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IMPROVING MAINTENANCE STRATEGY THROUGH CORPORATE CULTURE

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ABSTRACT

The economic and political realities of the 1990s are forcing industries to implement operational changes to cut or contain costs in their maintenance efforts. However, maintenance costs are difficult challenge in any organization and require a corporate culture. Often, the changes necessary to control maintenance costs directly confront long standing organizational cultures.

This paper provides insights to the magnitude of problems in the Nigeria electric power stations, by examining the maintenance practice efforts on corporate culture. Objectives for the study have been to gain an understanding of subtle areas of maintenance and culture; and the way maintenance management is handled in different cultures. It compares other organizational cultures, cultural theory, Hofstede's dimensions of power distance and uncertainty avoidance, the role of leadership in organizational culture and the lifelong learning at workplace. The study results offer many differences in corporate cultures, and therefore suggest complete maintenance of corporate culture reforms- from repair focused to reliability focused, which should include TMP and RCM.

KEYWORDS: *Maintenance Strategy, Corporate Culture, Learning, Leadership, and Nigeria Electric Power Stations*

INTRODUCTION

One of the major issues facing industries during the late 1990's is maintenance cost. Unless the economic conditions reverse drastically, maintenance issues will likely dominate the framework of any industrial organization for the next twenty years. The economic decline in Nigeria for the past several years have resulted in a steady decline in both industrial and government revenues.

The Nigeria electric power industry is one of the most glaring examples of revenues, not being able to keep pace with rising expenditures. During the past two decades or more, maintenance budgets have grown so astronomically high. As the economy is weakened and deficit has grown, there has become the need to reduce the cost of downtime by being proactive in maintenance efforts. The demand has become so urgent with present unreliable state of electric power supply in Nigeria. Although several efforts have been made to see how maintenance efforts can be improved in the Nigerian industries, yet none has been made about culture. It is apparent to all, but in particular, the Nigeria electric industry that the federal government must stop attempting to solve problems by throwing money at them.

The industrial managers have the luxury of doing less with more. They must now be realistic about doing more with less.

Maintenance problem in the Nigeria electric power industry is a formidable challenge. It needs an expeditious solution because of the oil rich environment.

Although much has been written about organization change, there is still very little literature devoted to effect of maintenance culture and leadership type essential to overcoming cultural resistance to maintenance efforts. The purpose of this paper is to provide insight into the cultural dilemma faced by the Nigeria electric industry, by not applying the current organizational culture, theory, the necessary leadership style, and continuous organizational learning.

The major premise is that, effective maintenance cannot be achieved by superficial procedural changes, but rather must address the underlying behavior of the organization. It is simply not enough to talk about maintenance by rearranging the organization chart, or to implement new procedures that focus on repair times.

These actions may only help to treat the systems and not the disease. So, achieve lasting maintenance effectiveness, the leaders/managers attention must be directed deeper into the soul of the organization. There must be a change in the behavior of the organization. Providing the leadership necessary to change the behavior of an organization is a major challenge in an environment, where, the behavior of the organization members is dictated by a strong, well-entrenched culture. Changes can only occur, if the leader/manager understands the culture of his organization and provide appropriate leadership, which motivates organization members to change.

OBJECTIVES

The first point about organizational culture is that changing it is not a short-term activity. Significantly, sustainable change in organizational culture can take at least 5 years in most organizations. What is required is a constancy of purpose that transcends short-term fluctuations in organizational circumstances, changes in personnel.

Success in a business is not determined by executives' skills alone; or by the visible features –the strategy, structure and reward system-of the organization. Rather, the organization itself has an invisible quality-a certain style, powerful than the dictates of any one person or nay formal system. Culture provides meaning, direction and mobilization, a social energy that moves the corporation into either productive action or destruction (1)

The term 'social energy' seems to be at the heart of corporate culture (2) Kilman et al, ignore culture and move on to something else, to assume and again that formal documents, strategies, structures and reward systems are enough to guide human behavior in an organization-that people believe and commit to what they read or are told to do. On the contrary, most of what goes on in an organization is guided by the cultural qualities of share meaning, hidden assumptions, and unwritten rules.

The impact of culture on any organization is measured by its thickness (i.e. level of penetration), extent of sharing, clarity of ordering (3) or by its direction of impact (where is it leading the organization to?) its pervasiveness (how widely spread and shared amongst members?), and the strength of its impact (the pressure culture exerts (2)). Hence, these various components make up 'roots'. The more deep-rooted they are, the stronger the organization is going to be. Looking after strategies, reward systems, plans, policies and people training can only be an effective task, if the roots are healthy and holding the organization tightly together.

Hence, the main objectives are to look into interrelationships between organizational variables and the degree of change, which results from certain dynamic behaviours. These will include:

- **Transformational Dynamics:** The areas, which mostly influence by environmental factors (mission, strategy, leadership), which invariably shape the corporate culture of the organization;

- **Transactional Dynamics:** The short term organizational changes, such as structure, management practices and systems (policies and procedures), and

- Using the cultural audit and strategic review to determine, which approach needs to be adopted for achieving the necessary changes?

Cultures

Corporate culture is at the heart of any organizational system. It has history, a past and present, and is affected by management systems, people, structures, processes and externally by society and wider environment (4). There is always culture in any organization, and whether this is in a desired state or not will be influenced by, among undoubtedly be influenced by the pervasive culture of the organization. The relationship is then symbiotic. Organizations today exist in complex dynamic environment with changing internal and external influence (5).

Various Definitions Have Been Given to Describe Corporate Culture. Some Definitions of Corporate Culture

- **Culture is a Pattern of Basic Assumptions:** Invented discovered or developed by a group, as it learns to cope with its problems of external adoption or internal integration – that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems (6)

- Culture is the sum total of the intellectual, constitutional and creative values produced by a firm's people, as its knowledge and skills, behavior patterns, customs, and value judgments, procedures and departments which, in their structural inter-association and organization, represent the work content of its people in a certain period of time or era(7).

