

e-STC FOR SITE REQUISITION MACHINERY SPARE PART ORDER

Noraziah Hamid¹ and Nur Azyyati Fari'ah Farizal Haryadi²

^{1,2}Civil Engineering Department, Politeknik Ungku Omar, Ipoh, Perak

^{1*}aziahhamid1965@gmail.com

²fariahazyyati@gmail.com

ARTICLE INFO

Article history:

Received

15 March 2024

Received in revised form

20 May 2024

Accepted

28 May 2024

Published online

15 June 2024

Keywords:

Systematic Tracking

Centre, Invoices,

Delivery Order (DO),

Delay Payment, Block
Order

ABSTRACT

Procurement Department at Pembinaan Tetap Teguh Jentera (PTTJ) basically manage all machineries at the site and responsible for internal department request, dealing with suppliers, coordinating, and monitoring purchases especially in documentation for purchase spare part machineries and equipment's order. The existing method used for machinery spare parts orders is not systematic and difficult to track between the Workshop Department and The Procurement Department, resulting in overlooking, double order, delay payment to suppliers, and blocked orders by suppliers. Therefore, the aim of the study is to develop the systematic tracking centre (e-STC) for site requisition machinery spare part order using wix.com at PTTJ for more systematic and efficient of purchase Invoices and Delivery Orders (DO) and payments to suppliers. There are three objectives to be studies, first is to identify the need of systematic tracking centre for site requisition machinery spare part orders at PTTJ. Secondly is to develop the e-STC for site requisition machinery spare part orders at PTTJ using wix.com and finally is to test the effectiveness of systematic tracking centre (e-STC) for site requisition machinery spare part orders at PTTJ. Objective 1 and 3, used quantitative method conducted by survey and objective 2 use wix.com. Data Analysis uses SPSS and Excel Solution Online. The results for objective 1 showed that the current method; average mean is very low in every constraint element; <1.5 average mean and was resulted for current method, easy to track order element. Result for objective 2 show that e-STC for site requisition machinery spare part orders at PTTJ using wix.com successful to developed. Meanwhile, result for objective 3 show that > 90% respondents agree the e-STC for site requisition machinery spare part order is systematic. Paired T Test showed the effectiveness element of e-STC for site requisition machinery spare part order for resulted as 2.69 in differences average mean; High in agree interpretation. The conclusion, e-STC is a systematic and efficient medium for purchase Invoices and Delivery Orders (DO) and payments to suppliers and needs to be implemented for site requisition machinery spare part orders at PTTJ.

1. Introduction

Construction industry is one of the industries that play an important role in developing and enhancing economic sector and the development of one's country. The variety of machinery used in the construction industry is critical. The construction industry has a significant impact on the global economy. Construction sites need effective management to optimize productivity and efficiency that stimulates economic growth by creating demand for various goods and services including raw materials, equipment, machinery and transportation service. In this era of technologies, the use of software or systems is essential to the growth of the organization. The Fourth Industrial Revolution (IR 4.0) is now developed on the Digital Revolution, in which technology and people are becoming increasingly integrated, preserve to improve performance of work. Implementing the IR 4.0 is highly suitable in creating a more systematic and centralized tracking centre to assist the process and reduce their common issues. IoT refers to the increasing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. Pembinaan Tetap Teguh (PTT) is one of the Malaysia's leading construction companies, specialized in Earthworks and Infrastructure works. Basically, all machineries at site under PTT is manage by Pembinaan Tetap Teguh Jentera (PTTJ), which is a subsidiary company under PTT. Primarily, the Procurement Department under PTTJ is responsible for sourcing direct and indirect materials requested by the internal departments, dealing with suppliers to negotiate the best price and payment terms. In existing method, the Procurement Department at PTTJ basically manage all machinery at the site and responsible for internal department request, required to liaise and dealing with supplies for timely delivery, coordinating, and monitoring all purchases especially in documentation for purchase spare part machineries and equipment's order to avoid any shortages, overcharges, and breakage. Procurement Department under PTTJ will also be responsible to manage supply chain related tasks, analyse the cost reduction activities and alternative part replacements. To ensure the financial viability of other industries, a variety of machines are required to handle the required speed, massive quantities of items, precision, and efficiency. These machines are necessary to handle the required speed, massive quantities of items, precision, and efficiency. The first common issue that arises in the process of PTTJ in maintaining and servicing PTT's machinery is the insufficiency to track orders properly made by site and office and followed by the checklist to check is not properly showed and documented to check the condition of the machineries because of poor communication among procurement and workshop department staff because they use WhatsApp's group medium only. There is lack of a systematic Tracking Medium. Other problem is always resulting in overlooking, double order, delay payment to suppliers due to incomplete documentation for purchasing spare part order and insufficiency to track spare part order and the third problem is causing of blocked orders by suppliers due to unsystematic tracking method. Therefore, a more systematic tracking centre for the ordering of machinery spare parts at PTTJ needs to be developed to solve the constrains faced with the existing method. Hence, the aim of the study is to develop the systematic tracking centre (e-STC) for site requisition machinery spare part order using wix.com at PTTJ for more systematic and efficient of purchase Invoices and Delivery Orders (DO) and payments to suppliers. There are three objectives to be studies, first objective is to identify the need of systematic tracking centre for site requisition machinery spare part orders at PTTJ. Next objective is to develop the e-STC for site requisition machinery spare part orders at PTTJ using wix.com and the third objective is to test the effectiveness of systematic tracking centre (e-STC) for site requisition machinery spare part orders at PTTJ. The scope of the project is at the headquarters and two construction site which are Kota Elmina and Bandar Bukit Raja 2. The Site Requisition Order

focusing on the procurement department and the site department at PTTJ.

2. Materials and Methods

The methodology refers to the practical “how” of any given piece of research that specifically it’s about how a researcher systematically designs a study to ensure valid and reliable results that address the research aims and objectives that will accomplish a perfect result. It can be termed as plan, structure, and strategy of a research to seek for alternative tools in problem solving and variance mitigation. They are essentially planned, scientific and value neutral (Rajasekar et al., 2006). The research design is the framework of research methods and techniques to focus on research methodologies that are appropriate for the subject matter by set up the method, instruments and the type of analysis used to achieve the result due to the objectives of the study. The research flow of methodology generally, consist of four major steps or phase which is consists of planning, procedure, data collection and data analysis. This development research is a process approach from the beginning to the end of Site Requisition Machinery Spare Part Order at PTTJ. The study’s methodology is broken down into multiple parts, each of which will be detailed in depth. Throughout the process of finishing this project, four phases of approach will be used as a Research Flow of Methodology process into mere detail which is show in Figure 1 below; depicts the operational framework. There are four phases of research flow methodology. Phase 1 is the problem discovery and literature reviews, Phase 2 is method of Collection Data (primary sources and secondary source), Phase 3 is production of system (testing of data, analysis, and interpretation of data), recommendation and conclusion. Phase 4 is the Final Outcome (achieve the objectives).

In general, phase 1 is the preliminary study to identify the problem statement, aims, objectives, scope of study and significance of study. Issues related to the selected topic were identified during this phase. Further, the objectives of the study to solve the problem have also been set. Inn phase 2, data collection for objectives 1 and 3, using quantitative method by survey through distribute the questionnaire to the respondents via google form. Next, for objective 2 is to develop the e-STC for site requisition machinery spare part orders using wix.com. Phase 3 is the stage of the data analysis to achieve the objectives 1 and 3 by using SPSS Software Phase 4 is to get the Final outcome to achieve the objectives.

