Survey of passenger's choice on direct and connecting flights in Indonesian domestic market

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Air transport plays a significant role in Indonesia since the country has 13,000 islands crossing an expanse of over 5,000 kilometers. Jakarta Soekarno-Hatta Airport located in the Western region of Indonesia is currently facing serious congestion problems because of operating far above its capacity. Makassar Airport serves as a regional hub in the Eastern region, thus it is possible to be a large-scale domestic hub with increased connecting flights for mitigating congestion at Jakarta Airport. The objective of this study is to identify the passenger choice characteristics of direct and connecting flights in both full-service carrier (Garuda Indonesia) and low-cost carrier (Lion Air). The survey results in Jakarta and Makassar airports show that both direct and connecting flights' passengers chose "Fit in schedule" as their first preference. Passengers who chose Garuda consider it can provide better safety measures, while cheaper airfare is the main reason of Lion passengers.

Key Words : Passenger choice characteristics, Full-service carrier, Low-cost carrier, Indonesia

1. INTRODUCTION

Indonesia is a country with a population of 237,6 million (Statistics in 2010). GDP per capita is $3,475.2 (Statistics in 2013), which ranks 5th in ASEAN and 144th in the world[1]. Indonesia has 13,000 islands crossing an expanse of over 5,000 km, thus only aviation can connect efficiently Indonesia's nearly 240 million inhabitants domestically and to the world. As the ASEAN moves forward with liberalization, it is important that Indonesia is well prepared with a safe industry operating on global standard infrastructure.

Table 1.1 Comparison of capacity, traffic and expansion plan in several airports   unit [million Pax]

	Jakarta	Surabaya	Denpasar	Makassar
Traffic in 2012	52.5	13.8	12.8	7.5
Capacity	22	7.4	9.4	7.3
Expansion Plan	62	12	25	-

Table 1.1 shows the top four airport among Indonesia's twenty-six largest airports that are currently operating over design capacity[2]. In order to alleviate the severe congestion in Jakarta Soekarno-Hatta Airport (CGK), hub-and-spoke system can be implemented in the east of Indonesia. The network of current system and new hub-and-spoke system in the eastern Indonesia are shown in Fig 1.1 and Fig 1.2, respectively. In this new system, Makassar airport (UPG), which locates in the middle of eastern Indonesia, will be utilized as a regional hub airport. In the current system, single aisle aircrafts with the capacity of approximately 170 passengers (e.g. B737), are used from CGK to local airports in the eastern Indonesia. While in the proposed hub-and-spoke system, twin aisle aircrafts with the capacity of approximately 500 passengers (e.g. B777) will be used to fly from CGK to UPG, and then go to eastern local airports through transit at UPG by regional jets. The frequency of regional jets from UPG to local airports might be higher than the current system.

Because twin aisle aircrafts will be used in new hub-and-spoke system instead of single aisle aircrafts, the number of flights that departure from CGK will be decreased, which is expected to alleviate congestion in the airport. However, travel time as well as inconvenience will increase because passengers need to transit at UPG. For airlines, although unit cost can be reduced as Available Seat Kilometers (ASK) increases, huge budget is needed for

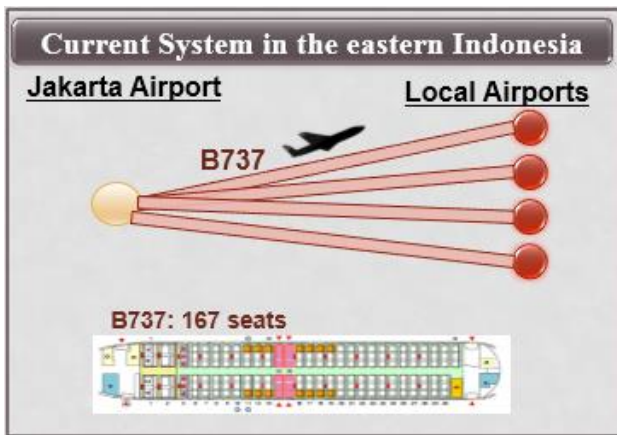changing aircrafts. Moreover, they may also lose passengers that are loyal to direct flights.

