

**INTEGRATED TICKETING SYSTEM OF PUBLIC TRANSPORT
IN JAKARTA VS VÄRMLAND, SWEDEN
(A Case Study of TransJakarta Busway and Commuter Train Jabodetabek
with Värmlandstrafik AB and Karlstad Buss)**

**INTEGRATED TICKETING SYSTEM PADA TRANSPORTASI UMUM
DI JAKARTA VS VÄRMLAND, SWEDIA
(Studi Kasus Pada TransJakarta Busway dan KAI Commuter Jabodetabek
dengan Värmlandstrafik AB dan Karlstad Buss)**

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Diterima: 7 Februari 2014, Revisi 1: 27 Februari 2014, Revisi 2: 13 Maret 2014, Disetujui: 21 Maret 2014

ABSTRACT

One service attribute in public transportation is the ticketing system. Currently, the ticketing system in Jakarta needs to be improved and is still not integrated. Therefore, it is important to develop and implement a new integrated ticketing system to increase the competitiveness and attractiveness of public transports. In order to describe and analyze the development of a new integrated ticketing system, this study uses a qualitative research approach and five sources of evidence i.e. documentation, archival records, interview, direct and participant observations through a survey using the form of questionnaires that were distributed to the public transport users. Further, this study also uses the case of Värmlandstrafik AB as the comparative study and the theoretical basis of the new services development as an approach to assess the possibility to implement a new integrated ticketing system. It aims to investigate the ticketing system phenomenon using information and data observations as materials to analyze, explore, and provide in depth explanation. By analyzing data from a survey of passengers, this study gives a description and explanation related to the characteristics and the travel behaviors of passenger, as well as an assessment of the ticketing system that underlies the development a new integrated ticketing system. Then, using the comparative case study of Värmlandstrafik AB that has already implemented an integrated ticketing system and the self-services in provision of public transport services gives an analysis of what needs to be prepared for implementing a new integrated ticketing system with consideration to the organizational process.

Keywords: *Integrated ticketing system, TransJakarta Busway, Commuter Train Jabodetabek, New Service Development (NSD)*

ABSTRAK

Salah satu atribut dari pelayanan jasa transportasi umum adalah *ticketing system*, dimana saat ini sistem tersebut belum terintegrasi dan masih memerlukan peningkatan layanan. Oleh karena itu, pengembangan *ticketing system* menjadi *integrated ticketing system* sangat diperlukan untuk menjadikan transportasi umum yang kompetitif dan memiliki daya tarik bagi pengguna jasa transportasi. Dalam melakukan analisis terkait dengan pengembangan sistem tiket baru yang terintegrasi, penyusunan penelitian ini menggunakan pendekatan penelitian kualitatif dan data yang bersumber dari dokumentasi, *archival records*, *interview*, *direct*, dan *participant observations*. Selain itu, penyusunan penelitian ini juga menggunakan kasus dari Värmlandstrafik AB sebagai comparative study dan teori *New Services Development* sebagai pendekatan untuk memberikan penilaian tentang kemungkinan dalam menerapkan *integrated ticketing system*. Dengan menganalisa data hasil survei pengguna jasa transportasi, penelitian ini memberikan *description* dan *explanation* tentang karakteristik dan *travel behaviour* pengguna jasa transportasi, serta penilaian terhadap layanan *ticketing system* yang mendasari perlunya pengembangan layanan menjadi *integrated ticketing system*. Kemudian, dengan menggunakan *comparative study* akan memberikan hasil analisis terkait dengan hal-hal yang diperlukan dalam mengembangkan *integrated ticketing system* berdasarkan pada *organizational process*.

Kata Kunci: *Integrated ticketing system, TransJakarta Busway, kereta komuter Jabodetabek, New Service Development (NSD)*

INTRODUCTION

The capital of the Republic of Indonesia, Jakarta is a metropolis city. In the year of 2010 the population approached 9 million at night and 12 million people in the day (BPS, 2012). This occurs because 3 million people commute during the day. People make their way to work in the city, especially people who live in cities around Jakarta such as; Bogor, Depok, Tangerang, and Bekasi. These areas are called 'Jabodetabek'. There are two kinds of mass public transport in Jakarta, commuter train and TransJakarta busway (BRT). The system of BRT has the flexibility being high performance operations and attributes of system into an integrated system (Levinson et al., 2003). Further, functional integration is a policy that allows the different travel modes to complement each other, so that multi-modal journey is easier (Potter & Skinner, 2000).

