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Review

A review and analysis of plant maintenance and replacement strategies of manufacturing firms in Nigeria

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Maintenance is important to the success and continuity of firms, particularly in the changing society as ours. The effectiveness and the survival of organizations are largely enhanced by the ability of management to ensure that there is functional equipment, lands and building, infrastructure and fixtures. In the manufacturing setup, there is wear and tear of machines and equipment in periods of usage that require sufficient maintenance to enhance their useful life. This ensures reliability of the machines and equipments in the production plants as to uninterrupted production runs. Most manufacturing firms have lost their effectiveness and productivity, because of poor equipment maintenance. Poor attitude towards equipment maintenance hamper firm's operation. This study examined the principles of preventive and breakdown maintenance aimed at addressing the issues of negligence and lack of equipment maintenance. Also, the study focused more on maintenance and replacement problem solving, and the main difficulties are reported along with probable solutions.

Key words: Maintenance, preventive maintenance, breakdown maintenance, reliability and replacement.

INTRODUCTION

Mangers of organizations are particularly interested in the smooth functioning of their assets especially, in manufacturing firms, where machines and equipments are used in the workstations in the conversation of inputs to product outputs. The regular use of these machines and equipments results in wear and tear, diminishing the value of the asset. Thus, regular maintenance of the assets will improve their functionality and enhance the efficiency of the production process. These efforts

commonly include an examination of the maintenance function (Gustav and Hanna, 2012). Furthermore, the installation and layout of machines and equipments in a plant or factory and even the human resources are to bekept productive and reliable by having a maintenance performed by way of repair, rest, lubrication, and inspection. There are wears and tears of the components of the machine, by course of regular usage and even in a state of inertia as idle parts can rust, fixate and worn out.

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LITERATURE REVIEW

Abdul-Moshen (2008) is of the opinion that maintenance means to hold, keep, sustain or preserve facilities to an acceptable standard. Also, maintenance is a combination of technical and administrative activities to keep a machine or equipment in its functional state. Machines or equipment with poor maintenance will result in dysfunction that might likely result to production of defective products which affect the quality of the product in a production process. It involves reliability of the machines and equipments to perform to a standard level of quality assurance (Shohet, 2009). Again, poor maintenance of production facilities can result in poor end-product quality and customer dissatisfaction, lost production runs, cost inefficiencies, and sometimes, unavailability of the facility for future use (Lavy, Garcia and Dixit, 2010).

Unfortunately, most organization's facilities in Nigeria, for example the refineries, lack good maintenance due to relatively high cost of maintenance, and this results in frequent breakdown and stoppages (Usman et al., 2012). Hence, there is usually unchecked rapid deterioration of the facilities and consequent loss of functional value and maximizing the useful life of the facilities.

Maintenance is one of the major activities which account for up to 40% of total costs, in some Nigeria organizations (Eti et al., 2006). Thus, maintenance plays a significant role that in most manufacturing firms there is a maintenance department which includes both building components and equipment (Alberto and Giulio, 2012). In the traditional accounting, maintenance is regarded as an expense that can easily be included to overall business costs, particularly in the short term (Tsang, 2002). To reduce maintenance cost in the short run, preventive maintenance involving prompt inspection and service of potential areas of failure will minimize cost of maintenance. This is contrary to allowing equipment or machine to fail before repairing it where repair and replacement cost will increase maintenance cost at the long run (Campbell and Jardine, 2001). According to Chika (2008), no single support technique and system can adequately give required solutions for both natural and artificial defects on structures. Olanrewaju et al. (2011) assert that there is need for shift from maintenance management principles to value-based initiatives.

Maintenance is the activities done to preserve the initial condition of an equipment or asset while atoning for the normal wear and tear. Bagshaw and George (2015) observed that "facility maintenance is the effort in connection with different technical and administrative action to keep a physical asset, or restore it to a condition where it can perform a require function". The function of maintenance is to ensure the reliability of machines or equipments in the course of its use. The concept of reliability has been defined by Meredith (1992) as "the

chance that a product or service will perform as intended for a stated period under specific operating conditions." The concept here is in groups of services but can very well be applied to machines and their components. More so, Hinchcliffe and Smith (2004) defined reliability as the dependence on the acceptable level of performance of the functioning of an equipment or machine within its useful life under normal operating conditions.

In the flow production system, there is continuous production run, requiring constant operations of the machines and equipments necessitating periodic inspection and servicing.

Failure, to ensure regular and periodic preventive maintenance will result in loss of operation due to failures of the machines or equipments highlighted the aspects of availability and reliability of the systems' safety (Biolini, 2010). The machines are designed for a particular functional use and the reliability of the machine is assured as quality control measures in the design of the asset to minimize machine failures.

When active and efficient maintenance principles are applied, it reduces the failure rate of operational assets to its minimum resulting in increase in the amount of time the asset or machine will be available for use. Also, this will reduce overall operational cost of the firm. Hence the maintenance plays a significant role in the overall profitability of the firm.

The machines are designed to perform certain functions and it is thus expected to do it within a given period of use. Hence, maintenance is to ensure that the expectation in the functionality of the machine of plant or equipment does not fail. In emphasizing the need for maintenance, Banjoko (2009) stated "it is therefore for business organizations to devise optimal maintenance policy which would ensure that operational disruptions due to failure or breakdown of machines and equipment are minimized".

Objectives of maintenance

According to Banjoko (2009), the objectives of maintenance are:

1. To maximize the amount of time the machine, tools, equipment, building etc will be available for use and for the purpose for which they are required.
2. To enhance toe operational reliability of the machine, tools and equipment.
3. To minimize overall operational cost of production through reduction of scraps and wastages that may be due to the malfunctioning of the machines.
4. To preserve the value of the assets by reducing the rate by which they deteriorate.

These objectives reveal the "infant mortality" and "wear and tear" period of an equipment or machine.

Benefits of maintenance

Slack et al. (1995) had identified the following benefits of maintenance.

1. Enhanced safety.
2. Increased reliability, that is, less disruption of normal activities of operations, results in increased production outputs.
3. Higher product quality.
4. Lower operating cost.
5. Longer life span through regular care, cleaning and lubrication of facilities.
6. Well maintained facilities will earn higher scrap values.

Maintenance strategies

Slack et al (1995) classified the maintenance activities into three approaches. These are:

1. Run to Breakdown (RTB) which is typical to breakdown maintenance where maintenance work is performed only after a breakdown has occurred. Examples are televisions, telephones in a hotel's guest room.
2. Preventive maintenance which is a procedure of eliminating or reducing the likelihood of failure of an asset or machine through inspection (checking potential areas of failure); and servicing (cleaning, lubricating, replacing) the facilities at preplanned intervals. Example, the engine of an aircraft are checked, cleaned and calibrated by regular, routine check after a number of flight hours.
3. Condition Based Maintenance (CBM). This is in the class of preventive maintenance, allowing maintenance of the facility only when the opportunity is created to do so. The prompting factors that call for maintenance action are the measured values (condition data indicating a developing failure) which indicate that the asset or machine will require maintenance action (Holmberg et al., 2010).

This leads to higher probability of preventing failures. As long as the failure is a gradual process with a detectable deterioration, the condition can be monitored; CBM can be a useful tool in ensuring smooth operations (Gopalakrishnan and Banerji, 2004).

However, a mixed maintenance strategy is advised to be used. The run-to-breakdown strategic option will be preferable where repair of machines or equipments are simple and easier, and where preventive maintenance carried out in stopping or disrupting normal production runs is very costly.

Also, in situations where failure of the machines do not have prevalent random occurrence of failure or breakdown, preventive maintenance of such machines or equipments can be carried under a predetermined timeframe.

The conditioned-based maintenance strategy can be adopted where turnaround maintenance of the plant or facility require very high cost estimate and again where disrupting production runs will not be permitted as in continuous production, for example, the refinery plant. Plant maintenance not only involve repair or replacement of faulty parts when they fail, called corrective maintenance or breakdown maintenance but also to prevent the breakdown of such equipments or machines, even to prevent their poor performance.

Basically therefore, there are mainly two types of maintenance policies- the preventive maintenance policy and the breakdown maintenance policy. In the two maintenance policies, both preventive and breakdown, maintenance involves cost, and the problem of which policy to adopt is influenced by cost minimization.

Preventive maintenance

Preventive maintenance involves identifying potential areas of failure as to avoid breakdown which might be costlier. This is followed through by inspection, service and replacement of parts before they fail. Banjoko (2009) stated that preventive maintenance "involves the regular or periodic check and servicing of the machines, tools and other facilities used in the production process so as to delay or prevent the breakdown or the total failure of the facilities." Some managers argue that why anticipate failure when it had not occurred and spend money that can be routed to other areas of need. On the other hand, not anticipating failure and preventing it, is to be ready to have a breakdown perhaps earlier than expected. Sometimes a breakdown of a component will result in further damage of other parallel sometimes costlier components.

Furthermore, the problem with in undertaking a preventive maintenance is to have a stand-by facility, which might increase the cost of asset. Again, stopping the machines for routine maintenance will cut down on its operating time, bearing in mind that the operation mode and plant-specific variables have a direct impact on the normal operating life of machine (Mobley, 2004). While preventive maintenance might not be the optimum maintenance strategic option, it does have several advantages over that of the breakdown maintenance strategy. Undertaking preventive maintenance of machines and equipments will ensure that the functional state of the machine or equipment is maximized as in the design specification.

Preventive (routine) maintenance therefore requires regular, consistent check by inspection and the inspection following a question - format "When to inspect? Where to inspect? and How to inspect?" Each these inspection analyses are to ensure that the equipment designed and built remains, "trouble - free" and that the production system is said to have "good

maintainability". The inspection procedure is followed by servicing. This most times requires stand-by facility in order not to disrupt the production process. Sometimes, servicing involves routines such as cleaning, lubrication and other necessary actions to reduce tear and wear.

Preventive maintenance should be carried out in work centers, and it is essentially important in continuous or flow production systems where no slack time is given for maintenance jobs. Preventive maintenance can be carried out therefore based on:

1. Time based, that is, periodic regular inspection and service.
2. Capacity or output based, that is, regular maintenance of machines parts, carried out after a pre-determined production output capacity.
3. Opportunity based. This occurs when there is no stand-by facility and where the equipment or machine is daily required such that the single facility cannot be halted for routine maintenance work. However, in periods of low production (downtime) change, in plant layout necessitating a general stoppage of work then the opportunity is created for routine maintenance.

In evaluating the Just-in-Time (JIT) philosophy, Adam and Ebert (1992) stated that "a distinctive feature of JIT environments is the constant attention to scheduled daily preventive maintenance of equipment". They went further to state that, "preventive maintenance runs counter to the traditional philosophy that machinery depreciates to a value of zero over a function of years".

In JIT production, the production process can be halted and machines lubricated, parts replaced where necessary. Meredith (1992) indicated that high reliability and good maintainability are important in the implementation of JIT system.

Some of the benefit of preventive maintenance includes:

1. It helps to curtailed pre-determined maintenance
2. It provide longer maintenance intervals
3. It helps to trim corrective maintenance and fewer unplanned breakdowns

Breakdown maintenance

When there is actual failure of the machine or equipment that have been in use until they fail to operate, then the breakdown maintenance strategy is the option to adopt. Breakdown maintenance involves the repair or replacement of faulty parts; often it occurs as an emergency in nature and requires a cost premium (Monks, 1996). Breakdown or corrective maintenance is a procedure to correct the faulty machine or equipment. Breakdown of machine will disrupt the production process especially in product layout where a breakdown of one machine will halt the production process causing a stoppage of the plant. The corrective maintenance takes

time, and with some specialized equipments, there is need for an expatriate or service personnel from the foreign manufacturing firm. Also, other associated breakdown costs are:

1. Loss of production output which can cause delay in product delivery dates.
2. Paying idle factory staff coupled with overtime costs that are sometimes doubled compared to regular pay to make up for the loss in output during the period of breakdown.
3. Also, in order not to disappoint customer orders, such orders are subcontracted out. Subcontract costs can be high, but more important is the stockout cost created by such idle capacity due to breakdown.

