



SCOOTER SHARING

MILAN URBAN AREA MARKETING ANALYTICS LAB

THE QUESTIONNAIRE

- CATEGORICAL ANSWER
- ORDINAL - LIKER SCALE
- INTERVAL

90,6%

PUBLIC
TRANSPORTATION

What are the reasons that you most often choose public transportation?

What kind of ticket for public transportation do you use most often?

How often do you use public transportation?

For most of these trips, how many connections do you need to make?

On average, how satisfied are you with the public transportation?

For most of these trips, how much time would you spend with public transportation?

4,9%

OWN CAR

What are the reasons that you most often use your own car?

How often do you travel with your own car in the urban area of Milan?

For most of these trips, how easy could you find parking?

For most of these trips, how much time would you spend * with your own car?

On average, how satisfied are you with travelling with your car?

4,5%

OTHER

**Have you ever used shared mobility
in the urban area of Milan?**

**How often do you use the following
types of shared mobility?**

**How well do the following scenarios
describe your usage of shared mobility?**

**What are the reasons that
motivate you to use shared mobility?**

**On average, how satisfied are you with
shared mobility that you have used?**

SHARED MOBILITY

**What is your opinion about
using a scooter sharing?**

**Consider that the service costs
€0,15 per minute of use.**

How likely are you going to try the service?

SCOOTER MOBILITY

Gender

Age

Where do you live?

**What is your
living situation?**

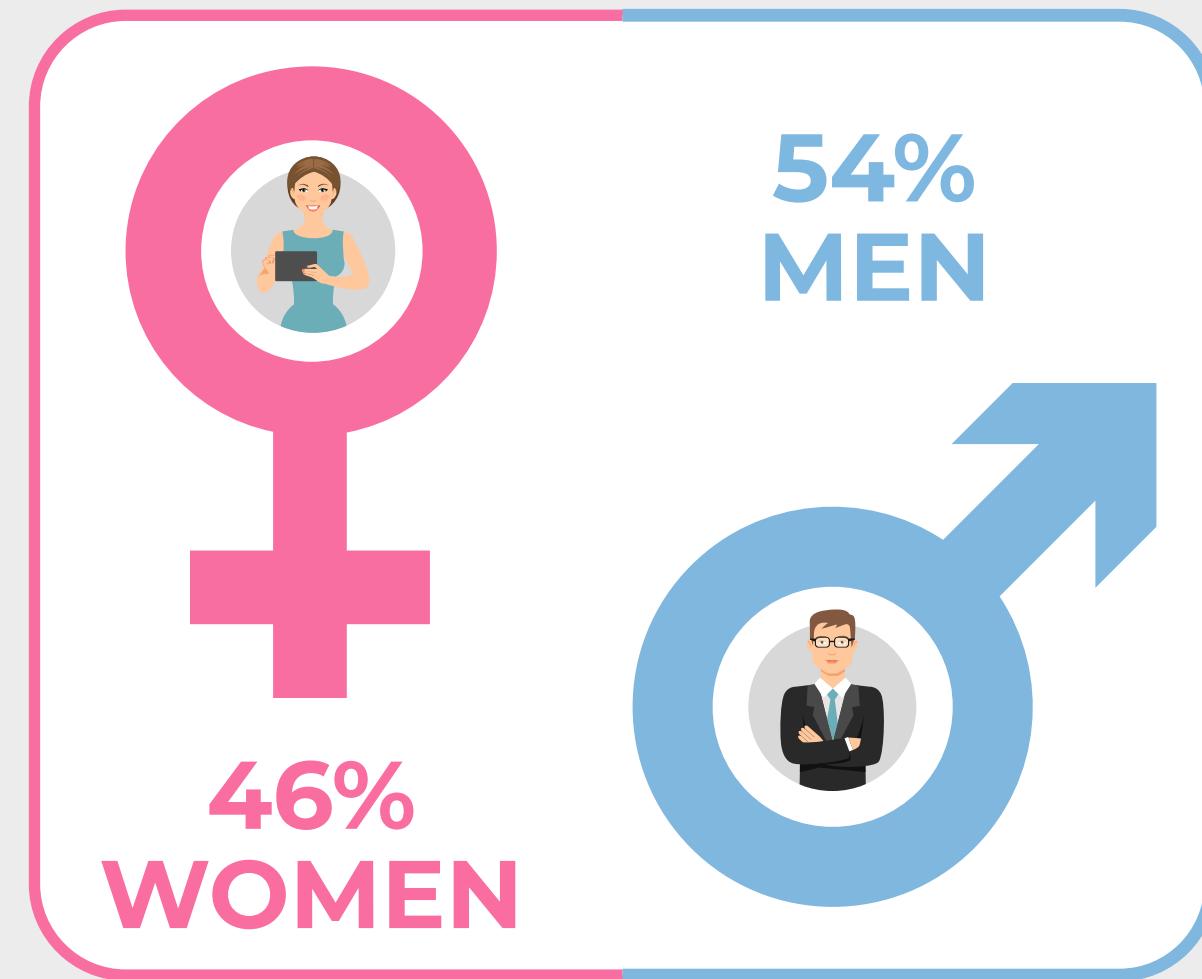
**How often do
you use the following
media channels?**

