

Analysis on the Shortage of Skilled Artisans in the Construction Industry: A Case of an Oil Refinery in South Africa

By

Ranjith Golbahram, Nishika Chetty

Mancosa Graduate School of Business, 16 Samora Machel St, Durban Central, Durban, 4001,
SOUTH AFRICA.

ir@mancosa.co.za, adhir.debiecharan@mancosa.co.za

Abstract

The purpose of this study is to establish the causes and effects of inadequate skilled artisans and the main factors that cause this shortage in the petro chemical industry. The current artisan shortfall is increasing at a rapid pace and the study was inspired by many international and local studies which demonstrate a lack of concern for the impact these shortages have on project performance, and their effects on project and maintenance time. Having identified the effects that the lack of skilled artisans have on projects and maintenance, this study will include various strategies to reduce this phenomenon in the construction industry. The findings from the study will provide recommended strategies that can be utilized to improve productivity and efficiency gains in the industry and will add value to academic knowledge which can be presented as a guideline to the contractors at the oil refinery in South Africa.

Keywords: *inadequate skilled artisans, petro chemical industry, construction artisans*

1. Introduction

South Africa (SA) is known to have an immense unemployment rate and filling high demand engineers and skilled artisan's positions have become harder. Currently the petro chemical industry is experiencing extensive growth which has led to an increased demand of all levels of skilled human resources including engineers, project managers and skilled artisans which impacts severely on production and maintenance in the construction industry. With the shortage of skills internationally most of the competitors are seeking to recruit artisans from South Africa because the past skills development programs are well recognised. These international organisations offer irresistible salaries and because of the ever declining economy, skilled artisans unquestionably accept employment. It is imperative to creatively address the shortage of skilled artisans, overall training costs, negative perceptions regarding blue collar artisans, the reduction of apprenticeship, closing of training centres, and poaching of skills from opposition companies, which has to be taken into consideration to retain these skills. Furthermore, the lack of training, inexperienced management, poor planning, ineffective quality management, and the lack of retention incentives, are some of the factors that have contributed drastically to the loss of skilled artisans in the construction industry. These factors that contribute to the loss and retention of the skilled artisans will be explored and recommendations will be submitted to the management of the contracting companies. The researcher has utilised the core contractors based at an oil refinery in South Africa that require skilled artisans to perform maintenance and project construction work.

Background of the Problem

Technically skilled artisan shortages continue to pose a serious threat in the South African petro chemical and construction industry, although a vast amount of private and public disciplines are specifically

dedicated to discuss the requirements of expansion developments due to an emergent economy and an increasing number of people (Hall and Sandelands, 2009:43). The petro chemical and construction industries play vital roles in developing a nation by supplying the infrastructure that most developmental enterprises depend on and is a huge manual labour recruiter. Shortages of skilled artisans are caused when the need for labour of a particular discipline is more than the availability of qualified resources who are willing to be employed under a current market situation. Organisations within the petro chemical and construction industries have to strategize on increasing the number of skilled artisans or suffer the consequences of not completing projects and maintenance as scheduled. Organisations need to understand why they encounter a continuous loss of skilled artisans by considering the viewpoints of artisans themselves. The outcome of this research can be utilised to strategize and develop methods to retain the artisans within the organisation. Techniques to prevent the loss of artisans has been a great concern within the oil refinery for a while, however few organisations have made a dynamic effort to explore why the number skilled artisans are declining. Employees should strategize on what exactly can be offered to artisans in order to retain them. Unless major changes within organisations are made to intervene and to demonstrate the main causes of artisan turnover in South Africa's industrial and construction regions continuous loss of qualified artisans will continue.

Shortage of Skills

Absolute scarcity refers to suitably skilled people not being available, for example in a new or emerging occupation such as biotechnology and information technology, a lack of sufficient numbers of workers with specific skills, or insufficient numbers to satisfy replacement demand. Relative scarcity, on the other hand, refers to a situation where suitably skilled people exist, but do not meet other employment criteria, for example they live in different geographical areas, or do not satisfy Black Economic Empowerment criteria (Badroodien, 2004:76).

Aim of Study

The aim of this study is to analyse the shortage of skilled artisans in the construction industry and the impact that the shortage of skilled artisans have on project, maintenance and production in the petro chemical and construction industry and to devise a solution that will support the process of decreasing employees and retaining of skilled artisans.

Research Questions

1. What are the causes for the lack of skilled artisans at the oil refinery?
2. What effects/impact does the shortage of skilled artisans have on the organisation?
3. What can be done to increase and retain the number of skilled artisans?
4. What recommendations can be made to retain these skills and to decrease the lack of skilled artisans?