Meredith (1992) stated Murphy's Law that, "what can go wrong will go wrong. And it will go wrong in exactly the worst possible way, at the worst possible time, and in the worst possible place." Therefore, goes the saying prevention is better than cure.

However, firms are unwilling to undertake preventive maintenance where there are low budgetary allocations for such routine maintenance. For example due to lack of funds, routine turn-around maintenance (TAM) could not be carried out in the refineries resulting in breakdown of machines that could not easily be repaired or replaced because of the higher costs involved. Other government establishments in Nigeria, such as the Nigerian Fertilizer Company (NAFCO) at Onne in Rivers State; Ajaokuta Steel at Kogi State; Alaja Steel company at Delta State are all replicates of poor maintenance culture resulting in complete breakdown of such plants.

Total productive maintenance

Total productive maintenance (TPM) is the maintenance that is carried out by all employees through small group activities (Slack et al., 1995). The concept of total production maintenance started in Japan. Nakajima (1998) stated the goals of TPM as:

1. Improve equipment effectiveness.
2. Achieve autonomous maintenance, that is, to allow the operators using the machines or equipment to be responsible and knowledgeable in undertaking some level of maintenance tasks.
3. Plan maintenance that is, having a schedule programme on maintenance task.
4. Train all staff in relevant maintenance skills. Training will ensure that both maintenance and operating staff have all the skills to do their tasks.
5. Achieve early equipment management. This is geared towards 'maintenance prevention. Maintenance prevention involves identifying the course of failure and the 'maintainability' of equipment.

Table 1. Quadrant on Total Productive Maintenance.

Maintenance staff	Operating staff
Roles to develop: Preventive actions; Breakdown services	To take on: Ownership of facilities
Responsibilities train operators: Devise maintenance Practice; Problem solving; Assesses operating practice	Correct operation: Routine preventive Maintenance ; Routine condition based maintenance

Source: Operations management Slack et al. (1995).

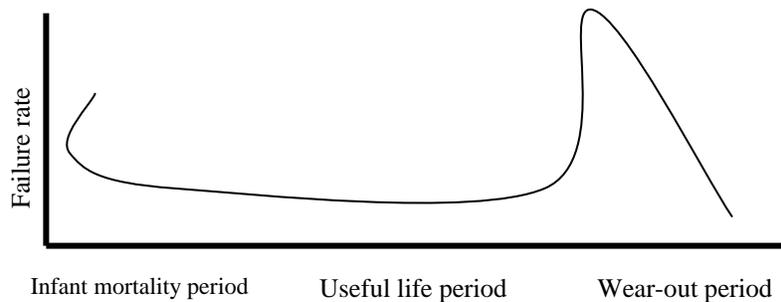


Figure 1. Typical system failure rate distribution (Source: The management of operations: A conceptual emphasis, Meredith (1992)).

Slack et al (1995) developed a 2x2 matrix model of the roles and responsibilities of operating staff and maintenance staff in TPM (Table 1).

Reliability of a machine over the usage period

In a typical failure rate distribution as shown below, there are three systems’ failure rate distributions, infant mortality period, useful life period and wear-out period in determining the degree of reliability of the machine or equipment.

From Figure 1, reliability is the chance that a machine or equipment can last this long of the useful life of the machine or equipment. The reliability of the machine or equipment is time dependent, and if the mortality rate and wear-out failures are relatively insignificant, then the items that fail during the useful life can be estimated to determine reliability.

According to Meredith (1992), if the time taken before failure, T is very short, then there is high reliability; that is, the probability that the machine will last through its useful life is high. However, if T is very long, then the machine’s reliability is very low. Reliability for time $T = e^{-T/MTBF}$ where, e is exponential distribution and MTBF is the mean time between failures. Statistically, it was found out that the failures that occur within the useful life of the machine are relatively random and the time between

failures follows the negative exponential distribution. Meredith (1992) Moving beyond the useful life to the wear-out period, we can appreciate that assuming that most of the failures occur during the wear-out period, the distribution of failures follows approximately the normal distribution.

In determining the reliability of equipment used in Rivers Vegetable Oil Company (RIVOC), Port Harcourt; four random samples of that equipment was taken, and tested: data presented showed that one failed at 120 hours, one at 900 hours, one at 1380 hours and the last one at 2400 hours respectively.

The average or mean time before failure:

$$(MTBF) = \frac{120 + 900 + 1380 + 2400}{4}$$

= 1200 hrs.

The probability of failure, $P(f) = 1 - R$; where R is reliability

$$\text{Reliability} = e^{-\frac{T}{MTBF}}$$

n = cumulative time = 3000 hours

T = number of samples = 4

MTBF = mean time to failure = 1200 hours

$$\text{Therefore, } R = \frac{e^{-\frac{3000(4)}{1200}}}{e^{-10}}$$

$$\text{But } P(f) = 1 - e^{-10}$$

$$\text{Therefore } P(f) = 0.999$$

The probability of failure is higher, which show that the proper maintenance policy is not been carry out or implemented in this organization.

The replacement problem

When a breakdown occurs, there is either a repair or replacement and essentially, there are certain components or parts like the fan belt that need replacement. Also, in other institutions, the high buildup of maintenance cost can warrant a replacement especially in long life assets (machines or plant). Meredith (1992) stated that the replacement problem is an economic issue as either in terms of:

- 1., The optimum life, that is, the situations where the most economic future time to replace current asset with another identical one. Or,
2. The value of a "challenger". Here due to technological innovation, a new machine was developed and available for more effective performance of task.

It is typical that, as the asset deteriorates over its life, it results in higher operating costs and loss of resale value. As the rate of usage of the machine increases; the operating cost increases due to reduced efficiency, wear and increased maintenance cost. Also, with the higher life span with deterioration, the salvage value of the asset decreases. It is necessary to determine the annual capital loss in the value of the asset for each year, and the annual operating cost.

The cumulative cost values for the annual capital loss and the annual maintenance cost are summed up to give the total cost for each respective year in the life of the asset. The optimum life cycle is that year where the average of the total cost element is minimized. Initially, the average cost decrease but begins to increase and at that point the machine should be replaced.

The optimum life problem exists for operating equipment with losses in value of the asset with age and use. As in the case of the "challenger" a new machine can be in the market, resulting in the "premature" replacement of the old asset. This seldom occurs in event of replacement of machines to newer more efficient ones. The reason given by most Nigerian manufacturing firms is their inability to assess foreign exchange and the high cost of operations from self-power supply. The cost analysis creates a situation where the decision has to be either to accept the loss in the resale of the old asset or

in purchasing the new asset termed the "challenger".

In applying the present value (pv) concept, the approach is to compare the costs and revenues of the old machine against that of the new machine so as to have an optimize solution of net present value (NPV).

Group versus individual replacement

In contrast to the replacement policy in items that deteriorate, there is one replacement decision analysis in replacing items that fail suddenly. Examples of such items are fan belt, safety valves, electrical bulb, etc. The replacement decision analysis is done in two categorizations. Individual replacement of items as failure occurs; or Group replacement of all the items that fail at the end of a given period coupled with items that was replaced previously but has now failed.

Items that failed suddenly

This involves items that fail suddenly without a priori notice but with cost consequences of failure and/ or installation costs. It is therefore necessary to estimate the various costs involved and choose the least cost. The costs calculations are:

1. Purchase price of the item to be required.
2. Labour cost.
3. Consequential cost of failure.

While (1) and (2) are quantitative inputs into the decision model; (3) is a qualitative input that can be used to obtain improved decision in having an optimal replacement policy. In items that fail suddenly, two cost components are involved:

Individual replacement policy

Step 1: Determine expected life of the item using the probability distribution of failure from historical data.

$$E(x) = \sum Xi Pi$$

where X_i = length of time item had been in use

P_i = probability of item failing in time x

Step 2: Determine average replacement per time period.

$$R_a = \frac{N}{E(x)}$$

where R_a = average replacement,

N = number of items that need replacement.

Step 3: Determine total cost of individual replacement = $R_a \times c$.

where c = unit cost of the item.

Group replacement policy

This involves individual replacement on failure followed by mass replacement after every interval as to locate the alternative that results in the least average replacement cost in each of the calculated group replacements.

Step 1: Determine the given replacement per time period:

R_1 = first group replacement in time period
 $R_1 = NP_1$ (replacement in first period 1, with probability of failure P_1)
 $R_2 = NP_2 + R_1P_1$ (replacement in period 2)
 $R_2 = NP_3 + R_1P_2 + R_2P_1$ (replacement in period 3)
 $R_n = NP_n + R_1P_{n-1} + R_2P_{n-2} + \dots + R_{n-1}P_1$ (replacement in n period, of items that were replaced previously but have now failed).

Note, as R increases, P decreases,

Step 2: Determine sum of group replacements (S_i)

$S_1 = R_1$ (for the first group replacement)
 $S_2 = R_1 + R_2$
 For group replacement at end of time t^n .
 $S_n = R_1 + R_2 + R_3 + \dots + R_n$

Step 3: Determine total replacement cost (T_c) for each replacement option

Step 4: Determine Average replacement cost (AC) for each replacement option

$$AC = \frac{TC}{n}$$

Decision criterion

The replacement cost in individual replacement policy and the average replacement cost for each option under group replacement (with intervening individual replacement) are compared, and the option with the least cost accepted as the optimal strategy.

Example 1: Example on replacement policy of items that fail suddenly

Nigeria Engineering Works (NEW) has a factory with 500 machines each with two fan belts, wants to apply an appropriate replacement policy for the fan belts that are likely to fail suddenly. The following information is provided for the likely number of failures for a given five month.

Month: 1; 2; 3; 4; 5
 Probability of failing: 0.10; 0.15; 0.25; 0.30; 0.20

Assuming the unit cost for the fan belt is ₦45 and the group replacement cost is ₦12000. The company is considering the alternative of replacing the fan belts as they fail; or replacing all the fan belts that fail in a given month together with all items that have previously failed. Advise management on the best strategy.

