present in that area and sent through a GPS card to a remote server for data analysis and decision making, as reported in Figures 10 and 11.

Figure 9: SMEs Configurable area partitioning

The system we propose consists of a number of mobile probes that acquire data on RTA values, the probe's position and time (acquisition system) and send them to a remote server (transmission infrastructure). The latter is equipped with a database management system (DBMS) and software analysis system (as a whole, a data management system) that allows information to be extracted.

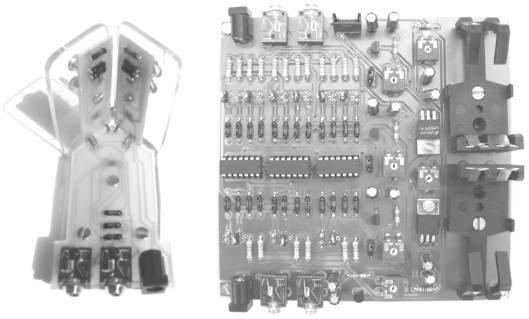

Figure 10: RTA measurement system

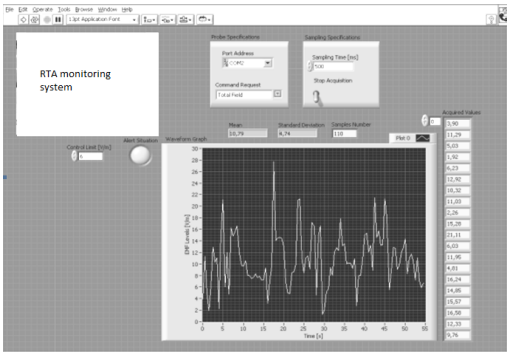

Fig. 11: Remote server gathering RTA data sent by clients mapping of a large area

Each mobile acquisition system should be equipped with a GPS module for localization purposes, and a wideband probe to measure RTA levels. Wherever possible, connections between devices could be established through optical links to minimize interference on measurements caused by electrical coupling.

CONCLUSIONS

The possibility of obtaining aggregated information constitutes an essential tool for defining the innovation profile of an entire urban or industrial zone level.

The only obstacle that must be overcome is the cost of measures.

In this paper a cost model using a Bayesian approach, followed in a different field by Chiuhchyu and I-Cheng-Chung Yu, consisting of a two-stage decision that minimizes the expected total cost of innovation's measurement, is proposed. This gives the operational tool used to validate

with statistical confidence a single zone through the appropriate dimension of the sample to be measured and, in a second step, provides a practical procedure to extend the results related to the single zone measures to the total wide area.

The wide area to be monitored is therefore divided into several local zones where the single sensing unit has the task of acquiring a fixed number of data. Sampling time and location of measurement points depend on topographical and environmental knowledge and the performance to be achieved. The prior distribution for the unknown mean is also assumed to be normally distributed. A numerical result has been presented to show how the model parameters, such as wide multi-zone area size, prior distribution, and cost ratio, affect the optimal sample size and the minimum expected total cost. In addition, in the model application, a comparison of three different RTA auditors has been developed according to AICTT-RTA protocol proposed by the Italian Association for technology Transfer Culture Promotion, AICTT.

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Destructive Leadership: From Retrospective to Prospective Inquiry (Antecedents of Destructive Leadership)

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ABSTRACT

This article explores the concept of destructive leadership and looks at potential ways of anticipating it in advance. To achieve this, the article considers the concept of leadership and especially the "leader-manager" dilemma as a lens to clarify the contextual processes that encourage the emergence and growth of destructive leadership. The article, then, focuses on how destructive behaviors proliferate and become part of organizational structures and how followers can disseminate the effects of these behaviors. In this regard, it sheds light on profoundly catastrophic consequences for the leader, the organization, and humanity at large because of destructive leadership.

LEADERSHIP AND MANAGEMENT

With over 2,000 books and 1,000 articles written annually about leadership, each with a different perspective, one could easily claim that the topic has been comprehensively analyzed and is therefore truly understood. However, leadership remains a highly ambiguous and elusive subject. Neither an agreed definition nor a conceptual basis for the professional language and terminology exist (e.g., [1]; [2]; [3]; [4]).

While clarifying the concept, it is a common approach to differentiate management and leadership. This serves as a useful tool, a "lens" through which an understanding of the perspective can be constructed, and which in turn could prove very useful in discussions about destructiveness and destructive leadership. This approach, which differentiates management and leadership as intrinsically different, also emphasizes their togetherness. Kotter [5] accentuates the necessity of them existing together although they are different constructs. Zaleznik [6] describes them as two distinctive systems of action, each with its own functions and characteristics. In this regard, both are essential for success in an increasingly complex and insecure environment, and complement each other. By viewing the two concepts in a domain analysis, three distinct areas can be made visible: "management," "leadership," and "management-leadership". It should be emphasized that the borders between these "states" are blurred and ambiguous.

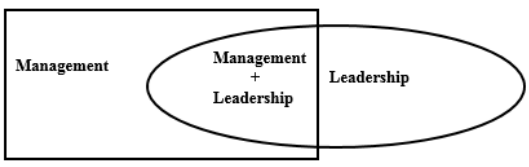


Figure 1: An illustration of the areas representing "management", "leadership," and "management + leadership" as intersections

Researchers seem to agree that the basic concept that differentiates leadership from management is change. Leadership is constructed around change while management is constructed around stability. Change, which in this instance is not gradual but sudden and drastic, reflects Miller's [7] "quantum view of change" and Tichy's [8] "strategic change." The latter is "non-routine, non-incremental, and discontinuous change which alters the structure and overall orientation" [8].

Barker [9] develops this issue of leadership and sudden change by emphasizing "crises" and not a "kaizen" type of incremental change, stating: "Leadership, must necessarily be founded in crisis. It is crisis that acts as a catalyst for the leadership process. For this purpose, crises can be defined as a perceived differential between what exists in the social order and what is desired" [9]. This perspective matches Schumpeter's [10] description of crises in his study Creative Destruction, which highlights the wholesale transfer of a system from one norm to another in a process that is indivisible. He implies that the process is "an attempt by the firm to keep on [its] feet, on the ground that is slipping away, therefore instead of administering relevant structures, the relevant problem … [is] how to destroy and re-create." Marion and Uhl-Bien [4] describe this as "the nonlinear characteristic of complex systems" and emphasize the slow building of aggregates and meta-aggregates until at some point

> *"a critical mass occurs, emergence accelerates and major change becomes inevitable, and very shortly following that, the pieces come together precipitously, as if overnight. Thus an innovation seems to appear out of nowhere, but of course much construction occurs behind the scenes before the pieces fall into place, and the change only seems to be precipitous."*

Such references to crises appear to allude to major problems in the context of leadership. However, we believe that the term "crises" should also cover minor problems because any change that requires a paradigm shift involves leadership. For example, leadership has been advocated as a solution to personal, social, and organizational problems. Further, some problems are ambiguous, and as such often have a political element that is fertile ground for leadership [11]. The simple perception of a "crisis" could also be enough to create leadership dynamics.

Notably, this perspective does not see leadership as the creator of change; instead, it regards change as the creator of leadership. "Leaders are part of a dynamic, rather than being the dynamic itself" [4]. Therefore, leadership is labeled as the legitimate offspring of conflict, a term that could be synonymous with "crisis." Alternatively, reverse causality could be true as well. Leadership can and must create and initiate change, while change can and will create leadership. Hence, leader-managers who act at the intersecting area of the domain analysis embrace change and even initiate change while retaining control and assuring controlled, smooth, and efficient change [5].

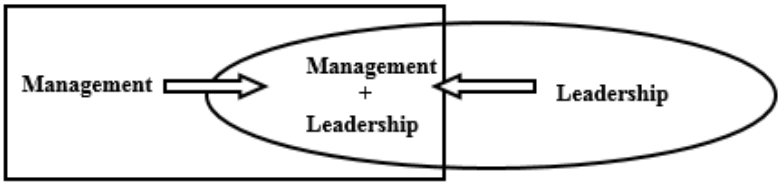
The middle ground, where management and leadership exist together, as illustrated in Figure 2, has been described as the area essential for the healthy existence of an organization [5] where both are needed for a well-functioning organization, while warning of the potential conflict between these roles. Kotter's [5] brilliant analysis on the management-leadership dyad provides a clear description of the boundaries of the middle ground of the management-leader intersection:

> *"… leadership by itself never keeps an operation on time and on budget year after year. And management by itself never creates significant useful change. Taken together, all of these differences in function and form create the potential for conflict. Strong leadership, for example, can disrupt an orderly planning system and undermine the management hierarchy, while strong management can discourage the risk taking and enthusiasm needed for leadership."*

Kotter [5] refers here to "risk-taking," a concept that Scherr and Jensen [12] also consider when they postulate a difference between leadership and management based on perspectives of risk. They argue that management is about minimizing risk and maximizing predictability, while leadership deals with the risk and uncertainty of change.

Bearing in mind the dynamic nature of the movements between the domains, a manager with official power is also the best candidate for leadership. Therefore, one should expect that managers easily become "leader-managers" (see Figure 2). Similarly, an emergent leader who proves to have sufficient courage, competencies, capabilities, and/or expertise should and, in most cases, will also assume the official role of the manager together with the title.

Figure 2: An illustration of the movements to the intersecting area to become "manager + leader"



ON DESTRUCTIVE LEADERSHIP

Despite the significant aforementioned interest in leadership, academic research has paid little attention to the topic of destructive leadership until recently. In general, destructive leadership has been seen as synonymous with "lack of leadership," and a more definitive description of "destruction" has not emerged. Perspective, time scale, and context all appear to have a strong influence on the idea of "destruction." However, should we describe a destructive leader by focusing on situational factors, processes, or end results? If the latter, will short- or long-term results be negatively correlated, as is commonly the case? Should we look to purposes and intents, or means? To whom is leadership destructive if the outcome favors one stakeholder and damages others? What is the role of situational factors and, of course, the chance factor? Does the legality of leadership, or the lack of it, affect destructiveness?

Kellerman [13] accepts that there are no easy answers to these questions. Padilla et al. [14] state that the test of destructive leadership (which they also refer to as "toxic leadership") is a matter of outcomes and should be evaluated in terms of negative organizational outcomes. In this context, they conclude that certain processes are more likely than others to lead to such outcomes.

Einarsen et al. [15] cite some of the concepts that fall within the domain of destructive leadership as follows: "abusive supervisors" [16], [17]; "health-endangering leaders" [18]; "petty tyrants" [19]; "bullies" [20]; "derailed leaders" [21]; "intolerable bosses" [22]; "psychopaths" [23]; and "harassing leaders" [24]. Destructive actions directed against the organization have also been identified (e.g., working toward goals other than those defined by the organization), examples being Lipman-Blumen's [25] concept of "toxic leaders" and McCall & Lombardo's [26] concept of leader derailment.

Further destructive leadership behavior includes personal insults, uninvited physical contact, threats and intimidation, humiliation, public shaming or status degradation rituals, impolite interruptions, and treating people as if they were invisible.

Shewchuk [27] provides a long list of "destructive boss behaviors" and includes rudeness, yelling at staff, being partially or wholly deceitful, humiliating and intimidating staff, being sarcastic, swearing, and using inappropriate humor. Such behavior also comprises arrogance, giving negative feedback, withholding recognition, slamming doors, being excessively angry,

withholding information, micromanaging, taking credit for work done by others, frequently reminding everyone who is in control, and exuding a supervisory "above-it-all" attitude. Further, Shewchuk [27] mentions racism and sexism as "toxicity makers" related to bullying. In this context, it is worth noting Yukl's [28] comment that the hostility this behavior evokes among staff influences leader effectiveness. The indicators of such hostility toward a leader include "absenteeism, voluntary turnover, grievances, complaints to higher management, requests for transfer, work slowdowns, and deliberate sabotage of equipment and facilities" [28].

In her comprehensive study Bad Leadership, Kellerman [29] divides the subject of destructive leadership into two broad categories, ineffective and unethical leadership. She emphasizes that the borderline between the two may never be adequately defined, and proposes a seven-item typology to describe bad leadership: incompetence, rigidity, intemperateness, callousness, insularity, corruptness, and evil.

