



Original article

Assessing Stakeholders' Satisfaction with the Transformation of Conventional Auction into an E-Auction

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Abstract

Ceylon Tea is renowned as the finest quality teas in the world. Colombo tea auction, which was functioned as the single origin traditional system is the main marketing platform for Ceylon tea. Due to the COVID-19 pandemic the industry was encouraged with the conversion of conventional tea auction into the virtual E- auction. Hence, this study aimed to assess stakeholders' satisfaction with this transformation and its pros and cons effects. A stratified sampling technique was used to collect 75 stakeholders who are directly and indirectly connected with the E-auction. A pretested survey instrument validated by applying a reliability test was administrated to collect data on perceived ease of use, usefulness, usability, socio-economic factors, and industry-related factors. The SWOT analysis was also undertaken on the gathered data to identify how best E-Auctioning process was matched with today's context of tea market. The ordinal logistic regression test results reveal that the degree of stakeholders' satisfaction with the transformation process varied in the range of high, moderate, and low, with values of 45.3%, 49.3%, and 5.3%, respectively. The overall model was significant at the 0.05 significant level and its results exhibited that stakeholder satisfaction was positively correlated with experience, age, perceived ease of use, and usefulness, whilst it was negatively correlated with education level, usability, and stakeholder type. The SWOT analysis results revealed that the newly implemented E-auction has many strengths and opportunities such as the ability to log in at any given time, maintaining high transparency, timesaving, reduction of operational cost, and real-time updating dashboard and some weakness and threats such as poor interaction among buyers and sellers, not fully automated current system, not a good system for people who have low IT literacy compared to conventional tea auction, mental tidiness among system operators etc.. Hence, this study confirms that there are both positive and negative effects of the newly implemented E-auction over a traditional auction and require user friendly simplified and more navigated IT related interventions to elevate more efficient and effective E-auction system with the technological advancement of the ICT sector.

Keywords: Covid-19, Conventional, E-auction, Satisfaction, Stakeholders.

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INTRODUCTION

Given its recognition as a prominent producer of the world's excellent teas, "Ceylon Tea" demands a premium on the global market (Thasfiha, Dissanayaka, and Arachchige, 2020). The tea industry in Sri Lanka contributes significantly to country's economy by foreign exchange earnings and employment (Dissanayaka, et al., 2020). Sri Lanka remained as the 4th largest tea producer and 2nd largest exporter of tea in the world (Tea Exporters Association Sri Lanka, 2022). The Colombo Tea Auction (CTA) is the world's largest tea auction center, dealing with more than three hundred million kg of black tea every year (Sri Lanka Tea Board Annual Report, 2016). The Colombo Tea Traders Association (CTTA) holds auctions according to the Sri Lanka Tea Board's (SLTB) by-laws and conditions of sale to maintain a regular, stable, and legal manner of selling tea (Athukorala, 2020).

The auction procedure has been carried out manually for a long time and had numerous problems, such as being time-consuming and difficult to update with technical advancements. However, all these were abandoned due to concerns about losing the existing physical bidding. The Colombo tea auction could not be held continuously for two weeks due to the imposed health guidelines for mitigation of spreading COVID pandemic in 2020. As a solution, the CTTA shifted the conventional auction system into an E-auction platform with the assistance of SLTB and the Export Development Board (EDB) aiming to improve its productivity, effectiveness, and efficiency with technological enhancement (Athukorala, 2020).

Although E-auction has been continued over the year since April 2020, no depth study has been undertaken to identify the pros and cons of the E-auction process. Therefore, this study was aimed at assessing stakeholders' satisfaction with the transformation of Sri Lankan conventional auctions into an E-auction.

METHODOLOGY

This study aimed to assess stakeholder satisfaction with the transformation of the Sri Lankan conventional tea auction into an E-tea auction. The Technology Acceptance Model (TAM) are the most widely used theories in IT research (Davis & Venkatesh, 2004, Abu-Dalbouh, 2013), served as the conceptual framework. Which considers three motivating factors such as perceived usefulness (PU- the degree to which adopting a new technology would improve performance), perceived ease of use (PEU- the perceived extent which employing a new technology will involve minimal effort as explained by Davis, 1989), usability (US - Potential issue which helps to get feedback on what is or isn't working and have a much broader understanding as explain by Mohammad and Dalbough, 2013). Additionally, industry-related experience, and socio factors were also considered as independent factors. By applying this framework, the study aimed to explore the association between tea stakeholders' satisfaction and variables impacting the conversion from out-cry auction to E-auction. This research fills a knowledge

gap by providing insight into stakeholder satisfaction, which is crucial for the Sri Lankan tea industry in overcoming COVID-19 pandemic challenges (Figure 1).

