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On Ensuring Total Quality of Computer Audits

Adekoya, Adebayo Felix and Kayode and Olayinka Ayo
Department of Computer Science, University of Agriculture, Abeokuta, Nigeria

Abstract: This study examines the process and technique of computer audits with a view to determining their quality as it affects the overall organizational performance. It assumes that quality is related to fulfilling the expectation of such audit. It proposed that entrenching total quality management strategies would further ensure the attainment of a healthy computer audit report. Two methods were used in the study; opinion evaluation and a TQM-based computer audit program. The results obtained showed clearly that a TQM-based computer audit program would enrich computer audits and thus increase confidence in computer-based information management systems.

Key words: Quality, total quality and computer audit

INTRODUCTION

Computer auditing is a branch of general auditing concerned with governance of the use of computer-based applications to store, process and generate business information. Specifically, this information must be seen to be reliable, accurate and valid to attract decision-makers reliance on them. Computer auditing therefore involve the assessment of computer hardware and software with a mindset of determining the degree of conformity of the actual with the expected performance. This is done with the aim of providing adequate and continuous guide and direction towards the efficient and effective operations of the computerized system.

However, the quality of any computer would determine to a great extent, management, staff and costumers reliance on the computerized system to adequately serve their information need. Succinctly put, reliability requires that the process of computer auditing and the resulting audit report should possess high degree of information value in terms of quality and accuracy. According to Crosby (1984), quality is conforming to the agreed performance requirements, and is the totality of characteristics of an entity that bear on its ability to satisfy stated and implied need. It also reflects on the *efficiency* (doing the right task, the right way at the right time) and *effectiveness* (meeting stated requirements or expected performance).

With the rising wave of threat to safety of information resources, there is the need to devise a reliable means of safeguarding assets, maintain data integrity, and achieve organizational goals effectively with efficient resources utilization. Businesses are more than ever conscious of the need to improve the security of their computer systems and the information contained in them. In such scenario the quality of computer auditing would be of great concern to all. This is because computer auditing is concerned with giving the business a health-risk free report.

The goal of this study is to find out the reliability of the conventional computer audit techniques or otherwise. It also aims to propound the application of total quality management in the computer audit process. This is with the aim of strengthening the quality of the computer audit report.

Conceptual basis and theoretical background: Computer audit involves finding and recording highly technical observations about the operational efficiencies of an organization's information resources and equipment. These include general observations on how information is handled by people within the organization and also the structure of the organization. This is done with a view to ensure that audit findings are incorporated in the operational guidelines.

As organizations manipulate and store critical business information, there is increased need for information retrieval for arrays of users located at different locations within or outside the organization. This creates security and control issues, which require adequate attention. The resulting security and control measures must protect and safeguard the information resources from unauthorized usage, accidental modification, damage, destruction and disclosure of information.

Over the years computer systems have been used to support critical business operations. However, there is an increasing trend of system threats to disclosures of information, system disasters and increasing fraud. These

Corresponding Author: Adekoya, Department of Computer Science, University of Agriculture, Abeokuta, Nigeria

associated risks of computerization projects are now being view as critical part of enterprise governance, thus making the regulatory environment to tighten control measures over the information resources. In addition electronics commerce has further exposed the need for management to have control measures over computer-based commercial transactions. To attain the goal of computer audit, management must ensure that the various techniques and processes involved are highly objective. This ensures the creation of an enabling environment for performance evaluation of the computer audit (process and technique).

It must also be hinged on the quality triology; quality planning, quality control and quality improvement as proposed by Juran (1989). Juran's quality triology is based on Crosby (1988) assertion that application of quality in organizations would reduce wastefulness and inefficiencies and that it leads to commitment that tasks will always be done the right way the first time and every time.

Total Quality Management (TQM) is a system of continuous improvements employing participative management, centered on the needs of customers (Jurow and Barnard, 1993). TQM is an approach to improving the competitiveness, effectiveness and flexibility of a whole organization. It is essentially a way of planning, organizing and understanding each activity, and depends on each individual at each level. The concern is moving the focus of control from outside the individual to within, the objective being to make everyone accountable for their own performance, and to get them committed to attaining quality in a highly motivated fashion. Oakland (1998). The focus is on changing attitudes and skills so that the culture of the organization becomes one of preventing failure. Key components of Total Quality Management (TQM) are employee's involvement and training, problem solving teams, statistical methods, formulating and implement long-term goals, recognition systems that lead to efficiencies.

Computer Audit can benefit from Total Quality Management through:

- Breaking down inter-departmental barriers; others outside the computer department are allowed to be part of the computer audit team.
- Redefining the beneficiaries of computer audit services; users of the computer audits must be clearly identified and also their expectation must be clearly stated. Computer audits must meet the need of management, staff, clients and legal requirements.
- Reaching a state of continuous improvements due to organizational, industrial and environmental dynamics.