2. Literature Review

The lack of technical competencies paired with rampant skills shortages remains a problem for local employers, across various industries. The skills shortage is widely regarded as a key obstacle to economic growth, job creation and business expansion (Mazlish, 2012:123).

Image of the Artisan

Merseta CEO, Dr Raymond Patel, has indicated that the grim shortage of skilled artisans is not exclusive to South Africa, but it is a global occurrence which infiltrates the Western world because the youth are reluctant to work hard and dirty their hands (Cape Times Insight, 2007). According to Samuel (2012:132) the youth would preferably work with computers instead of engineering and anything associated with it. In the event that the country is to expand the supply of artisans a few measures must be taken to urge people to train as artisans.

Defining Lack of Skills Shortages

The construction industry has a basic part to play in cultivating growth within recognised and unrecognised places in South Africa. The industry, confronts some genuine difficulties in its attempts to complete development programmes efficiently (Thornton, 2013:154). According to Mazlish (2012:123), contractual workers face numerous issues while participating in development activities, for example, temporary worker execution, low job value and poor output and efficiency are known in the trade.

Shortages of Skills

Critical skills refer to specific skills within an occupation. In the South African context there are two groups of critical skills: (1) generic skills, including problem solving and learning to learn, language, literacy or numeracy skills; and working in teams; (2) particular occupational skills required for performance with that occupation (Galagan, 2010:13). The latter accounts for the problems that emerge when a firm experiences technological change or reorganizes production methods (Galagan, 2010:14). According to Patel (2005), this shortage of artisans exists alongside a massive expansion of Further Education and Training Colleges (FET) enrolments in engineering studies (in the FET context artisan related skills are clustered under engineering). According to Patel (2005:67) a total of 280 000 graduated in engineering studies in the year 2000, but only 34% found jobs in industry because the courses offered are not aligned with industry requirements. The surplus of unemployed FET college engineering graduates is exacerbated by the increase in the number of learners who have enrolled in learner ships since April 2001.

The Impact of the Deficiency of Basic Education on Skills Development

Many see the education and training system of this country as the main contributor to the national skills crisis. The system is characterised by low education standards, inadequate provision for early child hood development, declining Grade 12 pass rates, declining enrolments at FET colleges, lack of resources, under-qualified teachers, weak management and poor teacher morale. High failure rates in schools, colleges and universities offer little hope of addressing the skills shortages. Benjamin(2008:5) states that South Africa came last in global studies concerning literacy and reading, as well as in mathematics and science. African countries like Ghana, Botswana, Morocco and Tunisia have been outperforming it. The number of South African completing school was also below the norm compared to the developing countries. Only 30.9% of South African adults completed high school, whilst 69.8% of adults in developed countries complete high school (Benjamin, 2008:5). Together with the low achievement rates, only 13% of learners enrolled for science and 9% for mathematics at the higher-grade level in 2008. There has been a significant decline in Grade 12 mathematics and science results between 2008 and 2009. Therefore, it reduced the supply of quality skills and the availability of required talent.

Learners Choices Post Matric

Du Toit and van Tonder (2012:23) analysed the factors that affected the choices of Grade 12 learners in their transition to higher education. South Africa's higher education participation rate of between 15-18 per cent was below the 20% benchmark given for middle income developing countries. The National Plan for Higher Education was designed to reduce income inequality and poverty by creating opportunities for young people and adults to further their education and was consequently touted as a major contributor to the reduction of intermediate skills shortages in South Africa. Intermediate level knowledge and skills are best described as skills held by workers in the craft and artisanal trades, where knowledge is a combination of theory and practice, and the emphasis is on the practical rather than the conceptual.

Business Approach to Training

It ought to be noticed that whilst before, South Africa was just an importer of skills; this is no more the case. South Africa artisans are currently employed in Russia, China and the Middle East, while thousands have moved to Australia and elsewhere (Babbie, 2010:65). These advancements could effect on the

expenses of working together in South Africa. This expanded worldwide rivalry for artisans has brought about flighty and shorter contract cycles. +

Employee Motivation

The meaning of motivation is the processes that decide the decisions individuals make about their behaviours. Motivation is the ability to indoctrinate personnel with a unity of purpose maintaining a continuing, harmonious relationship among all people. It is a force that encourages and promotes a willingness of each employee to cooperate with every member of the team. McGrath and Akojee (2011:45) suggests that the four types of inspirational motivations are accomplishment, connection, fitness and force, which are instilled in people that are self-inspired and this might be the situation for many construction workers.