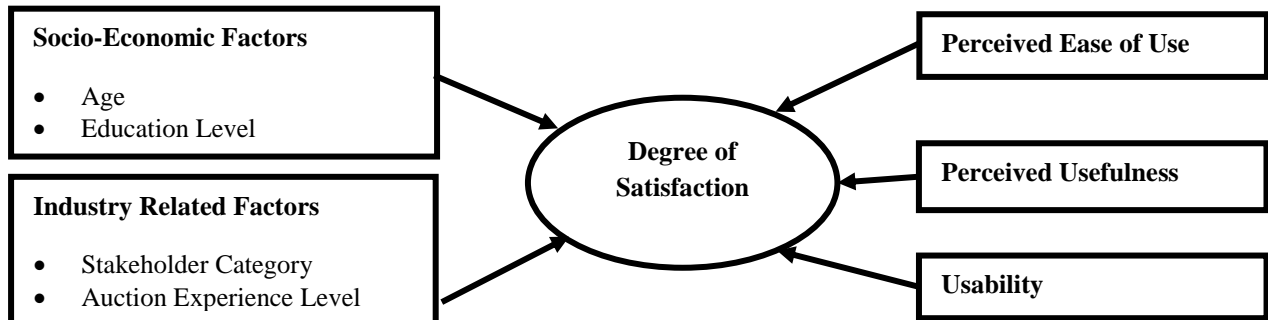


Figure 1. Conceptual Framework factors affecting the degree of satisfaction

Source: (Davis & Venkatesh, 2004), (Ha & Stoel, 2008)

Sampling Method and Selection of Location of the Study

The research was carried out at John Keells PLC, one of the country's leading tea brokers and has the largest warehousing complex and network in the tea trade. Out of 1000 Tea Board registered Stakeholders, only Seventy-five stakeholders who are directly (Exporters/buyers, Brokers and Auction organizer) and indirectly (Manufacturers, Warehouse keepers, Auction observer) involved with the E-auction were selected using a stratified purposive sampling technique, as shown in the (Hsu, 2009). Comparatively higher number of personals representing top and medium management, and operational level officials represented both direct and indirect categories were selected for primary data collection. This arrangement was purposely done to gather information that is more realistic from diverse group of direct stakeholders (Table 1).

A sample of 30 tea producers representing both privately owned factories and Regional Plantation Companies (RPC) in all three elevations, 20 tea brokering officials representing senior and middle management categories chosen from eight brokering firms; and 30 tea buyers chosen from 288 small, medium, and large-scale buyers were surveyed. Additionally, 10 warehouse keepers representing senior and middle management categories from eight warehouses, 5 auction organizers, and 5 auction observers were also selected for data collection.

Table 1. Research Sample for the Study

Tea Board registered Stakeholders	Direct Stakeholders			Indirect Stakeholders		
	Exporters/ Buyers	Brokers	Auction organizer	Manufacturers	Warehouse keepers	Auction observer
	288			686		
Population 1000	Large -7 Medium -77 Small -204	8	5	High -157 Medium -142 Low -387	8	5
Sample 100 (10%)	Large -05 Medium -10 Small -15	Large -10 Medium -05 Small -05	Governors committee -1 Steering committee -1 CTTA officials -3	(RPC/Privet factories) High -7 Medium -6 Low -17	Brokers' Warehouse -10	Tea Board Officials-5
	Subtotal 30	Subtotal 20	Subtotal 5	Subtotal 30	Subtotal 10	Subtotal 5

Data Collection and Analysis

The pretested semi-structured questionnaire and focus group discussions with key informants (Auction organizers and Auction observer such as Tea board representatives) were administered to collect the primary data from all the stakeholders in the E-tea auction system. Further internal secondary data for cumulative market shares of tea brokering companies for the year 2022 was collected from John Keells Plc and external secondary data (number of registered brokers, buyers, and manufacturers) was collected from the SLTB database. A 5-point Likert scale summated rating system, and indexes were developed to measure the perceived ease of use (Chandra, 2015), perceived usefulness, and usability (Table 2) and explained the relationship between the degree of satisfaction in the transformation process, with the above independent variables using descriptive analysis and an ordinal logistic regression model.