A TQM integrated computer audit should focus on continuous quality control improvement in computer audit process, and be willing to change its processes towards total quality improvement. To determine if changes need to be made, computer auditors must answer a number of questions, such as, what are our core business targets and as well our computer audit targets? What is the efficiency level of the computerization process? How can this efficiency be improved upon? How best can the computerization projects serve its users? (Martin, 1993).

Objectives of the study: The prime goals of computer audits include ensuring that computer based financial information systems are reliable and protected against fraud and misuse. The aim is to provide the management with an independent and objective opinion on the state of internal control. The overall objective of this study is to ensure the application of Total Quality Management in preparation, implementation and evaluation of computer audits. Succinctly, the study examines

- The overall contribution of computer audits to the organizational goals and objectives; and
- The possibility of a TQM-based computer audit with a view to improve the whole audit process and thus strengthen the confidence level in the audit report.

MATERIALS AND METHODS

The research methods adopted for this study include the combination of survey and experimental researches. The survey entails the use of a structured questionnaire with a view to elicit pertinent data about the audit procedure and their expectations from computer auditors and users of computer audit services. The experiment involves designing and testing of TQM-based audit software.

Population and sampling: The study focused on the Nigerian banking industry. The sample for this study is one of the big five bank in the Nigerian banking industry in terms of asset base, customers deposit and stock valuations. The bank's operation is running on GLOBUS package and database is centralized with the main computer server at the head office.

Table 1: Distribution of respondents

Category of staff	No of staff
Management	4
Information technology	8
Audit	8

Table 2: Scheme for scoring questions

S/N	Question No.	Yes	NO	(i)	(ii)	(iii)	(iv)	(v)	Total marks	TQM based exptd score
1.	7	5	0	-	-	-	-	-	5	5
2.	10	0	5	-	-	-	-	-	5	5
3.	11	5	0	-	-	-	-	-	5	5
4.	15	-	-	0	0	0	0	5	5	5
5.	16	5	0	-	-	-	-	-	5	5
6.	17	-	-	2	3	0	5	0	10	10
7.	18	10	0	-	-	-	-	-	10	10
8.	19	-	-	3	1	1	5	0	10	5
9.	20	5	0	-	-	-	-	-	5	5
10.	21	5	0	-	-	-	-	-	5	5
11.	22	5	0	-	-	-	-	-	5	5
12.	23	-	-	1	1	3	0	0	5	3
13.	24	5	0	-	-	-	-	-	5	5
14.	25	5	0	-	-	-	-	-	5	5
15.	26	5	0	-	-	-	-	-	5	5
16.	27	-	-	0	5	5	7	0	17	17
	Grand total	55	5	6	10	9	17	5	107	100

Research instrument: Two research instruments were designed in order to elicit and evaluate collected date. The first instrument is a questionnaire consisting of open-ended and closed-ended questions to obtain the opinion of personnel involved in computer audit about the conventional computer audit procedure. The respondents are required to supply information on the status of the current software in use for collection of the revenue item that is being tested. Table 1 gives the numerical distribution of the research instrument.

The second instrument is TQM-based computer audit software designed to test the control of the effectiveness of revenue collection in the area of Commission on Turnover (COT).

Data analysis technique: Data obtained from the respondents were scored using scoring scheme for the related questions. Generally, each set of questions carry 5 marks; more marks are allocated to some option of questions that are more directly related to TQM while only one question carries lesser mark. All the questions are generally directed towards expected Total Quality Management based Computer Audit. The related set of questions and the marks allocated to them are as follows: represent in Table 2

The TQM-based computer audit software checks the parameter sets for the collection of COT as against the expected procedure of collecting it. The parameters are the base rate and number of days in the year (366 days for leap year), classification of types of account (ensuring that only the COT chargeable accounts are considered) and transactions type (i.e. all transactions that attract COT are picked). The algorithm below illustrates the procedures involved in the TQM-based computer audit software.