- Culture is a set of norms and values, to which people conform and covers values, rewards, carrier development loyalty, power participation, leadership, communication and innovation (8).

This selection of definitions of corporate cultures reflects how vague it is, and how difficult it would be to transform. Burke Litwin Presents a corporate culture model: (Botteril, 1990). The model refers to interrelationships between organizational variables and the degree of change, which results from certain dynamic behaviours. There are two categories of cultures or modes of behavior in Burke – Litwin) models Botterril, 1990).

- **Transformational Dynamics:** These represent areas, which are mostly influenced by environment factors. (Mission, strategy, leadership). These variables shape the corporate culture of the organization; and

- **Transactional Dynamics:** These represent the short-term organizational systems policies and procedures).

The best way to distinguish between transactional and transformational cultures is the unit of time. Transactional change can happen over-night and can last for as long as it is necessary or desired by management. Transactional change however is much more difficult and reflects corporate culture. Usually, it is long-term objectives and

can take between 3-15 years (4). There are various ways of achieving complete corporate culture transformation. The first important task for leaders is to make cultures of their organizations explicit through a 'cultural audit'. This task needs to be considered by senior practiced. Culture audit can include areas such as belief and how they are competences, product-market guidelines, management employee, etc (9).

Together with a strategic review process, a cultural audit can serve the basis for conducting incremental and radical transformation. Culture transformation has to lead to a dynamic process, which can allow organizations to modify and change their strategic plans to succeed.

There are four different approaches to achieving cultural transformation (Kono (10).

Dynamic Corporate Culture: Dynamic strategic planning: this was ready stated situation, where culture and strategic planning are interconnected and constantly being adapted to different situations. This perhaps, is the ideal situation for most organizations to achieve. Control over cultural elements leads to tight control over strategic objectives.

- **Culture- Strategic Planning:** Partial Dependency (not fully dynamic: In this situation culture and long range planning are not closely interconnected, but the existing corporate culture complements the long range planning. This gives employees the initiative to take innovative action that leads to revitalizing corporate culture and making sure that, it is dynamic and does not just complement strategic plans, but is closely associated with the process of long planning;

- **Stagnant Corporate Culture**: Dynamic long range planning (incremental changes). This is a top down approach, whereby, the strategic planning pushes and forces changes in corporate culture. This, very much depends on the type of leadership approach and also employee responsiveness. It could be slow and lead to incremental changes; and

- **Corporate Culture Spearheading Changes in Long Planning:** This is the most radical approach, where bottom up initiatives are adopted through strong and dynamic corporate culture to influence changes in strategic thinking, firstly, by establishing incremental strategic changes to comprehensive process for long range planning.

The corporate culture change, therefore, can take any of the above forms. It will depend on the states of the organization concern, its history, values beliefs, systems and type of leadership Kono(10), maintains that transformation approach to be adopted is thought to be dependent on four different factors, including information approach (can change people's altitudes); symbolic product – market strategy (experiences leads new behavioral pattern; sanction system (changes in structure and management systems leads to responsibility, control rewards, etc); top management (leadership).

Continuous business change is inevitable in a global economy and successful business environments need to reflect the way people live their lives. Most enlightened organizations have at least heard of a work/life balance, even if they do not actively promote it among their staff. As Nigeria employees spend the longest hours in their work places, it makes sense to provide an environment and a culture, which contributes to, rather than drains, staff personal lives. It is impressive and also a commitment to create a culture of support, growth, responsibility and vision, which will come out as a common theme. Considering a staff as an individual, rather than a generic workforce, Cartwright (11), use proven universal constructs and methodologies such as Maslow's hierarchy of needs, professor Revens' learning by doing things, Hofstede's mental programming and the excellent model, to incorporate the truths that explained different aspects of a holistic cultural model. Cartwright's cultural model figure) is a simple three-part model representing:

- The purpose of an organization (goal and needs;

- The functions of an organization (quality management and communication);

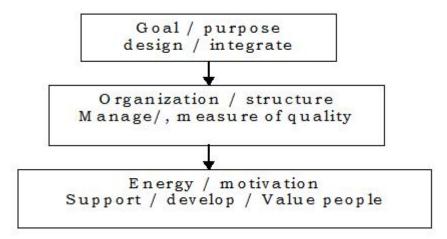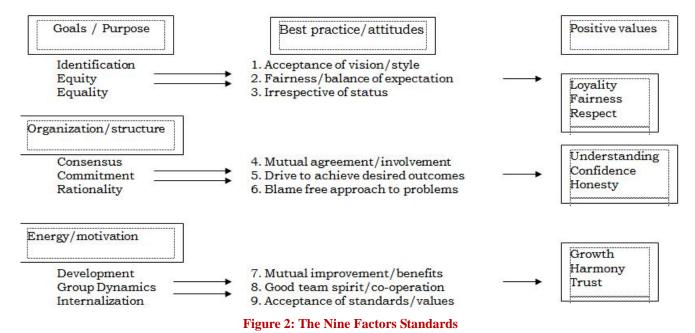- The energy of an organization (people and motivation).

Figure 1: Cartwright's Culture Model

The resulting analysis identified mine key motivating factors of organizational culture, that impact either positively or negatively on people (figure 2). The mini factors are: identification, equity; equality; consensus; commitment; rationality; development; group; dynamics; and internalization.

Figure 2: The Nine Factors Standards

Further analysis proved conclusively that good communication, open management style, ethical policies and basic human needs consideration such as respect, recognition, personal development; understanding and support have a positive impact on performance at every level (Cartwright, 2003).

Having identified that the quality of organizational culture is dynamic that motivate people, either positively to be loyal, accountable, productive or disruptive, the next challenge was finding a way to measure the dynamism and develop a benchmark for on-going analysis and improvement.

An Accurate Measuring System Should Achieve the Following Objective

- Relevance to business/people;

- Measurability / consistency / applicability;

- Precision / accuracy;

- Clarity / simplicity;

- Sufficiency / focus;

- Timeless / cost efficiency; and

- Monitor Progress / predict future outcomes.