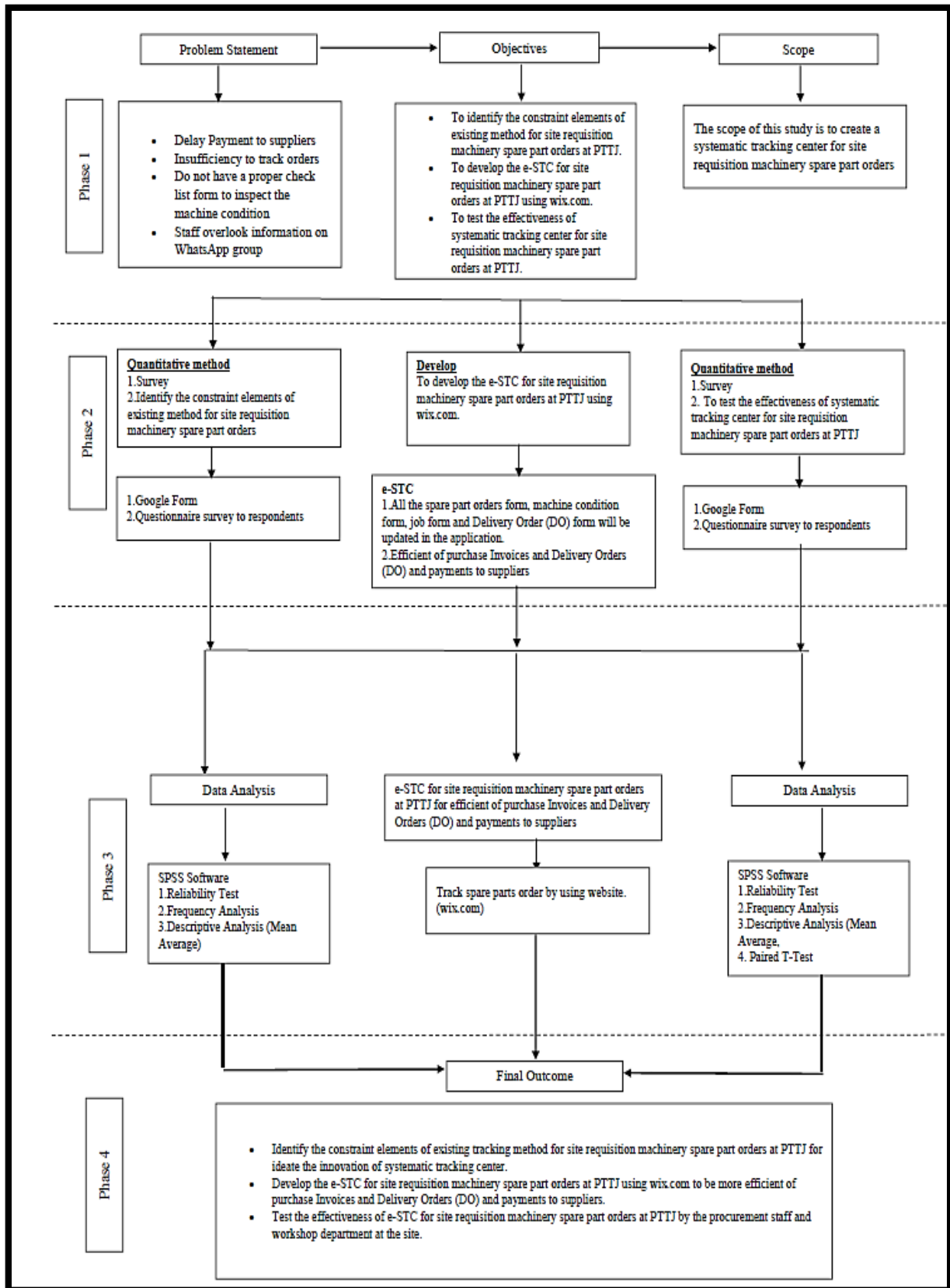


Figure 1: Research flow of Methodology

2.1 Data Collection

Data for objective 1 and 3 is collect through the questionnaire survey by respondents using a Google form. In this study, the quantitative method was chosen. The location of the study is conduct at PTT HQ under procurement department PTTJ and site because the analyst believes procurement department know the circumstance and situations facing related to machinery. Respondents are related person who are responsible for documentation order spare parts. A survey was given to 30 respondents consists of procurement department staff, site, and foreman to answer questions from the survey. In general, a larger sample size allows for more accurate and precise analysis of data and reduces the risk of sampling error. However, in some cases, a sample size of 30 respondents can provide enough data for meaningful analysis, particularly if the study aims to identify basic patterns or relationships in the data. According to Uma Sakaran (2003) sampling is a process of selecting an adequate number of populations to be reviewed so that the study and understanding of the nature or characteristics of the sample can represent the population. One of the most used methods is the Krejcie and Morgan Sampling Method. To simplify the process of determining the sample size for a finite population, Krejcie & Morgan (1970), came up with a table using sample size formula for finite population as in Figure 2 below.

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note. — *N* is population size. *S* is sample size.
 Source: Krejcie & Morgan, 1970

Figure 2: The sample size by Krejcie & Morgan 1970 (Sources from Google search)

2.2 Technology Acceptance Model (TAM)

The current global era, information systems are important in helping organizations run their activities. Without a good information system, it will be very difficult, given that the current global flow has become one of the main needs of the activities in an organization. An information system becomes indispensable as it can assist in carrying out the activities undertaken within the organization. Information systems today have become a major requirement in the running of the organization. In accepting a new technology system, not everyone will be well understood. Therefore, it is important to assess or measure the level of

acceptance and understanding recipients and users of information technology by measurement behaviour of the user. The Technology Acceptance Model (TAM) is a framework developed by Fred D. Davis in 1986. Davis's model in the adaptation of Theory Reasoned Action which assumes that one adopts a technology is generally determined by the cognitive process and aims to satisfy the wearer or maximize the usefulness of the technology. TAM is used to examine and measure factors that influence decisions whether one accepts or rejects the information technology. The TAM model is developed from psychological theory that explains that computer user behaviour is based on belief, attitude, intention, and user behaviour relationship. The purpose of this model is to explain the main factors of user behaviour toward acceptance technology users. In more detail explain the acceptance of IT with certain dimensions that can affect the acceptance of IT by the user.

2.3 Data Analysis

The analysis is using SPSS Software version 26 to analysis the Reliability Test, Frequency Analysis and Descriptive Analysis. The systematic use of statistical and logical methods to analyse data as credible evidence.

