Customer Satisfaction in Conquas and Qlassic Certified Housing Projects

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Abstract

Construction activities in Malaysia, as in many developing countries are growing tremendously which generate towards the nation Gross Domestic income. With the growing numbers of developments specifically to cater for the growing demand for the residential, commercial houses, specific quality standards has to be developed in order to regulate the standard quality that the contractors will need to deliver. Construction Quality Assessment by Building Construction Authority (BCA Singapore) and Quality Assessment in Construction (QLASSIC) by CIDB Malaysia being developed to set certain benchmarking standard for the building quality. A lot of occurrences reported in the news where the purchasers of the houses were not satisfied with the quality level for the houses being delivered. The objective of this study is to relate the CONQUAS/QLASSIC to customer satisfaction of the residential housing. The methodology adopted questionnaire and individual purchaser response was unit of analysis. In summary, the different between QLASSIC- based assessment and CONQUAS- based assessment in regards to customer satisfaction, was significant which stated for the satisfaction for the CONQUAS is higher than the QLASSIC projects. Hopefully, this research added value to academic research in understanding the benefit of implementing CONQUAS/QLASSIC standards towards increasing the market value of the property market

Keywords: CONQUAS, QLASSIC, Quality Assessment, Customer Satisfaction

INTRODUCTION

Poor quality in construction projects is a common phenomenon in the world. Many disputes happened among clients, house owners and parties involved in construction involving the key stakeholders in construction industry namely client e.g. property developer, appointed consultants and contractors on construction defects cases. Construction defects seen will be even more critical if it involves latent defect which will persists years after the completed units has already been occupied by the purchasers. When the purchasers bought their dream properties, they surely will expect for liveable houses which will be minimal in defects.

However, there have been numerous incidences where house purchasers expressed their dissatisfaction over the quality of workmanship and when they inspected their houses upon being handover the key to their houses. To some extent, some purchasers feel being false promised by the developer as they think actual unit delivered did not meet their sign Sales and Purchase Agreement or the CONQUAS is higher than the QLASSIC based assessment in regards to customer satisfaction, was significant which stated for the satisfaction for the CONQUAS is higher than the QLASSIC projects. Hopefully, this research added value to academic research in understanding the benefit of implementing CONQUAS/QLASSIC standards towards increasing the market value of the property market.
worthwhile and yield good economic returns. Clients start to realize the importance of quality and so will force developer to deliver better quality end products which can give them full satisfaction [19]. So it is the intention of this paper to examine the practice adopted by different developers in adopting CONQUAS or QLASSIC assessment in their projects and relate that to Customer Satisfaction of the house owners.

One of the programme subscribe by ABC company in delivering quality products to the purchaser was on CONQUAS (Construction Quality Assessment by developed by Building Construction Authority (BCA) of Singapore and Quality Assessment in Construction (QLASSIC) developed by Construction Industry Development Berhad (CIDB) Malaysia. This assessment will allow for target setting and ensure contractors to meet certain workmanship standards in the quality of finishing work for the developments. The ultimate aim of improving the quality standards in their development is in order to give assurance to their house buyers that they will be guaranteed of high quality products whenever they purchase their dream houses in ABC company projects.

ABC Company is a property development arm for a Government Linked Company which was established with the aim to become a competitive conglomerate at the international level. To reach to that stature, program on raising the construction workmanship quality has been introduced in ABC Company to beef up the quality expectation on the houses delivered to purchasers. One way, in which the house is monitored is through the monitoring on the CONQUAS achievements inside the Key Performance Indicator (KPI’s) for the Development projects. Since its inception in 2012, the key target for the CONQUAS KPI’s has been raised year over year to reflect on raising the bar of quality achievements for all the projects within ABC Company. This is reflected happening as the actual average year over years score is improving.

However, despite the achieved result on external assessment or quality commitment statement in the organization vision, the rate of customer complaints due to poor workmanship issue due to building defects are still at the alarming rate. Despite the improvement in the CONQUAS / QLASSIC score, which means that the number of defects will be reducing, whether that will translate into the satisfied house owner is still questionable. In contrast, CONQUAS is more widely recognized and accepted by developers as well as contractors in the country [10]. Hence, this study is meant to provide another dimensions in term of property owners satisfaction when comes to 2 different types of assessment.

