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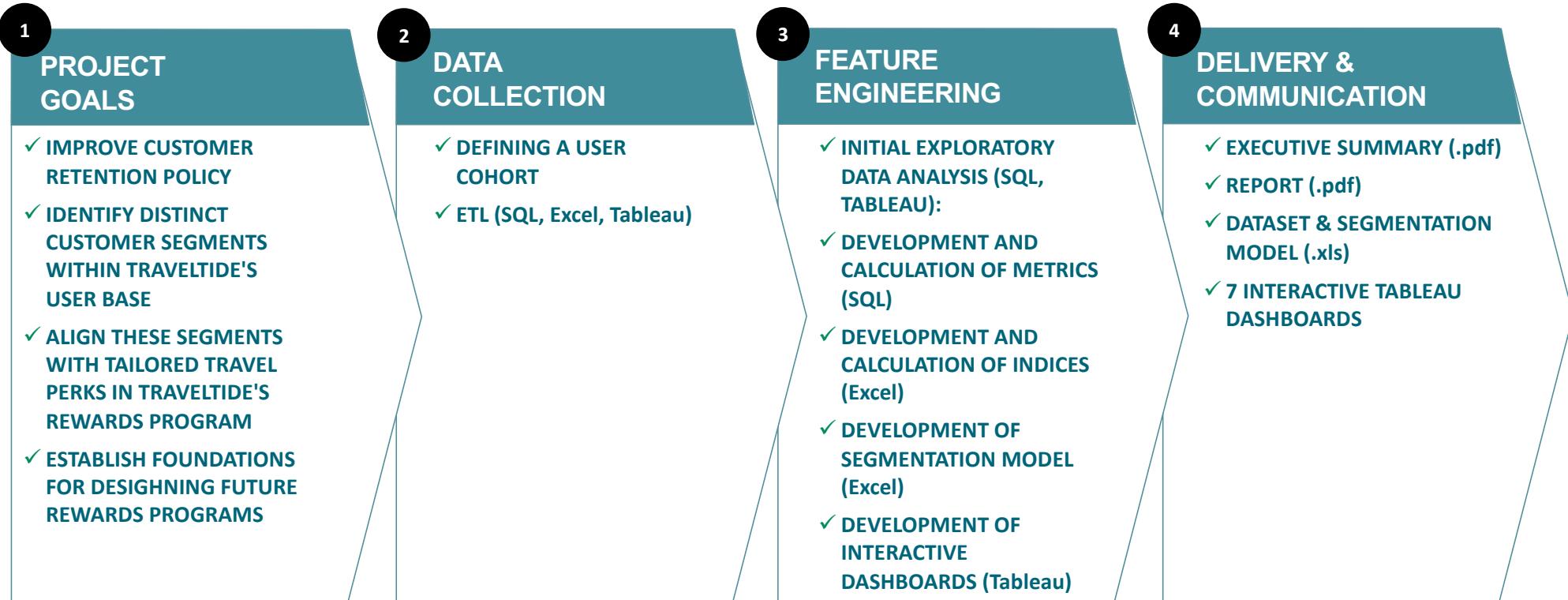
## CUSTOMER SEGMENTATION FOR THE REWARDS PROGRAM: Data Analysis and Feature Engineering

May 2024

Prepared for:  Masterschool



## PROJECT GOALS AND WORKFLOW





## USER COHORT DEFINITION AND GEOGRAPHIC DISTRIBUTION

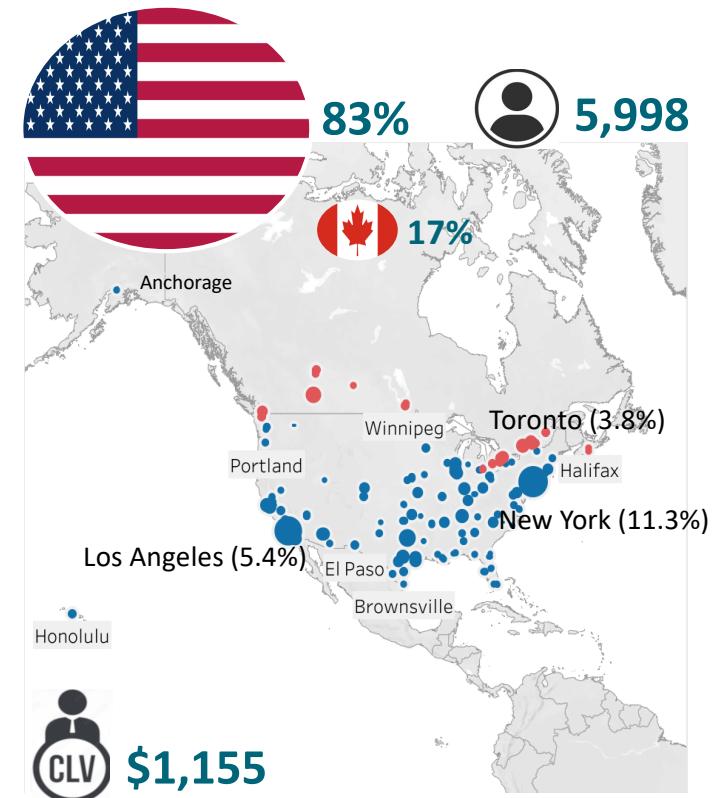
A SMALL AND RATHER NON-REPRESENTATIVE COHORT, UNEVENLY DISTRIBUTED BETWEEN THE USA AND CANADA