Nowadays, public transportation is not just moving people or goods from one place to another, but a service business. Vargo & Lusch (2008) argue that transport solutions need is Service Dominant Logic (SDL) to describe the customer value created and a services business, which is customer-oriented and relational. One strategy to increase the attractiveness of public transport is to develop an integrated ticketing system of commuter trains Jabodetabek and TransJakarta busway (Institute for Transportation & Development Policy (ITDP), 2005). Mezghani (2008) defines the ticket system as a translation of the tariff for the concrete means of payment for passengers and the collection of fees to operator. Further, the ticket prices depend on the type of tickets and media used in public transport networks. These encourage companies to increase the value of the service, because when people use public transport, they are paying for a service, and the value in the destination, punctuality, convenience, and security. The companies have to develop a service that creates value for existing customers, attracts new customers and the company's value or benefit (e.g. Edvardsson et al., 2000; Gustafsson & Johnson, 2003).

There are three main elements in the transportation sector such as; passengers or goods, transportation modes and infrastructure. Transportation sector derives demand and influence by other factors like political issues, tourism activities, economics, and industry. Jakarta as a city with high population, requires a public transportation system, that ensures the area has a high mobilization or transport of activity for studying, working, and shop-

ping as part of their daily activities. Public transport is one major issue in Jakarta and makes the government give notice to solve transportation problems. The number of both cars and motorcycles increasing every year and is raising some issues such as; air pollution, congestion, and high-cost economy. Based on Dirgahayani et al., 2007, the TransJakarta's system operates insufficiently, due to lack of intermodality measures implementation in improving the accessibility of the system and the risk of uncertainty of travel time caused by the transfer length and waiting time. This becomes a consideration in development of services both commuter train Jabodetabek and Transjakarta busway and provide better public transport services. An integrated ticketing system would lead to easier accessibility, flexibility, and reliability in public transport and will increase the attractiveness of public transport and reduce some of the problems caused by transportation. The overall aims of this research are to undertake an assessment on the public transport system, especially about an integrated ticketing system, describe and analyze how implementation of a new integrated ticketing system can improve the experience of travelling public, and analyze what needs to be prepared for implementing an integrated ticketing system.

LITERATURE REVIEW

1. An Integrated Public Transport

The modal integration is intended to transfer passengers from one to another mode of public transportation such as bus-rail interchange points and rail-link bus services. This policy must be supported by a travel demand management systems such as park and ride, bike and ride, and electronic road pricing (ERP). In situations they give more directed sense of integration of public transport modes in sequence process that need to be supported with the transport policy. From these definitions to create an integrated public transport are needed; location integration between bus shelter and train stations, the integration of scheduling, ticketing and information, integration of design services, namely; the legal and administration, as well as trip generation integration by integrating transport and land use planning (Potter & Skinner, 2000). Further, ticket is a tool for the implementation of a pricing policy with consideration of operational, commercial and social objectives. Ticketing system is a translation of the tariff to a concrete means of payment for passengers and the collection of fees to operator

(Mezghani, 2008). The ticket prices depend on the type of tickets used in public transport network as a single ticket from origin to destination or a single ticket with limited time for multiple trips, such as; 1 hour, single-mode tickets, integrated tickets, multi-trip tickets, season tickets (day, week, month, and year), off-peak tickets, and the combined ticket with park & ride.

2. Integrated Ticketing System

Ticket is a tool for the implementation of pricing policy with consideration of operational, commercial and social objectives. A ticketing system is a translation of the tariff to a concrete means of payment for passengers and the collection of fees to operator (Mezghani, 2008). The ticket prices depend on the type of tickets used in public transport network as a single ticket from origin to destination or a single ticket with limited time for multiple trips, such as; 1 hour, single-mode tickets, integrated tickets, multi-trip tickets, season tickets (day, week, month, and year), off-peak tickets, and the combined ticket with park & ride. There are differences of ticket media in several countries, but then have the same function as the ticket, namely: cash, tokens, paper tickets, magnetic strip tickets, contact based smartcard, contactless cards, and mobile ticketing (Mezghani, 2008).

3. New Service Development (NSD)

(Gustafsson & Johnson, 2003) argue that NSD consists of three process service development activities; (1) service maintenance, (2) improving service performance, and (3) service innovations.

4. Previous Research

There are several studies related to integrated transport system in Jabodetabek, Indonesia. The first study, the 'Study an Integrated Transportation Master Plan for Jabodetabek Phase 1 and 2' (SITRAMP). The study is a cooperation between the Government of the Republic of Indonesia and the Government of Japan that was conducted by the Japan International Cooperation Agencies (JICA) in 2002 and 2004 (BAPPENAS-JICA, 2002 and 2004). The result of this study recommends the development of integrated public transport in Jabodetabek, a master plan of public transport in Jabodetabek, and a hierarchical road system. The second study was the 'Study an Integrated Transportation Master Plan for Jabodetabek' that conducted by JICA and PUSWIK-UI in 2000. The results of this study suggest creating a comprehensive planning and detailed design of the operation, traffic management in favour of public transport,

improving maintenance to reduce costs, effective control and collection of data, income protection for the bus crew as motivation, and a competitive pricing system (JICA-PUSWIK-UI, 2000).