Einarsen et al. [15] focus on the harm inflicted by destructive leadership on an organization and its workers, and define such leadership as

"The systematic and repeated behavior by a leader, supervisor or manager that violates the legitimate interests of the organization by:

a) Undermining and/or sabotaging the organization's goals, tasks, resources, and

b) Undermining the effectiveness and/or the motivation, well-being or job satisfaction of his/her subordinates."

They further classify destructive leadership behaviors in three categories: tyrannical, derailed, and supportive-disloyal behaviors. These are an innovative extension of Blake and Mouton's "managerial grid" [30].

Padilla et al. [15] describe destructiveness in relation to long-term outcomes and define it with reference to its principle direction or target: either toward the self (personal destructiveness) or toward the organization, its internal membership, and external stakeholders.

Illies and Reiter-Palmon [31] suggest that destructive behavior harms organizational members or strives for short-term gains instead of long-term organizational goals. In their study, they cite O'Connor et al. [32] who define a destructive leader as an individual whose decisions "clearly harmed his or her society or organization."

Schaubroeck et al. [33] concentrate on aspects of leadership and conclude that an

> *"Emotionally unstable supervisor is a potential source of distress that is constant and cannot be resolved by using active (i.e., problem-focused) coping strategies. Subordinates are rarely in a position to exert problem-focused coping to overcome difficulties they experience in interacting with a hostile supervisor. Such a chronic source of distress over which subordinates have no control, be it in the form of feeling belittled by the supervisor's contempt, frustration, blaming, intimidation, excessive control, unrealistic expectations, or just poor communication, may be expected to create anxiety, somatic complaints, and general dissatisfaction. Ultimately, this may reduce their psychological commitment to and desire to stay employed by the organization."*

In sum, we may attempt to classify leadership destruction by using three broad categories:

- *destruction to self;*
- *destruction to an organization, peers, and subordinates; and*
- *destruction to humankind in general.*

We can see one or more, and in most instances all three, outcomes in many examples of destructive leadership. In the widely covered Enron case, the corporation collapsed, a situation that left stakeholders out in the cold; caused the loss of a great deal of wealth for society; and greatly damaged the image of business. An even more extreme example is that of Hitler. He eventually committed suicide in a bunker, leaving behind a devastated country and more than 20 million dead.

Illies and Reiter-Palmon [31] cite Mumford et al.'s [34] composite measure that has three belief-based constructs: (a) power motives, (b) myth viability (having a destructive image of the world), and (c) object belief (the belief that one can use others for personal gain). They contend that individuals who score high in each of these dimensions can be defined as destructive. Mumford et al.'s [34] findings revealed that individuals with high scores made more destructive organizational decisions (hurting long-term goals or profitability) and interpersonal decisions (harming organizational members) when they had either the support of an authority figure or low self-efficacy. Therefore, although there is a considerable volume of valuable research, especially in psychology and social psychology, we are more inclined to look at the organizational and situational perspectives of leadership that produce destructive behaviors, or at least provide fertile ground for destructive decision-making, rather than the individual and/or psychosocial characteristics of destructive leaders.

ANTECEDENTS OF DESTRUCTIVE LEADERSHIP

Using the management–leadership dilemma as a "lens," leadership is the ability to see the big picture and to be able to envision and thus embrace change. A lack or deterioration of these abilities constitutes destructiveness. Indeed, the "vision" can make a significant difference for organizations, distinguishing them from mediocre and reactive organizations. Therefore, lack of vision can mean falling behind and eventual destruction. However, the questions remain of who defines vision, what happens if change requires a new vision, and whether the "visionary leader is capable of discarding the old one] and adopting the new right 'vision'." It is known that "visionary leaders" have the habit of "going over the edge" [35]. Visionary leaders are expected to "see" the future state of the organization and enable others to see it as well. They are meant to be exceptional speakers, using language in symbolic forms as metaphors, and must attract, impress, and influence people. However, this is exactly what Hitler did. Therefore, from this perspective, the existence of "vision," rather than reducing risk, could actually increase it [35].

As aforementioned in the domain analysis, there are three states: "management," "management + leadership," and "leadership." However, the dynamism that is indicated by the movements among these three domains can clarify the perspective as follows.

a) Management and movement from management to management-leadership.
b) Leadership and movement from leadership to management-leadership.
c) Failing to stay in the management-leadership domain.

These processes are now considered in more detail.

a) Management and movement from management to management-leadership

Beginning with Fayol [36], the task of management has been widely researched and explained. A general categorization of planning, organizing, leading (within the context Fayol implied) and controlling are widely accepted as the basic tasks of management [37]. Therefore, failing in one or more of these functions negatively affects the organization. This can be either a slow, painful process or a drastic, sudden blow. Generally, such a failure in management originates from the appointment of an inadequate candidate to an official position. This can happen in almost any

organization but the most dramatic examples are visible in governmental organizations. Political pressures, and more commonly ideological biases, force administrators to appoint managers not on their competencies and capabilities, or even by tenure, but on a "one of us" approach. A manager who lacks the necessary skills to conduct management tasks and is appointed to his post in this way can do nothing but rely on bullying and intimidation to exert power and assure acceptance [38].

The incompetency of the manager will be visible at once to peers and followers, and trust and respect is certain to evaporate. Negative build-up is continuous; the manager will be forced to exert greater personal control and will become less able to hear the counsel of advisors or staff members who might be helpful. Of the supposed "followers," those who resist will leave the organization voluntarily or by force. In the worst case, the organization's resources are exhausted and the company fails.

Another common failure pointed out by Ferris [39] is that of managers who rise to positions of power only by possessing task-specific skills and are not able to recognize the power of subordinates. This inability to recognize such power releases them from normal self-imposed constraints and allows them to pursue power and reputation via their legitimate position in the organization. This is another direct route to destructive tendencies. Mintzberg [35; 40] refers to the power of subordinates embedded in the concept of organizational culture and highlights the risk as follows.

> *"Culture encourages the production of unique outcomes and it is loaded with causal ambiguity, which makes it difficult to understand. An organization's inability to understand and reproduce its own culture may be the best guarantee of its strategic advantage – far better than any security system or legal device ever devised. So, for example, an insider who leaves cannot necessarily replicate a resource for a competitor. But paradoxically that also renders it vulnerable, easily destroyed by any leader who makes dramatic moves without being able to assess their impact on the organization) [35]… Therefore … while culture itself may be difficult to build in the first place, and even more difficult to reconstruct later, it is rather easy to destroy. Give some disconnected "professional" manager enough authority, and watch what happens." [40]*

On the other hand, a manager holding official power, even when extremely successful in dealing with motivation and other human issues, may not be considered a leader until the true measure of leadership, a crisis, arrives. Management usually spends its time dealing with the current situation and has a tendency to acquire a mantle of myopia; therefore, it usually fails to foresee crises. Managers generally do not see changes in the environment until too late. A change becomes increasingly untamed and, at some point, a crisis erupts that threatens the system. Consequently, the organization becomes "unfit" and ends in disarray. In such a situation, either an emergent leader takes over who steers the organization to either safety or doom, or the institutionalized power of the management prevents any internal or external intervention and carries the destruction through to the end.

The Institute for Crisis Management (ICM), cited by James [41], classifies most crises into two groups: "sudden crises" and "smoldering crises." Although our focus is on management crises, which are included in the smoldering crisis category, sudden crises such as technology disruption, natural disasters, terrorist attacks, and sabotage can also test the capability of the manager as a leader. In such situations, a perspective of courage and wisdom is the determining factor in transforming management into the management-leadership sector. History is full of mediocre administrators who otherwise would have remained in obscurity but, when confronted with a crisis, they transformed brilliantly and became great leaders.

In contrast to these arguments, evidence suggests that some managers are able to foresee trouble and initiate change. Mintzberg et al. [35] formularize this process as follows: "The key to leadership therefore is to sustain stability or at least adoptable strategic change most of the time, but periodically recognize the need for transformation and be able to manage that disruptive process without destroying the organization." From this perspective, managers that face smoldering crises [41] that start in a small way, but have the potential to escalate into a full-blown crisis over time, should be able to detect and initiate the necessary change, thus creating a controlled crisis. For example, Jack Welch was the CEO of General Motors (GM), a massive corporation that was safe, profitable, and effective. He sensed changes in the business environment, however, and believed that the corporation faced imminent disaster. He initiated a massive change process, accepting considerable risk and determined resistance.

b) Leadership and movement from leadership to management-leadership

When confronted by pressure to conform, a deviant person who is a potential leader is certain to feel isolated and faces a risky and intimidating experience, being at the nexus of constructive and destructive forces. Machiavelli [42] describes this risk:

> *"There is no more delicate matter to take in hand or many dangerous to conduct, nor more doubtful of success, than to step up as a leader in the introduction of change. For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm support in those who might be better off under the new."*

From this perspective, leadership is closer to entrepreneurship. Both struggle against the status quo, and adopt an "I know better" attitude. The deviant person, after gathering the support of followers (or collaborators), assumes the powers of leadership. However, followers (or collaborators) can align with the wrong person. A psychopath can easily gain power and move toward destruction in an ill-defined and ambiguous situation such as real or perceived threats from followers (or collaborators) and perceived instability [11]. In such circumstances, the potential for leaders to make destructive decisions or follow a destructive course of action is always present [31]. Thus, supporting an emergent leader always carries the risk of taking a shortcut to destruction.

However, if we assume success in resolving a crisis, the risks do not diminish. Usually, an emergent leader who takes command in a crisis and proves to have bravado, as well as competency and capability, quickly gains an official title and official power, thus becoming a leader-manager. In this situation, if he or she is unable to demonstrate necessary management skills, the organization's drift to destruction is still inevitable. According to Conger [43]:

> *"The very behaviors that (make) leaders … also have the potential to produce problematic or even disastrous outcomes for their organizations. For example, when a leader's behaviors become exaggerated, lose touch with reality, or become vehicles for purely personal gain, they may harm the leader and the organization. … Fundamental errors in the leader's perceptions can also lead to a failed vision. Common problems (of lack of management skills) include (1) an inability to detect important changes in markets (e.g., competitive, technological, or consumer needs); (2) a failure to accurately assess and obtain the necessary resources for (success); and (3) a misreading or exaggerated sense of the needs of markets or constituents. The very qualities that distinguish the … leader contain the potential for disaster."*

Greiner's [44] model of "organizational growth" highlights management problems as the first crisis an organization faces after its establishment, and suggests that these have the potential for disaster. Greiner states that "as the organizations grow, the founding entrepreneurs confront the task of having to manage the organization, as they discover that management is a

very different process from entrepreneurship" (Ironically, Greiner names this type of crisis a "leadership crisis.")

The other issue to consider here is the perspective of followers. They tend to become dependent on the leader, impressed with his or her performance and bravado. Consequently, they ignore any negative aspects and offer unconditional loyalty, and thus, by their own actions, perpetuate the problem of potential disaster. Leaders welcome such total loyalty because they need to dominate and be admired. The resulting sense of omnipotence and invincibility encourages a denial of market and organizational realities. Thus, a successful emergent leader may fail to become a leader-manager. The end of this course is bleak. Leaders' desire for heroic recognition encourages them to undertake large, risky ventures. Warnings, criticisms, and signs of failure only serve to make them more aggressive, short-tempered, and destructive, a situation that often alienates followers, peers, and superiors. Such leaders and their loyal followers will then be cast out of organizations; if not, the organizations suffer the consequences.

c) Failing to stay in the management-leadership domain

As aforementioned, leadership is a dynamic process; further, a leader-manager is under constant pressure from the forces of change. Therefore, whether they enter the management-leadership domain from the leadership or management side, if leader-managers cannot maintain their positions, they will be under threat.

However, maintaining a leader-manager position is fraught with difficulties. For example, a leader's past successes combined with the followers' acceptance of him or her as a hero blur the fact that the leader may no longer represent the defining values, needs, and realities of the organization and its environment. In this regard, Kellerman [29] comments on the power of leaders as follows:

> "As leaders buy their own publicity, they begin to rule the organization as if it were their own fiefdom. They believe their own hype and invest in it. They tend to acquire bad habits - to become complacent and grandiose, to overreach, to deny reality, and to lose their moral bearings."