GENERAL INFORMATION

DESCRIPTIVE ANALYSIS

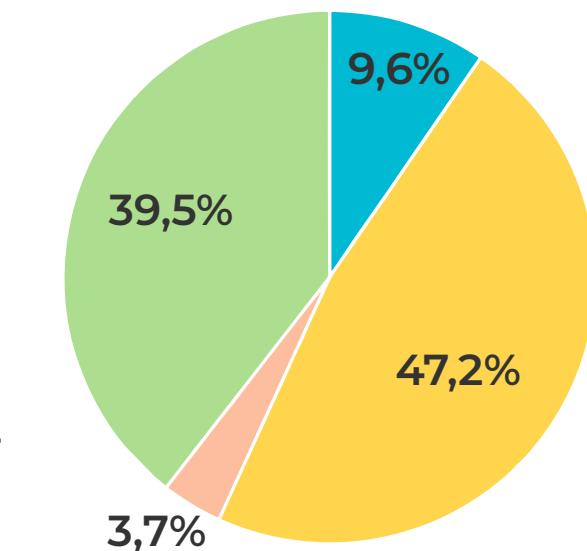
272 PEOPLE EXAMINATED

People that have completed correctly the questionnaire



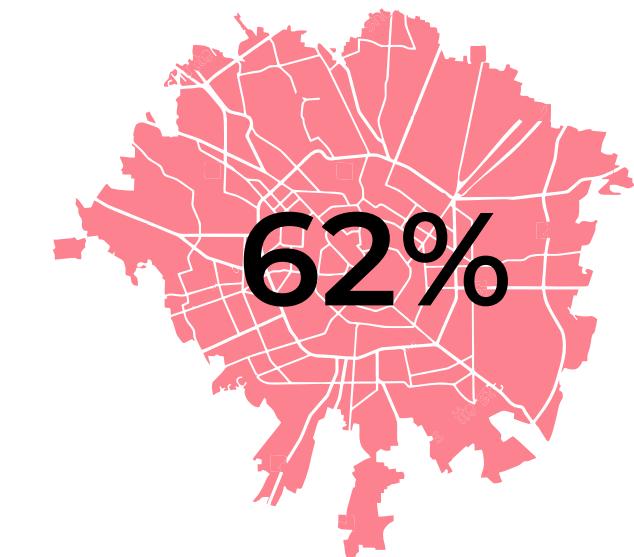
LIVING SITUATION

- Alone
- With roommates
- With spouse or partner
- With family

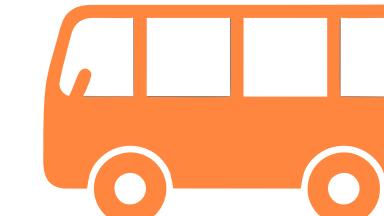


AVERAGE AGE 23,5

ORIGIN OF THE SAMPLE



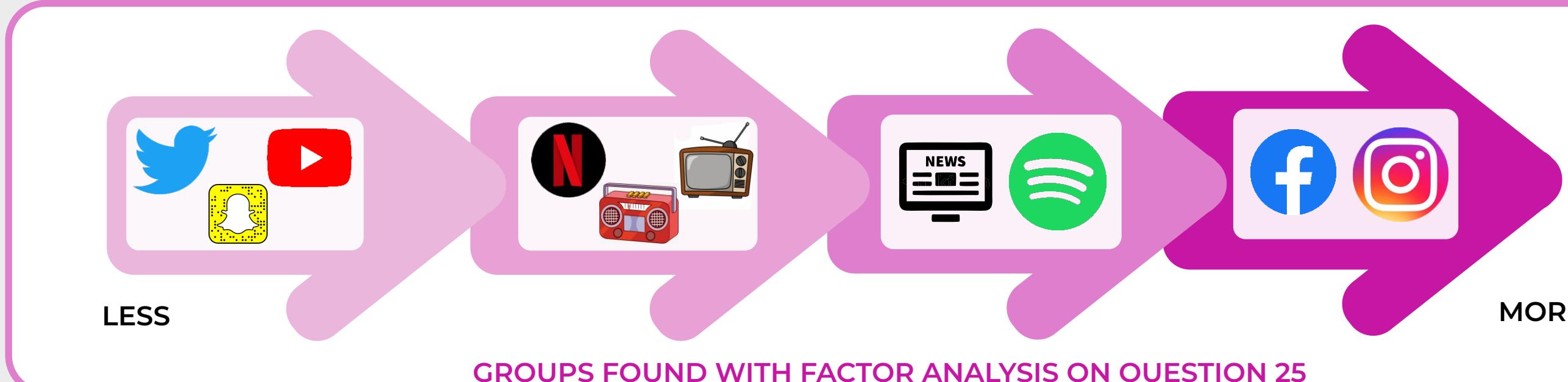
People of our sample that live in Milan
the other 38% are commuters

31,81 MINUTES


Average time spent on public transportation

33,44 MINUTES


Average time spent on car



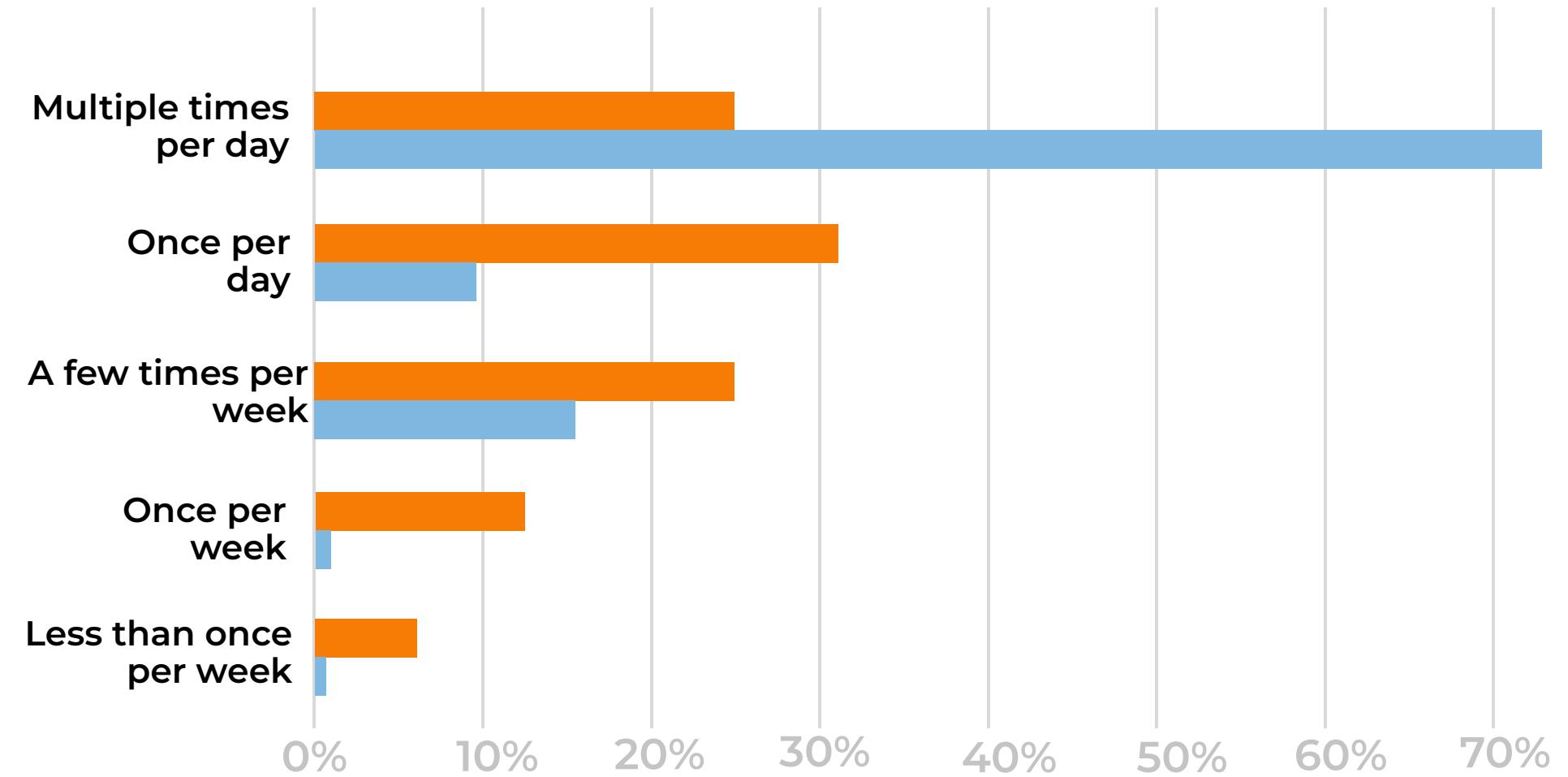
MEDIA CHANNEL USED

GROUPS FOUND WITH FACTOR ANALYSIS ON QUESTION 25

DESCRIPTIVE ANALYSIS

FREQUENCY OF TRAVEL

Public transportation
Own car



SATISFACTION

SCALE OF 5	PUBLIC TRANSPORTATION	OWN CAR
AVAILABILITY	3,53	1,94*
PUNCTUALITY	2,74	2,25
SPEED	3,41	2,81
COMFORT	3,03	--
RELIABILITY	3,08	--
SAFETY	3,53	4,00
COST	3,71	2,75