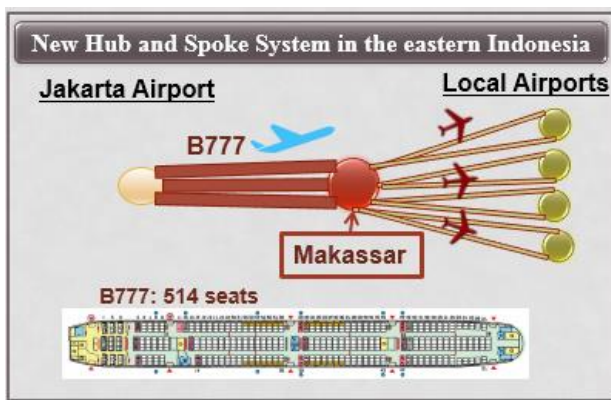**Fig 1.1** Network of Current System

Fig 1.2 Network of New Hub-and Spoke System

In order to transform from current system to the new hub-and-spoke system successfully, three questions need to be answered, they are: (1) Why do passengers in Indonesia choose direct flight or connecting flight? (2) Under what conditions will direct flight passengers choose connecting flight? (3) Is there any behavior difference between full-service and low-cost carriers?

In this study, in order to find the answers of the above questions, passenger characteristics of direct flights and connecting flights in both full-service carrier (Garuda Indonesia) and low-cost carrier (Lion Air) is analyzed by the field survey.

In the field survey, respondents are asked about services that they have used in the past, so that we are able to know people's preference and satisfaction of current service. Field survey is implemented in the form of face-to-face interview, the purpose is to understand passenger priority (airlines, fare, etc.) to choose their route.

2. OUTLINE OF FIELD SURVEY

(1) Full-service and low-cost carriers

In this study, Garuda Indonesia and Lion Air are chosen as the representatives of full-service and low cost carrier. Garuda Indonesia, the national airline of Indonesia, operates an extensive domestic and regional network of services throughout Asia, Australia and the Middle East. Lion Air is an Indonesian low cost carrier, which operates a network of scheduled passenger services throughout Southeast Asia and the Middle East. Lion Air is also the largest privately owned airline in Indonesia. The market share of the two airlines in domestic and international is shown in Table 2.1[2]. It is clear that Lion air is the leader of domestic market and captured around 42% of domestic market share in 2012.

Table 2.1   Comparison of selected airlines

Market Share in 2012	Garuda Indonesia	Lion Air
Domestic	22.82%	41.59%
International	37.03%	10.80%
Ownership/Status	State-owned (Government 69%, Listed 27.98%)	Private-Owned

(2) Selected routes

Targets passengers of this survey are direct and connecting passengers that flies from CGK to the airports of eastern Indonesia, either with Garuda Indonesia or Lion Air.

List of routes with direct and connecting flight from CGK airport to the airports of eastern Indonesia is shown in Table 2.2. Six among twelve destinations meet the conditions as target routes, they are: DJJ (Jayapura), PLW (Palu), KDI (Kendari), GTO (Gorontalo), AMQ (Ambon), MDC (Manado). Locations of target destinations are depicted in Fig 2.1.

(3) Design of field survey

The field survey form has two parts: personal information and individual travel information. For personal information, respondents are required to choose their gender, age, occupation, average monthly household income, and fill in the city they live in as well as the number of their family members. For individual travel information, respondents are asked about their flight number, number of round trips in the previous year, travel purpose, who decide their travel route, total ticket fare, way to buy ticket, member of frequent flyer program, reason for choosing the airline, type of flight and the reason of not choosing the other type of flight.

Fig 2.1 Map of Target Routes

Table 2.2 Routes with direct and connecting flights in eastern Indonesia (as of June 2014)

No.	Origin	Destination	Garuda		Lion	
			Direct	Connecting (UPG)	Direct	Connecting (UPG)
1	CGK	DJJ (Jayapura)	Yes	Yes	Yes	Yes
2	CGK	PLW (Palu)	Yes	Yes	Yes	×
3	CGK	KDI (Kendari)	Yes	Yes	Yes	Yes
4	CGK	TTE (Ternate)	Yes	Yes	×	×
5	CGK	GTO (Gorontalo)	Yes	Yes	×	Yes
6	CGK	SOQ (Sorong)	×	Yes	×	×
7	CGK	MKW (Manokwari)	×	Yes	×	×
8	CGK	AMQ (Ambon)	Yes	Yes	Yes	×
9	CGK	MDC (Manado)	Yes	Yes	Yes	Yes
10	CGK	KOE (Kupang)	Yes	×	Yes	×
11	CGK	BIK (Biak)	Yes	Yes	No flight to BIK	
12	CGK	TIM (Timika)	Yes	Yes	No flight to TIM	

(4) Overview of field survey

Field survey was conducted at CGK airport on July 7th, 8th, 10th -15th and at UPG airport on July 17th-20th, 2014.