Successful leaders may also come to ignore the efforts of their collaborators and followers. For example, Fletcher [45] cites Beer [46] and suggests that because of the nature of identity and ego, leaders who have achieved a goal and gained prominence for this achievement, tend to overlook the help they have received and reconstruct their behavior—in their own minds as well as in the perception of others—as individual action. Fletcher [45] also cites the work of Meindl et al., [47], who propose what they call the "romanticizing" of leadership as an explanation for a related form of social construction. This romanticizing occurs when a series of causally unrelated, ambiguous events are reconstructed in retrospect as intentional action and then described as "leadership." Rosenzweig [48] refers to this as the "halo effect," remarking that the direction of causality is wrong. Many things that are commonly believed as "contributions to company performance" are in fact "attributions." In other words, outcomes can be mistaken for inputs.

It is evident from such arguments that no clear formula can ensure an organization's success. If this were possible, leadership would be obsolete, and there would be no need for managers to move to management-leadership positions. After all, who else but a good manager is capable of ticking the right boxes to ensure that a formula has been followed with the utmost precision? Unfortunately (or, perhaps, most fortunately), organizational leadership and management do not work in this way. A leader-manager who holds official power because of past performance could tend to evaluate each problem that occurs in a familiar rather than flexible way, and worse, followers may back this inclination. Therefore, as already suggested, the very process

that created the leader-manager may also contain the seeds of destruction. For example, an organization may become increasingly misaligned with the environment; thus, the power of the leader-manager will be threatened. Usually, this threat forces the leader-manager to take measures to institutionalize his or her power, an approach that is relatively easy to take. Such institutionalization carries the threat of force, and since people have a tendency to obey, using force to ensure their compliance is easier than other means. Stout [49] emphasizes this:

> *"Threat is a powerful motivator which triggers an automatic and immediate response that happens without thinking. This strong preservation instinct is carved into our conscience by millions of years of evolution, exposed to danger. This is why those in an authority position have traditionally found that threats, intimidation, and pressure are much more effective than positive motivators."*

Hence, in Lord Acton's famous words from 1887: "Power tends to corrupt, and absolute power corrupts absolutely. Great men are almost always bad men." Yukl [28] elaborates further, stating: "The notion that power corrupts is especially relevant for positional power. Throughout history many political leaders with strong positional power have used it to dominate and exploit subordinates."

Salancik and Pfeffer [50] explain this process:

> *"Because of the processes by which power develops and is used, organizations become both more aligned and more misaligned with their environments. This contradiction is the most interesting aspect of organizational power. Because power derives from activities rather than individuals, a leader's power is never absolute and derives ultimately from the context of the situation. But power has a capacity for influence that extends far beyond the original bases that created it."*

Thus, power is facilitated by voluntary or involuntary conformism. However, more important than this is the fact that "power tends to take on institutionalized forms that enable it to endure well beyond its usefulness to an organization. Those in power will not give up their positions so easily; they will pursue policies that guarantee their continued domination." Salancik and Pfeffer [50] call this the "institutionalizing of power." In their own words:

> *"Current holders of power can structure the organization in ways that institutionalize themselves. By institutionalization, we mean the establishment of relatively permanent structures and policies that favor the influence of a particular subunit. While in power, a dominant coalition has the ability to institute constitutions, rules, procedures, and information systems that limit the potential power of others while continuing their own. The key to institutionalizing power always is to create a device that legitimates one's own authority and diminishes the legitimacy of others"*

This concept is called "Parkinson's Law." After prolonged and detailed studies on administrative processes in the British Navy, C. Northcote Parkinson argued that growth in the number of managers and hierarchical levels is controlled by two principles: (1) "an official wants to multiply subordinates, not rivals," and (2) "officials make work for one another" [51]. Thus, institutionalized power and fixed structures created by leader-managers will become unquestioned features of an organization, a situation that will eventually be devastating.

DISSEMINATION AND PROLIFERATION OF DESTRUCTIVE LEADERSHIP

Destructive behaviors carry the same perils for an organization as for leaders, whether the behaviors originate from an incapable manager, a manager who fails to become a leader-manager, a psychopath who holds power under pressure and/or who fails to become a leader-manager, and a leader-manager who loses touch with reality but succeeds in institutionalizing her/his power. Such behaviors create a toxic atmosphere that affects everyone. In addition,

pressures from the environment and the possibility of failure create increasing negativity. Consequently, basic management practices may cease to exist, leaving brute force as the only remaining way to enforce power. Faced with this scenario, followers are inevitably affected. Indeed, over time, it appears that the negative environment created by bullying (and other destructive behaviors) adversely affects motivation and morale to the extent that the focus and quality of production and/or service is significantly disrupted [39]. Ferris et al. [39] also state that

> *"Workers who experience assertive, tactical bullying are more likely to quit than those who are not bullied, but if they remain at their job, their attitudes toward their jobs will inevitably diminish. Even if the workers show commitment to the company, the way in which the assertive, tactical bullying leader treats these employees will encourage neither respect, nor trust, nor obligation."*

Moreover, followers actively disseminate destructive behaviors and help create a toxic culture, which has far-reaching effects. People not only evaluate leadership in organizations based on their preconceptions, they also have a tendency to romanticize leadership [52]. This will in turn evoke a "personal identification" by which followers imitate the leader's behaviors and develop similar attitudes [28]. "Isomorphism" [53; 54] is an expression that has been used to explain the similarity of organizations, but it can be borrowed and extended to the management concept of coercive, mimetic, and normative isomorphism among organizations. Isomorphism is coercive when upper management pressures line managers to adopt certain behavior models (i.e., destructive leadership behaviors): it is mimetic when managers intentionally imitate and copy upper management's behavior patterns; and it is normative when these patterns become the organization's culture. Mimetic behaviors may be a non-conscious tool of some sort that individuals may instinctively use, even among strangers and the most minimal of circumstances [55]. Indeed, mimicry may be default, automatic, and unmediated behavior, but we know that it affects postures, mannerisms, moods and emotions [56], and beliefs and judgments, which in turn create what behavioral scientists call "our social guidance system" [57]. Further evidence for the automaticity of mimicry comes from neuroscientific research on mirror neurons [58]. This research shows that within the human brain, there is an intimate link between observing an action and performing the same action oneself. The research finds that the brain is peppered with neurons that mimic, or mirror, what another being does. This previously unknown class of brain cells operates as neural Wi-Fi, allowing us to navigate our social world. When we consciously or unconsciously detect someone else's emotions through their actions, our mirror neurons reproduce these emotions. Collectively, these neurons create an instant sense of shared experience. Such attunement is literally physical. Thus, followers of an effective leader experience rapport with him or her. This is called "resonance" [57]. Spending time with a living, breathing model of (destructive) leadership behavior provides the perfect stimulation for followers' and subordinate managers' mirror neurons, which allow them to directly experience, internalize, and ultimately emulate what they observe. Be it physical and/or psychological, this effect will cause further proliferation of the destructive atmosphere of an organization. "It is the collective system that learns; there are many potential (destructive) leaders in most organizations" [35]. This framework may be characterized as a "trickle-down" model [59]. From the standpoint of this model, the injustices that supervisors experience trickle down (through abusive supervision) to produce injustice and anger reactions among subordinate targets [60]. Further, this chain of mistreatment continues even beyond subordinate victims because targets of severe bullying are likely to take their experiences home where they may displace aggression onto family members [61; 62; 63].

CONCLUSION

It is impossible to deny that bad, or at least unworthy people, often occupy top leadership positions. Capricious, murderous, high-handed, corrupt, and evil leaders are everywhere. In corporations, overweening personal ambition and greed have driven many CEOs to run afoul of the law. In recent years, scores of powerful and successful executives have been indicted for financial wrongdoing of various kinds. As the New York Times wryly quipped, it now "takes a scorecard to keep up with corporate scandals in America" [64].

Negative events in social interactions have a stronger effect than positive events [65]. Destructive leadership is one such negative event and requires much closer attention and research because everyone is familiar with its unwanted and sometimes terrible consequences. Thus, the ability to recognize destructive leadership behaviors, understand the situations and contexts that give birth to these, and understand and prevent the social dynamics that encourage volunteer followers and active collaborators are issues of paramount importance. Mintzberg et al.'s [35] words reflect these issues:

> *"When should followers stop following, say Hitler, Churchill and Gorbachev? Time and again, it is emphasized that outstanding performance necessitates passionate, single-minded dedication. But when exactly does this dedication pass the line from construction to destruction?"*

Mintzberg et al. [35] also cite Miller [7] who refers to the question quoted above as "The Icarus Paradox." Icarus, a mythological figure with perfect flying ability, aims to reach the sun, which, however, melts his wings and sends him to his death. Miller tries to explain this process in terms of "trajectories" where a) the "focusing" trajectory can turn a quality-driven craftsman into a detail-obsessed tinkerer; b) the "venturing" trajectory can turn an entrepreneur-builder into an impulsive and careless resource waster; c) the "inventing" trajectory can transform a successful pioneer into a chaos-loving, utopian escapist; and d) the "decoupling" trajectory can change a perfect salesman into an aimless bureaucratic drifter.

All of this begs the question of what can be done to combat the threat posed by destructive leadership. Kellerman [64] puts forward 12 suggestions to strengthen a leader's capacity to be effective and ethical, two of which are organizational remedies for destructive leadership: "limiting the tenure of leadership" and "sharing power." The other 10 suggestions focus on precautions at an individual level. Similarly, Yukl [28], citing the findings of Bachman et al. [66], and Smith and Tannenbaum [67], comments that most effective organizations have a high degree of reciprocal influence. This suggests that leaders in effective organizations create relationships in which they have a strong influence over subordinates, but that they are also receptive to influence from these same subordinates. Thus, Yukl [28] concludes that leaders should facilitate reciprocal influence by encouraging subordinates to participate in important decision-making; fostering and rewarding innovation; and providing formal mechanisms to promote reciprocal influence.

Nonetheless, as valuable as all these modern views are, the most insightful remark comes from a bygone age, and from who else but Machiavelli? The goals that should be valued most, according to Machiavelli (1531), are "long-term success and the plaudits of the ages." He believed that our inability to recognize the early warning signs of corruption was the great enemy and saw "the successful prince" as one who seeks "fame for being great and excellent." The prince should achieve such fame by governing well, which means ensuring the prosperity of the state and its citizens, and creating institutions that transcend his reign, thereby securing the survival and success of the state for generations to come.

From the perspective of this study, destructive leadership starts when a "manager + leader" stops being either a manager or leader. Hence, it is profoundly important to detect the clues and act in advance to warn, correct, or disempower destructive leaders.

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Predicting Performance through the Elements of Organizational Culture

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ABSTRACT

Organizational culture is shaped by the leaders and by the purpose for which the organization exist. There are many cultures and sub-cultures, which may be of different strengths and which may have different levels of influence. The main aim of this paper was to determine what elements of organizational culture predict the performance of an organization. The objectives of the study were to determine if the different elements of organizational culture has significant contribution on the performances of Universities and to reveal which of the different elements of organizational culture has the most significant contribution in predicting the performances of Universities. To determine what elements of organizational culture predict the performance of an organization, a sample of 100 staff (academic and non-academic)each of Covenant University, Ota, Olabisi Onabanjo University, Ago-Iwoye, University of Agriculture, Abeokuta, all in Ogun State were drawn. Data was collected with the use of a Likert type questionnaire and were analyzed using multiple regressions with the aid of Statistical Package for Social Sciences (SPSS). The finding shows that Quality Consciousness, Role Clarity, Employee Concern, Customer Care and Code of Conduct made the most significant contribution in predicting performances of organizations. Conclusively, there is no such thing as a 'right' or 'best' culture for all organizations. The most appropriate culture for an organization is the one that best helps it cope with the exigencies of its business environment. The most appropriate culture for an organization is the one that best helps it cope with the exigencies of its business environment.

Key words: *Organizational Culture, Elements of Organizational Culture, Predicting and Organizational Performance*

INTRODUCTION:

In the beginning nal culture is shaped by the leaders and by the purpose for which the organization has been created. It then develops within the constraints of the environment, technology, values of the leadership, and performance expectations. "The initial culture is altered by the design variables of the organization, experiences of the organization, management's leadership style, the structure of the organization, the nature of the tasks of the groups, the way decisions are made, and the size of the organization. In addition, the developing culture is affected by the internal integrity of the organization, the climate, and how well the organization is competing in the marketplace, its effectiveness" DeWitt (2001).