Solution to the problem on items that fail suddenly

Number of fan belts installed (N) = 1000
 Cost of individual replacement = ₦45.00 per fan belt
 Mass replacement cost = ₦12000
 Month: 1; 2; 3; 4; 5
 Probability of failing: 0.10; 0.14; 0.25; 0.30; 0.20

1. Individual replacement policy:

$$\begin{aligned} \text{Expected life } E(x) &= 1(0.1) + 2(0.5) + 3(0.25) + 4(0.3) + 5(0.2) \\ &= 3.35 \text{ months} \\ \text{Average replacement } (R_a) &= \frac{N}{E(x)} = \frac{1000}{3.35} \end{aligned}$$

$$\begin{aligned} &= 299 \text{ per month} \\ \text{Cost of individual replacement} &= R_a \times C \\ &= 299 \times ₦45 \\ &= ₦13455 \text{ per month} \end{aligned}$$

2. Group replacement at end of first month:

$$\begin{aligned} \text{Replacement in first month} \\ R_1 &= NP_1 \\ &= 1000 \times 0.10 \\ &= 100 \\ \text{Sum of replacement as at } t_1 &= S_1 \\ S_1 &= R_1 = 100 \end{aligned}$$

$$\begin{aligned} \text{Total cost} &= (S_1 \times C) + G \\ &= (100 \times 45) + 12000 \\ &= 4,500 + 12000 \\ &= ₦16500 \\ \text{Average cost} &= ₦16500 \text{ per month} \end{aligned}$$

3. Group replacement at end of second month:

$$\begin{aligned} R_2 &= NP_2 + R_1 P_1 \\ &= 1000 \times 0.15 + 100 \times 0.10 \\ &= 160 \\ \text{Sum of replacement as at } t_2 &= S_2 \\ S_2 &= R_1 + R_2 \\ &= 100 + 160 \\ &= 260 \\ \text{Total cost} &= (S_2 \times C) + G \\ &= (260 \times 45) + 12000 \end{aligned}$$

$$= 11700 + 12000$$

$$= \text{N}23700$$

$$\text{Average cost} = \frac{\text{N}23700}{2} = \text{N}11850 \text{ per month}$$

4. Group replacement at end of third month Replacement in third month:

$$R_3 = NP_3 + R_1 P_2 + R_2 P_1$$

$$= (1000 \times 0.25) + (100 \times 0.15) + (160 \times 0.10)$$

$$= 281$$

Sum of replacement as at $t_3 = S_3$

$$S_3 = R_1 + R_2 + R_3$$

$$= 100 + 160 + 281$$

$$= 541$$

$$\text{Total cost} = (S_3 \times C) + G$$

$$= 541 \times 45.0 + 1200$$

$$= 24,345 + 12000$$

$$= \text{N}36,345$$

$$\text{Average cost} = \frac{\text{N}36345}{3} = \text{N}12115 \text{ per month}$$

5. Group replacement at end of fourth month

Replacement in fourth month

$$R_4 = NP_4 + R_1 P_3 + R_2 P_2 + R_3 P_1$$

$$= (1000 \times 0.3) + (100 \times 0.25) + (160 \times 0.15)$$

$$+ (281 \times 0.1)$$

$$= 377$$

Sum of replacement as at $t_4 = S_4$

$$S_4 = R_1 + R_2 + R_3 + R_4$$

$$= 100 + 160 + 281 + 377$$

$$= 918$$

$$\text{Total cost} = (S_4 \times C) + G$$

$$= (918 \times 45.0) + 12000$$

$$= 41310 + 12000$$

$$= \text{N}53510$$

N53310

$$\text{Average cost} = \frac{\text{N}53310}{4} = \text{N}13328 \text{ per month}$$

6. Group replacement at end of fifth month

Replacement in fifth month

$$R_5 = NP_5 + R_1 P_4 + R_2 P_3 + R_3 P_2 + R_4 P_1$$

$$= 1000 \times 0.2 + 100 \times 0.3 + 160 \times 0.25$$

$$+ 281 \times 0.15 + 377 \times 0.1$$

$$= 350$$

Sum of replacement as at $t_5 = S_5$

$$S_5 = R_1 + R_2 + R_3 + R_4 + R_5$$

$$= 100 + 160 + 281 + 377 + 350 = 1268$$

$$\text{Total cost} = (S_5 \times C) + G$$

$$= (1268 \times 45.0) + 12000$$

$$= 57060 + 12000$$

$$= \text{N}69060$$

5

$$= \text{N}13812 \text{ per month}$$

Average replacement cost is minimized at option (iii) mass or group replacement at end of second month.

Source: From the Author

Items that deteriorate

Some equipment can be kept operating with satisfactory performance for a long time. However, the annual maintenance cost will increase, while annual resale value of the asset decreases. It therefore becomes necessary that in determining to replace such assets proper cost analysis are made to determine the most replacement time, ignoring inflationary rate, and other factors that might influence the replacement decision. Categories of cost include:

1. Annual capital loss (difference between market value the beginning of the year and at the end of the year.)
2. Annual maintenance costs.

The two costs are cumulated over the years of use and are added together to obtain the cumulative total cost, and then the average cost annually. The minimum average annual cost shows the optimum replacement time option. This is because at that point (year) average total maintenance cost including annual capital loss of the asset and the annual maintenance or operating cost is minimized.

Example 2: Example on replacement policy of items that deteriorate

The management of a manufacturing company wishes to decide when to replace a certain machine with initial outlay of N200,000. The scrap value remains constant at N1,800. Maintenance costs have been reliably estimated as follows:

Year:	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12
Maint.cost (N)	200; 400; 700; 1100; 1600; 2200; 2800; 3400; 4100; 4900; 5800; 6800

Solution to the problem on items that deteriorate

In the aforementioned problem, the criterion for replacement is the minimization of the average annual cost over the life of the equipment. Since the resale value of the asset over the years remains constant, then the annual capital loss will be zero after the first year of use. The cumulative annual capital loss is therefore the same value over the useful life. Cumulative capital loss constant.

Table 2. Solution on items that deteriorate.

Years in usage	Cumulative capital loss	Annual maintenance cost	Cumulative maintenance cost	Total cost	Average annual cost
1	₦18.200	₦200	₦200	₦18.200	₦18.200
2	"	400	600	18.800	9.400
3	"	700	1300	19.500	6.500
4	"	1100	2400	20.600	5.150
5	"	1600	4000	22.200	4.440
6	"	2200	6800	25.000	4.167
7	"	2800	9600	21.800	3.971
8	"	3400	13000	31.200	3.900
9	"	4100	17100	35.300	3.922
10	"	4900	22000	40.200	4.020
11	"	5800	27000	46.000	4.182
12	"	6800	34000	52.800	4.400

Source: From the author.

= ₦20.000 - ₦1.800
= ₦18.200

The result to the problem solution is presented in Table 2. The decision is to replace the equipment after 8 years of use. However, better decisions will result in the consideration of time value of money, the book value of the asset and capital need for effecting the replacement.

CONCLUSION

One of the driving forces behind maintenance in manufacturing firms is the continuous improvement in technological development. The issues here that concern maintenance most are the concept of process of innovation which has to do with the development of new technologies. This is not seen to be encouraging in technology adoption of manufacturing firms especially small and medium firms (SMEs) in Nigeria with obsolete manufacturing processes. Small and medium manufacturing firms may lack the capacity to improve productivity through acquiring new technologies.

Nigeria SMEs is extremely important and contribute significantly to the economic growth particularly to the nation's gross domestic product (GDP). SMEs are important source of capacity building and the diversification of the entire economy. Thus, maintenance strategists can ill-afford to ignore the technological environment since technological function define the business of organizations. Therefore, it can then be deduced that firms that practice modern technology adoption in the production system are more likely to innovate and improve on their product competitiveness. Furthermore, constraints to full industrial maintenance management include limited source of allocated funds to acquire modern machines that have efficient processes,

high cost of financing bank loans and high tariffs and levies on imported spare parts of manufacturing. Also, price fluctuations in developing countries like Nigeria have serious effect on manufacturing firms. In the current recession experienced in the Nigerian economy with high exchange rate has appeared to affect the prices of materials used in maintenance. The need for effective maintenance policy is dependent on impending or actual failure of the machine or equipment. Therefore, undertaking maintenance programme is to ensure continuous functioning of the machine or equipment. The useful life of most machines or equipment requires periodic maintenance in order not to disrupt production runs.

Having identified and discussed the various maintenance strategies and replacement policies, a mixed maintenance strategy is advised where it is applicable in enhancing the performance of the facility. Also, production and operations managers should adopt the optimum replacement policy of machines and equipment to have at least cost of maintenance and maximize production efficiency.

Conflicts of Interest

The author has not declared any conflict of interests.

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Full Length Research Paper

Leadership styles in organizations during harsh economic environments

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This study seeks to add to the knowledge gap on leadership styles in organizations under harsh economic environments by assessing the leadership styles of senior managers and chief executive officers in the private and public sectors and to correlate the organizational performance to the styles. A survey research design using self-administered questionnaires was used in this study. Questionnaires (150) were sent out to the major companies throughout Zimbabwe targeting senior managers and chief executive officers. Convenient sampling and snowball sampling were used to identify the organizations used in the study. Statistical Package for Social Sciences (SPSS) version 16.0 and MINITAB statistical package were used for analyzing data. Transactional leadership style was the dominant style in both the private and public sectors in the time of economic uncertainty. Contrary to widely held views, the private sector managers excelled on transactional leadership style compared to their counter parts in the public sector. The results suggest that during hard times or in economic crisis, leadership styles may change to suit the environment. In particular, transactional leadership style becomes a dominant style if organizations are to succeed in the maintenance of high standards of performance and retention of skills. In times of crisis, both transformational and transactional leadership styles are important for the survival of organizations. Although leadership styles have been studied in different organizations, information on studies in the public sector has lagged behind. The study described in the study is the first to consider leadership styles in the two sectors under harsh economic conditions (highest recorded inflation). As such, this study gives insight to managers and chief executive officers on how to keep performance high.

Key words: Transformational leadership, transactional leadership, public sector, harsh economic conditions.

INTRODUCTION

"The theory of the Ecology of organisations proposes that the management team does not influence the organisation's

outcomes" (Pedraja et al., 2006a).

The theory proposes that individual leaders such as the

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chief executive officer (CEO) are not important in determining the performance of the organizations. Instead it is proposed that there are external determinants of the performance of an organization which are beyond the leader's control. These factors include economic conditions, market conditions, technological change and government policies (Yukl, 2002).

Proponents of the theory further argue that the CEO has limited discretion to make any improvements because of internal and external constraints. The theory implies that there is a natural selection process as happens to living organisms where the environment determines which companies would survive and like in a biological system, the fit survive. Other studies however, argue stressing the importance of executives for the performance of large organizations (Yukl 2002).

This theory argues that leaders have a major influence on organizational performance and that top management team does influence certain strategic decision making and as a result influence the performance of companies. This alternative to the Ecology of organizations is called the Upper Echelons theory (Pedraja et al., 2006a). Waldman et al. (2001) proposed to include the issue of leadership style in the Upper Echelons theory because of its perceived impact on the performance of organizations.

LITERATURE REVIEW

According to Arvonen and Ekvall (1999), the field of leadership style theory has two views when it comes to defining effective leadership. The first states that there is one universal leadership style that is effective for all situations. The second view suggests that effective leadership style is contingent on the characteristics of the leadership situation (Arvonen and Ekvall, 1999; Yukl, 2002). The leadership styles that have been studied immensely in the recent literature include transformational and transactional styles. It is widely agreed that these leadership styles are better predictors of organization performance (Arvonen and Ekvall, 1999). Pedraja et al. (2006a) studied leadership styles and their effectiveness in small firms in Chile. They found that supportive leadership style was prominent and that both supportive and participative leadership styles had a positive influence on the effectiveness of small organizations (Pedraja et al., 2006a).

A decade of harsh economic conditions which prevailed in Zimbabwe between 1998 and 2008 presented an opportunity to enable an exploration of leadership styles in both the private and public sectors under an economic crisis. Public sector organizations in Zimbabwe faced increasing economic and social pressures to reform managerial and organizational practices in order to survive. The period was also characterized by a loss of skills base and a rise in the informal sector which meant many people left formal employment. According to a

report in the Wikipedia (Wikipedia, 2008), unemployment in Zimbabwe reached 85% while inflation which was reported to be the highest in the world then, stood at 100 000%. There are no records describing leadership styles prevalent in either the private or public sectors in Zimbabwe.