2.4 System Process and Development of e-STC for Site Requisition Machinery Spare Part Orders.

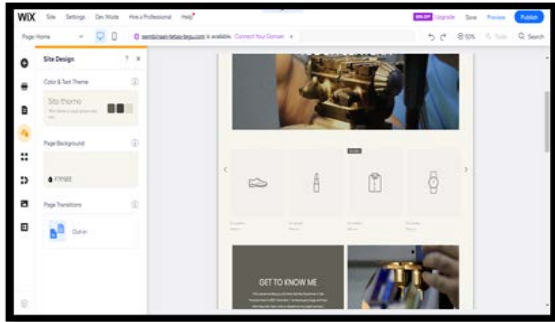
System processes are the result of gathering and quantifying a product's inputs and outputs across the course of its life cycle (ISO 14040:2006). System development refers to the process of creating or modifying systems, as well as the procedures, techniques, models, and methodologies required to do so. As a result, the system process and development mobile application tracking system are crucial to ensure that the process is properly developed and operated. To lead all labour activities while designing a mobile application, a systematic method is essential. However, to manage a successful product, analyse procedures to ensure product efficiency. e-STC for Site Requisition Machinery Spare Part Orders was built using wix.com website. Wix.com is a cloud-based website builder that is easy to use for user because of beginner-friendly to website builder. Wix.com also has hundreds of templates available for user to choose according to their needs. wix.com helps user editing website by adding variety element such as text, images, buttons, and so much more to the page, as shown in Figure 3 and Figure 4 below.



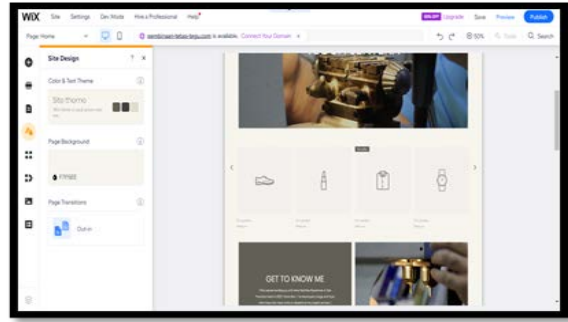
Figure 3: Design of e-STC for Site Requisition Machinery Spare Party Orders

Design of e-STC

Step 3: Design website using wix.com template.



Step 4: Home Page



Step 5: Order Form to order spare parts.

A screenshot of the 'Order Form' for ordering spare parts. The form includes fields for 'Ordered By*' (a dropdown menu), 'Date' (11/06/2023), 'Fleet No#*' and 'H/M' (text input fields), 'Site' (a dropdown menu), and 'Work type*' (a dropdown menu). There is a 'Parts Information' section with a text area for 'Please input P/N and quantity...'. A 'Verification*' section includes a reCAPTCHA widget and a 'SUBMIT FORM' button.

Step 6: Job Form for foreman update during inspection

A screenshot of the 'Job form' for foreman update during inspection. The form includes fields for 'Job Done By' and 'Date' (11/06/2023), 'Fleet No#*' and 'H/M*' (text input fields), 'Site' (a dropdown menu), and 'job type*' (a dropdown menu). There is a 'Detail of work performed' section with a text area for 'Please specify in details...'. A 'Parts & materials used' section has a text area for 'Please input P/N if possible...'. A 'Verification*' section includes a reCAPTCHA widget and a 'SUBMIT FORM' button.

Step 7: Machine Condition Form for foreman update after inspection

A screenshot of the 'Machine Condition Form' for foreman update after inspection. The form includes fields for 'Checked By' and 'Date' (MM/DD/YYYY), 'Site' (a dropdown menu), 'Fleet No.' and 'Model' (text input fields). There is a section for 'Overall machine Condition' with radio buttons for 'Critical', 'Average', 'Good', and 'Excellent'. A 'Parts in need of maintenance:' section has a text area. A 'Remarks:' section has a text area. A 'Verification*' section includes a reCAPTCHA widget and a 'SUBMIT FORM' button.

Step 8: Delivery Order for user upload documents

A screenshot of the 'Delivery Order Form' for user upload documents. The form includes fields for 'Supplier*' and 'Date' (13/06/2023), 'DO No.*' and 'Site' (a dropdown menu), and 'Receive By' (a dropdown menu). A 'Verification*' section includes a reCAPTCHA widget and a 'SUBMIT FORM' button.

Figure 4: Design of e-STC for Site Requisition Machinery Spare Party Orders

2.4.1 Material Used

The material to be used as tools and the functional of material development for e-STC as shown in Figure 5 below.







Materials Used to develop e-STC	
<p>Computers / Laptops</p>  <p>To create application, store data and test the functionality of the website.</p>	<p>Smartphone</p>  <p>To test the functionality of the website.</p>
<p>Internet/ Wifi</p>  <p>To link the computer and internet connect to upload the data.</p>	<p>wix.com</p>  <p>To develop the e-STC for Site Requisition Machinery Spare Parts Order.</p>
<p>Microsoft Teams</p>  <p>To upload the documents in the application.</p>	<p>Excel spreadsheets</p>  <p>To edit Microsoft Excel spreadsheets online without converting.</p>

Figure 5: Material Used

2.5 Testing of Product

The completed product was tested with a questionnaire distributed via Google form links. This product was tested on 30 members of the site team and headquarters employees. Pembinaan Tetap Teguh Sdn Bhd's 30 personnels include the Procurement Department, the Purchasing Department, and the Workshop Department. Davis' Technology Acceptance Model was used to create the questionnaire (1989). The Technology Acceptance Model (TAM; Davis, 1989) is one of the most influential models of technology adoption, stating that two fundamental factors impact an individual's willingness to utilize new technology and perceived ease of use and perceived value (Neil Charness, 2016). TAM most familiar variables being measured in this study which is Perceived Ease of Use, Perceived Usefulness, Attitude Towards Using Technology and Behavioral Intention to Use. The sample size was determined using Krejcie

and Morgan Table (1970) whereby for population of 30 respondents, 28 samples were adequate. However, all 30 population were involved in this study.

3. Results

There are various methods for determining the user's needs. In this project, the purpose of this questionnaire is to identify the need of systematic tracking centre for site requisition machinery spare part orders at PTTJ using data analysis and a questionnaire. The sample size was determined using Krejcie and Morgan Table (1970) whereby for population of 30 respondents, 28 samples were adequate. There are 30 respondents answered the questionnaire with the Likert scale will be used to determine the respondent's level of agreement on each item. The Likert scale items are description; 1 is Strongly Disagree, 2 is Disagree, 3 is Slightly Agree, 4 is Agree and 5 is Strongly Agree.

3.1 Reliability Test for Pre-Test

Reliability analysis allows us to study the properties of measurement scales and the items that compose the scales. The Reliability Analysis procedure calculates several commonly used measures of scale reliability and provides information about the relationships between individual items in the scale. For this study, Reliability test Alpha (Cronbach) used. This model is a model of internal consistency, based on the average inter-item correlation as Table 1 below.

Table 1: Reliability Test for Pre-Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.888	0.901	16

Cronbach's Alpha is one of the methods to measure reliability. The score below 0.6 is poor, between 0.6 and 0.7 is acceptable, between 0.8 and 0.9 is good, meanwhile, score above 0.9 is excellent. The result show that Cronbach's Alpha Based on Standardized Items is 0.901 and it is excellent in reliability test from questionnaire answered by respondents.

3.2 To identify the need of systematic tracking centre for site requisition machinery spare part orders at PTTJ.

3.2.1 Data Collection for Pre-Test

The techniques of collection from 30 respondents include detailed instructions on how to gather data from a questionnaire using Google Form. In this investigation, the quantitative technique was adopted. This strategy allows for the acquisition of dependable and accurate data, as well as rapid data collection and a broader area of data collection. Table 2 show the result of respondents related to Mean of constraint elements for existing method at PTTJ. There are 4 constraint elements of existing method in machinery sparepart order at PTTJ. The data was generated by using SPSS Software, version 26. The result as show in Table 2 below.