Development of Artisans in the Construction Industry

According to Rugraff and Hansen (2011:33) during the last two decades, South Africa encountered an uncommon reduction in the quantity of trained and experienced artisans, both by the public and private skills development centres. This pattern has been joined by a drop in the number of apprenticeship contracts enlisted with the Department of Labour (Rugraff and Hansen, 2011:58). Emigration, crime, affirmative action, a lack of quality maths and science matriculates, and poaching with more lucrative salaries abroad, add to the reduction of skilled artisans. According to Valsamakis (2012:48) this lack is an important challenge to find ways to increase the number of school-leavers opting to study Construction and Engineering and encourage them to enter a training pathway for the myriad of scarce skills such as electricians, fitters and turners and carpenters.

Organisational Behaviour

In today's work culture, it is important to understand the behaviours of workers in companies. Understanding the behaviour of workers helps in the growth of the company (Pallant, 2011:21). Knowledge of organisational behaviour has helped managers and executives to better understand their fellow workers and channel their skills and resources to achieve goals of the organisations (McGrath and Akojee, 2010:39). A meaningful organisational culture can have a positive impact on an individual's behaviour. Recent research has shown that more stress should be given to organisational development, which in turn will create team spirit and motivate employees to achieve organisational goals.

Leadership and Commitment

Thornton (2013:14) claimed that charismatic leadership transforms employees to pursue organisational goals over self-interests. Thornton (2013:15), defines leadership as influencing people so that they do the correct things, the right way at the right time, willingly, on their own, so that organisation grows and the purpose is fulfilled. Leadership is essential in the implementation of ISO 9000 and the complete involvement of management in their capacity of leadership is essential for the success of a quality project (Pallant, 2011:23). Managers set high performance expectations and standards because they are aware that challenging, attainable goals lead to greater productivity. In the context of total quality management (TQM), this style of leadership is important to the success of any TQM initiative within an organisation (Pallant, 2011:27). According to Macinati (2008:63) leaders in a TQM system view the firm as a system; support employee development; establish a multipoint communication among the employees, managers, and customers; and use information efficiently and effectively. In addition, leaders encourage employee participation in decision-making and empower the employees (Kaynak, 2003:129). Top management commitment and participation in TQM practices are the most important factors for the success of TQM practices. Previous studies have found that leadership improves operational performance, inventory management performance, employee performance, innovation performance, social responsibility and customer results, financial performance, and overall firm performance (Prajogo and Sohal, 2006:76). TQM literature has stressed the importance of transformational leadership in the creation and maintenance of a quality culture (Pallant, 2011:28).

Communication

According to Backes-Gellner and Tuor (2010:154) good communication is an essential tool in achieving productivity and maintaining strong working relationships at all levels in an organisation. Employers who invest time and energy into delivering clear lines of communication will rapidly build up levels of trust amongst employees, leading to increases in productivity, output and morale in general (Brutus, 2013:14). Poor communication in the workplace will inevitably lead to unmotivated staff that may begin to question their own confidence in their abilities and inevitably in the organisation (Backes-Gellner and Tuor, 2010:178). Organisational communication standards grow out of the communication choices of executives, managers and other employees. Ideally, organisational communication facilitates sharing of information, event planning, project coordination and social interaction. Poor communication and non-functional communication systems leads to confusion, lowered morale and loss of productivity. Barker (2003:34) states that employees feel empowered if they are able to have upward communication including effective feedback (Barker, 2003:36). It is imperative that bosses or managers listen to employees and respond; this leads to an increase in employee job satisfaction.

The Effect of Skills Shortages on Skills Migration in South Africa

The South African government is giving the issue of skills shortages considerable attention. However, skill shortages are still very real in South Africa today (Barker, 2003:67). The proliferation of new legislation, like employment equity legislation and the Mining Charter for women, reflect this. The legislation aims at developing the skills and employability of all citizens in order to alleviate poverty, address historical inequalities, create employment opportunities and improve the competitiveness of the national economy (Du Toit and van Tonder, 2009:20). The government is trying desperately to escalate valuable skills output through its increased education budget. However, structural changes in the economy are exacerbating skills shortages. As the economy moves towards greater capital and skills intensity, the demand for unskilled workers is diminishing (McCord and Borat, 2003:115). This shows structural changes in the economy with a growing demand for skilled workers. The government continues to place a high premium on development. The loss of skilled workers is called the 'brain drain'. This movement also affects South Africa as thousands of skilled South Africans leave the country every year. Some of the factors that influence emigration include crime, affirmative action, Black economic empowerment, poor education standards, and inadequate government provisions for skilled resources (McDonald and Crush, 2008:85). A net inflow of immigrants in the 1980s has become a net outflow in the 2000s. This is a major contributing factor to the skills crisis. The unofficial number of emigrants is estimated at three times the official number (BhoratMeyer and Mlatsheni 2002:154). Attempts to recruit foreign skills to work in local firms are proving to be a challenge. From a service delivery perspective, the Department of Home Affairs is battling to process approximately 35 200 quota work permit applications South Africa made available in 2007 to attract foreign workers to help alleviate these shortages.

