Big Data Analytics of Abandoned Online Transaction in Garuda Indonesia Website

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Abstract. Garuda Indonesia conducts digital marketing activities with considerable effort and budget to attract customers to visit the Garuda Indonesia website. On the other hand Garuda Indonesia also continues to make improvements to its website to increase the user experience, ease of use, speed and transaction security. However, customers who visit Garuda Indonesia website with the intention to make a flight booking frequently end up abandoning their transactions due to various factors. This study aims to analyze online transaction abandonment in Garuda Indonesia website using Big Data Analytics. This research identifies and analyze error code that causing the abandoned transaction in every step of online booking in Garuda Indonesia website. During the period of January until December 2018, there were 33.8 million sessions that accessed Garuda Indonesia website. 41% of total sessions suddenly exited after viewing one web page only. 32.2% of total sessions made a flight search. Major drop of sessions happened after the flight search, there were only 7.0% of total sessions continued to passenger detail step. 3% of total sessions reached the payment page and finally 1.8% of total sessions successfully made online reservations. The result of this study can be utilized to develop appropriate recovery strategy to reduce online transaction abandonment in Garuda Indonesia website.

Keywords: Big Data Analytics, Online Reservation, Transaction Abandonment, Remarketing.

1 Introduction

The Internet has changed travel industry significantly. By the implementation of the internet, travel company can transfer travel information electronically and electronic tickets has likewise wiped out the requirement for physical contact between buyers and sellers (Button, 2002). The internet supports distribution channels that allow customers to order airplane tickets quickly and comfortably. This undermines barriers to information availability and competitive ticket price comparisons, intensifies market transparency and gives customers more power. (Ruiz-Mafé, Sanz-Blas, Aldás-Manzano, 2009).

Digital travel platform such as airline website and mobile application, online travel agent, price comparison website, review portals, and travel planning website have been making travel arrangements much easier. According to statista.com, the sales of digital travel worldwide during 2014 to 2020. Sales of digital travel worldwide in 2018 totaled USD 693.91 billion and in 2020 it is projected to increase to USD 817.54 billion.

According to survey of Future Airline Distribution released in 2016 by Atmosphere Research Group from IATA (participated by 49 airline participants), airlines in the survey have intention to grow their digital direct sales channel share. In 2016, they expect to generate 33%

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of their booking from their website and 2% from their mobile application. By 2021, airlines expect their websites and mobile application sales channels will generate 45% of their ticket bookings. Airlines' websites will remain the largest shares, but mobile application sales channel is expected to increase exponentially from 2% to 7%.

Garuda Indonesia is one of the five stars airlines in the world and also the flag carrier of Indonesia. Garuda Indonesia is currently serving more than 90 destinations worldwide. With the number of flights reaching 600 flights per day, Garuda Indonesia provides services through the concept of "Garuda Indonesia Experience" which promoting the Indonesian hospitality.

In the context of intense market competition, since 2009, Garuda Indonesia enriched their business operations by offering online flight ticket booking that can be accessed by using web browser in desktop, tablet and mobile device. Along the time until present, Garuda Indonesia website has evolved with many improvements by adding more features and other functionalities such as flight information center, ancillary products, and membership & loyalty platform.

Garuda Indonesia conducts digital marketing activities with considerable effort and budget to attract customers to visit the Garuda Indonesia website. On the other hand Garuda Indonesia also continues to make improvements to its website to increase the user experience, ease of use, speed and transaction security. However, customers who visit Garuda Indonesia website with the intention to make a flight booking frequently end up abandoning their transactions due to various factors such as lack of trust, complexity, browsing, lack of payment options, price too high, or perceived transaction inconvenience.

Big data is one of the most fashionable concepts nowadays: everybody talks about it, is permanently in the media, and companies and governments try to exploit the new amount of available information Lohr (2012), John Walker (2014), James (2018).

This research aims to analyze online transaction abandonment in Garuda Indonesia online channel using big data. By leveraging information and insight gathered from the big data, it is useful for the company to create a strategy to reduce and recover the abandoned online transaction to generate more sales and revenue from online sales channel.