Other research is about 'Macro Transportation Pattern' which contains strategic issues and transport planning in the province of Jakarta (Public Transport Authority of DKI Jakarta Province, 2007). And reports grant from the U.S. Agency for International Development conducted by the Institute for Transportation and Development Policy (ITDP) entitled "Making TransJakarta a World Class BRT System" in 2005. This report shows performance improvement in the TransJakarta busway to develop as an integrated public transport, reliable, and competitive price with better service (Institute for Transportation & Development Policy (ITDP), 2005).

One of the points of assessment is that the current ticketing system on TransJakarta Busway still needs to be developed as multi-journey tickets and be integrated with other public transport modes. Today most passengers still use coupons / paper ticket with the customer paying by cash, which means revenue is collected from ticket sales at the bus stop and then deposited into the bank, and it is difficult to collect data on services. ITDP in this report also suggests how to provide a better ticketing system, in which the TransJakarta Busway could make a clearing centre operator to control and manage all the transactions of the ticketing system implemented. In order to develop the ticketing system the company should have; the money manager (usually a bank), the equipment provider, the ticket provider, the ticketing system operator, and the transit authority.

According to Dirgahayani et al., 2007, TransJakarta's system is operating insufficiently, due to lack of intermodality measures implementation in improving the accessibility of the system and the risk of uncertainty of travel time caused by the transfer length and waiting time. To overcome some of the problems faced by TransJakarta Busway, they suggest reducing the physical effort to develop park and ride facilities, minimizing the transfer and waiting time. Other obstacles are the availability of land and institutional issues. For more detail the process of planning public transport in Jakarta can be described, in the figure 1.

Further, based on (Psarros et al., 2011), waiting time is one important attribute for planning and development of public transit system. This research result shows the different characteristics of waiting time perception that are shown, in the table 1.

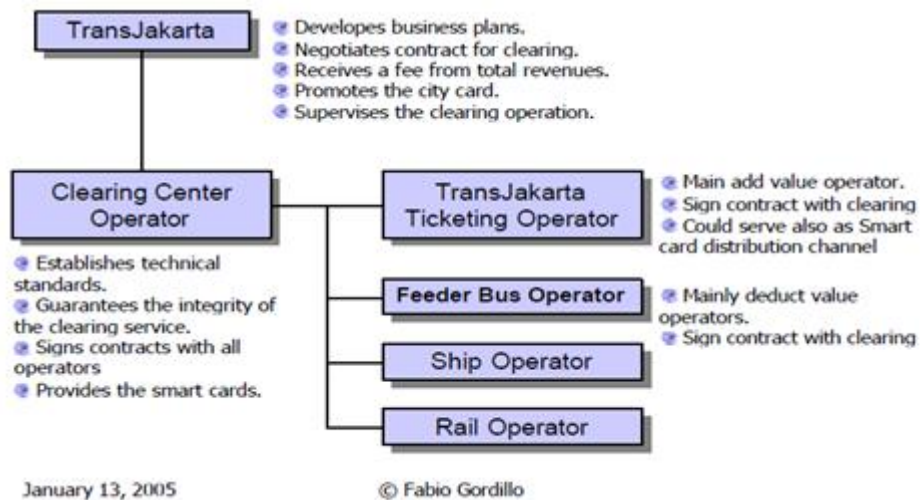


Figure 1. Process of Public Transport Planning (Institute for Transportation & Development Policy (ITDP), 2005)

Table 1. Actual and Peerceived Waiting Time of Passenger in Athens, Greece

Group	Average Perceived Waiting Time (minute)	Average Actual Waiting Time (minute)
Age Group		
< 18	7.65	5.56
18- 30	5.76	4.06
31- 45	6.30	3.85
46-65	7.21	4.19
More Than 65	6.81	3.84
Gender		
Men	6.22	3.87
Woman	6.53	4.30
Trip Purpose		
Going home from work	6.60	4.72
Work	7.23	4.73
Education	8.80	7.73
Personal	8.08	5.49
Entertainment	6.58	5.17
Shopping	7.91	5.86
Other	9.29	4.57

Source: Report Paper on TRB Annual Meeting 2011 (Psarros et al., 2011)