Effects of Human Immunodeficiency Syndrome (HIV) and Acquired Immunodeficiency Virus (AIDS) on Skills Shortage

South Africa is experiencing the largest HIV and AIDS epidemic in the world. An estimated 5.6 million South Africans were HIV positive in 2008, one of the largest numbers of HIV positive people of any country in the world (Provincial HIV/AIDS Statistics, 2008). Almost one in five South Africans between the ages of 20 and 64 is HIV positive (Solomon, 2006:14). Increased attrition rates because of HIV and AIDS are going to affect the country adversely in the 21st century by diminishing the future skills pool (Mitchell, 2003:26).

3. Research Methodology

According to Cooper and Schindler, (2010:153) the definition of research methodology refers to different ways that a research employs to collect primary and secondary data to pursue the objectives of the study.

Cooper and Schindler (2010:38) define research design as a roadmap which aids the research with guidelines to address the research objectives and it is an outline that can be used in research to collect, analyse and interpret data. There are three forms of research design namely; exploratory, descriptive and causal (Saunders *et al.*, 2007:267). While explanatory research is usually carried out in cases where the study is new or has an indistinguishable background and descriptive research monitors and describes the phenomenon. This study implemented a descriptive research design (Creswell, 2009:98). A descriptive study is governed by the following rules: subjects are generally measured once; the intention is to only establish associations between variables; and, the study may include a sample population of hundreds or thousands of subjects to ensure that a valid estimate of a generalized relationship between variables has been obtained.

Research Philosophy

A research philosophy is a belief about the way in which data should be gathered, analysed and used. There are two classifications of research methods which are qualitative and quantitative (Malhotra, 2011:284). Quantitative research methods were originally developed in the natural sciences to study natural phenomena (Pallant, 2011:39). Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. The positivist research methodology was followed because a conclusion was drawn from the research setting that provided evidence to support research and the emphasis is on measurement, whether this be of scientific quantities for example, time or speed through experimental activities, or of attitudes, behaviours and opinions through the surveys and questionnaires.

Quantitative Research

The study conducted was a quantitative research approach because the purpose of the research concerns explanation and prediction of time. The respondents for the study were the educated and experienced artisans who were familiar with quantitative research at the oil refinery.

Research Strategies

Research strategy is a methodology that helps the researcher to investigate the research issue. According to Cooper and Schindler (2010:97) the research strategy is a general plan that helps the researcher in answering the research questions in a systematic way. An effective research strategy contains clear objectives, research questions, data collection resources, and various constraints that affect the research in different ways such as access, money, location, and time limitations, ethical issues and constraints.

Surveys

According to Gay and Peter (2009:97) quantitative researchers try to recognize and isolate specific variables contained within the study framework, seek correlations, relationships and causality, and attempt to control the environment in which the data is collected to avoid the risk of variables, other than the one being studied, accounting for the relationships identified. The survey method in the research was used to help prepare for a more focused, in-depth study using time-intensive methods such as in-depth interviews or field research (Hopkins, 2008:76).

Target Population

Welman and Kruger (2010:142) maintain that target population refers to the group from which the sample is drawn. In this study the population referred to 150 contractors that execute project and maintenance construction activities at the refinery. Due to the population being small and accessible it was possible to conduct a census.

Sampling

Sampling includes two types of sampling methods, namely, probability and non-probability sampling (Sekaran and Bougie, 2010:65). For the purpose of this study, the target population of 150 contractor artisans who are employed by the contractors at the two companies were respondents for the census. With

probability sampling there is a known and equal chance that each case be selected from the population (Saunders *et al.*, 2012:145).

The Research Instrument

The main instruments used are self-administered / interview, administered or structured / unstructured interviews and questionnaires or a combination of both. The questionnaire can be used for descriptive or explanatory study, and must have a good layout, unambiguous questions, complete items, non-offensive but relevant items, and logical arrangements of items, (Singh, 2011:143). A self-administered structured questionnaire was used to collect data from respondents using a close-ended, Likert scale model questionnaire. The questionnaire was constructed with a covering letter to state the purpose of the research to the respondents which provided respondents with the aim and objectives of the study.

Pilot Study

The purpose of the pilot test is to refine and reflect on the questionnaire so as to facilitate the smooth answering of questions and recording of data (May, 2011:56). A pilot study is vital as it allows the research to see the gaps of the questionnaire as well as to make sure that it captures the required information and makes adjustments where necessary. It was necessary that the pilot study was carried out on ten engineers who was directly involved with the artisans executing projects and maintenance work at the refinery.

