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Learning Quality Management for Ships' Upkeep and Repair Environment

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Abstract

Ships Quality Management (QM) in a naval disciplined repair environment is under significant demands. The purpose of this paper is to emphasise the requirement for the establishment of quality management. Quality management is essential to support operations, work preparation and formulation, material replenishment, repairs and trial processes to enhance productivity and availability. Quality Assurance (QA) and Quality Control (QC) encompassing Reliability Centred Maintenance (RCM), Condition Based Maintenance (CBM) and Failure Modes, Effectiveness and Criticality Analysis (FMECA) are required to monitor Preventive and Corrective Maintenance with the aim of heading towards ISO. The QA and QC processes should be in line with a complete survey, Pre Upkeep Machinery Assessments (PUMA), Dynamic Machinery Trials (DMT) to predict and formulate the intended refurbishment followed by post upkeep standard trials. The whole process can be boosted when health and safety are integrated. The research instrument was based on the dedicated constructs to predict the '*mindsets/opinions*' of employees in their perceptions of future improvement. The variables-hypotheses were inferentially analyzed (correlated and regressed). They were found to be positively related and significantly contributed to the ships' upkeep support performance. The implication of this study is to understand the strength of the research framework and to make proposals for the enhancement of quality management in line with the variables.

Keywords: quality management, tactical operation, business environment, maintenance and performance

1. Introduction

The demand for quality management at a tactical level that is subject to the need for knowledge, competencies, skills and abilities to achieve dedicated tactical commitments and to deliver to the customer/operator should not be underestimated. It is argued that in any business there is only one boss-the customer and effective quality management processes focus on the customer (Anonymous, 2010; Besterfield et al., 2010; Evans & Lindsay, 2008; Hoyle, 2000; ISO-9001, 2008E). To maintain the availability of the end product, such as sufficient ships at sea, involves the stakeholder-the operator, the deciders or planners and the providers of services or maintainer and the provider of resources/material. The system of ownership will not work without maintaining maximum planning, developing and executing with the industry to complete the required product in terms of quality, time and cost at different levels, whilst meeting the platforms' operational strategy. The maintenance plan has to support the operational availability and lifecycle of the capability (Martijn, 2009; Houghton & Lea, 2009; Levrat et al., 2008; Oke & Charles-Owaba, 2006). It requires innovative management particularly in a diversified organisation of ships' repair to create a climate that provides employees with a sense of ownership particularly during major maintenance to deliver (Harris, 2004; Treven & Zizek, 2008; Cooke, 1955). Performance and quality should therefore work together for the purpose of an overall system under maintenance to deliver optimum availability (Yuniarto & Osada, 2009; Raper, 1970). The use of performance requires a good system (single-loop learning) and performance management themselves (double-loop learning) to improve quality of performance (Van Dooren, 2011; Al-Raqadi et al., 2015b). The foregoing and other factors are the processes that require the maintenance of efforts by those involved encompassing the relationship and contribution of proficiency, concentration (Mintzberg, 1991; Jashapara, 2003; King & Zeithaml, 2001; Long & Ismail, 2011)

and the effectiveness of training for the *'ships upkeep support performance and availability'* to give the customer/operator fully operational assets or platforms at sea (Law & Richardson, 2003; Houghton & Lea, 2009; Rizzo et al., 2011; Anvari et al., 2010; Delaney & Huselid, 1996; Abdallah, 2013). "*Training, workforce management, and customer focus were found to be positively and significantly related to Total Productive Maintenance (TPM) implementation level"* (Abdallah, 2013, p. 10).

The whole process requires quality standard programs to promote the values of the organisation product to systematically and comprehensively deliver to the end users/customer or operators of the platforms (ISO-9001, 2008E). The traditional maintenance of preventive and corrective processes played some role in the ship repair industry but it requires some modernisation involving comprehensive techniques and frameworks to support strategies and goals (Oke & Charles-Owaba, 2006; Koochaki et al., 2011; Lind, 2012; Heizer & Render, 2011). However, preventive and corrective maintenance encompasses unnecessary repairs where things done were not necessary (Lind, 2012). Equally, corrective repairs could create repercussions by waiting for something to happen, leading to failure or breakdown (Lind, 2012).

As a result of such consequences, some gaps are noted in the area of efficient readiness and economic preventive and corrective maintenance leading to a demand for effective quality assurance and quality control management (Hoyle, 2000; Evans & Lindsay, 2008; Besterfield et al., 2010). Quality Management remains essential to promote values of organisation product and to systematically and comprehensively deliver to the customer (ISO-9001, 2008E). Total Quality Management practices on TPM are needed to enhance the standard of productivity whilst reducing cost (Abdallah, 2013). Quality leadership, management and quality thinkers, quality efficiency and enhancement are all important for the success of business (Anonymous, 2010a; McCuiston & DeLucenay, 2010).

This process should concentrate on technically educated and proficiently prepared Quality Assurance and Quality Control Groups, encompassing Reliability Centred Maintenance (RCM), Condition Based Maintenance (CBM) and Failure Modes, Effectiveness and Criticality Analysis (FMECA), to be placed in the core of the organisation (Blanchard, 1986; Moubray, 1991; Lazakis et al., 2010; Conachey, 2004; Conachey et al., 2008) with the aim of future improvement. The specific disciplines are needed to monitor and correct the operation, maintenance and material qualities, taking into consideration of aspects of Preventive and Corrective Maintenance (Oke & Charles-Owaba, 2006). This process should be initiated by a complete survey and Pre Upkeep Machinery Assessments (PUMA) including Dynamic Machinery Trials (DMT) to formulate the intended overhauls and refurbishment. On completion, the whole process should be followed or proved by comprehensive Setting to Work (STW), Harbor Acceptance Trials (HAT) and Sea Acceptance Trials (SAT). The whole process has to be integrated with health and safety disciplines to form distinctive integration with TQM in the aim of heading towards ISO.

2. Research Purpose

The purpose of this research is to develop understanding and to propose the need for strengthening quality management in the core of organizations. Whilst this paper consults the literature and links the whole research with a practical framework, it equally concentrates or uses the ships' upkeep and repair support management (SU&RSM) as a specific reference for finding solutions, means and methods on the perceptions of enhancing the quality management for performance (ISO-14001, 2004; ISO-9001, 2008E). This study emphasizes the need for a framework to understand organizational learning and quality management. It used proficiency, concentration and effectiveness of training to positively and significantly understand the relationship and influence/contribution to the ships' upkeep and repair support organizational learning performance.

The purpose of this study is to commit and encourage learning for the ships' upkeep and repair support performance to guide practitioners to use modern disciplines in a variety of areas including, emphasis on establishing quality management disciplines, involving quality control and quality assurance on the perceptions of improving performance (ISO-9001, 2008E; ISO-14001, 2004; Hoyle, 2000).

3. Research Objective

This paper seeks to determine a method for understanding the components of quality management in a tactical area of Ships' Upkeep and Repair Support Management (SU&RSM) to synchronise it with other disciplines.

The objective is based on the hypotheses outlined below. It seeks to articulate the relationship between organisational learning constructs to develop quality management disciplines in ships' support environment to improve upkeep performance. This study employed the following Study objectives (SO):

SO1: To investigate proficiency, concentration and the effectiveness of training relationships with ships' upkeep and repair support organisational learning performance.

SO2: To develop a research framework for proficiency, concentration and the effectiveness of training and ships' upkeep and repair support organisational learning performance.

SO3: To formulate the frameworks that can synchronically understand and communicate the perceptions of improving ships' upkeep and repair organisational learning performance.

4. Literature Review

4.1 Quality Management through Proficiency, Concentration and Effectiveness of Training for Organisation Learning Performance

Quality management is mostly created to maintain quality of workmanship and to help the repair organisation to win on productivity of organisational learning performance. But the question is what and why the quality in ships' repair is important? The answer is that there is a need for concentration, proficiency and effectiveness of training to be competitive, to increase productivity and to be in line with organisational learning performance. There is a need to build proficiency and concentrate on quality management to be over and above customer expectations in quality of ship management and maintenance and to have a method for anticipating contingency (Abdallah, 2013; Besterfield et al., 2010; Griffin et al., 2007). Additionally, to be competitive, there is a need for knowledge and competencies in proficiency in technical skill and activity. Proficiency and concentration on the end product and those involved, supported by learning or effectiveness of training is the way forward to learn quality management in organisational learning performance. Millson and Wilemon, (2008) hypothesised that, 'increased technical proficiency leads to increased new product quality' in new product development. This hypothesis was statistically supported by a statement which states that proficiency performance is significantly associated with new product quality (Millson & Wilemon, 2008). Equally, to encourage effectiveness and an economic way of training through knowledge sharing in an organisation learning effort, the same study (Datar et al., 1996, 1997) was quoted for emphasis on concentration of product developers for centralised and decentralized of knowledge workers among geographical separated facilities to develop products among organisations (Millson & Wilemon, 2008).