RESEARCH METHODOLOGY

This study used a qualitative research approach with quantitative data and was based on the previous research, literature review related to an integrated public transport system, observations, customer surveys, and comparative studies about an integrated ticketing system to attract car users and enhance customer satisfaction. Qualitative research tends to use words or pictures as materials analysis, derived from observations, previous reports, and literature studies (Denscombe, 2007). This approach allows researcher to explore the phenomenon, identify and describe its components, which can be a

practical guide for future research. Qualitative research is also appropriate to answer questions like, *what ...* and *how to ...*, or describe the experience. Differences between qualitative and quantitative research are qualitative research aims to explain the phenomenon, the subjective views of participants, small sample aimed to encourage their experiences, data could be information or documents as the written word, interviews, and pictures to be used for the analyses or interpretation of data. Otherwise, the purpose of quantitative research is to explore the cause or make a prediction with an objective perspective, the number of samples must be valid

to ensure that the data came from questionnaires or other objective measurements, and analyzing data using statistical methods (Thompson&Walker, 1998). One of the research processes is collecting primary data and secondary data. Primary data was obtained from observations and surveys of passengers by distributing the form of questionnaires to the passengers consists of 500 respondents from both TransJakarta Busway and the commuter train Jabodetabek within three weeks from 17th of April until May 5, 2012. The secondary data was obtained from literature studies as the material to make comparisons between public transport system in Värmland, Sweden and Jakarta, Indonesia. Based on (Yin, 2003), a case study is an empirical inquiry that investigated a contemporary phenomenon in the context of real life, which aims to explore in depth and explanation of the complexity of the situation. A *case study* of this typology is distinguished from *history* only by the fact that it focuses on contemporary events, and have access to several additional sources of data (Yin, 2003a: 5). This research investigates the passenger ship business phenomenon using information from the literature studies and observations to analyze, explore, and provide depth explanation. Further, case studies can use for exploratory, descriptive, and explanatory. In order to make it's easier, and then used the *word table* which displays the data on the same pattern, and the conclusion can be made (Yin, 2003).

Research subject consists of how public transport operators implement an integrated ticketing system, and what can be learnt from the system. The results of this study analyse and assess the possibility of developing a new integrated ticketing system in Jakarta, Indonesia, which intends to describe and explore the ticket system. Further, this research will lead to conclusions, managerial implications, and interesting questions for future research.

RESULT AND DISCUSSION

The e-ticketing system of TransJakarta Busway was launched by PT. Bank DKI, the JakCard as a pre-paid card on 2006. JakCard utilized the chip technology or smartcard used as a means of payment. At first it only operated in corridors 1, 2 and 3. Currently, the card operates in 8 corridors and will expand to 11 corridors. These cards provided in some merchants 'Indomaret' have logo 'JakCard Sale & Top Up', shelters along the 8 corridors, and 18 branches of Bank DKI throughout DKI Jakarta province. Based on information from Bank DKI (2012),

customers can top up the card to a maximum of one million IDR in Bank DKI in accordance with the regulations of Bank Indonesia. At the shelter subscribers can charge in denomination of IDR 20,000; 50,000; 100,000; 200,000, and 500,000; while in the merchant Indomaret 'Top up 50,000 IDR denominations and multiples there of. Further, the KAI Commuter JABODETABEK (KCJ) started operating in 2000, when the Indonesian government receive grants of 72 units of commuter train, and 50 units can be used directly and operated. Based on data from PT. Kereta Api Commuter Jabodetabek (KCJ), 2012, the company operated 192 units of commuter train. The company provided two categories of commuter train services as commuter AC and economy non AC. Most of the passengers buy tickets at counter sales in every train station or buy monthly cards. Nowadays, the ticket prices are almost the same for commuter train AC as 6,000 IDR per trip. On February 1, 2012, the company launched Comet card as Commuter Electronic Ticketing with implementation divided into 3 steps, the first step on February 1, to March 31, 2012, started by replacing Monthly Cards such as Kartu Trayek Bulanan (KTB) and Kartu Langganan Sekolah (KLS). At the first step e-ticketing system was implemented in 35 stations. The second step on April 1, to June 30, 2012, the system implement in 51 stations in Jabodetabek region and the Comet Card is sold for public or passengers. Further, the third steps on July 2012, by implementing the system in all stations at Jabodetabek area as 63 stations.