Algorithm for the TQM-based computer audit program

Step 1. Open customer information file, customer-history file and Commission On Turn over (COT) file as input files.
Step 2. Open Output file and printing file
Step 3. Extract Customer No., Customer Name, COT Date, GLOBUS Turnover Amount, GLOBUS COT Rate and Glob us COT Amount from the files.
Step 4. Use Transaction Type in the History file to find the entire COT attracted Transaction Amount for each customer.
Step 5. Add all Transaction Amounts to give calculated Turnover Amount.
Step 6. Multiply calculated Turnover Amount by COT Rate (i.e. Management Standard Approved Rate) to give Calculated COT Amount.
Step 7. Compare GLOBUS COT Amount with calculated COT Amount to give Variance.
Step 8. Check Variance in 7 above:If Variance= Negative, Write to COT Undercharged Report file.
If Variance = Positive, Write to COT Over charged Report file.
If Variance = Zero, Write to COT Accurate-charged Report file.
Step 9. Store Customer No. Customer Name, COT Date, GLOBUS Turnover Amount, GLOBUS COT Rate, GLOBUS COT Amount, Calculated Turnover Amount, Approved COT Rate, Calculated COT Amount, Variance and remark in Output file
Step10. Print the result obtained in 9 above
Step11. Check End-of-Input file, at End GOTO 12,lse GOTO 3.
Step 12. Close all Opened files.
Step 13. Display 'End of Job'.
Step 14. STOP

The program compares 12 months COT computations using current operational procedures against the Total Quality Management principles. The COT was analyzed based on the following criteria:

Table 3:Result of the scored data from the respondents

S/N	Question No	Audit staff	IT and S staff	Mgmt staff	Total aggregra ted	%Tas
1.	7	25	10	20	55	2.75
2.	10	40	40	20	100	5
3.	11	40	40	20	100	5
4.	15	25	0	15	40	2
5.	16	40	40	20	100	5
6.	17	40	32	10	82	4.01
7.	18	80	80	40	200	10
8.	19	20	22	8	50	2.05
9.	20	40	40	20	100	5
10	21	40	40	20	100	5
11.	22	35	30	20	85	4.25
12.	23	4	4	4	12	0.6
13.	24	0	0	0	0	0
14.	25	0	0	0	0	0
15.	26	40	40	20	100	5
16	27	105	64	61	230	11.05
	Total	574	482	298	1354	66.71

Normal charge: COT- current procedure = COT-TQM software. *Interpretation of result:* This implies adequate collection.

Over-charge: COT-Current-procedure > COT-TQM software. Interpretation of result: This implies excess charges, which translate to refund.

Under-charge: COT-Current-procedure < COT-TQM software Interpretation of result: This represents shortfall of what is expected to be collected as COT, which might be due to procedural and handling error. Management is interested in this aspect since it has significant impact on the organization revenue and/or profit, and the overall performance of the organization.

RESULTS

The scores of the respondents are aggregated, averaged and analyzed are presented in the Table 3.

Table 3 indicates the aggregated cumulative total of scores for qualifying TQM available in the present audit system. It also indicates the percentage-aggregated scores vis-à-vis quality of TQM available in the present audit system.

Evaluation of TQM-based computer audit program: The data obtained from the present system are real life data files generated during operations for collection of an item of charges. i.e., Commission to Turnover. The data files, (Customer master file, History file and COT file), are taken in as input data files by the TQM based Audit program. The TQM-based Computer Audit program is aimed at making critical check on the efficiency and effectiveness of the already collected revenue item (COT) with a view to ensure the application of Total Quality Management (TQM) in the evaluation and provision of feedback, assurances and suggestions in Computer Audit. Therefore, the data of one of the branches for 12 months on COT are extracted, re-computed, aggregated and averaged on a monthly basis for comparison purpose. This is done using month-by-month percentage variance (increase) and consistency to justify whether the difference is spread over the referenced period of time or influenced by a jump increase in revenue of some few months. Thus, the cumulative average revenue figures from the present computer system and the expected figures computed by the TQM based Audit Software was compared.

Table 4 indicates comparison of revenue data collected by the existing audit software and data generated by the proposed TQM based audit software. They also indicate the cumulative total at the end of twelve months.

DISCUSSION

The proportion of the answers that are related to improved quality of TQM available in the present Audit system is 67.7% while all other benefits derived/accrued as a result of ensuring Total Quality Management in Computer Auditing process is 32.3% (i.e. 100-67.7%).

Therefore, it could be deduced that while some benefits are derivable from introducing Total Quality Management strategies in Computer Auditing process, quality of Computer Auditing is greatly enhanced thereby resulting to quantum improvement in the effectiveness and efficiency in the operational process and its modus operandi. There is a significant variance/increase in the average monthly revenue accrued to the organization after application of TQM based Computer Audit Software.

The hypothesis here test whether the introduction/application of TQM based Computer Audit Software has a significant positive (or enhanced) effect on the Computer Audit process and revenue accrued to the organization. It is to determine whether there is improvement after provision of means of application and sustaining strategies for ensuring Total Quality Management in computer audit.

Meanwhile, in the present system, such variances are sent to the respective branches by the computer auditors to be collected manually. The amount of shortfall vis-à-vis each customer is debited into his or her respective accounts (manual collection). However, application of TQM ideas will be very influential in this regard.