The possible effects of styles that have been studied elsewhere on performance of Zimbabwean organizations especially during a crisis are not known. Bass (1985) indicated that transformational leadership is more likely to reflect social values and to emerge in times of distress and change while transactional leadership is more likely to be observed in a well-ordered society. Most of the studies to date have examined transformational and transactional leadership in units that operated within relatively stable conditions. It is not known if the leadership style in Zimbabwe has changed in the past decade given the distressful economic environment. Since the beginning of the economic problems in Zimbabwe a decade ago, a handful of companies have gone international and some have listed on the stock exchange signifying good performance. The present study suggests that the major variable could be leadership style. The study therefore seeks to assess the leadership styles of senior managers and chief executive officers in the two sectors and to try and correlate the organizational performance to the styles. The three leadership styles considered are transformational, transactional and laissez faire.

Transformational and transactional leadership have been used to predict unit performance (Bass and Avolio, 1994). In their study, Bass et al. (2003) found that both transformational and transactional contingent reward leadership ratings of platoon leaders and sergeants positively predicted unit performance. This was one of the few studies that have examined how transformational and transactional leadership predict performance and how each style would predict unit performance operating in challenging and uncertain conditions.

Bass et al. (2003) found out that contrary to earlier research, both contingent reward and transformational leadership of the platoon leader equally predicted performance. It was concluded that transactional leadership that deals more with intrinsic motivators and recognition may overlap more with transformational leadership. The researchers further suggested that the type of transactional leadership where recognition is more individualized, may be a bridge to transformational leadership. This is in contrast to Howell and Avolio (1993), whose observation was that transformational but not transactional leadership of financial managers positively predicted unit performance over a one year period. Similar observations by Geyer and Steyrer (1998) in an evaluation of managers heading Australian branch banks, reported a stronger positive relationship between transformational leadership and long-versus short term performance.

Organizational literature on leadership theories and transformational leadership has increased in the past 20 years for the private sector. However, public sector literature has lagged behind. Researchers studying organizational leadership in the public sector, have commented on the lack of rigorous empirical examination of the proposed theories in public sector organizations (Javidan and Waldman, 2003) and pointed out several critical weaknesses of the models (Van Wart 2003). There are thus very few studies which have evaluated the role of transformational and transactional leadership styles in the public sector organizations.

However, public sector organizations are experiencing increasing economic and social pressures to reform managerial and organizational practices (Javidan and Waldman, 2003). There is pressure on the managers to pay close attention to client and employee satisfaction and at the same time consider performance outcomes. In their studies, Lowe et al. (1996) suggested that charismatic leadership was more prevalent in public sector organizations. However, their conclusions were dismissed as it was pointed out that their analysis was not representative of actual government departments. Javidan and Waldman (2003) found out that charismatic leadership was more or less conceived in public sector organizations. However, such leadership may have difficulties to produce the types of performance and motivational results associated with the private sector, because of political or bureaucratic considerations.

Trottier et al. (2008) found out that employees considered transformational leadership to be more important than transactional leadership in federal or government setting. However, in the study, the federal workers ranked their leaders higher in transactional leadership factors than transformational factors. The researchers argued that government managers tend to be slightly stronger on management by exception and contingent reward and weak in instilling enthusiasm and a sense of empowerment.

Trottier et al. (2008) placed individualized consideration under transactional leadership. Most studies including our current study have placed this behaviour under transformational leadership (Bass et al., 2003). Trottier et al. (2008) drew the following conclusions from their study: that good leadership seems to depend more on transformational elements than transactional. They also recommended that leaders in government settings in addition to traditional technical and managerial skills of the past, they need to be honed in transformational competencies of mission, vision and inspirational motivation.

One sector in which leadership styles, especially that of transformational and transactional styles have been discussed, is nursing management (Thyer, 2003; Murphy, 2005; Chen et al., 2005). A number of these studies have concluded that health care leadership runs under transactional style (Thyer, 2003; Murphy, 2005). Some

observations suggest that both transactional and autocratic styles predominate (Murphy 2005). Transformational leadership style has been recommended by several studies for the health sector. It is envisioned that transformational leadership style is ideologically suited to nurses and may ensure the future of nurses and nursing in the health care sector (Thyer, 2003).

Though several observations seem to imply that transformational leadership is the preferred style for most organizations, other observations suggest that the two styles may operate together. For example, Trottier et al. (2008) suggested that both transactional and transformational leadership are perceived as important in government settings, although transformational leadership is considered more important. Geyer and Steyrer (1998) reported that transactional leadership predicted the short-term financial performance of bank branches while transformational leadership exhibited stronger predictions over a long period of time.

The current study seeks to explore the prevalence of transformational and transactional leadership styles in the private and public sectors under harsh economic conditions in Zimbabwe. Since there are no records of similar studies in Zimbabwe, the study is the first of its kind. The study does not attempt to comment on the leadership styles that may be present in retail, manufacturing and other sectors because of the limitation of sample size to make meaningful conclusions as sector specific studies have to be undertaken to draw firm conclusions.

Research questions and hypotheses

Main research question (1): Are there any differences in the leadership styles between private and public sector organizations in Zimbabwe?

Main Hypothesis 1: Leadership styles in private and public sectors are different in Zimbabwe

Sub-hypothesis (i): There are differences in transformational leadership in public and private sectors

Sub-hypothesis (ii): There are differences in transactional leadership between public and private sectors

Sub-hypothesis (iii): There are difference in laissez faire leadership between public and private sectors. The three sub-hypothesis (i-iii) will be used to answer the main hypothesis

Leadership styles especially transactional and transformational have been studied in several organizations. In a recent study, Trottier et al. (2008) found out that employees considered transformational

leadership to be more important than transactional leadership in federal or government setting.

However, in the study, the federal workers ranked their leaders higher in transactional leadership factors than transformational factors. Burns (1978) reported that transactional leadership was predominantly found in bureaucratic organizations like government organizations. This implies that private organizations may have transformational leadership style. Other studies have suggested that leadership styles in organizations may be affected by stressful and harsh conditions.

According to Bass et al. (2003) the maintenance of high standards of performance under challenging environments requires both transformational and transactional leadership styles. The harsh economic conditions in Zimbabwe present us with an opportunity to study leadership style in organizations in Zimbabwe. The items that will be used to measure this hypothesis are questions 6 to 11 for transactional leadership, questions 13 to 23 for transformational leadership and questions 24 to 28 for laissez faire leadership style.

Research question 2

Is there a single or dominant leadership style that could be associated with public or private sector organizations in Zimbabwe?

Hypothesis 2: Transactional leadership is the dominant leadership style in public sector organizations

Burns (1978) reported that transactional leadership was predominantly found in bureaucratic organizations like government settings. Many studies especially in nursing institutions have reported the prevalence of transactional leadership in the nursing institutions and have pointed the need for transformational leadership (Murphy, 2005; Thyer, 2003). Given the earlier mentioned sentiments, transactional leadership is expected to be the dominant leadership in public sector organizations. In order to measure transactional and transformational leadership, the questions 6-11 and 13-23 were used respectively. The combined means for the items were compared using *t-test*.

Research question 3

Is there are particular leadership style that could be associated with good organizational performance under harsh economic environment in Zimbabwe

Hypothesis 3: Organizations in which transformational leadership is the dominant style perform better than those where transactional dominate.

Hypothesis 4: Are the leadership styles that are

associated with good performance in the public sector the same as those in the private sector?

Hypothesis 5: Do organizations having a greater diversity of leadership styles in the organization perform better than those that have low diversity of leadership styles.

A number of studies have attempted to correlate leadership style and the performance of organizations (Evkall and Ryhammar, 1997; Pedraja et al., 2006b; Bass et al., 2003). Berson and Linton (2005) found that transformational leadership more than transactional contingent reward leadership, supported the development of quality environment. Studies by Pedraja et al. (2006b) with small firms in Chile showed a positive influence on the effectiveness of the firm in the case of transformational leadership while negative effect was seen in the case of transactional and laissez faire leadership.

A review by Elkins and Keller (2003) suggested that "transformational leadership" appears to be an effective style for use in Research and Development (R&D) settings. Certain behaviours of transformational leadership which included mission awareness were important in predicting the success of R&D projects (Pinto and Slevin, 1989).

However, in recent studies by Berson and Linton (2005) on the role of leadership style in R&D and administrative environments, it was concluded that both transformational leadership and transactional contingent-reward leadership were related to the establishment of quality environment in the R&D part of telecommunications firm.

Contrary to earlier research, Bass et al. (2003) found out that both contingent reward and transformational leadership of the platoon leader equally predicted performance. It was concluded that there could be an overlapping of transactional leadership and transformational leadership. The aforementioned observations are at variance with observations by Howell and Avolio (1993), who noted that transformational but not transactional leadership of financial managers positively predicted unit performance over a one year period. The questions from the questionnaire that have been used to assess both transformational and transactional leadership style will be used. Performance questions (29, 37, 38 and 41) from the questionnaire will be used. The concept of profit was not considered as there were not for profit organizations. Some of the questions helped to clarify the main questions.

Research question 4

Does leadership style have a greater influence on the performance of an organization than political and

economic variables?

Hypothesis 6

The performance of organizations in Zimbabwe is attributed to leadership styles than political and economic variables. The literature cited earlier has indicated that leadership style plays an important role in the performance of organizations. Bass (1985) argues that "transformational leadership energizes groups to persist when conditions are unpredictable, difficult, and stressful". Since the economic environment in Zimbabwe over the past ten years has been difficult, any good performance by organizations may be attributed to leadership styles. Performance items (29, 37, 38, 40 and 41) were used to establish the relationship between leadership styles and the performance of organizations in Zimbabwe. Analysis will involve stepwise regression analysis of each performance item carried out against the three leadership styles (transactional, transformational and laissez faire).

METHODOLOGY

Research design

A survey research using a self-completion questionnaire also called a self-administered questionnaire was used in this study to gather information on leadership style from organizations. In studies to assess leadership styles, several methods have been used by a number of researchers. Shea (1999) studying the effect of leadership style on follower's performance improvement on a manufacturing task over time, utilized an experimental methodology. The experiment used students who were randomly assigned to one of three leadership conditions. In a study to predict unit performance by assessing transformational and transactional leadership, Bass et al, (2003) used direct observations and field observations in their study. The commonest method that has been used in the assessment of leadership styles have been surveys (Pedraja et al., 2006a; Arvonon and Ekvall 1999; Waldman et al., 2001).

A survey research design using self-administered questionnaires was used in this study because the method is cheaper and easier to administer and to collect data (Bryman and Bell, 2003; Bryman, 2012). It requires the respondents to read the instructions and write or mark their responses to the questions. In the present study the sample was geographically widely dispersed as organizations across the country were considered. The questionnaires were posted electronically and physically which made it cheaper and quicker. The method has also the advantage of convenience for respondents as they are able to complete a questionnaire at a time when they want and also at their own speed (Bryman and Bell, 2003). This was especially relevant in this study as Senior Managers and Chief executive officers are very busy people and are hard to pin down for an interview.

Population and sampling plan

The target population for the survey was senior managers and Chief executive officers of organizations in Zimbabwe. The organizations considered were medium to large organizations with at least 60 employees. This is because the size of the organization

has been noted to have an effect on the leadership style that could be practiced (Pedraja et al., 2006a).

The organizations considered had to be based in Zimbabwe and were mainly located in any of the cities in Zimbabwe. A number of organizations have closed down business in Zimbabwe especially in Bulawayo (area where researchers are based) due to the adverse economic environment hence the need to extend the research beyond Bulawayo (research base). In order to make the follow up process easier and manageable, most of the government departments targeted were from Bulawayo. The sample consisted of private sector and public sector companies. The researchers felt that with the time and cost constraints of the project, a sample consisting of a survey population of 150 organizations would be representative. A consideration of the fact that managers are busy people and hence this might affect the response rate was taken into account. Attempts were made to ensure that at least a sector got 40% of the questionnaires.