The nine factors are used to measure people satisfaction, motivation, engagement and commitment. Application of the nine factors measurement tool becomes increasingly powerful; when leaders and managers measure year-on-year results and are able to see, which changes and improvements have been most successfully received to achieve their desired outcomes. The nine factors also provide a clear standard, against which, managers can discuss issues with their people and establish realistic priorities for improving actions.

So much of human motivation, attitude and behavior are determined by culture, a good cultural model, based on the fundamental values that address human needs and aspirations on all levels, as therefore an invaluable aid to management that will enable them to get the best from their people.

Cartwright (11) stated on culture transition that, without a culture measurement process, it will be difficult to identify day-to-day behaviors that were not aligned to the values.

Culture should be considered as an integral part of the whole management system. There is always a culture in an organization, whether this is in a desired state or not, will be influenced by among other things, the defined quality management system. Similarly, the system design will be influenced by the pervasion culture of the organization. The relationship is symbiotic; organizations today exist in complex dynamic environment with changing internal and external influences (5).

They often go to great length to define their strategy through comprehensive business planning arrangement, yet often, there is little about creating and maintaining the cultural aspect of this strategy. It is important that organization, and particularly top management, plan and define their ideals, i.e. what are the norms and values, which support the defined strategy? This defining stage means that company's ideals can be communicated. Through education, everyone is able to understand what they are and why they are important for the organization. Top management defines their ideals through mission, vision, value and policy statements, and it is common for these to include references to people as being valuable assets. The question is how many have proactive programmes to manage the cultural aspect, referred to in these inspirational statements? ISO 2001: 2000 now recognizes more explicitly than previous versions, a number of areas that will significantly influence quality culture such as:

- Top management involvement;

- Customer focus;

- Communication;

- Management of human relation;

- Management and work environment; and

- Management, analysis, improvement

Designing, the management system is one thing but implementing it, is quite another. Unless people understand why they are doing what they do, they are failing to 'own' the task, and therefore unlikely to be to enact improvement. To engage people fully requires more. Developing people to understand why activities are performed in a certain way, what is important, and what to do if work falls outside of the norms is more than just training; it is education (Lawson, 5).

National Culture

Culture can be seen on different levels. According to Hofstede (12), four layers of culture exist in the form of symbols, heroes, rituals and values in the order of increasing profoundness continuing. He defines four dimensions of cultural value as:

- Power Distance;

- Individualism vs. collectivism;

- Masculinity vs. femininity; and uncertainty avoidance

These dimension influence all areas of life including the family, schools, the workforce and society as a whole.

The power distance addresses the area of social inequality and distribution of power. Individualism concerns the relationship between the individual and the group, and whether persons primarily identify themselves as separate entities or rather as a part as a social context. Masculinity vs. femininity deals with the social implications of being a man or a woman, as well as harder or softer general tendencies in the culture. Uncertainty avoidance refers to the ability to tolerate uncertain situations, as well as expression to situations as well as expression of aggression and emotions.

Table 1 shows the important aspects regarding the workplace (Hofstede, 12).

In a slightly different framework, Trompenars and Hampden – Turner (13) proposed some alternative dimensions and a model of corporate images. These dimensions are:

- Equality vs. hierarchy; and

- Persons vs. task orientation

Combining these two dimensions they define four images, which are introduced as:

- **The Incubator:** The organization is egalitarian and person oriented, which leads to fulfillment – orientation;

- **The Guided Missile**: Depicts an organization, which is egalitarian but task oriented, which makes it a project oriented culture;

- **The Family**: This is an organization that is hierarchical and person oriented – a personal – oriented culture; and

- **The Eiffel Towel:** The organization is hierarchical and task oriented, which leads to a role – oriented culture.

Leadership

Section 4 of 150 9004: 2000 relates to top management, and is fundamentally about leadership. This is in alignment with the leadership principle of ISO 2001; 2000, whereby: leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which, people can become fully involved in achieving the organization's objectives.

Excellent (Leadership can be achieved through a clear vision and mission statement, and the role model behavior of managers. Employees will develop through excellent leadership good recruitment and selection procedures, ongoing education and training facilities, and clear guidelines about what is expected of them. Everybody in the organization must believe in the vision, mission statement, strategy, operational maintenance goals, particularly the leaders. They are the ones, who should empower their employees. They have to align the operational and maintenance works with the vision of the vision and mission of the organization.

Leaders have to share vision, thoughts, knowledge, skills and power with all the people around them. They have to share and investigate a process of inspiration for others to aspire to becoming leaders. In a way they have to 'coach' leadership experiments in their organizations, and create what one may refer to as the leadership process.

Nadler, and Tushmen M. (14), argue the limitations of both the charismatic and instrumental types of leadership, and propose a more global model which encompasses elements of charismatic and instrumental types. The model is presently termed as institutionalizing the leadership of change, including the three leverage points:

- Leveraging the senior term: the development of an effective, visible and dynamic senior term to complement the limitations of the individual leaders;

- Broadening senior management: more beyond the senior team and

Table 1

Some Important Implications for the Workplace of the Four Cultural Dimensions	
Small power distance Hierarchy in organization means an inequality of roles, established convenience, established for convenience.	*Large power distance* Hierarchy in organization reflects the existential inequality between higher – ups and lower – downs.
Decentralization is popular Subordinates expect to be consulted. The ideal boss is a resourceful democrat	*Centralization is popular* Subordinates expect to be told what to do. The ideal boss is a benevolent autocrat or good father
Collectivist Relationship employer – employee is perceived in moral terms, like a family link. Management is management over groups. Relationship prevails over tasks.	*Individualist* Relationship employer – employee is a contract supposed to be based on mutual advantage. Management is management of individuals. Task prevails over relationship
Feminine Managers use intuitions and strive for consensus. Stress on equality, solidarity and quality of work life. Resolution of conflicts by compromise and negotiation.	*Masculine* Managers expected to be decisive and assertive. Stress on equity, competition among colleagues and performance. Resolution of conflicts by fighting them out

Weak uncertainty avoidance There should not be more rules than is strictly necessary Tolerance of deviant and innovative ideas and behavior. Motivation by achievement. ***Source:*** Hofstede (1997)	*Strong uncertainty avoidance* Emotional need for rules, even if these will never work. Suppression of deviant ideas and behavior, resistance to innovation. Motivation by security.