Data Analysis

Data processing involves translating the answers on a questionnaire into a form that can be manipulated to produce statistics. In general, this involves coding, checking, data entry, editing and monitoring the whole data processing procedure (Rodrik, 2006:78). Adopting a methodical and consistent approach to each task is important to ensure that the processing is completed satisfactorily and on schedule (DeVaus, 2002:45).

Validity and Reliability

Every research instrument is pretested and validated to detect any weaknesses that may be present with regards to the design of that instrument (Sekaran and Bougie, 2010:103). There are two steps involved in the pretesting and validation of a research instrument to ensure reliability (Sekaran and Bougie, 2010:110).

Validity

To ensure that the questionnaire was not biased it was important to test it for validity and reliability. Validity is the degree to which results are close to the truth. Measures which can be undertaken to warrant validity include picking an appropriate sample and the use of a suitable methodology (Saunders *et al.*, 2012:98). There are different types of validity which are face validity, content validity, construct validity, criterion validity and concurrent validity. To achieve content validity, this research ensured that it had all the relevant questions and literature to cover an analysis on the effect pertaining to the lack of skill artisans in the construction industry. To ensure these types of validity, the research correlated previous studies with the current study to check for external validity.

Reliability

Reliability of the questionnaire is also important even if validity is achieved. According to Babbie (2010:88) reliability is the rate at which the research instrument remains consistent. The results obtained in the research were consistent and carried out repeatedly to ensure the reliability of the instrument (Malhotra, 2011:283). When respondents fail to interpret the question the way the researcher intended for it to be interpreted, it means it lacks internal validity, and can, therefore, not be answered.

Limitations of the Study

Limitations are the shortcomings, conditions or influences that cannot be controlled by the researcher that place restrictions on the methodology and conclusions (Creswell, 2009:78). Limitations of the study relate mainly to the sample size used, the sample size was a maximum of 150 artisans which was the entire population. However of the 150 artisans that was selected, 101 artisans participated in the study. A target of a 100% response rate was expected but a response rate of 67% was achieved.

Elimination of Bias

Bias is defined as any tendency which prevents unprejudiced consideration of a question. In research, bias occurs when systematic errors are introduced into sampling or testing by selecting or encouraging one outcome over others. The challenge is to make sense of the massive amount of data, reduce the volume of information, identify significant patterns, and construct a framework for communicating the essence of what the data reveals (Alam and Hoque, 2010:215).

Ethical Considerations

The study complied with the three key areas of ethical concerns, the ethics of data collection and analysis, treatment of human subjects, and the responsibility to society (Bohlam, 2010:163). Ethics can be defined as moral standards that are widely and generally accepted to avoid any suspicions (Creswell, 2009:108). This study protected its respondents to gain their cooperation and trust through the following ethical considerations.

Ensuring that participants have given consent: According to May (2011:54), the participants must be well informed about the idea of the agreement as to what the research includes. Each participant of the study was required to sign a consent form before participating in the study.

Ensuring no harm comes to participants: The researcher to guarantee the participants will not be harmed in anyway while conducting the research (May, 2011:53). All questionnaires did not require the participant's names or other identification.

Ensuring confidentiality and anonymity: The researcher has to confirm that the participant's identity remains anonymous (May, 2011:53). The questionnaires were collected in a sealed collection box with no access granted to any unauthorised individuals and were hand delivered to the researcher; and

Ensuring that permission is obtained: According to May (2011:54), it is significant that the authorised channels are cleared before conducting the research, by officially obtaining written consent by the respondents. This was complied with.

4. Results

Demographics

The sample of this study was 150 of which 101 respondents returned their questionnaires making a response rate of 67% which is classified as acceptable to proceed with the research. 45% of the respondents have experience ranging from 1-5 years. 25% of the respondents have between 5-10 years of experience. 15% of the respondents have 10 or more years of experience as artisans whilst 11% have experience of between 0-1 years. 60% of the respondents were aged between 30-39 years followed by those aged between 40-49 years who represented 20% of the respondents and a further 14% who were between 20-29 years old. None of the respondents were aged over 60 years. 30% of the respondents indicated that they have diplomas whilst 20% have Honours/B. Tech degrees and 10% have Masters as highest levels of qualifications. 20% of the respondents indicated that they are Master Artisans followed by 15% who are Certified Artisans. 5% have Matric certificates and the remaining 1% indicates that they have below Matric level as their highest qualification.