Even though the company has invested millions of dollars to ensure compliance to CONQUAS / QLASSIC standards over the years through training, seminar or benchmarking exercise, which does not necessarily translate to the end users to be satisfied when the products were handover to the purchasers. The above argument, bring us to the following research questions:

Is there any difference in the customer satisfaction level for CONQUAS and QLASSIC certified housing projects?

The research objectives are described as follows:

To determine if there is any difference in the Customer Satisfaction level for housing projects after completed CONQUAS assessment comparing it against the project after completed QLASSIC assessment.

Even though CONQUAS is said to be a popular method [19], however no studies has so far been conducted compare the customer satisfaction level from both assessment. From the academic standpoint, this study is to establish whether there is any significant impact whenever developer applied for the CONQUAS / QLASSIC assessment to the customer satisfaction level. As of now, very limited research in the market did study about CONQUAS and QLASSIC impact to customer satisfaction and interrelationship, so this will open up the avenue for future research being develop in the similar nature.

LITERATURE REVIEW

Quality in Housing

The rapid pace of construction industry has set a new paradigm of product quality expected by the customers. Quality, cost and time have long been recognized as the major target of concern by the client in constructions. With the revolution in customer expectation, purchasers are now well educated, even the low end marketed range of products does not mean that they accept and satisfied with low quality houses upon received of the keys to their dream houses. Quality to construction product refers to the goodness and the level of the satisfaction to the consumers [9], [7] and [14] had discussed quality in construction in two groups namely design and construction. The aspects of quality are shown divided into the design and construction work method which are essential element for construction. The aspects of quality are shown in Figure 1, which considered essential for construction quality.

![Fig. 1 Construction Quality Dimension](image)

Under the construction work method element, 1 of the 3 main elements for the quality will be on the workmanship elements which describe the quality of constructed work.

This is where CONQUAS/QLASSIC assessment will be the standards used to measure the workmanship quality of the constructed work. As to be further discussed in the below topic, both CONQUAS and QLASSIC standards address the workmanship standard for the construction quality especially in the final architecture finishing.

What is CONQUAS Standard?

As Low et al. (1993) explain, CONQUAS system was essentially developed to meet three objectives:

a) To have common quality evaluation system for construction projects.

b) To provide an objective and measurable system for quantifying the quality standards of the building construction.

c) To facilitate the systematic assessment of the quality standards within specific time and cost limits and raise the quality level in construction.

The assessment in the CONQUAS system divided into 3 parts:-

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1. Structural work – covering formwork, reinforcement, concrete quality and finished concrete. Because most of the structural works for a building would be inaccessible after completion. Assessment is carried out during the entire construction process.
2. Architectural work – covering floors, walls, ceilings, doors, windows, components, M&E and roofs. The assessment is carried out at the completion of the project.
3. External work – covering pedestrians, walkways, drains, playgrounds, swimming pools, etc. The assessment is carried out at the project completion.

In addition, weightage of scoring assessment are varies according to building category as shown in Table 1.

Weightage by building Category are given by the following Table 1.

<table>
<thead>
<tr>
<th>Component</th>
<th>A Commercial with central cooling system</th>
<th>B Commercial without central cooling system</th>
<th>C Private (Highrise)</th>
<th>D Public Housing</th>
<th>E Landed Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural work</td>
<td>25%</td>
<td>30%</td>
<td>25%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>Architectural work</td>
<td>55%</td>
<td>60%</td>
<td>65%</td>
<td>60%</td>
<td>65%</td>
</tr>
<tr>
<td>M&amp;E work</td>
<td>20%</td>
<td>10%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Points to be noted, for the overseas project, structural assessment will not be conducted, hence the assessment will be purely based on the architectural work and the M&E work. Weighted architectural element for CONQUAS scoring given by the table 2.

<table>
<thead>
<tr>
<th>Architectural Element</th>
<th>Total</th>
<th>Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Finishes</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>Floor</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Internal Wall</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Door</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Component</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>External Wall</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>External Work</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

For the purpose of this study, all the above elements will be evaluated for the customer satisfaction survey except for the roof and external work elements. Roof elements for example applicable for the flat roof type of houses, while the sample used for this study, all using the pitch roof type of housing. Meanwhile, the external work element is not evaluated as different project will have different type of external works offered. So in order not to create any bias in term of evaluation result, this roof and external work will not be included inside the instruments questionnaires.