Include a broader range of individuals (even from the junior management level); and

- **Developing Leadership in the Organization:** Use organizational structures ability, and skills to aspire for a leadership role.

- The essential elements of leadership include:

- Experience ability to grow with experience and learn from previous mistake;

- **Vision:** Ability to conceptualize and execute through effective communication;

- **Making Things Happens**: Ability to bring the best out of others, and mark them improve their standards all the time;

- **Intuition**: Ability to sense that a problem exists, to react to them in the right way, to make experience work, use data analysis effectively;

- **Problem Management**: Ability to manage series of problems in an orderly and effective manner or even, better to prevent them; and

- **Leading by Example**: Making others feel wanted and expectations, facilitating climate of individual growth and development.

A good leader gives an organization; its vision and have the ability to translate that vision into reality. An effective leader is result-oriented, and has a vision, which transforms purpose into action.

For a leader to effectively implement and maintain strategies, he or she must have a clear vision of what needs to be done, and the ability to translate that vision into reality. The translation of vision into reality requires transformational rather than transactional leadership.

The Learning Organization

The human resources are a core competitive advantage in any organization. Human capital consists of the knowledge, skill, abilities, attitudes and experience required to accomplish employees. Organizations must ensure that, their corporate cultures are conducive to the achievement of overall strategic objectives. To increase an organizations human capital, the corporate culture should inculcate the values of continuous organizational and individual learning in a learning organizational culture (15, 16). Fostering a learning climate will lead to an organizational learning that can capture and deploy learning to those who seek it and, when this is coupled with individual learning, human capital within the organization will be greatly enhanced (15, 16). Developing an experimental mindset is important in a learning environment, as it encourages employees to try out new things, and experiment with new ideas, which may churn out winning products. Other facilitating factors include constant environmental scanning maintaining, maintenance an open environment, continuous skill development lifelong learning, open communication systems etc (15, 16). Another strategy

for developing a learning focus is to concentrate on human resource development: individual development, career development and organizational development (17). Individual development usually comes in the form of training and development activities provided to help employees improve skills and knowledge for their current jobs. Career development focuses on identifying the individual interests, values, competencies, activities and assignments needed to develop skills for future jobs. It can be part of a performance management system. This will help to motivate employees and can contribute towards attracting and retaining the best talent (17).

According to Harvey and Denton (18), six developments are at the base of the importance and popularity of organizational learning.

- The shifting importance of the factor of production;

- The accelerating pace of change in the business environment;

- Knowledge viewed as a sources of competitive advantage;

- Customers that are more demanding;

- Dissatisfaction with the existing management paradigm; and

- The increasing intensity of competition

Senge (19) reminds us that the real lesson of quality movement is the "learning". In addition, he points out that the solution of learning organizations can be studied as services of three quality waves:

- First quality wave where primary focus of change has been point – line workers;

- Second quality wave based on improving the management (the quality of management); and

- The third quality wave that institutionalizes learning.

The learning organization also needs some broad organizational conditions, in order to develop: a clearly stated purpose, effective communications, training about all aspects of the business, flexible structure and systems, and an organization that facilitates innovation, creativity and risk taking straw bough (20). Gavin (21) notes that concrete practices and tools should accompany this effort: systematic problem solving, experimentation, learning from experience, learning from others transferring knowledge, and measuring learning. Senge (22) points out that in any evolution, it needs the transformation of culture. Nonaka (23) shows that learning in Japan is viewed in holistic way; in other worlds, learning is for everybody and form part of the work. Garwin (22) viewed rganizational learning as "an organization skilled at creating, acquiring and transforming knowledge, and at modifying its behavior to reflect new knowledge and insights". Deming (24) points out that the main task consists in transforming management, and "profound knowledge" as a way for achieving this transformation. Profound knowledge has parts: understanding a system; statistic; theory of knowledge; and psychology.

It is becoming increasingly important that to remain competitive, organization needs a high rate of internal learning. Successful organizational learning and knowledge management requires internal processes to support them and a vision that values learning and knowledge. To remain internationally competitive, firms must sustain a high rate of internal learning that both refines current practices and adopts new ones. Generally, organizational learning is concerned with improving the behavior and capability respond to its environment.

For change processes to be effective in terms of strategy implementation and organizational adaptation, need to be systematic, encourage open discussion of barriers and should develop a partnership among all relevant stake holders (27). Systematic change needs to incorporate elements of structure and systems as well as elements of values, Leadership and competencies Nonaka (23).

According to Lawson and Lorenz (28), "Individual Learning cannot be separated from organizational learning or organizational change, when interventions require alterations in managerial behaviours and values. Beer and Eisentat (28) maintain that strategic change is impeded in organizations by defensive routines and internal politics. Lawson and Lorenz (28) argue that organizational inertia means having difficulty in using new knowledge effectively, because individuals resist changes to their organizational routines and behaviours, as these embody their knowledge.

To reduce barriers and impediments to change, involving stakeholders must increase the likelihood of successful implementing of change. Involving employees in decision – making heightens their interest, commitment and contribution, and improves their quality of decisions, according to Larsen, et al (28). Moshowitz (29) maintains that meaningful participation reduces uncertainty and its adverse effects, and can increase the climate of trust, enhancing employees. Whilst many organizations accept the need for continuous organizational learning, and embrace the concept of the learning organization, most find it easier to focus on data capture and in some cases data transfer. To stimulate learning within a complex organization, individuals need to convert data to information or knowledge that can be encoded and transmitted in ways that are useful to the organization and. It needs to be easily retrievable and couched in the language and vocabulary of the organization, and it needs to lead to change in the way the organization operates. Even if new knowledge is readily accessible, it must appear relevant to the individuals and their day-to-day work environment, and for a group to make use of the knowledge, as sources are relevant (Hyland and Beckett, 2002).