Culture generates strong pressures on people to go along, to think and act in ways consistent with the way employees dress and the amount of time allowed to elapse before meetings begin, to the speed with which people are promoted.

Although, it is a known fact that culture has an effect on people's behaviour, management's interest is likely to be prompted by curiosity about why this happens than by its possible bottom-line effects on the commercial performance of an organization. To a large extent this interest was kindled by the writings of authors who view culture as a key component in the performance of successful organizations. These ideas resulted in an increased awareness among managers of the effects of culture but, as is often the case, a more dangerous turn of events were set in motion.

When cultural characteristics of successful organizations were set out in books in a catchy, marketable and easily grasped way, there was an understandable tendency for some managers to believe that, at last, social science had come up with something of immense practical use. Other than the writings of popular authors, there is little evidence of a strong association between culture and organizational performance, and none for a set of cultural characteristics that are likely to be appropriate in all circumstances.

Later, when studies were conducted on firms that were said to have their culture associated with performance, no coherent link between culture and performance could be established and several of the firms were in serious difficulties.

CONCEPTUAL FRAMEWORK:

Organizational culture is the basic pattern of shared assumptions, values and beliefs considered to be correct way of thinking about and acting on problems and opportunities facing the organization. McShane (2005) simply describes organizational culture as an organization's DNA not visible to the eye, but a very powerful tool that shapes what happens in an organization.

Mowat (2002) put forward that organizational culture is the personality of the organization: the shared beliefs, values and behaviours of the group. It is symbolic, holistic, and unifying, stable, and difficult to change. Organizational culture is made up of both the visible and invisible, conscious and unconscious learning and artifacts of an organization. Mowat also said that culture is the shared mental model that is assumptions. This mental model that is assumptions are taken for granted by those within the organization and it is difficult for people outside the organization to decode it. It is important to note therefore that the organizational culture is not the ideal, vision, and mission stated for the organization towards achieving its goals and objectives, rather, it is the expression of the day-to-day practices, communications, norms, values and beliefs that exist within an organization.

According to Borgatti (1996) a strong culture:

- Is internally consistent
- Is widely shared, and
- Makes it clear what appropriate behaviour is.

The result of an organization with a vision that everyone understands to which everyone is committed to, When employees gather and particularly when employees with a common purpose begin to work together, the strategies of work and the processes of thinking will enlarge and the culture of the organization will be created. No organization exist in a vacuum just as we know that "no man is an island," most organizational cultures have key features that are common with the larger culture of the community or society in which the organization exist. For example in Mowat (2002), organizational cultures in America all have some similar underlying thread. Organizational cultures in other countries also have a unifying, cross-organizational flavour. However, even within a social culture, each organizational culture is unique.

Put more simply, organizational culture is the way things are getting done in an organization. It is what determines the action in an organization, guides how employees think, act and feel. It is the systematic set of assumptions that define day-to-day working behaviour. "Culture can be described in a circular fashion where philosophy expresses values; values are manifest in behaviour; and behaviour gives meaning to the underlying philosophy. Philosophy, values, and behaviour describe an organization's culture and culture is the glue that holds the organization together." DeWitt (2001)

Organizational culture can also be looked at as a system with inputs from the environment and outputs such as behaviours, technologies and products. It "is dynamic and fluid, and it is never static. A culture may be effective at one time, under a given set of circumstances and ineffective at another time. There is no generically good culture. There are however, generic patterns of health and pathology." Hagberg et al (2000).

According to BOLA (2001), culture is the shared beliefs, values and norms of a group and it includes:

- The way work is organized and experienced
- How authority exercised and distributed
- How people are and feel rewarded, organized and controlled
- The values and work orientation of staff
- The degree of formalization, standardization and control through systems there is/should be
- The value placed on planning, analysis, logic, fairness etc.
- How much initiative, risk-taking, scope for individuality and expression is given
- Rules and expectations about such things as informality in interpersonal relations, dress, personal eccentricity etc.
- Differential status
- Emphasis given to rules, procedures, specifications of performance and results, team or individual working

There are many cultures and sub-cultures, which may be of different strengths and which may have different levels of influence. "Subcultures may share certain characteristics, norms, values and beliefs or be totally different. These subcultures can function cooperatively or be in conflict with each other." Hagberg et al (2000).
The Organizational Culture Inventory (OCI) defines corporate culture as "the sum of all moral concepts reflecting direct and indirect behavioural expectations. The central question of the OCI is: How must an employee behave in order to match the organization and meet the expectations?"

There is considerable overall agreement as to the general definition of organizational culture and most questionnaires define culture as: "a set of cognitions shared by members of a social unit" O'Reilly et al (1991), or more fully: "a system of shared values and beliefs that produces norms of behaviour and establishes an organizational way of life" Koberg et al (1987). This latter definition is important because it pinpoints that the culture construct can be equivocally understood to deal with "major beliefs and values" Goll et al (1991), or alternatively as "norms and patterns of behaviours and norms" Gundry et al (1994).

Employees are influenced by multiple cultural institutions such as family, community, nation, state, church, educational system, and other work organizations, and these associations shape their attitudes, behaviour, and identity; employees bring these influences with them when they join an organization, so it is difficult to separate an organizational culture from the larger cultural processes (Hatch, 1997).According to the work of Koteswara, P. K., Srinivasan, P. T.

and George J.P. (2005),Literatures have revealed that organizational culture have been measured by various authors in terms of various elements. Koteswara et al identified a total number of 123 elements from ten different authors in his work. This does not connote that there are only 123 elements of organizational culture that can be used to measure organizational culture; there is a possibility that there may be some more which have not fallen into the 123 elements. Koteswara and his colleagues went further to summarize the 123 elements into ten elements that can be used in the measurement of organizational culture, which include, unity in diversity, creativity-adaptability, culture nurturing, customer care, quality consciousness, collaboration, open communication, code of conduct, role clarity and employee concern.

The objectives under consideration in this paper was:

- To determine if the different elements of organizational culture has significant contribution on the performances of Universities.
- To reveal which of the different elements of organizational culture has the most significant contribution in predicting the performances of Universities.

Research Question:

a) Which of the elements of organizational culture has significant contribution on the performances of Universities?
b) Which of the elements of organizational culture has the most significant contribution in predicting the performances of Universities?

Research Hypothesis:

H_0: There is no significant contribution of the elements of organizational culture in predicting the performances of Universities.

H_1: There is significant contribution of the elements of organizational culture in predicting the performances of Universities.

RESEARCH METHOD

The method adopted in this study was the Survey Research Design, which is to research on "Predicting Performance through the Elements of Organizational Culture" using the questionnaire to harvest opinions on the culture and performances of Universities. The population studied cuts across all staff of the three Universities in Ogun State, Nigeria. The hierarchical structure of the study population is made up of three tiers, which include top, middle and lower level staff. The characteristic of the study population is that it was mixed at every level of the organization irrespective of age, sex, educational background, employment level, salary scale and marriage status.

The sample frame for this study covers all staff at various levels of the three Universities in Ogun State. The sample size, which was determined judgmentally, consisted of 100 staff of each of the Universities. Non-probability sampling technique was the sample technique adopted and the sampling instrument used was a structured questionnaire. The respondents to the questionnaire were selected based on convenience sampling in each of the Universities.

The Questionnaire was the data collecting instrument used in this study. The questionnaire had twenty major statements, which was intended to assess "Predicting Performance through the Elements of Organizational Culture" of three Universities in Ogun State, Nigeria. Twenty item statements of a five point Likert Scale ranging from a "Strongly Agree to Strongly Disagree", were asked to get responses on 10 elements of Organizational Culture, which are: Culture Nurturing, Creativity – Adaptability, Unity in Diversity, Customer Care, Collaboration, Open Communication, Code of Conduct, Role of Clarity, Quality Consciousness and Employee Concern; and responses on two Performance variables: Perceptions and Effectiveness. The

questionnaire was a structured one as the method of data collection and field assistance was used in retrieving the questionnaires from the respondents.

The data from the questionnaires were collected, collated, sorted, analyzed and presented through the use of multiple regressions. The procedures for processing the data was done through the use of analytical software called the Statistical Package for Social Sciences (SPSS). All the items in the questionnaire were analyzed.

RESULT

This section of the paper presents the data collected on the "Likert scale," through the use of Multiple Regression. A frequency table was used for analysing the monthly salary of the respondents from the three Universities. After the data had been collected, the procedures for the processing of the collected data using Likert scale was through the use of analytical software called the SPSS. The hypothesis was tested using Multiple Regression.

Table 1: Frequency Distribution Table of Respondents by Monthly Salary from the three universities

Universities			Frequency	Percent	Valid Percent	Cumulative Percent
Private (CU)	Valid	below - N49,999	19	23.2	26.4	26.4
		N50,000 - N99,999	32	39.0	44.4	70.8
		N100,000 - N199,999	17	20.7	23.6	94.4
		N200,000 - Above	4	4.9	5.6	100.0
		Total	72	87.8	100.0	
	Missing	System	10	12.2		
	Total		82	100.0		
State (OOU)	Valid	below - N49,999	33	39.3	39.3	39.3
		N50,000 - N99,999	32	38.1	38.1	77.4
		N100,000 - N199,999	18	21.4	21.4	98.8
		N200,000 - Above	1	1.2	1.2	100.0
		Total	84	100.0	100.0	
Federal (UNAAB)	Valid	below - N49,999	19	24.7	25.7	25.7
		N50,000 - N99,999	21	27.3	28.4	54.1
		N100,000 - N199,999	20	26.0	27.0	81.1
		N200,000 - Above	14	18.2	18.9	100.0
		Total	74	96.1	100.0	
	Missing	System	3	3.9		
	Total		77	100.0		

The table 1 above, shows the total number of respondents' monthly salary and their percentages. It reveals that from CU, 23.2% received the salary between below – N49,999 every month, 39.0% received the salary between N50,000 – N99,999 every month, 20.7% received the salary between N100,000 – N199,999 every month, 4.9% received the salary between N200,000 – above every month and none were missing. From OOU, 39.3% received the salary between below – N49,999 every month, 38.1% received the salary between N50,000 – N99,999 every month, 21.4% received the salary between N100,000 – N199,999 every month, 1.2% received the salary between N200,000 – above every month and none were missing. From UNAAB, 24.7% received the salary between below – N49,999 every month, 27.3% received the salary between N50,000 – N99,999 every month, 26.0% received the salary between N100,000 – N199,999 every month, 18.2% received the salary between N200,000 – above every month and 3.2% were missing.