What is QLASSIC standard?

Stand for Quality Assessment in Construction (QLASSIC) was developed in November 2006 by the CIDB’s spearhead Technical Committee (TC) consisting of representative from Public Works Department (PWD), Jabatan Perumahan Negara (JPN), Real Estate and Housing Developers Association (REHDA), Pertubuhan Arkitek Malaysia (PAM), Master Builders Association Malaysia (MBAM), National House Buyers association and others relevant organizations and authorities. Standards named as CIS 7:2006, (Construction Industry Standard).

QLASSIC is a system that evaluates and assesses the quality of workmanship through a sampling and statistical approach. [17] stated that the objectives of QLASSIC (CIDB, 2006) are to achieve the following objectives:

a) To have a standard quality assessment system as a benchmark for quality of workmanship of the building projects.
b) To assess quality of workmanship of the building projects based on approved standards contractors to achieve defect-free when carrying out construction work.
c) To evaluate the performance of contractors based on quality of workmanship.
d) To compile data for statistical analysis.

2.4 Assessment Approach and Sampling Process

As it is impractical to assess all elements in a construction project, QLASSIC assessment uses a sampling process to carry out the assessment. The sampling takes into account the size of the building as well as the distribution of the various functional locations. This will enable the assessment to adequately represent the entire building before carrying out the assessment; the assessor will determine the samples (elements or locations) that need to be assessed.

The samples must be distributed as uniformly as possible throughout the project and various construction stages. The samples are selected from drawings and plans of the relevant construction project. Sampling of the structural works is divided into two or three stages beginning of the commencement of the superstructure activity until the completion of the structural works depending on the scope of the structural activities. All locations in the construction project must be made available for the assessment.

There are several elements that the assessor can determine on the standard of quality that are implemented by their client or contractor. Hence, the assessment will depend on the package of assessment required. The package elements as shown in Table 3 are as follows: STRUCTURAL WORKS

The assessment is carried out throughout various construction stages. The numbers of samples are determined based on the gross floor area (GFA) of the building with a minimum and maximum number of samples. ARCHITECTURAL WORKS

The assessment is carried out upon completion of the building project and before handing over of the project. The samples are determined based on the gross floor area (GFA) of the building with a minimum and maximum number of samples. MECHANICAL AND ELECTRICAL (M & E) WORKS

The samples are determined based on the gross floor area (GFA) of the building with a minimum and maximum number of samples. For completed projects the assessment is carried out upon completion of the building project and before handing over of the project. For ongoing projects the assessment is carried out throughout the various construction stages. EXTERNAL WORKS

The assessment is carried out upon completion of the building and before handing over of the project. The numbers of samples are determined based on (10m length section/ location) with a minimum number of samples.

<table>
<thead>
<tr>
<th>Component</th>
<th>A Landed Housing</th>
<th>B Stratified Housing</th>
<th>C Public Building</th>
<th>D Special Public Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Work</td>
<td>25%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Architectural Work</td>
<td>60%</td>
<td>50%</td>
<td>45%</td>
<td>35%</td>
</tr>
<tr>
<td>M&amp;E Work</td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>External Work</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
For QLASSIC assessment the scoring weightage also varies according to building category as shown in Table 3. Category A (Landed housing) - Detached, Semi Detached, Terrace, Cluster Category B (Stratified housing) - Flat, Apartment, Condominiums, Town House Category C (Public building) - Office Building, Schools and other facilities intended for public use Category D (Special Public building) - Hospital and Airports only

For the architectural element for QLASSIC the weightage scoring given by table 4:

<table>
<thead>
<tr>
<th>Architectural Element</th>
<th>Total</th>
<th>Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Finishes</td>
<td>56%</td>
<td>16%</td>
</tr>
<tr>
<td>Floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Wall</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Door</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Component/ Fixtures</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

For the purpose of this study, same reasoning as for CONQUAS, all the above elements will be evaluated for the customer satisfaction survey except for the roof and external work elements. In order not to create any bias in term of evaluation result, this roof and external work will not be included inside the instruments questionnaires.

During the day of assessment for QLASSIC, samples selected must be distributed as uniformly as possible throughout the project with reference to drawings and plans of the relevant construction project. Sampling of the structural works is divided into two or three stages beginning of the commencement of the superstructure activity until the completion of the structural works depending on the scope of the structural activities. All locations in the construction project must be made available for the assessment by the assigned assessors.