This implies that all the root cause of variance will be taken care of once and for all to ease off the stress of manual collection of these shortfalls, to save time and resources used in collection of these shortfall and to save

Table 4 : Comparison of revenue data collected by the existing audit software and data generated by the proposed tqm based audit software

Months	Revenue data of existing audit software (X1) (N Million)	Data of TQM based audit software (X2) (N Million)	Variance X2-X1 (N Million)	% Variance
1ST	2.697	3.809	1.112	41.23
2ND	2.925	3.731	0.806	27.56
3RD	2.906	3.771	0.865	29.77
4TH	2.949	3.800	0.871	29.54
5TH	2.996	3.800	0.804	26.84
6TH	3.132	3.690	0.558	17.82
7TH	3.224	3.764	0.540	16.75
8TH	3.192	3.845	0.653	20.46
9TH	3.275	3.886	0.611	18.66
10TH	3.284	3.941	0.657	20.01
11TH	3.197	3.828	0.631	19.74
12TH	3.220	3.861	0.641	19.91
Total revenue	36.997	45.746	8.749	23.64
Average monthly Revenue (A.M.R.)	3.08	3.810	0.73	1.97

Note:(%) Variance Is the Percentage of the Difference (Increase) Between the Results of the Proposed Software (X2) and Existing Software (X1) over Existing Software Result.I.e. X2-X1% X1

time and resources in monthly routine/repetition of audit process in a bid to efficiently and effectively collect the revenue item.

It was discovered that human error is always the main cause of variances in collection of revenue duly earned by the organization. Errors can be made during coding of programs that is used in calculating the revenue item and also by operations personnel while setting various parameters that determine the calculation of the revenue item by the software. The following are the various errors that result to variances:

- Wrong use of base rate approved by the management of the organization for calculation of interest rate,. i.e. using 366 days in place of 365 days and vice versa in the calculation of COT
- Wrong use of unapproved concessionary interest rate.
- Wrong classification of Account type, i.e using of savings account code in place of current account code.
- Wrong use of transaction code, which determines each transaction, attracts charges.

Implication of result on the organisation finances: The findings of the research on the basis of the underlined assumptions show that the revenue of the bank could, significantly, be improved by the introduction of Total Quality Management strategies in Computer Audit. It was discovered that Average Monthly Revenue (AVR) increased from N3.81 Million, which represent a variance in total revenue amounting to N8.749 Million over 12 months and also variance in average monthly revenue amounting to N0.753 Million. This gives an increase of 1.97% on monthly basis and a Total Annual Revenue increase of N23.64 Million.

However, the research is limited to approximate analysis (on short run) of immediate impact of introducing TQM in Computer Audit whish was tested on one of the revenue items., i.e. COT. The proposed strategies bring in efficiency and effectiveness in its collection, which if taken care of, will add to the extent of increase of contribution to revenue accruable to the organization profitability, proximately and ultimately.

The findings further revealed that the introduction and sustenance of TQM strategies in all process and procedures of Computer Audit could significantly improve the service, mode of operations and profit of an organization. Moreover, there would be improvement in the efficiency and collection of earnings duly earned if applied in all ramifications thereby eliminating wastage and reducing bottlenecks in the operations of the bank.

CONCLUSION

The objective of this research was to ensure Total Quality Management in the evaluation and review of the computer audit in business process. The study shows that the introduction of Total Quality Management strategies in Computer Audit has immediate and tremendous significant increase in revenue through mere improved efficiency and effectiveness in the collection of the revenue item. The findings thus suggest that improved revenue generation will be enormous when strategies for ensuring TQM in computer audit (the new developed TQM based Computer Audit software) is applied to all other revenue items of the bank.

It can therefore be concluded that gains or increase in revenue accruable to an organization through reduction or total elimination of losses of duly earned revenue, and leakage as a result of revenue collection ineffectiveness and inefficiency caused by non introduction of strategies

for ensuring TQM in computer audit, is significant enough to motivate the decision to introduce it. In addition to the above financial consideration, time, energy and resources are saved by elimination of wastages by doing it right the first time and always. Nigerian banks may, therefore, use these findings effectively for all aspects of their computer audit process.

Recommendations: This research has been able to emphasize the impact that introducing Total Quality Management in computer audit will have on revenue. Management must be committed to the principles of Total Quality Management and give support to its application to computer audit. Computer Auditors must ensure that the entire root causes of variance and shortcomings are corrected at source. There is need for establishment of a forum where computer auditors will meet the computer programmers to discuss various negative observations and ways to remove them completely from the system and offer suggestions on ways to move forward. There must be program of training and re-training of all members of staff to prepare them for the challenges inherent in their operations.

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