

Digital Transformation for Improve Debt Collection Process on Spare Parts Transaction in Leading Heavy Equipment Company

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Abstract—This research was conducted at a heavy equipment distributor company in Indonesia that sells heavy equipment and spareparts. The objective is to design spareparts receivable billing improvement process which is focused on the process of sending invoice documents using the ITIL v.3 Framework on the Continuous Service Improvement (CSI) stage. The findings obtained in this study are related to billing documents that are still in hardcopy form, so it takes quite a long time in handling and delivery process, because they have to be sent from the company's work location and customers who spread in locations that are very far away to be received at the customer's head office. The implementation of the 7 steps improvement process which is the CSI framework in the ITIL v3 framework has succeeded in designing a bill document management system whose delivery leadtime can increase quite significantly from 9.87 days to 6.89 days by using the mechanism for sending documents via OneDrive, and from 9.59. days to 3.38 days with the mechanism of sending documents through host to host. In addition, the results of the CSI maturity level assessment on the receivables collection process also increased by 20% - 44% in each aspect.

Keywords— billing, heavy equipment parts, ITIL v3, CSI, t test.

I. INTRODUCTION

This research was conducted at a heavy equipment distributor company in Indonesia, hereinafter referred to as the "Company". In running its business, this company also sells spare parts for heavy equipment as an element of revenue contributor as well as after sales.

The current condition in the company is that the spare part sales portfolio through credit transactions reaches approximately 95%.

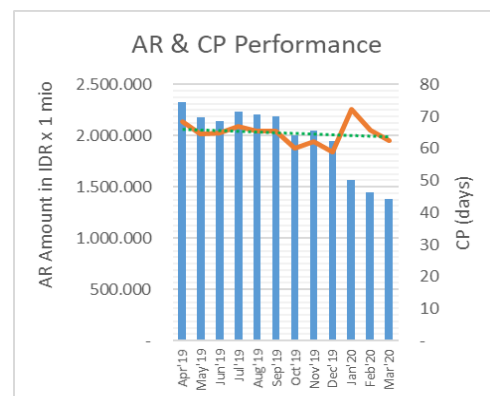


Fig. 1. AR and CP Performance (Source: Internal Company Data)

From the data in Fig. 1, it can be seen that AR has tended to fall quite a lot since the beginning of 2020, but it turns out that the collection period (CP) trend has risen again when viewed from the end of 2019. The average CP for the 12 months backwards is 65 days. If in detail again, the process of billing spare parts to customers and their lead time (collection period) can be sorted into the following process:

- Internal process, starting from the form of invoice documents to receipt by the customer (billing documents delivery) with an average leadtime of 10 days.
- External processing, starting from when the documents are received by the customer until they are paid with an average leadtime of 55 days.

The objectives of this study are:

- Designing a new billing document format and delivery system to improve delivery leadtime.

2. Increasing the CSI maturity level in the invoice document delivery system using the Information Technology Infrastructure Library version 3 (ITIL v.3) framework which is focused on Continual Service Improvement (CSI) to maintain the leadtime performance of invoice document submissions from time to time.

The research scope includes:

1. This research will focus on HO customers and with a pilot project implementation in 2 head office billing customers, namely customer A and customer B who are the customers who have contributed greatly to the spare parts transaction.
2. The process of improving the collection of accounts receivable, which will be discussed and corrected in this research, is only focused on the process of sending billing documents.

II. LITERATURE REVIEW & RESEARCH METHODOLOGY

A. Framework Information Technology Infrastructure Library v.3 (ITIL v.3)

ITIL or Information Technology Infrastructure Library is a series of concepts and techniques for infrastructure management, development and operation of information technology (IT). ITIL provides detailed descriptions of some of the most important IT practices with comprehensive checklists, tasks and procedures that can be adapted to suit any type of IT organization. On 30 June 2007, the United Kingdom's Office of Government Commerce (OGC) OGC published the third version of ITIL (ITIL v3) which is essentially five-part and puts more emphasis on managing the service lifecycle provided by information technology, namely Service Strategy, Service Design, Service Transition, Service Operation, and Continual Service Improvement.

The implementation of ITIL also makes IT functions more service and user oriented, better structure and coordination of IT functions through standardization and documentation of processes, clear roles and responsibilities, better synchronization of various IT services and increased transparency [6].

B. Continual Service Improvement (CSI)

CSI is a framework used to measure the performance of information technology services in a sustainable manner, develop information technology service processes and information technology structures to increase efficiency and work effectiveness. In implementing CSI, there are seven steps known as the "7 Steps Improvement Process" [12] which are Identify the strategy for improvement, Define what you will measure, Gather the data, Process the data, Analyse the information and data, Present and use the information, and Implement improvement.