Maintenance Culture

The focus of the maintenance function is to ensure that all organization asserts to meet and continue to meet design function of the assertion. Proper maintenance of plant equipment can significantly reduce the overall operating cost, whilst boosting the productivity of the plant. Hence, the terms benchmarking, best practice, competitive analysis and core competence are used in business today.

Benchmarking

Xerox Corporation defines benchmarking as follows: the search for industry best practice, which leads to superior performance. Many organizations use benchmarking to be as good as their competitors. Benchmarking is a continuous improvement tool that is to be used by organizations that are thriving to achieve superior performance in their respective marketplace. Another definition for benchmarking is as follows: an ongoing process of measuring and improving business practices against the organization that can be identified as the best worldwide. Information that allows companies to improve their competitive position must be gathered from the best organization, no matter where they are located.

Companies striving to improve must not accept past constraints, especially the "not invented here paradigm. Benchmarking provides a deep understanding of the processes and skills that create superior performance. Because maintenance management is a core business process, it is a process that could benefit from benchmarking.

Bench marking is used to improve performance by understanding the methods and practices required to achieve world-class performance levels (30). Bench marking has become one of the most popular business management tools of

the millenniums. It has been promoted as a technique that bring change and improvement to an organizations business processes through a process of learning from other organization's successes, and application of these practices in one's own firm (31).

Spendolini (32) characterizes bench marking as a continuous process, a process of investigation providing valuable information, a process of learning from others, a pragmatic search of ideas, a time-consuming and labour – intensive process requiring virtually any business activity. Spendolini (32) identified the following reasons for using bench marking:

- Gathering relevant information to be used in strategic planning

- Forecasting trends in relevant business areas, like the business directions of the key players in the market,

- Generating new ideas and functional learning by expiring individuals to new products, work presses, and ways of managing company recourses, i.e. by thinking "out of the box"

- Collecting and using information about the products or processes of competitors or excellent companies for setting standards or making comparisons with similar products or services; and

- Setting performance goals in relation to state – of – the art practices.

- Walton (33) states that the evolutionary process of benchmarking process are:

- To identify key performance measures for each function of a company operations;

- To measure the internal performance levels of the company as well as the performance levels of the competitors;

- To compare performance levels in order to identify areas of competitive advantage; and

- To implement programmes for closing the gap between the internal operators and the other – companies.

Several types of benchmarking can be employed in constructing a benchmarking project these include:

Internal benchmarking

Internal benchmarking, typically involves different departments or processes within a plant. However, internal benchmarking is unlikely to result in any major breakthrough in improvements that meets the world standard best practice. Nevertheless, internal bench marking will lead to small, incremental improvements and should provide adequate return on investment (ROI). For any internal benchmarking will very likely increase the desire for more extensive external benchmarking. Similar industry or competitive benchmarking uses external partners in similar industry or processes. The companies are somehow open to sharing information that is not proprietary. With similar industry/competitive benchmarking, the project tends to focus on organizational measure. Best practice benchmarking focus on finding the inarguable, leader in the processes being benchmarked. This search, which crosses industry sectors and geographical locations, provides the opportunity for developing breakthrough strategies for a particular industry. The organization studies business processes outside its industry, adapts, adopts superiors' business process, and makes a quantum leap in performance compared to its competitors. Best practices are good practices that have worked well elsewhere. They are proven and have produced successful results. They must focus on proven sources of best practices. Best practice bench marking provides the opportunity to make the most significant improvement; the companies being benchmarked are the

best in the particular process. It provides the greatest opportunity to achieve breakthrough strategies, resulting in an increase in the company; competitiveness.

Core Competence

Core competence is a key business output or process, through which an organization distinguishes itself positively. It impact in being expert maintenance, lowering costs, increasing profit, providing improved service to customers, improving product quality, and improving regulatory compliance. The process will help distinguish an organization positively. Core competences are by deliration virtually imitable. Dreje and Sorensen (34) different care competence from support and complementary competencies, complementary competencies add value to care competencies; they can be imitated. While support competencies are defined as competences that are essential for corporation's competitiveness, but not sufficiently to décor the corporation's competitive banners alone (Dreje and Sorensen 2002). Importantly, theories connected to the study of care competencies highlight organizational learning as an integral element to corporate strategy. Thus, these theories point up human abilities expertise as aspects which corporations ought to plot into their competencies, which at the same time attempting to foster a more dynamic corporate view point on competencies in general and on competence development (34). The American Productivity and Quality Centre define care competences as business processes that should impact the following business measures: return on assets; customer satisfaction; revenue for employee, quality; asset utilization; and capacity. Maintenance functions in any plant or fits the definitions. These definitions point to a core competence as strategic advantage. The maintained process in any company provides this advantage in many ways. These include enhancing any quality initiatives, unceasing capacity, reducing costs and eliminating waste. (34).

Best Practices

Best practices are good practices that have worked well elsewhere. They are proven and have produced successful results elsewhere; they must focus on proven sources of best practices. The organizations should schedule frequent reviews of practices to determine, if they are still effective and whether they should continue to be utilized.

Best practice benchmarking focuses on finding the unarguable leader in the process being benchmarking. This search, which crosses industry sectors and geographical locations, provides the opportunity for developing break through strategies for a particular industry, adopts superior business processes, and makes a quantum leap in performance compared to its competitions. Being the early adaptor or adaptor, will give the organization an opportunity to lower costs or aggressively capture market share. Best practices evolve over time. What was once a best practice in the past may only be a good practice now, and perhaps in the future, even a poor practice. Hence, continuous improvement is needed.

