IMPROVING SERVICE DELIVERY PERFORMANCE OF AIRPORT SELF-SERVICE TECHNOLOGIES
(CASE STUDY: TERMINAL 3 SOEKARNO-HATTA INTERNATIONAL AIRPORT)

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Abstract

In the last two decades, the air transport industry has grown tremendously all over the world. The airports were transformed from Airport 1.0 to 4.0, when all about traditional processes turned into full-connected with all stakeholders and superior activities. AP2 has introduced some new digital services in Terminal 3 Soekarno-Hatta International Airport (Terminal 3) focused on easing passenger journey, especially for the using of Self Service Technologies (SSTs). The service quality and performance of SSTs was still under an unacceptable level and the current investment is still ineffectively implemented. Using a modified conceptual model about the needs of service design for organizational change and enhanced value creation, this study is a mixed-research with assumptions that a problem was caused by organization contribution and the customer acceptance. The result from internal analysis identified that SSTs design interface (UI/UX) was identified as major fail points and from Qualitative Data Analysis that SSTs services in Terminal 3 still need many improvements. Furthermore, SSTQual customer survey with 143 respondents described that the highest gap on is Design dimensions with -0.357 and the lowest gap is Assurance dimensions with -0.199. Six proposed solutions were prioritized using AHP model and alternative 3 for Customer Feedback & Channel as top priority with Normal score 0.2645. This result will impact for airport operator to improve service delivery performance by business process improvement for achieving higher customer experience level.

Keywords: Airport Technology, Customer Experience, Digital Services, Service Dominant Logic.

1. Introduction and Purpose

In the last 20 years, the air transport industry has grown significantly all over the world. International Air Transport Association (IATA) released that air transport passenger numbers could double to 8.2 billion in 2037 globally. This continuous strong growth was contributed by a giant shift of increase to Eastward region (Asia Pacific), predicted a 3.5% compound annual growth rate, leading a doubling in passenger numbers from today's levels.

Asia Pacific region will contribute the biggest growth with more than 0.5 times of total number of new passenger market in next 20 years. This growth was driven by a combination of robust GDP growth, household income improvements, and changing lifestyle. China will become the world's largest aviation market in the mid-2020s, while Indonesia is forecast to be an outstanding performer jumped from 10th place in 2017 to the 4th position by 2030.

Indonesia has the biggest aviation market in South East Asia with a population of 230 million people, the number of air transport passenger has increased from 9 million in 1990 to around 90 million in 2016. Based on IATA forecast, Indonesia new air transport passenger was projected into 282 million new passengers of a total 411 million people in 2030, dominated by domestic passengers.

With the increase in the passenger volume of air transport industry, the airport sector is undergoing a period of rapid evolution. Airports, as key players in the industry, are trying to improve travelers' experiences. As airports continue to become more 'customer-centric', their digital customer-facing technologies are increasingly embedded within the passenger journey (Jaffer & Timbrell, 2014).

IATA since 2007 developed Fast Travel Program which main goal is to provide a seamless journey to and through the airport, at a cost that reflects the realities of modern aviation, triggered passengers to serve themselves by an advance technology. The latest amendment in 2016 covered six initiatives related to passenger journey, consist of check-in, bags ready to go, document check, flight rebooking, self boarding, and bag recovery.

Terminal 3 Soekarno-Hatta International Airport (Terminal 3), which operated by Angkasa Pura II, as the biggest airport terminal in Indonesia became the new battleground for implementing this concept. AP2 has introduced some new digital services focused on easing passenger journey to and through the airport, especially for the using of Self Service Technologies (SSTs). During the implementation, from the author's observation, the SSTs implementation has not really solved the problem that customers face. The service quality and performance was still under an unacceptable level of the goal of SSTs implementation.

On digital initiatives implementation, companies should provide a large investment of capital expenditures. This investment was expected to improve the level of service quality and customer satisfaction, by delivering the best value and benefits. Actually, the implementation had challenges such as airport ecosystem collaboration and culture adoption, so current investment still ineffectively implemented.

Service-Dominant (S-D) Logic, as introduced by Vargo &Lusch (2004, p.9), is a mindset for a unified understanding of the purpose and nature of organizations, market, and society. The foundational proposition is that organizations, market, and society are fundamentally concerned with the exchange of service. Although developed primarily in the marketing area, the S-D logic is applicable to areas other, including in airport business.