Realistically, the maintenance or repair facilities under discussion will expect the quality of ships to begin with the initial bid proposal, specification and the ship builder involving availability-understood in naval terms as percentage operational time at sea (Raper, 1970). This is the end product involving the required effect-organisational learning performance. The concept of availability has gained importance in manufacturing by offering total value for economic cost, which should satisfy both the operators (customers) and the company (Dwivedi & Maffioli, 2010). This involves intensive development of shipbuilding contract specifications. The concept of accuracy in ship building or repair support requires [concentration] of those tasks for the purpose of elimination of error (Dwivedi & Maffioli, 2010). Concentration is an important variable in any industry, or in a ships' repair environment, with diversified tasks. The concepts of alertness, mindfulness and ardency in diversified organisational tasks improve concentration for better quality performance (Weick & Putnam, 2006) with effective training as an essential determinant for long term improvement (Maguad, 2006). Shleifer & Vishny, (1986), statistically support the hypothsis, which states that more highly concentrated ownership tends to enhance firm value, by improving monitoring and alleviating free-rider problems (Jaafar & El-Shawa, 2009).

The attributes can be expressed in measurable quantitative terms including 'size, weight, shape, durability, hardness, performance, reliability, maintainability, supportability, seaworthiness, robustness, speed and operation-ability and availability in general with personnel and training on the forefront' (Blanchard, 1986). The areas of logistics and maintenance of quality should include an Operation Quality Assurance Section (OQAS), to monitor the assurance of the quality of product, the Maintenance Quality Control Section (MQCS) to monitor deep maintenance and, where necessary, to propose changes and a Logistics Quality Assurance Section (LQAS) to ensure the robustness and originality of spares and material (Hoyle, 2000; Evans & Lindsay, 2008). The QASs have great responsibility in the area of material and operation. In fact this is where the *'economy'* would normally commence and where only necessary maintenance and material are incorporated in the original work-package/specification and not as stipulated by Original Equipment Manufacturers (OEMs) (Maguad, 2006). This is necessary to bring an overall saving in production but it requires consistency in learning, and double-loop learning, involving competency in proficiency and concentration in workplace diversity (Argyris, 1976; Argyris & Schon, 1978; Mintzberg, 1991; Smith, 2004; Al-Raqadi et al., 2015b). This is the time for the QASs to compare the specified or built data from the ship builders and the OEMs with current data and to discover whether the values remain within acceptable economic limits. Mintzber, (2003) argues that the foregoing

disciplines require concentration to serve a particular market or organisation that is diversified. There is a need to maintain proficiency for doing tasks of different varieties, such as those of a hospital or in engineering, in the organisation (Mintzberg, 1991; Jashapara, 2003).

4.2 Emphasis on Quality Management Disciplines and the Required Determinants

As in ships' upkeep and repair support organisations (SU&RSO), some other organisations have established traditional quality sections with some limited expertise covering different or limited areas of specialisations. However, they do not meet the standards required by ISO quality system. Some organisations imitate such standards using a mixture of experience to include those from OEMs and others collected from personal education and experience from the surroundings/environment. They include quality assurance and quality control, which are considered to be two different levels of discipline, and are important for any ships' upkeep, repair and operation management program (Hoyle, 2000; Evans & Lindsay, 2008). The management of service quality in the public sector is intended to achieve productivity through organisational learning performance and through the planning of resources and business process techniques. It is anticipated that quality process analysis for enhancing planning, processes, resources allocation and communication improvement can be a useful start for organisations willing to move towards training and quality initiatives (Navaratnam, 1995). Both the profieicncy and concentration of such tasks require continuity of effectiveness of training to satisfy the quality and organisational learning performance implications. Garvin, (1983) and Lumpkin and Lichtenstein, (2005) argued that learning in a learning organisation has to possess skills in creating, acquiring and transferring knowledge to modifiy its behaviour while reflecting new knowledge and insight. This leads to the quality needed to effectively consider the new opportunities for organisational learning performance (Wang & Rafiq, 2009).

4.3 Quality Using SU&RSO as a Reference

By definition, *"quality is the degree to which a set of inherent characteristics fulfils a need or expectation that is stated, generally implied or obligatory*. [The literature goes on by outlining the quality meaning as] *a degree of excellence, conformance with requirements, the totality of characteristics …* [that] *satisfies implied needs, fitness for use, fitness for purpose, freedom from defects, delighting customers*" (Hoyle, 2000, p. 21). To articulate the foregoing statement further, when the product satisfies the client with the agreed terms and conditions such as appropriate durability, robustness, a guarantee period, maintainability, affordability, operation-ability and mutually agreed costs, with necessary post guarantee support (Blanchard, 1986), one can say that the product has a good quality implication and it can meet the expectation of the customer. Customers can equally compare quality with other products or available standards to make feasible decisions even if they do not follow the ISO. Jashapara, (2003) supported the hypothesis which states that organisational learning focused on concentration and proficiency is positively related and significantly contributes to organisational performance. None of the foregoing can occur without force for concentration and force for proficiency with a high level of knowledge and competencies, particularly in diversified organisational disciplines requiring the formalization of work (Mintzberg, 1991; Griffin et al., 2007).

The SU&RSOs should work hard towards ISO standards, following the principle that productivity performance can remain feasible to smoothly maintain the availability of the required capabilities through organisational learning performance. The improvement would gain momentum because of the availability of a system that can be understood by all. Deming's 14 principles encourage people to take responsibility in areas of leadership for continual improvement by adopting new philosophies (Heizer & Render, 2011; McCuiston & DeLucenay, 2010). Deming's 14 principles stress enabling the team to create a bank of data and to analyze this in order to avoid mass inspection in the future (Avery, 2010). All processes of improvement require continuous and continuing education in proficiency and concentration of such disciplines of quality management under organisational learning performance (Mintzberg, 1991; Millson & Wilemon, 2008; Jashapara, 2003; Lakshmanan et al., 2010; Cabahug et al., 2004) and effectiveness of training to strengthen personnel knowledge whilst reducing unnecessary fears, barriers and exhortation (Abdallah, 2013; Anvari et al., 2010; van Eerde et al., 2008; Deming, 1986) to improve performance. The approaching mode is intended to positively drive the system of any young non-profit or profit organisation towards the required vision. None of this will give fruitful results without the effort of senior management to encourage QAs and QC to participate to the full towards ISO standards and with a predefined organisational structure that is devoted to quality in organisational learning performance at any cost.

4.4 Paradox in Ships' Repair

The organisational learning performance encompassing quality management in ships' upkeep and repair performance is handicapped by many areas of paradox and bottlenecks, making it more difficult to meet the commitment to quality, specification, time and cost and to head towards ISO (Mezher & Ramadan, 1998).

Maintaining a scheduling plan and managing downtime by project managers can be a daunting task in need of effective learning/training in concentration and proficiency. It requires a sound interpretation of the work to be carried out and the constraints that go into and come out of the repair operation. As stipulated in Figures 2 and 3 below; this would normally be succeeded by amalgamating the required modification work with comprehensive pre-refit trials, pre-refit surveys followed by production of comprehensive work specification collated from surveys, outstanding operational defects, running defects, planned maintenance and later during refit/after final surveys, an emergent work list etc., which is to be raised during the course of repair work. The project resources required and time scale calculation will account for things like docking the ship, surveying item 'A', removing item 'B', overhaul/repair of item 'B', replacing item 'B', testing item 'B' and item 'A'. The systematic removal, repair, replacement and setting to work of such items will require a variety of resources such as quality control and quality assurance etc., to maintain specific maintenance and operational trials time scales. In a study involving ISO 9000 implementation in the public sector in Taiwan, ISO 9000 was seen as the way forward and public organisations have been encouraged to adopt private sector practice (Chu & Wang, 2001).