Company commitments

40% of the respondents agreed and an additional 30% strongly agreed that their company's ineffective quality management practices have an effect on skills shortages. 5% chose to be neutral, 15% disagreed to this statement and 10% of their counterparts strongly disagreed. 46% of the respondents strongly agreed and an additional 40% of their counterparts agreed that poor skills and experience has an impact on skills shortage and it makes work difficult. Only 5% of the respondents disagreed with this and an additional 5% strongly disagreed whilst the remaining 4% were neutral. The majority of the respondents from the contractors therefore strongly agreed that lack of training and experience has an impact on skills shortage and makes work difficult. The respondents were asked to indicate whether their company equips on-site personnel to mentor employees during on-site training. Very few employees were on the negative (disagree) side. Whilst 5% chose to be neutral, 55% of the respondents agreed with this statement whilst 25% strongly agreed that their company equips on-site personnel to mentor employees during the on-site training. 41% of the respondents disagreed that their skills were regularly assessed, whilst 30% strongly disagreed. The majority of the respondents agreed that inexperienced management is responsible for the shortage of skilled artisans at the oil refinery. 40% of the respondents disagreed whilst 35% strongly disagreed that skills test are performed before employment of individuals. It can be ascertained that the respondents did not agree that skills test are performed before employment of individuals. As a result, this could be one of the causes of lack of contractor skills at the oil refinery. 55% strongly agree that the shortage of skilled artisans has a great impact on planning activities at the oil refinery. To measure the effects a shortage of skilled artisans have on the companies respondents were asked if an artisan does not get recognition for their performance is he likely to be less productive than an artisan whose performance is recognised. 47% of the respondents agreed with this statement. 3% of the respondents were neutral, with 10% who strongly disagreed. 55% of the respondents strongly articulated that the lack of skilled artisans impacts heavily on Project Budget. However 6 % disputed the statement strongly. In order to determine factors and ways that can be done to increase the number of skilled artisans at the oil refinery, the respondents were asked whether companies provides opportunities to develop and increase employees ability to work. 25% of respondents strongly disagreed with the statement with a further 18% also refuting to the statement. 19% of respondents were neutral. Respondents are therefore not given enough opportunities to develop and increase their abilities at work which reduced the artisans' chances of increasing skills and the ability to be productive and efficient. The research investigated whether companies made future plans to replace ageing staff without affecting productivity. 30% of the respondents strongly agreed that the oil refinery were making future plans to replace ageing staff without affecting productivity. A further 20% also agreed to this statement. 15% refuted this statement. 20% of the respondents articulated that the oil refinery provides incentives for extra work employees put in. A further 14% also agreed to this statement. 34% of the respondents strongly disagreed that salaries of artisans in their company was good but not comparable to other salaries in other industries.

5. Conclusions and Recommendations

What are the causes for the lack of skilled artisans at the companies?

- Ineffective management is identified as one of the causes of the lack of skilled artisans at the companies. 40% of the respondents agreed that this is the cause in their organisation;
- Lack of training and experience causes a lack of skilled artisans. 46% strongly agreed that lack of training and experience impacts on artisans' skills and work in the construction industry;
- Poor skills background check before training -- companies are not determining the areas that require further training in terms of human capital 41% advised that no skills background check is done prior to training;
- Lack of formal training was also identified as causing lack of skills in the organisation. 42% agreed that there is lack of formal training for skilled artisans at the companies; and

- Poor coordination of resources leads to skills shortage in the artisans. 44% of the respondents agreed with this statement.

What are the effects that the shortage of skilled artisans has on the refinery?

- It leads to additional work. 40% indicated that such a shortage will imply that the existing artisans end up repeating tasks;
- Work becomes more difficult. 46% of the respondents indicated that a lack of skilled artisans makes tasks difficult;
- Planning activities is also affected negatively by lack of skilled artisans. 55% of the respondents agreed with this statement; and
- A lack of skilled artisans impacts on project budgets. 55% of the respondents strongly agreed that a lack of skilled artisans cause poor project budgeting in the construction industry.

What can be done to increase numbers and retain the skilled artisans at the refinery?

The refinery is making future plans to replace the ageing artisans. This was indicated by the modal score of 30 = strongly agreed. It is suggested that:

Incentives for extra work put in

As the statement had a modal score of 36= disagree, it was projected that most companies do not provide incentives for extra work employees put in. **Adequate salaries with benefits:** In order to determine what measures are done to retain skilled artisans in organisations, it was necessary to investigate whether the salary skilled artisans receive was competent enough to salaries from other industries. With a modal score of 34 = strongly disagree, respondents refuted this statement. Hence there is need for the organisation to provide employees' salaries and benefits that motivates and compares well with salaries from other industries.

Training and skills development: In order to increase the number of skilled artisans the refinery must develop a skills development and training plan for all artisans which should be expanded from unskilled personnel up to management. Poor management of personnel can lead to the loss of these skills who will seek employment with the competitors.