Review of the Past Research on the Customer Satisfaction

A review of the past researches was conducted in order to assess the past studies that have been conducted on the customer satisfaction against the construction quality standards. From the review of the past researches we can summarize the following conclusion:

a) Customer satisfaction correlated with the defects quality of houses
b) This is supported by [16], in their articles which generally mention strong correlation exists between housing defects to customer satisfaction. Fewer defects will result to a more satisfied customer.
c) Evaluation of housing defects in Malaysia construction industry reveals that the architecture finish will be the most common defect will be on the wall with plaster crack seen as the biggest problem complaint by the purchasers [6]. Six common defects occur will be crack, moisture, peeling off, painting defect, rust ant rot (Ismail et al., 2012).
d) Study on the defect with Build to Sell concepts reveals that less defects will be produced compared to the conventional Sell than Build concept [15, 16, 24].
f) Customer satisfaction towards the quality of the houses vary according to the type of the houses build as low cost house owners tend to be very satisfied with the house quality and more concern on the facilities more compared to the normal terrace houses, [7,8].
g) Post Occupancy Evaluation provides valuable approach towards analysing performance of government or public building in Malaysia [18].

Construction Workmanship Quality that Contribute towards Customer Satisfaction in Quality Housing

From the review of the [6] [11] and [16], the following factors could be drawn up on the construction quality and customer satisfaction. Those factors are:-

a) Improving construction quality will have direct impact on the customer satisfaction as the strong correlation exists between the quality and customer satisfaction. Fewer defects will translate into more satisfied customer.
b) In order to improve on the construction quality, past reviews have pointed toward few elements which were common in the Malaysia construction industries. For example, [6] states on architecture finish and [11], points towards cracking defect, crack, moisture, peeling off, painting defect, rust ant rot. Architecture finishes are parts of the CONQUAS / QLASSIC assessment and with the improved result seen on the result, will translate to improved customer satisfaction on the quality.

Also, from the previous research there has been a study on the purchaser’s satisfaction with respect to elements specified in QLASSIC and CONQUAS, and the rating achieved only at the average satisfaction level. However, there has been no correlation study to relate this with the QLASSIC element achievement and how did CONQUAS and QLASSIC fare when measured on the customer satisfaction perspective. It was noted also that the CONQUAS is a more popular instruments engaged by the property developer in Malaysia, however no study has tried to link the investment put in against the return to meet the total customer satisfaction. So this is what this research question is trying to answer in this paper.

After all the above discussion on the customer satisfaction the hypothesis question which this research paper willing to address will be as the following:

H1 – There is significant difference in Customer Satisfaction between CONQUAS and QLASSIC certified housing projects.

METHODOLOGY

The Unit of Analysis

Unit of analysis will be individual purchaser response. Researcher measure the level of customer satisfaction based on different element in the CONQUAS or QLASSIC standards. Based on the standard elements, the questionnaires will be developed to measure on the purchasers’ satisfaction level of each element and its effect towards the final customer satisfaction level.

3.2 Population of Study

This research was carried out within the ABC Company. The population of ABC Company is 196 companies in Malaysia. This study focuses on the result of the customer satisfaction survey after the assessment of the CONQUAS/QLASSIC assessment for development. For CONQUAS assessment 2 developments were used for this research namely project East Ledang 4B1 and East Ledang 4B2. For study on the post QLASSIC assessments, 2 developments were used, namely IOI Phase 3A and IOI Phase 6B03. So after third party assessment, this satisfaction survey will determine whether homeowners were satisfied with the quality of housing upon received key during handover.

Research Sampling

Research sampling is based on stratified random sampling technique where samples will be chosen from 4 sets of developments...
representing CONQUAS assessed development and QLASSIC assessed development respectively. Sampling will be picked from the whole list of purchasers under the defined developments. The reasons to adapt the random sampling as the research only focus on intended development which has gone through the CONQUAS or QLASSIC assessment and the type of development is uniform for the sample being selected.

Research instruments for data collection

The research instruments consist of four (4) sections, section A, B, C and D. The researches instruments consist of questions covering the demographics, respondent background, section B, respondent satisfaction of the workmanship quality of the houses they purchase and section C, on their additional comment for feedback.