Qualitative data was analyzed by using dummy variables and Likert scales. The satisfaction level of each category was analyzed to identify the level of satisfaction using percentage analysis (Gunathilaka & Rathnayaka, 2012).

Reliability Test

A pretested survey instrument validated its internal consistency by applying a reliability test and obtained a Cronbach alpha value of 0.955 for the overall model. Additionally, the Cronbach alpha value was separately obtained for each main sub-components of the survey instrument such as perceived ease of use, usefulness, and usability (Table 2).

Table 2. Reliability Statistics for Overall model and Independent Variable Instrument Tool

Item	No of Items	Cronbach's Alpha	Significant value
Overall model	74	0.955	.000
Perceived ease of use	13	0.933	.000
Perceived usefulness	17	0.817	.005
Usability	13	0.948	.000

For the overall model, Cronbach's Alpha value was 0.955 with a significance of $P < 0.001$ whilst that of Perceived ease of use, Usefulness, and, Usability instrument tools were 0.933 ($P < 0.001$), 0.817 ($P < 0.005$), and 0.948 ($P < 0.001$) respectively. Therefore, the internal consistency of tested research instrument tools was excellent and reliable; therefore, those will give credible results.

Table 2. Dependent variable and Measurement

Component	Likert Scale Measurement	Ranking
Strongly disagree	1	Less satisfied
Disagree	2	Moderately satisfied
Neither agree nor disagree	3	
Agree	4	highly satisfied
Strongly Agree	5	

The dependent variable such as level of satisfaction was measured using Likert scale and ranked values as less, moderately and highly satisfied as given in (Table 3).

Table 4. Independent variables and their unit of measurements

Code	Independent Variable	Unit of Measurement
X1	Social Factors-	
	Age	Years
	Education	Years
X2	Industry-related Experience-	
	Stakeholder category (broker, manufacturer, buyer, warehouse keeper, auction organizer, SLTB)	Dummy variable
	Involvement with the auction (experience)	Years
X3	Perceived Usefulness (Performance attributes and New Features)	Likert scale
X4	Perceived Ease of Use (E-auction benefits and strengths)	Likert scale
X5	Usability (Weaknesses and threats of E-auction)	Likert scale

Indexes developed for the independent variables as follows

$$\text{Perceived Usefulness Index} = \frac{\text{Marks achieved by the Stakeholder}}{\text{Total Potential Mark}} \times 100$$

$$\text{Perceived Ease of Use Index} = \frac{\text{Marks achieved by the Stakeholder}}{\text{Total Potential Mark}} \times 100$$

$$\text{Usability Index} = \frac{\text{Marks achieved by the Stakeholder}}{\text{Total Potential Mark}} \times 100$$

Descriptive analysis, hypothesis testing, correlation and Ordered Logistic Regression model were applied to measure variables and explain the relationship among the tested parameters. Excel and Stata software packages were used for the data analysis.

Hypothesis for the Study

H0 – There is no relationship between the degree of satisfaction with the transformation of conventional tea auctions into E-tea auctions and the independent variable

H1 – There is a relationship between the degree of satisfaction with the transformation of conventional tea auctions into E-tea auctions and the independent variable

If, P-Value < 0.05; Reject H0

Empirical Model

An ordinal logistic regression model was used to explain the relationship of the dependent variable (Y-Degree of satisfaction), which has a meaningful order of high-2, medium-1, and low-0, with the independent variables.