2 Principle Theory of Analysis

Abandonment of online transactions is when the prospective customer starts the check out process for online ordering but leaves the process before completing the purchase. Any item that enters the shopping basket but never makes it through the transaction is considered "abandoned" by the shopper. Abandoned online transactions is an important aspect of the online shopping process that must be considered by retailers.

In previous research, it was found that although almost 95% of Internet users visit online retail sites, most of them do it without intending to actually make transactions (N. Maravilla, 2001). More importantly, even when consumers visit internet stores who want to make purchases, many of them do not complete the transaction and leave their intentions before checkout due to various factors such as:

•Perceived waiting time (Davis an Heineke, 1998)

•Perceived risk (Belanger et al, 2002)

•Perceived transaction inconvenience (Childers et al., 2001; Donthu and Garcia, 1999; Srinivasan et al., 2002).

Perceived transaction inconvenience is the major predictor of shopping cart abandonment. The other predictors are perceived risk and perceived waiting time (Rajamma, Paswan, Hossain, 2009).

3 Research Methodology

Research will be developed using following process:

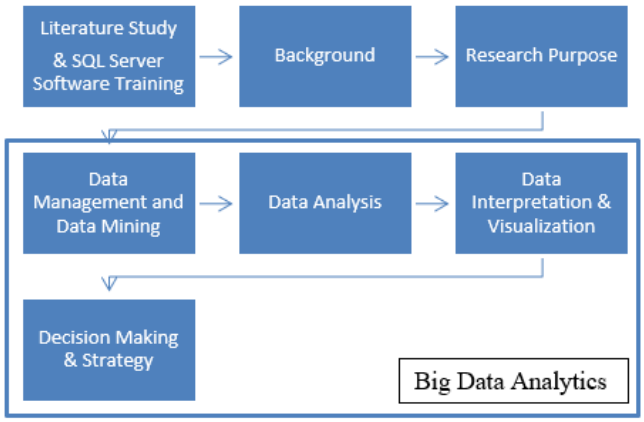

Fig. 1. Research Flowchart

There are 3 main phases of customer journey for flight booking in Garuda Indonesia website. They are:

1. Searching / Browsing

Customer landed in Garuda Indonesia website from various source of traffic. When they landed in Garuda Indonesia website, some of them continue accessing various features such as flight booking, flight schedule, GarudaMiles member panel, promotional and informational page, etc. But some of them don't continue to access other web pages after landing page and they get out of website instead. This event is called Bouncing Sessions. The total of bouncing Sessions compared to the total of website sessions defined as Bouncing Rate.

2. Flight Booking

This is one of the main features that available in Garuda Indonesia website. Customer can search for flight schedule, check availability of preferred flight and directly make an online reservation.

3. Payment

Payment is one of the most crucial booking step during online reservation. Currently Garuda Indonesia website provide 13 payment options which are Credit Card, Major Indonesian Internet Banking, ATM Payment, Convenience Store, Ogone and Alipay). Payment step is crucial since it indicates the highest intention to purchase from the customer.

In this research, researcher measures the drop off rate at each booking step, and then analize the major error code that causing transaction abandonment. In this research, there are three main data sources for Big Data Analytics, which are website traffic database from Garuda Indonesia Website's Google Analytics, Amadeus eMO database from Garuda Indonesia Internet Booking Engine and Payment database from Garuda Indonesia payment page.

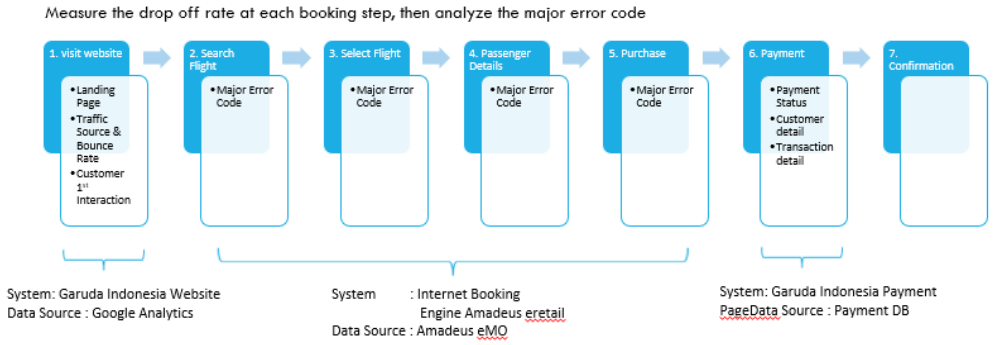

Fig. 2. Flow of Research

4 Analysis

4.1 Transaction Funnel Analysis

The figures below, depicts the success rate of each reservation step in Garuda Indonesia Website, start from the customer visit Garuda Indonesia website until successfully make a reservation.