The Changing World of Maintenance

For some time now, maintenance has changed, perhaps more than any other management discipline. The changes are due to huge increase in the number and variety of physical assets (plant, equipment and buildings), which is being maintained throughout the world, more complex designs, new maintenance techniques and changing views on maintenances organization and responsibilities. Maintenance is also responding to changing expectations. These include a rapidly growing awareness of the extent to which equipment failure affects safety and the environment, a growing awareness of connection between maintenance and product quality, and increasing pressure to achieve high plant availability and to contain (36). These changes are testing attitudes and skills in all branches of industry to the limit.

Maintenance people are adopting completely new ways of thinking and acting as engineers and managers (Moubrary, 2000). Proper maintenance of plant equipment can significantly reduce the overall operating cost, while losing productivity of the plant. Although many management personnel often view plant maintenance as an expense, a more positive approach in looking at it is to view maintenance work as a profit centre. The key to this approach lies in a new perspective of proactive (35).

New Approach

Quite apart from greater expectations, new research is changing many of our most basic beliefs about age and failure. In particular, it is apparent that there is less and less connection between the operating age of most assets and how likely they are to fail (36). There has been explosive growth in new maintenance concepts and techniques. The new developments include:

- Decision support tools such as hazarded studies, failure

- Modes and effect analysis and experts systems;

- New maintenance techniques such as condition monitoring;

- Designing equipment with much greater emphasis on reliability and maintainability; and

- A major shift in organizational thinking towards participation team working and flexibility.

The Challenges Facing Maintenance

A major challenge facing maintenance people today is not only to learn what this techniques are, but to decide which are worthwhile and not in their own organizations. Also, if we make the right choices, is it possible to improve asset performance? If we make the wrong choices, new problems are created while existing problems only get worse (Moubary, 1991). The challenges facing maintenance are,

- To select the most appropriate techniques to deal with each type of failure process, in order to fulfill all the expectations of the owners of the assets, the users of the assets and society as a whole;

- In the most cost-effective and enduring fashion; and

- With the active support and cooperation of all people involved.

Reliability Focused Culture

Dunn (37) discusses five key elements required for successful transition from traditional, repair – focused organizational culture, to a proactive, reliability – focused culture, these include:

- Ensuring a long-term strategic focus;

- Aligning reward systems with strategic goals;

- Better integration between production and maintenances;

- Creating opportunities for teamwork and organizational learning; and

- Strong committed leadership

Most maintenance organizations are looking to move their culture from a repair – focused culture to a reliability-focused organization.

Table 2: Repair-Focused to Reliability Focused

Repair Focused	Reliability Focused
Fix it	Improve it
Firefight	Predict, plan, schedule
Tradesman	Business team member
Manage defects	Eliminate defects
Reduce maintenance cost	Increase uptime
Programme of the moth	Continuous improvement
Believe Failures are inevitable	Believe failures are exceptional
Give priority to breakdowns	Give priority to eliminate failures
Low level of planned work	Low level of rework
High level of rework	High reliability
Poor reliability	
High maintenance cost	Low maintenance cost
Short term plants	Long term plans
Become non-profitable	Attract new investments

Table 2 shows the traditional and the proactive maintenance of organizational culture

The first point to make about organization culture is that "change is not an easy approach. The key to effective organizational change flows from the sound management process for cultural change, strategic and business planning, role, and process design, management development and performance management. For any organization to service, it must manage cultural and organizational change, so as to energize resources and create the innovative environment needed to service.

For successful organization organizational change:

- Use a team approach that involves as many stakeholders in the change management process as possible;

- Recognize that organizational change can only be achieved through people, and therefore change management must address their emotional needs;

- Recognize that organizational change takes time and resources – result should not be expected soon;

- Organizational change needs skills and business awareness training; and

- Strategic change management need committed, and dedicated leader, planning for organizational change ensures that a company is doing the right things at the right time. In large organization, strategic change in plant may be prepared at different levels in the organization and / or may define the role of particular functions across the whole organization. Innovative and integrated development is fundamentally viewed as a combination of strategic management and change.

The Changing Realm of Maintenance

Over the past years, maintenance has become more important in the industry, and the role of maintenance has grown into a much more prominent purpose in the plant operation. From a single expectation of keeping equipment running or restoring it to desired operating condition, management saw a much more role of maintenance. Most saw maintenance efficiency as a factor that can affect the overall business effectiveness and risk – safety,

environmental integrity, energy efficiency, product quality and customer service and not contained only to plant availability and cost. The evolution of maintenance process also rooted from the changing complicity of the industry itself. The beginning of 1980's witnessed the growth of mechanization and automation, and becoming more complex and any little breakdown in equipment could affect the operation of the whole plant. This means that, reliability and availability have become key issues, since any failure can have a services consequence to the whole plant organization. There is a fundamental focus on maintenance such as:

- Condition monitoring, design for reliability and maintainability; hazard studies/risk analysis;

- High-tech computers, failure modes and effect analysis;

- Expert systems; and multi skilling and tram work. Significance feature basic principles of proactive maintenance include:

- Definite deliberation of risk, mutably at higher levels of organizations, when dealing with equipment design and maintenance strategies.

- Coherence between functional demand, equipment and maintenance low costs of maintenance; and

- Drift development in information technology to detect, product, diagnose and prevent equipment failures. Another factor, which might have a very influential factor in the trends of maintenances, is the increasing use of computer modeling in maintenance strategy. With the rapid development of computer technology especially in the area of artificial intelligent may provide the predictive tools of the future. Not only that computers help in collecting and storing data, it will also help us to better understand the focal sources of an equipment failure. Fundamentals among present maintenance principles include:

- Focus is now not only concentrated on availability but also reliability;

- There is a push towards zero downtime or zero in services breakdowns, and

- Improved maintenance tools such as reliability centered maintenance (RCM) total productive maintenance (TPM), root cause failure analysis (RCFA), failure modes effects analysis (FMECA). Many companies in the industrialized economies have stated zero breakdowns/zero in – service failures as their maintenance goods.