An empirical model for the research was developed to identify the relationship between dependent and independent variables.

$$SL (pred.) = \beta_0 + \beta_1(X1) + \beta_2(X2) + \beta_3(X3) + \beta_4(X4) + \beta_5(X5) + \beta_6(X6) + \beta_7(X7) + \beta_8(X8) + \varepsilon$$

Where, SL-Satisfaction Level

SL-Satisfaction Level

X1- Age (AG)	X5-Stakeholder type (ST)	β_0 - Coefficient of Constant
X2-Experience (EX)	X6-Perceived Usefulness (PU)	ε - Error
X3-Education Level2(EUL2)	X7-Perceived Ease of Use (PEU)	
X4-Education Level3(EUL3)	X8-Usability (US)	

RESULTS and DISCUSSION

This section summarizes the descriptive statistics of the data, SWOT analysis, Hypothesis testing, correlation and regression analysis and the outcome of the empirical model used for the study.

Descriptive Analysis

Descriptive analysis results revealed that the age range of responded stakeholders is 22- 66 whilst the mean age is about 36 years (Table 5). The minimum experience of the stakeholders is 1 year while the maximum experience is 58 years with the tea industry. The majority of stakeholders have a sound educational background (Mean value of Eul2 = 0.64 and Eul3 = 0.12).

Table 3. Descriptive Analysis Results on Social Factors

Variable	Mean	Min	Max
Level of Satisfaction	1.40	0	2
Age	36.33	22	66
Industry related Experience	10.12	1	58

Overall Satisfaction of the Stakeholders

Table 4. Distribution of Stakeholders according to the Level of satisfaction

Level of Satisfaction	Frequency	Percentage
0	04	05.33
1	37	49.33
2	34	45.33
Total	75	100.00

The findings revealed that 45.33%, 49.33%, and 5.33% of stakeholders are highly, moderately, and less satisfied with the transformation into E-auction, respectively (Table 6). The results reveal that majority of stakeholders have either high or moderate satisfaction as they have experienced with

operating E-Auction over two years and they may have felt E-auction system is more user friendly than the former system of conventional physical auction which they operated over the period of time before commencement of corvid pandemic situation.

Correlation Analysis

The association between the level of satisfaction with independent factors (Social and economic variables, factors relating to industry, PEU, PU, US) was evaluated using correlation analysis. There is a positive correlation between level of satisfaction and education level, online handling literacy, PU, PEU and US while having a negative correlation with stakeholder type, age, and tea industry experience (Table 7).

Table 5. Correlation Analysis Results

Independent Variable	satisfaction level		
	Pearson Correlation	Sig. (2-tailed)	Interpretation
Stakeholder Type(direct/indirect)	-0.329**	0.004	Weak (-) correlation
Age	-0.102	0.383	Very weak (-)correlation
Education Level	0.050	0.667	Very weak (+)correlation
Tea Industry Experience	-0.182	0.118	Very weak (-)correlation
Online handling Literacy	0.398**	0.000	Weak (+) correlation
PU	0.747**	0.000	Strong (+)correlation
PEU	0.820**	0.000	Very Strong (+)correlation
US	0.255*	0.027	Weak (+) correlation

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed)

Ordinal Logistic Regression Analysis

The regression model used in this study was an ordered logistic regression model, and it was taken from the related study (Kishokanthan, 2014).

Table 6. Ordinal Logistic Regression Results

Component (Log likelihood = -21.349354)	Ordered Logistic Regression Results
Number of observation	75.00
LR chi2(8)	86.83
Prob > X ₂	0.0000
Pseudo R ²	0.6704

The Prob > X₂ value is 0.000, which is less than the 0.05 significance level in the model summary, showing that the regression model as a whole fit significantly at a 95% confidence level. Pseudo-R square for the calculated model is 0.6704. Accordingly, R square indicates that eight independent

variables in the model account for 67.04% of the variance in satisfaction level resulting from the conversion of a traditional auction into an electronic auction.

Table 7. Coefficient Results

Level of Satisfaction	Coefficient	P value
Age	0.07	0.26
Eu12	-1.33	0.25
Eu13	-0.11	0.95
Stakeholder type	-1.23	0.28
Experience	0.02	0.81
PU	0.01	0.87
PEU	0.38	0.00
US	-0.05	0.42

The Table 9 shows that the independent variables have a positive or negative association with the degree of satisfaction level. Meanwhile, only the estimated perceived ease of use variable has a significant positive relationship with the degree of satisfaction level.