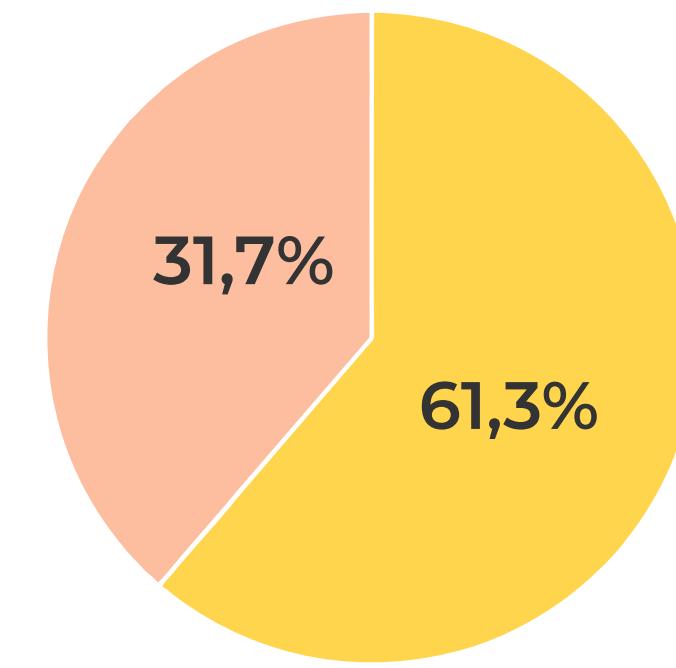
SHARED MOBILITY

3,26
--
3,40
3,42
3,40
3,05

*of parking

SHARED MOBILITY

Used
Never Used



COMMENT OF THE DESCRIPTIVE ANALYSIS

From the descriptive analysis it emerges that most of the individuals who completed the questionnaire are Milan students (equally divided between males and females) who are largely accustomed to using shared mobility.

They are also very inclined to use social networks and they mainly take half an hour to arrive at the workplace (strictly by public transport).

About the satisfaction of the kind of transportation used the majority of the values are positive, except for the parking availability for who use the car; a middle-low satisfaction is on the punctuality of the public transportation and on the cost of the car. A good thing for our objective is that the shared mobility has all good satisfaction parameters, the cost too.

METODOLOGY FOR THE NEXT STEPS

After the descriptive analysis of the sample we proceed to segmentation and profiling, based mainly on the Question 19 which we believe (having previously tested the other questions) is the most useful to subdivide the sample into clusters with large differences between them.

From Q19 we get three factors that will later be grouped into four clusters.

Then we will analyse the 4 clusters obtained searching the most relevant differences and so profiling them; finally evaluating their answer at Question 20 we have understand which is the best profile on which basing our marketing campaign.

We will do an AB test on the Question 20 both generally and per each clusters.

SEGMENTATION AND PROFILING

Q19 FACTOR ANALYSIS

CHARACTERISTIC THAT TAKE INTO ACCOUNT THE PRACTICAL ADVANTAGES OF THE NEW KIND OF MOBILITY



FUNNY

CHARACTERISTIC THAT TAKE INTO ACCOUNT THE SAFETY WHEN SOMEONE DRIVE A SCOOTER



SAFETY

CHARACTERISTIC THAT TAKE INTO ACCOUNT THE IMPACT OF THE IMPLEMENTATION OF THE SCOOTER ON THE ENVIRONMENT



ENVY

RESULTS FROM R STUDIO

- It seems practical to use
- It seems an interesting solution
- It seems easy to use
- It seems fun to use
- It seems clear how I should behave on the road with such a scooter
- It seems safe to use
- It would have positive impact on urban transportation
- It would have positive impact on the environment

item	MR1	MR2	MR3
4	0.76	0.26	0.18
1	0.72	0.25	0.37
2	0.70	0.19	0.25
6	0.69	0.06	0.19
5	0.16	0.86	0.14
3	0.20	0.67	0.18
7	0.23	0.26	0.76
8	0.30	0.09	0.58

COMMENT OF THE FACTOR ANALYSIS

After the factorization into 2, 3, 4 and 5 factors, we came to the conclusion that the most suitable is the 3 factor.

The e.values of the factorization are:

e.values

3.952 1.197 0.918 0.484 0.441 0.373 ...

(Since the third value is very close to one we have taken it into consideration).

We also observed the results of the "fa" function individually using the minres method. We have chosen to consider as a threshold for the division a difference of 0.4 between the values of the factors obtained.

Making the 2-factor analysis, we did not encounter significant differences in items 8 and 7 (in the 3-factor analysis, in fact, they result in an isolated factor, highlighted in green) so we switched to the 3-factor analysis which gave significant differences (as suggested by the e-values).

Finally we did the 4 and 5 analysis in which there are more factors composed by a single element that we have decided to discard.

Q19
**FACTOR
ANALYSIS**

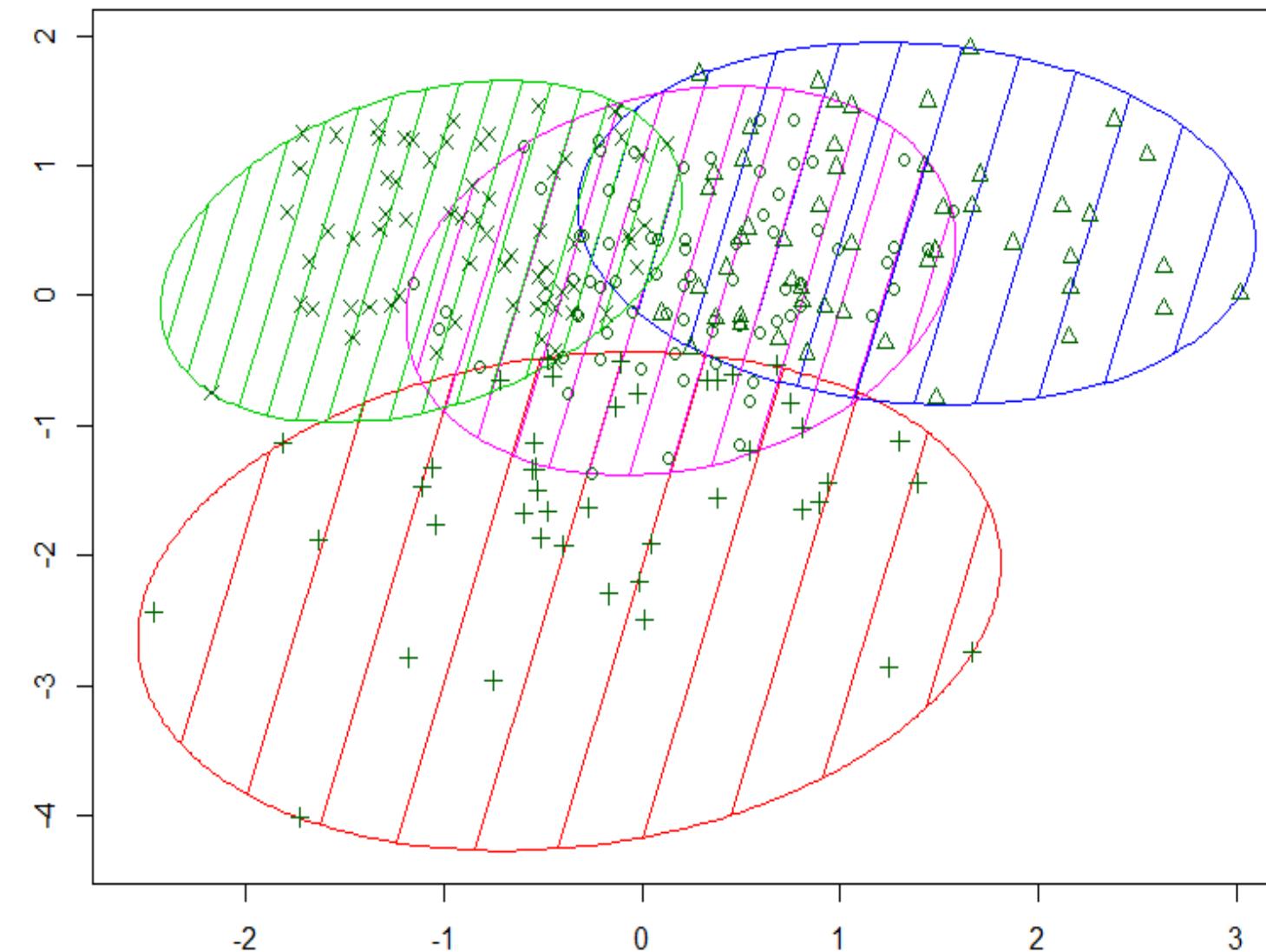
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SEGMENTATION AND PROFILING

