



## EMPLOYEES' ASSESSMENT OF IMPACT OF INFORMATION SYSTEMS ON OPERATIONAL EFFICIENCY OF INSURANCE COMPANIES

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### Abstract

*This study investigated employees' assessment of impact of information systems on operational efficiency of insurance companies. Specifically, the study drew cross-sectional data from insurance companies in Akwa Ibom state to examine the impact of transaction processing system, decision support system and office automation systems on operational efficiency of insurance companies. A total of 100 employees of insurance companies in Akwa Ibom state were sampled and used in the study and simple random sampling technique was used in selecting the participants who completed the self-structured questionnaire used in data collection for the study. One sample t-test was used in data analysis in the study. Findings indicated that the use of transaction processing system, decision support system and office automation system had significant impact on operational efficiency of insurance companies. It was concluded that information systems influenced operational efficiency of insurance companies and investment in training skilled workforce in information systems was the major recommendation.*

**Keyword:** Information systems; transaction processing system; decision support system; office automation systems; operational efficiency; t-test.

### Introduction

The deployment of information systems (IS) is critical to efficient organizational management (Setyowati, Widayanti, & Supriyanti, 2021). Like all organizations, insurance companies have engaged IS in the management of their operations to enhance their efficiency and productivity (Pearlson, Saunders, & Galletta, 2024). These systems can be used when establishing contact with prospective or existing insured, issuing proposal forms and policy documentation. IS are also used in the underwriting process, premium payment, investment projects appraisal, investment evaluation techniques, and claims reporting, identifying genuine or fraudulent claims, claims

payment or denials and maintaining contact with the prospective or existing policyholders. Furthermore, the data collected using these systems become information for stakeholders in the insurance industry for taking



informed decision making (Setyowati, Widayanti, & Supriyanti, 2021). Amongst the many IS applicable in the management of insurance firms are transaction support system, decision support system, and office automation system (Asif & Shaheen, 2022; Verma, 2022).

A well-defined and organised information system (IT), known as a transaction processing system, automates an organization's core functions (Stair & Reynolds, 2018). In terms of functionality, transaction processing systems gather, handle, and store information about business transactions in an organisation, including sales, purchases, payments, invoices, payroll, and the creation and receipt of orders (Alawamleh et al., 2012). When compared to manual procedures, transaction processing systems operate more quickly, methodically, and efficiently to accomplish the same tasks (Wang & Kogan, 2018). Therefore, to efficiently complete routine tasks that are well-structured, transaction processing systems substitute computer-based procedures for manual procedures.

An automated interactive system called a decision support system is made to increase human reasoning capacity to address particular unstructured decision-making situations (Verma, 2022). A decision support system, in particular, facilitates the decision-making process by offering pertinent data that allows decisions to be made with ease, speed, and accuracy. Additionally, decision support systems ensure that users have interactive access to processing media that they can use imaginatively to investigate a variety of options and obtain the information required to make a decision in response to an issue (Massaro, 2021). Decision support systems generally aid in decision making when computer data processing capability is required in accordance with human reasoning. Therefore, rather than automating decision-making, the primary focus of a decision support system is on its support function (Asif & Sandhu, 2023; Bokadarov et al., 2020). In other words, decision support system does not offer responses or impose a sequence of predefined analyses. However, decision support system offers the user a range of options to choose from in tackling a problem and finally take a decision (Rawat, Rawat, Kumar, & Sabitha, 2021).

Office automation system involves the use of different computers and suitable software packages to create, collect, store, manipulate, and relay information needed in an organization for efficiency (Ingole, Gharde, Lad, & Lambade, 2019). Thus, office automation system is characterized by raw data storage and electronic transfer of same as well as management of electronic business information. Fundamentally, Office automation system optimizes existing office procedures for efficiency using local area network, which allows users to transfer data, mail and voice across the network, as the backbone (Keke, Egerega, & Emeyazia, 2021). Office automation system allows for fast accomplishment of variety of task eliminating the need for large number of employees while leveraging on less data storage requirement and the flexibility of multiple updates of data possibility by multiple people in the event of change in schedule (Nan, 2021).