Developing a Maintenance Strategy

The focus of the maintenance function is to insure that all company assets meet and continue to meet the design function of the asset, and best practices are adopted that enables a company to achieve a competitive advantage over its competitions in the maintenance process. These practices (or processes), within maintenance fall under these categories: preventive maintenance, inventory and procurement, work flow and controls, computerized maintenance management system usage, techniques, operational involvement, predictive maintenance, reliability centered maintenance total productive maintenance, financial optimization, and continuous improvement.

Preventive Maintenance

The preventive maintenance (PM) programme is the key to any attempt to improve the maintenance process. It reduces others to a level that allows other practices in the maintenance process, to be effective.

Most companies need to focus on the basics of maintenance, if they are to achieve activities, enabling a company to achieve a ratio of 80 percent proactive maintenance to 20 percent (or less) reactive maintenance.

Stores and Procurement

The inventory (store) and procurement programs must focus on providing the right parts at the right time. The goal is to have enough spark parts, without having too many spare parts. Stores controls are needed to allow the service levels reach 95 to 97 percent with 100 percent data accuracy. This practice involves documenting and tracking the maintenance work that is performed. A work order system is used to initiate, track and record all maintenance activities. The work may start as a request that needs approval. Once approved, the work is planned, then scheduled, performed, and finally recorded. Where this is not in place and enforced, data is lost, and true analysis can never be performed. At least 80 percent of all maintenance work should be planned on a weekly basis, and at last 90 percent of the schedule should all be in compliance, weekly.

Computerized Maintenance Management Systems

The use of computerized maintenance management systems (CMMS) has become popular throughout the world. CMMS software manages the junctions' collection, processing, and analysis of data and provides support for some of other best practices for effective use of CMMS. All the data collected must have completed accuracy.

Work force specialization and interpersonal training: Trade specialization is a characteristic of traditional maintenance organization. However, it is more usual to find maintenance work that requires a range of skills, in such cases, inter-trade flexibility is of paramount importance. This can be achieved by developing multi-skilled trade force. Apart from inter-trade flexibility within the maintenance organization, there is the operator maintenance amalgam. In TPM parlance, operator maintenance is known "self-initiated maintenance" the autonomous maintenance is where, every equipment owner is involved in maintenance function. The concepts foster a sense of plant ownership by developing the operator maintenance to be involved in continuous improvement. Additionally, these involved in the maintenance function must have the interpersonal skills to be able to communicate with other departments in the organization. They must be able to work as a team or a mature group within the environment.

Operational Involvement

The operations or production department must take enough ownership of their equipment that they are willing to support the maintenance department's efforts. Operational involvement includes:

- Inspecting equipment prior to start up;

- Filing out work requests for maintenance;

- Completing work orders for maintenance;

- Recording breakdown orders or malfunction in data for equipment;

- Performing some basic equipment service, such as lubrication,

- Performing routine adjustments on equipment;

- Executing maintenance activities/supported by central maintenance etc.

Operators are available round the clock near the equipment, so they can continuously watch for problems while the maintenance staff is usually available only during the general shift. In operator maintenance, the operator provides the "first aid" as soon as the symptoms are noticed. Implementing operator maintenance cannot be half-realized. There should be a total commitment from the top and middle management and the shop-floor. Training is the key to successful operator in "self maintenance" environment. He should acquire the ability to judge an abnormality and have knowledge of the current measures to quickly implement for preserving the normal running condition. He should understand the quantitative methods for determining the extent of determination based on stands and follow the rules once decided. Personal should be taught how to maintain their equipment by daily checks, lubrication cleaning, repairs, adjustments and early detection abnormal conditions.

Predictive Maintenance

Predictive maintenance also known as the condition – based maintenance, is the maintenance carried out in response to a significant deterioration in a unit's condition or performance, as indicated by a change in monitored parameter. Predictive maintenance allows production loss to be minimized by scheduling around the down time predictive maintenance (PDM) inspections that should be planned and scheduled, utilizing the same techniques that are used to schedule the preventive tasks. All data should be integrated into CMMS.

Four major categories of on-condition techniques are identified as Moubray (38):

- Condition monitoring techniques in product quality;

- Primary effects monitoring techniques, which entail the intelligent use of

- Inspection techniques based on the human senses.

Reliability Centered Maintenance (RCM)

RCM is a process, used to determine what must be done to ensure that any physical assets continue to do whatever its users want, and to do in its present operating context (Moubray, 2000). The RCM is a maintenance approach used in identifying the best suitable maintenance strategy for a system. Identifying of system function and functional failures, as well as failure modes and effects analysis is important element in RCM. The first step in the RCM process is to define the functions of each asset in its operating context, together with the associated desired standards of performance. The objectives of maintenance are defined by the functions and associated performance expectations of the asset. RCM techniques are now applied to the preventive and productive efforts to optimize the programmes.

Moubray (36) points out, what the users of expected assets are able to do as:

- Primary function, summarize why the asset was acquired in the first place. The category of functions covers issues such as speed, out – put, carrying or

- Secondary functions, recognizes that every asset is expected to do more than simply fulfilling its primary functions. Users also have expectations in areas such as safety, control, containment, comfort, structural integrity, economy, protection, efficiency of operation, compliance with environmental regulations and even the appearance of the asset. The users of the assets are usually in by far the best position to know exactly what contribution each asset makes to the physical and financial well-being of the organization as a whole, so it is essential that they are involved in RCM process from the nest. The only occurrence, that is likely to stop any asset performing to the

standard required by its users is some kind of application, we need to identify what failures can occur. RCM process does thereby:

- Firstly, by identifying what circumstances amount to a failed state; and

- Thereby asking what events can curse the asset to get into a failed state. RCM relies on the application of a breadth of knowledge regarding the operation and maintenance of a piece of equipment thorough small, multi-disciplinary teams, usually involving experienced shop floor trades people and operator, as well as other people, who have technical knowledge of the equipment, such as engineers, supervisors, and vendors.