Q19 CLUSTER ANALYSIS



CLUSPLOT

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Q19_data\$Cluster	3	158.2	52.75	123.5	<2e-16 ***
Residuals	271	115.8	0.43		
diff		lwr	upr	p adj	
2-1	1.7339733	1.446731546	2.0212151	0.0000000	
3-1	1.8716200	1.577229040	2.1660110	0.0000000	
4-1	2.0310090	1.707030231	2.3549877	0.0000000	
3-2	0.1376467	-0.125082143	0.4003756	0.5291883	
4-2	0.2970357	0.001531643	0.5925397	0.0482818	
4-3	0.1593889	-0.143069057	0.4618469	0.5241734	

ANOVA AND
TUKEY HSD
FUNNY

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Q19_data\$Cluster	3	155.5	51.84	118.6	<2e-16 ***
Residuals	271	118.5	0.44		
diff		lwr	upr	p adj	
2-1	1.15593680	0.8653330	1.4465405	0.0000000	
3-1	-0.75170089	-1.0495375	-0.4538642	0.0000000	
4-1	-0.03479237	-0.3625631	0.2929783	0.9927675	
3-2	-1.90763768	-2.1734416	-1.6418338	0.0000000	
4-2	-1.19072917	-1.4896918	-0.8917665	0.0000000	
4-3	0.71690852	0.4109105	1.0229066	0.0000000	

ANOVA AND
TUKEY HSD
SAFETY

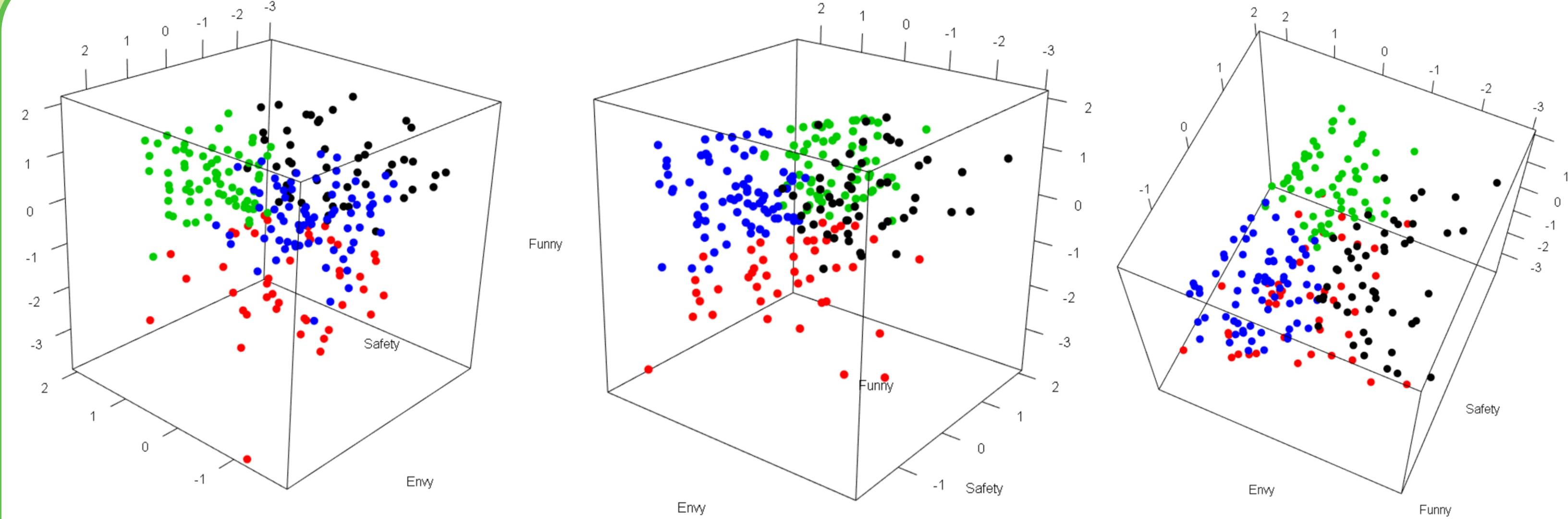
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Q19_data\$Cluster	3	134.9	44.98	87.66	<2e-16 ***
Residuals	271	139.1	0.51		
diff		lwr	upr	p adj	
2-1	0.5385988	0.2237644	0.8534331	0.0000831	
3-1	0.7537897	0.4311194	1.0764600	0.0000000	
4-1	-1.1800098	-1.5351101	-0.8249095	0.0000000	
3-2	0.2151909	-0.0727758	0.5031576	0.2172188	
4-2	-1.7186086	-2.0424989	-1.3947184	0.0000000	
4-3	-1.9337995	-2.2653118	-1.6022873	0.0000000	

ANOVA AND
TUKEY HSD
ENVY

We performed the analysis with two, three, four and five clusters and for each analysis we verified its goodness by performing the Anova and the TukeyHSD function. Based on the results we found that the best segmentation is the 4-cluster. Regarding the latter, the results ("Pr" value) of the Anova tests on the 3 factors are all below the threshold (0.05), therefore significant for the analysis. Among these four clusters there is one (the central one, purple) that has similarities with others (as evidenced by the TukeyHSD function).