Table 2: Mean and average mean of the categories for existing method

Constraint elements of existing tracking method	Mean	Average Mean	Average Mean (%)
Minimize delay payment	2.03	1.98	25.10
	1.93		
	2.03		
	1.93		
Easy to track order	1.93	1.95	24.68
	1.93		
	2.00		
	1.93		
Systematic Tracking Medium	2.00	1.98	25.06
	1.97		
	1.97		
	1.97		
Effective communication	1.97	1.99	25.16
	1.97		
	1.97		
	2.03		
Total Average:	1.97	7.89	100

3.2.2 Frequency Analysis

Frequency analysis is a general method of analysis that is used in a wide range of scientific disciplines, not just social measurement research. Furthermore, it is a statistical branch that investigates the frequency of occurrences and evaluates metrics such as central tendency, dispersion, percentiles, and so on. Using SPSS to obtain the analysis frequency date. The Frequency show in Figure 6 below.

The result shows that more than 80% of respondents is disagree for all four (4) elements in existing method. The result show that the highest in percentage is the effective communication element; it is 99.17% of respondents is disagreed in existing method. Second highest is in Systematic Tracking Medium elements, it is about 98.33% of respondent disagreed because they only use WhatsApp group medium, next is the Minimize Delay Payment element which is about 98.34% respondents disagreed and lastly is the Easy to Track Order element, results by 93.34% respondents disagreed while using existing method for site requisition machinery spare part orders at PTTJ.

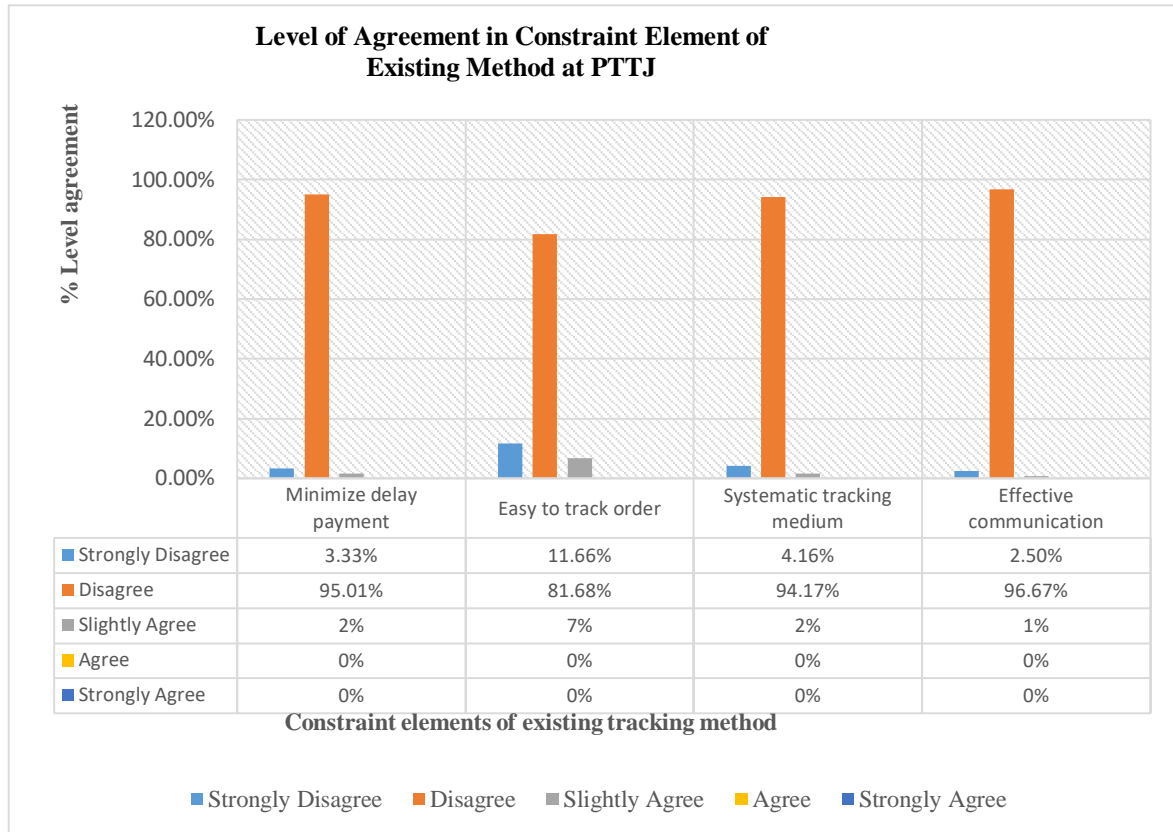


Figure 6: Frequency Analysis in Existing Method by percentage

3.3 Descriptive Analysis.

3.3.1 Average Mean

The constraint elements of existing tracking method had been identified. The result in mean and average means are referred in Table 3 below, interpretation is low in all elements of constraints with analysis revealing that the mean score for all variables examined was less than 2.50, indicating that the usability level of existing methods was poor. The result show that the Effective Communication element is the highest average mean score which is representative as 1.99 in average mean (25.16%) compared to another three (3) elements. Mostly, the average mean is less than 2.50 in all four (4) elements of constraints in using of the existing method for the site requisition spare part orders at PTTJ. It is showing the Mean Interpretation as Low category. Therefore, e-STC for Site Requisition Machinery Spare Part Orders needs to be develop.

3.3.2 Mean Range Interpretation

Table of mean score interpretation is referred in Table 4 below to interpret the pre - test result by respondents in using the existing method for Site Requisition Machinery Spare Part Orders at PTTJ by 30 respondents. The respondent level of usability toward existing method shows for all variables tested the average mean score were less than 2.50 meaning that the mean range level of existing method was Low. By referring to the interpretation of 5- point mean rating from Srisaard (2002).

Table 3: Average Mean in Existing Method

Constraint elements of existing tracking method	Mean	Average Mean	Average Mean (%)	Interpretation
Minimize delay payment	2.03	1.98	25.10	Low
	1.93			
	2.03			
	1.93			
Easy to track order	1.93	1.95	24.68	Low
	1.93			
	2.00			
	1.93			
Systematic Tracking Medium	2.00	1.98	25.06	Low
	1.97			
	1.97			
	1.97			
Effective communication	1.97	1.99	25.16	Low
	1.97			
	1.97			
	2.03			
Total Average:	1.97	7.89	100	

Table 4: Mean Range Interpretation (Source from Srisaard, 2002)

No	Mean Range	Interpretation
1	4.51 – 5.00	Very High
2	3.51 – 4.50	High
3	2.51 – 3.50	Medium
4	1.51 – 2.50	Low
5	1.00 – 1.50	Very Low

3.4 Develop e-STC for Site Requisition Machinery Spare Part Orders

The e-STC for Site Requisition Machinery Spare Part Orders is develop by using wix.com. The e-STC can track Invoices and Delivery Order (DO), update machine condition on site after inspection and order spare parts for machinery. All these works can be seen and done using e-STC for Site Requisition Machinery Spare Part Orders in the Design of e-STC for Site Requisition Machinery Spare Party Orders as show in Figure 3 and Figure 4 as explain in paragraph 2.5 before.

3.4.1 The Process to develop e-STC for Site requisition machinery spare parts order.

The process to develop of e-STC for site requisition machinery spare part order at PTTJ a s show in Figure7, Figure 8, Figure 9, and Figure 10 below. There are several steps to create, design and develop the website of the tracking system.