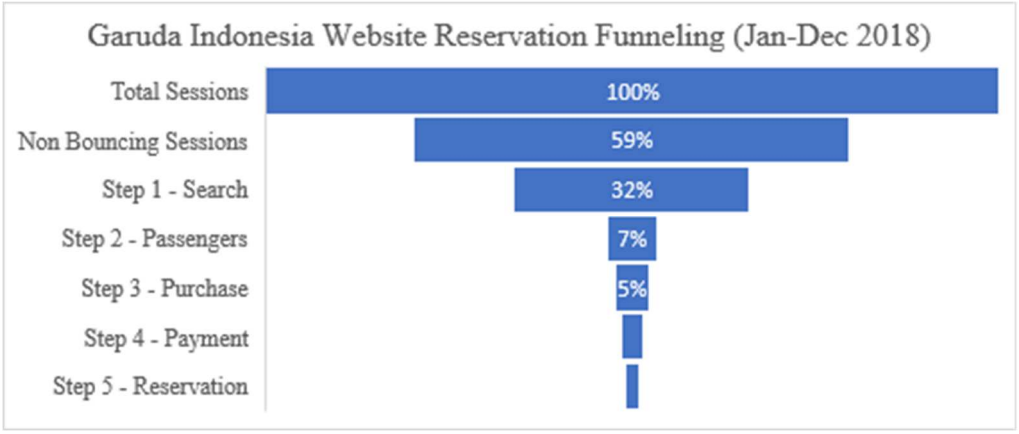

Fig. 3. Transaction Funnel of Garuda Indonesia Website

According to the figures above, during January – December 2018, there were 33.8 million of sessions that came to Garuda Indonesia website. 40.5% of total sessions are bouncing (open only 1 page and then exit from the website). 20,122,891 sessions or 59.5% of total sessions continued to access another page in Garuda Indonesia website.

10,894,407 sessions or 32.2% of the total sessions searched for flight. A major abandonment of transactions occurs in this booking step, only 2,368,592 sessions or 7.0% of total sessions that continued to Passenger's Detail step to submit passenger's identity and contact information.

1,573,893 sessions or 4.7% of total sessions continued to Purchase step. In this step customers are required to review their selected itinerary and opted to select or buy additional service such as seat selection, meal selection and travel insurance. after reviewing selected itinerary and selecting additional service, customers are required to declare that they agree with applied terms and condition. The declaration of agreement is required to continue to payment step.

1,009,977 sessions or 3.0% of total sessions continued to Payment step. In this step, customers have to select one of available payment options and fill payment credentials correctly to avoid payment failures.

At the end, 628,790 sessions or 1.8% of total transactions successfully make a booking and payment. After successfully make a payment, customer will receive e-ticket through their email address that submitted in Passenger's Detail step.

4.2 Website Browsing Behaviour Analysis

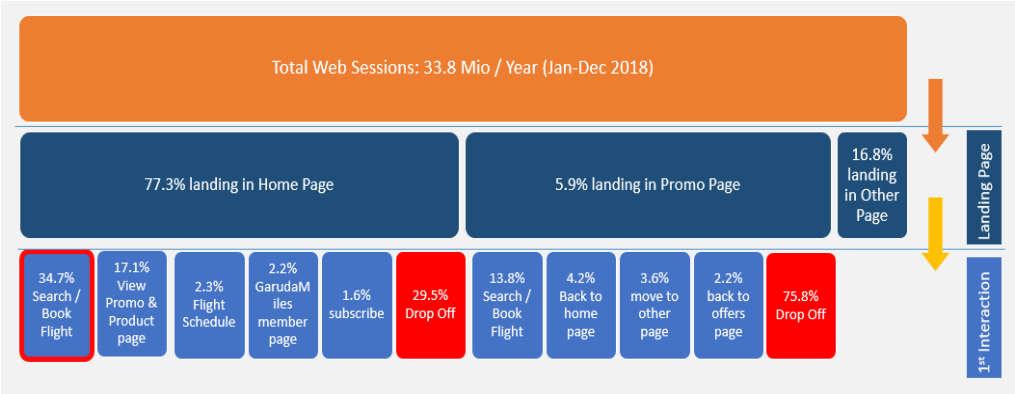

Fig . 4. Landing Page and First Interaction of Visitor In Garuda Indonesia Website