Predicted Probabilities Results on Marginal Effects

Marginal effects show the change in probability when the predictor or independent variable increase by one unit. Accordingly, Predicted Probabilities for “0” Satisfaction level (Less Satisfied), “1” Satisfaction level (Moderately Satisfied) and “2” Satisfaction level (Highly Satisfied) can be explained as follows (Table10).

Age of the Stakeholders: as a unit increases in age 0.0009 at a less satisfying level and 0.0038 at a moderately satisfying level decreases the change in probability whilst 0.0047 at a highly satisfying level when given all the other variables in the model are held constant increases it. All other variables could also interpret in the same way.

Stakeholders who are in younger age categories are happier about the transformation of conventional tea auctions into E-auction than stakeholders who are in middle and older age categories as they have good ICT literacy skills. As a result, the marginal values are -0.09% at the least satisfying level, -0.38% at the moderately satisfying level, and 0.47% at the highly satisfying level.

Table 8. Average Marginal Effect (AME) Results for “0, 1, and 2” Satisfaction Level

Independent Variable	AME (“0” Satisfaction Level)	AME (“1” Satisfaction Level)	AME (“2” Satisfaction Level)
Age	-0.0009	-0.0038	0.0047
Eul1	-0.0014	-0.0060	0.0074
Eul2	0.0167	0.0691	-0.0858
Eul3	0.0000	0.0000	0.0000
Stakeholder type	0.0168	0.0695	-0.0863
Experience	-0.0002	-0.0009	0.0011
PU	-0.0002	-0.0007	0.0008
PEU	-0.0051**	-0.0213***	0.0264***
US	0.0007	0.0028	-0.0034

Education level-1,2 of the Stakeholders: Eul1 (-0.14%), (-0.6%), and Eul2 (1.67%, 6.911%) at the less and moderately satisfied satisfaction levels, respectively. Stakeholders with a less advanced educational background (Advanced level) are unlikely to participate in this transformation because their ICT literacy is low and they are unlikely to use advanced technologies. So they might have negative satisfaction with the above transformation. The stakeholders who have a good educational background (graduate or postgraduate) are much more likely to benefit from this transformation. Therefore, it has positive marginal values.

Stakeholder Type: The marginal values for the type of stakeholder for less satisfied, moderately satisfied, and highly satisfied levels are 0.17%, 0.69%) and -0.86%, respectively. The majority of the respondents were buyers and manufacturers, and they might have had negative satisfaction with the E-auctioning process due to their limited experiences on IT literacy in tea Market handling.

Experience of the Stakeholders: The marginal values for experience for less satisfied, moderately satisfied, and highly satisfied levels are (-0.02%), (-0.09%), and 0.11%, respectively. Stakeholders who have more experience with the drawbacks of conventional auction would like a novel system that is more convenient and effective for them. However, the study conducted by Kishokanthan (2014) revealed that there is a negative relationship between the level of satisfaction versus the experience of stakeholders. This study was carried out in 2014 before the COVID-19 pandemic. Therefore, the well-experienced stakeholders who were aware of the drawbacks also tended to the conventional auction due to losing existing physical bidding.

Perceived Usefulness: Perceived usefulness includes performance attributes and the new features of the E-auction system that stakeholders are more likely to go with. Therefore, at a highly satisfying level, it has a positive marginal value. The marginal values for PU for less satisfied, moderately satisfied, and highly satisfied levels are (-0.02%), (-0.07%), and 0.08%, respectively. These results support

previous findings as postulated by Daud, et.al, (2018). It confirmed that perceived ease of use is having positive relationship with the user satisfaction.

Perceived Ease of Use: Perceived ease of use explains the strengths and benefits of the E-auction process. It has marginal values of (-0.51%), (-2.13%), and 2.64% for less, moderate, and high-satisfied levels. The stakeholders are more like the strengths and benefits of the novel E-auction process. Therefore, they might have been highly satisfied with this transformation.

Usability: Usability includes weaknesses and threats to the E-auction process. Therefore, stakeholders have a negative probability of usability at a highly satisfying level, and they are looking for a more user-friendly auction system with the new advancement in technology.