Total Productive Maintenance (TPM)

The TPM is a methodology, which focuses on people and is an integral of total quality management (TQM). The methodology was developed in Japan's manufacturing industries, initially with the aim to eliminate production losses due to machine breakdowns in just – in – time (JIT) production systems. TPM redefines the organization of maintenance work by applying the following principles (38):

- Cultivate a sense of ownership in the operator, by introducing autonomous operator maintenance – the operator takes responsibility for the primary care of his plant. The tasks involved include cleaning, routine inspection, lubrication, adjustments, minor repairs, as well as cleanliness and tidiness of the operator's workspace;

- Optimize the operator's skills and knowledge of his plant to maximize operating effectiveness. The operator is thus mobilized to detect early signs of wear, misalignment, note oil leaks, errant chips, or loose parts. He is also involved in making improvement suggestions to eliminate the looses due to breakdowns or sub-optimal performance of the plant,

- Use cross-functional teams consisting of operators, maintainers, engineers and managers to improve people and equipment performance; and

- Establish a schedule of clean-up and preventive maintenance to extend the plants life spans and maximizes its up time job. Management as well as senior manager must demonstrate their commitment to TPM by devoting time and allocating resources to create and sustain the cultural change, and to provide necessary training to employees to achieve autonomous maintenance.

Financial Optimization

This statistical technique combines all the relevant data about an asset such as downtime cost, maintenance cost, lost efficiency cost, and quality costs. It then, balances that data against financially optimized decisions, such as when to take equipment off the line for maintenance, whether to repair or replace an asset, how many critical spare parts to carry, and what the maximum/minimum levels on routine spares should be. Financial optimization requires accurate data; making these types of decisions incorrectly, could have a devastating effect on a company's competitive position. Within many large scale plant based industries, maintenance costs can account for as much as 40 percent of an operational budget. The maintenance effort is therefore, easily identified at a corporate level as a source of saving. Costs in maintenance can be cut in either a beneficial or detrimental manner. The best business outcome would be to both reduce costs and optimize current maintenance effort to increase reliability. (38).

Continuous Improvement

Continuous improvement in asset care is an ongoing evaluation programme that includes constantly looking for the "little thing" that can make an organization more competitive. Continuous improvement can be considered as the 'wheels' of the organizational vehicle. It is the effort produced by the wheels, which well make the vehicle move forward.

Continuous improvement comes only when individuals are motivated to achieve regular improvement in all areas of their work. Kaizen in Japan means ongoing improvement, which involves everyone in the organization. Kaizen is process- oriented rather than individual task oriented. Continuous improvement is usually represented in terms of Kaizen and innovation. Zairi (4), points at the essential elements of continuous improvement initiative as:

- Continuous improvement is a continuous – driven effort. Targets can only be set and determined by customer requirements;

- The use of knowledge work is required. Any continuous improvement initiative will depend on peoples' skills, knowledge, expertise and creative output;

- Continuous improvement is about inter-functional problem- solving activity and teamwork. Shared goals and objectives are key to successful continuous improvement programmes;

- Continuous improvement is about driving out fear, and making problems an opportunity for improvement;

- Management systems, which include the use of tools and techniques to understand processes, measure existing performance, identify problems and implement the solutions.

- Continuous improvement requires positive management systems, which create a positive climate for improvement and step positive management teams; and

- Continuous improvement focuses on the whole process (means and the ends) rather than the results only. Once a culture of common beliefs, principles, objectives and concerns has been established, people will manage their own tasks and will make voluntary responsibility to improve processes, which they own. Benchmarking is used to examine specific processes in maintenance, compares the processes to organizations that have mastered those processes and maps changes to improve the specific process. Benchmarking is a continuous improvement tool that can facilitate change.

CONCLUSIONS

Maintenance functions in Nigeria are under increasing pressure to improve quality maintenance and reduce maintenance and operational costs. The top management industries in Nigeria have not recognized this, and have not responded to focus on reliability cultured maintenance and continuous improvement. This paper, focused on elements of corporate culture to continuous improvement in the following areas: corporate culture; national culture, leadership, the learning organization; core competition; benchmarking; continuous improvement; and management style.

Nigerian barriers in proactive maintenance in industries can be identified as lack of corporate culture, which could be identified by the management style, and maintenance strategy. An objective of this paper has been to gain an understanding of the subtle areas of maintenance and culture. One complication when studying quality maintenance and culture is that, the cultural influence not only comes from national culture, but from corporate culture. The culture of an

organization comes through the development of norms and values that help it to survive the environment, in which it was created and in which it exists. The curious paradox exists that organization can influence the behavior and values of the individual, while the organization itself is constructed or composed of these same individuals. They respond to organizational environment as a result of a combination of positive and negative regards. Organization develops in response to their environmental influence. Over time, these phenomena contribute to a tendency to uniformity of individuals within the organization, and similarly to a tendency toward uniformly of organizations within the greater environment (40). The culture inside an organization evolves in part in response to the pressures of the outside society, or the social context in which that organization was created and in which it exists. As societal cultures evolve over time, organizational cultures also evolve over time. The social or cultural environment in which that organization exists also evolves over time. The mechanisms of cultural evolution are similar, whether the unit is of analysis of nations, organizations or species (40). Thus, an organization's culture evolves over time in response to the general culture or environment in which it exists, and it continues to perpetuate those culture that enable its continued existence. Cultural change requires integrating systems thinking, learning organization and requires a visionary, and committed leader to pilot the organization through uncertain environment, fraught with turbulence. Such environmental changes include revolutionization of information, fast-paced technologic change, and the dissolution of national and changing values (40, 41).

Environments frequently change faster than the cultures they contain, which results in the demise or replacement of the cultures that do not keep pace. Hence, the current and increasing interest in the problem of corporate maintenance culture, particularly in the Nigerian industries. This paper offers a connectional framework on how Nigerian industries can successfully improve maintenance functions by transforming and renewing the corporate culture using the RCM and TPM maintenance philosophies and strategies. The top managers should discover an approach to management of change, learning, and organization; care competence, continuous improvement, and best practices in order to improve maintenance functions. Since an organization is composed of individual, one might expect that in order to change the organization, one need only to change the attitudes and behavior of the individuals.

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