According to figures above, there were 33.8 million of sessions that came to Garuda Indonesia website during January – December 2018. 77.3% of total sessions landed in Home Page, 5.9% of total sessions landed in Special Offers pages and 16.8% of total sessions landed in Other Page category.

34.7% of total sessions that landed in home page directly searched for flight, while 29.5% of total sessions that landed in home page exit from Garuda Indonesia website. The rest of

sessions viewed promo and product page (17.1%), viewed flight schedule (2.3%), visited GarudaMiles member page (2.2%) and subscribed for promotional offers (1.6%).

Only 13.8% of total sessions that landed in promo page directly searched for flight, while 75.8% of total sessions that landed on promo page exit from Garuda Indonesia website. The rest of sessions back to homepage (4.2%), navigated to other page (3.6%), and navigated to Offers Page (2.2%).

4.3 Book Flight Funnel Analysis

Table 1. Top Error Code In Booking Step 1 – 3

Error Code	Number of Occurrence	% of Occurrence
5685(E) No fare can be found for the flights and/or cabins you selected. Please search again and select another cabin and/or different flights.	2,072,892	39.3%
3001(E) Sorry, but your session has timed out. Please login again.	700,119	13.3%
5003(W) The requested cabin class is full or not available in at least one of the options listed below.	557,184	10.6%
3006(E) We are having difficulty with the request as submitted. Please try again or contact us if the problem persists.	535,721	10.1%
66002(E) We are unable to find recommendations for your search. Please change your search criteria and resubmit the search.	345,815	6.6%
7127(W) The Calendar dates had to be shifted so that each day stays within the site travel limits.	303,526	5.7%
4502(E) Not all flights have seats available for the price option you have selected. Please press Back to select another option to price your itinerary or change your flight selection.	200,554	3.8%
3010(E) Sorry but we cannot process your request as you have hit the navigation buttons (Forward or Back) too many times. Please start again.	93,072	1.8%
8104(E) We are unable to find this confirmation number. Please validate your entry and try again or contact us for further information.	54,611	1.0%
4000(E) System Error. Please try again later. If the problem persists please contact your Travel Support Desk.	50,116	0.9%
Other Error	365,465	6.9%
Total	**5,279,074**	**100%**

According to the table above, listed the top 10 of error and warning codes that happened in flight booking process and might causing customer to abandon their transaction. Top 10 of error and warning codes are representing 93.1% of total occurrence.

Those errors occurred during in Step 1 – Search, Step 2 – Passenger's Detail, and Step -3 Purchase. Causing the significant abandonment rate from 10,894,407 (32.2% of total sessions) session to 1,009,977 (3.0% of total sessions).

Those errors code will be a reference for the IT team to fix the problem and improve the reliability of Garuda Indonesia Online booking engine.

4.4 Payment Analysis

Table 2. Payment Status

Status	Total Transactions	Total Amount in IDR	% of Transactions	% of Total Amount
Success	628,790	2,640,535,391,807	64.7%	60.1%
(blank)	268,029	1,298,660,991,006	26.5%	29.5%
Failure	78,668	401,193,805,876	7.8%	9.1%
Pending	9,562	54,901,651,888	0.9%	1.2%
Total	**1,009,977**	**4,395,291,840,577**	**100.0%**	**100.0%**

Payment is one of the most crucial step of Garuda Indonesia online booking. In this step, customer should select one of available payment options and input payment credentials correctly to avoid payment failures. According to Transaction Funnel Analysis, 1,009,977 sessions or 3.0% of total sessions continued to Payment step. But only 628,790 sessions or 1.8% of total transactions successfully made a booking and payment.