Related to this research, one of the core principle of the S-D logic is the co-creation of value, where the customer is "a co-creator of value" (Vargo &Lusch, 2008, p.7) and a company offers a value proposition, together the customer and organization create value.

2. The Original Framework

The conceptual framework of this study provides an outline that consists of the concept model from Andreassen & Et.al (2016) about the needs of service design for organizational change and enhanced value creation. This study has an assumption that the underperformance of SSTs could be caused by organization contribution and the customer acceptance for the delivered service.
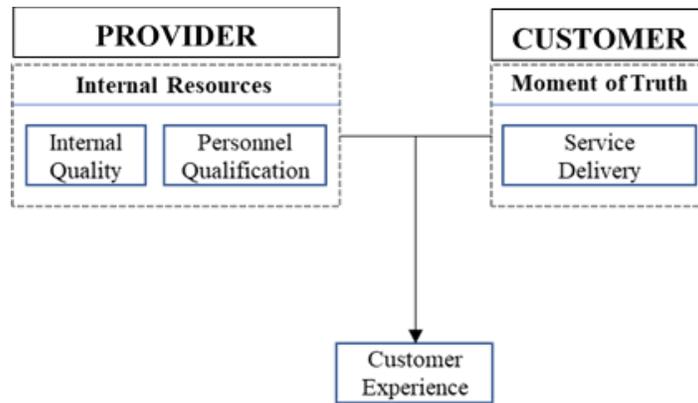
Figure 1 Conceptual Framework

Based on the conceptual framework, customer experience depends on how well the service was designed by the service provider (organization internal resources) and the acceptance from customers (service delivery). Furthermore, the design of SSTs from the organization's view was contributed by internal quality (service development process) and personnel qualification (how well the channel's interface with service personnel is designed).

3. Methodology

This research will use a mixed method research design, the most suitable method of collecting the data was in form of a survey for the quantitative approach and an interview for the qualitative approach. In this study, simple random sampling was used as the sampling method for quantitative approach.

In this research, the number of respondents was formulated using Slovin formula, with an estimated total population 10,500,000 departing passengers in 2018.

Number of departing passenger (2018)	10,500,000
Margin of error	10%
Confidence level	95%
Sample size	**97**

Figure 2 Sample Calculation

Based on the calculation above, this study will collect data from 97 respondents by simple random sampling method.

The SSTQual model proposed by Lin & Hsieh (2011) in terms on how measuring the service delivery in T3 was used as the main source for our structured questionnaire where data was collected accurately on the customers' expectations and perceptions of SSTs service quality. Lin & Hsieh (2011)SSTQual scale tried to measure the service quality of a SST and many researchers have adopted SSTQual and it is acknowledged to be the foremost scale for measuring the service delivery quality level of consumer-to-technology interactions. From all dimensions, in SSTQual, the table below described about the detail purpose of each dimension.

Table 1 The SST Quality Dimension

DIMENSION	DESCRIPTION
Functionality	Represents functional aspects of SST including reliability, perceived ease of use and responsiveness.
Enjoyment	Tests perceptions of perceived enjoyment during SST delivery and the outcomes of use.
Security/Privacy	Examines perceived security including fraud and general safety and loss of personal data.
Assurance	Portrays the confidence of the consumer in the competence of the SST provider.
Design	Tests the overall design of the SST service system.
Convenience	How accessible and convenient to use is the SST service.
Customization	Tests how customizable the SST is and if it can be adapted to meet the individual customers' needs and historic transactions.

This study is carrying out a mixed research and this will involve some quantitative and qualitative analyses. In order to analyze the collected data from the survey of this study, the author will use four different types of analysis in order to organize the information from the collected data.

Table 2 Data Analysis Tools

NO	SUBJECT	ANALYSIS	PROCESS
1	Internal Environment	• Service Blueprint • Interview	Fail Point Identification Qualitative Data Analysis
2	Service Delivery	SSTQual Survey	Using SPSS for: a. Reliability & Validity Test b. Descriptive Statistic
3	SSTs Quality	Root Cause	Ishikawa Diagram & Five Whys

4. Service Blueprint Analysis

From the six SSTs services that were observed in this study, there were 7 customer actions when using SSTs, with the main on-stage process on UI/UX of the SSTs services in Terminal 3. All SSTs services actually have not had an actual service blueprint yet, this figure was constructed by the author to describe how SSTs services were operated.