SWOT Analysis

Out of all the strengths, " Improve the technology literacy among the participants, Producers can keep an eye on the market trends online by sitting in their remote tea estates through the internet " can be identified as major strengths of the E-action system. Ensure reliability and Higher level of compatibility were ranked second and third level of the strengths as per the weightage. As well as buyers and brokers, manufacturers will also get benefits since they can analyze the tea market and consequently get an idea about the tea they produce. As this novel auction system is updated with the new technology, all stakeholders can improve their ICT literacy skills (Table 11).

Table 9. Strengths of the E-auction

Strengths	Total Score	Weightage	Ranking
S1 Producers can keep an eye on the market trends online	325	0.1238	1
S2 Improve the technology literacy	325	0.1238	1
S3 Ensure reliability	318	0.1211	2
S4 Higher level of compatibility	317	0.1208	3
S5 Reduce/eliminate duplication of data entry	313	0.1189	4
S6 Receive real-time market information	312	0.1192	5
S7 Reasonable time for bidding any lot in this system	305	0.1162	6

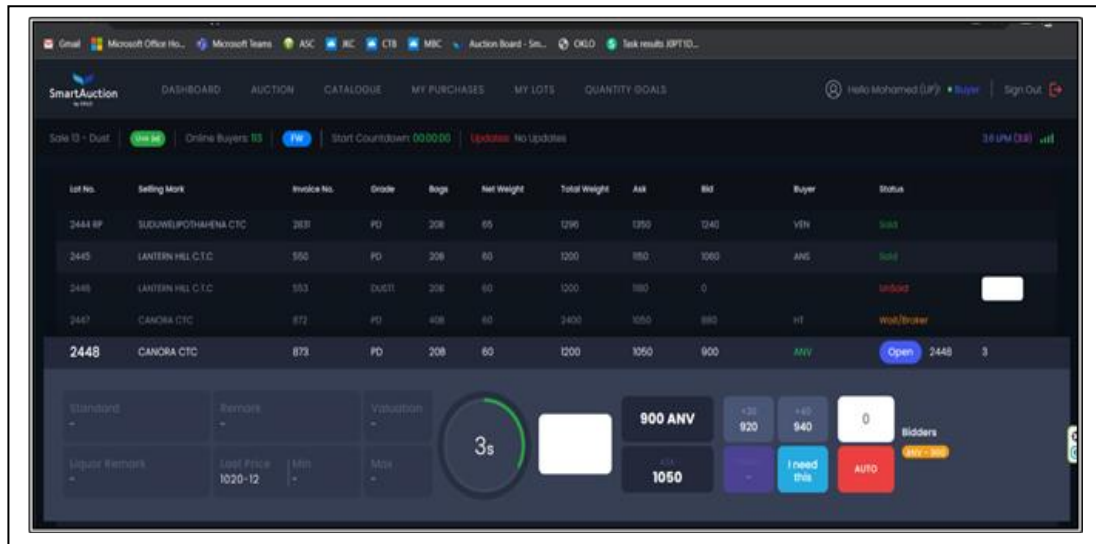


Figure 2. Interface of the E-auction System

Currently, in the E-auction system, the average number of lots sold per minute is 6.5. The countdown started at 9s and it will be 4s just after bidding by buyers. As a result, each buyer has a significant amount of time to bid on a specific lot. Participants will also receive real-time market reports that are available in the system (Figure 2). All the data is entered into the system, so there is no duplication of data. Unlike conventional auction systems, as all data is systematic, E-auction is more reliable. Therefore, it can be concluded that above features strengthen the E-auction system.

What made out-cry tea auction remain for such a long period was the physical interaction among buyers and sellers. Therefore, losing physical interaction among stakeholders can be identified as a major weakness of the online system. The ongoing E-auction is not a fully automated system and is ranked as 2nd major weakness, and therefore, stakeholders confirmed the requirement of updating the ongoing E-auction system into a fully automated system with technical advancement. The people who had a lack of online skills which was ranked as 3rd major weakness tended to reject this novel system as they got mental fatigue from getting used to a new and unfamiliar system. However, almost all the stakeholders have currently adopted the technologically enhanced system and they are looking for an all-time updated system with new features and infrastructure to run the auction process smoothly (Table 12). The results are consistent with the study done by Kishokanthan (2014) that the manual auction system is not many transparent and large buyers are running the system and much time spend on buying tea.