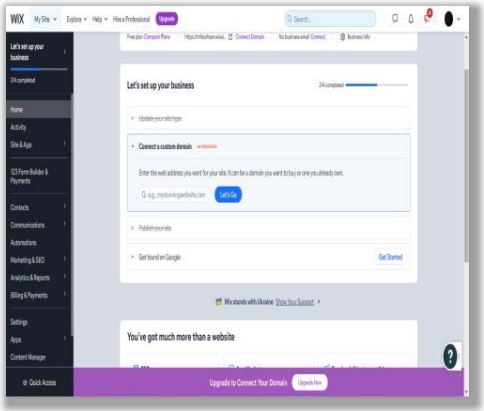
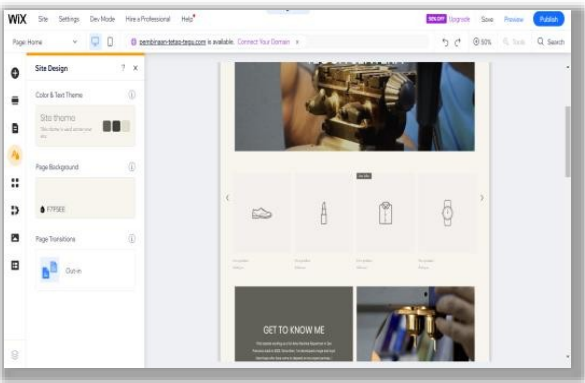
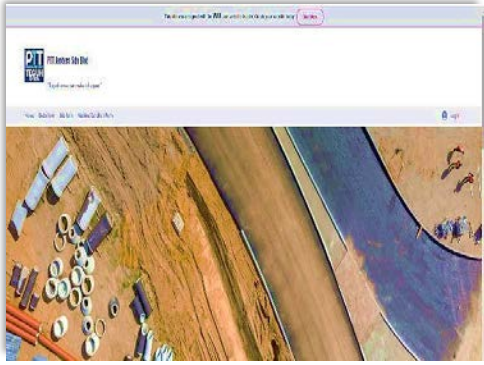
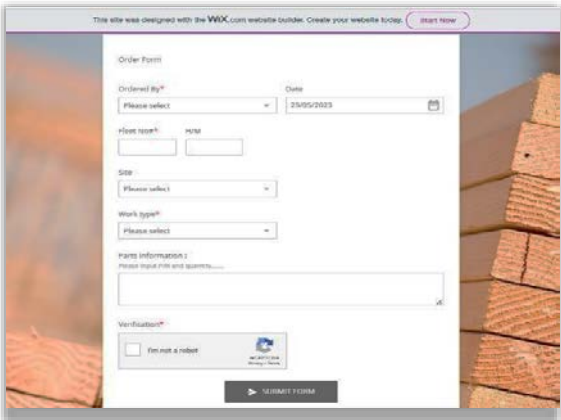
Process to develop of e-STC	
<p>Step 1: Create an account on Wix.com.</p> <p>Create an account using an email.</p>	<p>Step 2: Set up the website with Wix ADI</p> <p>Set up the website based on the type of site are building.</p>
	
<p>Step 3: Choose template from Wix.com.</p> <p>Choose templates from the relevant sub-category that been choose from.</p>	<p>Step 3: Design the website.</p> <p>Design the website based on the preference.</p>
	
	<p>Step 3: Build the website by adding forms Create a form for each section using templates in Wix.com. There are four (4) sections on this website:</p> <ol style="list-style-type: none"> i. Order form section for spare part orders. ii. Next is Job form for foreman update during inspection. iii. Machine condition form for foreman update after inspection and. iv. Delivery Order form for user upload documents related.

Figure 7: The process to develop e-STC at PTTJ

Process to develop of e-STC (continued)	
Step 4: Final product website development.	Final Product: Homepage of e-STC website Create details for Home Page.
	

Figure 8: The process to develop e-STC at PTTJ

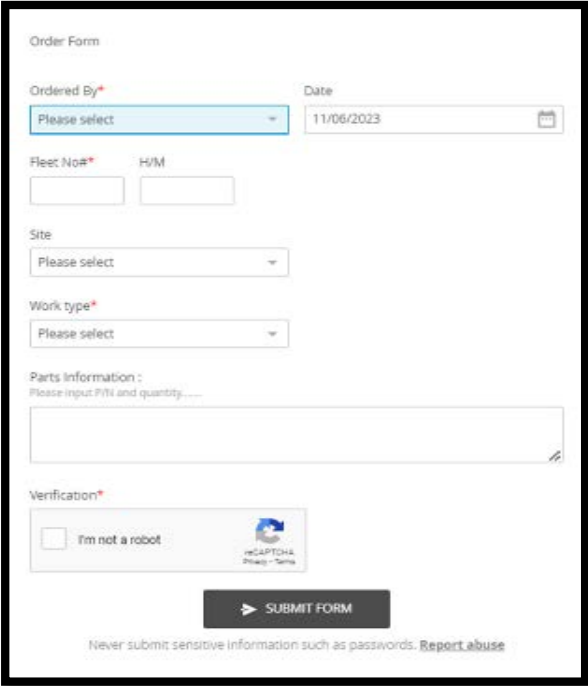
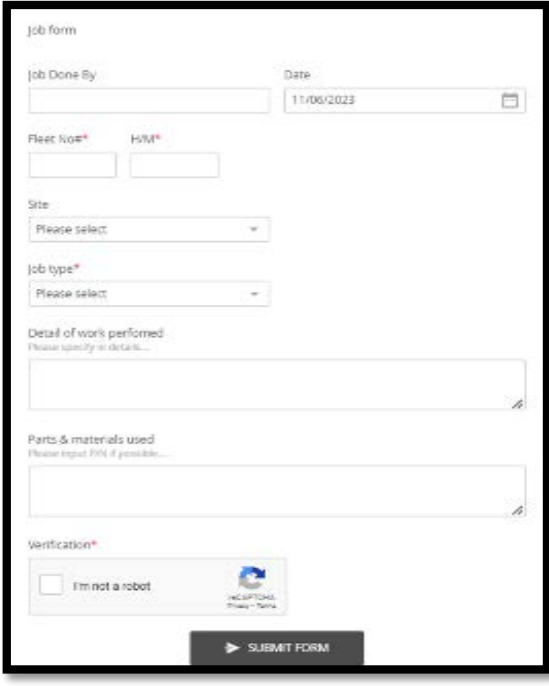
Final product of e-STC	
Order Form to order spare parts.	Job Form for foreman update during inspection
	