1,020,926 ALL TIME USERS

FROM  
04/01/2021 TO  
LAST  
AVAILABLE  
DATE

>7 SESSIONS  
PER USER

5,998 COHORT USERS  
(0.6%)





## AT THE FIRST STAGE OF FEATURE ENGINEERING, NO PRINCIPAL DIFFERENCES IN THE CUSTOMER BEHAVIORAL PATTERNS BETWEEN THE US AND CANADA WERE FOUND

### KEY FEATURE ENGINEERING INPUT METRICS

DEMOGRAPHY	BROWSING, CONVERSION, VALUE
✓ AVERAGE AGE: 40.8	✓ AVERAGE # OF SESSIONS: 8.2 ✓ AVERAGE SESSION DURATION: 3.1 ✓ AVERAGE # OF CLICKS: 14 ✓ CONVERSION RATE (BOOKINGS AS % OF SESSIONS): 36.9% ✓ CUSTOMER LIFETIME VALUE: \$1,155
BOOKING PATTERNS	TRAVEL PATTERNS
✓ AVERAGE # OF BOOKINGS: 2.8 ✓ COMBINED BOOKING, SHARE: 75% ✓ AVERAGE FLIGHT COST: \$538.5 ✓ AVERAGE HOTEL COST: \$178.3 ✓ AVERAGE HOTEL STAY: 3.9 days ✓ CANCELLATION RATE: 3.6%	✓ RETURN FLIGHTS: 96% ✓ DOMESTIC FLIGHTS, SHARE (US): 77% ✓ DOMESTIC FLIGHTS, SHARE (CA): 18% ✓ INTERNATIONAL TRAVEL OUTSIDE NORTH AMERICA: only 3% of flights

AS A RESULT OF COUNTRY PROFILES' SIMILARITY, WE DECIDED NOT TO PROCEED WITH CREATING TWO SEPARATE SEGMENTATION MODELS



### AVERAGE USER'S PROFILE

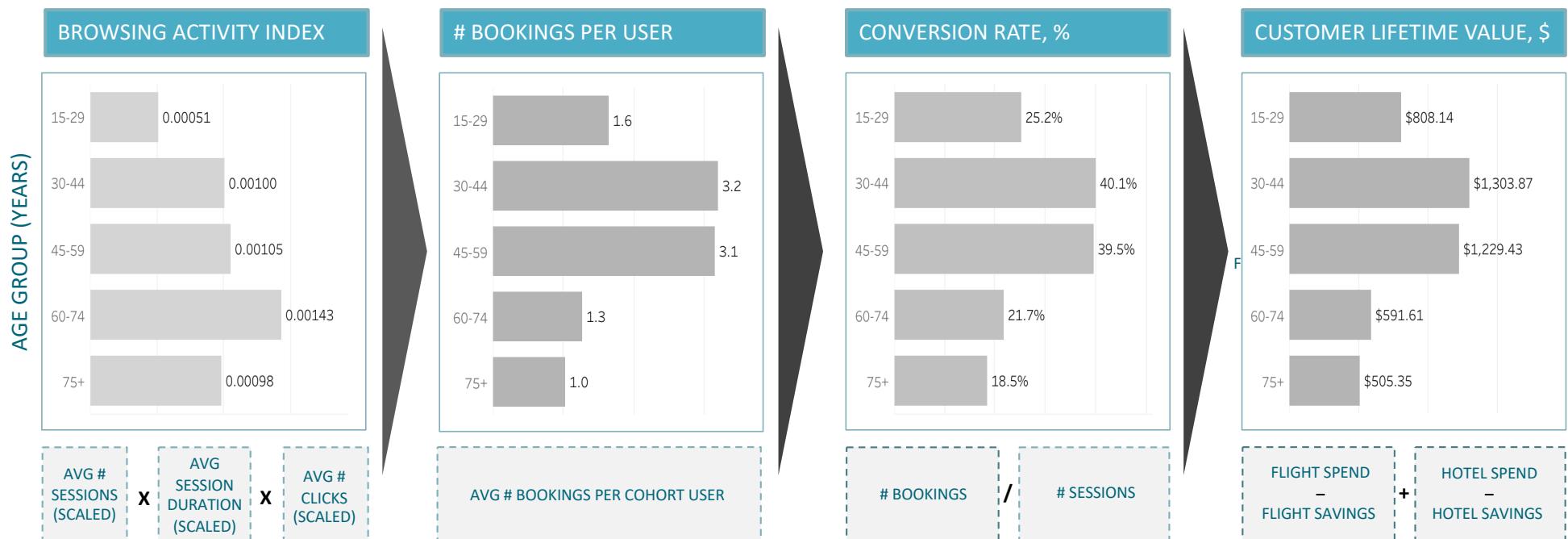
- A single woman of 40.9 years with no children who made 2.8 bookings within the study time, 75% of which are combined.
- Generated CLV of US\$ 1,146 within the study period.
- Prefers to travel alone, mostly within the US (77 % of flights), to Canada (20 %), and other countries (3 %).
- Flights are mostly returned (96 %), with the average cost standing at US\$ 540.
- The hotel cost stands at US\$ 178 per night, with 3.9 nights of stay on average.