Non-probability sampling methods were used as the sampling technique as it was initially impossible to verify which organizations were still operational and also whether the senior managers were in the country during the period. The technique was also used because it was impossible to ascertain the number of organizations present in Zimbabwe. Convenient sampling and snowball sampling were used to identify the organizations used in the study. Convenient sampling was used because the researchers had access to some senior managers who attended a Master's in Business Administration degree class at the National University of science and Technology. Researchers also made use of other national events such as The Zimbabwe International Trade Fair (ZITF, 2008) or other religious and social functions. The above strategies ensured that the questionnaires would be returned.

The snowball sampling technique was also used in this study as the researchers contacted a few senior managers and used these managers to get contact of other senior managers. The other senior managers even volunteered to pass the questionnaire to their colleagues in other organizations. The technique was an inexpensive way to enlarge the sample size.

Questionnaire design and measures

A review of the literature revealed several instruments used to assess leadership style especially transformational and transactional leadership styles. The commonest of these instruments that has been used by a variety of researchers in the field of leadership, is the Multifactor Leadership Questionnaire (MLQ) which was originally developed by Bass (1985) and updated by Bass and Avolio (1990).

An attempt to get the instrument from the authors was fruitless as the instrument has now been commercialized although there is a claim that it can be made available for research purposes. The instrument is available at a cost of US\$ 30 which expense was beyond the project. The researcher then decided to design a new questionnaire that would encompass the behavioural and personal attributes of transformational, transactional and laissez-faire leadership style. Development of the instrument considered the hypotheses and sub-themes of the project as well as using literature were the MLQ had been used (Bass and Avolio (1990).

The wording of the questions was very simple and easy to understand so as to improve the response rate especially for senior managers and Chief executive officers who are very busy people. The preamble outlined the purpose of the survey as well as the researchers' contact details for clarifications. The questionnaire contained mostly closed ended questions that required ticking to make it easier to respond. A few open ended questions were used to solicit for more information. Section A of the questionnaire covered fairly general questions on gender, position in the organization and the type of business and sector the organization

was involved in. Section B assessed the three leadership styles namely transactional, transformational and laissez-faire. The last part of the questionnaire which is section C, covered questions on the performance of the organizations measured by expansion geographically, profits, customers and employee satisfaction amongst other things.

A five point scale was used in most cases and respondents were required to report the degree to which they agreed with each statement. Possible responses ranged from "strongly agree" to strongly disagree". The items measuring transactional leadership in Section B were based on the work by Pedraja et al. (2006a) and on Bass (1985) revised full range model of leadership. Items 6 through to 11 assessed transactional leadership. According to Bass's revised full range Model of leadership, transactional leadership only intervenes when standards are not met.

This is also termed management by exception, passive. Item 6 which asked if action is taken when mistakes are made measures this aspect of leadership. Items 7, 8 and 11 clarify what needs to be done and material rewards for services rendered. These questions answer one characteristic of transactional leadership which is the issue of contingent reward. The other items 9 and 10 assess management by exception, active which is a characteristic of transactional leadership. Item 9 assesses whether leadership focuses attention on any irregularities while item 10 assesses whether any deviations from the expected is given attention.

Transformational leadership was assessed by item 13 through to 23. The items 13-16 assessed inspirational motivation which is one characteristic of transformational leadership. Items 17-20 measured idealized influence which involves the ability of leadership to become a source of inspiration, be role model, enhance follower pride, generate loyalty from followers and give them confidence. Item 21 which asked if leadership diagnoses and elevates the needs of each employer, measured individualized consideration which is a major characteristic of transformational leadership. Items 22 to 23 assessed the stimulation of followers by leadership through determination and also by enabling them to perceive the world from new perspectives by questioning old beliefs.

Laissez-faire leadership style was assessed by items 24 to 28. The questions assessed a general lack of intervention or acceptance of responsibility by leadership. As mentioned before, questions 29 to 42 assessed organizational performance.

Pre-testing questionnaire

For testing of the questionnaire, a convenient sample of 10 senior managers was taken. The pre-test was carried out to find out if the questionnaire could be understood and if there were any issues that required clarification. After the pre-testing, an additional four (4) questions were added to the questionnaire which initially had thirty eight questions. The four questions that were added are 4, 15, 21 and 31. The original questionnaire had only differentiated the type of businesses being run, however, the addition of question four categorized the businesses into two main sectors public and private sectors. Questions 15 and 21 where additional questions on transformational leadership these questions reinforced the idea of vision and individualized consideration. The addition of question 31 was important as other organizations are not profit making. Questions 34, 35, and 36 were modified to include services. This was in response to some organization which did not have sales but services. The questionnaire became clearer and more reliable with the indicated additions.

Validity and reliability of variables and measures

In order to assess the validity and reliability of the variables of transformational, transactional, laissez faire and performance

measurements, Cronbach's alpha was calculated using SPSS (version 16). The items selected should be reliable and the multiple items selected to measure the same concept should have internal consistency. An alpha value should preferably be above 0.700. The alpha values for transactional and transformational leadership and performance exceeded 0.700. However, alpha value for laissez faire was slightly below 0.700 with a value of 0.696. This is not uncommon as in literature alpha values of less than 0.700 have been used in concepts of management (Trottier et al., 2008). Transformational leadership style was measured by 11 items on the questionnaire (13 to 23) and gave a relatively high level of internal reliability (Cronbach's alpha = 0.897). Six items from the questionnaire (6 to 11) were used to measure transactional leadership style. A test of internal reliability showed that the index variable was relatively reliable to measure transactional leadership (Cronbach's alpha =0.734). Eight items (29, 32, 34, 37, 38, 39, 40 and 41) were used to measure performance and gave a good internal reliability (Cronbach's alpha = 0.837).

Data collection and response rate

One hundred and fifty questionnaires were sent out to top management of corporations in Zimbabwe for both public and private sectors. A total of 71 completed questionnaires were received giving a response rate of 47%. However, 66 completed questionnaires were used in the analysis given that three of them had been completed by junior-managers, one questionnaire arrived late while the other was incompletely filled in. Thirty public sector organizations, thirty three private sector organizations and others (NGOs and Churches) were evaluated in the study.

Data analysis

The data was coded, inputted and analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0 and MINITAB statistical package. Several demographic data were analyzed through descriptive statistics in SPSS. In order to assess the leadership styles present in the organizations, the means of the items comprising each leadership style were calculated in SPSS. The means were compared for significance at 0.05 level using *t*-test. A paired sample *t*-test was also used to determine the dominant leadership style in either private or public sectors. Similar test was used by Trottier et al. (2008) to compare transactional and transformational leadership. A null hypothesis was formulated which stated that there was no relationship between the variables. Regression analysis was carried out using MINITAB to measure the relationship between leadership style and performance. The R^2 (R-squared) values were calculated to measure the contribution of the variable to the variation in performance. The significance of the relationship between each leadership style to performance was assessed at 5%.

RESULTS AND DISCUSSION

Main research question 1

Are there any differences in the leadership styles between private and public sector organizations in Zimbabwe?

Main Hypothesis 1

Leadership styles in private and public sectors are

different in Zimbabwe

Sub-hypothesis (i): There are differences in transformational leadership in public and private sectors

Sub-hypothesis (ii): There are differences in transactional leadership between public and private sectors

Sub-hypothesis (iii): There are difference in laissez faire leadership between public and private sectors

Three leadership styles namely transactional, transformational and laissez faire were assessed in public and private sector organizations in Zimbabwe using the constructs for each leadership style; transactional leadership style (questions 6 to 11), transformational leadership style (questions 13-23) and laissez faire leadership style (questions 24 to 28). Means and standard deviations were generated for each of the leadership styles against each sector as shown in Tables 1 to 3. Transformational leadership was compared between the sectors using questions 13-23 from the questionnaire and the means are as shown in Table 1.

The results shown in Table 1 from the comparison of the means for each sector using constructs for measuring transformational leadership show that transformational leadership style to be present in both the private and public sector organizations in Zimbabwe. The questions 13 to 16 which measure "inspirational motivation" which is one characteristic of transformational leadership was practiced more by public sector organizations compared to private sector organizations. This was unexpected as leadership in private organizations is the one that is supposed to excel on "inspirational motivation". Questions 17 to 23 which addressed the remaining three "Is" of transformational leadership namely "idealised influence" (questions 17 to 20), "individualised consideration"(question 21) and "intellectual stimulation" (questions 22 to 23) were practiced more in the private sector than in the public sector organizations as indicated by the means.

The results show that concerning the diversity of aspects of transformational leadership, the private sector managers excel in transformational leadership in comparison to their counter parts in the public sector organizations. The means however, show that transformational leadership style is present in the two sectors. However, there is need to assess if there are any differences in transformational leadership style between the two sectors.

A comparison of means of transformational leadership style in each sector was carried out using paired-samples T-Test and results are shown in Table 2. The t-ratio is less than 1.96 and the p-value > 0.05 therefore the differences between transformational leadership in the public and private sectors is not significant. The mean for private sector (2.2348) being less than that of the public

sector (2.3492) suggesting that private sector managers excel in transformational leadership than their private counter parts.

Literature has nearly maintained that transformational leadership is more in private organizations than in public sectors or government organizations. This has also been used to explain the poor performance of most public sector organizations. However, application of statistical significance show that there are no significant differences in transformational leadership between public and private sector using the sample studied ($t = 1.0840$, $p = 0.304$).

Therefore we accept the null hypothesis that there are no differences in transformational leadership style between public and private sector organizations in Zimbabwe. The means in Table 3 show that transactional leadership is present in both the private sector and public sector organizations in Zimbabwe. Question 6 measures management by exception, passive and was found to be practiced more in the public sector than in the private sector.

This observation is consistent with literature where managers only take action when mistakes are made. The rest of the questions (7 to 11) showed that private sector managers excelled more in the activities than their public sector counter parts. Items 7, 8 and 11 clarify what needs to be done and material rewards for services rendered (mean the characteristic called contingent reward). The private managers also excelled in management by exception, active where performance of employees was monitored and corrective action taken (questions 9 and 10). The next stage was to find out if there were any significant differences between the means for transactional leadership style between public and private sector organizations in Zimbabwe.

There are significant differences in transactional leadership style between the private sector and public sector organizations in Zimbabwe since t-ratio is greater than 1.96 and p-value < 0.05. Therefore we reject the null hypothesis and accept the sub hypothesis (ii) because private and public sector organizations differ. The earlier shown results which show private sector managers to be high in transactional leadership than public sector managers are very interesting and at variance with observations in literature. In a study that examined the nature and significance of leadership in government settings, government workers ranked their leaders higher in transactional leadership factors than in transformational factors (Trottier et al., 2008). Hence public sector managers have been evaluated as better transactional leaders (Trottier et al., 2008).

The means of questions used to measure laissez faire leadership style are very close to 3.00 for the two sectors. This implies that there is very little laissez faire leadership style in both the private and public sectors in Zimbabwe. Comparisons of the means using paired sample T-test is given in Table 6 to find if the differences in the observations between the two sectors concerning laissez

Table 1. Measuring Transformational leadership style in Public and Private Sector organizations in Zimbabwe.