Figure 9: The process to develop e-STC at PTTJ

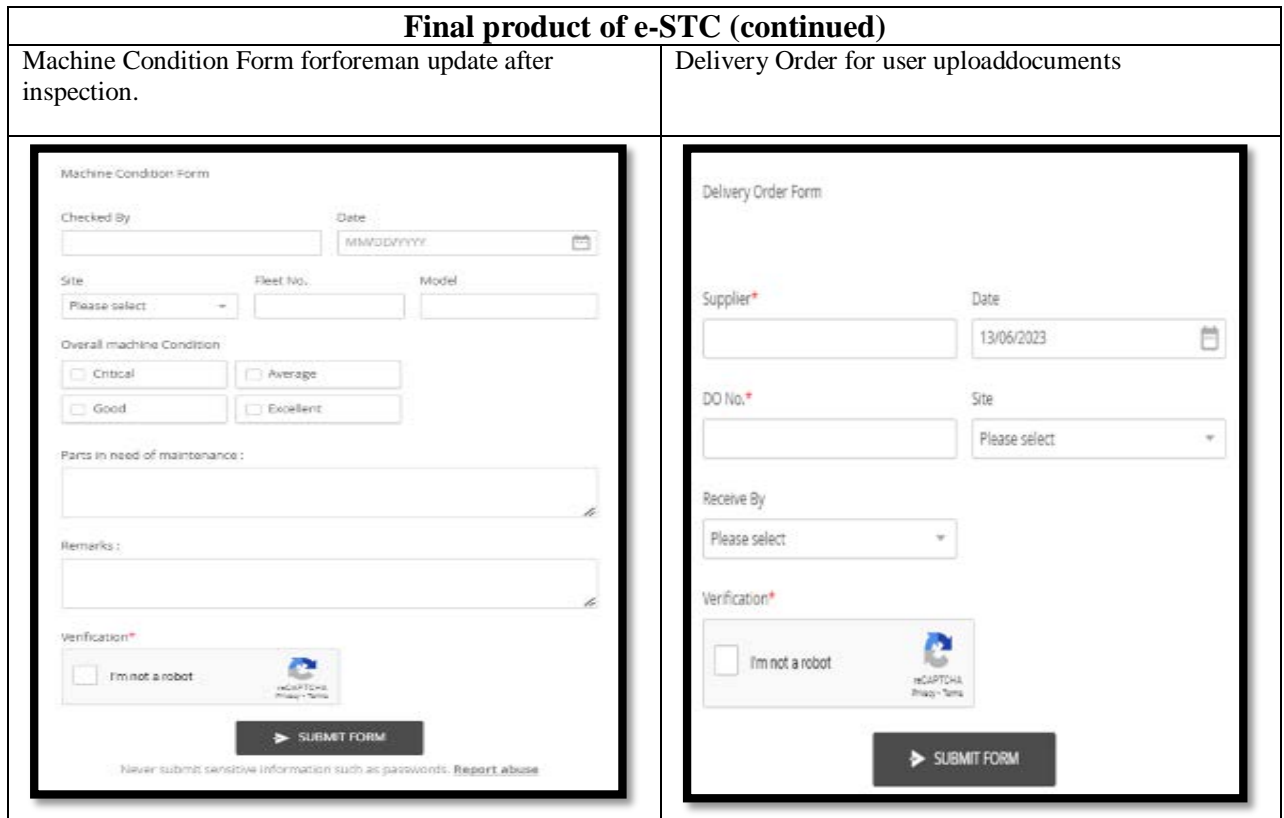


Figure 10: The process to develop e-STC at PTTJ

3.5 Test the effectiveness of e-STC for Site Requisition Machinery Spare Part Orders

There are 30 respondents answered the questionnaire and data collected from a questionnaire using Google Form. The analysis using SPSS Software version 26.

3.5.1 Reliability Test for post-test

There are four (4) elements that need to scale by respondents in questionnaire, to test the effective usage of e-STC. In addition, the questions were on the 5-point Scale with respondents in level of agreement from “Strongly agree” to “Strongly disagree”. To determine the questionnaire could “reliably” measure the latent variable like the effectiveness of e-STC, Cronbach Alpha test was conducted. The acceptable reliability value is 0.6. Therefore, the questionnaire’s reliability result 0.60-0.70 score is acceptable, and the questionnaire is considered “reliable”. The result as shown in Table 5 below. The average inter-item correlation according to Cronbach's Alpha Based on Standardized Items resulted as 0.731. The reliability result for the questionnaire is more than 0.6, is "reliable".

Table 5: Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.743	0.731	16

3.5.2 Frequency Analysis

Figure 11 show the percentage of respondents who agree with the use of e-STC for ordering spare parts at PTTJ. It is show that the respondents need e-STC for Site Requisition Machinery Spare Part Orders for more efficient to purchase Invoices and Delivery Orders (DO) spare parts machinery and efficient to release payment to suppliers. There are 100% agrees in all four (4) elements that the e-STC can minimize delay Payment, easy to track order, systematic Tracking System and Effective Communication. It shows that >80% respondents agreed in all four (4) elements of use the e-STC for Site Requisition Machinery Spare Part Orders at PTTJ.

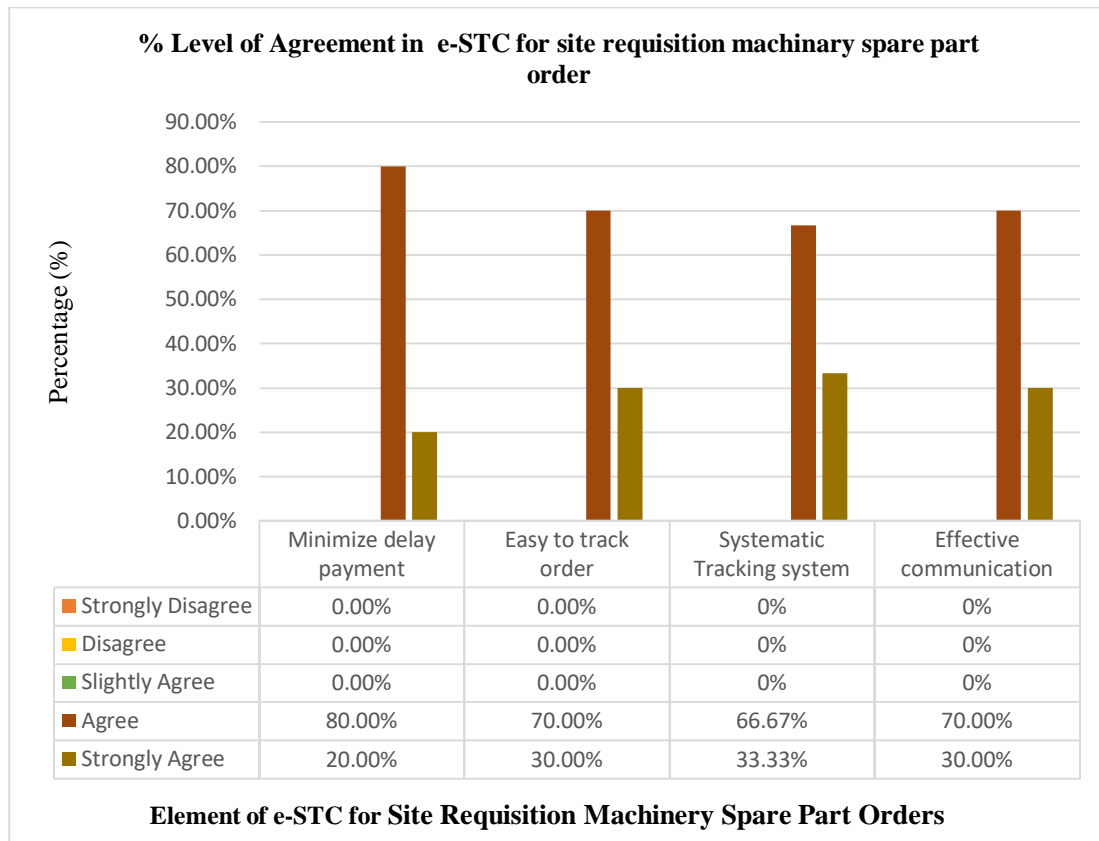


Figure 11: Frequency Analysis in e-STC as new medium

3.5.3 Descriptive Analysis

3.5.3.1 Average Mean

Table 6 is demonstrating respondent usability toward using e-STC, analysis shows that for all factors, examined, the mean score was greater than 3.51 -4.50 is High interpretation and score in average mean >4.5; interpretation Very High as referred in Table 4, Mean Range Interpretation (Source from Srisaard, 2002) as detailed in paragraph 3.3.2 Mean Range Interpretation above; indicating that using e-STC is significantly simpler than the present approach.