Performance of skills test before employment

A skills test should be compulsory as an entry level and those that fail the performance test must be provided with additional training or form part of a skills development program supported by the government or approved institutions.

Increased co-ordination of skilled artisans

The refinery needs to ensure that better co-ordination and resource loading on the schedule is accurate and a two week look ahead on resource loading must be implemented in order to increase the co-ordination of artisans.

Causes of Lack of Skilled Artisans

Causes of lack of skilled artisans were found to be due to ineffective management, lack of training and development, poor skills background check prior to training, and poor coordination.

Solutions to Increase the Number of Skilled Artisans

In order to increase the number of skilled artisans, companies must provide continuous development programmes for management and artisans in order to be promoted to a higher level.

Solutions to Retain Skilled Artisans

Solutions have been given to change future plans to replace the ageing employees, so incentives should be given for extra work done as well as adequate remuneration in terms of wages and salaries.

Conclusions

The study was carried out to examine skills shortage in the construction industry using a case study of an oil refinery in South Africa. The study found that ineffective management, poor training, poor skills as well as poor coordination, amongst other factors, are responsible for the shortage of skilled artisans within the construction industry. The study determined that these factors impact on planning, operations, and budgets which makes work difficult. In order to solve these challenges; the study deduced that there should be an improvement in the policies relating to effective management, training and development, and coordination, as well as a continuous skills background check.

Recommendations

Future Plans for Ageing Staff: One of the recommendations for the ageing staff is to use the experience of aging artisans to mentor and train the inexperienced artisans. The ageing artisans can be promoted to a higher level as supervisors or management to increase efficiency and productivity.

Incentives for Employees: Incentives are one of the driving factors of retention. An incentive creates appreciation and desires to remain at the company. Remuneration is one of the key factors used to retain artisans with an incentive program introduced.

Artisan Salaries: The main purpose of being employed is to earn a decent, comfortable salary to ensure that daily necessities are affordable. Companies must ensure that the artisans are remunerated in line with market related rates. An unhappy employee is inefficient and less productive.

Effective Management: Implement training and development either on or off the job. Training managers were identified in literature as one of the effective ways of improving efficiency, time management and quality services.

Improve Experience: The refinery can improve the engagement of their artisans through continuous job rotation and shifting of places in the course of carrying out their tasks.

Skills Background Check: By doing background checks, the organisation will be able to determine what is required in terms of training and development. This will not only benefit the artisans, but it will also encourage them to stay in their organisation.

Improve Resource Coordination: One of the causes of low skilled artisans in the construction industry is due to poor coordination of resources. As a result, there should be different strategies that can be used by the refinery to improve coordination. This can be through improvement in communication, improving the work or organisational structure, or ensuring that employees are always engaged in different activities.

Areas for further Research

Further research could be done on a bigger sample using several construction industries with different worker policies. Studies can also be taken to identify the impacts of training of artisans towards the performance of construction industries. A study can be carried out to investigate the competency of management towards the development of artisans.

References

- [1] Alam, G.M., & Hoque, K.E. (2010). Who gains from “brain and body drain”. *African Journal of Business Management*, 4 (4), 534-548.
- [2] Babbie, R. (2010). *The practice of social research (12th Ed.)*. Belmont, CA: Wadsworth Cengage.
- [3] Backes-Gellner, U., & Tuor, S. (2010). Avoiding labour shortages by employer signalling—On the importance of good work climate, and labor relations. *Industrial and Labor Relations Review*, 63, (2), 271-285.
- [4] Badroodien, A. (2004). *Understanding the size of the problem: The National Skills Development Strategy and enterprise training in South Africa*. Cape Town: HSRC Press.
- [5] Barker, F. (2003). *The South African labour market*. Pretoria: Van Schaik.
- [6] Benjamin, C. (2008). *Poor education hampering SA growth effort*. South Africa: Business Day.
- [7] Bhorat, H. (2004). Labour market challenges in the post-Apartheid South Africa. *South African Journal of Economics*, 72 (5), 940-977.
- [8] Bhorat, H., Meyer, J. B., & Mlatsheni, A. (2002). *Skilled labour migration from developing countries*. Geneva: International Labour Office
- [9] Bohlman, H. R. (2010). *The macroeconomic impact of skilled emigration from South Africa: A CGE analysis*. Melbourne: Centre of Policy Studies, Monash University.
- [10] Brutus, S. (2013). Self-reported limitations and future directions in scholarly reports: Analysis and recommendations. *Journal of Management*, 39(1), 48-75.
- [11] CapeTimes Insight. (2007). *Foreign direct investment and the challenge of political risk*. Retrieved from <http://www.economist.com/node/9803811>.
- [12] Cooper, D.C., & Schindler, P. (2010). *Business research methods*. Pennsylvania: McGraw-Hill Education.
- [13] Creswell, J.W. (2009). *Research design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: Sage.
- [14] DeVaus, D. A. (2002). *Surveys in social research*. London: Routledge.
- [15] Dunn, D.S. (2010). *The practical researcher: A student guide to conducting psychological research*. United Kingdom: Wiley-Blackwell.
- [16] Galagan, P. (2010). *Bridging the skills gap: Part II*. Retrieved from <http://www.astd.org/Publications/Magazines/The-Public-Manager/Archives/2010/04/Bridging-the-Skills-Gap-Part-II>.
- [17] Gay, L. R., & Peter, A. (2009). *Educational research: Competencies for analysis and applications*. Upper Saddle River: Prentice Hall.
- [18] Hall, J., & Sandelands, E. (2009). Addressing South Africa's engineering skills gaps. *Education + Training*, 51 (3), 215-219.
- [19] Hopkins, W.G. (2008). *Quantitative research design*. South Africa: Department of Biology, Bates College.