Face to face interviews are implemented in the boarding lounge (waiting room) in order to ensure that questionnaires were given to the targeted passengers, as well as to minimize disruption to passengers. In boarding lounge, passengers can conveniently choose to (1) fill in the questionnaires by themselves, or (2) being interviewed directly by the survey team. Survey team consists of nine Indonesian students. Each student is responsible to do survey for at least four flights per day. Schedule of survey is started from 6.30 am – 00.30 am every day during the survey period.

3301 samples were collected during survey period. Among them, 222 samples are considered ineffective because it skip to answer some questions, contains wrong information, etc. As a result, the number of effective samples is 3079. The amount of effective sample data for different types of flight and in different OD are shown as Fig 2.2.
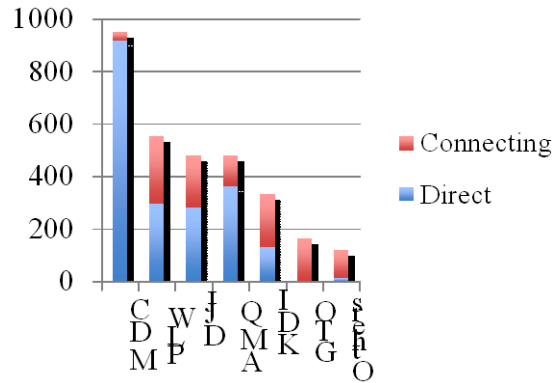

Fig 2.2 Sample data for different destinations

3. ANALYSIS OF FIELD SURVEY RESULTS

(1) Overall results

a) Characteristics of respondents

Fig 3.1-Fig 3.4 shows the individual characteristics. Fig 3.1 shows gender distribution in the two airlines, which are no difference. As Fig 3.2 shows, passengers who are younger than 20 years old or older than 61 years old tend to choose Lion Air. From Fig 3.3, passengers with average monthly income less than 3 mil IDR (=$230) or larger than 20 mil IDR (=$1540) chose Lion Air's flights. Fig 3.4 shows the occupation distribution of two airlines, passengers who chose "others" include lecturer, teacher, athlete, etc. As Fig 3.4 shows, student and state employee prefer Lion Air, while state enterprise employee and private employee tend to choose Garuda Indonesia.
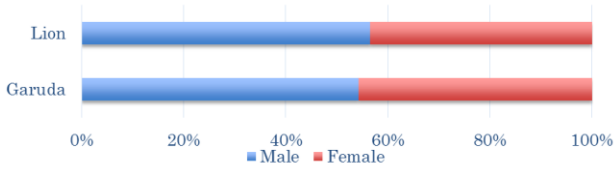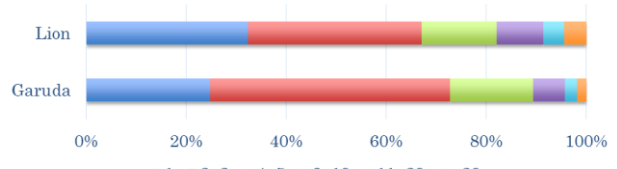
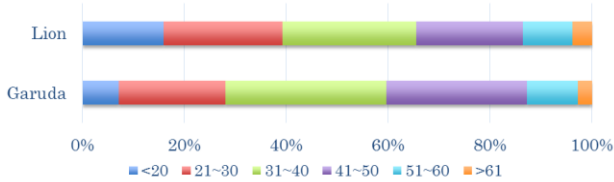**Fig 3.1** Gender distribution

Fig 3.2 Age distribution

Fig 3.3 Average monthly household income distribution

Fig 3.4 Occupation distribution

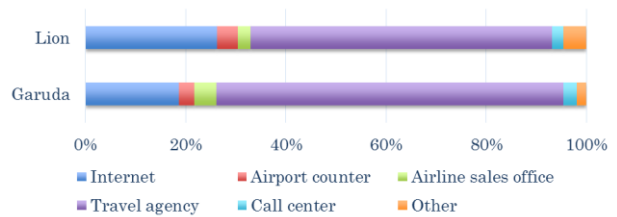**Fig 3.5** Times of round trip distribution