C. Maturity Level Assessment for CSI

The CSI process maturity framework allows each ITIL process to be compared against the criteria defined for each level in the model. The result of this comparison is to determine the process maturity level for each process being reviewed. The assessment of current processes 'as is' and the criteria defined for each maturity level can be presented in a number of ways based on organizational preferences such as *FGD (Forum Group Discussion)*.

D. Hypothesis Testing with Paired Sample t-Test Method

This different test model is used to analyze the pre-post or before and after research models. Different tests are used to evaluate certain treatments in the same sample at two different observation periods [9]. According to Widiyanto [2], paired sample t-test is one of the testing methods used to assess the effectiveness of treatment, marked by differences in the average before and after treatment.

The basis of the decision to accept or reject H_0 on this test is as follows.

1. $H_0 : \mu D \leq 0$: There is no significant improvement after new treatment (in this case new e-billing)
2. $H_1 : \mu D > 0$: There is a significant improvement after new treatment (in this case new e-billing)
3. The critical α (alpha) is 0.05, which means the confidence level reaches 95%
4. Degree of Freedom (df) is $n - 1$
5. The criteria for acceptance of the hypothesis test are:
 - a. Accept H_0 if $t \text{ calculate} \leq t \text{ table}$ or $p\text{-value} > \alpha$
 - b. Reject H_0 if $t \text{ calculate} > t \text{ table}$ or $p\text{-value} \leq \alpha$
6. $t \text{ calculate}$ in data in excel is $t \text{ stat}$
7. $t \text{ table}$ in excel data is $t \text{ critical one tail}$
8. $p\text{-value}$ in excel data is $P(T \leq t)$ one tail

E. Research Methodology

The steps to be carried out on this research are as follows:

1. Identification of the vision, business needs, and company strategy related to the billing of spare parts and the things related to the process in it.
2. Process mapping and what variables will be measured. At this stage a plan will also be made related to measuring the maturity level of the current system related to the company's existing receivables collection process which includes 7 aspects of CSI, namely Service Management as a Practice, CSI Principles, CSI Processes, CSI Method and Techniques, Organizing CSI, CSI Technology Consideration, and Implementing CSI.
3. Collect data

The data that will be taken for research material are document delivery data and also an assessment of the maturity level of the current system related to sending invoice documents.

4. Process the data

From the data that has been processed, it will illustrate the current condition of the delivery of spare parts billing documents at the company. And from the data related to the assessment of the maturity level of the system, it will be known which category the current position is in.

5. Analysis

The data that has been processed will be analyzed in relation to billing document leadtime, and CSI maturity level assessment

6. Gap Analysis

Compare the result assessment of the CSI maturity level which with the ideal conditions or targets of the company.

7. Program Design

The information and data obtained from the results of the analysis will be used by researchers to be discussed in the FGD with an expert team in company.

8. Implementation

To carry out the process of implementing a new invoice delivery program/system, the steps that need to be taken are socialization and approach to customers, outreach to the internal team, and after an agreement is made with the customer, then implementing the new system / program.

9. Evaluation & Validation

Carried out by observing transaction data that has implemented the new system/program. And also conducted a gap analysis between the conditions before the improvement with the conditions after the improvement.

10. Conclusion & Recommendation

Conclusions are made based on the steps that have been taken during the research process. Suggestions in this study are input in the form of improvements that are still needed to further increase the useful benefits for the company.

III. RESULT & DISCUSSION

A. Direction of Company Strategy Regarding Receivables Collection (AR) Spare Parts

The Target Collection Period for Customer A and B is 32 days and 62 days, respectively. The target is based on the mutually agreed Term of Payment, namely 30 days each for customer A and 60 days for customer B, then added with the target leadtime for sending documents for 2 days. The 2-day document delivery target is based on the longest fixed waiting time, namely the process of issuing a tax invoice from the state tax system. And for other processes it means that it must be faster or equal to 2 days so that the target leadtime for delivery can be achieved.

B. Billing Document Delivery Process and Leadtime on Current Conditions

The results of the mapping of the spare parts receivable billing process along with the lead time of the process that occurs before the repair process for customer A and customer B can be seen in Table 1.