SEGMENTATION AND PROFILING

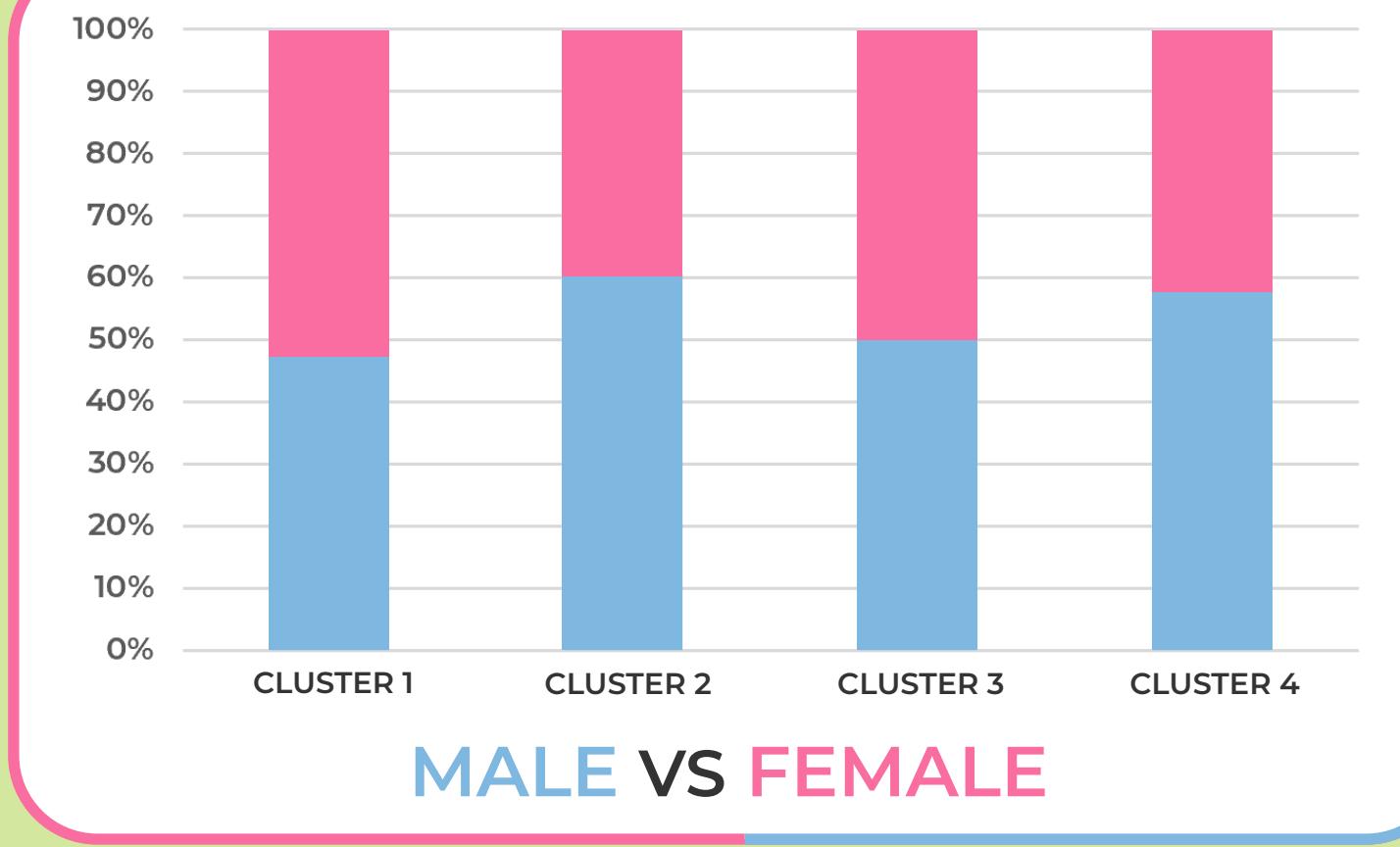
Q19 CLUSTER ANALYSIS



3D PLOT OF THE CLUSTERS

With the CUSPLOT we can see the distribution of the clusters only in 2 dimensions, so taking into account only 2 of the 3 factors used.
So we've decided to plot the clusters on 3 axis in order to better understand the differences between the 4 clusters.
We see that the differences between the clusters are good defined and that the sovrappositions are very small, finally we can conclude that the result is satisfactory.

SEGMENTATION AND PROFILING



PEOPLE THAT LIVE IN MILAN



GENERAL INFORMATION PROFILATION

In all the 4 clusters we have obtained, we can see similarities in the number of males and females present and the fact that they mainly live in Milan (in agreement with what emerged in the descriptive analysis).

A thing to evidence is the fact that in the cluster 3 there is a high number of people that live in family, that is higher comparing with the average of the sample.