There are 4 main payment status captured from Garuda Indonesia payment page database:

- Success means that the customer selects one of the payment options and input the payment details and credential correctly. The transaction proceeded and successfully authorized by respective payment gateway and Bank.
- Blank means that the customer has reached payment page but he/she doesn't select one of available payment option and abandon the transaction instead.
- Failure means that the customer selects one of the payment options, input the payment details and credentials but the transactions fail to get authorization from respective payment gateway or Bank.
- Pending means that customer selects one of the payment options but he/she doesn't input the payment detail and credentials.

64.7% of total transaction or equals to IDR 2.6 Trillion are successful. 26.5% of total transaction or equal to IDR 1.2 Trillion are blank. 7.8% of total transaction or equals to IDR 401 billion are failure. And 0.9% of total transactions or equal to IDR 54 billion are pending. Almost 40% of total transactions or equals to IDR 1.8 Trillion are unsuccessful. Garuda Indonesia can get significant growth without targeting new market which usually cost a lot of marketing budget, by fixing the problem and retarget the customer to make a transaction through Garuda Indonesia website.

Table 3. Success Rate, Fail Rate and Pending Rate of Each Payment Option

Payment Option	Success Status	Failure Status	Pending Status	Total Transactions	% Shares of Transaction	Success Rate	Fail Rate	Pending Rate
Credit Card Full	555,548	71,043	29	626,620	**84.5%**	88.7%	**11.3%**	0.0%
Klik BCA	41,594	2,948	5,483	50,025	**6.7%**	**83.1%**	5.9%	**11.0%**
ATM Payment	1,640	23	-	1,663	0.2%	98.6%	1.4%	0.0%
Installment	12,949	1,537	-	14,486	2.0%	89.4%	10.6%	0.0%
Installment (MT)	12,865	1,080	-	13,945	1.9%	92.3%	7.7%	0.0%
Credit Card Points	9,423	1,241	-	10,664	1.4%	88.4%	**11.6%**	0.0%
Convenience Store	3,480	8	-	3,488	0.5%	99.8%	0.2%	0.0%
CIMB Clicks	3,766	385	1,596	5,747	0.8%	**65.5%**	6.7%	**27.8%**
BRI ePay	2,578	93	2,535	5,207	0.7%	**49.5%**	1.8%	**48.7%**
Ogone	3,804	154	-	3,958	0.5%	96.1%	3.9%	0.0%
Mandiri Clickpay	3,691	547	-	4,238	0.6%	87.1%	**12.9%**	0.0%
BNI Yap	769	262	-	1,031	0.1%	**74.6%**	**25.4%**	0.0%
Alipay	866	11	-	877	0.1%	98.7%	1.3%	0.0%
Grand Total	**652,972**	**79,332**	**9,644**	**741,948**	**100%**	**88.0%**	**10.7%**	**1.3%**

According to table above, credit card full is the majority of payment option that selected by customer. It represents 84.5% of total transaction. Success rate of credit card full payment option is 88.7% slightly higher than average of 88.0%. Fail Rate of Credit Card Full is 11.3% slightly higher than average of 10.7%.

KlikBCA is the second highest payment option selected by customer. It represents 6.7% of total transaction. Success rate of KlikBCA payment option is 83.1% and lower than average. Fail Rate of KlikBCA is 5.9% and lower than average. Pending Rate of KlikBCA is 11.0% much higher than the average of 1.3%.

CIMB Clicks, BRI ePay and BNI Yap has the lowest success Rate of payment. Mandiri Clickpay and BNI Yap has the highest Fail Rate. CIMB Clicks and BRI ePay has the highest Pending Rate.