Notwithstanding the vast significance of IS in the efficiency of insurance firms, extant literature lacks empirical studies on the integration and applicability as well as operational support of IS in the insurance sector. It is against this background that this study seeks to ascertain the impact of IS on operational efficiency of insurance companies drawing evidence from insurance companies in Akwa Ibom State, Nigeria. Specifically, the study examines the impact of three IS namely - transaction support system, decision support system and office automation system - on operational efficiency of insurance companies.

### **Information Systems and Performance: Review of Empirical Literature**

Sun and Kong (2023) investigated the impact of IS on organizational performance in using cross-sectional data elicited from the use of structured questionnaire from 200 employee of 31 firms in Pakistan.



Results from the regression analysis applied showed a significant positive relationship between management IS and organizational performance. The authors recommended a full automation of business processes to maximize the firm performance.

The study conducted by Ladan Shagari et al. (2017) aimed to examine the correlation between the IS quality measures and the efficiency of accounting IS. System and information quality were the quality measures taken into consideration in the study. Data were gathered from 287 respondents who worked for deposit money banks in Lagos, Nigeria, using a survey research design. The study's findings showed that efficiency, security, and ease of use are crucial aspects of system quality, whereas accuracy, timeliness, and completeness were aspects of information quality. Additionally, the outcome showed that the effectiveness of accounting IS was significantly influenced by the quality of the system and the information. The authors recommended timely evaluation of the efficiency of IS in line with the findings of the study for optimal performance.

Mithas, Ramasubbu, and Sambamurthy (2011) developed a conceptual model linking information technology (IT) enabled information management capability with three important organisational capabilities, customer management capability, process management capability, and performance management capability, in order to investigate the mediating relationship between information management capability and firm performance using archival data sets from a conglomerate business. Actual scores from excellent assessments of the conglomerate's businesses and internal units were included in the data set. These assessments provided discrete measurements of the key ideas needed to support the conceptual model developed for the study. The results demonstrated that the information management capability had a major impact on the growth of other firm capabilities related to performance, process, and customer management. These competencies were then found to positively impact organisational effectiveness, financial, human resource, and customer performance metrics. The authors came to the conclusion that, since IT infrastructure and information management capabilities are the cornerstones of other capabilities that are built for enhanced firm performance, senior managers should concentrate on establishing the conditions necessary for their development.

The impact of knowledge management (KM), information systems (IS), and employee empowerment (EE) on employee performance (EP) was examined by Abualoush et al. (2018). A structural model was created to show how these constructs interacted with one another and investigate how employee empowerment mediated the relationship between knowledge management IS, and worker performance. A survey in the form of a questionnaire was created to test the previously mentioned model using data from 287 employees in Jordan's pharmaceutical industry. The findings showed that while IS and KM both had a positive and significant impact on employee empowerment, they also had an impact on workers' performance. IS and KM, however, did not show a positive correlation with worker performance. Additionally, EE positively and significantly mediated the relationship between KM and EP, besides the relationship between IS and EP.

Gorla, Somers, and Wong (2010) investigated the connection between organisational impact and the quality of IS. The hypothesis of a positive relationship between system quality and information quality, as well as a greater organisational impact in situations where system quality, information quality, and service quality are high, were tested by the authors using survey data. We use survey data to test our hypotheses. The most significant variable, according to the results, was IS service quality, which was followed by information quality and system quality. The findings, according to the authors, demonstrated the significance of IS for organisational performance.



Petter, DeLone, and McLean (2013), conducted a systematic literature review to identify independent variables that may influence the success of an IS. The authors identified 43 specific variables posited to influence the different dimension of IS success. The success factors were organized into five (05) categories based on the Leavitt Diamond of Organizational Change as “task characteristics, user characteristics, social characteristics, project characteristics, and organizational characteristics”. Furthermore, fifteen (15) success factors that were consistent in the literature reviewed were identified as “enjoyment, trust, user expectations, extrinsic motivation, IT infrastructure, task compatibility, task difficulty, attitudes toward technology, organizational role, user involvement, relationship with developers, domain expert knowledge, management support, management processes, and organizational competence”.

## **Methodology**

### ***Research Design***

Cross-sectional study design was adopted for the study. This study design was considered most appropriate as a cross section of employees were sampled from a population of 268 full-time employees from 26 insurance companies operating in Akwa Ibom State, Nigeria. A statistical sampling technique known as Taro Yamane formula was used in determining the sample proportionate to the size of the population of study as 100 employees to guarantee the generalization of the findings of the study to the population of study.