4.5 Research Gap

There is a gap in the literature that addresses the problems of quality performance of this area in the Sultanate of Oman. The difficulties of modernity, potential causes, identifying the right contingency, dedicated management frameworks, approaches and processes are needed to solve the problem. The organisation requires a dedicated working configuration that brings all the components of disciplines together to be in line with the required quality organisational learning performance. The gap in the literature is that there is no single model that everyone agree upon (Waheed et al., 2010). There is an existence of skills gap between the types of skills that we require and what is available (Al-Maktoum, 2007).

4.6 Background of Research Hypothetical Framework

The framework for this research is based on the perceptions of emphasizing modern quality management techniques. To step up the traditional method of preventive and corrective maintenance in this economic world, there is a need for modern knowledge, competencies and skills in areas of proficiency and concentration supported by effectiveness of training. Preventive maintenance is where repairs are taking place without any specific faults, whilst corrective maintenance is caused by breakdown/unplanned failure (Lind, 2012).

Proficiency is essential to carry out such tasks in an efficient and effective manner. Without proficiency the organisation can become a '*fire fighters*', where the tasks are done in a haphazard manner. Without proficiency and concentration in a diversified organisation with multiple disciplines the organisation cannot manage tasks in an efficient, effective and economic manner (Mintzberg, 1991). Proficiency and competency are related and need each other. Competency can be defined as a degree of proficiency level (Gander, 2006) and capability or ability (Boyatzis, 2008). There is a need for proficiency to carry out certain tasks with high knowledge and skills (Mintzberg, 1991). Organizations with managers who characterize competencies as causally ambiguous (high characteristic ambiguity) are positively associated with firm performance ($r = .4473, 0.4648$, $p = 0.05$) (King & Zeithaml, 2001). Competencies such as business knowledge and HR technology have a significant correlation with a firm's performance. These competencies obtained Spearmen's ρ value at $r = 0.433$ (p , 0.01), ($\beta = 0.122$, $p = 0.01$) and $r = 0.463$ (p , 0.01), ($\beta = 0.064$, $p = 0.01$) (Long and Ismail, 2011). Proficiency, requiring a high level of knowledge and skills to achieve competitive advantage, has been reported to contribute positively to organizational performance in UK construction firms ($r = .36$, $p = 0.01$) and ($\beta = 8.483$, $t = 0.014$), showing readiness to achieve competitive advantage and to increase performance (Jashapara, 2003).

The force for concentration is important on serving certain disciplines in diversified firms (Jashapara, 2003). However, whilst concentration was positively related to organisation performance ($r = .31$, $p = 0.01$), it had negative structural loading (-7.795, $t = -.048$) in the UK construction firms (Jashapara, 2003). Jashapara, using Hodgson, (1988) quoted the reason for failure of 'concentration' towards significant performance as an indication of the competitive environment at the time of the study and as a response to the dynamic nature of strategic change processes. Mindfulness and concentration need each other and mindfulness contributes to an increase in concentration (Weick & Putnam, 2006). In a study "Examining workplace mindfulness and its relations to job performance" (Derick & Brummel., 2013), it was hypothesized that there is positive and significant relationship between workplace mindfulness and job performance. ($r = .23$, $p = .021$) and ($\beta = .22$, $p = .024$). Thus, the hypothesis is supported.

The research framework is needed to understand the *'mindsets/opinions'* of the practitioners and to ascertain the relationship between variables (Saunders et al., 2000b; Saunders et al., 2009; Sekaran, 2009) on the perceptions of emphasizing modernisation. The competencies are the proficiency and concentration working side by side

with effectiveness of training to enhance skills and expertise for better performance. In a study "Entrepreneurial Orientation, Learning Orientation, and Firm Performance" (Wang, 2008), it was found that the loading of learning orientation to firm performance was significant (0.53, $t = 6.125$, $p < 0.001$). The importance of training is known and cannot be underappreciated, it is positively and significantly related with effective organizational commitment ($r = .565, .511, .568$, $p < .05$) and ($\beta = .302$, $p = 0.05$) (Anvari et al., 2010). Typical areas where proficiency, concentration and effectiveness of training become vital for upkeep and repair support in organizational learning performance were discussed in area of RCM, CBM, FMECA, PUMA, DMT, STW, HAT, PUT, SAT etc., (Argyris & Schon, 1978; Jashapara, 2003; Moubray, 1991; Conachey, 2004). Organisational learning performance requires elements of *'knowhow'* factors to succeed; particularly where diversified and multi-discipline tasks are involved (Houghton & Lea, 2009; Law & Richardson, 2003; Saunders et al., 2000a; Rizzo et al., 2011).

4.7 Research Framework

The focus of this study is to develop a research framework that can enhance understanding in quality management involving concentration, proficiency, effectiveness of training to enhance ships upkeep and repair support organisational learning performance. The intention is to study the relationship and contribution of independent variables and dependent variable involving correlation and multiple linear regressions. The concentrations, proficiency, effectiveness of training and organisational learning performance are important determinants of quality services in the ships' repair organisation. The hypothetical research framework for this research is designed based on the proficiency, concentration, effectiveness of training and ships' upkeep and repair support organisational learning performance. They are critically discussed in Sections 4.6 following the research framework (Figure 1) proposed to answer study objective 2. The results encompassing relationships and contributions are described in Section 6 to answer study objective 1.

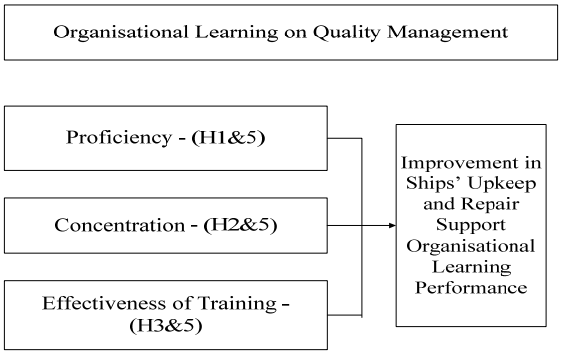

Figure 1. Research framework

4.8 Research Hypotheses

Based on the above research hypothetical framework (Figure 1), the following hypotheses were formulated to test the 'mindsets/opinions' of practitioners in a different area, different organisational disciplines and a completely different culture in the Sultanate of Oman. The purpose and objective was to learn from their views on the perceptions of proposing a framework for improving ships' upkeep and repair support organisational learning performance and to contribute to the body of knowledge:

H1: There will be no positive significant relationship between proficiency and ships' upkeep support performance among respondents.

H2: There will be no positive significant relationship between concentration and ships' upkeep and repair support organisational learning performance among respondents.

H3: There will be no significant relationship between effectiveness of training and ships' upkeep and repair support organisational learning performance among respondents.

H4: The regression model of ships' upkeep and repair support organisational learning performance will be significant when regressed against the independent variables.

H5: There will be no significant effect of (i) proficiency, (ii) concentration and (iii) effectiveness of training on the ships' upkeep and repair support organisational learning performance among respondents.

Further to the development of research framework, there is a need to understand the outcome of people's '*mindsets/opinions*' in a statistical format using the hypotheses followed by discussions, conclusions and recommendations on the perceptions of change to improve ships' upkeep and repair support organisational learning performance. This paper brings to light the methodology within the "quality", "quality management" and the "techniques", using a wide range of literature research. It utilized SU&RSO of the Sultanate of Oman as a reference to propose frameworks that can support the product management to fulfill some initial and basic preparation for the quality requirements. It is equally intended to recommend a quality strategy to lead towards ISO standards in the foreseeable future.

5. Methodology

This is a quantitative study involving the collection of data from a rich population outlined in Table 1 by use of a survey questionnaire abbreviated at Appendix A. This study forms a small part of a major piece of research involving a dissertation of mixed method approach on ships' upkeep and repair performance improvement. This study is designed specifically to address variables of quality management environment and introduce quality management frameworks. The methodology is concentrated on the study objective using content and statistical analyses. The reviewed literature was intended to understand the quality implication in a tactical area where hands-on and tangible work gets done through the use of research framework variables. The statistical analysis is done using a standard and modified organisation learning survey questionnaire involving proficiency, concentration, effectiveness of training and ships' upkeep and repair support organizational learning performance. The intention is to discover and create a solution from the '*mindsets/opinions*' of people on the perceptions of future improvement (Jashapara, 2003; Marsick & Watkins, 2003). Inferential statistics involving Correlation and Multiple Linear Regression to determine the significant relationship and contribution of variables were found appropriate for this analysis (Sekaran, 2009; Baron & Kenny, 1986). The study hypotheses were designed based on the study objectives to develop the quantitative data (Saunders et al., 2000b; Saunders et al., 2009).