Table 4. Success Rate of Each Credit Card Issuer Bank

Issuer Bank	Total Of Transactions	Success	Failure	Success Rate	Failure Rate
BNI	41,060	33,141	5,815	80.7%	14.2%
BCA	30,275	27,730	1,612	91.6%	5.3%
CITIBANK	26,388	23,830	852	90.3%	3.2%
MANDIRI	25,367	21,685	2,741	85.5%	10.8%
CIMB	14,348	11,487	1,595	80.1%	11.1%
HSBC	13,659	12,434	858	91.0%	6.3%
DBS	12,044	10,997	698	91.3%	5.8%
UOB	9,688	8,720	477	90.0%	4.9%
MEGA	7,754	6,798	611	87.7%	7.9%
ANZ	6,395	5,852	329	91.5%	5.1%
BRI	6,018	4,417	1,276	73.4%	21.2%
MAYBANK	3,386	2,941	315	86.9%	9.3%
DANAMON	3,182	2,824	263	88.7%	8.3%
PERMATA	3,009	2,695	185	89.6%	6.1%
Citibank SG	2,894	2,675	80	92.4%	2.8%
ICBC	2,019	1,416	267	70.1%	13.2%
SCB	1,767	1,579	108	89.4%	6.1%
OCBC NISP	1,138	1,049	59	92.2%	5.2%
BTN	338	133	185	39.3%	54.7%
BANGKOK BANK	296	268	13	90.5%	4.4%
Bukopin	295	251	36	85.1%	12.2%
BRI - Hana Bank	15	11	4	73.3%	26.7%

The table above describe the success rate and fail rate of each credit card issuer bank. Credit card issuer bank can be identified by 6 first digits of credit card number that captured in payment page system.

BNI, BCA, Citibank, Mandiri and CIMB Niaga are listed in top 5 of credit card issuer. BCA, and Citibank has the highest success rate of 91.6% and 90.3% respectively. While BNI and CIMB has the lowest success rate of 80.7% and 80.1% respectively.

Among all of identified issuer Bank, BCA, Citibank, HSBC, DBS, UOB, ANZ, OCBC NISP and Bangkok Bank has the highest success rate (above 90%). While BRI, ICBC, BTN and Hana Bank has the lowest success rate (below 80%).

5 Conclusion

1. During the period of January – December 2018, there were 33,845,970 sessions that visited Garuda Indonesia Website. 59.5% of the traffic visit more than 1 page in Garuda Indonesia website, while 40.5% of the traffic are bouncing (visit only 1 web page and then exit from the website). 32.2% of total traffic performed Flight Search. Only 7.0% of the traffic continue to Passenger's Detail page. 4.7% of the traffic continue to Purchase page to review the

itinerary before check-out for payment. 3.0% of total traffic continue to payment page. And only 1.8% of total traffic successfully make a payment and confirming the reservation.

2. Main errors that causes the abandoned transaction in Garuda Indoneesia website:

- 77.3% of total sessions landed in Home Page, 34.7% of them directly search for flight while 29.5% of them exit from Garuda Indonesia website. 5.9% of total sessions landed in Special Offers pages, only 13.8% of them directly search for flight, while 75.8% of them exit from Garuda Indonesia website. There is no further information captured by the system that can define the reasons of visitors exit from Garuda Indonesia website.
- The top 3 errors that occurs on Step 1 – Search, Step 2 – Passenger's Detail, and Step -3 Purchase are:
  - (error code: 5685) No Fare can be found for flights or cabin you selected (2,072,892 occurences represents 39.3% of total errors).
  - (error code: 3001) Session time out (700,119 occurences represents 13.3% of total errors).
  - (error code: 5003) The requested cabin class is full or not available (557,184 occurences represents 10.6% of total errors).
- Payment status:
  - 64.7% of total transactions are successful, it equals to IDR 2.6 trillion of revenue
  - 26.5% of total transactions are blank, it equals to IDR 1.2 trillion of potential revenue. There is no further information captured by the system that can define the reasons of visitors leave the payment step without payment option selection.
  - 9.1% of total transactions are Fail, it equals to IDR 1.2 trillion of potential revenue. Top 3 errors that occurs in payment step and causing payment failure:
    - (error code: 476) Payer could not be authenticated (9,312 occurences represents 35% of total payment errors)
    - (error code: 203) General decline of the card (7,763 occurences represents 29% of total payment errors)
    - (error code: 204) Insufficient fund in account (2,754 occurences represents 10% of total errors)

3. The Conversion Rate of Garuda Indonesia website (total of successful transaction divided by total of sessions) is 1.8%. it is quite low ratio of conversion rate. Garuda Indonesia should focus on reducing the abandoned transaction in order to increase the sales volume of Garuda Indonesia website. Garuda Indonesia can potentially get sales growth by without targeting new market, just focus on retargeting the abandoned transaction.

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