Additionally, employees who were willing to participate in the study were chosen using the simple random sampling method. Each employee in the population was given a number in order to prevent selection bias, and participants were chosen at random from the population using Microsoft Excel's random number function (RAND). Because the population was homogeneous and finite, this method gave every staff member an equal chance of selection 1 in 2.68.

A structured questionnaire was divided into two sections. First is Section A, comprised of socio-demographic information of the respondents. The other is section B, which consists of questions to address the objectives of the study – designed in the form of modified four points likert scale of strongly agree (SA), agree (A), disagree (D), strongly disagree (SD) was administered on the sampled employees on a face to face basis at their place of work by trained surveyors. The assigned weightings were SA = 4, A = 3, D = 2 and SD = 1.

### ***Validity and Reliability of the Instrument of Data Collection***

The face and content validity of the instrument was established by researchers that are knowledgeable in the area of focus of this study, one each from the department of Business management and the department of information Science in University of Uyo, Nigeria. Relevant corrections, suggestions and comments were done and the validated version of the instrument was used to produce the final copy of the questionnaire used in the study.

The test re-test method was adopted to determine the reliability of the instrument. The instrument was administered to 5 staff from five insurance companies in Akwa Ibom state and after two weeks; the instrument was re-administered to the same staff. The two sets of data obtained were subjected to analysis using Pearson Product Moment Correlation and 0.86 was obtained indicating that the instrument was reliable.

### ***Data Analysis***

A one sample t-test was used in the study. One sample t-test evaluates whether the mean of a single group differs from a known value using hypothesis testing. The adoption of this method of data analysis was



informed by the non-sensitivity of one-sampled t-test to the normality of the data assumption and equally supported as sample size of 100 participants in the study as less than 50 participants sample size is typically regarded as small and unacceptable (McDonald & Dunn, 2013). Furthermore, the manner that the questions in the questionnaire were structured to directly address the specific objectives of the study as independent variables supported the use of one sampled t-test as the method of data analysis. In addition, the Likert scale method used enables an estimation to confirm if the employees agree that IS enhances operational efficiency or not with “3” as weighting for “Agree”. Therefore, the null hypothesis formulated for testing was that the sample mean was equal to “3” while the alternate hypothesis was that the sample mean was greater than “3” indicating that a one-tailed test was adopted. The null hypothesis will be rejected and the alternative hypothesis will not be rejected if the p-value of the t-statistics is less than 0.05 in line with practice (Lee, Seo, & Siemsen, 2018). The test statistics is presented thus:

$$t = \frac{\bar{x} - \mu_0}{s_{\bar{x}}}$$

and

$$s_{\bar{x}} = \frac{s}{\sqrt{n}}$$

where;

- $\mu_0$  = The weighting for “Agree” in line with the likert scale which is “3”.
- $\bar{x}$  = Sample mean
- n = Number of observations
- s = Sample standard deviation
- $s_{\bar{x}}$  = Estimated standard error of the mean

Stata 13 statistical analysis package was used in analysing the data.

## Results

### *Profiling of Respondents*

Table 1 presents the profiling of a sample of 100 employees who were respondents in the study. Male respondents constituted 64% (64) while the female respondents constituted 36% (36) of the sample. Also, 46 % (46) of respondents were between 30-50 years old while 32% (36) were under 30 years and 22% (22) were above 50 years. Exactly 48% (48) of the respondents had worked with their employer for less than 10 years while 27% (27) and 25% (25) had worked with their companies for 10-20 years and above 20 years respectively. With regards to the departments, 68% (68), 7% (7), 16% (16), 4% (4) and 5% (5) worked in marketing, underwriting, account, human resource and claims departments respectively which reflects the typicality of departmental staffing in branches of insurance firms in Nigeria of a significant number being marketing staff.