The backstage and support processes were dominated by how the SSTs connect to the system, network, and database. The current system and database involved several institutions, including Immigration, airlines, transportation operators, and AP2.

From the observation and key person interview for validation, the author has identified six fail points from current SSTs services in Terminal 3. From six fail points, the table below summarized 3 main problems that identified from current SSTs services.

For improving the SSTs service quality from provider side (AP2) considering the controllable factor, it needs to redesign the design interface (UI/UX) of current SSTs services.

5. Qualitative Data Analysis

For confirming the related issues of internal environment in the organization, the interview was conducted with four Senior Leaders from AP2 Head Office and Soekarno-Hatta International Airport Branch. It was held on the 16th to the 20th of May 2019, with 30 minutes time spent in average.

From the interviews, there were seven subjects based on interview question for exploring the interviewee perspective. The answers were transcripted and found 51 keywords/findings related to the provision of SSTs services in Terminal 3. The opinion consisted of two perspectives, in contradiction between positive and negative comments.

The author tried to simplify overall conversation and findings into 15 general themes. The summary described how the underperformance of SSTs services in Terminal 3 happened. In overall, it could be concluded that SSTs services in Terminal 3 still need many improvements to achieve high standard of customer satisfaction from provider perspectives.

For simplifying the internal perspectives, the contributed factors to SSTs under performance were started from pre-planning process. The picture below will summarize the interview result based on its staging.
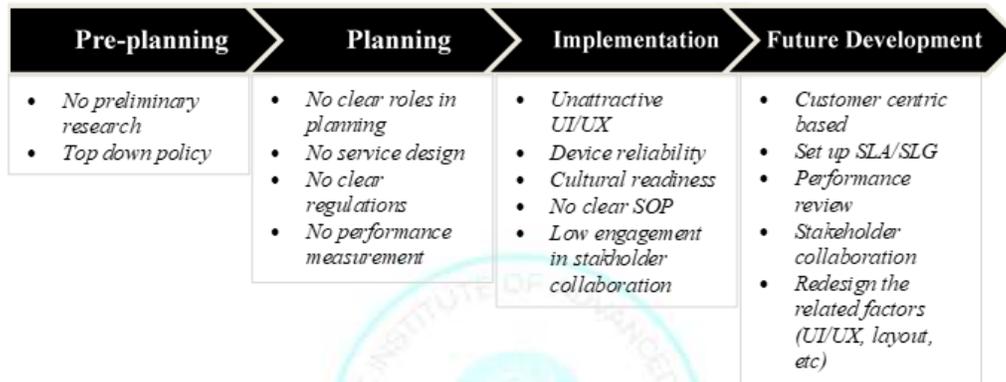
Figure 3 SSTs Staging Phase Review

6. SSTQual Customer Survey

The survey period was from 14-16 May 2019, with 179 total responses and 143 valid questionnaires (80% completion rate and 6 minutes time spent in average). The respondent gender was dominated by 107 male respondents (74.83%) and 36 (25.17%) female respondents. This data could reflect that currently the most user of SSTs was male, probably caused by the simplicity of travel characteristic compare to female.

From the validity and reliability test, both results for reliability test on customer perception and expectation had an excellent internal consistency, by getting Cronbach's Alpha number (α) above 0.9 from 21 survey items. If the results were observed in detail, the Assurance dimension had the lowest number for internal consistency, both for perception (0.788) and expectation (0.536). It could be caused by the respondents getting confused while stated their preference on AP2 corporate reputation based on the survey statements.

With the sample size of 143 and confidence level at 95%, the r-value is 0.1642. The author compared the value of corrected item-total correlation with 0.1642, both for customer perception and customer expectation.

All constructed variables were declared as valid variables with the value of $rxy > $ r-table product moment (>0.1642). Only one variable for customer expectation (FUN_3) was stated as an invalid variable.

From all SSTs service quality dimensions, the customer satisfaction gap from high to low could be ranked as following table:

Table 3 Gap Score Ranking

NO	DIMENSION	GAP	RANK
1	DESIGN	-0.357	1
2	ENJOYMENT	-0.351	2
3	CUSTOMIZATION	-0.345	3
4	CONVENIENCE	-0.324	4
5	SECURITY	-0.311	5
6	FUNCTIONALITY	-0.214	6
7	ASSURANCE	-0.199	7

From the customer perspective, it could be concluded that by having all negative gap result from all SSTs service quality dimensions, the customer expectation is higher than the perception of the SSTs use in Terminal 3. The highest gap is Design dimensions with -0.357 and the lowest gap is Assurance dimensions with -0.199.