### AVERAGE USER'S PROFILE

- A single woman of 40.1 years with no children who made 2.9 bookings within the study time, 76 % of which are combined.
- Generated CLV of US\$ 1,202 within the study period.
- Prefers to travel alone, mostly to the US (79 % of flights), inside Canada (20 %), and to other countries (3 %).
- Flights are mostly returned (95 %), with the average cost standing at US\$ 530.
- The hotel cost stands at US\$ 179 per night, with 3.8 nights of stay on average.

## BABY BOOMERS (60-74 YEARS) EXHIBIT THE HIGHEST BROWSING ACTIVITY, BUT THIS ENGAGEMENT DOES NOT TRANSLATE INTO THE HIGHEST BOOKING ACTIVITY OR CLV



➤ Neither of browsing activity metrics can properly show the differentiation in browsing activity's intensity along age groups, if taken alone.



➤ To overcome this limit, an integrated Browsing Activity Index was developed, where all the three metrics are scaled and multiplied.



➤ Key takeaway: In the age group split, browsing intensity has no direct impact either on conversion rate or customer value generation.

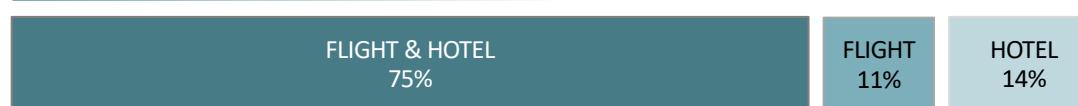


➤ Older and senior customers (60+ years) demonstrate in general a higher browsing intensity than middle-aged groups (30 to 59), but their conversion rates and CLV metrics are significantly lower.

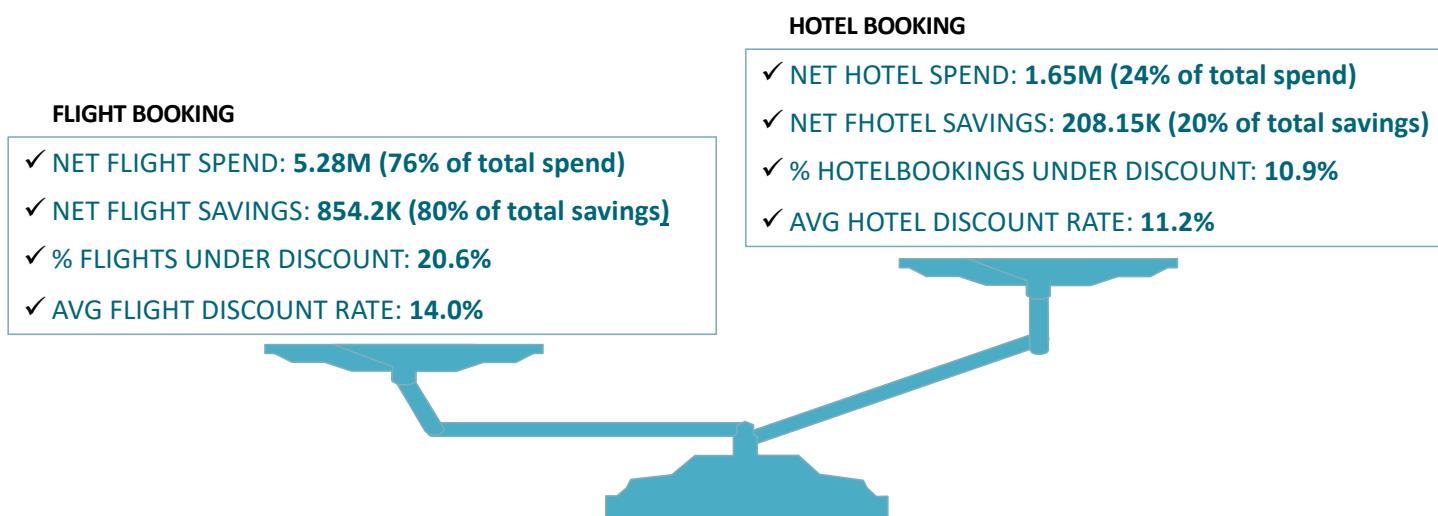


## FLIGHT BOOKING IS A MAJOR CONTRIBUTOR TO TRAVELTIDE'S BUSINESS, INCLUDING THE CASE OF COMBINED FLIGHT & HOTEL BOOKING

Booking Structure, % of Total Bookings



Booking Structure, % of Total Bookings



BESIDES UNEQUAL REVENUE SHARE, FLIGHT AND HOTEL BOOKING DEMONSTRATE DIFFERENT CUSTOMER BEHAVIOUR PATTERNS (INCL. DISCOUNTING AND DEAL HUNTING) AND SHOULD THEREFORE BE ANALYZED SEPARATELY



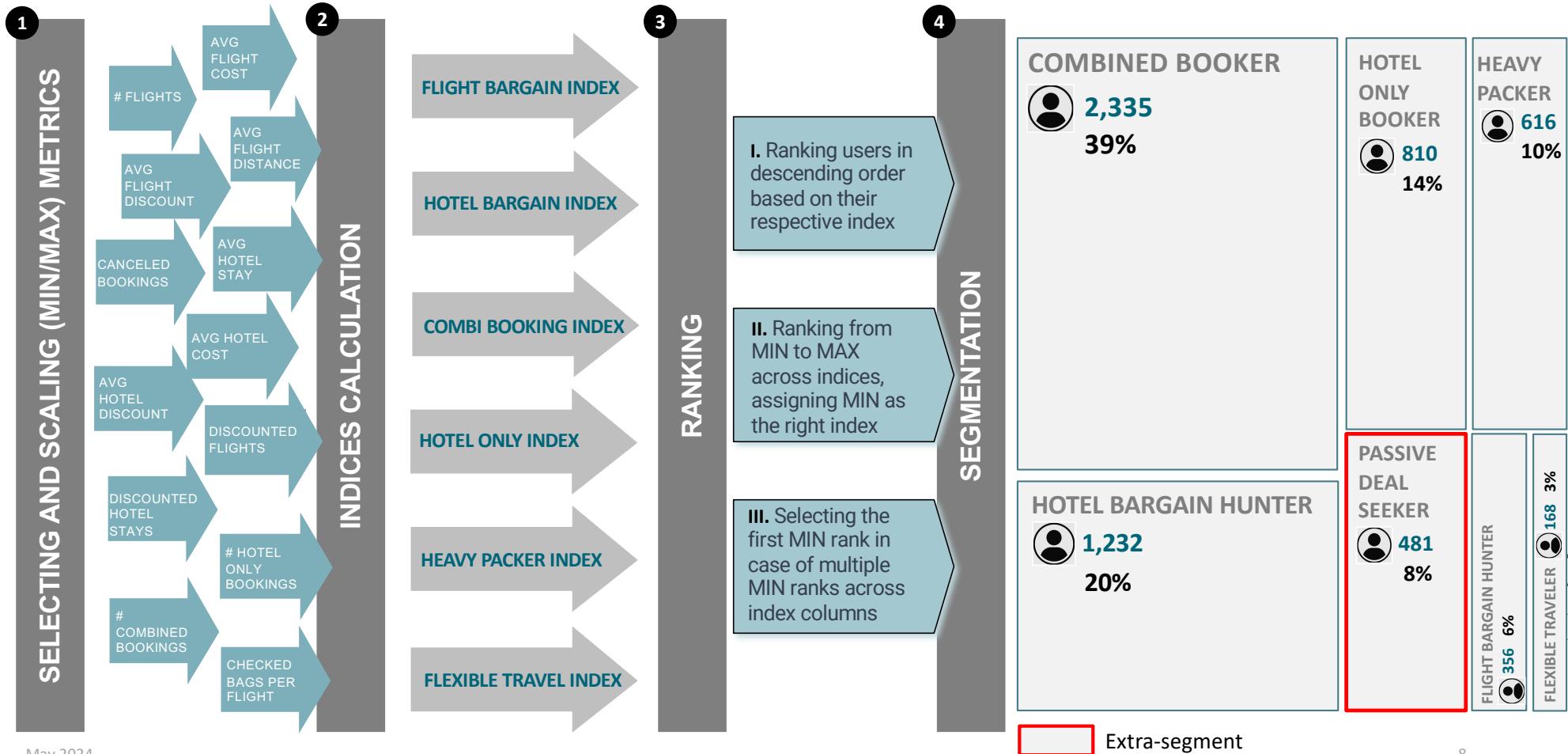
## TO MATCH THE REQUESTED PERKS, A FRAMEWORK OF SIX HYPOTHETICAL SEGMENTS WAS DEVELOPED, INCLUDING INDEX FORMULAE TO CALCULATE THEM

RECOMMENDED PERK	POTENTIAL SEGMENT	KEY FEATURES	INDICES
FLIGHT EXCLUSIVE DEAL	FLIGHT BARGAIN HUNTER	<ul style="list-style-type: none"><li>• High # of discounted flights</li><li>• Higher than average savings per flight distance</li><li>• Combined bookings prevail</li></ul>	Avg Flight Discount Rate (Scaled) X % Flights Under Discount (Scaled) X Avg Flight Savings per 100 Miles (Scaled)
HOTEL EXCLUSIVE DEAL	HOTEL BARGAIN HUNTER	<ul style="list-style-type: none"><li>• High # of discounted hotel stays</li><li>• Higher than average savings per night of stay</li><li>• Combined and hotel only bookings prevail</li></ul>	Avg Hotel Discount Rate (Scaled) X % Stays Under Discount (Scaled) X Avg Hotel Savings per 1 Night (Scaled)
FREE HOTEL MEAL	HOTEL ONLY BOOKER	<ul style="list-style-type: none"><li>• High # of discounted hotel stays</li><li>• Longer than average duration of hotel stays (6+ nights)</li><li>• Hotel only bookings prevail</li></ul>	HIGHER THAN AVERAGE % OF HOTEL ONLY BOOKINGS IN BOOKING PORTFOLIO (SCALED)
ONE NIGHT FREE HOTEL NIGHT WITH FLIGHT	COMBINED BOOKER	<ul style="list-style-type: none"><li>• High # of discounted flights</li><li>• Low # of discounted hotel stays</li><li>• Combined bookings prevail</li></ul>	HIGHER THAN AVERAGE % OF HOTEL ONLY BOOKINGS IN BOOKING PORTFOLIO (SCALED)
FREE CHECKED BAG	HEAVY PACKER	<ul style="list-style-type: none"><li>• Higher than average # of checked bags, flight seats, and hotel rooms (incl. potential group travelers)</li><li>• Combined and flight only bookings prevail</li></ul>	HIGHER THAN AVERAGE # CHECKED BAGS PER USER PER FLIGHT
NO CANCELLATION FEES	FLEXIBLE TRAVELLER	<ul style="list-style-type: none"><li>• Higher than average % of cancelled bookings in total booking portfolio</li><li>• All types of bookings</li></ul>	HIGHER THAN AVERAGE % CANCELLED BOOKINGS IN BOOKING PORTFOLIO



TravelTide

## SCALING KEY METRICS AND CALCULATING SIX INDICES RESULTED IN SEVEN UNEVEN BEHAVIOURAL SEGMENTS, INCLUDING AN UNEXPECTED ADDITIONAL SEGMENT



May 2024

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## ACROSS THE ESTABLISHED BEHAVIOURAL SEGMENTS, BROWSING INTENSITY DOES NOT CLOSELY CORRELATE EITHER WITH CONVERSION OR VALUE CREATION

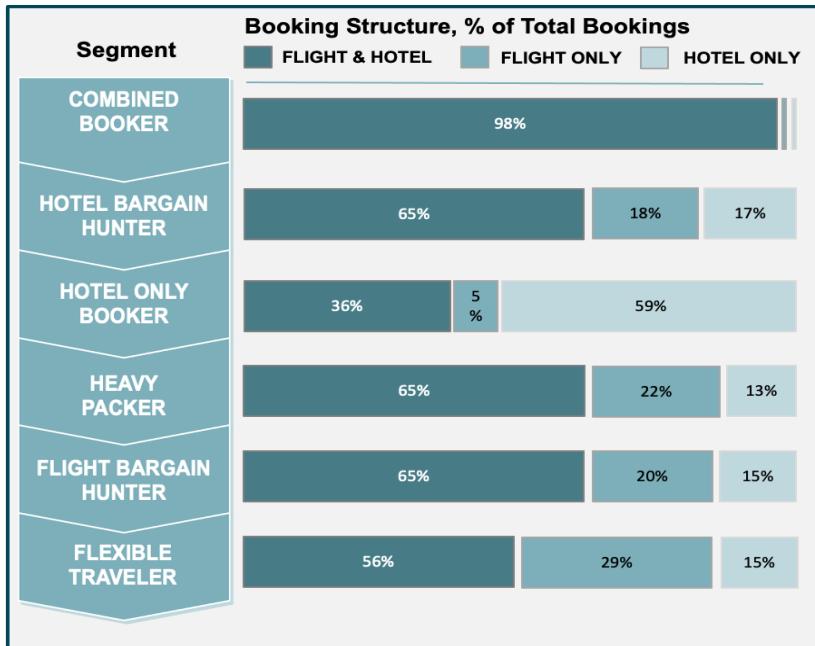
Segment	Browsing Activity Index	Avg # of Bookings	Avg Conversion Rate, %	Customer Lifetime Value, \$
COMBINED BOOKER	0.00131	2.8	34.6%	\$1,252.69
HOTEL BARGAIN HUNTER	0.00053	3.9	47.6%	\$1,419.78
HOTEL ONLY BOOKER	0.00022	2.2	26.7%	\$365.34
HEAVY PACKER	0.00054	3.1	38.6%	\$1,613.18
FLIGHT BARGAIN HUNTER	0.00066	3.3	40.2%	\$1,551.82
FLEXIBLE TRAVELER	0.00725	2.4	29.0%	\$2,269.39
PASSIVE DEAL SEEKER	0.00010	X	X	X

- Index Ranking method established an extra segment of users who, while demonstrating the expected high browsing activity (8+ sessions), do not convert into active customers by making bookings. We call them "Passive Deal Seekers".
- Across segments, **browsing activity has no direct impact on conversion and value creation.** E.g., having the highest browsing activity index, Flexible Travelers demonstrate one of the lowest conversion rates.
- On the other hand, **Combined Bookers are almost two times more "browsing intensive" than Hotel Bargain Hunters, which show higher conversion rate and CLV, etc.**

BROWSING ACTIVITY IN GENERAL AND # OF SESSIONS IN PARTICULAR ARE NOT THE BEST CRITERIA FOR DEFINING A REPRESENTATIVE USER COHORT

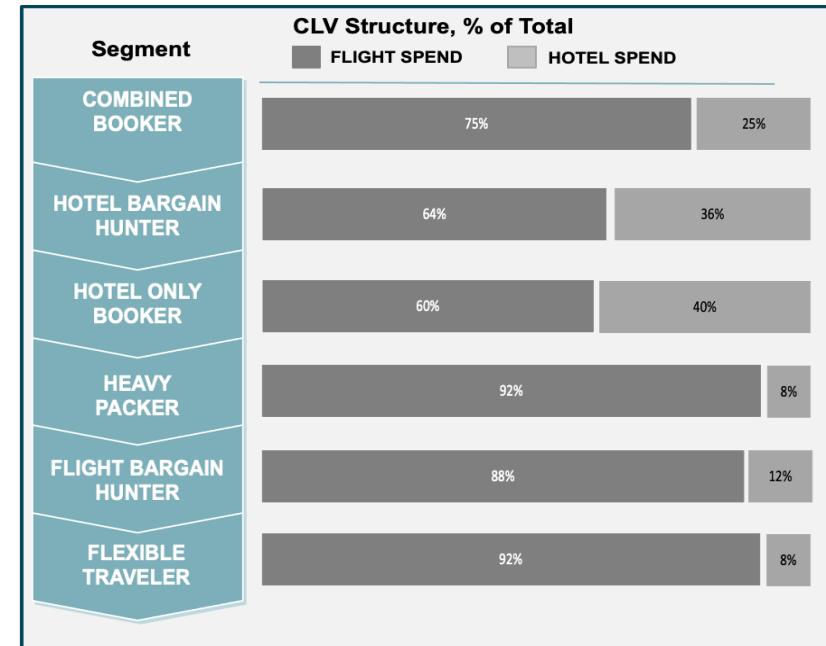
## THE TYPE OF BOOKING DETERMINES THE STRUCTURE OF CLV, BUT OTHER VARIABLES (FLIGHT/HOTEL COST) ALSO PLAY ROLE

STRUCTURE OF BOOKINGS BY TYPE ACROSS SEGMENTS



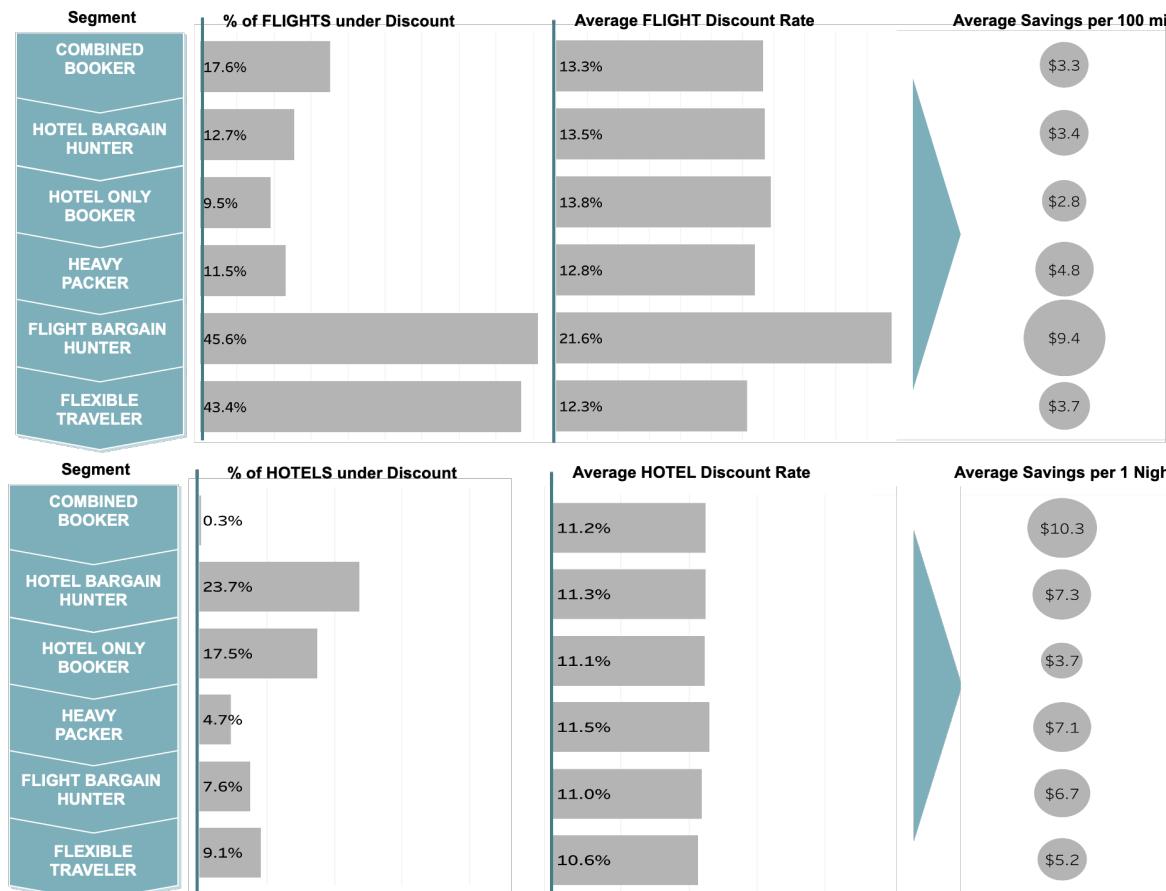
- Combined booking (flights and hotels) is the dominant type of bookings across all segments, except for Hotel Only Bookers who have the highest Hotel Only booking share.
- Flexible Travelers feature the highest share of Flight Only bookings, even higher than by Flight Bargain Hunters.

STRUCTURE OF CUSTOMER LIFETIME VALUE ACROSS SEGMENTS



- Flight spend dominates in the average CLV across all segments, including Hotel Bargain Hunters and Hotel Only Bookers. However, in these two segments the share of hotel spend is significantly higher than in all other ones.
- Surprisingly, Heavy Packers and Flexible Travelers have the highest share of flight spend in their average CLV (92% of total).

## THE KEY METRICS OF BARGAIN SEEKING BEHAVIOR, IN GENERAL, ALIGN WITH THE MAIN CHARACTERISTICS OF THE IDENTIFIED BEHAVIOURAL SEGMENTS



- As expected, Flight Bargain Hunters have an “outlining” flight discount rate compared to other segments. Combined with the fact that almost half of their flight bookings (46%) were discounted, it resulted in the highest average savings per 100 miles of flight (Haversine distance).
- Flexible Travelers **feature 43% of discounted flights in their portfolio, mostly because they booked very expensive long-haul flights.** Resulting from moderate discount rates and large distances, their average per unit savings are much more modest than by Flight Bargain Hunters.
- On average, the hotel discount rate is relatively similar across all segments, unlike the situation with flights.
- Except for Hotel Bargain Hunters, who booked 24% of their hotel stays under discounts, all the segments show relatively small or explicitly small shares of discounted bookings.
- Combined Bookers have higher average savings per 1 hotel night than Hotel Bargain Hunters; yet the share of discounted hotel stays within this segment is negligible.
- **Hotel Only Bookers demonstrate much less intensive bargain seeking behavior than Hotel Bargain Hunters,** which results in much lower average savings per night (the lowest across all segments).



## ACCOUNTING FOR 20% OF THE COHORT, GEN Y (30-44 YEARS) COMBINED BOOKERS, PRIMARILY SINGLE FEMALES WITH NO CHILDREN, REPRESENT THE BIGGEST DEMOGRAPHIC

KEY DEMOGRAPHIC METRICS BY SEGMENT

Segment	Avg Age	Female (%)	Married (%)	Children(%)
COMBINED BOOKER	41.3	87.7	42.6	32.5
HOTEL BARGAIN HUNTER	41.9	88.6	44.1	30.7
HOTEL ONLY BOOKER	38.9	88.9	44.0	35.1
HEAVY PACKER	41.5	87.2	48.9	33.9
FLIGHT BARGAIN HUNTER	40.8	86.8	44.1	31.7
FLEXIBLE TRAVELER	37.4	90.5	36.3	32.1
PASSIVE DEAL SEEKER	38.5	89.0	40.7	33.3

DISTRIBUTION OF SEGMENTS BY AGE GROUP (% OF TOTAL COHORT)

Segment/Age Group	15 – 29	30 – 44	45 – 59	60 – 74	75+
COMBINED BOOKER	4.4%	19.8%	14.0%	0.7%	0.0%
HOTEL BARGAIN HUNTER	1.7%	10.9%	7.6%	0.3%	
HOTEL ONLY BOOKER	4.5%	4.4%	2.9%	1.4%	0.3%
HEAVY PACKER	1.6%	4.5%	3.8%	0.4%	0.0%
FLIGHT BARGAIN HUNTER	0.8%	3.0%	2.0%	0.2%	
FLEXIBLE TRAVELER	1.1%	0.9%	0.5%	0.3%	0.0%
PASSIVE DEAL SEEKER	3.5%	1.5%	1.4%	1.4%	0.2%

- Hotel Only Bookers and Flexible Travelers are the youngest segments in the cohort, with correspondingly low (but not always lowest) shares of married users and users with children. Passive deal seekers are also relatively young compared to the biggest user

May groups

- Gen Y (30 to 44 years) and Gen X (45 to 59 years) Combined bookers and Hotel Bargain Hunters (4 subsegments squared in red), account for 54% of the cohort. Only four other subsegments (out of 35) account for more than just 4% of the cohort each.

## FOUR OF THE SEVEN USER SEGMENTS ARE HEAVILY SKEWED TOWARDS GEN Y (30 TO 44 YEARS) AND GEN X (45 TO 59 YEARS) DEMOGRAPHICS

DISTRIBUTION OF AGE GROUPS ACROSS SEGMENTS (% OF TOTAL SEGMENT)

Segment / Age Group	15 - 29	30 - 44	45 - 59	60 - 74	75+
COMBINED BOOKER	11.3%	50.8%	36.1%	1.8%	0.1%
HOTEL BARGAIN HUNTER	8.2%	53.2%	37.0%	1.5%	
HOTEL ONLY BOOKER	33.6%	32.6%	21.1%	10.5%	2.2%
HEAVY PACKER	15.4%	44.2%	36.7%	3.4%	0.3%
FLIGHT BARGAIN HUNTER	13.5%	50.8%	33.1%	2.5%	
FLEXIBLE TRAVELER	38.1%	31.5%	17.9%	11.3%	1.2%
PASSIVE DEAL SEEKER	43.9%	19.1%	17.3%	17.5%	2.3%

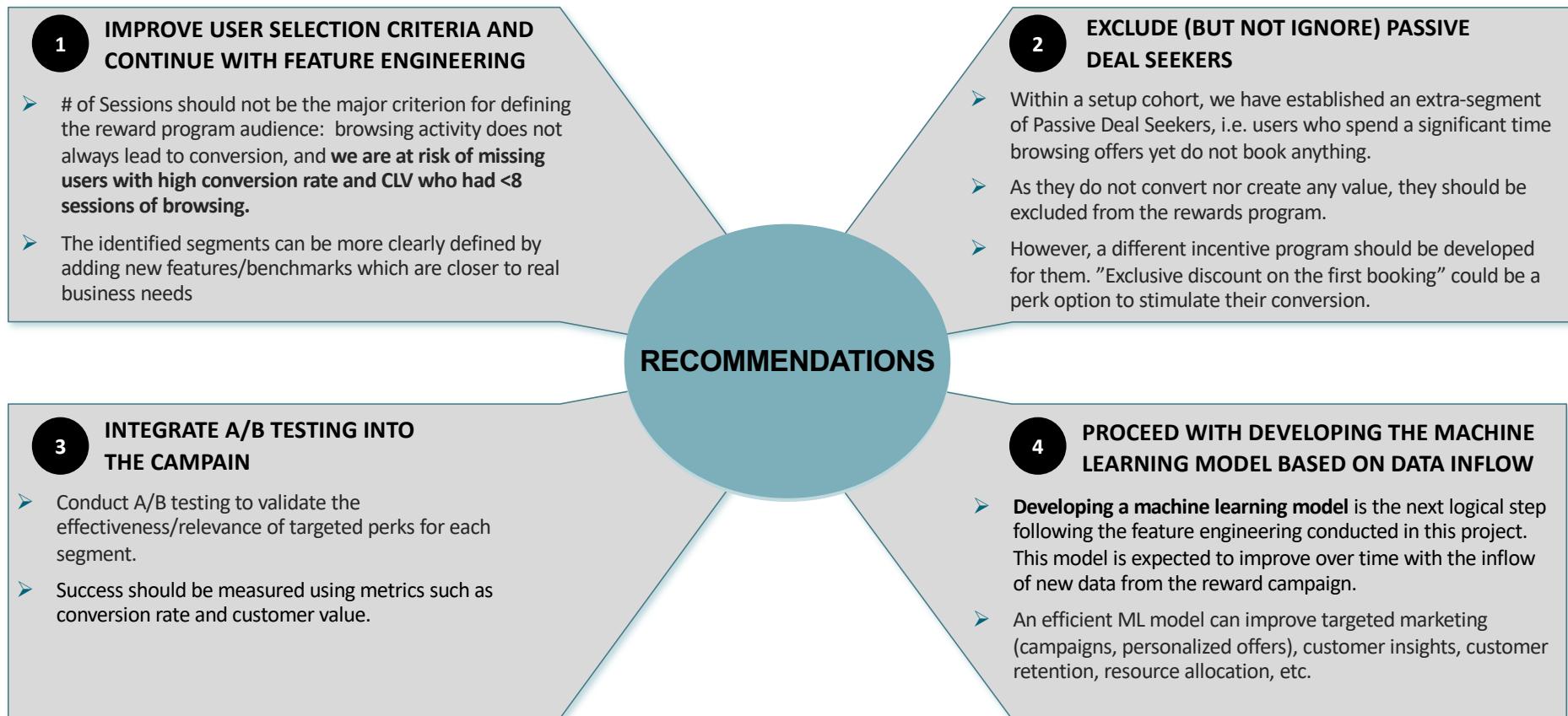
### ACTIVE (CONVERTING) USERS

- Combined Bookers, Hotel Bargain Hunters, Flight Only Bookers and Heavy Packers are distinctively "middle-age" segments, due to high shares of 30-44- and 45-59-years age groups.
- Over the third of users in Hotel Only Bookers and Flexible Travelers are younger people of 15-29 years.
- At the same time, Hotel Only Bookers and Flexible Travelers have relatively high shares (10-11%) of older people (60-74 years), at least compared to other segments.

### PASSIVE DEAL SEEKERS

- The segment of Passive Deal Seekers features the highest shares of both younger people (15-29 years) and older people (60-74 years), and the lowest shares of middle-aged people at the same time.
- The age partly explains conversion limitations among these internet intensive users.

## CONCLUSIONS AND RECOMMENDATIONS: FINDINGS AND NEXT STEPS





THANK YOU FOR YOUR ATTENTION!

## QUESTIONS?

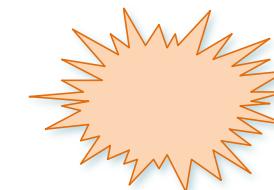


## COMMENTS?



## PROPOSALS?

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## IDEAS?

CLICK HERE:



Seven Interactive Tableau Dashboards to further slice and dice the User Cohort Data

[https://public.tableau.com/app/profile/oleksiy.danilin/viz/Travel\\_Tide\\_Dashboards/USERCOHORTDEMOGRAPHY](https://public.tableau.com/app/profile/oleksiy.danilin/viz/Travel_Tide_Dashboards/USERCOHORTDEMOGRAPHY)

CLICK HERE:



All the project's deliverables, incl. report, dataset/model, and SQL code

<https://github.com/oleksiy-danilin/TravelTide>