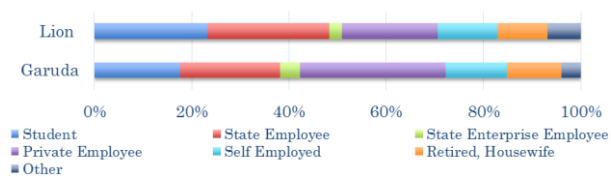**Fig 3.6** Travel purpose distribution
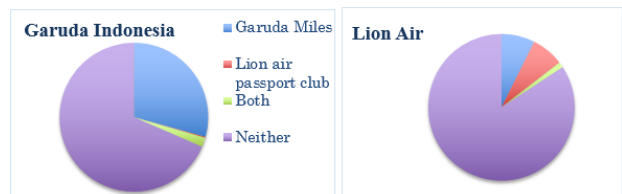

Fig 3.7 Way to buy ticket distribution

Fig 3.8 Frequent flyer program distribution

Fig 3.5 shows the distribution of the times of round trip that respondents have made in the previous year. Most of Garuda Indonesia's passengers experienced 2-3 times of round trip in the previous year, and passengers who travel less than twice or more than 6-10 times chose Lion Air.

Fig 3.6 shows the distribution of travel purpose of each respondent. It is clear that business travel purpose passengers account for more than 30% in both Garuda Indonesia and Lion Air. Also, passengers were returning hometown chose Lion Air.

Fig 3.7 shows the way how respondents bought their ticket. We can see that more than half of Garuda Indonesia's passenger booked their ticket at travel agency and around 25% of passengers who chose Lion Air booked their ticket via Internet.

From Fig 3.8, we can see that there are more frequent flyer members among passengers who chose the flight of Garuda Indonesia, however, surprisingly many passengers are not the member of FFP of both airlines.

b) Reasons for choosing airline and flight type

Fig 3.9 concludes result of passengers' first priority to choose airline. Compared with Lion Air, more passengers chose Garuda Indonesia because the flights fit their schedule, have fewer cancel, and they consider this airline can provide better safety measure. More than 45% of passengers chose Lion Air for its cheaper price.
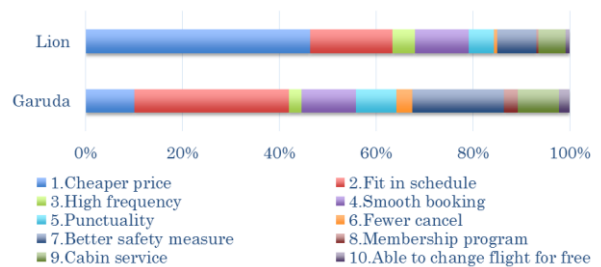

Fig 3.9 First priority to choose airline

Fig 3.10 -Fig 3.14 shows why passengers chose a certain type of flight. In field survey, we asked passengers to choose three reasons in the order of their

preference. We only used their first reason for analysis to ensure the reliability.

Fig 3.10 is an overall result which combines the result of Fig 3.11 and Fig 3.13. Fig 3.10 shows passengers' first priority to choose direct and connecting flight. It is clear that both direct and connecting flight passengers chose "Fit in Schedule" as their first priority. It is worth noting that nearly 5% of passengers chose direct flight because they considered there is "No transit route", even if all the targeted destinations in field survey are supported by both type of flights.
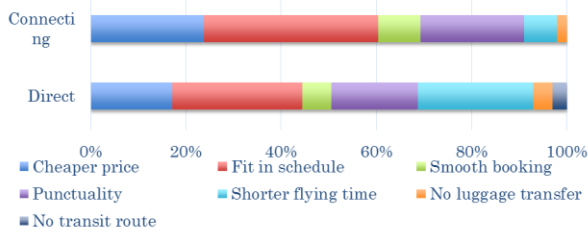

Fig 3.10 First priority to choose flight type

Next, we take a closer look at the difference between two airlines' passengers in choosing flight type.

Data depicted in Fig 3.11 and Fig 3.12 comes from the survey of direct passengers. In Fig 3.11, more passengers chose Garuda Indonesia because the flights fit their schedule and are more punctual. More than 20% of direct passengers chose Lion Air for cheaper ticket. Fig 3.12 shows direct passengers' reason of not choosing connecting flight. More Garuda Indonesia passenger chose "Unfit in Schedule" and more Lion Air passenger chose "Longer flying time". It should be noted that among Garuda Indonesia's passengers, about 10% of people did not chose connecting flights because they were not able to book transit route and around 5% of people claimed they did not know the existence of transit flight to the same destination.
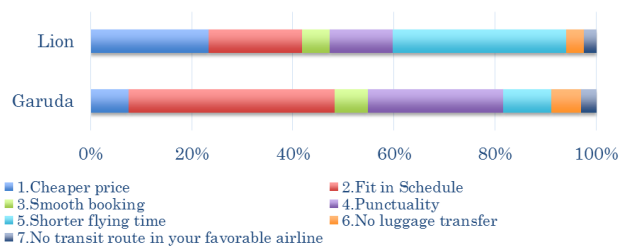
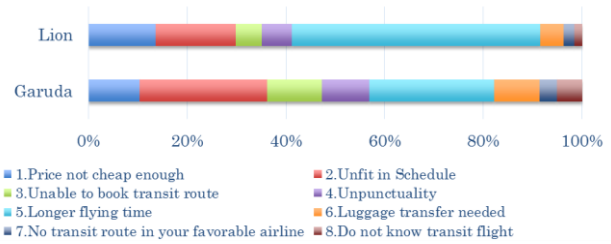