TEST OF HYPOTHESIS

The data from Covenant University (CU), Olabisi Onabanjo University (OOU) and University of Agriculture (UNAAB) were also combined and analyzed to determine the significant contribution of the elements of organizational culture in predicting the performances of the three Universities on general terms. The analysis of the three Universities combined is as presented below:

Table 2a: Model Summary for the three Universities (CU, OOU, and UNAAB)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.659(a)	.434	.409	.49454

Table 2b: ANOVA for the three Universities (CU, OOU, and UNAAB)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.700	10	4.170	17.050	.000(a)
	Residual	54.295	222	.245		
	Total	95.995	232			

Table 2c: Coefficients for the three Universities (CU, OOU, and UNAAB)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
1	(Constant)	3.675	.262		14.032	.000		
	i1A	.023	.041	.031	.554	.580	.833	1.200
	Responses to Item 2	.013	.037	.023	.358	.721	.603	1.659
	i3A	.049	.050	.055	.983	.327	.803	1.245
	Responses to Item 4	.117	.033	.199	3.574	.000	.819	1.221
	Responses to Item 5	-.104	.031	-.211	-3.386	.001	.657	1.523
	Responses to Item 6	-.038	.034	-.064	-1.112	.267	.769	1.300
	Responses to Item 7	-.018	.031	-.034	-.593	.554	.761	1.315
	Responses to Item 8	-.102	.034	-.177	-2.984	.003	.726	1.378
	Responses to Item 9	-.078	.033	-.145	-2.348	.020	.669	1.495
	Responses to Item 10	.130	.030	.251	4.267	.000	.734	1.362

a. Dependent Variable: Performance

Key:

i1A: Unity in Diversity;
Item 2: Creativity - Adaptability; Concern
i3A: Culture nurturing
Item 4: Customer Care
Item 5: Quality Consciousness
Item 6: Collaboration
Item 7: Open Communication
Item 8: Code of Conduct
Item 9: Role Clarity
Item 10: Employee

Table 2d: Multiple Regression Analysis for the three Universities (CU, OOU, and UNAAB)

		Performance	i1A	Responses to Item 2	i3A	Responses to Item 4	Responses to Item 5	Responses to Item 6	Responses to Item 7	Responses to Item 8	Responses to Item 9	Responses to Item 10
Pearson Correlation	Performance	1.000	.014	.352	.225	.393	-.482	-.300	.226	-.384	-.378	.395
	i1A	.014	1.000	.215	.128	-.021	-.011	.151	.251	.178	.045	.117
	Responses to Item 2	.352	.215	1.000	.428	.341	-.362	-.070	.243	-.130	-.207	.417
	i3A	.225	.128	.428	1.000	.199	-.177	-.002	.068	-.089	-.114	.194
	Responses to Item 4	.393	-.021	.341	.199	1.000	-.253	-.178	.196	-.132	-.180	.269
	Responses to Item 5	-.482	-.011	-.362	-.177	-.253	1.000	.351	-.258	.365	.423	-.249
	Responses to Item 6	-.300	.151	-.070	-.002	-.178	.351	1.000	-.113	.351	.354	-.079
	Responses to Item 7	.226	.251	.243	.068	.196	-.258	-.113	1.000	-.123	-.263	.330
	Responses to Item 8	-.384	.178	-.130	-.089	-.132	.365	.351	-.123	1.000	.426	-.084
	Responses to Item 9	-.378	.045	-.207	-.114	-.180	.423	.354	-.263	.426	1.000	-.037
	Responses to Item 10	.395	.117	.417	.194	.269	-.249	-.079	.330	-.084	-.037	1.000
Sig. (1-tailed)	Performance	.	.415	.000	.000	.000	.000	.000	.000	.000	.000	.000
	i1A	.415	.	.000	.023	.371	.434	.009	.000	.003	.244	.035
	Responses to Item 2	.000	.000	.	.000	.000	.000	.138	.000	.022	.001	.000
	i3A	.000	.023	.000	.	.001	.003	.487	.145	.084	.039	.001
	Responses to Item 4	.000	.371	.000	.001	.	.000	.003	.001	.022	.003	.000
	Responses to Item 5	.000	.434	.000	.003	.000	.	.000	.000	.000	.000	.000
	Responses to Item 6	.000	.009	.138	.487	.003	.000	.	.040	.000	.000	.110
	Responses to Item 7	.000	.000	.000	.145	.001	.000	.040	.	.028	.000	.000
	Responses to Item 8	.000	.003	.022	.084	.022	.000	.000	.028	.	.000	.096
	Responses to Item 9	.000	.244	.001	.039	.003	.000	.000	.000	.000	.	.282
	Responses to Item 10	.000	.035	.000	.001	.000	.000	.110	.000	.096	.282	.
N	Performance	243	243	242	243	236	240	242	242	242	241	243
	i1A	243	243	242	243	236	240	242	242	242	241	243
	Responses to Item 2	242	242	242	242	235	239	241	241	241	240	242
	i3A	243	243	242	243	236	240	242	242	242	241	243
	Responses to Item 4	236	236	235	236	236	233	236	236	235	235	236
	Responses to Item 5	240	240	239	240	233	240	239	239	239	238	240
	Responses to Item 6	242	242	241	242	236	239	242	241	241	240	242
	Responses to Item 7	242	242	241	242	236	239	241	242	241	241	242
	Responses to Item 8	242	242	241	242	235	239	241	241	242	240	242
	Responses to Item 9	241	241	240	241	235	238	240	241	240	241	241
	Responses to Item 10	243	243	242	243	236	240	242	242	242	241	243

The above analysis is part of the results generated from the SPSS package using multiple regression analysis. The three Universities were investigated together as a whole. From the analysis, several tables were generated, but for the basis of measuring the significant contribution of each element of organizational culture in predicting performance, three tables will be used to explain the significant contribution of each of the elements of organizational culture on performance. These tables are model summary, correlation and coefficient.

In the multiple regression analysis table (Table 2d), the column showing i1A, responses to item 2, i3A, and responses item 4 to responses to item 10, represent each of the cultural element analyzed. From the analysis in table 4.9, items 2, 4, 5, 6, 8, 9 and 10, have moderately strong correlations with the dependent variable (Performance), which is equal to and above ".300". Also, the correlation among each of the independent variables is not too high. Researchers suggest that we do not include two variables with a bivariate correlation of ".7" or more in the same analysis.

In table 2a (model summary), the result shows how much of the variance in the dependent variable (Performance) is explained by the model, which includes the variable item 1 to 10 (the elements of organizational culture). The ".434" in the 'R' square column is expressed in percentage. This means that our model (the cultural elements) explains 43.4% of the variance on performances of the three Universities, which is a weak relationship.

In comparing the contribution of each independent variable (cultural elements), table 2c (coefficient table) will be used to determine this. In the "Beta" column, the largest value is considered, that is ".251" for item 10. This means that, the cultural element item 10 makes the strongest unique contribution in explaining the dependent variable (Performance). The Beta values for the other elements indicate that they made less contribution on performance. The "Sig." column of the same table shows, whether this variable is making a statistically significant unique contribution. The decision rule is that if the "Sig." value is less than .05, then the variable is making a statistically significant unique contribution on the dependent variable (Performance). Therefore, items 4, 5, 8, 9, and 10 made a statistically significant unique contribution on performances of the three Universities combined as a whole.

A further analysis was also done on each of the three Universities to check the significant contribution of the elements of organizational culture in predicting performance. The analysis below is a multiple regression analysis on Covenant University:

Table 3a: Model Summary for Covenant University (CU)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.693(a)	.480	.403	.40667

Table 3b: ANOVA for Covenant University (CU)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.368	10	1.037	6.269	.000(a)
	Residual	11.246	68	.165		
	Total	21.614	78			

Table 3c: Coefficients for Covenant University (CU)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
1	(Constant)	3.225	.467		6.909	.000		
	i1A	.036	.069	.051	.524	.602	.797	1.255
	Responses to Item 2	.159	.061	.297	2.597	.012	.585	1.710
	i3A	-.013	.089	-.017	-.148	.883	.590	1.694
	Responses to Item 4	.217	.066	.391	3.295	.002	.544	1.838
	Responses to Item 5	-.012	.051	-.028	-.238	.813	.559	1.790
	Responses to Item 6	.009	.063	.016	.146	.884	.657	1.522
	Responses to Item 7	.015	.050	.034	.301	.765	.584	1.713
	Responses to Item 8	-.142	.050	-.283	-2.825	.006	.765	1.307
	Responses to Item 9	-.087	.059	-.168	-1.486	.142	.600	1.667
	Responses to Item 10	-.024	.057	-.050	-.422	.674	.538	1.858

Key:

i1A: Unity in Diversity;
Item 2: Creativity - Adaptability; Concern
i3A: Culture nurturing
Item 4: Customer Care
Item 5: Quality Consciousness
Item 6: Collaboration
Item 7: Open Communication
Item 8: Code of Conduct
Item 9: Role Clarity
Item 10: Employee

Table 3d: Multiple Regression Analysis for Covenant University (CU)

		Performance	i1A	Responses to Item 2	i3A	Responses to Item 4	Responses to Item 5	Responses to Item 6	Responses to Item 7	Responses to Item 8	Responses to Item 9	Responses to Item 10
Pearson Correlation	Performance	1.000	-.020	.484	.362	.471	-.297	-.316	.329	-.372	-.324	.300
	i1A	-.020	1.000	.164	.068	-.222	-.215	-.051	.099	.161	-.072	.153
	Responses to Item 2	.484	.164	1.000	.389	.314	-.472	-.284	.424	-.063	-.272	.482
	i3A	.362	.068	.389	1.000	.464	-.267	-.190	.239	-.281	-.035	.395
	Responses to Item 4	.471	-.222	.314	.464	1.000	-.057	-.297	.253	-.095	.029	.427
	Responses to Item 5	-.297	-.215	-.472	-.267	-.057	1.000	.395	-.301	.100	.484	-.260
	Responses to Item 6	-.316	-.051	-.284	-.190	-.297	.395	1.000	-.385	.211	.326	-.136
	Responses to Item 7	.329	.099	.424	.239	.253	-.301	-.385	1.000	-.075	-.413	.488
	Responses to Item 8	-.372	.161	-.063	-.281	-.095	.100	.211	-.075	1.000	.249	.049
	Responses to Item 9	-.324	-.072	-.272	-.035	.029	.484	.326	-.413	.249	1.000	-.185
	Responses to Item 10	.300	.153	.482	.395	.427	-.260	-.136	.488	.049	-.185	1.000
Sig. (1-tailed)	Performance	.	.428	.000	.000	.000	.004	.002	.001	.000	.002	.003
	i1A	.428	.	.072	.271	.024	.027	.326	.187	.074	.261	.086
	Responses to Item 2	.000	.072	.	.000	.002	.000	.005	.000	.287	.007	.000
	i3A	.000	.271	.000	.	.000	.008	.044	.015	.005	.378	.000
	Responses to Item 4	.000	.024	.002	.000	.	.308	.004	.012	.200	.398	.000
	Responses to Item 5	.004	.027	.000	.008	.308	.	.000	.003	.187	.000	.009
	Responses to Item 6	.002	.326	.005	.044	.004	.000	.	.000	.029	.001	.111
	Responses to Item 7	.001	.187	.000	.015	.012	.003	.000	.	.251	.000	.000
	Responses to Item 8	.000	.074	.287	.005	.200	.187	.029	.251	.	.012	.330
	Responses to Item 9	.002	.261	.007	.378	.398	.000	.001	.000	.012	.	.048
	Responses to Item 10	.003	.086	.000	.000	.000	.009	.111	.000	.330	.048	.
N	Performance	82	82	81	82	80	81	82	82	82	82	82
	i1A	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 2	81	81	81	81	79	80	81	81	81	81	81
	i3A	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 4	80	80	79	80	80	79	80	80	80	80	80
	Responses to Item 5	81	81	80	81	79	81	81	81	81	81	81
	Responses to Item 6	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 7	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 8	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 9	82	82	81	82	80	81	82	82	82	82	82
	Responses to Item 10	82	82	81	82	80	81	82	82	82	82	82

The tables above are the result from multiple regression analysis of the contribution of the cultural elements on performance for Covenant University. In the correlation table (Table 3d), the column showing i1A, responses to item 2, i3A, and responses item 4 to responses to item 10, represent each of the cultural element analyzed for Covenant University. From the analysis in table 4.13, items 2, i3A, 4, 6, 7, 8, 9 and 10, have moderately strong correlations with the dependent variable (Performance), which is equal to and above ".300". Also, the correlation among each of the independent variables is not too high; therefore, we retain all the independent variables for further analysis.

In table 3a (model summary), the result shows ".480" in the 'R' square column, which means that our model (the cultural elements) explains 48.0% of the variance on performances of Covenant University, meaning it is a weak relationship.

In the "Beta" column of table 3c (coefficient table), the largest value is considered, that is ".391" for item 4. This means that, the cultural element item 4 makes the strongest unique contribution on the dependent variable (Performance). The Beta values for the other elements indicate that they made less contribution on performance. The "Sig." column of the same table 4.12 reflects that items 2, 4, and 8, made a statistically significant unique contribution on performances of Covenant University.