Section A

The first part covered the background of the respondent which consisted of the certain background details of the respondents. This part was designed to gather basic background details of the respondents and their property purchased such as respondent status, age range, tenancy / own house type and respondent occupations. This provided information will be vital in determining respondents’ experience with their houses and thus correctly assessing the satisfaction level of the purchasers to the houses they are purchasing.

Section B

This form the most important part in the questionnaires where respondents were asked to indicate their satisfaction level on the experience with their houses and thus correctly assessing the satisfaction level of the purchasers to the houses they are purchasing.

Sample Size

A questionnaire survey was conducted to collect the required data directly from the home owners where stratified samples were then randomly selected from newly handover keys developments under namely East Ledang Phase 4B1, East Ledang 4B2, IOI Phase 3A and IOI Phase 6B03. The criteria for selection of this project is based on the project which were within 6 months of handover period from the date of the research was being conducted. Hence, during this period, there will be a lot of interaction between household owners with the customer service department in settling defect complaints exist within the 24 months defect liability period (DLP). During house hold owners came to the customer service department for settling their concerns, the questionnaires were distributed to the owners to be filled up and return to the customer service after filled up. A total of 150 householders were randomly distributed with the questionnaires through the project handover / customer service department during the sampling period of the questionnaires. The number of questionnaires sample distributed will meet the minimum requirement of sample size required as defined by the [22].

For this research, determination of sample size is referring to [13].

According to the [13] table in the population for 196, total minimum sample size of respondents is equal 132. Table 7 illustrate a part of Morgan’s table for determining sample size from a given population.

Table 6 Defects Grouping Guide for Internal Finishes CONQUAS & QLASSIC

<table>
<thead>
<tr>
<th>Elements</th>
<th>Defects Grouping</th>
<th>Defects Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor Wall/ External wall</td>
<td>Finishing</td>
<td>Stains, Painting/ Coating Defects, T Dobility, Patchy &amp; Roughliness</td>
</tr>
<tr>
<td></td>
<td>Alignment &amp; Evenness</td>
<td>Alignment, Unevenness, Squareness</td>
</tr>
<tr>
<td></td>
<td>Crack &amp; Damages</td>
<td>Crack, Chipping, Dent, Scratches</td>
</tr>
<tr>
<td></td>
<td>Hollowness / Roughness</td>
<td>For internal wall (Hollowness)</td>
</tr>
<tr>
<td></td>
<td>Jointing</td>
<td>Joints, Pointing</td>
</tr>
<tr>
<td></td>
<td>Finishing</td>
<td>Stains, Painting/ Coating Defects, Patchy &amp; Roughness</td>
</tr>
<tr>
<td></td>
<td>Alignment &amp;</td>
<td>Appearance of the ceiling levelling</td>
</tr>
<tr>
<td>Ceiling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evenness

Crack & Damages

Roughness

Jointing

Joints & Gap

Alignment & Evenness

Material & Damages

Functionality

Accessories

Defects

Crack, Chipping, Dent, Scratches

Rough surface

Joints, Pointing

Joints, Gap etc, too big, Inconsistent, Improper Seal

Appearance of the door/window/component /M&E level

Crack, Chipping, Dent, Scratches, Sag, Warp

Movement, Functionality, cannot be opened or closed properly, Loose

Missing items, Improper Fixing, Stains, Corrosion, Other damages

RESULTS AND DISCUSSION

The source of data collection for this research was through self-administered of survey questionnaires in the study area. Data...
collection method will be based on the survey distributed to the specified homeowner as determine in the case studies. This study will determine the customer satisfaction level of the homeowners based on the quality of houses with respect to the CONQUAS/QLASSIC element. This element will be in the form of Floors/Wall/Ceiling/Door/Window/Component, M&E and External Wall. Instruments used for questionnaires is valid since it adopts the establish elements according to CONQUAS and QLASSIC assessments. These standards will follow the CONQUAS standard, revision 8 as released by Building Construction Authority (BCA) Singapore and CIS 7: 2006 for QLASSIC as released by Construction Industry Development Board (CIDB) Malaysia. Reliability of the questionnaires will be tested using the Cronbach-Alpha tools which will determine the stability of the questionnaires being developed will address to the data being collected. In this research, reliability test was used in order to find the stability of the data collection. Cronbach’s coefficient (α) provides an indication of the average correlation among all the items that make up the scale. Values range from 0 to 1 with higher values indicating greater reliability. Cronbach’s α of value 0.65 to 0.95 is satisfactory. The following Table 9 summarizes the of value with higher values indicating greater reliability. Cronbach’s α provides an indication of the average correlation from the data collection. Cronbach’s coefficient (α) provides an indication of the average correlation among all the items that make up the scale. Values range from 0 to 1 with higher values indicating greater reliability. Cronbach’s α value relative to the items in the questionnaires for Customer Satisfaction questionnaires.