TABLE I
MAPPING PROCESS DETAIL AND LEADTIME OF BILLING DOCUMENT DELIVERY

No	Activity	Leadtime Customer A		Leadtime Customer B	
		Avg	Standard Deviation	Avg	Standard Deviation
1	Print the invoice, collect billing documents attachment (delivery note, tax invoice), and submit documents to Department Head	3,71 days	3,37 days	4,29 days	4,90 days
2	Checking and signing billing documents				
3	Send billing documents and document receipt to UT head office via expedition				
4	Delivery the documents from Company Site to Company Head Office (L/F – A/F)	3,19 days	2,61 days	4,27 days	3,99 days
5	Checking billing documents, update document receive date in company system	2,97 days	3,23 days	1,03 days	2,38 days
6	Send document receipt and billing documents to customer via city courier				
7	Delivery the documents to customer				
8	Receive the documents and signing document receipt				
9	Send back document receipt to Admin Company Head Office				
10	update customer receive date in company system				
Total		9,87 days	5,58 days	9,59 days	6,88 days

From the data, it is found that the lead time for submitting billing documents has not been able to meet the ideal or target of management, which is 2 days. The results of the data processing analysis were discussed in the FGD

forum to look for obstacles that existed in each part of the process. The bottleneck identified on the process of sending invoice documents are, delayed for invoice printing, waiting for return delivery note, waiting for the tax invoice, availability Department Head for sign the documents, availability of admin, and availability of city courier

The problems that arise will then be discussed in the FGD forum to find ideas for improvements in the future.

C. Result Maturity Level Assessment CSI for Current Condition

The CSI maturity level assessment of current conditions is carried out through an FGD with a team of IT experts, project leaders, and process owners who have long experience in the company. The results of the FGD on the CSI maturity level assessment of the current conditions are shown in Table 2.

TABLE II
SUMMARY ASSESSMENT RESULT OF MATURITY LEVEL OF CSI FOR CURRENT CONDITION

CSI Average score all participants, all questions	Result Assessment	Target Management
Service Management as a Practice	3,62	4
CSI Principles	3,57	4
CSI Processes	3,45	4
CSI method and techniques	3,25	4
Organizing CSI	3,49	4
CSI Technology Considerations	3,34	4
Implementing CSI	3,41	4

From the assessment results, it can be seen that none of the aspects have met the targets of management.

D. Program Design for Improvement

The results of measurement and analysis of the billing document leadtime as well as the CSI level maturity assessment in the document billing system on the current condition are continued with discussion or search for improvement ideas that can be done to further improve performance according to ideal conditions or targets of management in the FGD forum. The resulting improvement ideas can be seen in Table 3.

After the new system/program blueprint is finalized, the next step is to carry out system development by the company's internal team. And then carried out on the implementation of the new improved system/program.

E. Evaluation & Validation

After implementation for approximately 3 months, then the transaction data after implementation of the improvement is re-observed to find out the leadtime performance of sending invoice documents to Customer A as shown in Table 4.

TABLE III
BLUE PRINT NEW SYSTEM/PROGRAM

No	Before	After
1	Invoice hardcopy	E-Invoice (pdf file)
2	Approval invoice with signature on hard copy	- No signature on hard copy - Approval by system - Equipped with a QR Code can validate to the UT web (references such as the Tax Invoice QR Code model)
3	Delivery of invoice documents and their completeness in hardcopy form (invoice, tax invoice, delivery note)	Paperless delivery, adding a system for uploading scanned documents that are <u>still hardcopy (delivery note)</u>
4	Delivery of hardcopy documents by expedition (Tiki, JNE, HMU, etc.)	1. Delivery via email / one drive 2. Delivery via FTP server / Host to Host (for customers who have integrated the system with the company)

TABLE IV
LEADTIME DOCUMENT DELIVERY AFTER IMPROVEMENT ON CUSTOMER A

Customer Measurement	Leadtime Cust A (days)		Gap (%)	Gap Analysis
	Before	After		
Average of Leadtime Invoicing-Sent	3,71	3,92	-6%	1. Waiting for delivery note 2. Availability Dept. Head 3. Admin job load for doing scanning delivery note and upload documents to SAP
Average of Leadtime Sent-Received HO	3,19	1,05	67%	Already significantly improve, but still waiting checking and data downloaded by Admin HO
Average of Leadtime Received HO-Received Cust	2,97	1,92	35%	Need some process for checking and merged the documents as customer requirement
Average of Total Leadtime	9,87	6,89	30%	

There was an improvement in the leadtime for sending documents after the implementation of the improvements, where the improved leadtime was in the process after the documents were sent from the Site until they were received at the Company's HO and until they were received at the HO Customer. This is because the document is in digital form or soft file, so that the process of sending documents can be done online through the company's internal system. From the data in Table 5, it is

known that there is no decrease in leadtime in the invoicing process until the documents are sent, because they are constrained by still having to wait for the delivery note to return from the goods handover process with the customer. This factor is the biggest component where there is no improvement, and this was discovered when conducting interviews with the admin who carried out the process. The process from when documents are sent to, they are received at company headquarters is much faster because the delivery is done through the system. And for the document management process at the head office until it is received by the customer even though there has been improvement, there are still activities that are not optimal, namely there is a waiting time when the admin has to download, merge documents according to the request from the customer.

Likewise, observations are made on Customer B transactions after improvements are made as shown in Table 5.