**Table 1**

*Profiling of Respondents*

Question	No. of Respondents (N=100)	Response (%)
<b>What is your Gender?</b>		
Male	64	64
Female	36	36
<b>What is your Age bracket?</b>		
Under 30	32	32
30 – 50	46	46
Above 50	22	22
<b>How many years have you worked with the company?</b>		
Less than 10	48	48
10 -20	27	27
Above 20	25	25
<b>What is your department?</b>		
Marketing	68	68
Underwriting	7	7
Account	16	16
Human Resource	4	4
Claims	5	5

**Source:** Researcher's computation using the data collected and Stata 13.

***Descriptive statistics of response to the items to address the objectives of the study***

**Item One:** Transaction Processing System influences operational efficiency of insurance companies in Akwa Ibom State.

Table 2 indicates that the responses to the use of TPS support increase in sales of volume of product ranked 1<sup>st</sup> with a mean of 3.89 and a standard deviation of 0.987 while the use of TPS supports increase in turnover as compared to previous systems ranked 2<sup>nd</sup> with a mean of 3.62 and standard deviation of 0.957. Furthermore, with mean value of 3.58 and standard deviation of 0.935 the responses to the use of TPS reduces time spent on processing transaction ranked 3<sup>rd</sup> and with a mean of 3.48 and standard deviation of 0.961 the responses to the use of TPS reduces human resources related cost was ranked 4<sup>th</sup>. The aggregate mean and standard deviation for the item was 3.64 and 0.960 respectively.

**Table 2**

*Descriptive statistics of response to Transaction Processing System (TPS) influences operational efficiency.*

S/N	Item	$\bar{x}$	SD	Mean Rank	Decision
1.	The use of TPS reduces time spent on processing transactions	3.58	0.935	3 <sup>rd</sup>	Agree



2.	The use of TPS supports increase in turnover as compared to previous systems	3.62	0.957	2 <sup>nd</sup>	Agree
3.	The use of TPS reduces Human Resources related cost.	3.48	0.961	4 <sup>th</sup>	Agree
4.	The use of TPS support increase in sales volume of products.	3.89	0.987	1 <sup>st</sup>	Agree
<b>Aggregate mean</b>		<b>3.64</b>	<b>0.960</b>		<b>Agree</b>

**Source:** Researcher’s computation using the data collected and Stata 13.

**Item two:** Decision support system has impact on operational efficiency of insurance companies in Akwa Ibom State.

Table 3 shows that the response to the use of DSS supports timely and efficient decision making was ranked 1<sup>st</sup> with a mean and standard deviation of 4.01 and 0.986 respectively and the mean of 3.97 and standard deviation of 0.91 ranked the response to the use of DSS reduces operational cost of the organization 2<sup>nd</sup>. The response to the use of DSS controls wastage and stealing of items with 3.86 as mean and 0.877 as standard was ranked 3<sup>rd</sup> and ranked 4<sup>th</sup> was the response to the use of DSS impacts profitability of the organization with 3.11 as the mean and 0.901 as the standard deviation. The aggregate mean and standard deviations of all the responses was 3.74 and 0.941 respectively.

**Table 3**

*Descriptive statistics of response to decision support system (DSS) has impact on operational efficiency*

S/N	Item	$\bar{x}$	SD	Rank	Decision
1.	The use of DSS supports timely and efficient decision making	4.01	0.986	1 <sup>st</sup>	Agree
2.	The use of DSS controls wastage and stealing of items	3.86	0.877	3 <sup>rd</sup>	Agree
3.	The use of DSS impacts Profitability of the Organization	3.11	0.998	4 <sup>th</sup>	Agree
4.	The use of DSS reduces operational cost of the organization	3.97	0.901	2 <sup>nd</sup>	Agree
<b>Aggregate mean</b>		<b>3.74</b>	<b>0.941</b>		<b>Agree</b>

**Source:** Researcher’s computation using the data collected and Stata 13.

**Item three:** Office Automation System (OAS) has effect on operational efficiency of insurance companies in Akwa Ibom State?

Table 4 presents the responses to the use of OAS supports timely decision making and the use of OAS supports the company keeps peace with the dynamics business environment ranked 1<sup>st</sup> and 2<sup>nd</sup> with corresponding means and standard deviations of 3.96 and 0.907 and 3.73 and 0.904. Ranked 3<sup>rd</sup> and 4<sup>th</sup> were responses to the use of OAS improves the analytical skills of staff member and the use of OAS improves the quality of our products with mean values of 3.68 and 3.13 and corresponding standard deviation estimates of 0.903 and 0.915. The aggregate mean of the responses was 3.68 and 0.907 standard deviation.