The whole process of learning quality management is designed to underpin ships' upkeep performance in line with the proposed variables. This empirical examination is needed to enhance the possibility of underpinning ships' upkeep and repair support organisational learning performance through the use of people's mindsets/opinions by the employment of organisational quality management and performance variables of 'force for concentration', 'force for proficiency' and 'effectiveness of training', requiring high levels of knowledge and competencies, in diversified organisational disciplines (Mintzberg, 1991; Anvari et al., 2010; Wang, 2008; Jashapara, 2003). The variables assessment in a diversified organisation is possible when the work role is formalised through terms of reference outlining the distinctive responsibilities and job descriptions that the practitioners have to follow to meet the standard required in line with variables items at Appendix A. This process of design is meant to remove uncertainty, and to increase organisational control of operational and repair issues. In fact, it all depends on how the organisations are designed to match the required conditions and to understand the conditions of the variables under study (Griffin et al., 2007; Mintzberg, 1991) and their application in Figures 1, 2 and 3. The 'effectiveness of training' is introduced as a supporting and independent variable to enhance the quality of learning in the organisation (Anvari et al., 2010; Wang, 2008). Organizational learning focused on concentration, proficiency and training was reported to be positively related and to significantly contribute to organizational learning performance (Jashapara, 2003; Wang, 2008; Anvari et al., 2010). An Omani dockyard was used for collection of quantitative data for this study to build perceptions from mindsets/opinions for improvement in quality management.

5.1 Study Instrument

The research instrument for this quantitative study was adapted and developed based on the 'Instrument of Learning Organisation' (ILO) (Jashapara, 2003) and 'Dimension of the Learning Organisation Questionnaire' (DLOQ) (Marsick & Watkins, 2003). The DLOQ was used for this research to enhance ILO in the area of effectiveness of training and organisational learning performance. The ILO and DLOQ quantitative instruments were carefully examined, with a sufficient reliability coefficient alpha of .71 for proficiency; .60 for concentration and .88 for organisational learning performance (Jashapara, 2003); >.70 for effectiveness of training and .70 for organisational learning performance (Marsick & Watkins, 2003). It was however deemed necessary to reconfirm the contents of the survey questionnaire instruments through validation, piloting, and a final reliability test, using a mixture of staff from the Omani dockyard organisations. The main constructs of proficiency and concentration were related to competitive forces (Marsick & Watkins, 2003). In the ILO study, a pilot questionnaire was used with a minimum of 5 items for each construct and the 7 points of the Likert Scale (Jashapara, 2003). All the ILO constructs scored an above average internal consistency. The questionnaire for

the DLOQ study by Marsick and Watkins, (2003) used a six point response scale ranging from strongly disagree to strongly agree (Marsick & Watkins, 2003). The objective of research instruments or questionnaires was to collect economic data that can help practitioners to understand the underlying process and to make feasible and reliable decisions. The questionnaires were adapted, refined and modified as outlined above, and are in line with the principle constructs of organisational learning (Mintzberg, 1991) apart from effectiveness of training, which was theoretically justified for its purpose (Wehrle-Einhorn & Wehrle-Einhorn, 1994; van Eerde et al., 2008; Velada & Caetano, 2007; Donaldson, 2001; McGuire et al., 2008).

The selected Likert-style Scale was based on the scholarly argument that 7 and 5 Point Scales are the same and can produce almost similar results (Colman et al., 1997; Dawes, 2008). The survey questionnaire was designed using a 5 point '*Likert-style rating scale*', ranging from 1-strongly disagree, 2-disagree, 3 - neutral/undecided, 4-agree and 5-strongly agree (Saunders et al., 2000b; Saunders et al., 2009).

5.2 Sampling Design

As in Al-Raqadi, et al., (2015a, 2015b), data were collected from October to December 2013 using five organisations that collectively share the same objectives. The five organisations used encompass (1) Deciders of Service/Planners, Customer and Platforms Operation Groups, (2) Providers of Service within the Omani dockyard and other organisations including (3) Provider of Material, (4) Operation and drafting and (5) Personnel and Training. The survey questionnaire was targeted at senior, middle and junior management, supervisors and specialist technical personnel. It obtained a total of 362 replies (86.2%) out of 420 sets of the questionnaire. These were distributed in a stratified sampling method using overall specialisation (Sekaran, 2009; Denscombe, 2007). The other 58 sets of questionnaires were either missing/not returned/discarded or disqualified-40 of them were not returned or 18 had a large number of blank items. The sample size was in accordance with the method for determining sample size and the population was 100% male encompassing logisticians, engineers, technicians, administrators and managers with vast experience (Krejcie & Morgan, 1970). As in Al-Raqadi, et al., (2015a, 2015b) sample size was also determined using a method for computing power (sample size) for regression coefficient based on the power value of .8 (7.85) at 95 % CI and alpha value of .05; the effect size measure for regression coefficient used is .15 (Cohen, 1988). Cohen (1988) suggests that smaller effect size yields more sample size; and three predictors (proficiency, concentration and effectiveness of training) were used. However, many researchers commonly add 10 % to the sample size to compensate for persons that the researcher is unable to contact (Israel, 1992; Singh & Masuku, 2013). Therefore the sample size for this study was increased by 19 % to compensate for the few of the respondents who resisted the researcher and for nil responses. Cohen's (1988) method for computing power (sample size) for regression coefficients is given by:

$$n = \frac{L}{f^2} + K + 1 \tag{1}$$

Where n = sample size, L = is a tabled value corresponding to a specific power value. As Cohen stipulated, the conventional Power value at $\alpha = .05$ is .8 which is also equal to 7.85. f = is an effect size measure for the regression coefficient. It is 0.15 as Cohen (1988) suggests that smaller effect size yields more sample size. K = is the number of predictors in the regression equation. There are 3 (three) predictors in this research.

Therefore:

$$n = \frac{7.85}{0.15^2} + 3 + 1 = \frac{7.85}{0.0225} + 4 = 348.889 + 4 = 352.889 \approx 353 \tag{2}$$

This makes the total administered questionnaire in the survey to be 420. Table 1 below illustrates the sets of questionnaires distributed and collected from each organisation.

Table 1. Distribution of questionnaire-source: (Al-Raqadi et al., 2015a; Al-Raqadi et al., 2015b)

Organisations	Specialisation	Population (Approx)	Sample Size	No. of Questionnaire Distributed	Questionnaire Respondents
Decider of Service, Customer and Platforms Operation Groups	Planning and work-package compilation and Trials	200	35	35	26
Provider of Service	Maintenance of	1400	230	230	212

Organisations	Specialisation	Population (Approx)	Sample Size	No. of Questionnaire Distributed	Questionnaire Respondents
Provider of Material	Platforms Logistics	300	45	45	37
Operation and Drafting	Human Resources Management	100	20	20	13
Personnel and Training	Knowledge and Competencies	900	90	90	74
Total		2900	420	420 (100%)	362 (86.1%)

5.3 Validity, Reliability and Normality Test

The in-depth literature review helped the adoption of reliable constructs encompassing proficiency, concentration (Mintzberg, 1991) and effectiveness of training (Heizer & Render, 2011; Anvari et al., 2010; Abdallah, 2013; McGuire et al., 2008; Wang, 2008). As discussed in Section 6.1, the adapted questionnaire reliability test was 0.71 for proficiency, 0.66 for concentration, 0.77-0.88 for organisational performance, and > 0.70 for effectiveness of training (Jashapara, 2003; Marsick & Watkins, 2003). The research instrument is presented in an abbreviated format at Appendix A. Owing to some slight changes in the research constructs items to suit the Sultanate of Oman, a revalidation and reliability coefficient was carried out for the pre test (n = 40) and found to be .738 for proficiency, .805 for concentration, .824 for effectiveness of training and .828 for organisational learning performance. For the final test (n = 362), it was found to be .783 for proficiency, .810 for concentration, 0.829 for effectiveness of training and .851 for organisational learning performance, which were all above good (George & Mallery, 2002; George & Mallery, 2003).