TABLE V
LEADTIME DOCUMENT DELIVERY AFTER IMPROVEMENT ON CUSTOMER B

Customer Measurement	Leadtime Cust B (days)		Gap (%)	Gap Analysis
	Before	After		
Average of Leadtime Invoicing-Sent	4,29	3,38	21%	1. Waiting for delivery note 2. Availability Dept. Head 3. Admin job load for doing scanning delivery note and upload documents to SAP
Average of Leadtime Sent-Received HO	4,27	0	100%	No more activity in this step. Checking, validation, sending document already done automatically by system
Average of Leadtime Received HO-Received Cust	1,03	0	100%	
Average of Total Leadtime	9,59	3,38	65%	

There was an improvement in the leadtime for sending documents after the implementation of the improvements, where the improved leadtime was in the process after the documents were sent from the Site until they were received at the HO Customer. This is because the documents are in digital form or soft files, and document delivery host to host is done directly from the site to the HO customer, without going through the company's HO first. In addition, in the improvement scenario in Customer B, the process of sending documents is carried out automatically by the system.

From the data in Table 5, it is known that there is no significant reduction in leadtime in the invoice creation process until the documents are sent, because they are

constrained by still having to wait for the return delivery notes from the spare parts delivery process with the customer. The process of waiting for the republished document is the biggest component that causes no improvement, and this is known when conducting interviews with the admin who carried out the process. The process when the document is sent until it is received by the customer is on the same day because the process is carried out by an automatic system.

F. Maturity Level Assessment CSI for After Improvement Condition

The CSI maturity level assessment is again carried out on conditions after the improvement process is carried out with the same team as the previous assessment. The results of the CSI maturity level assessment of the conditions after improvement can be seen in Table 6.

TABLE VI
RESULT OF ASSESSMENT MATURITY LEVEL BEFORE VS AFTER IMPROVEMENT

CSI Average score all participants, all questions	Average Score (Before)	Average Score (After)	Gap
Service Management as a Practice	3,62	3,98	37%
CSI Principles	3,57	4,01	44%
CSI Processes	3,45	3,89	44%
CSI method and techniques	3,25	3,61	36%
Organising CSI	3,49	3,69	20%
CSI Technology Considerations	3,34	3,76	41%
Implementing CSI	3,41	3,81	40%

From the results of the assessment, it can be seen that there is an increase in the maturity level of all aspects of CSI after improvement. This happens because when carrying out the improvement process a better method has been carried out, namely using the 7 step improvement process framework which is the method of CSI ITIL v3., Where the steps to make improvements are explained in great detail and structure. However, to validate whether there has been a significant change in the conditions before and after the improvement process, it is necessary to test a hypothesis which in this study was conducted using the One Tail Paired Sample t-Test method using Microsoft Excel.

Furthermore, the calculations are processed in Microsoft Excel with the results as in Table 7. From the results of the t-test, it can be concluded that all aspects of the CSI decision are Accept H_1 , which means that there has been a significant increase or change after improvement.

TABLE VII
 RESULT OF T TEST

Assessment Criteria	t Stat	t Critical one-tail	P(T<=t) one-tail	Decision
Service Management as a Practice	7,370	1,740	$5,48 \times 10^{-7}$	Reject H_0 (Accept H_1)
CSI Principles	7,5	1,746	$6,34 \times 10^{-7}$	Reject H_0 (Accept H_1)
CSI Processes	21,527	1,682	$1,31 \times 10^{-24}$	Reject H_0 (Accept H_1)
CSI method and techniques	18,679	1,696	1×10^{-18}	Reject H_0 (Accept H_1)
Organising CSI	6,484	1,753	$5,16 \times 10^{-6}$	Reject H_0 (Accept H_1)
CSI Technology Consideration	18,817	1,753	$3,81 \times 10^{-12}$	Reject H_0 (Accept H_1)
Implementing CSI	16	1,833	$3,22 \times 10^{-8}$	Reject H_0 (Accept H_1)

IV. CONCLUSSION & RECOMMENDATION

Based on the results of the analysis and research that has been done, the conclusions that can be drawn are as follows:

A. Conclusion

1. Invoice was successful changed to digital document E-Invoice).
2. Delivery notes still have not been changed
3. For document delivery using alternative email, one drive, and host to host via FTP server.
4. Leadtime was improved.
5. Although there has been a leadtime improvement with the new system, but still cannot meet the management target of 2 days.

6. CSI level assessment maturity have been significant improvements or changes.

B. Recommendation

For the following developments, several recommendations are made as follows:

1. Need further research for change delivery note documents to be digital.
2. Need Further research for mechanism of sending documents through one drive or email for better leadtime.
3. Re-socialize and re-negotiate to others big customer to be able to send documents through host to host.
4. CSI implementation with ITIL v.3 framework needs to be more socialized and applied to other processes in the company.

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