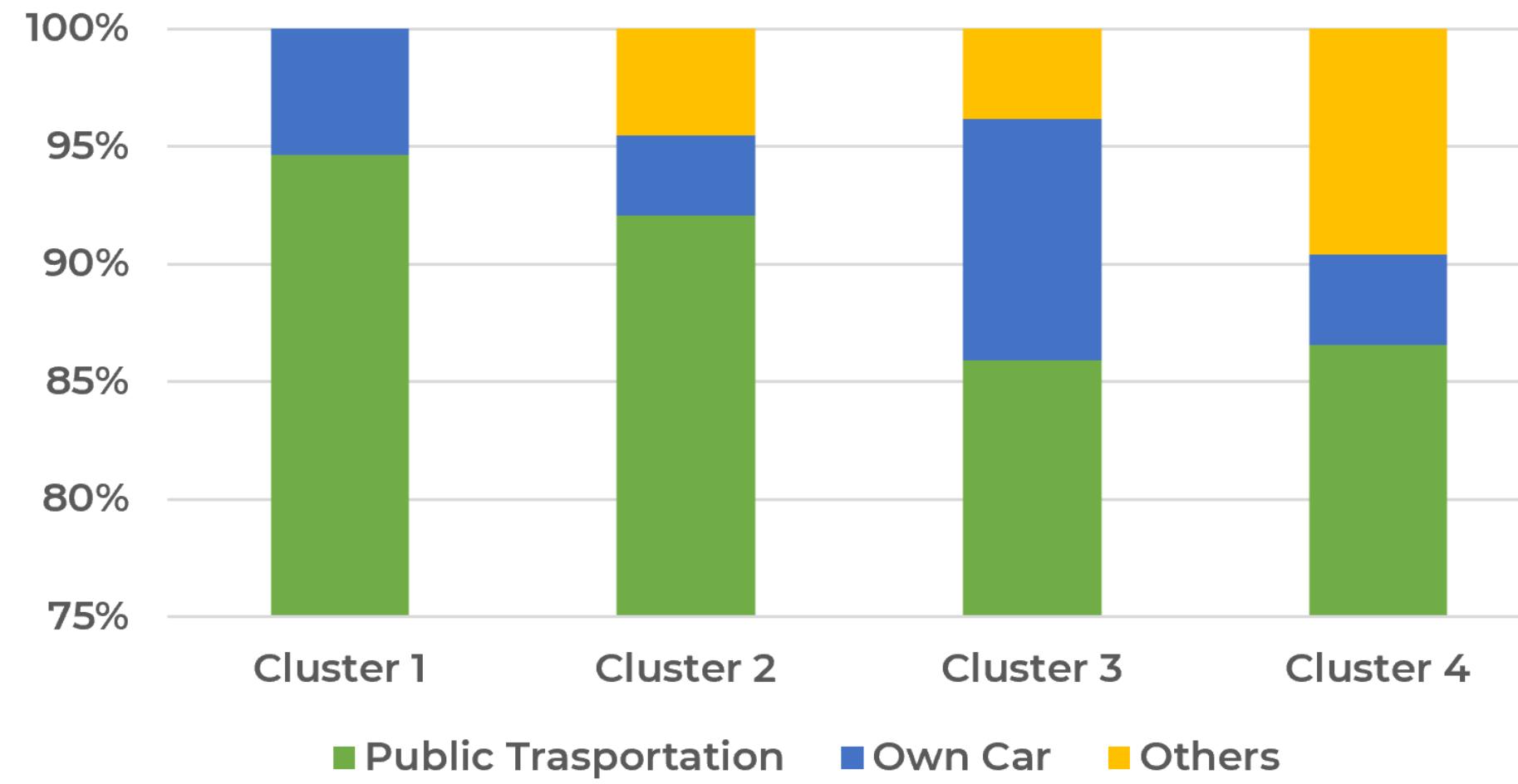
CLUSTER PROFILING



LIVING SITUATION

SEGMENTATION AND PROFILING

KIND OF TRANSPORTATION USED

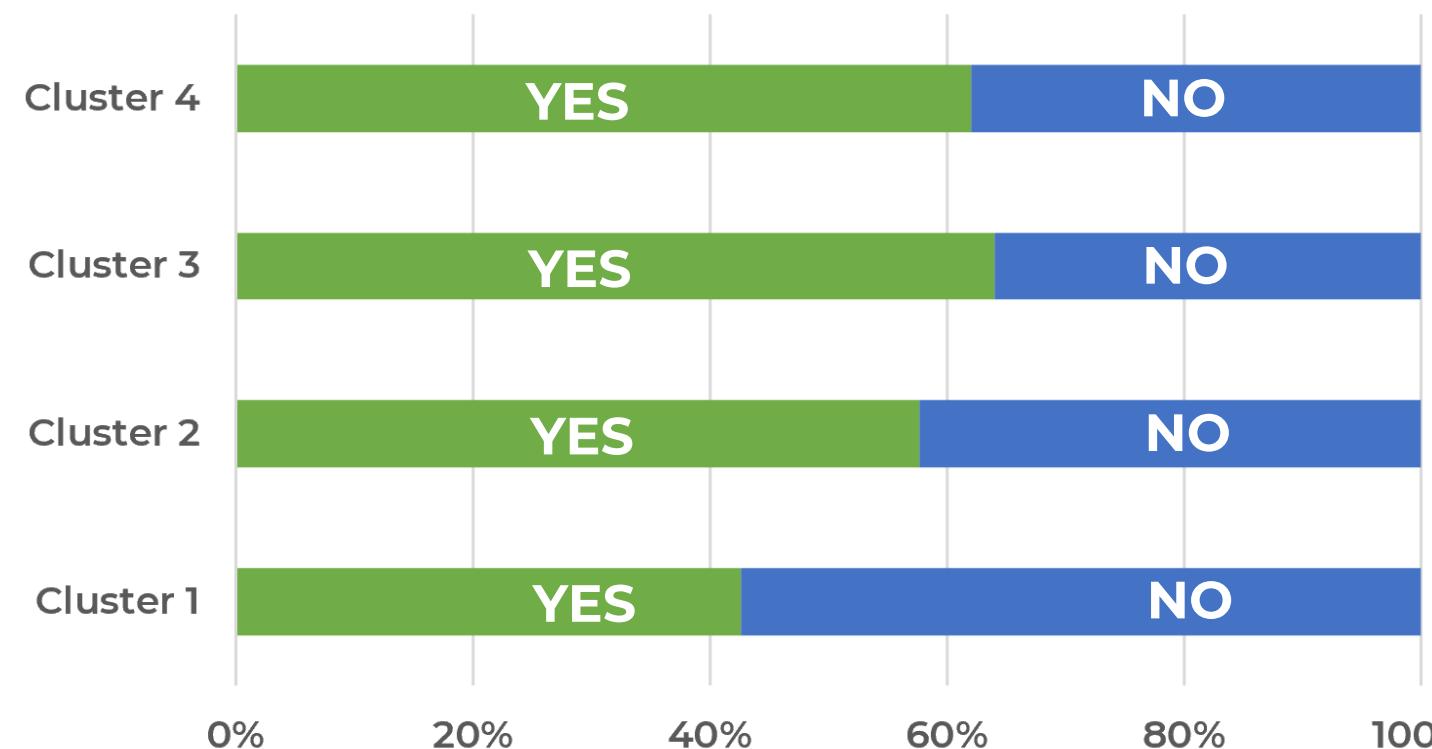


COMMENT

For the most part the clusters prefer the use of public transport, even if this tendency is not noticed in cluster 3 and 4, with the first having a good number of users of cars and the second preferring alternative methods.

The propensity to use shared mobility is higher than 50% in all the clusters except the cluster 1 that doesn't use too much the shared mobility.

The kind of shared mobility most used is the bike sharing and the car sharing, the motor bike is the one used less.



PEOPLE THAT USE SHARED MOBILITY

SHARED MOBILITY USED

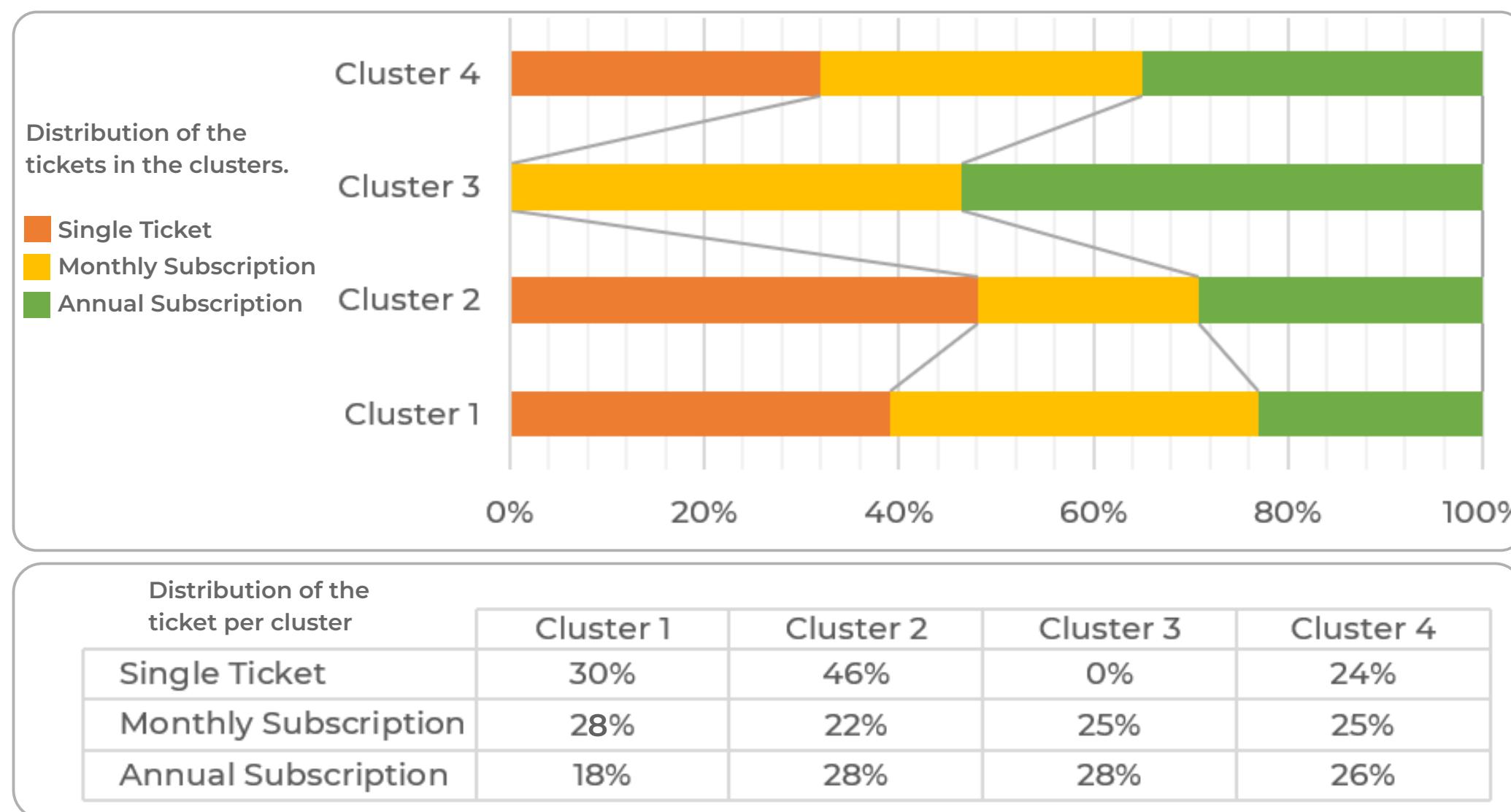
*	Bike sharing	Car sharing	Motorbike sharing
Cluster 1	0,37	0,44	0,11
Cluster 2	0,75	0,66	0,18
Cluster 3	0,73	0,83	0,19
Cluster 4	0,78	0,76	0,46