The analysis below is a multiple regression analysis on Olabisi Onabanjo University:

Table 4a: Model Summary for Olabisi Onabanjo University (OOU)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648(a)	.420	.333	.56028

Table 4b: ANOVA for Olabisi Onabanjo University (OOU)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.227	10	1.523	4.851	.000(a)
	Residual	21.032	67	.314		
	Total	36.260	77			

Table 4c: Coefficients for Olabisi Onabanjo University (OOU)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
1	(Constant)	4.584	.564		8.133	.000		
	i1A	-.219	.090	-.260	-2.447	.017	.770	1.299
	Responses to Item 2	-.066	.064	-.121	-1.032	.306	.630	1.588
	i3A	.056	.093	.072	.604	.548	.609	1.642
	Responses to Item 4	.065	.065	.103	1.007	.318	.824	1.213
	Responses to Item 5	-.119	.062	-.201	-1.931	.058	.798	1.253
	Responses to Item 6	-.065	.067	-.108	-.968	.336	.700	1.428
	Responses to Item 7	-.085	.059	-.147	-1.439	.155	.834	1.199
	Responses to Item 8	-.010	.081	-.015	-.118	.907	.530	1.886
	Responses to Item 9	-.098	.080	-.161	-1.229	.223	.505	1.981
	Responses to Item 10	.201	.061	.351	3.308	.002	.768	1.302

Key:

i1A: Unity in Diversity;
Item 2: Creativity - Adaptability; Concern
i3A: Culture nurturing
Item 4: Customer Care
Item 5: Quality Consciousness
Item 6: Collaboration
Item 7: Open Communication
Item 8: Code of Conduct
Item 9: Role Clarity
Item 10: Employee

Table 4d: Multiple Regression Analysis for Olabisi Onabanjo University (OOU)

		Performance	i1A	Responses to Item 2	i3A	Responses to Item 4	Responses to Item 5	Responses to Item 6	Responses to Item 7	Responses to Item 8	Responses to Item 9	Responses to Item 10
Pearson Correlation	Performance	1.000	-.428	.028	.191	.169	-.363	-.310	-.097	-.272	-.239	.336
	i1A	-.428	1.000	.091	.028	-.058	.213	.254	.130	.392	.126	-.107
	Responses to Item 2	.028	.091	1.000	.543	.198	-.025	.066	-.048	.088	-.102	.265
	i3A	.191	.028	.543	1.000	.152	-.209	-.075	-.092	.028	-.221	.221
	Responses to Item 4	.169	-.058	.198	.152	1.000	-.176	-.142	.166	-.066	-.337	-.051
	Responses to Item 5	-.363	.213	-.025	-.209	-.176	1.000	.149	-.118	.245	.344	-.053
	Responses to Item 6	-.310	.254	.066	-.075	-.142	.149	1.000	-.056	.475	.366	-.059
	Responses to Item 7	-.097	.130	-.048	-.092	.166	-.118	-.056	1.000	.066	-.222	.007
	Responses to Item 8	-.272	.392	.088	.028	-.066	.245	.475	.066	1.000	.493	.140
	Responses to Item 9	-.239	.126	-.102	-.221	-.337	.344	.366	-.222	.493	1.000	.219
	Responses to Item 10	.336	-.107	.265	.221	-.051	-.053	-.059	.007	.140	.219	1.000
Sig. (1-tailed)	Performance	.	.000	.400	.041	.068	.000	.002	.191	.006	.015	.001
	i1A	.000	.	.204	.402	.306	.027	.010	.121	.000	.130	.166
	Responses to Item 2	.400	.204	.	.000	.040	.411	.277	.333	.213	.181	.007
	i3A	.041	.402	.000	.	.091	.029	.249	.204	.401	.023	.022
	Responses to Item 4	.068	.306	.040	.091	.	.061	.105	.072	.284	.001	.327
	Responses to Item 5	.000	.027	.411	.029	.061	.	.091	.146	.013	.001	.318
	Responses to Item 6	.002	.010	.277	.249	.105	.091	.	.309	.000	.000	.299
	Responses to Item 7	.191	.121	.333	.204	.072	.146	.309	.	.277	.023	.475
	Responses to Item 8	.006	.000	.213	.401	.284	.013	.000	.277	.	.000	.103
	Responses to Item 9	.015	.130	.181	.023	.001	.001	.000	.023	.000	.	.024
	Responses to Item 10	.001	.166	.007	.022	.327	.318	.299	.475	.103	.024	.
N	Performance	84	84	84	84	79	83	83	83	83	82	84
	i1A	84	84	84	84	79	83	83	83	83	82	84
	Responses to Item 2	84	84	84	84	79	83	83	83	83	82	84
	i3A	84	84	84	84	79	83	83	83	83	82	84
	Responses to Item 4	79	79	79	79	79	78	79	79	78	78	79
	Responses to Item 5	83	83	83	83	78	83	82	82	82	81	83
	Responses to Item 6	83	83	83	83	79	82	83	82	82	81	83
	Responses to Item 7	83	83	83	83	79	82	82	83	82	82	83
	Responses to Item 8	83	83	83	83	78	82	82	82	83	81	83
	Responses to Item 9	82	82	82	82	78	81	81	82	81	82	82
	Responses to Item 10	84	84	84	84	79	83	83	83	83	82	84

From the analysis above, the contribution of the cultural elements on performance for Olabisi Onabanjo University (OOU) as reflected in the correlation table (Table 4.17) shows that items i1A, 5, 6, and 10, have moderately strong correlations with the dependent variable (Performance), which is equal to and above ".300". Also, the correlation among each of the independent variables is also not too high; therefore, we retain all the independent variables for further analysis.

In table 4.14 (model summary), the result shows ".420" in the 'R' square column, which means that our model (the cultural elements) explains 42.0% of the variance on performances of Olabisi Onabanjo University reflecting a weak relationship.

In the "Beta" column of table 4.16 (coefficient table), the largest value is considered, that is ".351" for item 10 meaning that, the cultural element item 10 makes the strongest unique contribution on the dependent variable (Performance). The Beta values for the other elements indicate that they made less contribution on performance. The "Sig." column of the same table 4.12 reflects that items 1, and 10, made a statistically significant unique contribution on performances of Covenant University.

The analysis below is a multiple regression analysis on University of Agriculture:

Table 5a: Model Summary for University of Agriculture

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.818(a)	.669	.618	.34835

Table 5b: ANOVA for University of Agriculture

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.941	10	1.594	13.136	.000(a)
	Residual	7.888	65	.121		
	Total	23.829	75			

Table 5c: Coefficients for University of Agriculture

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
1	(Constant)	3.512	.554		6.339	.000		
	i1A	.183	.053	.313	3.457	.001	.622	1.607
	Responses to Item 2	.015	.055	.025	.275	.784	.627	1.596
	i3A	-.071	.102	-.058	-.698	.488	.735	1.360
	Responses to Item 4	.114	.042	.222	2.746	.008	.777	1.286
	Responses to Item 5	-.185	.051	-.441	-3.653	.001	.349	2.867
	Responses to Item 6	.029	.055	.057	.521	.604	.422	2.369
	Responses to Item 7	.008	.042	.017	.187	.852	.616	1.622
	Responses to Item 8	.015	.048	.031	.316	.753	.537	1.864
	Responses to Item 9	-.125	.035	-.294	-3.537	.001	.736	1.359
	Responses to Item 10	.106	.046	.218	2.290	.025	.559	1.787

Key:
i1A: Unity in Diversity;
Item 2:Creativity - Adaptability; Concern
i3A: Culture nurturing
Item 4: Customer Care
Item 5: Quality Consciousness
Item 6: Collaboration
Item 7: Open Communication
Item 8: Code of Conduct
Item 9: Role Clarity
Item 10: Employee

Table 5d: Correlations from Multiple Regression for University of Agriculture

		Performance	i1A	Responses to Item 2	i3A	Responses to Item 4	Responses to Item 5	Responses to Item 6	Responses to Item 7	Responses to Item 8	Responses to Item 9	Responses to Item 10
Pearson Correlation	Performance	1.000	.243	.481	-.332	.426	-.591	-.464	.386	-.400	-.441	.499
	i1A	.243	1.000	.247	.146	-.023	.167	.192	.405	.162	.197	.213
	Responses to Item 2	.481	.247	1.000	-.096	.285	-.457	-.321	.288	-.313	-.193	.340
	i3A	-.332	.146	-.096	1.000	-.321	.313	.289	-.085	.182	.184	-.343
	Responses to Item 4	.426	-.023	.285	-.321	1.000	-.278	-.349	.027	-.096	-.137	.205
	Responses to Item 5	-.591	.167	-.457	.313	-.278	1.000	.678	-.224	.585	.360	-.264
	Responses to Item 6	-.464	.192	-.321	.289	-.349	.678	1.000	-.052	.430	.370	-.380
	Responses to Item 7	.386	.405	.288	-.085	.027	-.224	-.052	1.000	-.258	-.149	.423
	Responses to Item 8	-.400	.162	-.313	.182	-.096	.585	.430	-.258	1.000	.439	-.341
	Responses to Item 9	-.441	.197	-.193	.184	-.137	.360	.370	-.149	.439	1.000	-.164
	Responses to Item 10	.499	.213	.340	-.343	.205	-.264	-.380	.423	-.341	-.164	1.000
Sig. (1-tailed)	Performance	.	.017	.000	.002	.000	.000	.000	.000	.000	.000	.000
	i1A	.017	.	.015	.102	.421	.074	.047	.000	.080	.043	.032
	Responses to Item 2	.000	.015	.	.204	.006	.000	.002	.006	.003	.046	.001
	i3A	.002	.102	.204	.	.002	.003	.005	.231	.056	.055	.001
	Responses to Item 4	.000	.421	.006	.002	.	.008	.001	.409	.203	.117	.037
	Responses to Item 5	.000	.074	.000	.003	.008	.	.000	.026	.000	.001	.011
	Responses to Item 6	.000	.047	.002	.005	.001	.000	.	.325	.000	.000	.000
	Responses to Item 7	.000	.000	.006	.231	.409	.026	.325	.	.012	.099	.000
	Responses to Item 8	.000	.080	.003	.056	.203	.000	.000	.012	.	.000	.001
	Responses to Item 9	.000	.043	.046	.055	.117	.001	.000	.099	.000	.	.077
	Responses to Item 10	.000	.032	.001	.001	.037	.011	.000	.000	.001	.077	.
N	Performance	77	77	77	77	77	76	77	77	77	77	77
	i1A	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 2	77	77	77	77	77	76	77	77	77	77	77
	i3A	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 4	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 5	76	76	76	76	76	76	76	76	76	76	76
	Responses to Item 6	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 7	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 8	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 9	77	77	77	77	77	76	77	77	77	77	77
	Responses to Item 10	77	77	77	77	77	76	77	77	77	77	77

From the analysis above for University of Agriculture (UNAAB), the correlation table (Table 4.21) shows that items 2, i3A, 4, 5, 6, 7, 8, 9, and 10, have moderately strong correlations with the dependent variable (Performance), which is equal to and above ".300". Also, the correlation among each of the independent variables is also not too high; therefore, we retain all the independent variables for further analysis.

In table 4.18 (model summary), the result shows ".669" in the 'R' square column, which means that the model (the cultural elements) explains 66.9% of the variances on performances of University of Agriculture revealing a strong relationship.

In the "Beta" column of table 4.20 (coefficient table), the largest value is considered, that is "-.441" (ignoring the negative sign) for item 5 meaning that, the cultural element item 5 makes the strongest unique contribution on the dependent variable (Performance). The Beta values for the other elements indicate that they made less contribution on performance. The "Sig." column of the same table 4.20 reflects that items 1, 4, 5, 9, and 10, made a statistically significant unique contribution on performances of University of Agriculture.