Table 10. Weaknesses of the E-auction

	Weaknesses	Score	Weightage	Ranking
W1	Less interaction among buyers and sellers	306	0.136	1
W2	Not fully automated system	291	0.129	2
W3	Not a good system for people who have poor IT Literacy on marketing	283	0.126	3
W4	Creates more opportunities for large and medium buyers	255	0.113	4
W5	Mental tiredness	250	0.111	5
W6	Low bidding efficiency	212	0.094	6

The best opportunity of the E-auction system, according to the Table 13, was a good alternative during the COVID-19 pandemic. There was no other option except to transform the out-cry auction into an E-auction as the Sri Lankan tea auction was unable to be conducted for two weeks continuously due to the curfew and social distance situations.

Table 11. Opportunities of the E-auction

	Opportunities	Total Score	Weightage	Ranking
O1	Good alternative during the pandemic	344	0.153	1
O2	The ease of analyzing the tea market	322	0.143	2
O3	Buyers' equality in the system	306	0.136	3
O4	To expose for foreign buyers (price up US dollar)	296	0.132	4
O5	Good opportunity for newcomers	282	0.125	5
O6	To open up new market avenues	261	0.116	6

As well, it is easier to analyze the tea market, as all the market reports are available after a sale. Unlike the out-cry auction system, which was dominated by large-scale buyers, in the E-auction system, each buyer has an equal chance of bidding. Hence, it is a good opportunity for newcomers as well. Therefore, it can be concluded that the E-auction process is effective in enhancing market opportunities.

Table 12. Threats of the E-auction

	Threats	Total Score	Weightage	Ranking
T1	Continuous power failure in the country	296	0.158	1
T2	Losing one's skills	290	0.155	2
T3	Expose foreign markets (increase competition)	283	0.151	3
T4	Direct purchasing without many intermediaries	271	0.145	4
T5	Handling both buyers' and brokers' valuation details can lead to privacy issues	259	0.138	5

Continuous power failure in the country and losing one's personal skills can be identified as major threat to the E-auction system. Since there was an art to selling tea at the Colombo Conventional Auction, the brokers had the power and skills to sell tea. However, with the time being, they may lose those skills and the newcomers will not get the chance to practice them as it is going online. As well, with the advancement of technology, the system might be modified to sell tea without many intermediaries. It can be a threat to the brokers who have enormous power in the system. Therefore, there should be a way of defending against threats. The Colombo Tea Traders Associations, all together with SLTB and EDB implementing solutions, will be advantageous (Table 14).

Perception of Stakeholders on Out-Cry Auction and E-Auction

Table 15. Perception of Stakeholders on Out-Cry Auction and E-Auction

E Auction	D	N	A	Out cry	D	N	A
Easy and convenient	1.3%	7.8%	90.9%	More Paper work	5.2%	5.2%	89.6%
High transparency	3.9%	14.3%	81.8%	Less transparency	10.4%	14.3%	75.3%
Handling both buyers' and brokers' valuation details can lead to privacy issues	10.4%	41.6%	48.1%	More trustfulness among brokers and buyers	5.2%	35.1%	59.7%
Less interaction among buyers and sellers	3.9%	19.5%	76.6%	More interaction among brokers and buyers	9.1%	13.0%	77.9%
Eliminate duplication of data entry (no human errors)	3.9%	10.4%	85.7%	Physical auction system prone to human errors	14.3%	18.2%	67.5%
Availability of auction summary	2.6%	3.9%	93.5%	unavailability of previous bid history	7.8%	15.6%	76.6%

Good opportunity for newcomers to the tea market	7.8%	24.7%	67.5%	Not an effective marketing channel for newcomers	14.3%	33.8%	51.9%
Buyers' equality in the system	5.2%	13.0%	81.8%	Big buyers dominating small buyers	11.7%	14.3%	74.0%
Informative dashboard	1.3%	6.5%	92.2%	Buyers can watch the operations of their competitors	5.2%	14.3%	80.5%

D%- Disagreement N%- Neither agree nor Disagree A%- Agreement

Table 15 illustrates the perception of stakeholders on Out-cry tea auction and E-auction. It has mentioned stakeholder's agreement as a percentage on each given statement. Unlike the Out-cry auction system, the E-auction only drawback compared to the out-cry auction is that there's no physical interaction between buyers and sellers. At the out-cry auction system, the gesture of the buyers could be seen such as nodding his head, winking an eye, or lifting a hand, finger, brow, etc. Therefore, more interaction was there between buyers and sellers. But at the E-auction system, this is no longer available. But apart from that E-auction is effective in all other dimensions.