Variable	Business sector							
	Public sector		Private sector		Other (specify)		Total	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Leadership shares the mission and vision of the organization with employees	1.8667	1.10589	1.9091	1.04174	1.3333	0.57735	1.8636	1.05081
The employees understand the vision of the organisation	1.9667	0.88992	2.2727	1.23168	1.3333	0.57735	2.0909	1.07742
Employees share and have accepted the long-term vision of the leader	2.4333	1.00630	2.7879	1.31714	1.6667	0.57735	2.5758	1.17749
There is an acceptance of their role in the organization by the employees	2.1333	1.04166	2.3333	0.98953	1.6667	0.57735	2.2121	1.00023
Leadership communicated high performance expectations	1.9333	0.98027	1.7576	1.00095	2.3333	1.52753	1.8636	1.00593
Employees feel good to be around leadership	2.7333	1.04826	2.5455	1.12057	1.6667	0.57735	2.5909	1.08099
Organisational leadership has respect from employees	2.3667	1.29943	2.2500	1.01600	1.3333	0.57735	2.2615	1.14941
Employees have complete confidence in the leadership	2.9000	1.09387	2.3030	0.95147	1.6667	0.57735	2.5455	1.05512
Leadership diagnoses and elevates the needs of each employee or follower	3.2414	1.12298	2.4545	1.09233	1.6667	0.57735	2.7692	1.16952
Leadership shows determination when accomplishing goals	1.9667	0.80872	1.7576	0.79177	1.0000	0.00000	1.8182	0.80210
Stimulation of followers/employees to view the world from new perspectives	2.3000	0.65126	2.2121	1.16613	1.3333	0.57735	2.2121	0.95297

Note: All items were measured on a five point scale ranging from 1 = "strongly agree" to 5 = strongly disagree.

Table 2. Comparison of Transformational leadership styles in the private and public sectors using T-Test.

Variable		Mean	N	Std. deviation	Std. error mean	t	df	Sig. (2-tailed)
Pair 1	Public sector	2.3492	11	0.44741	0.13490	-	-	-
	Private sector	2.2348	11	0.32075	0.09671	-	-	-
Paired sample test	Public sector	0.11437	-	0.34987	-	1.084	10	0.304
Pair 1	Private sector							

T-Test.

laissez faire style are significant are shown below. The means for the for private and public sector are very close and above 3.00 signifying that there is very little of laissez faire leadership style in the two sectors. In the questionnaire

3.0 indicated occasionally true while 4.0 meant never true in other words there would be no laissez faire style. There are no significant differences since the t-ratio is less than 1.96 and the p value > 0.05.

Table 3. Measuring transactional leadership style in public and private sector organizations in Zimbabwe.

Variable	Business sector							
	Public sector		Private sector		Other (specify)		Total	
	Statistics		Statistics		Statistics		Statistics	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Action is taken when mistakes are made	1.7000	0.79438	1.5152	0.50752	1.0000	0.00000	1.5758	0.65775
Employees are reminded of what they will receive if they do what is needed	2.3333	1.18419	2.0606	1.02894	2.3333	1.52753	2.970	1.11244
There is a reinforcement of the link between achieving goals and obtaining goals	2.4000	1.13259	1.9091	1.18226	2.0000	0.00000	2.1364	1.14873
Leadership focuses attention on any irregularities from what is expected	2.3333	1.12 444	2.2121	1.11124	2.6667	1.15470	2.2879	1.10614
Any deviations from the expected is given attention	2.0000	0.90972	1.7879	0.89294	1.3333	0.57735	1.8636	0.89247
There is talk subordinates about special promotions for good work	2.4667	1.16658	2.2121	1.13901	2.6667	2.08167	2.3485	1.18312

Note: All items were measured on a five point scale ranging from 1 = "strongly agree" to 5 = strongly disagree.

Table 4. Comparison of Transactional leadership styles in the Private and public sectors using T-Test.

Pair 1	Mean	N	Std. deviation	Std. error mean	-
Public sector	2.2055	6	0.29546	0.12062	-
Private sector	1.9495	6	0.27079	0.11055	-

Paired samples test		Paired differences				
Pair 1	Mean	Std. deviation	Std. error mean	t	df	Sig. (2-tailed)
Public sector	0.25605	0.12699	0.5184	4.939	5	0.004
Private sector						

T-Test.

We accept the null hypothesis that there are no differences in laissez-faire leadership between the two sectors. The three sub hypothesis help us to answer the main hypothesis of the study (Hypothesis 1) which says Leadership styles in private and public sectors are different in Zimbabwe. We agree with the hypothesis and

reject the null hypothesis. This is because transactional leadership style differs in public and private sector organizations.

A summary of results for research question 1 (Table 1 and 3) show that transactional and transformational leadership styles are present in both private and public

Table 5. Measurement of laissez faire leadership style in Public and Private sector organizations in Zimbabwe.

Variable	Business sector							
	Public sector		Private sector		Other (specify)		Total	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Formulation of decisions in the organization is completely delegated to subordinates	3.833	0.83391	3.970	0.98377	3.000	1.7321	3.864	0.95895
Implementation of decisions in the organization is completely delegated to subordinates	3.200	1.2149	3.636	1.2703	1.7321	3.409	3.409	1.2646
Leadership allows employees to determine their own organizational objectives	3.000	0.78784	2.788	0.85723	2.667	1.5275	2.879	0.85061
Employees are allowed to carry out the decisions to do their job because they know more	2.900	0.66176	3.121	0.85723	3.667	0.57735	3.045	0.77324

Note: All items were measured on a four point scale ranging from 1 = "always true" to 4 = "Never true".

sector organizations in Zimbabwe. However, Table 5 shows that laissez faire leadership style is infrequent in the two sectors.

The results (Table 2) also show that there is no significant differences between transformational leadership style in the public and private sectors as a paired sample t-test showed that the difference is statistically insignificant at 0.05 level ($t = 1.084$, $p = 0.304$). However, the mean for private sector (mean = 2.2348) was lower than the mean for public sector organizations (mean = 2.3492) indicating that they excelled more in transformational leadership competencies than their counter parts in the public sector (Table 2). Based on the results in this study (Table 4), a paired sample t-test shows that the differences between private and public sector in transactional leadership style is significant at the 0.05 level ($t = 4.939$, $p = 0.004$). The results indicate that private sector managers excel in transactional leadership (mean = 1.9495) in comparison to public managers (mean = 2.2055).

Therefore, we reject the null hypothesis which says there are no differences in leadership style between the private and public sector organizations. We accept the alternative hypothesis and say there are differences in leadership styles between the private and public sector organizations especially in transactional leadership. The private sector managers seem to excel in transactional leadership style under the present conditions than their counter parts in the public sector. These results are interesting as they are at variance with observations in other studies.

Research question 2

Is there a single or dominant leadership style that could

be associated with public or private sector organizations in Zimbabwe?

Hypothesis 2

Transactional leadership is the dominant leadership style in public sector organizations. The mean for transactional leadership in public organizations is 2.2055 while that for transformational leadership in the same sector is 2.3492 (Table 7). These mean values may not be significantly different however; the lower value mean for transactional leadership style suggests that transactional leadership style is the dominant leadership style in public sector organizations. This is agrees with observations from other studies. Table 12 also shows as mentioned before that managers of private sectors excel in transactional leadership and that it is also the dominant leadership style in private organizations in Zimbabwe. Laissez faire leadership style is infrequent in both organizations.

However, the means show that it is more in public sector compared to the private sector organizations. In answer to the question of a dominant leadership style that could be associated with public or private sector organizations; the results indicate that transactional leadership style is dominant in all sectors. However, both transformational and transactional leadership styles are present in both private and public sector organizations. We therefore reject the null hypothesis and accept that Transactional leadership is the dominant leadership style in public organizations. Our results when considering the means of the items comprising transactional leadership shows that the public sector excel in management by exception, passive. This trend has been seen in other studies as discussed below.

According to Burns (1978 cited in Thyer 2003:74)

Table 6. Comparison of laissez faire leadership styles in the private and public sectors using t-test.

Variable		Mean	Std. deviation	Std. mean error	-	-
Pair 1	Public sector	3.2333	0.41898	0.20949	-	-
	Private sector	3.3785	0.52652	0.26326	-	-

Paired samples test		Paired differences					
		Mean	Std. deviation	Std. error mean	t	df	Sig. (2-tailed)
Pair 1	Public sector Private sector	-0.14517	0.26965	0.13482	-1.077	3	0.360

transactional leadership is predominantly found in bureaucratic organizations. The present results confirm that.

The aspect that contributed highly to transactional leadership style was management by exception, passive (measured by question 6 on questionnaire). This means that managers of public organizations only take action when mistakes are made rather than being pro-active. However, it was unexpected that transactional leadership be found in higher levels in private sector compared to public sector organizations. The reasons for this could be that the items of contingent rewards where managers of private companies excelled in this study are important in harsh environments. In order to motivate workers in stressful environments, rewards play a major role. The presence of both leadership styles in the two sectors supports recent observations.

Most researchers now agree that both transactional leadership and transformational leadership elements are important for leadership effectiveness in all organizations (Trottier et al. 2008; Murphy, 2005; Bass et al., 2003). A number of studies especially in the nursing profession (government setting) have advocated for transformational leadership as the panacea for leadership problems in that profession (Murphy 2003:131, Thyer 2003: 73 to 74). Transformational leadership has been observed to have a cascading effect in that the behaviours practised at the top level of organizations is mirrored downwards through the organizational ladder (Murphy 2005:131). Our results suggest that both leadership styles are important in the two business sectors.

Lindholm et al. (2000) argues that organizations require latitude, and that diverse leadership styles are important at different times in organizations. The best performance therefore is the result of a balance between transactional and transformational leadership behaviours (Trottier, 2008; Stordeur et al., 2001; Murphy, 2005). According to Stordeur et al. (2001) transformational leadership is not a substitute of transactional but that it complements and enhances it.

Objective 2: To find out if the companies that are performing well under the current harsh economic conditions in Zimbabwe have a dominant leadership style

Research Question 3

Is there are particular leadership style that could be associated with good organizational performance under harsh economic environment in Zimbabwe

Hypothesis 3

Organizations in which transformational leadership is the dominant style perform better than those where transactional dominate.

Hypothesis 4

Are the leadership styles that are associated with good performance in the public sector the same as those in the private sector?

Hypothesis 5

Do organizations having a greater diversity of leadership styles in the organization, perform better than those that have low diversity of leadership styles.

In order to find out a particular leadership style that could be associated with good organizational performance, transactional and transformational leadership styles of those companies that were performing well were assessed.

The following dimensions of performance were used as they have been used in many studies and were easy to analyse:

Qn 37 How would you rate the satisfaction of your customers?

Qn 38 How would you rate the satisfaction of your personnel?

Qn 41 Your organization is growing

The concept of profit was not considered at this juncture as there were non-profit organizations. When question 37 was assessed concerning the satisfaction of customers, there were no differences in either transactional leadership or transformational leadership between the organizations with satisfied customers and those with non-satisfied customers. Here are significant differences in transactional leadership styles between managers of

Table 7. Means of the three leadership styles for public and private sectors.

Variable	Leadership style					
	Transactional		Transformational		Laissez-faire	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Private sector	1.9495	0.27079	2.2348	0.32075	3.3785	0.52652
Public sector	2.2055	0.29000	2.3492	0.44741	3.2330	0.41898

Table 8. Comparison of transactional leadership style of companies with satisfied and non-satisfied personnel.

QN 38 vs transactional leadership style		Mean	N	Std. deviation	Std. error deviation	-
Pair 1	Employee satisfied	1.6964	6	0.24406	0.9964	-
	Not satisfied	2.3153	6	0.38250	0.15616	-

Paired sample tests						
Pair 1	Paired differences			t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error deviation			
Employee satisfied	-0.61890	0.30581	0.12484	-4.957	5	0.004
Not satisfied						

Table 9. Comparison of transformational leadership style of companies with satisfied and non-satisfied personnel.