Fig 3.11 Reason of choosing direct flight

Fig 3.12 Reason of not choosing connecting flight

Fig 3.13 and Fig 3.14 concludes answers from passengers who chose connecting flights. In Fig 3.13, it is clear that more than 40% of Garuda Indonesia's passengers chose connecting flights because it fits their schedule, and the percentage of Lion Air passengers who chose the flight type for the same reason is more than 20%. More than 10% of Lion Air passengers chose "Good service at UPG" as their reasons for choosing connecting flight, which is around 3 times of Garuda Indonesia's passengers who chose the same reason. Fig 3.14 shows connecting flight passengers' reason of not choosing direct flight. Compared with Lion Air, a big proportion of Garuda Indonesia passengers made their choice because of "Expensive price" and "Unfit in schedule". Nearly 30% of Garuda Indonesia's passengers and more than 10% of Lion Air passengers did not chose direct flight because they were not able to book direct route. We should pay attention to Lion Air, since more than 40% its passengers did not chose direct flight because they assumes there is no direct route in their favorable airline.
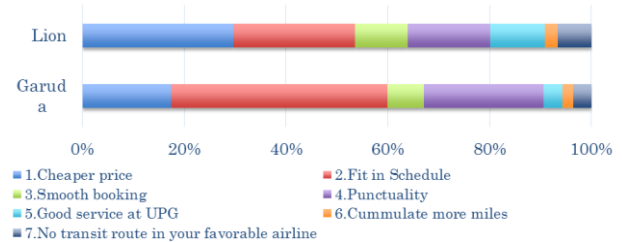

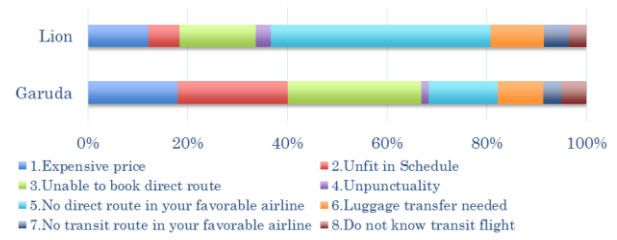**Fig 3.13** Reason of choosing connecting flight

Fig 3.14 Reason of not choosing direct flight

(2) Significant findings in different routes

In this section, we did further analysis on passenger characteristics of direct and connecting flights in both Garuda Indonesia and Lion Air in different routes. Samples of online flights (Flights that passengers need

to get off at transit airports to change another aircraft) passengers are excluded, since there are very few samples and some routes do not provide online flights. As a result, the analysis is done using the data of direct and connecting flight passengers. More than 70% of Lion Air passengers chose connecting flight because there is no direct flight or they were not able to book it. This trend can be seen in the results of each destinations.

a) Jakarta(CGK)-Jayapura (DJJ)

Target flights from Jakarta to Jayapura are listed in Table 3.1. Fare is the median of all the samples of that flight, flight time and connection time is calculated using the flight schedule on each airline's official website. Except the night flights listed here, Lion Air serves a morning flight departure at 5:30. This flight is excluded because we failed to get enough sample. In Garuda, direct flight is more expensive, however, Lion's connecting flight is far more expensive than its direct flight.