**Table 4**

*Descriptive statistics of response to office automation system (OAS) has effect on operational efficiency*

S/N	Item	$\bar{x}$	S. D	Rank	Decision
1.	The use of OAS supports the company keeps pace with the dynamic business environment	3.73	0.904	2 <sup>nd</sup>	Agree
2.	The use of OAS improves the quality of our products.	3.13	0.915	4 <sup>th</sup>	Agree
3.	The use of OAS supports timely decision making	3.96	0.907	1 <sup>st</sup>	Agree
4.	The use of OAS improves the analytical skills of staff members.	3.68	0.903	3 <sup>rd</sup>	Agree
<b>Aggregate mean</b>		<b>3.63</b>	<b>0.907</b>		<b>Agree</b>

**Source:** Researcher’s computation using the data collected and Stata 13.

**Results of Data Analysis**

Table 5 presents the results of the t-test. It was discovered that employees’ responses weightings to transaction processing system having influence on operational efficiency ( $\bar{x} = 3.64$ ) were significantly higher than the weighting for agree ( $\mu_0=3$ ),  $t(99) = 69.854$ ,  $p=0.00$ . Also, a medium effect size was found as the estimated Cohen’s d (E.S) indicated that employees responses to transaction processing system having influence on operational efficiency increased the mean response score by 0.66 standard deviation above the score for agree and 98% of the variability in the estimation can be explained by the employees response score to transaction processing system having influence on operational efficiency from the proportion of variance estimation using omega squared ( $\omega^2$ ).

The employees’ responses scores to decision support system having impact on operational efficiency ( $\bar{x} = 3.74$ ) was found to be significantly higher than the score for agree ( $\mu_0=3$ ),  $t(99) = 59.314$ ,  $p = 0.00$ . The estimated Cohen’s d (E.S) of 0.78 indicate a large effect size as employees’ responses score increased the mean response score by 0.78 standard deviation above the score for agree and the proportion of variance estimation using omega squared ( $\omega^2$ ) showed that 97% of the variability in the model can be explained by employee’s response score to decision support system having impact on operational efficiency.

Furthermore, employees’ responses scores for office automation system having effect on operational efficiency ( $\bar{x} = 3.64$ ) was observed to be significantly higher than the score for agree ( $\mu_0=3$ ),  $t(99) = 61.849$ ,  $p = 0.00$ . A medium effect size from the estimated Cohen’s d (E.S) which indicates an increase of 0.69 standard deviation above the score for agree of the mean score of employee’s responses to office automation system having effect on operational efficiency was found with the proportion of variance estimation using omega squared ( $\omega^2$ ) showing that 97% of the variability can be explained by the response score of the employees.

**Table 5**

*Result of one sample (one-tailed) t-test*

Item	$\bar{x}$	S. D	D.F	T	$\omega^2$	E. S	p-value( $\bar{x} > 3$ )
Transaction Processing System influences operational efficiency	3.64	0.960	99	69.854	0.98	0.66	0.000



Decision support system has impact on operational efficiency	3.74	0.941	99	59.314	0.97	0.78	0.000
Office automation system (OAS) has effect on operational efficiency	3.63	0.907	99	61.849	0.97	0.69	0.000

N=100;  $\mu_0=3$

### Discussion

The findings revealed that employees assessed transaction processing systems had impact on operational efficiency of insurance companies. Furthermore, the impact was found to be statistically significant indicating that a significant number of the employees were of a strong opinion that transaction processing system had a significant impact on their job which supported operational efficiency. The result also indicated that the employees assessed transaction processing to have above average effect on operational efficiency. This result suggests that transaction processing systems are used by more than just insurance companies as IS, and that their use is justified because it enhances operational effectiveness. This agrees with Olulekan and Akinlo (2016), who discovered that transaction processing systems constitute the essential building blocks of an organization's IS when it comes to compiling day-to-day operations for successful operations. Additionally, as a result of an effective management system, Akhmedov and Uzhegova (2023) noted an improvement in the quality of customer service, the process of coming up with creative solutions for new loan proposals, improved information sharing within the bank, improved relationships among coworkers, and an increase in employee happiness.