Table 4 Gap Score Ranking Each Dimension

NO	DIMENSIONS	STATEMENTS	CODE	GAP
1	DESIGN	The layout of the firm's SST is esthetically appealing	DES_1	-0.357
		The firm's SST appears to use up-to-date technology	DES_2	-0.357
2	ENJOYMENT	The operation of the firm's SSTs is interesting	ENJ_1	-0.406
		I feel good being able to use the SSTs	ENJ_2	-0.385
3	CUSTOMIZATION	The firm's SST understands my specific needs	CUS_1	-0.413
4	CONVENIENCE	It is easy and convenient to use firm's SST	CON_3	-0.357

Considering the customer analysis results, it could be described that SSTs customers in Terminal 3 still feel that these services was not a customer centric based services and user friendly. The gap scores reflected that each dimension of SSTs needs to be improved in order to achieve the high performance of SSTs services.

7. Proposed Solutions

Based on all encountered problems in this study, the author proposed the business solution the Digital Experience Improvement Program, adopted and customized from Arthur D. Little study on AP2 Smart Connected Airport Roadmap (2018). This framework was expected to cover all related problems that arise in SSTs implementation in Terminal 3, both from provider and customer perspectives.

Figure 4 Digital Experience Improvement Framework

The first solution will focus on how to improve the delivery of customer-centric service experience. The other pillar explains how to strengthen digital-savvy organization.

1. Delivering Customer-Centric Experience, with four supporting programs:
   a. Redesign UI/UX of SSTs, based on ISO 9241-210:2019
   b. Customer Campaign, based on RACE Planning System
   c. Customer Feedback & Channel, based on Omni-Channel Customer Feedback
   d. Full Digital Concept (2nd Level), based on ACI Airport Digital Transformation

2. Strengthening Digital-Savvy Organization, with two supporting programs:

   a. Digital Organization Transformation & Training, based on Digital Master criteria in Digital Maturity Matrix

   b. Airport Digital Service Roadmap & KPIs, AP2 needs to re-set up and review whole process of current airport digital service roadmap and involving its customer to join co-creation (interaction) process before launching digital service platform in Terminal 3.

Furthermore, referring to the six proposed solutions above, this study needs to analyze the priority of all solutions using multiple criteria decision making process. It will help AP2 to implement the best solution based on timing and available resources for improving SSTs service quality in Terminal3.

In this step, the author used simple Analytic Hierarchical Process (AHP) to analize multiple criteria decision making based process.

Name	Graphic	Ideals	Normals	Raw
A.Redesign UI/UX		0.739084	0.195211	0.097605
B.Customer Campaign		0.942527	0.248945	0.124473
C.Customer Feedback		1.000000	0.264125	0.132063
D.Full Digital Concept		0.324629	0.085743	0.042871
E.Transformation & Training		0.311286	0.082219	0.041109
F.Digital Service Roadmap & KPIs		0.468557	0.123758	0.061879

Figure 5 AHP Calculation using Super Decisions

From the calculation result above, alternative 3 for Customer Feedback & Channel would be the top priority for AP2 to improve SSTs service quality performance in Terminal 3. The inconsistency in this calculation was less than 0.10 (max. 0.09).

Based on analysis of the alternatives using AHP, the implementation plan will divide into two stages, short term (quick-win) solutions and mid-term solutions. Quick-win solutions refer to solutions that could be implemented within 6 months and do not need significant budget (possibly using operation expenditure). Mid-term solutions are programs that need budget proposal to support programs and executed over six months until end of Q4-2020.

Furthermore, for implementing solutions, total estimated budget is around IDR 5,350 mio, consist of short-term budget IDR 680 mio and mid-term budget IDR 4,670 mio that proposed to 2020 budgeting year plan.

Conclusions

The low performance and low engagement level of SSTs in Terminal 3 caused by internal organization capabilities and customer needs. It needs a process improvement to meet the customer experience, neglected the corporate strategy that clearly stated in 5 years corporate plan. The proposed solution is how to improve the digital service quality by optimizing service delivery performance through continuous improvement related to people, process, and technology. The solutions were expected to meet customer experience in Terminal 3. This solution must be a customer centric, quickly implementable, and controllable.

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