Table 3.1 Information of target flights (CGK-DJJ)

Air-line	Route type	Flight No.	Sample size	Ave. Fare (mil IDR)	Flight time (min)	Connection time (min)	Dep. Time	Arr. Time
Ga-luda	Direct	GA656	**71**	2.7	330	0	23:50	7:20
	Connecting	GA650	**59**	2.6	485	95	21:00	7:05
Lion	Direct	ID6180	**211**	2.3	300	0	23:55	7:55
	Connecting	JT798	**105**	3.0	385	40	21:40	6:05

Fig 3.15 and Fig 3.16 shows the reason why passengers chose their flight type. Fig 3.17 shows the reason why connecting passengers did not chose direct flight. Around 32% people chose GA650 for its cheaper price, which is far above the average percentage of Garuda connecting flight (18%). Around 38% people chose JT798 for its cheaper price however the airfare is even more expensive than Garuda's direct flight. Compared with direct flights, 40% of GA650 passengers and about 16% of JT798 passengers chose the flights because it fits their schedule.

In Indonesia, passengers do not need to get off the plane when it stops at connecting airport. Connecting flights are preferred because it departures two or three hours earlier than direct flight, so that passengers can take good rest in the plane. In Fig 3.17, nearly 60% of JT798's passengers chose the flight because there is no direct route in their favorable airline. That is because one of Lion Air's direct flight was cancelled during our survey period, and ID6180 is served by Lion air's group company called "Batik Air".
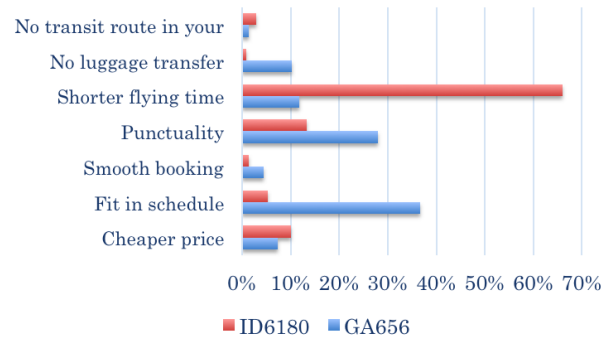

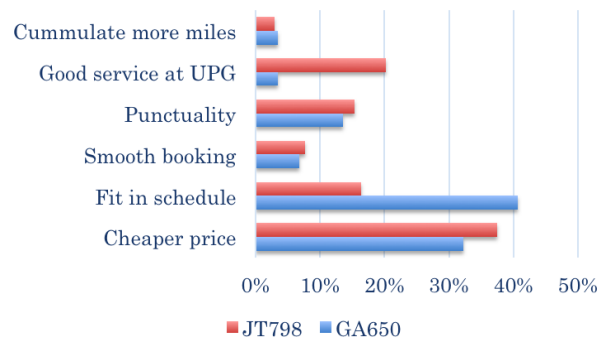**Fig 3.15** Reasons to choose direct flight (CGK-DJJ)

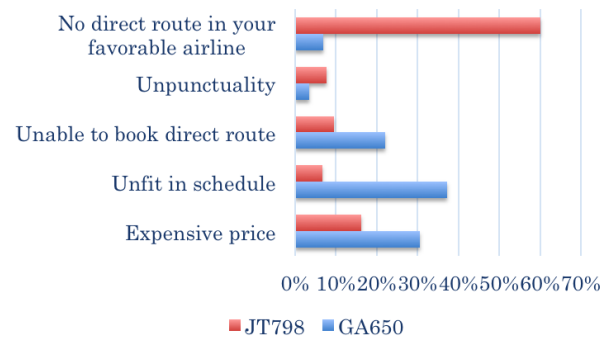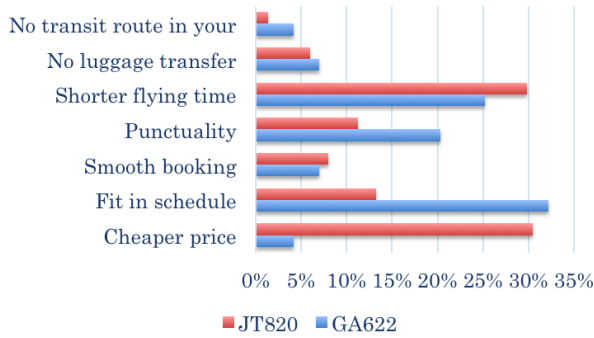**Fig 3.16** Reasons to choose connecting flight (CGK-DJJ)

Fig 3.17 Reasons not to choose direct flight (CGK-DJJ)

b) Jakarta(CGK)-Palu (PLW)

Target flights from Jakarta to Palu are listed in Table 3.2. This is a short distance route, so that the connection time is also relatively short (about 45 minutes). Among the target flights, GA608 departures at morning, JT820 departures at afternoon and GA622 is an evening flight. Since airfare of the three flights does not have big difference, we assume passengers were choosing route due to their schedule instead of airfare. This assumption can be proved by looking at Fig 3.18, Fig 3.19 and Fig 3.20, a large proportion of passengers took "schedule" as their first priority.