It was also discovered that decision support system was assessed by employees to impact operational efficiency of insurance companies. Interestingly, the impact of decision support system on operational efficiency was found to be significant indicating the level of assertion of the employees. This finding is suggestive of an impressive level of applicability and intractability of employees of insurance companies with the decision support system as an IS interface that supports operational efficiency. This finding corroborates the findings of Asemi, Safari, and Zavareh (2011) that decision support systems are tailored to the specific needs of individual and group managers which makes it a dependable tool for managers in decision making to achieve operational efficiency. Furthermore, the finding of this study is in line with Dey (2001), who discovered that managing risk using decision support system provides effective means of managing projects efficiently with regards to timely delivery cost effectiveness and quality achievement.

Equally, the results of the analyses of this study shows the assessment of employees of the impact of office automation system on operational efficiency to be significantly above average expectation. The finding further demonstrates employees' acceptance that office automation system has significant effect on operational efficiency. Furthermore, the finding is suggestive of employees' level of conviction on the dependability of operation efficiency on office automation system as an IS in active functionality in the insurance sector. This result is consistent with that of Yaghoubi and Sargazi (2014), who found that office automation significantly impacts organizational excellence in terms of resources, leadership, strategy, and partnerships. The authors discovered that the application of office automation had a significant impact on customer results, people results, society results, and key performance results in addition to organizational excellence in people, process, products, and services. The results of Bandpey and Niknaghsh (2022), which show that office automation systems greatly enhance workers' performance in terms of efficiency, uniformity,



speed, accuracy, and precision of task performance, as well as quality of task performance, also support this conclusion.

### Conclusion

The study was designed to investigate employees' assessment of the impact of IS on operational efficiency of insurance companies using cross-sectional data drawn from insurance companies in Akwa Ibom State, Nigeria. Three hypothesis which originated from three specific objectives that were formulated for the study were tested with the use of one sampled t-test to confirm if the sample mean was greater than the weighting for "agree ( $\mu_0=3$ )" in the Likert scale used in the questionnaire which was the instrument of data collection in the study. The findings of the study indicated that the mean of employees' responses to transaction processing system having influence on operational efficiency ( $\bar{x} = 3.64$ ) were significantly higher than the weighting for agree ( $\mu_0=3$ ),  $t(99) = 69.854$ ,  $p=0.00$ . Also, the result of the analysis showed that mean employees' responses scores to decision support system having impact on operational efficiency ( $\bar{x} = 3.74$ ) was found to be significantly higher than the score for agree ( $\mu_0=3$ ),  $t(99) = 59.314$ ,  $p = 0.00$ . In addition, it was also found that the mean employees' responses scores to decision support system having impact on operational efficiency ( $\bar{x} = 3.74$ ) was found to be significantly higher than the score for agree ( $\mu_0=3$ ),  $t(99) = 59.314$ ,  $p = 0.00$ . Based on findings it was concluded that IS had significant impact on operational efficiency of insurance companies.

The following recommendations were made from the findings:

- i. The insurance companies should continue to invest in its IS infrastructures as well as support infrastructure like IT infrastructures to ensure reliable and high-speed internet access, as well as the availability of up-to-date hardware and software. This is critical for the effective functioning of IS.
- ii. Insurance companies should invest in education and training programs to develop a skilled workforce in IS. This includes sponsoring staff for specific certifications in IS management and related fields to improve capacity in the area
- iii. Insurance companies should ensure the development of standards and interoperable systems to ensure that different IS can work together efficiently. This is particularly important in the context of migrating to full electronic management in the future.

Undoubtedly the findings of this study suggest an urgent need to enhance the development and further the use of IS in insurance firms in Nigeria as this will not only contribute to operational efficiency but will improve data security and digital inclusion across various department in insurance companies. Thus, the recommendations of this study can serve as a blueprint for implementing interventions and programs in the area of IS in the insurance sub-sector of the economy that can further improve operational efficiency.

To increase empirical evidence in this area of research, future studies can adopt data analysis method that will measure the impact in both the magnitude and direction to differ from the test of difference adopted in this study.

### Funding

This research was funded by RHAB-YESS Foundation research grant.

### Conflict of interest

Authors had no conflict of interest to disclose.

### Ethical statement

This research did not require ethical approval as it did not involve human or animal experiment.



## Acknowledgement

The authors acknowledge the valuable contribution of scholars in Risk Management and Insurance research cluster and Research for Impact cluster of the University of Uyo to this study. Time spent by scholars in the clusters to review and discuss this work added value to the quality of the study.

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