- [20] Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management*, 21 (4), 405–435.
- [21] Macinati, M.S. (2008). The relationship between quality management systems and organizational performance in the Italian National Health Service. *Health Policy*, 85 (2), 228–241.
- [22] Malhotra, N.K. (2011). *Basic marketing research: Integration of social media*. England: Prentice Hall.
- [23] May, T. (2011). *Social research: Issues, methods and research*. USA: McGraw-Hill International.
- [24] Mazlish, B. (2012). Three factors of globalisation: Multinational corporations, non-governmental organisations and global consciousness. *Globality Studies Journal*.
- [25] McCord, A., & Bhorat, H. (2003). *Overview of the South African economy*. Cape Town: HSRC.
- [26] McDonald, A.D., & Crush, J. (2002). *Destinations unknown: Perspectives on the brain drain in Southern Africa*. Pretoria: Africa Institute of South Africa.
- [27] McGrath, S., & Akoojee, S. (2010). Education and skills for development in South Africa: Reflections on the accelerated and shared growth initiative for South Africa. *International Journal of Educational Development*, 27 (4), 421-434.
- [28] Mitchell, J. (2003). *White exodus out of South Africa*. Retrieved from [http:// www. South African Emigration.com/reviews.htm](http://www.SouthAfricanEmigration.com/reviews.htm).
- [29] Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using the SPSS program*. Berkshire: Allen & Unwin.
- [30] Patel, L. (2005). *Social welfare and social development in South Africa*. Cape Town: Oxford University Press.
- [31] Prajogo, D.I., & Sohal, A.S. (2006). The integration of TQM and technology/R&D management in determining quality and innovation performance, *Omega*, 34 (3), 296–312.
- [32] Rodrik, D. (2006). *Understanding South Africa's economic puzzles*. Boston: Harvard University.
- [33] Rugraff, E., & Hansen, M.W. (2011). *Multinational corporations and local firms in emerging economies*. Amsterdam: Amsterdam University Press.
- [34] Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for Business Students*. England: British Library Cataloguing-in-Publication Data.
- [35] Sekaran, U., & Bougie, R. (2010). *Research methods for business*. Wiley: West Sussex.
- [36] Singh, K. (2011). *Quantitative social research methods*. Los Angeles, CA: Sage.
- [37] Solidarity Research Institute. (2008). *Skills shortage in South Africa: Summary off act persecutors regarding this issue*. Retrieved from [www. solidarityresearch.co.za/wp. content/uploads/2010/07/16.skills-shortaginsouthafricasummary-fjc-et.pdf](http://www.solidarityresearch.co.za/wp-content/uploads/2010/07/16.skills-shortaginsouthafricasummary-fjc-et.pdf).
- [38] Thornton, G. (2013). *Lack of skills remains greatest constraints to business growth in South Africa*. Retrieved from <http://www.gt.co.za/News/Press-releases/International-business-report/2008/skills.asp>.

- [39] Toit, C., & Tonder, J. (2009). *South Africa's economic performance since 1994: Can we do better?* London: Sage.
- [40] Valsamakis, A. (2012). *The role of South African business in South Africa's post-Apartheid economic diplomacy*. Birmingham: University of Birmingham.
- [41] Van Rooyen, J. (2000). *The new great trek: The story of South Africa's white exodus*. Pretoria: UNISA Press.
- [42] Welman, J.C., Kruger, S.J., & Mitchell, B.C. (2010). *Research methodology (3rd Ed.)*. Cape Town: Oxford University Press.
- [43] Zikmund, W.G., & Babin, B.J. (2010). *Exploring marketing research*. Ohio: Thomson.