Table 6: Average Mean in e-STC

No	e-STC for Site Requisition Machinery Spare Part Orders	Mean	Average Mean	Average Mean (%)	Interpretation
1	Minimize Delay Payment	4.6	4.67	25.79	Very High
		4.73			
		4.60			
		4.73			
2	Easy To Track Order	4.53	4.53	25.06	Very High
		4.57			
		4.63			
		4.40			
3	Systematic Tracking System	4.70	4.53	25.06	Very High
		4.67			
		4.43			
		4.33			
4	Effective Communication	4.17	4.36	24.10	High
		4.67			
		4.43			
		4.17			
Total Average:		4.50	18.09	100	

3.6 Paired Samples Statistics

Paired samples statistics is the tests to compare the effectiveness of e-STC for Site Requisition Machinery Spare Part Orders as Figure 12 below, bar chart shows the respondent is more preferred to using e-STC which is average mean show the element in Systematic Tracking system, meanwhile is highest score, is 4.33. Next, second highest score in average mean is in Easy Track order element and Effective Communication, where each of the element score is 4.30 average mean. Lastly, the Minimize delay payment element is resulted as 4.20 in average mean. The result to be compare between existing method and e-STC is show in Figure 10 below. There are High in different mean between existing method and e-STC as a website. Figure 11 show average mean in differences of Paired

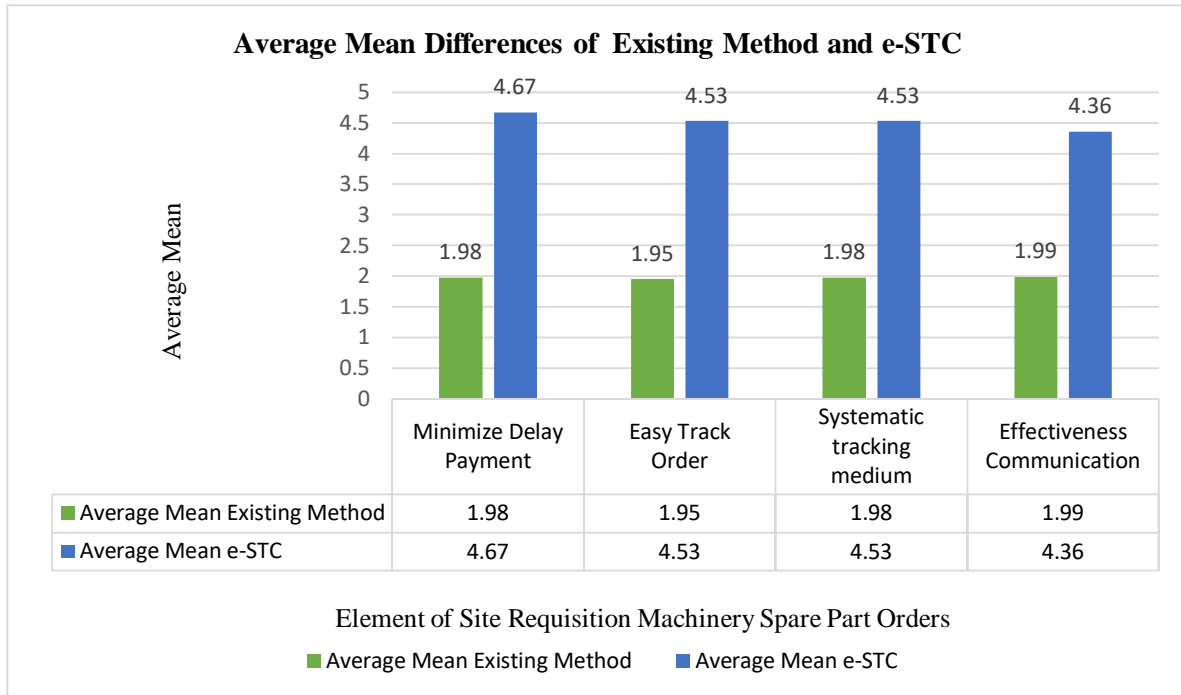


Figure 12: The differences in average mean of existing method and e-STC

From the result of difference average mean between existing method and e-STC as a Website as shown in Figure 13 below. The highest difference is in Minimize delay payment element, is 2.69, second highest is Easy Track Order element, is 2.58, third highest is Systematic Tracking System element, is 2.55 and lastly is Effective Communication element, is 2.37. Therefore, respondents agrees that e-STC Site Requisition Machinery Spare Part Orders at PTTJ is effectiveness in all four elements.