The instrument normality assessment was conducted through an Exploratory Data Analysis (EDA). This is an important step in data cleaning and/or in the elimination of error because no matter how carefully the data are keyed in; some errors are bound to occur (Norusis, 1992). The skewness and kurtosis results are shown in Table 3 below and were found to be within range (George & Mallery, 2002; George & Mallery, 2003):

Table 2. Instrument normality assessment/normality exploratory data analysis

Skewness value between = 1.0 to -1.0 is excellent, =2.0 to-2.0 is acceptable (George & Mallery, 2003)			
Constructs	**Descriptions**	**Statistics**	**Std Error**
Proficiency	Skewness	-.324	.128
	Kurtosis	-.448	.256
Concentration	Skewness	-.114	.128
	Kurtosis	-.241	.256
Effectiveness of Training	Skewness	.061	.128
	Kurtosis	-.515	.256
Organizational Learning Performance	Skewness	-.116	.128
	Kurtosis	.088	.256

6. Results

The answer to the study objective 1 employed correlation and multiple linear regressions shown in Section 6.1 and 6.2. Statistical comparison was done with the literature in Section 7.

6.1 Correlation

The Pearson Correlation Analysis was conducted to examine the relationship between proficiency, concentration, effectiveness of training and ships' upkeep and repair organizational learning performance. As shown in Table 3 below, there is significant positive high relationship between proficiency, concentration and effectiveness of training on organizational learning performance (r = .615, p = .01), (r = .659, p = .01), (r = .700, p = .01), thus, H1, H2 and H3 are rejected. The positive relationship results show that the people have the perceptions to move in the positive direction towards competitive advantage. The process requires the use of knowledge and skills

supported by structured training for serving diversified disciplines (Mintzberg, 1991; Marsick & Watkins, 2003; Jashapara, 2003).

Table 3. Relationship between independent variables and organisational learning performance

Variable	Y	x_1	x_2	x_3
Y (organizational Performance)	1			
x_1 (Proficiency)	.615**	1		
x_2 (Concentration)	.659**	.543**	1	
x_3 (Effectiveness of Training)	.700**	.637**	.624**	1

6.2 Multiple Linear Regression

The summary ANOVA shown at Table 4 illustrates the multiple linear regression model of organizational learning. Based on the results of the multiple regression analysis, the model as a whole (which includes proficiency, concentration, effectiveness of training) is significant F (3,358) = 175.380, p = .000). This indicates that the slope of the estimated linear regression model line is not equal to zero. Therefore the model fits the data and so, H4 is supported. Moreover, the result produced by the SPSS showed that about 59.5% variance in organizational learning performance is explained by the predictor variables entered into the regression model.

Table 4. Summary Anova

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4400.077	3	1466.692	175.380	.000[a]
	Residual	2993.926	358	8.363		
	Total	7394.003	361			

a. Predictors: (Constant), Proficiency, Concentration, Effectiveness of Training

b. Dependent Variable: Organizational Learning Performance

The analysis in Table 5 below shows that, proficiency, concentration, effectiveness of training have significantly contributed to organizational learning performance (β = .208, t = 4.631, p = .000), (β = .314, t = 7.077, p = .000), (β = .372, t = 7.686, p = .000), thus, $H_{5(i\text{-}iii)}$ are rejected. Notwithstanding the evidence, the ships' repair, like other construction industries, is not easy. It involves a dangerous, dirty and unpleasant work environment (Jashapara, 2003; Gann & Senker, 1998; Abdel-Wahab et al., 2008; Khiun, 2002). Even so, the strength of prediction from the three variables shows a positive contribution to the dependent variable. Results of this research show that the perceptions for improvement in ships repair performance are high. Proficiency, concentration and training were reported to have a positive level of relationship and contribution to the organizational performance (King & Zeithaml, 2001; Long & Ismail, 2011; Derick & Brummel., 2013; Anvari et al., 2010; Delaney, 2007; Wang, 2008; Orvis et al., 2009; Velada I Caetano, 2007).

Table 5. Multiple linear regressions on organizational learning performance

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta (β)	t	p
(Constant)	11.694	1.762		6.637	.000
Proficiency	.396	.086	.208	4.631	.000
Concentration	.419	.059	.314	7.077	.000
Effectiveness of Training	.505	.066	.372	7.686	.000

Note: R^2=.595, adjusted R^2=.592

a. Dependent Variable: Organizational Learning Performance

6.3 Summary of Hypotheses Results

The results of hypotheses are formulated in Table 6 below. The results show positive relations and significant contributions to the dependent variable of organisational learning performance. It is obvious that the perceptions of the results show a positive and promising readiness for improvement of organisational learning performance.

Table 6. Summary of hypotheses results

Hypotheses	**Results**	
	Correlation	**Multiple Linear Regression**
H_1: there will be no positive significant relationship between proficiency and ships' upkeep and repair support organisational learning performance among the respondents.	Rejected-positively related	
H_2: there will be no positive significant relationship between concentration and ships' upkeep and repair support organisational learning performance among respondents.	Rejected-positively related	
H_3: there will be no positive significant relationship between effectiveness of training and ships' upkeep and repair support organisational learning performance among respondents.	Rejected-positively related	
H_4: the regression model of ships' upkeep and repair support organisational learning performance will be significant when regressed against the independent variables.		Significantly supported
$H_{5(i)}$: There will be no significant positive effect of proficiency and ships' upkeep and repair support organisational learning performance among the respondents.		Rejected-significantly contributed
$H_{5(ii)}$: There will be no significant positive effect of concentration and ships' upkeep and repair support organisational learning performance among the respondents.		Rejected-significantly contributed
$H_{5(ii)}$: There will be no significant positive effect of effectiveness of training and ships' upkeep and repair support organisational learning performance among the respondents.		Rejected-significantly contributed

7. Discussions

7.1 Research Statistical Comparison

The research examined the relationship between the proficiency, concentration, effectiveness of training and ships' upkeep and repair support organisational learning performance. The statistical process took place by investigating each component to deliver support from the organisational learning performance on the perceptions of enhancing quality management represented by the independent variables. The constructs were needed to support the dependent variable of 'ships' upkeep and repair support organisational learning performance' for the public or disciplined environment. The theories applied for this research are based on the clear distinction between the systems and contingency approaches to the management of organisations with the understanding that there is no one best way to organise, design, lead or make decisions. Organisations are supposed to build their own structures (Cole, 2004; Mintzberg, 1991). The relationship and contribution made for the original hypotheses H_1, H_2, H_3, H_4 and $H_{5(i\text{-}iii)}$ are respectively in line with, or contrary to, similar findings from other studies.

7.2 Proficiency

By comparison, in a study "Competencies and firm performance: Examining the causal ambiguity paradox" (King & Zeithaml, 2001) - that has reference to Section 4.6. It is hypothesized that "organizations with managers who characterize competencies [proficiency] as causally ambiguous (high characteristic ambiguity) are positively associated with firm performance" ($r = .4473, 0.4648$, $p = 0.05$). This study is in line with [H1] of this research. One study "An analysis of the relationship between HR professionals' competencies and firms' performance in Malaysia" (Long & Ismail, 2011) - has reference to Section 4.6. Competencies [proficiency] such as business knowledge and HR technology have significant correlation with a firm's performance. These competencies obtained Spearmen's ρ value at $r = 0.433$ (p, 0.01), ($\beta = 0.122$, $p = 0.01$) and $r = 0.463$ (p, 0.01), (β

= 0.064, p = 0.01). This study is in line with H_1 & $H_{5(i)}$ of this research. Another study "Cognition, culture and competition: an empirical test of the learning organisation" (UK Construction Firm) (Jashapara, 2003) operates on the hypothesis which states that: "Organizational learning focused on proficiency is related positively to organizational performance" (r = .36, p = .01), (β = .19, t = 2.24) and is in line with *H1 & H5(i)*. Finally "Work-related commitment and job performance: it's also the nature of the performance that counts" (Somers & Birnbaum, 1998), is concerned with job commitment and extra role performance (β = 0.32; p < 0.05; B = 1.21; p < 0.01) and is in line with *H1&H5(i)*.