The analysis below is a multiple regression analysis on Public University:

Table 6a: Model Summary for Public Universities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.704(a)	.496	.460	.50864

Table 6b: ANOVA for Public Universities

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.359	10	3.636	14.053	.000(a)
	Residual	36.997	143	.259		
	Total	73.355	153			

Table 6c: Coefficients for Public Universities

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
1	(Constant)	3.574	.338		10.583	.000		
	i1A	.024	.052	.032	.469	.640	.749	1.335
	Responses to Item 2	-.028	.045	-.049	-.626	.533	.585	1.709
	i3A	.050	.063	.054	.798	.426	.762	1.313
	Responses to Item 4	.104	.040	.175	2.619	.010	.791	1.265
	Responses to Item 5	-.154	.039	-.299	-3.963	.000	.619	1.615
	Responses to Item 6	-.010	.042	-.017	-.239	.812	.733	1.364
	Responses to Item 7	-.031	.039	-.055	-.808	.420	.753	1.327
	Responses to Item 8	-.055	.046	-.091	-1.199	.233	.611	1.635
	Responses to Item 9	-.089	.041	-.160	-2.161	.032	.641	1.561
	Responses to Item 10	.204	.038	.369	5.425	.000	.760	1.315

Key:
i1A: Unity in Diversity;
Item 2: Creativity - Adaptability; Concern
i3A: Culture nurturing
Item 4: Customer Care
Item 5: Quality Consciousness
Item 6: Collaboration
Item 7: Open Communication
Item 8: Code of Conduct
Item 9: Role Clarity
Item 10: Employee

From the analysis above for Public Universities, the multiple regression analysis table (Table 6d) shows that items 2, 4, 5, 8, 9 and 10, have moderately strong correlations with the dependent variable (Performance), which is equal to and above ".300". Also, the correlation among each of the independent variables is also not too high; therefore, we retain all the independent variables for further analysis.

In table 6a (model summary), the result shows ".496" in the 'R' square column, which means that the model (the cultural elements) explains 49.6% of the variances on performances of Public Universities revealing a moderate relationship.

In the "Beta" column of table 6c (coefficient table), the largest value is ".369" for item 10 meaning that, the cultural element item 10 makes the strongest unique contribution on the dependent variable (Performance). The Beta values for the other elements indicate that they made less contribution on performance. The "Sig." column of the same table 4.24 reflects that items 4, 5, 9, and 10, made a statistically significant unique contribution on performances of Public Universities.

Based on the above analysis therefore, we shall reject the null hypothesis (H_0) stating that "there is no significant contribution of elements of organizational culture in predicting the performances of Universities" and accept the alternate hypothesis (H_1) stating that "there is significant contribution of organization cultural elements on performances of Universities."

CONCLUSION

Shani et al (2005) concluded that organizational cultures can have a significant impact on an organization's long term economic performance; organizational cultures will probably be an

even more important factor in determining the success of failure of organizations in the next decade; organizational cultures that inhibit strong long-term financial performance are not rare, they develop easily, even in organizations that are full of reasonable and intelligent people, and; although tough to change, organizational cultures can be made more performance enhancing.

A recent perspective of Rollinson (2005) was firmly part of what is now known as the 'excellence movement', which holds that culture is a key ingredient in the commercial success of an organization. Because authors list cultural characteristics that are said to lead to this outcome of success, it is easy to see why the ideas have an instant appeal to managers.

The challenge, however, is that this perspective and others like it imply a 'one best culture' suitable for all organizations. Since different organizations face different circumstances, the most useful approach to the culture-performance relationship is likely to be a contingency perspective; an assumption that there is no such thing as a 'right' or 'best' culture for all organizations. The most appropriate culture for an organization is the one that best helps it cope with the exigencies of its business environment.

Many managers have attempted to revamp their business culture, some by bench marking themselves against their most admired competitors. This offers few insights for those attempting a business turnaround and the task is all the more daunting because culture is not just about 'how we do things', but also about 'what we do'.

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Table 6d: Correlations from Multiple Regression Analysis for Public Universities

		Performance	i1A	Responses to Item 2	i3A	Responses to Item 4	Responses to Item 5	Responses to Item 6	Responses to Item 7	Responses to Item 8	Responses to Item 9	Responses to Item 10
Pearson Correlation	Performance	1.000	.014	.324	.172	.388	-.547	-.278	.196	-.385	-.381	.488
	i1A	.014	1.000	.243	.144	.057	.069	.248	.319	.191	.104	.142
	Responses to Item 2	.324	.243	1.000	.451	.343	-.327	-.025	.170	-.162	-.208	.388
	i3A	.172	.144	.451	1.000	.113	-.137	.086	-.005	-.004	-.131	.147
	Responses to Item 4	.388	.057	.343	.113	1.000	-.334	-.182	.171	-.157	-.285	.185
	Responses to Item 5	-.547	.069	-.327	-.137	-.334	1.000	.338	-.240	.475	.401	-.270
	Responses to Item 6	-.278	.248	-.025	.086	-.182	.338	1.000	-.019	.400	.329	-.148
	Responses to Item 7	.196	.319	.170	-.005	.171	-.240	-.019	1.000	-.148	-.220	.267
	Responses to Item 8	-.385	.191	-.162	-.004	-.157	.475	.400	-.148	1.000	.489	-.166
	Responses to Item 9	-.381	.104	-.208	-.131	-.285	.401	.329	-.220	.489	1.000	-.054
	Responses to Item 10	.488	.142	.388	.147	.185	-.270	-.148	.267	-.166	-.054	1.000
Sig. (1-tailed)	Performance	.	.430	.000	.014	.000	.000	.000	.006	.000	.000	.000
	i1A	.430	.	.001	.034	.239	.194	.001	.000	.008	.095	.037
	Responses to Item 2	.000	.001	.	.000	.000	.000	.375	.016	.021	.004	.000
	i3A	.014	.034	.000	.	.080	.042	.141	.475	.478	.050	.031
	Responses to Item 4	.000	.239	.000	.080	.	.000	.011	.016	.025	.000	.011
	Responses to Item 5	.000	.194	.000	.042	.000	.	.000	.001	.000	.000	.000
	Responses to Item 6	.000	.001	.375	.141	.011	.000	.	.404	.000	.000	.031
	Responses to Item 7	.006	.000	.016	.475	.016	.001	.404	.	.032	.003	.000
	Responses to Item 8	.000	.008	.021	.478	.025	.000	.000	.032	.	.000	.018
	Responses to Item 9	.000	.095	.004	.050	.000	.000	.000	.003	.000	.	.251
	Responses to Item 10	.000	.037	.000	.031	.011	.000	.031	.000	.018	.251	.
N	Performance	161	161	161	161	156	159	160	160	160	159	161
	i1A	161	161	161	161	156	159	160	160	160	159	161
	Responses to Item 2	161	161	161	161	156	159	160	160	160	159	161
	i3A	161	161	161	161	156	159	160	160	160	159	161
	Responses to Item 4	156	156	156	156	156	154	156	156	155	155	156
	Responses to Item 5	159	159	159	159	154	159	158	158	158	157	159
	Responses to Item 6	160	160	160	160	156	158	160	159	159	158	160
	Responses to Item 7	160	160	160	160	156	158	159	160	159	159	160
	Responses to Item 8	160	160	160	160	155	158	159	159	160	158	160
	Responses to Item 9	159	159	159	159	155	157	158	159	158	159	159
	Responses to Item 10	161	161	161	161	156	159	160	160	160	159	161

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Impact Of E-Marketing on Social Network usage

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ABSTRACT

This study attempts to analyze the impact of e-marketing on social networking usage. A questionnaire was distributed for data collection among universities students, employing simple linear regression analysis. This paper concludes that there is a significant relationship between e-marketing, personalization and social networking usage, while personalization is unable to mediate the relationship between e-marketing and social networking usage. The managers of social network should consider e-marketing and personalization as a competitive policy to improve its usage. The drawback of this study is that the sample size was small due to time shortage.

Key words: *E-marketing, Personalization, Social networks.*

INTRODUCTION

This paper is about the relationship of e-marketing to that of social networking usage. Therefore this paper examines the impact of e-marketing on the social networking usage, which is one of the prevailing dilemmas that exists in today's world in the field of marketing, specifically e-marketing. The purpose of this study is quite simple, to analyze weather e-marketing plays a significant role in the usage of social networking sites specially Facebook. E-marketing is basically the application of Marketing principles and techniques via electronic media. The question exists that why to study the impact of e-marketing on social media usage, as it is crystal clear that social media is having a greater impact in promoting e-marketing? So the purpose of this paper is to fill that gap that exits in terms of the impact of e-marketing on its own determinant so called as social media. There is a question how this paper comes up with this gap, it is through brainstorming, and going through literature on both of the key terms with respect to each other, and the evidence were in favor of social media impact on the e-marketing. like that a lot many work has done in finding of the impact of these social networks on e-marketing, in the form of ads etc. but did we ever notice when using the youtube.com and finding something interesting whatever it is, it could be educational video, it could be a trailer of the favorite movie, or it could be a favorite singer's new song etc. there we find a small tab below each video, named as "share" and pressing that can led us to share this video of interest on these particular websites so called as social networking sites. So we believe that our topic is important in a sense to get an evidence of the impact of e-marketing on social networking sites. Why particularly examining the social media? It is because no one denies the importance of social media in promotion and accelerating the performance of e-marketing in the past few years. and the reason behind this is the increasing rate of usage of this social media, in other words we can say that social media is the cry of the day and there are a lot many issues relates to it, regarding their privacy, their earning and their ability to retain customers etc. same is the case with the term "E-marketing" that we are now the residence of the global world, the middle man is now eliminated, the customer can contact directly with the manufacturer, the social networking user can now use the benefits of e-marketing. How

particularly and frequently they are using this facility and how much they are satisfied with the use of e-marketing? This is what this paper is actually dealing with.

The rest of paper is aligned in such a way that section 2, is about the related literature review, section 3 is about methodology and Data collection, section 4, is about Empirical analysis and discussion. And finally section 5, is about Implication, limitation and future directions and conclusion.

LITERATURE REVIEW

Social networks have been studied for a decade as the most influencing tool and source of advances in internet-marketing, simply called as e-marketing. A social network here means social networking website, such as Facebook. Social network is defined as a connected group of individual agents, who make production and consumption decision based on the actions (signals) of the other agents on the social network (Potts, Conninghum, Hartley & Ormerod. 2008).

Elison, Stainfield and lampe (2007) also defines the social networking sites , such as Facebook, that it allows individuals to present themselves, articulate their social networks and establish or maintain connections with others. According to Yang, Kim & Dhalwani (2008),Facebook is one of the social networking sites, initially developed for college and university students, but is now made available to anyone. This is one of the evidence in the increase of social networking usage.

These Social networks are examined in different papers and the interesting part of literature that exists on social networking with respect to e-marketing is that these networking sites are having a significant impact on promoting e-marketing, including that of Arabie and Wind (1994) in dealing the social networks for better marketing strategies. They suggest how to identify and manage social networks, and explain the future marketing practices, as discussed by (Iacobucci and hofkins 1992). Who presents statistical models for the analysis of the relationships as a potential in a wide variety of marketing applications.

According to Kinsella, Breslin, Passant and Decker (2008), the basic functions of social networking sites are profiles, friend's listings and commenting offer along with other features, such as private messaging, discussion forums, blogging and media uploading and sharing.

Different papers contribute to the knowledge on e-marketing, including Sarner (2007), his paper explains how e-marketing improves the customer's buying process, to him the online channel usage, as part or all the buying process, continues to grow and making the e-marketing a stronger influencer of purchase decision.

Ellison et al (2007) examine the social networking site Facebook discussing its benefits. In their article the focuses on Facebook that enables its users to present themselves in an online profile, accumulate "friends" who can post comments on each other's pages, and view each other's profiles.

The greater part of revenues generated by these online social networking sites are due to advertisements on it and in return these advertising agencies has the unique feature due to the use of these internet-based technologies and data collection mechanisms to target and track specific individuals and to automate the buying and selling of advertising inventory. (Evans 2008).

Furthermore, Gross and Acquisti (2005), analyze the information revelation and its privacy issues in social networks, while studying the information disclose by their sample data, with regards to the usage of the site's privacy settings, they conclude that only a minimal percentage of users changes the highly permeable privacy preferences.

Slyke, Bilanger and Comunale (2004) discusses the role of trust in the web based shopping and provides empirical evidences with respect to the impact of trust in the electronic based economic transactions conducted between individual consumers and organizations.

Similarly, Golbeck and Hendler (2006) assign and examine the trust in web-based social nets and investigate how trust information can be mined and integrated into applications and introduces a definition of trust that "it is a commitment to an action based on a belief that the future actions of that person will lead to a good outcome".

Furthermore, Fogel and Nehmad (2009) also investigates trust and privacy in examining social networking sites, comparing facebook with MySpace there findings were in favor of facebook users exhibiting greater trust as compare to MySpace.