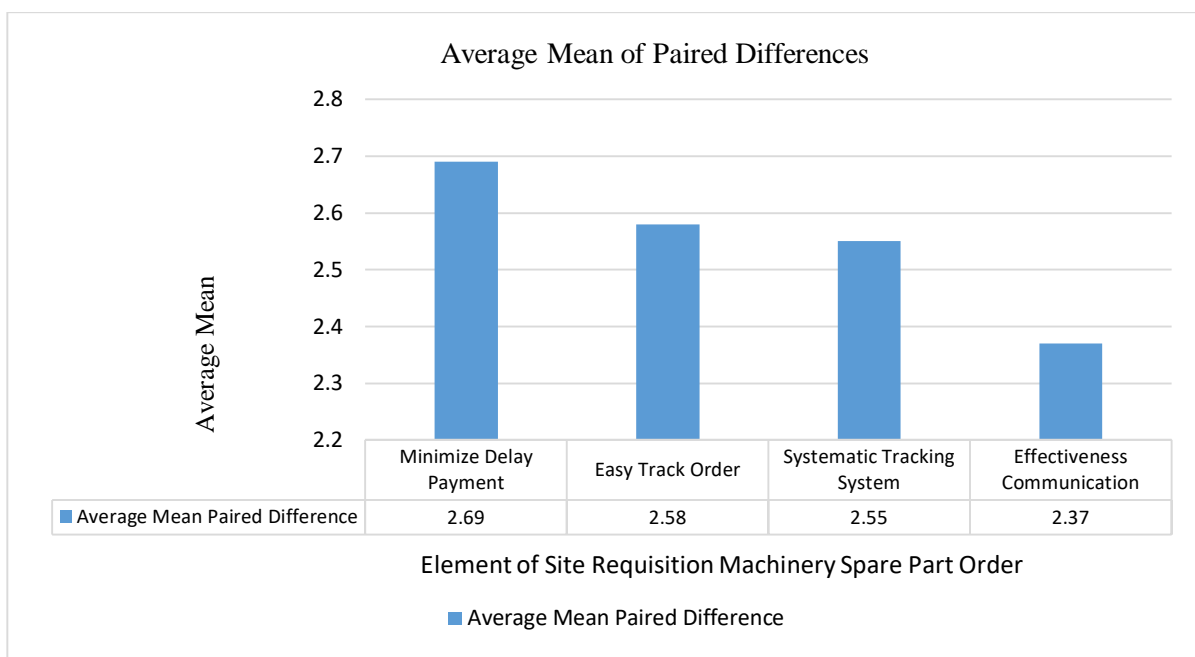


Figure 13: Paired Differences in Average mean between Existing method and e-STC

3.6.1 Paired Sample T-Test

Overall, as the result shows all the four (4) elements have the differences value. A paired found this difference to be significant, $t(4) = \dots, p =, p < 0.05$. Hence, e-STC is most efficient compared to existing method. A paired sample t-test found this difference to be significant for all variables as show in Table 7 below, the value of **t** of Minimize Delay Payment is 24.74 and the value of **p** is $< .00001$. The result is significant at $p < .05$. Next, the value of **t** of Easy to Track Spare Part Order is 28.83 and the value of **p** is $< .00001$. The result is significant at $p < .05$. The value of **t** of Systematic Tracking System is 34.07 and the value of **p** is $< .00001$. The result is significant at $p < .05$. The value of **t** of Effective Communication is 29.19 and the value of **p** is $< .00001$. The result is significant at $p < .05$. Therefore, the Website of e-STC for Site Requisition Machinery Spare Part Orders are more effective compared to the existing method.

Table 7: Result of Paired Differences

Pair	Paired Different Mean	t	Significant (two tailed)
Minimize Delay Payment	2.69	24.74	.000
Easy to Track SparePart Order	2.58	28.83	.000
Systematic Tracking Medium	2.55	34.07	.000
Effective Communication	2.37	29.19	.000

4. Discussion

According to oral interview and observations, most of respondents had issues with the delay payment to suppliers, insufficiency to track orders properly made by site and office, site does not have a proper check list form to inspect the machine condition and staff overlook information in WhatsApp group because lack of systematic tracking medium. The main aim of this study is to develop the systematic tracking centre (e-STC) for site requisition machinery spare part order using wix.com at PTTJ for more systematic and efficient of purchase Invoices and Delivery Orders (DO) and payments to suppliers. First objective is to identify the need of systematic tracking centre for site requisition machinery spare part orders at PTTJ. From survey to the respondents, resulted in mean and average mean interpretation is Low in all four (4) elements of constraints in using of the existing method for the site requisition spare part orders at PTTJ with analysis revealing that the mean score for all variables examined was less than 2.50, indicating that the usability level of existing methods was poor in all four (4) elements using existing method. Therefore, e-STC for Site Requisition Machinery Spare Part Orders needs to be develop. The second objective is to develop e-STC for Site Requisition Machinery Spare Part Orders using wix.com. The approach utilized throughout the study was addressed in method, including the creation of an application for the establishment of e-STC for Site Requisition Machinery Spare Part Orders using wix.com. The result show that the e-STC for Site Requisition Machinery Spare Part Orders successful developed. Third objective is to test the effectiveness of the e-STC for Site Requisition Machinery Spare Part Orders. From survey to the respondent to assess input from construction site team members, respondents highly

agree, according to the result are demonstrating respondents' usability toward using e-STC Website. Analysis shows that three (3) elements, examined, the mean score was greater than 4.50. It is resulted as Very High Interpretation and score in average mean is >4.5 . The elements are Minimize Delay Payment, Easy to Track Spare Part Order, and in Systematic Tracking System. For Effective Communication element, the score in average mean is 4.36; it is in mean range 3.51-4.50; interpretation High in agreed by respondents in using of the e-STC for Site Requisition Machinery Spare Part Orders for efficient of purchase Invoices and Delivery Orders (DO) and payments to suppliers.

5. Conclusion

In conclusion, based on the results of the disseminated questionnaire survey, it is feasible to deduce that they have roughly difficulties that occur throughout the document management process. All the respondents agreed that e-STC more efficient of purchase Invoices and Delivery Orders (DO) and payments to suppliers. The e-STC for Site Requisition Machinery Spare Part Orders was tested at the workshop and headquarters and was found to be successful. According to most respondents, the e-STC for Site Requisition Machinery Spare Part Orders helps to minimize delay payment, able to track spare part orders, enhance communication of team member and it is also user pleasant in construction sites and headquarters. Descriptive Analysis by Paired T Test, show that the systematic Tracking System is the highest among the four (4) elements in differences mean; is 2.55 with value of t is 34.07 and the value of p is $< .00001$. From the result, show that objective 1 and 3 was achieved. Hence, e-STC is of purchase Invoices and Delivery Orders (DO) and payments to suppliers at the same time save lot of time. Moreover, using e-STC for Site Requisition Machinery Spare Part Orders also helps Procurement staff to update machine condition on site and Workshop staff can order spare parts without any doubleorder. Next, the data on e-STC for Site Requisition Machinery Spare Part Orders is property and casual that only admin can register the user so that not simply user can access the website. e-STC for Site Requisition Machinery Spare Part Orders is online website storage and can be used with gadgets. This system is user-friendly where the system can be accessed anywhere and anytime, and the machine condition report can be shared with Microsoft Teams application. Only authorized people or webmasters can enter the website by have the link.

Acknowledgments

I would like to acknowledge and give my warmest thanks to my student Nur Azyyati Fari'ah Farizal Haryadi and stay strong to complete the Final Year Project at her company and I am Madam Noraziah binti Hamid as her supervisor who made this work possible. The guidance and advice carried through all the stages of writing the Final Year Project. I would also like to thank my committee members for letting the defence be an enjoyable moment, and for brilliant comments and suggestions, and exchange the idea during Presentation of Final Year Project session. Finally, I would like to thank Allah S.W.T, for letting me through all the difficulties. The passion to write a research paper has produce this paper writing.

References

- Chetty, P. (2022, May 18). Reliability test in SPSS using Cronbach Alpha. Knowledge Tank. <https://www.projectguru.in/reliability-test-in-spss-using-cronbach-alpha/>
- Davis, F. D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, 13 (3): 319–340, doi:10.2307/249008, JSTOR 249008, S2CID 12476939
- Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
- Malaysia Construction Market Share, Size (2022-27) | Industry Analysis. (n.d.). Retrieved October 31, 2022, from <https://www.mordorintelligence.com/industry-reports/malaysia-construction-market>.
- Sekaran, U. (2003). *Research Methods for Business: A Skill-Building Approach*. John Wiley & Sons, Incorporated, USA
- S. Rajasekar - Research Methodology | PDF | Hypothesis | Quantitative Research. (n.d.). Scribd. <https://www.scribd.com/doc/133967941/S-Rajasekar-Research-Methodology>
- Pheng, L. S., & Hou, L. S. (2019, January 9). The Economy and the Construction Industry. PubMed Central (PMC). https://doi.org/10.1007/978-981-13-5847-0_2
- Seo-Zindy R. Industry 4.0 to digital industrialization: when digital technologies meet industrial transformation; 2018 (11 June 2019). Available: industry-4-0-to-digital-
- Trochim, W. M. (n.d.). Descriptive Statistics. Descriptive Statistics - Research Methods Knowledge Base. <https://conjointly.com/kb/descriptive-statistics/>
- What Is Research Methodology? Definition + Examples - Grad Coach <https://gradcoach.com/what-is-research-methodology/>