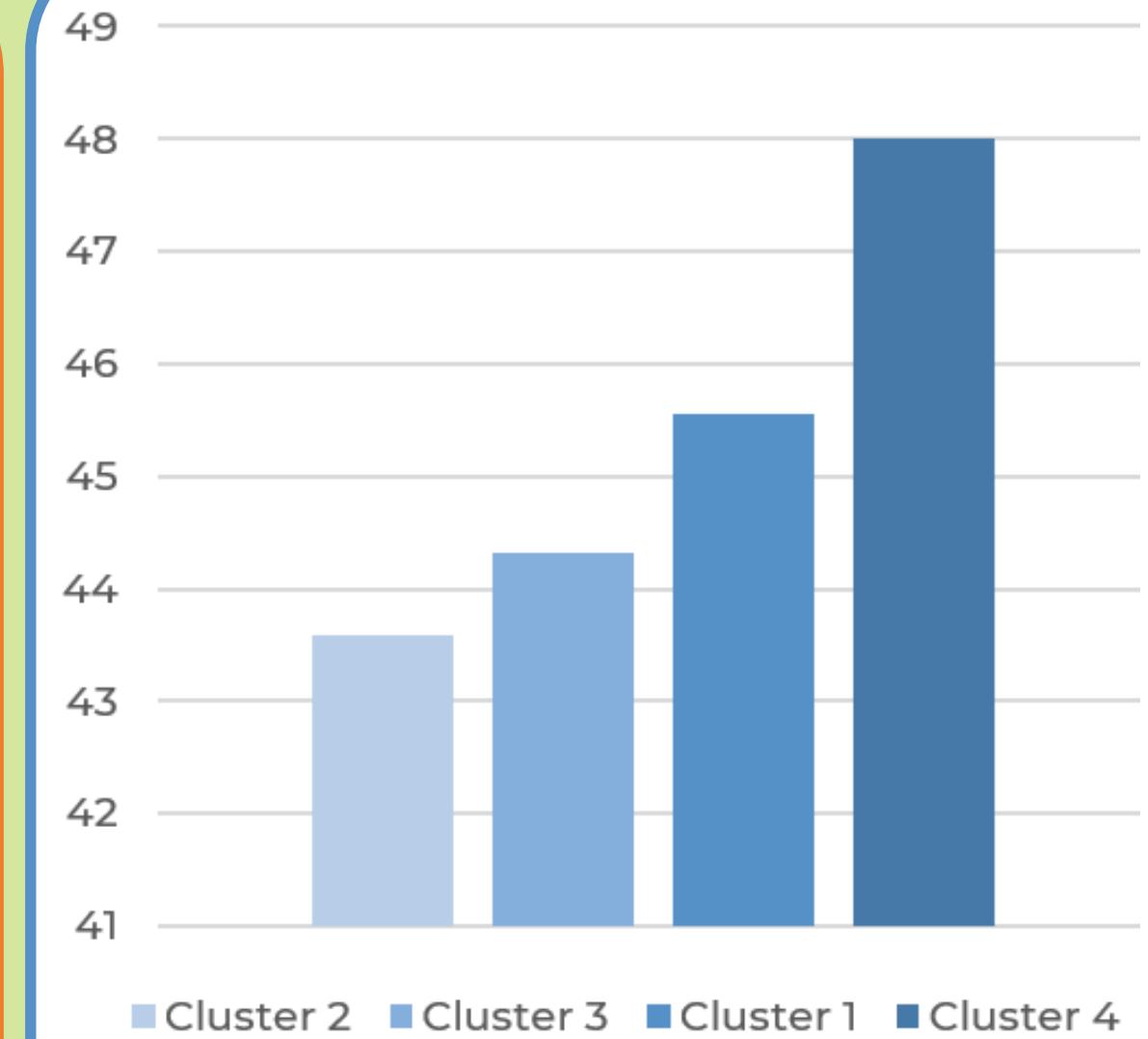
* times used in a month

SEGMENTATION AND PROFILING

PUBLIC TRANSPORTATION TICKET USUALLY USED



NOTE: About the other choices of the question the numbers are very small: 0 for all clusters about Day ticket and only 1 Multiple Ticket in Cluster 3.



PUBLIC TRANSPORTATION PROFILATION

Now we analyze the part of the clusters that use the public transportation.

The members of cluster 4 are those who use public transport for longer. It is worth noting also that in cluster 3 there are no single ticket utilizers, but they can be found in good numbers in all the other clusters.

So our attention will be on the first two clusters because they usually spend a time affordable with a scooter too.

SEGMENTATION AND PROFILING

	Availability	Punctuality	Speed	Comfort	Safety	Cost	Reliability
Cluster 1	6,4	5,7	6,7	6,3	7,5	7,6	6,3
Cluster 2	7,2	5,6	7,2	6,3	6,7	7,1	6,2
Cluster 3	7,3	5,5	6,9	5,7	7,2	7,6	6,1
Cluster 4	6,6	4,8	6,3	5,6	6,9	7,6	5,9

PUBLIC TRANSPORTATION SATISFACTION

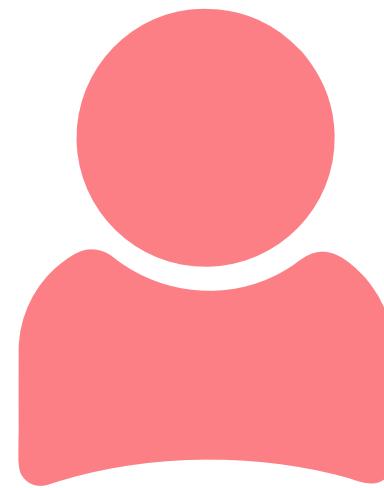
Regarding the satisfaction of clusters about public transportation we can note that generally they all agree that they are not very satisfied with punctuality, in fact it is the only parameter that is under the sufficient vote for all the clusters.

While they are all fairly agreed that the cost of these services is adequate for the offer. The same can be said about vehicle safety.

The cluster 2 has the best mark for all the public transportation parameters probably because it is the one that uses it for a smallest time during the day.