Table 3.2 Information of target flights (CGK-PLW)

Air-line	Route type	Flight No.	Sample size	Ave. Fare (mil IDR)	Flight time (min)	Connec-tion time (min)	Dep. Time	Arr. Time
Ga-luda	Direct	GA622	**143**	1.5	165	0	18:10	21:55
	Con-necting	GA608	**225**	1.7	270	45	9:40	15:10
Lion	Direct	JT820	**152**	1.4	155	0	16:55	20:30

Table 3.3 Information of target flights (CGK-AMQ)

Air-line	Route type	Flight No.	Sample size	Ave. Fare (mil IDR)	Flight time (min)	Connec-tion time (min)	Dep. Time	Arr. Time
Ga-luda	Direct	GA646	**224**	1.7	220	0	8:15	13:55
	Con-necting	GA640	**116**	2.2	305	45	0:30	7:35
Lion	Direct	JT6170	**129**	1.8	210	0	0:30	6:00

Fig 3.18 Reasons to choose direct flight (CGK-PLW)
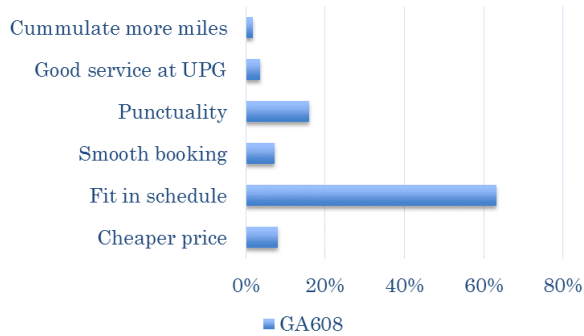

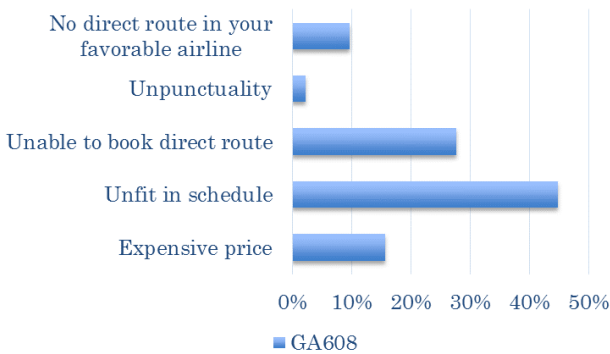**Fig 3.19** Reasons to choose connecting flight (CGK-PLW)

Fig 3.20 Reasons not to choose direct flight (CGK-PLW)

c) Jakarta(CGK)-Ambon (AMQ)

Target flights from Jakarta to Ambon are listed in Table 3.3. Among the listed flights, GA646 is a morning flight and the rest departures at midnight. JT6170 is more expensive than GA646, which can explain in Fig 3.21 why compared with other destinations much fewer passengers chose this flight for "cheaper price".

As shown in Fig 3.22, nearly 43% of GA646's passenger claimed "Unfit in schedule" was their main reason of not choosing connecting flight, it might be because they do not want to take a midnight flight. Actually, the departure and arrival time of a flight is quite significant passengers, especially those who are travelling on a business purpose. Businessmen cannot wait another day for their meeting if the flight arrives in the morning. And non-business travel purpose passengers might prefer to avoid midnight and early morning's flight for more comforts.
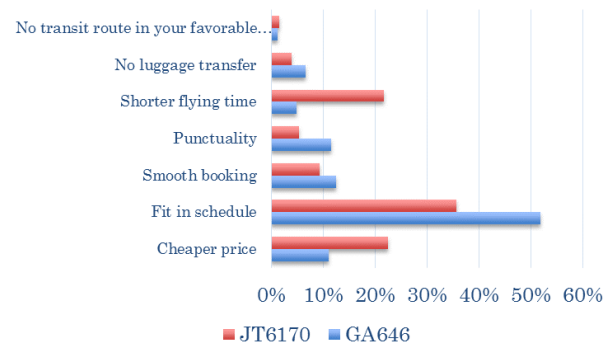