7.3 Concentration

With mindfulness being directly and positively related to concentration, mindfulness is reported to work positively with concentration (Weick & Putnam, 2006). In a study "Examining workplace mindfulness and its relations to job performance" (Derick & Brummel., 2013), it was hypothesized that there is a positive and significant relationship between workplace mindfulness [concentration] and job performance. (r = .23, p = .021) and (β = .22, p = .024). This hypothesis is in line with [*H2*] and [*H5(ii)*] of this research. Additionally, in a study, "(UK Construction Firms)" (Jashapara, 2003), organizational learning focused on concentration is related positively to organizational performance (r = .31, p = 0.01). The concentration had a negative structural loading (-7.795, t = -.048). This is in line with [*H3*] and is contrary to [*H5(ii)*] of this research.

7.4 Effectiveness of Training

In "Strategic training practices, effective organizational commitment, and turnover intention: The mediating role of psychological contract: Universities of medical sciences in Iran" (Anvari et al., 2010), the outcomes of H3 & H5(iii) are in line with the hypothesis which states that strategic training practices, including motivation to learn, perceived support, and training attitudes are positively and significantly related to effective organizational commitment [performance] (0.565, 0.511, 0.568, p < 0.05) and (β = .302, p = 0.05) respectively. Additionally, in a study "Employers must act on workplace stress" (Delaney and Huselid, 1996)-H3 & H5(iii) of this research are in line with the hypothesis which states that progressive HRM training is positively related to perceptual measures of organisational performance (r = .88, p < 0.01).

Overall the results of this research help to increase distinctive knowledge in the area of proficiency, concentration and effectiveness of training to improve ships' upkeep and repair support organisational learning performance in an area where the end product cannot be debilitated.

7.5 Correlation and Multiple Linear Regression

The results of correlation and multiple linear regression have focused on the need for force for proficiency, force for concentration and effectiveness of training to improve on the ships' upkeep and repair organizational learning performance. The variables were articulated to develop understanding of the '*mindsets/opinions*' of the workforce for future improvement in the field of quality management. It was found that in general the momentum of the workforce has fully supported development towards learning. The results indicated that culture of proficiency, concentration and effectiveness of training will lead the organisation into effective quality performance.

Managers are needed to reinvigorate the learning culture to commit and create the specialist workforce for the purpose of enhancing quality and improving performance. It is therefore proposed in Section 7.6 that the deciders/providers/operators long-term support framework is built with quality management disciplines at the core of management processes to enhance the significant repair environment described in Figure 2 and 3 below.

7.6 Quality Management

Based on study objective 3, the examination of constructs/variables in the literature review, it was found that proficiency, concentration and effectiveness of training are appropriate for production quality in improving ships' upkeep and repair organisational performance (Griffin et al., 2007; Millson & Wilemon, 2008; Dwivedi & Maffioli, 2010; Weick & Putnam, 2006). It was also found that the outcomes or findings of this study are in line with other research (sub Section 4.6 and Section 7.1-7.4) involving proficiency, concentration (Mintzberg, 1991; Jashapara, 2003) and effectiveness of training (Anvari et al., 2010; Wang, 2008). With such findings managers are encouraged to put emphasis on quality management disciplines including quality assurance, quality control, vibration analysis and their incorporation in a management core that can enhance better 'ships' upkeep and repair support organisational learning performance' as follows.

7.6.1 Quality Assurance and Quality Control Teams

(i) The Quality Assurance (QA) team under the QA Managers should have a range of responsibility and should

be primarily required to work continuously alongside and ahead of Maintenance Quality Control Section (MQCS). The team responsibilities are to monitor the marine machinery equipment operation at sea. They are to help the platform groups with the status of marine machinery and equipment, to understand instantaneously the machinery conditions and to prepare for work packages/work specification. The Operational Quality Assurance Section (OQAS) should be professionally responsible for trialing, analyzing the real conditions of the platforms during the course of sea time (fleet time engineering) before entering into the maintenance phase. The OQAS tasks should therefore not be directly or immediately involved in the routine activity of upkeep or defect rectification. It is a quality process, analysis oriented, which is considered necessary for the public dockyard organisation if it is to face the environment and meet the Deciders or Customers needs. OQAS are primarily the team responsible for initial trialing, diagnosing and extending operational hours on ships, using more scientific knowledge and sophisticated tools in the area of vibration monitoring and analysis; lubricating and hydraulic oil analysis, including magnetic ferrous particles etc., involving wear, contamination and chemistry and using the most sophisticated software of the machinery health manager. The OQAS should boost the Reliability Centred Maintenance (RCM), the philosophy of Failure Mode, Effective and Criticality Analysis (FMECA), and Condition Based Maintenance (CBM) (Moubray, 1991; Evans & Lindsay, 2008; Besterfield et al., 2010; Conachey, 2004). This should be confirmed by Pre Upkeep Machinery Assessments (PUMA) including Dynamic Machinery Trials (DMT) followed by Post Upkeep Trials (PUT) including Set to Work (STW)/Harbor Acceptance Trials (HAT) and Sea Acceptance Trials (SAT). The QA teams require effective training to establish proficiency and concentration to deliver results to the organizational learning performance.

(ii) The Vibration Analysis (VA) should be housed within the operation of the QA Section to be responsible for deep diagnosing, predicting failures and finding solutions. OQAS require deep concentration and should also be a professionally qualified body within the overall quality management team and they should be involved in supporting safety engineering, testability engineering, maintainability engineering, logistics engineering, availability engineering, design engineering etc. They should, in fact, be fully trained and involved to understand all failure patterns, particularly for the main and auxiliary machinery, and to monitor the manufacturing factory patterns such as that of the bathtub techniques where a model of machinery is fully tested at the factory and data recorded for future use covering the total major overhaul cycle (Dileep et al., 2013; Blanchard, 1986; Moubray, 1991). They should support Reliability Centred Maintenance (RCM) either through the use of factory patterns with the understanding of the system function and the likelihood/consequences of breakdown and also to reduce the probability of failure. By definition "*RCM is a process used to determine the maintenance requirements of any physical asset in its operating context*" (Moubray, 1991, p. 7). Additionally, "*a fuller definition of RCM could be a process used to determine what should be done to ensure that any physical asset continues to do in its present operating context"* (Moubray, 1991, p. 7). Equally, overseeing spare parts quality is the start of economy of scale where production savings are commenced for the whole process and this remains the responsibility of Logistics Quality Assurance Section (LQAS). LQAS should be a professional body, which ensures the spare parts quality assurance that follows the agreed and established policies, guidance, regulations as per the contract requirement to support the platforms during the course of the total life cycle. Therefore, the processes require intensive knowledge, competencies and skills involving proficiency, concentration through continuous training and learning. Comparatively, such processes are followed by advanced naval logistics around the world (Kobren, 2013; Solis, 2004; Saunders et al., 2000a) but require the necessary competencies in proficiency, concentration and appropriate training.

(iii) The quality control (QC) team under the QC Managers should have a range of responsibilities. They are primarily required to work continuously alongside the production groups to help with the diagnosis, repair quality and to offer ranges of specialisation whilst predicting and preventing failures. Their QC function within the production group should be to offer quality assessment or evaluation of the products themselves in the areas of main machinery deep assessment, motor circuit analysis, electric motor/generator testing and analysis, motor health rotating equipment diagnostics, flow measurement, endoscopic inspection, leak detection, and infrared thermography-laser alignment and rotating components tolerances, X ray inspection, etc., related to bad configuration. Quality control tools require competent and trained people who have a clear understanding with proficiency and concentration in their application and analysis to achieve a Total Control Methodology (TCM) (Kwok & Tummala, 1998). *"Quality control is a process for maintaining standards of quality that prevents and corrects change in such standards so that the resultant output meets customer needs and expectation"* (Hoyle, 2000, p. 654). Maintenance Quality Control Section (MQCS) should discover, prevent or detect errors from occurring using appropriate and less sophisticated tools and equipment-quality control is a product oriented analysis. MQCS should be academically and professionally prepared through continuous training in proficiency and concentration to enhance quality proactively, to avoid repetition through the use of appropriate

documentation and to publish Document Based Inspection (DBI), which is easily understood by both management and production departments so that corrective action can be taken to improve performance (Hoyle, 2000). The MQCS should ensure the quality of refits/repairs carried out on ships, in the dockyard, including rectification of operational defects. They should devise a proactive method to prevent such failure in the future; especially where changes/modification/are implemented, taking configuration control into consideration. The team should house specialists in the area of Mechanical, Hull, Electrical and Electronics Engineers and Technicians to maintain or return the platforms availability in a 'configuration change control' (Mintzberg, 1991; Blanchard, 1986; Hoyle, 2000; Philpott, 2003; US-Navy, 2004) of product and services. The quality control of the infrastructures is equally important to support those platforms. The MQCS Managers should have the responsibility of continuously developing and maintaining an effective internal QC service for all the deep maintenance teams to support both the provider and the deciders/operator of services staff activities. MQCS Staff are required to make sure that the product and services of the employer are reliable and of top quality.