Based on the percentage analysis results, the E-Auction system exhibits several advantages over the Outcry Tea Auction. First, E-Auction provides an easy and convenient platform, with a significantly higher agreement percentage of 90.9% compared to out-cry auction. Furthermore, E-Auction reduces the amount of paperwork involved, with 89.6% agreement, while the Outcry Auction lags behind at 5.2%.

In terms of transparency, E-Auction outshines the Outcry Auction, with 81.8% agreement for high transparency compared to 14.3%. Conversely, the Outcry Auction receives a higher percentage for less transparency, indicating a potential drawback. Privacy concerns arise with the handling of buyers' and brokers' valuation details, as indicated by 41.6% disagreement for E-Auction and 48.1% for the Outcry Auction. However, E-Auction fosters more trustfulness among brokers and buyers (35.1% agreement) compared to the Outcry Auction (5.2%).

Interaction among buyers and sellers is less prominent in E-Auction, with only 19.5%. Moreover, E-Auction eliminates the risk of human errors with 85.7% agreement, whereas the Outcry Auction is prone to such errors with 67.5% agreement. Availability of auction summaries is higher in E-Auction, with 93.5% agreement, while the Outcry Auction lacks previous bid history with 76.6% disagreement.

For newcomers to the tea market, E-Auction presents a good opportunity (24.7% agreement), whereas the Outcry Auction proves less effective as a marketing channel (33.8% agreement).

Lastly, E-Auction offers an informative dashboard (92.2% agreement), allowing buyers to monitor their competitors, whereas the Outcry Auction falls short with 80.5% agreement. Overall, these percentage analysis results suggest that E-Auction surpasses the Outcry Auction in terms of convenience, transparency, efficiency, and newcomer opportunities, making it a more favorable choice for tea auctioning.

Conclusion

The study confirmed that the majority of stakeholders are either moderately (49.3%) or highly satisfied (45.3%) with the transformation of conventional auctions into E-Auction, whilst limited of them are only less satisfied (5.3%).

The model's findings confirmed that stakeholder satisfaction on transformation of conventional auctions into E-Auction was positive relationship with stakeholder experience in industrial sector, their age, perceived ease, and usefulness of E-Auction system. However, their level of satisfaction has negatively relationship with stakeholder type, education level, and usability. Perceived Ease of Use of the E-Auction system has significant relationship with a degree of satisfaction on the transformation of conventional auctions into E-Auction.

The SWOT analysis results reveal that the strengths of the transformation of E-auction; the availability of real-time market information, reduction/elimination of duplication of data entry, and easy prediction of the market trends due to the online visibility of information even tea producers located in remote tea estates. The opportunities exhibited as the alternative viable mechanism to overcome the constraints occurred due to the COVID pandemic situation. E-auction creates benefits such as the ability to log in at any given time, maintaining high transparency, time-saving, reduction of operational cost, and real-time updating dashboard. E-auction systems also create some defects such as less interaction among buyers and sellers, not fully automated current system, not a good system for people who have low IT literacy.

Hence, this study provides sufficient evidence that the newly deployed E-auction has advantages and disadvantages over a conventional auction and relevant authorities should take suitable auction strategies to improve the system's performance with the technology advancements.

- Implications to improve the E-Auction System
- Introduce a more user-friendly and advanced E-auction system.
- Improve a way to navigate easily the upcoming lots.
- Combine with foreign tea auctions to open up the international market.
- Provide blend sheets, shipping documents, etc. on one sheet.

- Determine a minimum bid price.
- Avoid selling out lots as it creates a lot of pressure on brokers.

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