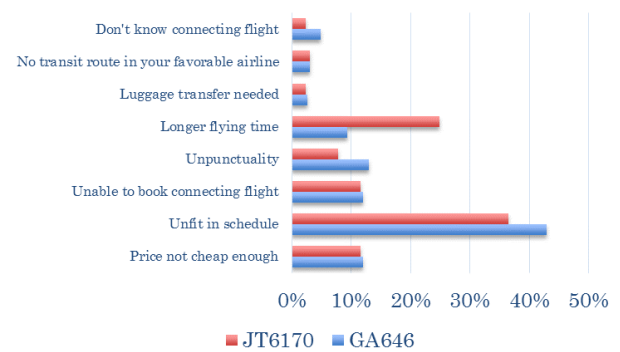**Fig 3.21** Reasons to choose direct flight (CGK-AMQ)

Fig 3.22 Reasons not to choose connecting flight (CGK-AMQ)

Fig 3.23 shows reasons why passengers chose GA640. Compared with connecting flights in other routes, few passengers chose "Cheaper price" as their main reason. In fact, as shown in Table 3.3, airfare of GA640 is more expensive than GA646, and it can be seen in Fig 3.25 that GA640 passengers have a higher income. As shown in Fig 3.24, nearly

45% of GA640 passengers did not chose direct flight because they were not able to book it, for there is only one direct flight served by Garuda Indonesia.
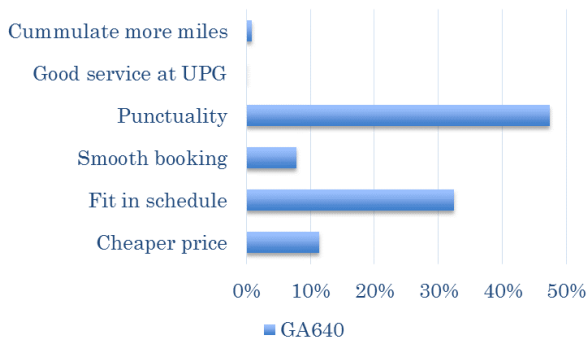

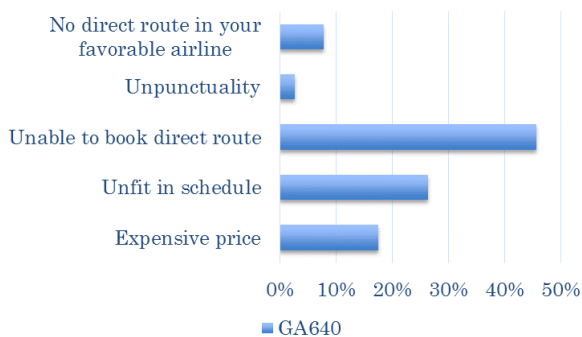**Fig 3.23** Reasons to choose connecting flight (CGK-AMQ)

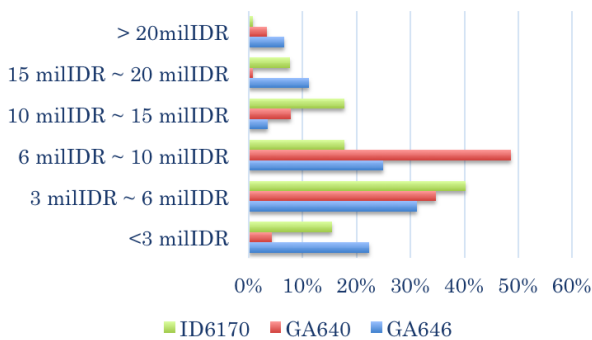**Fig 3.24** Reasons not to choose direct flight (CGK-AMQ)

Fig 3.25 Income distribution (CGK-AMQ)

4. CONCLUSION

In this study, passenger choice characteristics of direct and connecting flights in full-service carrier (Garuda Indonesia) and low-cost carrier (Lion air) is identified through field survey.

The results of this field survey show that both direct and connecting flights' passengers chose "Fit in schedule" as their first preference. Passengers who chose Garuda Indonesia consider it can provide better safety measures, while cheaper airfare is the main reason of Lion Air's passengers. Moreover, different passenger choice characteristics can be seen in routes of different distances. Flights to Jayapura (DJJ) have the longest distance among target routes, and passengers chose connecting flight because it departures at evening instead of midnight, so that passengers can take a good rest. Flights to Palu (PLW) is the shortest among target routes, in which passengers chose the flight mainly based on schedule, since there's no big difference in price. About flights to Ambon (AMQ), passengers who chose the connecting route that departures at midnight, have a relatively higher income compared to connecting flights users in other routes.

For further research step, in order to recognize the significance of airfare and frequency in business and non-business travel purpose, the multinomial logit model estimation based on a combination of field survey and stated preference data can be conducted.

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