Since 1990, public transport operators in Värmland, Sweden have implemented an integrated ticketing system between railway and bus system. It started when the Värmlandstrafik AB delivered the regional railway services that before were provided by SJ's trains. The most important was to support an integrated ticketing system to connect between train stations and bus stops. The company built park and ride facilities in the train stations to attract private car users. The company also developed ticketing system and built cooperation with Karlstad Buss to make an integrated ticketing system. Nowadays, Värmlandstrafik AB and Karlstad Buss are developing the ticketing system together with the same system as the new smart card system from the German companies 'ATRON' and the system will be managed by Sweden companies 'BIMS'. Passengers can use public transport modes by a period card that is valid for Värmlandstrafik AB and Karlstad Buss. The new system will make an integrated ticketing system between eight public transport com-

panies in the middle of Sweden i.e. Dalatrafik, Karlstadsbuss, Länstrafiken Örebro, Västmanlands länstrafik, Tåg i bergslagen, Upplands Lokaltrafik, Värmlandstrafik, and X-trafik.

The result of passenger surveys using the questionnaire forms consist of 13 questions which are described in the table below:

Table 2. The Empirical and Data Result of Passengers Survey

Description	TransJakarta Busway (%)	Commuter train (%)
Passenger by gender	Male = 57,6 % Female = 42,4 %	Male = 56,4 % Female = 43,6%
Passenger by age	15-20 years = 12 % 21-30 years = 49 % 31-40 years = 18 % 41-50 years = 16 % > 50 years = 5%	15-20 years = 15% 21-30 years = 43% 31-40 years = 24% 41-50 years = 12% > 50 years = 6%
Passenger by occupation	Student = 20,8% Civil servant = 23,2% Private employees = 38% Entrepreneur = 4,8% Other = 11,6% Unemployment = 1,6%	Student = 21,2 % Civil servant = 25,6% Private employees = 34,8 % Entrepreneur = 10,8% Other = 6,8% Unemployment = 3,2%
Passenger by purpose of travelling	Go to home = 28,8% Shopping/pleasure = 17,6% Office = 55,2% Study = 11,6% Other = 1,2 %	Go to home = 36,8% Shopping/pleasure = 16,8% Office = 58,4% Study = 14,8% Other = 2,4 %
Passenger by the type of class services	-	Commuter Non-AC = 38% Commuter AC = 62%
Type of ticket used by passengers	E - tickets = 13,2% Paper tickets = 86,8%	E - tickets = 32,4% Paper tickets = 67,6%
Passenger by queuing of time	< 5 minute = 6 % / 2 % 5-10 minute = 44 % / 35% 11-15 minute = 26 % / 22% 16-20 minute = 9 % / 18% >20 minute = 6 % / 23% (To buy tickets/enter the bus)	< 5 minute = 29,6% 5-10 minute = 41,2% 11-15 minute = 15,2% 16-20 minute = 8,8% >20 minute = 5,2% (To buy tickets)
Frequency of passengers	<4 times = 54% 5-8 times = 35% 9-12 times = 10% >12 times = 1 %	<4 times = 20% 5-8 times = 26% 9-12 times = 50% >12 times = 4%
Use other public transport	Commuter train = 43% Para transits = 33% City bus = 14% Kopaja/Metro mini = 4% Other = 6%	TransJakarta busway = 26% Para transits = 42% City bus = 13% Kopaja/Metro mini = 11% Other = 8%
Use private car and public transport	Private cars = 13% Motorcycles = 52% Only transJakarta = 35%	Private cars = 21% Motorcycles = 50% Only transJakarta = 29%
Passenger who use mobile phone	Mobile phone = 95,6% Not use = 4,4%	Mobile phone = 92,4% Not use = 7,6%
Passenger who use ATM/credit card	ATM Card = 86,8% Credit Card = 15,6% Other = 13,2%	ATM Card = 87,6% Credit Card = 24,4% Other = 12,4%

Based on data from the survey of passengers will describe and analyze the characteristic of passengers based on gender, age, and occupation. The re-

sult showed that the number of male passenger higher than the female passenger. However, the differences in either male or female passengers of

TransJakarta busway as 15, 2 percent and commuter trains as 12, 8 percent. This means that the numbers of passenger have the same tendency and almost equally between male and female passenger, and the attractiveness users to use public transport is not influenced by gender, but the customer needs. The customer needs in public transport is intent to the Services Dominant Logic, which means customers use a public transport as solution of their need on daily activities and the passengers' value will be different depending the purpose of the trips.

The result of survey also showed that the most of passengers TransJakarta busway dominated by young people with the age of 21-40 years as 67 percent, which means most of the passengers were economically active. Based on information from (Central Bureau of Statistics Indonesia (BPS), 2012), *Labor Force* is persons with the age of 15 years old and over who worked, temporarily absent from work but have a job, which categorized as employed, and those who are unemployed and looking for work. Moreover, the number of passengers' commuter train dominated by young people with the age of 21-40 years as 67 percent, the passenger with the age of between 21-30 years old as 43 percent and the age of 31-40 years as 24 percent. This means that the most of passengers also categorized as economically active or labor force.