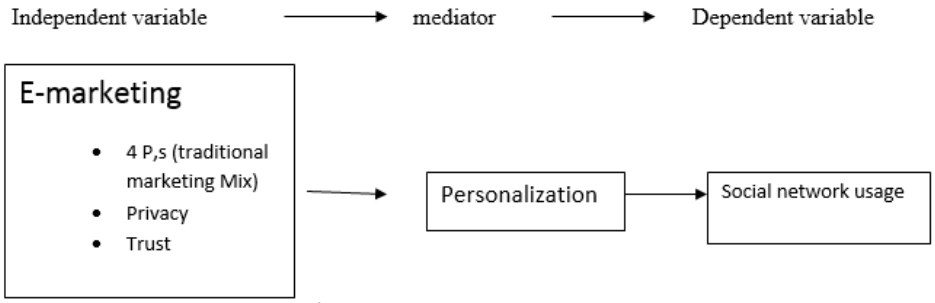
In addition to that Valenzuela, Park and Kee (2009), analyzes facebook as one of the most popular network site among college students and conclude a positive relationship between intensity of facebook usage and student's social trust.

Along with that , there exists so many issues related to social networking usage, including personalization, which is explained by Golbeck (2005), in her doctoral thesis, that its one of the property of trust that users put on the applications they uses in social networking sites, and discusses its importance , which was overlook in the past by these social networks.

Tucker, C. (2011). Provide evidence of personalization, using data from a randomized field experiment, concluding that users were twice as likely on personalized ads and recommend that increase in effectiveness was larger for ads that used most unique personal information to personalize their message. For this analysis they also introduced the element of improved privacy control.

Kalyanam and Maclntyre (2002), in their article develops a single unifying and theoretically based taxonomy for e-marketing techniques based on the paradigms of exchange, relationships and digital interactions in networks.

THEORETICAL FRAMEWORK



Adapted from Kalyanam and Maclntyre (2002).

On the basis of above literature and theoretical framework, the following hypothesis are drawn.

H1: personalization has significant impact on social networking usage.

H2: E-marketing has significant impact on social networking usage.

H3: Personalization mediates the relationship between e-marketing and social networking usage.

METHODOLOGY OF THE PAPER

This paper uses a convenience sampling technique, to examine the impact of e-marketing on social network usage. Eighty questionnaires were distributed among the students of different universities of Pakistan and fifty-six questionnaires were received back, with a response rate of 70%. Out of which Fifty-three questionnaires were valid and were used for regression analysis,

to examine the stated hypothesis. While three of them were not usable. The questionnaires that were distributed among the students were adapted from (Nyland 2007), (Orleao 2009) and (Anh, 2010).

Likert scale of 5 choices were used in this questionnaire, starting from left to right with Strongly disagree , disagree, neutral , agree and strongly agreed respectively.

EMPIRICAL ANALYSIS AND DISCUSSION

Demographic

The data collected from the students of different universities with the use of convenience sampling technique. The sample contain both male and female having different level of age and education. The respondents were advised to choose one social network among Facebook, Myspace and twitter. There were 42 respondents of Facebook user, comprising of 79.2% of the total collected questionnaires. Similarly, 7 and 4 respondents were of twitter and Myspace users, with a 13.2% and 7.5% of the total collected questionnaires respectively.

The questionnaire used in this paper was distributed after its pilot testing and confirm its reliability separately. The reliability of each variable is higher than the acceptance level. Social network usages have 0.706 alpha reliability. While the reliability of Personalization and e-marketing mix was 0.907, and 0.947 respectively. A sample of questionnaires is attached in Appendix 1 of the paper.

Table 1: Correlation

	Mean	St deviation	E-marketing	Personalization	Social network usage
E-marketing	3.4308	.97700	(.947)		
Personalization	3.7547	1.07807	.566**	(.907)	
Social network usage	3.5134	.76318	.708**	.497**	(.706)

** Correlation is significant at the 0.01 level (2-tailed). Alpha values are given in parenthesis

Table1, represent the correlation. This table shows that there is a positively strong significant relationship between personalization and social network usage, and positively strong significant relationship between e-marketing and social network usage. The relationship of personalization and e-marketing is also positively strong significant. On the basis of above relationships regression analysis were performed to measure the stated hypothesis. Table 2.a, Table 2.b and Table 2.c shows the results of linear regression analysis.

Table 2.a: R Square change

Model	R	R Square	Adjusted R Square	R Square Change	F Change	Sig. F Change
1	.497[a]	.247	.232	.247	16.738	.000
2	.717[b]	.515	.495	.268	27.582	.000

1. Predictors: (Constant), personalization

2. Predictors: (Constant), Personalization, e-marketing.

As mention in literature review, that Personalization is used as mediating variable. Table 2.a show the R^2 and change in R^2 after using personalization as a mediating variable. The value of

R^2, which is coefficient of determination, is 0.515, which means that the model explains 51.5 % of the dependent variable (social networking usage); the value of adjusted R^2 is 0.495.

Table 2.b: ANOVA

Model		Mean Square	F	Sig.
1	Regression	12.265	16.738	.000[a]
	Residual	.733		
2	Regression	12.775	26.522	.000[b]
	Residual	.482		

A; Predictors: (Constant), personalization B; Predictors: (Constant), personalization, e-marketing mix C; Dependent Variable: social_network_usage

Table 2.b. Explains the analysis of ANOVA. ANOVA analysis shows the overall fittness of the model. The null hypothesis of ANOVA is that the model is not fit for prediction, the values of the ANOVA table shows significant value, rejecting the null hypothesis of the ANOVA. This means that the model is fit for prediction.

Table 2.c: Regression analysis

		Standardized Coefficients		
Model		Beta	T	Sig.
1	(Constant)		4.047	.000
	Personalization	.497	4.091	.000
2	(Constant)		.270	.789
	Personalization	.142	1.190	.240
	e-marketing	.627	5.252	.000

a. Dependent Variable: social network usage

Table 2.c shows regression analysis. Regression is performed, using personalization as a mediating variable; model 1 of table 2.c shows that the separate impact of personalization is significant on social network usage having the t-statistic 4.091 and significance value 0.000 < 0.05 acceptance level of p-value. The beta value of individual personalization is 0.497, which means that one percent change in personalization will cause 0.497 percent change in social network usage. However, as a mediating variable the impact of personalization on social network usage is insignificant which is shown in table 2.c, model 2 having t-statistic 1.190 and significance value is 0.240 > 0.05 acceptance level of p-value. The beta value of personalization as a mediating is 0.142, which means that one percent change in personalization, as a mediating will cause 0.142 percent change in social network usage. This is against of our expectation and hypothesis that personalization play a significant mediating role between e-marketing and social network usage.

E-marketing has significant impact on social network usage having t-statistic 5.252 and significance level 0.000 < 0.05 acceptance level of p-value. Beta value of e-marketing is 0.627, which means that one percent change in e marketing will cause 0.627 percent change in social network usage, which is according to our expectation and hypothesis that e-marketing has

significant impact on social network usage. Arabie and Wind (1994) studied that social networks has significant impact on e-marketing strategies. Sarner (2007) suggests that e-marketing is a greater influence on consumer's online purchasing decision.

IMPLICATION OF THE STUDY

The implications of the study is that not only social network founders and revenue generators are contributing to the growth of online marketing alone, but also these online marketing activities have their strong influence on their operations and their worth is suggested not to be underestimated by these social media owners. Along with that, these owners of social networking sites are advised on the basis of above empirical evidence, to consider the e-marketing as a greater influence on their policies and their popularities among social network usage.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This paper is just an attempt to discover another feature of relationship that exists between the e-marketing and social networking usage. Due to time shortage a very small sample size is collected, which is directed to be extended in further research, LISERAL and AMOS are statistical software, and are suggested to be used for future research on this particular relationship.

CONCLUSION

This paper presents the theoretical model for e-marketing to hypothesize and explain its relationship with social networking usage. On the basis of above analysis, this paper concludes that the e-marketing is playing a significant role in the social networking usage, hence adding to the existing literature that was totally based on the social networking usage's impact on the e-marketing.

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APPENDIX 1

Questionnaire for measuring "The Impact of E-marketing on social networking usage"

Dear Sir/Madam,

We are MS students of International Islamic University Islamabad. We are conducting a Research on Social networking usage. Data will be used only for Research Purposes and will be kept Confidential.

Please tick the relevant answers from this questionnaire.

Name (optional) _____

1. Gender ( ) Male ( ) Female
2. Age ( ) 16-20 ( ) 21-25 ( ) 26-30 ( ) 31 and above
3. Education ( ) Inter ( ) Bachelor ( )Master ( ) MS/M.Phil
4. Please kindly mention your network: _____
   (e.g. facebook, twitter, myspace)

Listed below are statements to describe **Marketing mix** Please circle the number that best matches how much you agree or disagree with each statement. (Values range from 1, strongly disagree, to 5, strongly agree)	Level of Agreement Strongly disagree ⟷ Strongly agree				
1. The network I am evaluating is a good social networking site.	1	2	3	4	5
2. The network that I am evaluating is more effective in terms of cost.	1	2	3	4	5
3. I believe, that this network serves as a product of social interaction to me.	1	2	3	4	5
4. This network is of great value to me as a user.	1	2	3	4	5
5. The network I am evaluating is a good place for online market.	1	2	3	4	5
6. It's good to see the ads of other products on the site of the network I am evaluating	1	2	3	4	5
7. The network I am evaluating is a good place for advertisement.	1	2	3	4	5
8. The network I am evaluating is more effective in terms of time spent.	1	2	3	4	5
9. The network I am evaluating is more effective in terms of convenience	1	2	3	4	5
10. The network I am evaluating is having an effective marketing strategy.	1	2	3	4	5
Listed below are statements to describe **Trust** Please circle the number that best matches how much you agree or disagree with each statement. (Values range from 1, strongly disagree, to 5, strongly agree)	Level of Agreement Strongly disagree ⟷ Strongly agree				
1. This Social web site would do what it takes to make you happy in the future.	1	2	3	4	5
2. I would use the same social web site in the future	1	2	3	4	5
3. The Social web site would deal with you in a way that is in your best interests.	1	2	3	4	5
4. The Social web site can be trusted to do the right thing for you in the future	1	2	3	4	5
5. This social network is a trustworthy social network.	1	2	3	4	5

6. I can trust on this social network to protect my privacy.	1	2	3	4	5
7. I can trust this social network to protect customer information from unauthorized use.	1	2	3	4	5
8. This social network can be relied on to keep its promises.	1	2	3	4	5
9. I can trust the performance of this Social web site to be good	1	2	3	4	5
Listed below are statements to describe **Privacy** Please circle the number that best matches how much you agree or disagree with each statement. (Values range from 1, strongly disagree, to 5, strongly agree)	Level of Agreement Strongly agree ⟷ Strongly disagree				
1. This social network is concerned about user's privacy.	1	2	3	4	5
2. I am confident that I know how to control who is able to see my profile.	1	2	3	4	5
3. I have no privacy issue in using this social networking site.	1	2	3	4	5
4. This social network does not reveal User's personal data to other parties.	1	2	3	4	5
5. I feel safe about the privacy control of this social network.	1	2	3	4	5
Listed below are statements to describe **Personalization** Please circle the number that best matches how much you agree or disagree with each statement. (Values range from 1, strongly disagree, to 5, strongly agree)	Level of Agreement Strongly disagree ⟷ Strongly agree				
1. This network I am evaluating is interesting.	1	2	3	4	5
2. This network I am evaluating is easy.	1	2	3	4	5
3. I have the right of personalization in using this network.	1	2	3	4	5
4. This network has many familiar people, places, and things	1	2	3	4	5
Listed below are statements to describe **Social networking usage** Please circle the number that best matches how much you agree or disagree with each statement. (Values range from 1, strongly disagree, to 5, strongly agree)	Level of Agreement Strongly disagree ⟷ Strongly agree				
1. Social networks are part of my everyday activity.	1	2	3	4	5
2. I am proud to tell people that I am the user of this social network.	1	2	3	4	5
3. This Social network is a part of my daily routine.	1	2	3	4	5
4. I feel out of touch when I haven't logged onto this social networks for a while.	1	2	3	4	5
5. I feel I am part of the social networks community	1	2	3	4	5
6. I would be sorry if this social network shut down.	1	2	3	4	5