The result of α = 0.847 which indicate scale used for the present study is considered as highly reliable to measure customer satisfaction.

A total of 77 questionnaires were usable as the rest was incomplete. It was found that the majority of the respondents are middle-aged (between 31 – 50 years). Detail of the demographics for the respondent can be referred to table 10.

After establishing the goodness of data, the descriptive statistics including: measures of central tendency and dispersion (including Mean and standard deviation) have been obtained for the items of this study. Descriptive statistics of constructs in the model can provide insights regarding the perception and subjective response of participants for each given construct. The result of descriptive analysis is shown in table 11.

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable Name</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONQUAS</td>
<td>Ceiling</td>
<td>37</td>
<td>3.7877</td>
<td>.6157</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>77</td>
<td>3.9766</td>
<td>.6398</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>77</td>
<td>3.9636</td>
<td>.6623</td>
</tr>
<tr>
<td>QLASSIC</td>
<td>Ceiling</td>
<td>37</td>
<td>3.61848</td>
<td>0.6953</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>77</td>
<td>3.59845</td>
<td>.6626</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>77</td>
<td>3.59845</td>
<td>.6626</td>
</tr>
</tbody>
</table>

The t-test analysis was conducted to determine whether there is a difference in customer satisfaction level for housing projects after completed CONQUAS assessment against the project after completed the QLASSIC assessment.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20 and below</td>
<td>13.0</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married with Children</td>
<td>15.6</td>
</tr>
<tr>
<td>Formal Education</td>
<td>College</td>
<td>32.5</td>
</tr>
<tr>
<td>Occupation</td>
<td>Teaching</td>
<td>11.7</td>
</tr>
<tr>
<td>Income</td>
<td>RM 24,000 and below</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Table 10 Descriptive statistical analysis

The t-test analysis was conducted to determine whether there is a difference in customer satisfaction level for housing projects after completed CONQUAS assessment against the project after completed the QLASSIC assessment. The t-test analysis was conducted to determine whether there is a difference in customer satisfaction level for housing projects after completed CONQUAS assessment against the project after completed the QLASSIC assessment. The statistical result, as shown in Table 12 indicated that the customer satisfaction level for project using CONQUAS assessment is higher compared to QLASSIC assessment. In summary, the different between QLASSIC-based assessment and CONQUAS-based assessment in regards to customer satisfaction, was significant (t= 2.34, df = 75, p = 0.022) which stated for the satisfaction for the CONQUAS is higher than the QLASSIC projects.

<table>
<thead>
<tr>
<th>Element</th>
<th>CONQUAS</th>
<th>QLASSIC</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>3.9575</td>
<td>4.0270</td>
<td>0.64251</td>
<td>75</td>
</tr>
<tr>
<td>Wall</td>
<td>3.8779</td>
<td>3.9636</td>
<td>0.60839</td>
<td>75</td>
</tr>
<tr>
<td>Window</td>
<td>3.7400</td>
<td>3.7584</td>
<td>0.58349</td>
<td>75</td>
</tr>
</tbody>
</table>

To understand further on the contribution of the important elements within CONQUAS or QLASSIC, further tabulation of the mean analysis was conducted from the survey obtained. The intention of this analysis is to specify which element usually customer will be less satisfied whenever they receive their keys. This analysis is shown in the above table. From this analysis, floor and wall elements are seen as the key elements which contribute the most to the lower satisfied score as both of them scored the lowest among all other elements. For example, for QLASSIC, floor scored at 3.57 and wall at 3.74 respectively.
For CONQUAS, floor scored 3.96 (only element below 4) and wall at marginally 4.02 (slightly above 4). The significant of this result is consistent with the finding reported by [23] which stated that floor and wall are the most defective, accounting for 63.69% of the defects. Defect group is related to finishing, alignment, evenness and joint and gap. These types of defects have been asserted by [23] that is strongly associated with poor workmanship quality. Therefore, workmanship quality should be enhanced to reduce building defects and improve the quality of provided house.