Public transport passengers comprised of private sector employees as 35, 96 percent, civil servants as 24, 11 percent, and the student as 20, 75 percent of the total number of 80.8 percent. This is lead to the various ability for pay the services. Companies have a possibility to implement competitive prices systems and services. Currently, the single trip fare of public transport in Jakarta using a flat rate even for students and elderly. This makes customers feel ordinary about the services offered by the company. The differences of passengers' occupation will generate options for using the class of service. Based on data survey (2012), commuter train passenger consist of 62 percent of commuters AC and the economy non AC as 38 percent. Company improve services and focus on their customers by changing the concept of service, which previously had three categories such as commuter train express, economy AC and non AC become commuter AC and Economy non-AC.

The travel behavior determine using some component, such as; the passengers' travel purpose, the frequency to use public transports, the type of public transport, and combine both public transport and

private car or motorcycle. Passenger using public transport as the solution need in their daily activity and the value different depend on the travelling purpose. The most of passengers are travelling to go home and office with total 73, 56 percent of daily trip, which means most of the passenger, are labor force and travelling purpose for working. It illustrates the situation of DKI Jakarta Province as the centre of government and business activities and the heightened mobility of employees who come from cities around Jakarta.

The frequency of passengers to use public transport comprised of TransJakarta busway users who use the services in a week for 4 times as 54 percent, 5-8 times as 35 percent, 9-12 times as 10 percent, more than 12 times as 1 percent, and the commuter train users dominated by passengers who use the services in a week for 9-12 times as 50 percent, 5-8 times as 26 percent, 4 times as 20 percent, and more than 12 times as 4 percent. This means that the company needs to improve the competitiveness and attractiveness of public transport to increase the frequency of passengers using public transports. Further, data survey showed that, there are 51 percent of passengers who use both motorcycles and public transports, and private cars users only 17 percent on average. This means that the public transports services ineffective to attract the private cars users. Therefore, needs to increase the accessibility of public transports, competitive prices, and develop park and ride facilities. The number of TransJakarta passengers who use the commuter train and Para transits called 'Angkot or Mikrolet' as 76 percent of the passengers and the commuter train passengers who use Para transits and TransJakarta busway with a total of 68 percent. This means that some of passengers also use other modes of public transport in daily activities to reach their destinations. So it needs to improve both the accessibility and flexibility of public transport system. The process of development an integrated ticketing system should be supported by implementing public transport management, such as; park and ride facilities and an Electronic Road Pricing (Ibrahim, 2003).

Commonly the passenger of public transport in Jakarta still using the one way tickets or paper tickets although the companies has develop e-ticketing system. Based on data survey (2012), the number of passengers who use paper tickets as the amount of 77, 2 percent on average, which is consist of the passenger of TransJakarta busway as 86, 6 percent and commuter train as 67, 6 percent. Otherwise,

the passengers who used e-ticketing system as the amount of 22, 8 percent on average both public transports i.e. TransJakarta busway and commuter train. This means that the attractiveness of passengers to use e-ticketing system is lower than paper ticket. The companies could increase the benefits using e-ticketing system to attract the customers and offers the competitive pricing system as the implementation of ticketing system.

The companies possible to develop a new integrated ticketing system with make cooperation that purposed to increase the competitiveness of public transport services and reduce the private car users. One of the reason of people choice private car than public transport, because lack of accessibility and need more time to use several public transport mode to the destination place. Some of the public transport infrastructure in Jakarta still not integrated each other. The companies need to develop together the route network and create an access connecting between the shelter bus and train stations, especially at central business activities. Currently, passengers need to walk far to the shelter bus and train stations, and need time for queuing to wait the bus or train and buy the ticket. Its cause take more time to use public transport for travelling along the area at city and increase the attractiveness of people to use private car and motorcycle. Based on data survey, the most of passenger has to queue between 5-10 minutes and 11-15 minutes for buying the tickets with total of 62, 8 percent passenger on average. The passengers queuing time of commuter train is

less than the TransJakarta busway, and according to the data survey, the most of passengers' commuter train has queuing time for buying ticket between 5 to 10 minutes and less than 5 minutes with total of 70, 8 percent. TransJakarta busway passengers has twice for queuing time to use the services, which first to buy the ticket and wait to enter the bus at the shelters and sometimes the bus only carry part of total passengers in the shelter. The passengers must be patient to wait the next bus with the same destination. These causes take more time to use the public transport and the condition of several shelters that crowded with a lot of passengers queuing became one of the reasons of people to use private cars and motorcycle. Consider to the area of Jakarta as the centre of government and business activities make people determine the travel choice mode based on the accessibility and travel time. This also influenced the travel behaviour of public transport user as explained in the previous section. Based on (Mishalani et al., 2006), there is a linier relationship between the passengers perceives of waiting times and the actual time at the bus stop, whereas the customer perceived was range of 3 to 15 minutes, and 94 percent of respondents waiting time is range between 3 and 9 minutes. And most of them willing to wait at the bus stop as long as 5 minutes.

The information and description in the previous chapter can be analyzed and discussed by making a comparison between public transport services in Jakarta, Indonesia and Värmland, Sweden that can be described in the following table 3

Table 3. Comparison Between Public Transport in Jakarta, Indonesia Värmland, Sweden

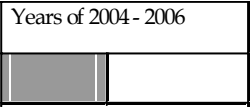
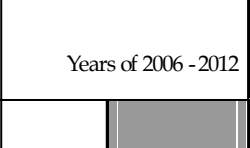
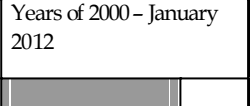
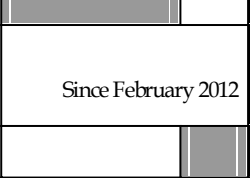
Items	Public Transports Systems	
	Jakarta, Indonesia	Värmland, Sweden
Organizations	TransJakarta Busway and Commuter Train are managed by the different companies, and the Public Transport Authority (PTA) i.e. PTA of provincial DKI Jakarta for TransJakarta busway and the Directorate General of Railways for commuter train Jabodetabek. The companies develop the ticketing system without cooperation of both public transport operator, and the pricing system using flat tariff.	Public transport services of both bus and train in the regional area of Värmland county is managed by Värmlandstrafik AB. The company builds cooperation with Karlstad Buss to provide the urban transportation in Karlstad municipality to increase the accessibility, flexibility by an integrated ticketing system, and competitive pricing system. The companies make cooperation with Sweden company 'BIMS' as third party to manage and provide the ticketing systems
Hardware; Interchange Physical Design	Public transport operator is trying to make a close connection both of TransJakarta busway and commuter train systems. The companies provide park and ride facilities in Ragunan and Kalideres shelter to connect private cars or motorcycles with TransJakarta busway and parking facilities in train stations. In several locations, the distance between the busway shelter and train stations is too far away and unconnected.	Already connects both bus and train by placing bus stops near the train stations. It can be seen from the network of Värmlandstrafik AB. The company also provides park and ride facilities in some of the train stations.

Software; Logical integration of information system	Signage, maps, and schedules information are still few and is provided in TransJakarta busway, shelters, commuter train and train stations in a traditional way.	The companies provide information about schedules, time table, and route, etc. in several ways such as; handbooks for customers, electronic board and live time in several shelters of Karlstad Buss, mobile phone apps that can be downloaded by passengers, and official website.
Finware; Combine ticketing and common fare system that consist of three components such as; fare collection process, payment media as tickets, and fare structure.	Already implement the e-ticketing system that can be used for inter-modality both TransJakarta busway and commuter train Jabodetabek. Most of the passengers use the paper tickets and fare collection in the shelter and train station, then deposit to the bank by cash. The tariff structure of TransJakarta busway uses the flat tariff system, although the e-ticketing only deducts the tariff based on the frequency of using the services and the fare same with one trip tickets.	Already implement an integrated ticketing system both bus and train services in region of Värmland, Sweden and urban transportation in Karlstad municipality in cooperation with Karlstad Buss. The companies will develop an integrated ticketing system between eight public transport companies that operate in six counties in the middle of Sweden. Currently, there is no cash payment to use public transport in Sweden and the ticket media use a smart card, mobile or SMS ticketing, Turkronor and vending machine of ticket for Karlstad Buss.

Based on the experiences of public transport in Värmland, Sweden that has already implemented an integrated ticketing system and developed the self-services in provision of public transports can be learned and adapted to improve the public transport services in Jakarta, Indonesia. The operator of both TransJakarta busway and commuter train have the possibility developing the self-services by providing vending machine of tickets, especially at main shelters of TransJakarta busway and make an inte-

grated ticketing system. The process of developing a new integrated ticketing system needs an organization that functions to provide the ticketing systems, manage the system with integrated pricing system and media as tickets, and collection of fee and distribution of revenue. This can be achieved by developing an organization as clearing centre and standardized tickets media, fare collection and system of ticketing to create an integrated ticketing system. This explanation can be illustrated in the table below:

Table 4. Stage of Implementation Ticketing System of Public Transport in Jakarta, Indonesia Värmland, Sweden

STAGE OF IMPLEMENTATION TICKETING SYSTEM OF PUBLIC TRANSPORT IN JAKARTA, INDONESIA			
TICKETING SYSTEM	TIME PERIOD	DESCRIPTION	PROPOSED
TransJakarta Busway : - Paper Ticket - Paper ticket and e-ticketing system called JakCard		- Actors of public transport are Provincial Government of DKI Jakarta, Public Transport Authority, and TransJakarta Busway. - E-ticketing system was launched on 2006 by PT. Bank DKI with first implemented in corridor 1, 2, and 3. Currently, the system operated in corridor 1 - 8 and will expand to corridor 11.	Several stages to implement an integrated ticketing system between TransJakarta Busway and Commuter Train Jabodetabek are: 1) Agreement between two companies that supporting by Directorate General of Railway, Ministry of Transportation, and Public Transport Authority of DKI Jakarta Province. 2) In general agreement to develop an integrated ticketing system consist of; data and information of parties in contract, the obligations and duties, type and specification of services i.e. technology of ticketing system, how to perform and evaluate the services, and time period. 3) Developing e-ticketing system together through a procurement process to determine the company to manage ticketing system i.e. technology, share the revenue, etc. both TransJakarta Busway and Commuter Train Jabodetabek.
			
Commuter Train Jabodetabek - Paper ticket and monthly card - Paper ticket and e-ticketing system called Comet Card		- Actors of public transport are Directorate General of Railway, Ministry of Transportation and Commuter Train Jabodetabek. - Since February 2012, the company launched Comet Card with implementation divided into 3 steps; the first step (February-March 2012) started by replacing monthly card and implemented in 35 train stations, the second step (April-June 2012) implemented in 51 train stations, and the third step started on July 2012 implemented in whole stations at Jabodetabek area.	
			

STAGE OF IMPLEMENTATION TICKETING SYSTEM OF PUBLIC TRANSPORT IN JAKARTA, INDONESIA

TICKETING SYSTEM	TIME PERIOD	DESCRIPTION	PROPOSED
TransJakarta Busway and Commuter Train Jabodetabek		- Each public transport operator has implemented e-ticketing system i.e. Comet Card and Jak Card, but still not integrated.	4) By creating a single company in developing a ticketing system whose purpose is to implement the same system of ticketing that lead to the specification of technology, and easier to evaluate the services. 5) Further, the companies (TransJakarta Busway and Commuter Train) elaborate to make an 6) integration facility and information.
			- Build cooperation between public transport operator in Jakarta through an agreement to provide card reader or ticketing machine in every shelter of TransJakarta Busway and Commuter Train Jabodetabek. - This is supposed to increase flexibility of public transport, whereby the Jak Card Holder enables to use commuter train and vice versa. The tariff is according to the ticket price that is implemented by each public transport operator. - Further, the public transport operator can improve to be one card for both public transport operator i.e. TransJakarta Busway and Commuter Train Jabodetabek. If customers use transJakarta busway then machine or card reader will deduct the transjakarta tariff as well as Commuter Train Jabodetabek. - By a new integrated ticketing system the public transport operator has possibility to implement several types of ticket prices as example in Sweden. - This is supposed to increase attractiveness of public transport services.

CONCLUSION

The development of a new integrated ticketing system is purpose to increase the public transport passengers and reduce the motorcycle and private car users as well as improve the competitiveness and attractiveness of public transport. The survey data deliver description related to the characteristic and travel behavior of passenger, also assessment of ticketing system that implemented by public transport operator in Jakarta, Indonesia. Although, this research focuses on the development of ticketing system based on the organizational process, by using a comparative study also give an assessment to the public transport operator that through an integrated ticketing system the company has flexibility to implement pricing systems, which means the ticketing system as the way of the public transport operator to offer the price and services. By using the case of Värmlandstrafik AB, it can be learned and adapted to improve the public transport system in Jakarta, Indonesia by developing the self-services and ticketing system to reduce queuing time. The public transport operator in Jakarta could be started by making an agreement between TransJakarta

Busway and PT. Kereta Api Commuter Jabodetabek (KCJ) related to the ticketing system. This is purpose to determine the ticketing system which shall be provided and built the organization as ticketing provider and clearing centre.

CONTRIBUTION

This study tries to contribute developing an integrated ticketing system by providing a description and explanation related to the characteristic of passenger, travel behavior, and assessment of ticketing system in Jakarta, Indonesia. Further, this study also give illustration of the process of development and implementation of a new integrated ticketing system regarding aspects of management and organizational process use the case study of public transport system in Värmland, Sweden as comparison.

INTERVIEWS

Mr. Johnny Albenius, Operational Manager of Värmlandstrafik AB and the representative of BIMS KB, Sweden.

Mrs. Eva Lotte Fermings, the representative of Karlstad Buss, Sweden.

Mr. Anders Dyberg, the representative of Karlstad Buss, Sweden.

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