QN 38 vs transactional leadership style		Mean	N	Std. deviation	Std. error deviation	-
Pair 1	Employee satisfied	1.8413	11	0.25118	0.7573	-
	Not satisfied	2.5479	11	0.41907	0.12635	-

Paired samples test							
Pair 1	Variable	Paired differences			t	df	Sig. (2-tailed)
		Mean	Std. deviation	Std. error deviation			
	Employee satisfied	-0.70665	0.27420	0.8268	-8.547	10	0.000
	Not satisfied						

satisfied employees and those employees that are not satisfied ($p < 0.05$). Transactional leadership style of top management of organizations with satisfied personnel (mean = 1.6964) excelled in transactional leadership compared to their counter parts in organizations where the personnel were not satisfied (mean = 2.3153) Table 8.

There are significant differences in transformational leadership styles between managers of satisfied personnel or employees (mean = 1.8413) and those that are not satisfied (mean = 2.5479) ($p < 0.05$). The results indicate that managers of satisfied personnel or employees were stronger in transformational leadership style than their counter parts with unsatisfied employees.

Employee satisfaction has been associated with transformational leadership style, and Bass (1985) argues

that transformational leadership energizes groups to persist when conditions are unpredictable, difficult and stressful. Of the four "Is" of transformational leadership, our results (Table 9) showed that the evaluated managers excelled in idealized influence, individual consideration and intellectual stimulation. The aspects of intellectual stimulation and individualized consideration are important for employee satisfaction. Bass et al. (2003) suggests that the maintaining of high standards of performance against challenging environments requires both transformational and transactional leadership.

This may be the situation in Zimbabwe where organizations have faced incessant economic hardships over a decade. The fact that managers of satisfied employees excelled in both transactional and trans-

Table 10. Comparison of transactional leadership style of organization which are growing and those that are not growing.

Qn 41 vs transactional leadership style		Mean	N	Std. deviation	Std. error mean	-	-
Pair 1	Growth	2.0037	6	0.28439	0.11610	-	-
	No growth	2.1500	6	0.38987	0.15916	-	-

Paired samples test							
	Paired differences	Mean	Std. deviation	Std. error mean	t	df	Sig
Pair 1	Growth	-0.14630	0.28045	0.11449	-1.278	5	0.2257
	No growth						

formational leadership styles may be supported by observations by Stordeur et al. (2000). They found that transactional leadership style could offer prompt solutions for immediate staff needs, particularly under stressful conditions. This would result in the satisfaction of personnel.

There are no significant differences between transactional leadership style between managers whose organizations are showing growth and those whose organizations are not growing ($p > 0.05$) in Table 10. The means are very close. Results of means in Table 11 consistently show that for organizations that are growing, the managers excel in transformational leadership than their organizations which again excelled in the two leadership styles, performed well. Bass et al. (2003) stresses the importance of diversity in leadership style in order to maintain high performance standards especially under counter parts in organizations that are not growing.

Here are significant differences in the means in transformational leadership style of the organizations that are growing and those that are not growing ($p < 0.05$). The means above show that the managers whose organizations are growing excel in transformational leadership (mean = 2.0656) than those whose organizations are not growing (mean = 2.6455).

Observations in the current study have indicated that both transformational and transactional leadership styles are important for the performance of organizations in Zimbabwe. However, those organizations that excelled in transformational leadership showed higher performance indicated by growth and personnel satisfaction. Many organizations in Zimbabwe that have grown and expanded have been characterized by transformational leadership at the top level. While the economic environment has been adverse to business growth, many of the transformational leaders have channelled and painted a new picture and made employees see a new perspective.

Organizations such as Africa sun and Econet have gone international to mention a few. Local papers have attributed this to the charismatic or transformational nature of the top leadership. Bass et al. (2003) showed that transformational leaders work more effectively in

rapidly, changing environments by putting challenges into perspective and then appropriately responding to those challenges. From the aforementioned observations, it can be concluded that transformational leadership style could be associated with good organizational performance under harsh economic environment in Zimbabwe (Research question 3). We thus accept hypothesis 3, that organizations in which transformational leadership is the dominant style perform better than those where transactional dominate. Hypotheses 4 has been answered in the fact that the current study has shown that companies in either public or private which would excel in both transactional and transformational resulted in good performance.

The present study reveals that there is no organization from the samples considered with one type of leadership style hence Hypothesis 5 is answered in that all stressful conditions.

Objective 3: To establish if there is a relationship between leadership styles and performance of organizations in Zimbabwe

Research question 4

Does leadership style have a greater influence on the performance of an organization than political and economic variables?

Hypothesis 6

The performance of organizations in Zimbabwe is attributed to leadership styles than political and economic variables.

The following performance items from the questionnaire were used to establish the relationship between leadership styles and performance of organizations in Zimbabwe:

Qn 34 In the last 5 years, your sales or services have?

Qn 37 How would you rate the satisfaction of your customers?

Qn 38 How would you rate the satisfaction of your

Table 11. Comparison of transformational leadership style means of organization which are growing and those that are not growing.

Variable	Your organization is growing	N	Mean	Std. deviation	Std. error mean
Leadership shares the mission and vision of the organization with employees	Yes	45	1.667	1.00000	0.14907
	No	20	2.3000	1.08094	0.24170
The employees understand the vision of the organisation	Yes	45	1.9111	1.04059	1.5512
	No	20	2.4000	1.04630	0.23396
Employees share and have accepted the long-term vision of the leader	Yes	45	2.4222	1.15776	0.17259
	No	20	2.8500	1.18210	0.26433
There is an acceptance of their role	Yes	45	2.0889	0.94922	0.14150
	No	20	2.4500	1.09904	0.24575
Leadership communicates high	Yes	45	1.6444	0.88306	0.13164
	No	20	2.3000	1.12858	0.25236
Employees feel good to be around leadership	Yes	45	2.3778	1.07215	0.15983
	No	20	3.0500	0.22331	0.22331
Organisational leadership has respect	Yes	44	1.9773	0.97620	0.14717
	No	20	2.8500	1.30888	0.29267
Employees have complete confidence in the leadership	Yes	45	2.3111	0.87444	0.13035
	No	20	3.0500	1.27630	0.28539
Leadership diagnoses and elevates the needs of each employee or follower	Yes	44	2.5227	1.10997	0.16733
	No	50	3.3000	1.17429	0.26258
Leadership shows determination when accomplishing goals	Yes	45	1.7111	0.72683	0.10835
	No	20	2.0500	0.94451	0.21120
Stimulation of followers/employees to view the world from new perspectives	Yes	45	2.0889	0.90006	0.13417
	No	20	2.5000	1.05131	0.23508

Note: Yes means organization is growing, no means organization is not growing.

Table 12. Comparison of transformational leadership style of organization which are growing and those that are not growing.

Qn	41 vs transformational leadership style	Mean	N	Std. deviation	Std. error mean	-	-
Pair 1	Yes growth	2.0656	11	0.31444	0.09481	-	-
	No growth	2.6455	11	0.39399	0.11879	-	-
Paired samples test		Paired differences					
		Mean	Std. deviation	Std. error mean	t	df	Sig. (2-tailed)
Pair 1	Yes growth	0.57981	0.18248	0.05502	10.538	10	0.000
	No growth						

personnel?

Qn 40 The relative position of your organization has improved in the industry

Qn 41 Your organization is growing

Stepwise regression analysis of each performance item was carried out against the three leadership styles (transactional, transformational and laissez faire leadership style) to choose the best predictor that explains performance. There is a significant relationship ($p\text{-value}=0.001<0.05$) between transformational leadership style and performance.

Transformational leadership style accounts for 98.1% (R²) of the variation in performance (Q34) as shown in Table 13a. There is a significant relationship ($p\text{-value}=0.001<0.05$) between transactional leadership style and performance. Transactional leadership style accounts for 96.4% (R²) of the variation in performance as measured by increase in sales or services (Table 13b).

Transactional leadership style was chosen ahead of the other two styles as the best predictor of performance in stepwise regression using question 37 on customer satisfaction. Table 18 shows the results. The results in Table 14a show a significant relationship ($p\text{-value}=0.001<0.05$) between transactional leadership style and performance. Transactional leadership style account for 98.4% (R²) of the variation in performance (Q37). Transformational leadership style was also chosen as the best alternative variable in explaining performance. There is a significant relationship ($p\text{-value}=0.005<0.05$) between transformational leadership style and performance.

Table 14b shows the transformational leadership style accounted for 95.1% (R²) of the variation in performance as measured by customer satisfaction. There is a significant relationship ($p\text{-value}=0.008 < 0.05$) between transactional leadership style and performance. Transactional leadership style accounted for 93.1% (R²) of the variation in performance as measured by personnel satisfaction (Table 15a). Transformational leadership style was the best alternative predictor of performance. There is a significant relationship ($p\text{-value}=0.015<0.05$) between transformational leadership style and performance. Transformational leadership style accounted for 89.7% of the variation in performance as measured by personnel satisfaction (Table 15b).

There is a significant relationship ($p\text{-value}=0.006<0.05$) between transformational and laissez faire leadership style and performance. Table 16 shows that the two leadership styles account for 99.4% (R²) of the variation in performance as measured by organizational image. There is a significant relationship ($p\text{-value}=0.006<0.05$) between transactional and laissez faire leadership style and performance. The two leadership styles account for 99.6% (R²) of the variation in performance as measured by relative position of organization in the industry (Table 17).

Stepwise regression analysis carried out against the three leadership styles (transactional, transformational and laissez faire leadership style) to choose the best predictor that explains performance as measured by growth of the organization (Qn 41) identified transformational leadership. From the stepwise regression below it can be noted that transformational leadership style account for about 97.3% of the variation in performance. The addition of laissez faire increased the R-square value by about 3% thus increasing the explanatory power of the model. Since the p-value (0.000) is less than 0.05 (Table 18a, b), we conclude that the regression model is significant at the 5% level of significance. We conclude that explanatory variables transformational leadership and laissez faire account for 100% of variability in the response variable performance (growth). We note that transformational leadership style contribute positively to performance whereas laissez faire contributes negatively, implying that a unit increase in transformational leadership style will result in the increase in performance whereas a unit increase in laissez faire leadership style will decrease performance.

The p-value (0.007) is less than 0.05 implying that the model is significant at the 5% level of significance. The regression equation indicates that transaction leadership style contributes positively to performance. The explanatory power of the model is 93.8% which imply a very good model though the explanatory power is less than that of transformational leadership style.

The aforementioned results show that there is a relationship between leadership styles and the performance of organizations in Zimbabwe. Furthermore, leadership styles seem to have greater influences on performance than political and economic variables given the high percentage contribution to the variation by the items used to measure performance.

In a study of transformational and transactional leadership in small companies in Chile, Pedraja et al. (2006b) showed that leadership style influences the effectiveness of the small companies studied. They found that the influence was positive for transformational leadership while it was negative in the case of transactional and laissez faire leadership (Pedraja, 2006b). Despite the increase in literature on transformational and transactional leadership, there are only a handful of studies that have examined how transformational and transactional leadership predict performance (Bass et al. 2003:207).

In recent studies, both transformational and transactional contingent reward leadership of leaders in the army predicted unit performance (Bass et al., 2003). They confirmed that transformational leadership augmented transactional leadership in predicting performance. The results also suggest that the performance of organizations in Zimbabwe may be attributed to leadership style. However, this is not to say that other factors are not at play. The results indicate that both transformational and transactional leadership

Table 13a. Regression analysis for leadership style and performance as measured by sales or services in the last 5 years (Qn 34)
(a) The regression equation is Perf-Q34 = - 1.78 + 0.124 Transformational leadership style).