CONCLUSION

CONQUAS or QLASSIC both are systematic tools to measure the level of defects in completed housing before they are being handover to the purchasers.

Through their assessments, important elements, such as wall, floor, ceiling, door, window, component, M&E, external wall and external works are inspected to ensure less defects exists, or have been rectified at no cost. However, due to lack of awareness by the developers as well as home buyers, the house defects are less and dissatisfaction when the houses are fully laden with defects. These findings advocate previous findings established by [1,2] and [20] that the occupants’ satisfaction level has a relationship with their house conditions.

So this research question is to compare is there any difference in the satisfaction level for CONQUAS / QLASSIC assessed projects. In order to answer the Research Objective 1; the t-test analysis was used to identify the significant level between the customer satisfaction data from the QLASSIC assessed project and CONQUAS assessed project.

Based on the result, this study emphasizes that there is significant difference in the customer satisfaction level (p = 0.022 < 0.05) which indicate for significant difference in the customer satisfaction level.

This positive effect of customer satisfaction level for projects which adopted the CONQUAS assessment in comparison to the QLASSIC assessment is reflective of the theory put forward by [19] which quoted as saying “CIBD Malaysia provides QLASSIC assessment at no cost. However, due to lack of awareness by key and confidence in QLASSIC, only few developers have engaged CIBD to assess the quality of their projects using QLASSIC”. In contrast, CONQUAS is more widely recognized and accepted by developers and contractors in the country [19].

This explains why the CONQUAS will be much more preferred assessments among developers compared to QLASSIC. Lack of awareness and confidence in the QLASSIC standards maturity may be one of the factors which explain the difference in the customer satisfaction level itself. Furthermore as stated by [12], CIBD Malaysia introduced QLASSIC – Construction Industry Standard (CIS) – CIS 7:2006 which is adapted from CONQUAS Singapore to be suite into Malaysia’s construction industry. Thus, CONQUAS is seen more mature standard compared to QLASSIC. [3] stated that there are 2 types of quality measurement system namely the QLASSIC and CONQUAS which possess similar evaluation system, however CONQUAS is more popular in usage.

Detail analysis shows that floor and wall elements are seen as the key elements which contribute the most to the lower satisfied score as both of them scored the lowest among all other elements. The significant of this result is consistent with the finding reported by [23], which stated that floor and wall are the most defective, accounting for 63.69% of the defects. Defect group is related to finishing, alignment, evenness and joint and gap. These types of defects have been asserted by [23] that is strongly associated with poor workmanship quality. Therefore, workmanship quality should be enhanced to reduce building defects and improve the quality of provided house. In conclusion, with reduction in defects in the wall and floor will directly improve on the customer satisfaction of the occupant owners.

As [19] quoted, CONQUAS is more recognized and accepted by developers as well as home buyers. She further quoted by Chow Chee Wah, Managing Director of Gamuda Land Bhd [10], “As a pioneer for the implementation of CONQUAS for landed properties, we are not only setting the trend for ourselves but also for the industry. We are always thinking about the benefits for our purchasers with the aim to constantly provide a higher standard workmanship as well as better quality buildings.

Developers have started using CONQUAS as a measure of quality to promote and market their projects. It is common for developers to specify target CONQUAS scores in their construction contracts for their contractors to achieve. CONQUAS can be considered to be an effective tool that the local construction industry can adopt in order to achieve higher quality standard in building projects.

The objective of the research has been achieved based on the literature review from articles, journals and books; finding from questionnaire survey; and analysis results. This research has answered the question on CONQUAS assessment will be evaluated as better and more popular among the developers to be implemented in their projects. This is in support of the [19] theories of CONQUAS will be more widely practiced among the property players in Malaysia. This is mainly due to maturity for the CONQUAS standards already in the market longer enough compared to QLASSIC assessment standard introduced by CIDB. CONQUAS already long established provides consistencies in the evaluation method thus gives confidence in the developer to engage their assessments will fairly produce consistent results according to the actual feel of the quality level.

References:


