Risk Associated with the Use of Software’s For Quantity Surveying (QS) Practces in South West Nigeria

Aiyetan, A. Olatunji

Abstract
Risk which is uncertainty in any activity should be should be identified and mitigated for safe execution of the activity or task, because it can adversely affect it. The aim of the study is to assess risks associated with the usage of software’s for QS practices. The study was conducted in Western part of Nigeria, specifically in Lagos. Respondents for the study were quantity surveyors. Random sampling technique was employed in the selection of samples. A total of twenty-six questionnaires were analysed for the study, Descriptive statistics was employed for the analysis.

Findings include that the most used software’s for QS practice are master bill and QS Cad. The factors with high risk rating are, incompatibility of software’s, lack of first hand experts, and virus attack. The factors with high impact of risk relative to software’s used for QS practice are, laziness and capable of making professionals redundant/Redundant. Recommendations include the mandatory use of QS software’s for practice and submission of QS documents. Training should be given to professionals relative to the functions and choice of software’s for QS practices.

Keywords: Practice, quantity surveyor, risk, software

Introduction
Risk can either make or destroy a firm. Risk is a thing firms do not want to undertake because the outcome is uncertain. Risk is defined as uncertainty Chapman (2014). Software are written packages to assist in performing certain specific task. There are pros and cons associated to the use of software packages to perform tasks. Software are install on computer for this purposes. Computer and software perform work faster, efficiently, accurately, and neatly. Though, it is what is captured that will be processed.

Computers and software have ushered into our work environment a change in the way of doing work (traditional). This change from the traditional way of doing work is also referred to as the manual method of work order. This is labourious, time consuming and inefficient. According to Hore (2006), the application of information Communication Technology in construction has been sporadic and piecemeal.

At the Technological age, it will be inappropriate to remain in the traditional method/way of doing work. There will be no competition internally and internationally, no sharing of information within professionals in other parts of the world. Large projects are

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1 Department of Construction Management & QS, Faculty of Engineering, Sciences, and the Built Environment, Durban University of Technology, P.O. Box 1334, Durban, 4000, KwaZulu-Natal, SOUTH AFRICA. E-mail: ayodejia@dut.ac.za, Tel No. +27-74-8426297

2 Department of Construction Management & QS, Faculty of Engineering, Sciences, and the Built Environment, Durban University of Technology, P.O. Box 1334, Durban, 4000, KwaZulu-Natal, SOUTH AFRICA. E-mail: ayodejia@dut.ac.za, Tel No. +27-74-8426297
complex, there is therefore, a need for a change from the traditional method of doing work to the modern way through technology to handle complex project Van der Fort, (2009).

Despite all these advancements, there are risk associated with the use of software’s for QS practices and other professions. It is of importance to know these risks, to better prepare for them. This will afford successful delivery of project via the elimination of delays and cost increase on project. The reason for this study being initiated to identify risk associated with the usage of quantity surveyor’s software’s practices and to evolve strategy to mitigating them.

**Literature Review**

Before the 1990’s, type-writers were used for typing information’s and these are filed away on shelf’s for record keeping. Photocopying machine are used in conjunction with type-writers to reproduce small numbers of paper work. Large quantity of work are typed on stencil and are reproduce on a cycloxersing machine, while applying ink for the print. All other works were done manually, for example, in a QS firm taking of quantities are done manually and afterwards quantities are typed manually on standard form of paper for taking-off. A QS is a professional working within the construction industry concerned with construction costs and contract (Kulasekara et al., 2013) and (Cunningham, 2014).

The development of computer ushered in the use of Microsoft word and excels for the performance of quantity surveying practices, this was followed by the innovation of the internet. Computer and internet were developed based on the idea that a platform be created for individuals to instantly access professionals information and transfer it easily, overcoming the difficulty of the traditional method. This led to increase efficiency and performance of task. The introduction of software made work much easier to be perform faster and storing of information.

The Construction Industry is fragmented in nature with a lot of specialisations, which need to be coordinated to achieve the desired goals of cost, time, and quality relative to a project (Toole, 2003). Maqsood, Walker, and Finegan (2004) declare that construction projects demand heavy exchange of data and information among participants on a daily.

There are various specialist software’s packages that have being identified [Ken, (2010); Bazjanac, (2006), Nagalingam et al., (2013) and Khemlani, Papanichael and Harfmann , (2006)] for performing the array of tasks involved in the practices. These include:

- Autodesk Quantity Take-off.
- WinQS
- Vector
- CostX
- Develop
- Feasibility Estimate
- Cut and Fill
- Digico
- Ripac
- QsPlus
- Qs Cad
- Masterbill
- Building Information Model Software
- Microsoft Excel
Factors Promoting the Usage of Quantity Surveying Software in Nigeria

Disediakan, Mohd, and Ghazali (2001) identified the following factors to necessitate the use of QS software in Nigeria, namely:

- Increasingly sophisticated clients
- Increasingly collaboration
- Economic policies, and
- Changing trends in technology

Risks Associated With the Use of QS Softwares in Nigeria

Despite the fact that quantity surveying software’s make professional job easier, facilitates decision making, improve public image of firms and increased productivity through automated quantities and cost calculations, there are uncertainties identified as risk associated with the use of the software, which makes its use unreliable at times. Researchers, such as Oluwole (2010); Nuruden et al., (2012); have identified these risks. These are:

- Proliferation of Software Application.
- Virus Attacks.
- Project Information Discouragement.
- Health Risks.
- Incompatibility in Software Packages.
- Lack of Management Desire and Appreciation of Software.
- High rate of Obsolescence of Software.
- Capable of making Professionals redundant.
- Low Return on Investment.

Proliferation of Software Application

The production of software applications for estimating without due permission, constitute a risk to the product and the industry. Nuruden et al., (2010) states that proliferation of software applications for estimating practices is indeed a major risk. The risk inherent therein is, they may not perform well as they are supposed to be reliable and durable even at the long run. In most cases they do not accommodate changes made of some aspect of the software nasn improved on by the means of updating

Virus Attacks

Virus attack is a general and common phenomenon in the computer world. Virus arewritten programme that are harmful to the computer system. When this attacks occurs, the system may stop working. The solution to this is to install a powerful anti-virus on the system and to scan any document for virus attack before opening them.

Project Information Discouragement

The issue of data standards not being compatible with all application could be a factor that leads to discouragement in project information sharing. Nuruddeen et al., (2012) state this, especially when data are imported into a different file format. This result in poor communication of information among professionals
Lack of First-Hand Software Expert

The fact that most software used in Nigeria are imported is an indication that professionals lack first-hand or expert knowledge on the concept of their making and therefore knowledge of applicability could be deemed average. This affects the choice of one over the other relative to performance, reliability and other test factors. Oluwole (2010) states that to achieve appropriate business objectives, estimating practices have to make a lot of risky decisions in choosing what applications will be appropriate for the firm in the short, medium and long term scenario for combination of application for specific tasks.

Health Risk

There are health challenges that researchers have identified, which are related to computer usage. These include, monitor glare causing headaches, a burning sensation in your eyes, temporarily blurred vision. Long sitting at workplace can cause spinal problem.

Incompatibility in Software Packages

ISO/IEC 25051:2014 and 20282-1: 2014 recommends objective framework for selecting appropriate software packages. During the process of selecting most software, the choice are not based on these recommendations and these ultimately creates problem in the short run. Due to this neglect, the problems overlooked based on these are interoperability, portability, and flexibility.

High Rate of Obsolescence of Software

It is of interest to note that on a daily basis improvements are being made on existing software. The rate at which the existing software become obsolete as a result is alarming, requiring that software need to be updated frequently and those that have not the facility will have to purchase another one. This could lead to stoppage of work or abandonment as a result of non-availability.

Lack of Management Desire and Appreciation of Software

This may be as a result of problematic experience management has had relative to the use of software’s. The lack of adequate training in the use of these software’s may result in erroneous result and the resultant loss of job, cost increases that will put the firm in a bad Secondly these software’s get outdated too quickly and may be another reason. This may lead to management lack of desire for their usage.

Capable of Making Professionals Redundant

This factor has dual function. Firstly as risk associated with the use of QS software’s and secondly as an impact relative to QS software’s application in organisation. It is better discussed as an impact factor.

Low Return on Investment
The cost of this software’s are very high. It is an organisation that securing job steady can afford them. That kind of organisation that is always out of job may not be able to purchase them for use.

**RISK IMPACTS ASSOCIATED WITH THE SOFTWARE APPLICATION ON PROJECT DELIVERY**

Some identified risk impacts relative to application of QS software on project delivery are discussed below.

*Project Failure or Delay*

Project may experience failure or delay in the delivery as a result of virus attack on software. Vital information may be loss and result into these. Aiyetan, Smallwood, and Shakantu (2011) declare that delay is an occurrence non of the parties to a contract is interested in. There are negative ripple effect of delay on client, consultant, and contractor. Further, Saleh, Abdelnaser and Abdul (2009), says that delay is one of the major problem faced by construction firms.

*Wrong Budget Estimate*

In the instance that most software used for estimating and tender analysis rely o manual capturing of input, there is the likelihood of making mistakes and producing a wrong budget estimate Oyediran (2011). This culminates in counter –productivity.

*Capable of Making Professionals Redundant*

The introduction of computer and robots into our working environment has resulted in increase in productivity. Computers as it is being said can perform the function of many individuals put together more efficiently and faster. Computers can perform the following functions: production of drawings, making structural analysis, carrying Out cost and time calculations and store and manage construction information Isikdag (2006) cited in Isikdag, Underwood, Kuruoglu, Goulding, and Acikalin (2009)

*Laziness*

Software introduced laziness in professionals. The exercise of multiplication, summation, subtraction and other paper work has being eliminated with the use of software that does the work faster and more accurately.

**Research Methodology**

The objectives of the study are to identify risk factors and impact associated with the use of software’s for QS practice. The scope of the study is relative to software’s used for QS practice. A quantitative research approach was used for the study. A questionnaire survey was conducted. The sample frame consist of registered QS firms with the Nigerian Institute of Quantity Surveyors, in Lagos State. The number of registered firms in Lagos state is 95. The sample size is 30. Twenty-six (26) questionnaires were returned filled representing 87%
response rate. Some criteria were set for the selection of firms. Principal among them are years of establishment firm and number of projects handled by firm. Sample size was determined by a formula given below as:

\[
n = \frac{N}{1 + N (e)^2}
\]

Equation (1)

Where: \( e \) = level of precision (15%) = 0.15; \( N \) = total population, and \( n \) = Sample size

Based on this formula, the sample size was found to be 30. Random sampling techniques was used for the selection of samples for the study. The data obtained were analysed by the mean score statistical tool and interpreted on the following measurement scales. For Table 1, 1 = not used and 5 = most used; Table 2, 1 = minor and 5 = major influence; Table 3, 1 = low and 5 = very high risk, and Table 4, 1 = low and 5 = very high impact. On the characteristics of firms surveyed, predominantly (100%) firms have being established over five years and above and have handled not less than eight sizeable (Medium and large) projects were surveyed. Based on these it can deem that firms are well experienced and knowledgeable in construction and their responses can be relied on.

**Data Presentation and Analysis**

This section presents the data for the study and analysis.

<table>
<thead>
<tr>
<th>S/No</th>
<th>Softwares</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spread sheet (Microsoft Excel)</td>
<td>5.00</td>
</tr>
<tr>
<td>2</td>
<td>Word processor (Microsoft Word)</td>
<td>5.00</td>
</tr>
<tr>
<td>3</td>
<td>Master bill</td>
<td>2.54</td>
</tr>
<tr>
<td>4</td>
<td>Qs Cad</td>
<td>2.38</td>
</tr>
<tr>
<td>5</td>
<td>Qs Elite</td>
<td>1.62</td>
</tr>
<tr>
<td>6</td>
<td>Ripac</td>
<td>1.46</td>
</tr>
<tr>
<td>7</td>
<td>Computer Aided taking off (CATO)</td>
<td>1.42</td>
</tr>
<tr>
<td>8</td>
<td>Building Information Model Software</td>
<td>1.39</td>
</tr>
<tr>
<td>9</td>
<td>Win Qs</td>
<td>1.27</td>
</tr>
<tr>
<td>10</td>
<td>Computer Aided Estimating (CAE)</td>
<td>1.27</td>
</tr>
<tr>
<td>11</td>
<td>Qs Plus</td>
<td>1.23</td>
</tr>
<tr>
<td>12</td>
<td>Vector</td>
<td>1.15</td>
</tr>
<tr>
<td>13</td>
<td>Digico</td>
<td>0.92</td>
</tr>
<tr>
<td>14</td>
<td>Cost X</td>
<td>1.12</td>
</tr>
</tbody>
</table>

Table 1 presents the extent of usage of software’s in quantity surveying firms. There are two software’s having the same rating, which are the most used, they are: Microsoft excel and Microsoft word (MS=5.00). This may be due to their relative cheapness, availability, versatility, and simplicity in usage. This is followed by master bill (MS=2.54) and next to it is QS Cad (MS=2.38).

The least use software is Digico (MS=0.92) followed by Cost X (MS= 1.12) and Vector (MS=1.15). The likely reason for their low usage is lack of their operating and functions knowledge.
Table 2: Factors that Necessitate the Usage of Quantity Surveying Software

<table>
<thead>
<tr>
<th>S/No</th>
<th>Factors</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Changing trends in technology</td>
<td>4.85</td>
</tr>
<tr>
<td>2</td>
<td>Increasingly sophisticated clients</td>
<td>4.16</td>
</tr>
<tr>
<td>3</td>
<td>Level of competition</td>
<td>4.12</td>
</tr>
<tr>
<td>4</td>
<td>Increasing collaboration</td>
<td>3.79</td>
</tr>
<tr>
<td>5</td>
<td>Economic policies</td>
<td>3.67</td>
</tr>
</tbody>
</table>

Table 2 presents factors necessitating the usage of quantity surveying software. Changing trends in technology (MS=4.85) is the most important factor that necessitates the usage of quantity surveying software’s due to the fact that the introduction of these software’s is being viewed as an important strategic tool towards making the firm more efficient, profitable and competitive. Software application reduces the time for data processing and communicating information, and improves communications for effective decision making and coordination among construction participants to enhance construction productivity. Next in rating is increasingly sophisticated clients (MS=4.16). This could be as a result of client’s becoming more sophisticated as a result of their changing taste and need for project information. Next is level of competition (MS=4.12). Many large Nigerian Quantity Surveying firms are looking towards the export of their construction management skills. To compete internationally, the standard of work must be equal to what is obtained internationally.

The least of the factors necessitating the usage of QS software’s is Economic policy (MS=3.67). When exchange rate is high, and policies of the government does not favour the importation of certain goods and requires that they be developed internally, it may not drive the usage of these software’s.

Table 3: Risk Associated with the Usage of Quantity Surveying Software

<table>
<thead>
<tr>
<th>S/No</th>
<th>Risks</th>
<th>Mean Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Incompatibility in Software packages</td>
<td>3.65</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Lack of first hand expert</td>
<td>3.54</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Virus attack</td>
<td>3.19</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Proliferation of software application</td>
<td>2.96</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Poor response to in house training</td>
<td>2.96</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>High rate of obsolescence of software</td>
<td>2.81</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Capable of making professionals redundant</td>
<td>2.62</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Project information discouragement</td>
<td>2.50</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Low return on investment</td>
<td>2.38</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Health risks</td>
<td>2.08</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 3 reveals the risk associated with the usage of QS software’s. Incompatibility in software packages (MS=3.65) has the highest risk associated with the usage of QS software’s. These is software’s are imported. There is no body regulating the use of them for practices, therefore each firm selects their software’s based on preference and operating knowledge. This then results in firms using different types of software’s and firms cannot work in other firms or work on documents from other firms due to issues of incompatibility of software’s. Next to these is lack of first hand expert (MS=3.54). This is relative to choice
of software vis-a-vis the tasks they perform. There are no expert to give educate to firm as to which software suits a particular task. This constitute a limitation to maximise the enormous benefits that can be derived from their use. Next to this factor is virus attack (MS=3.19). Since these software’s are only consumed in the country, the technology of protecting them adequately is not is not at hand. Therefore, they are exposed to virus attack. These firms may not have capable antivirus install on their systems to protect and maintain them. These may be the reasons for these softwares getting attacked quickly.

The least factors that indicates risk associated with QS software’s usage is results in health challenges. The risk factor associated to this is low probably as a result of constant breaks users take from working with computers. This is followed by low return on investment (MS=2.38). Any organisation purchasing QS software for work practices must have weighed the benefits and disadvantages anf have taken a decision that will least affect the organisation because they are expensive and requires a number of project running in order to breakeven from such purchases, and project information discouragement (MS=2.50) in most cases workers haing the operating knowledge of these software’s are those that handle them, therefore the risk from this factor is low.

Table 4: Impact of Risk Associated with the Usage of Softwares in Quantity Surveying Firms

<table>
<thead>
<tr>
<th>S/No</th>
<th>Impact</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Laziness</td>
<td>2.81</td>
</tr>
<tr>
<td>2</td>
<td>Capable of making professionals redundant</td>
<td>2.62</td>
</tr>
<tr>
<td>3</td>
<td>Wrong budget estimate</td>
<td>2.42</td>
</tr>
<tr>
<td>4</td>
<td>Project failure</td>
<td>1.69</td>
</tr>
<tr>
<td>5</td>
<td>Project Delay</td>
<td>1.65</td>
</tr>
</tbody>
</table>

Table 4 indicates the perceived impact of risk associated with the usage of software in quantity surveying firms in Nigeria. The factor that has the most impact stemming from the risk associated with the usage of QS software’s is laziness (MS=2.81). Professionals rely heavily on these software’s to perform their tasks with minimum imput from them, this tends to makes them lazy. Next to this factor is capable of making professionals redundant (MS=2.62). This is as a result of the capability of each software being able to perform the work of more than one professional, faster, accurately, and neatly.

The least impact of risk as a result of QS software’s usage is project delay (MS=1.65). Though the least, but has some level of influence.

CONCLUSION

Based on the analysis of data, the following conclusions were made:

- The most used software’s for office practices are: Microsoft word and Excel, while for QS practice are: master bill and Qs cad. Win Qs is gradually gaining popularity in Nigeria.
- The factor that most necessitate usage of QS software’s is changing trends in technology
- The factors with very high risk rating associated with the usage of QS software’s are, incompatibility of software’s, lack of first hand experts, and virus attacks.
- The highest impact of risk relative to the usage of QS software’s is laziness induced on professionals.
RECOMMENDATION

The following measures should be given adequate attention to mitigate risk associated with the usage of QS software’s:

- The government should make it mandatory for the submission of Bill of quantities and other document using QS software’s.
- Training should be give professionals through workshops relative to the functions, choices, and antivirus of QS software’s. This will safeguard the system and software’s.
- Professionals should be familiar with the traditional method of work order before using the software’s. It will mitigate errors to a large extent

REFERENCES


Oyediran, O. S., and Akintola, A., 2011. A survey of the state of the art of e-tendering in Nigeria. 30-31