7.6.1 Establishing QAs/QCs

Preparing, establishing and implementing QAs/QC are not easy and it is reiterated that proficiency, concentration and effectiveness of training remain the hub of the whole process. It requires proficiency, concentration, effectiveness and constancy of learning/training for ships' upkeep and repair support organisational learning performance to maintain a competent, and committed workforce that has the belief in meeting quality, in addition to a basic education and the knowledge to succeed. The whole process is like any change that seeks improvement in the way the business is done. It is the means to raise the standards, durability and robustness of whatever the organisation is trying to do. Additionally QAs and QC require soft and hard resources, and expertise that is not blocked by those who are against its processes because they cannot immediately see it. This would be the problem in the public sector, which equally requires dedication, time and management techniques and development (Navaratnam, 1995). To implement QAs and QC the organisation requires discipline and support from the top management and in developing quality the following have to be seriously taken in mind for continuous action:

a) Resources - There is a need for adequate resources to at least make QAs and QC teams do their jobs in a learning performance organisation. They need to be able to produce results that have meaningful output for the whole system for them to be understood, respected and implemented by the organisation using the new essential skills. The resources required should be in addition to knowledge and education. They have to be continuously prepared to be in line with the sophistication of their task, to understand, use, translate and analyse in plain format so the workforce in the production groups can implement their decisions in the interest of the SU&RSO and the system as a whole (Kwok & Tummala, 1998; Zinn & Haddad, 2007; Hoyle, 2000; Evans & Lindsay, 2008).

b) Procedures - The whole process should be properly planned and conducted according to requirements; either to meet the planned maintenance, to update the operational records of marine machinery, equipment and systems or to recheck the machinery or system to prevent or rectify defects (Kwok & Tummala, 1998; Moubray, 1991; Blanchard, 1986). Time remains a very important element or soft resource. If it is not properly organised the system will suffer. The QAs and QC should be resourced with the required information such as reference points and they have to develop the required data for future use (Kwok & Tummala, 1998; Moubray, 1991). The whole system should be developed to foresee and support the system with the objective of reducing expenditure, which could be caused by failures or unnecessary maintenance thereby increasing the availability of the platforms.

c) Planning - The QA and QC should work at different levels of routine and, as outlined, they should use a disciplined approach. Frequency checks should therefore be thoroughly planned to both ascertain and compare the conditions to encourage the CBM approach and to investigate problematic situation failures (Moubray, 1991).

7.6.2 Quality in the Core of Management Framework

The framework in Figure 2 and 3 below (Section 8) was designed to offer feasible support in the organisation structure and to allow the Quality Management Team (QMT) in a dockyard to participate fully in the domain of the senior management. The approach is considered feasible for this type of environment to allow continuous improvement, for profit or non-profit organisations, such as the SU&RSO before introducing ISO. The Deciders and Providers within the SU&RSO should be responsible for QAs and QC respectively and they should offer continuous support to the three teams following the agreed work description, through the use of appropriate standing instructions, a mission statement, feasible vision and direction with a strong policy to drive the whole system to the required objective. The proposition is for SU&RSOs to work hard towards ISO standards,

following the principle whereby the productivity performance can remain feasible to smoothly maintain the availability of the required capabilities. The improvement would gain momentum because of the availability of a system that employs proficiency, concentration and effectiveness of training that is understood by all. Deming's 14 principles encourage people to take responsibility in areas of leadership for continual improvement by adopting new philosophies (Heizer & Render, 2011; McCuiston & DeLucenay, 2010). Deming's 14 principles stress enabling the team to create a bank of data and to analyse this in order to avoid mass inspection in the future (Avery, 2010). All processes of improvement require continuous and continuing education and training to strengthen personnel knowledge whilst reducing unnecessary fears, barriers and exhortation (Heizer & Render, 2011). The approaching mode is intended to positively drive the system of any young profit, or non-profit, organisation into the required vision. None of this will give a fruitful result without the effort of senior management to encourage QAs and QC to participate to the full towards ISO standards and with a predefined organisational structure that is devoted towards quality at any cost. The development of this study is based on an intensive literature review reinvigorated by the '*mindsets/opinions*' of people on their perceptions of heading towards quality enhancement in ships' upkeep and repair organizational learning performance.

8. Conclusions and Recommendations

Ships' upkeep and repair support organisational learning performance require enforcement of quality superimposed by constancy of proficiency, concentration and effectiveness of training in single- and double-loop learning (Al-Raqadi et al., 2015b). Having critically reviewed the literature, it is reiterated that enhancement of competencies in business is necessary so as to be in a position to meet the needs of organizational learning performance. Understanding one's position and the use of management frameworks and tools are both paramount particularly in a complex situation. Quality management and techniques are vital disciplines not only in marine, electrical and electronics engineering but also in all types of specialisation. The whole process requires quality management, quality assurance and quality control compounded by quality attributes. QAs & QC cannot be established without planning soft and hard resources and the necessary procedures. It is pertinent to mention that businesses without any form of quality enforcement, in a variety of disciplines, will find it difficult to remain abreast and to arrive at the required productivity and availability of fully operational ships at sea.

The organisation structure should be thoroughly designed to encourage application of concentration, proficiency and effectiveness of training to support and work side by side with the QAs & QC teams and techniques. Overall effort should be formulated to communicate with the interested parties such as the survey, design, platform, project management, health and safety, logistics and production groups within the agreed structures to benefit from the whole. To contribute to research objective 3, the synchronic framework at Figure 2 and 3 below are proposed for the purpose of boosting the communication and enhancing the ships' upkeep organisational learning performance. It is therefore stressed that quality management teams under the quality manager should have full support from senior management to fulfil their part in different phases of operation; without any fears and in the interest of the ships' upkeep and repair support organisational learning performance.

The RCM, FMECA, Preventive and Corrective processes supported by Integrated Logistics Support and Configuration Management (ILS&CM) are considered to be imperative parts of quality management that can bring a comprehensive end product of organisational learning performance. They require PUMA including DMT followed by STW, HAT and SAT. They should provide an in depth explanation of assessment techniques, failure management task and analysis but with constant support of tasks concentration and inspection. When fully formulated they will address the issue of spare parts, sustainability analysis, documenting and implementing results etc., all of which should be designed as part of quality management technique for the marine machinery, equipment and components and for the interest of ships' upkeep and repair support organisational learning performance.

The bathtub techniques should be done at a factory as a future management reference to facilitate better and the required proficiency, concentration and effectiveness of training. This will ensure that any new product type such as a main model of marine machinery has been fully factory tested and corrected before it is introduced to the operation, or some form of guarantee that such a product has received a full test and has proved correct at the factory using the aforesaid bathtub techniques. The data collected should help the QAs/QC, ships' operators and maintainers to ascertain the patterns of particular machines whilst comparing them with the current patterns to improve the operational status.

It is recommended that those interested in the TQM, RCM, FMECA and CBM for the purpose of quality in ships' upkeep and repair support organisation learning performance should take the initiative and consult other

literature. The quality managers should have responsibilities in the areas of QAs and QC to develop and manage a wide range of quality disciplines for the purpose of organisational learning performance which are summarised below:

a) The management and development of organisation-wide Quality Control processes including certifications and failure investigations.

b) Facilitating the Provider of Maintenance Support Sections with a service that improves the quality of output without unnecessarily increasing administrative checks that impair efficiency.

c) Arranging and monitoring the testing of the finished product whilst improving the quality of work definition.

d) Monitoring standards of repairs and production. The QC Managers should work with the production team to support the modifications to the products when deemed necessary and approved by the management to make them more useful and durable whilst maintaining continuous checks.

e) Reviewing and updating basic installation and setting to work procedures.

f) Introducing test and calibration procedures for ship borne instrumentation to improve the confidence of operators in the performance and reliability of their equipment.

g) Instructing providers and deciders staff in the methods and advantages of QC.

h) Collating and reporting Performance Management data as required. Within QC job description; they should document all findings, including improvements and faults to be used for future analysis.

i) Providing Health and Safety support for the Health and Safety Managers (H&SM) in terms of identifying health and safety issues, introducing procedures and appropriate documentation.

The basic methodology that is required for a learning organisation can form reliable local QAs/QC that can maintain availability of the capabilities with the aim of meeting the ISO standard. The following items therefore outline essential areas that can help any learning organisation to remain abreast with the QAs/QC disciplines:

a) Establishing essential practices in quality assurance and control.

b) Introducing an in-house quality management structure. This may not be in-line with the International System Organisation (ISO) but is most likely fit for purpose and heading towards ISO.

c) QAs/QC Techniques required are in the form of an amalgamated a variety of professional disciplines to form a reliable system.

d) Enhancing QAs with the latest philosophy of the Reliability Centred Maintenance (RCM) including Failure Mode, Effective and Criticality Analysis (FMECA) and Condition Based Maintenance (CBM) (Moubray, 1991; Hoyle, 2000).

The quality management teams should work with the operators to maintain a combined effort during PUT including STW, HAT and SAT to introduce new references for future operational monitoring systems.

The implementation of Reliability Centred Maintenance (RCM) in this professional, conceptual and statistical paper is mostly based on the work of “Reliability-Centred Maintenance" by Moubray, (1991) supported by other literature.

The statistical finding of this research is that quality management in a learning organisation like that of ships’ upkeep and repair support environment in need of organisational learning performance through the employment of independent variables of quality management through proficiency, concentration and effectiveness of training. Their relationship and contribution, as outlined in the research framework in Figure 1 and Summary of Hypotheses Results in Table 6, leads this research to reject (positively support and significantly contributed) all the hypotheses.

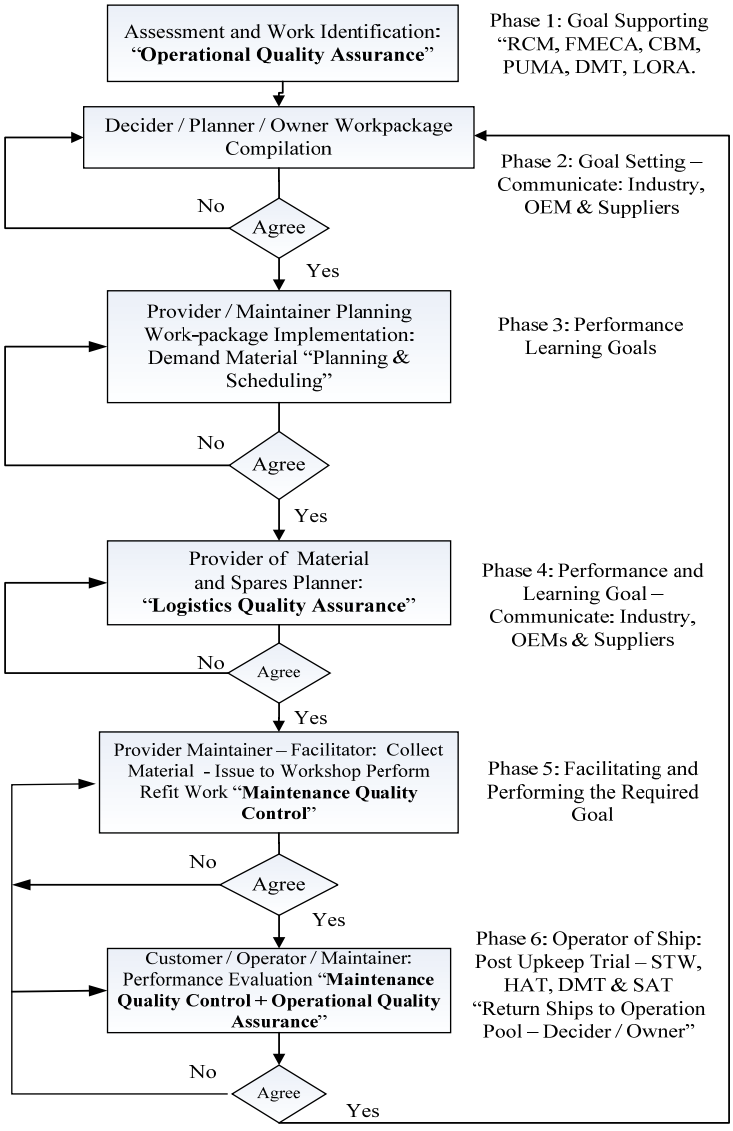

Figure 2. Integrated support framework requiring concentration, proficiency and effectiveness of training for management of ship upkeep and repair support organizational learning performance

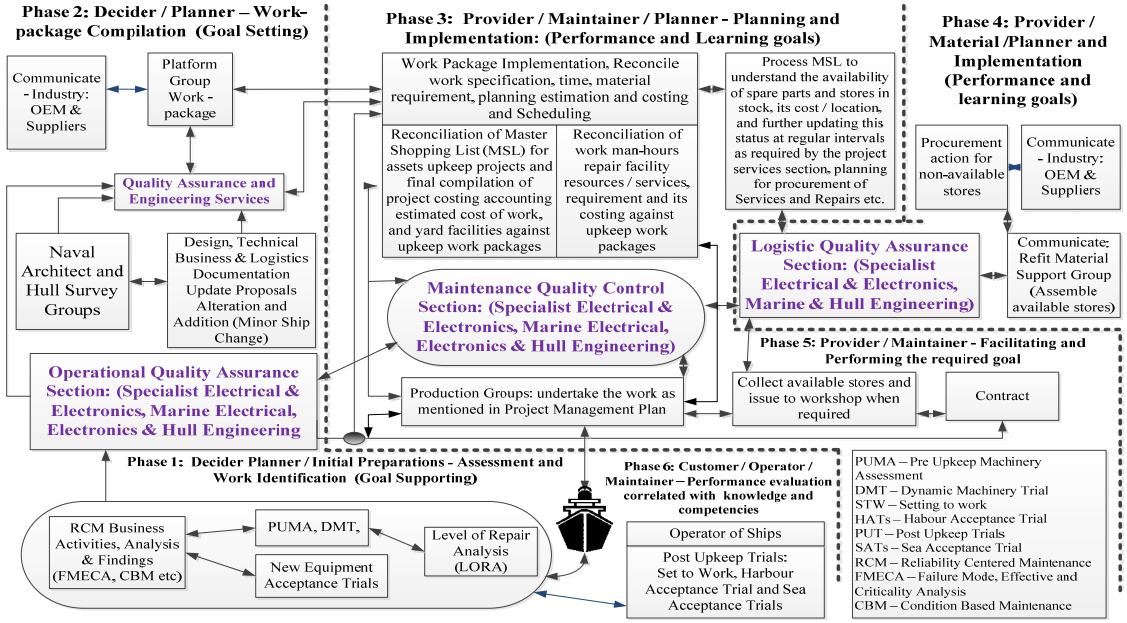

Figure 3. Deciders/providers/operators long-term support framework for ships' upkeep and repair activities with OAs and OC in the core of maintenance and logistics business (Al-Raqadi et al., 2015b)

9. Limitation and Implication

No hypothetical studies were found on concentration, proficiency and effectiveness of training relationship with performance in the ships' repair industry. Limited numbers of other studies were found in these areas that were used for the purpose of enhancing this study's hypothetical framework and for comparing with statistical findings. It is felt that ships' repair requires further hypothetical studies in this area to learn more from the 'mindsets/opinions' of the people for the purpose of future improvement.

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Appendix A

Abbreviated Version of Questionnaire Format for quality management in a learning organization to underpin ships' upkeep support performance.

Quality Management through Proficiency:

"training at all levels", "expertise thro' training", "increase training expenditure", "encourage learning", "develop individual"

Quality Management through Concentration:

"need of ISO', "achieve product activity", "develop capabilities", "unite technical effort", develop product reliability', "serving the customer", "satisfy operators demand", "justification, investigation, operators demands",

Quality Management through Effectiveness of Training:

"Encourage self-learning", "support learning request", "opportunities to learn", "share up-to-date information", "empower others", "mentor and coach", "ensure learning consistency", "concentrate with outside communities"

Performance through Quality Management:

"maintain productivity", "learning, flexibility and productivity", "flexibility and customer satisfaction", "maintain staff satisfaction", "create job satisfaction", "performance and job standard", "implement suggestion", "technology and information processing", "raise staff morale", "achieve goodwill organization capital", "Maintain wellbeing of staff", "encourage change management".