Predictor	Coef	Stdev	t-ratio	p
Constant	-1.775	1.842	-0.96	0.406
Transfor	0.124139	0.009945	12.48	0.001

s = 2.567; R-sq = 98.1%; R-sq(adj) = 97.5%

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	1027.0	1027.0	155.80	0.001
Error	3; 19.8; 6.6				
Total	4; 1046.8				

Table 13b. Regression analysis for second best model (transactional leadership) (The regression equation is Perf-Q34 = 1.26 + 0.200 transact).

Predictor	Coef	Stdev	t-ratio	p
Constant	1.255	2.316	0.54	0.626
Transact	0.19980	0.02245	8.90	0.003

s = 3.568; R-sq = 96.4%; R-sq(adj) = 95.1%

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	1008.6	0.003	1008.6	79.23
Error	3; 38.2; 12.7				
Total	4 ; 1046.8				

Table 14. Regression analysis for leadership style and performance as measured by the satisfaction of customers (Qn 37) ((a) The regression equation is Perf-Q37 = 4.12 + 0.199 transact).

Predictor	Coef	Stdev	t-ratio	p
Constant	4.124	1.529	0.074	2.70
Transact	0.1988	0.01482	13.42	0.001

s = 2.355; R-sq = 98.4%; R-sq(adj) = 97.8%

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	0.001	180.17	999.36	999.36
Error: 3; 16.64; 5.55					
Total: 4; 1016.00					

styles have a positive influence on performance while laissez faire would have a negative effect.

Conclusions

The major objective of this research was to find out the leadership styles prevalent in the public and private

sector organizations in Zimbabwe. The focus was then to find out which leadership styles were dominant in the private and public sector. The study also wanted to find out if the performance of organizations could be explained by leadership styles and which styles were associated with good performance. Finally, the research wanted to add to the body of knowledge in this area since it is scant or non-existent in Zimbabwe.

Table 14b. The regression equation is $\text{Perf-Q37} = 1.57 + 0.120 \text{ transformational leadership style}$.

Predictor	Coef	Stdev	t-ratio	p
Constant	1.566	2.926	0.54	0.630
Transact	0.12040	0.01580	7.62	0.005

$s = 4.079$; $R\text{-sq} = 95.1\%$; $R\text{-sq(adj)} = 93.4\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	966.09	966.09	58.06	0.005
Error:	3;	49.91;	16.64		
Total:	4;	1016.00			

Table 15a. Regression analysis for leadership style and performance as measured by the satisfaction of personnel ((a) $\text{Perf-Q38} = 2.53 + 0.185 \text{ transact}$).

Predictor	Coef	Stdev	t-ratio	p
Constant	2.526	2.998	0.84	0.461
Transact	0.18548	0.02905	6.38	0.008

$s = 4.618$; $R\text{-sq} = 93.1\%$; $R\text{-sq(adj)} = 90.9\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	869.22	869.22	40.76	0.008
Error:	3;	63.98;	21.33		
Total:	4;	933.20			

Table 15b. The regression equation is $\text{perf-Q38} = 0.17 + 0.112 \text{ transfor}$.

Predictor	Coef	Stdev	t-ratio	p
Constant	0.173	4.064	0.04	0.969
Transfor	0.11206	0.02194	5.11	0.015

$s = 5.665$; $R\text{-sq} = 89.7\%$; $R\text{-sq(adj)} = 86.2\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	836.93	836.93	26.08	0.015
Error:	3;	96.27;	32.09		
Total:	4 ;	933.20			

There has been a limited body of knowledge in the area of leadership style especially transactional and transformational leadership styles in Zimbabwe. The research has indeed contributed to the understanding of leadership styles prevalent in private sector and public sector organizations in Zimbabwe. There are several conclusions that have emerged from the current study and they are as follows:

1. The research questions aimed at finding out the leadership styles that are present in Zimbabwean

organizations and if there were any differences in leadership styles between private and public sector organizations. Transformational and transactional leadership styles are present in both private and public sector organizations in Zimbabwe.

2. Laissez-faire leadership style is infrequent in the organizations that were considered in the current study

3. Private sector organization managers excelled in transactional leadership and were surpassed by public sector managers on one factor of transactional leadership which is management by exception, passive. The private

Table 16. Regression analysis for leadership style and performance as measured by the improvement in organizational image (Qn 39) ((a) Regression analysis; The regression equation is $\text{perf-Q39} = 3.84 + 0.0738 \text{ transfor} - 0.0232 \text{ Leisez}$.

Predictor	Coef	Stdev	t-ratio	p
Constant	3.8365	0.8279	4.63	0.044
Transfor	0.073830	0.003941	18.73	0.003
Leisez	-0.023207	0.008838	-2.63	0.120

$s = 0.9828$; $R\text{-sq} = 99.4\%$; $R\text{-sq(aj)} = 98.9\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	2	344.07	172.03	178.12	0.006
Error:	2;	1.93;	0.97		
Total:	4;	346.00			

Table 17. Regression analysis for leadership style and performance as measured by the relative position of the organization in the industry (Qn 40).

Predictor	Coef	Stdev	t-ratio	p	VIF
Constant	2.7098	0.7984	3.39	0.077	-
Transact	0.143997	0.006675	21.57	0.002	1.1
Leisez	-0.010345	0.009217	-1.12	0.378	1.1

$s = 1.011$; $R\text{-sq} = 99.6\%$; $R\text{-sq(aj)} = 99.2\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	2	508.76	254.38	248.97	0.004
Error:	2.04;	1.02			
Total:	4;	510.80			

Regression analysis: The regression equation is $\text{Perf-Q40} = 2.71 + 0.144 \text{ Transact} - 0.0103 \text{ Leisez}$.

Table 18a. Regression analysis for leadership style and performance as measured by the growth of the organisation (Qn 41).

Predictor	Coef	St. deviation	t-ratio	p
Constant	7.8601	0.7512	10.46	0.009
Transfor	0.226494	0.003576	63.34	0.000
Leisez	-0.082924	0.008020	-10.34	0.009

$s = 0.8918$; $R\text{-sq} = 100.0\%$; $R\text{-sq(aj)} = 99.9\%$

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	2	3221.2	1610.6	2025.30	0.000
Error :	2;	1.6;	0.8		
Total:	4;	3222.8			

The regression equation is $\text{perf-Q41} = 7.86 + 0.226 \text{ Transfor} - 0.0829 \text{ Leisez}$.

sector managers were stronger on contingent rewards more than their counter parts in the public sector. This observation was at variance with literature which normally

shows public sector managers to excel in transactional factors including contingent rewards. However, harsh economic conditions may be responsible for such an

Table 18b. Regression analysis for leadership style and performance as measured by the growth of the organization (Qn 41).

Redictor	Coef	St. deviation	t-ratio	p
Constant	9.322	5.284	1.76	0.176
Transact	0.34596	0.05120	6.76	0.007
s = 8.139	R-sq = 93.8%	R-sq(adj) = 91.8%		

Analysis of variance					
Source	DF	SS	MS	F	p
Regression	1	3024.1	3024.1	45.65	0.007
Error	3; 198.7;	66.2			
Total	4;	3222.8			

The regression equation is perf-Q41 = 9.32 + 0.346 transact.

observation were the private sector organizations would come high on rewards to cushion employees against the adverse environment.

4. The differences in transformational leadership styles between private sector organizations and public organizations were not significant. However, private sector managers excelled in three "Is" out of the four factors of transformational leadership. They excelled in idealized influence, intellectual stimulation and individual consideration compared to their counter parts in the public sector. The observation that transformational leaders were low on inspiration motivation compared to public sector managers is unexpected.

5. Under the current adverse economic conditions in

Zimbabwe transactional leadership style rather transformational was found to be the dominant leadership style in both the private and public sector organizations. In literature, the private sector is expected to have transformational leadership as the dominant leadership style while transactional leadership should dominate and be associated with government organizations.

6. There is no single leadership style that could be associated with either the public or private sector organizations but that both were present in different levels. This observation is supported by recent literature which recognises the importance of the two leadership styles. Bass's full leadership range model is the proponent of this observation. They argue that the two styles are a continuum rather than isolated and distinct.

7. Leadership styles especially transformational and transactional had a positive influence on performance while laissez-faire leadership style had a negative impact on the performance of organizations.

8. There is a strong relationship between leadership style and the performance of organizations in Zimbabwe. Leaders that excelled in transformational leadership style had organizations that showed growth and employee satisfaction. Therefore leadership style may have a

greater effect on performance of companies than economic and political variables.

The major objectives of the study which were to find the predominant leadership styles in the corporate organizations in Zimbabwe were met. The study also established the dominant leadership styles in the private and public sector organizations. The relationship between leadership style and the performance of organizations was confirmed. The present study has significantly added to knowledge especially on leadership styles in organizations under stressful and harsh economic environments.

The present study has made important contributions to leadership styles in the private and public sector organizations. The uniqueness of the study is that leadership style and performance was considered under stressful and harsh economic conditions. Few studies have taken these aspects into consideration and indeed the results point to a different pattern than that observed in normal environments. Literature on leadership in public sector organizations has lagged behind. This study has added important insights to the body of knowledge on leadership in public organizations.

RECOMMENDATIONS

As a result of the conclusions earlier mentioned, the following recommendations are made:

1. Managers should be trained on the benefits of transactional and transformational leadership styles and how to match them for different situations.
2. Since leadership style has such a bearing on performance, management courses including MBA programs should have a larger leadership component.
3. Government should advocate for regular training of top management on leadership issues to ensure that they

keep abreast with current trends and economic environment.

4. Organisations should have in house training programs for all managers specifically tailor made for their industry.
5. Confederation of Zimbabwe Industries (CZI) should establish a business forum where CEOs and Senior Managers interact and share ideas with regards to leadership and performance

LIMITATIONS

Due to the harsh economic period that prevailed the quality of the sample may have been compromised as most skilled top management left the country for greener pastures. So it is possible that some of the ideal leaders who would have been suitable to be part of the sample left the country. The research was conducted in only two cities within an African context, any interpretation or generalization should allow for possible cultural bias. Given the harsh economic conditions it was difficult to ensure that one gets more than one respondent per organization. As a result the study treated a single respondent to represent the leadership style prevalent in that organization.

AREAS FOR FURTHER RESEARCH

This study has opened up several areas for future research. Further studies and research in the areas listed below will add to the body of knowledge on leadership and performance.

1. Time, resources and project space did not allow further investigations of how other variables such as age, sex, culture and level of education would affect leadership style and performance. These are potential areas for further research.
2. It will also be interesting to find out how subordinates rate their managers on leadership style. This is because senior managers may have a bias on themselves.
3. Research is needed to determine the impact or influence of company Boards on the leadership style and performance of organizations.
4. A study that concentrates on the leadership style of the CEOs and the influence on performance is essential.
5. The current study grouped all industries together. There is a need to find out the leadership styles in different industries or sectors such as service industries, manufacturing industries, banking sectors and education.
6. Research on a similar line as the current study should be carried out on parastatal organizations and compare them with private and wholly government organizations.

Conflicts of Interests

The authors have not declared any conflict of interests.

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A hand holding a lit lightbulb is the central focus. In the background, there is a white chalkboard with a business process diagram. The diagram includes a lightbulb icon, a circular arrow, and several handwritten words: 'Business Idea', 'Sale', 'Success', 'Analysis', and 'Plan'.

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