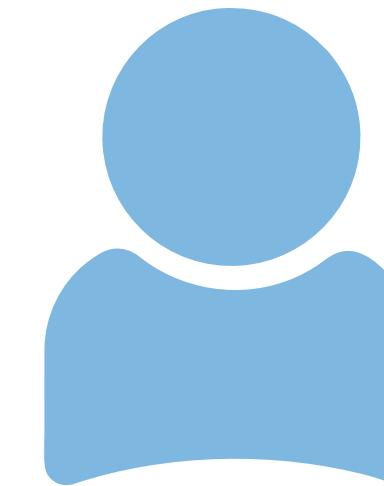
Generally the other parameters are equally distributed, the cluster that has the lowest vote is the number 4, this one as we can see in the previous slide is the one that uses most the public transportation; we can conclude that there can be a negative correlation between the time spent on the public transportation and the satisfaction about it.

SEGMENTATION AND PROFILING



TYPICAL PERSON OF CLUSTER 1

It is mainly composed by women who lives with a roommate. They mostly use public tranports with a single ticket or with a monthly subrcption and they spend about 45 minutes every day on it.They are satisfied about it for the safety and the reliability. About the 60% of them don't use the shared mobility, and the ones who use it prefer the Car sharing.



TYPICAL PERSON OF CLUSTER 2

It contains more men than women. They mainly live with a roommate and they mostly use the public tranports. They use this service with a single ticket and they spend about fourty minutes every day on it. They are satisfied for the speed, the comfort and the availability.About the 40% of them don't use the shared mobility, and the ones who use it prefer the Bike sharing.



TYPICAL PERSON OF CLUSTER 3

It is composed by both women and men in equality. They mainly live with their family and they use both their car and the public transports.They use the latters with a monthly or annual subscription and they spend about 45 minutes every day on it. They are satisfied for the availability and the cost of this service. More than 60% of them use the shared mobility, mainly Car sharing.

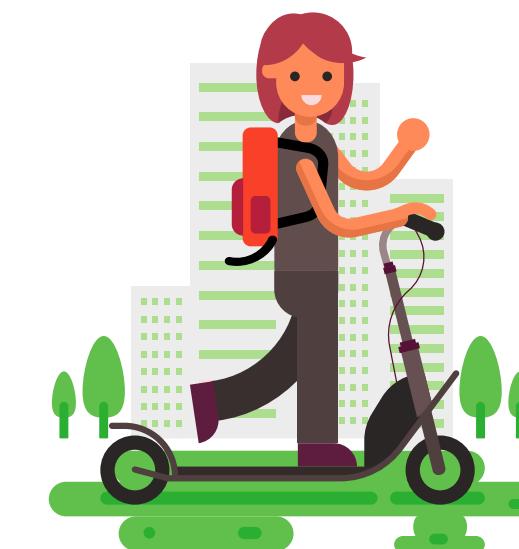


TYPICAL PERSON OF CLUSTER 4

It is mainly composed by men who live with their family or roommate. They use public transports and other kind of transports, but they don't use their car. They spend about fifty minutes every day on a public transports and they are not satisfied about it except for it's cost. More than 60% of them use the shared mobility, mainly Bike sharing.

SEGMENTATION AND PROFILING

SCOOTER PROFILATION



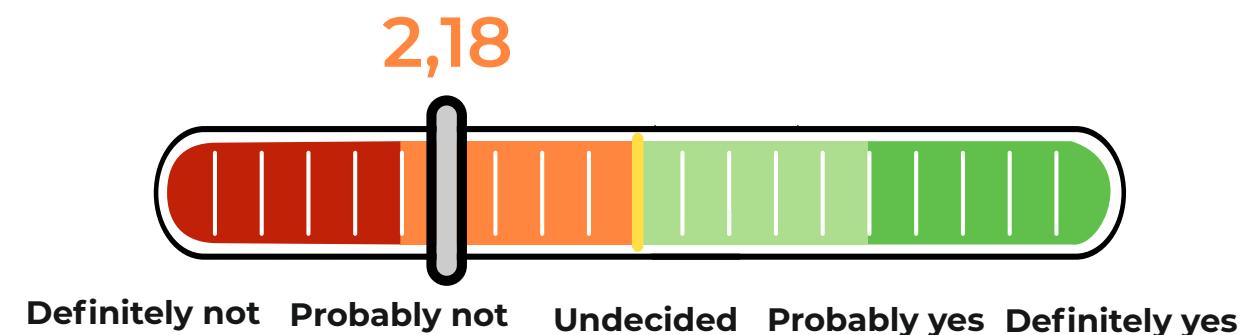
OPINION ABOUT USING SCOOTER

	Funny	Safety	Envy
Cluster1	1,33	4,62	4,59
Cluster2	5,66	7,51	5,94
Cluster3	6,00	2,75	6,48
Cluster4	6,40	4,54	1,64

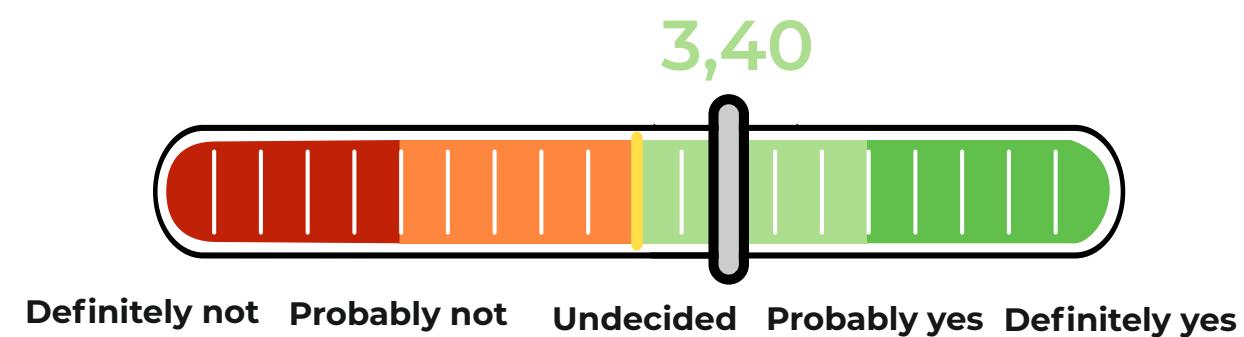


WILLINGNESS TO TRY THE SERVICE

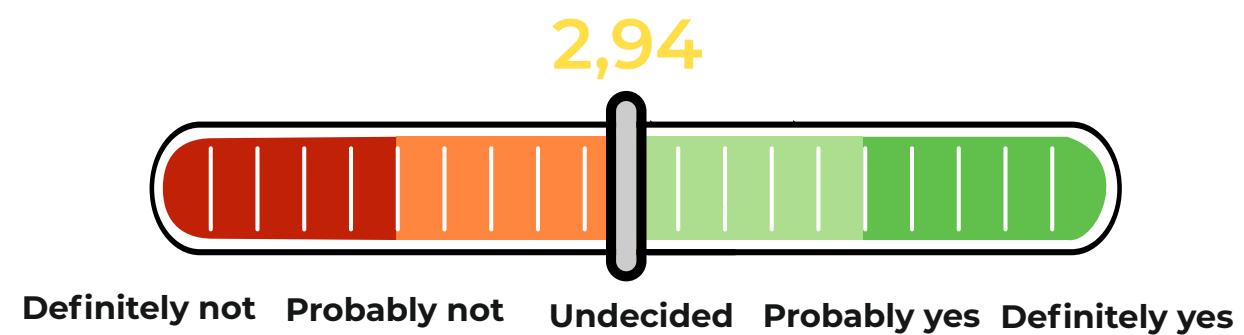
CLUSTER 1



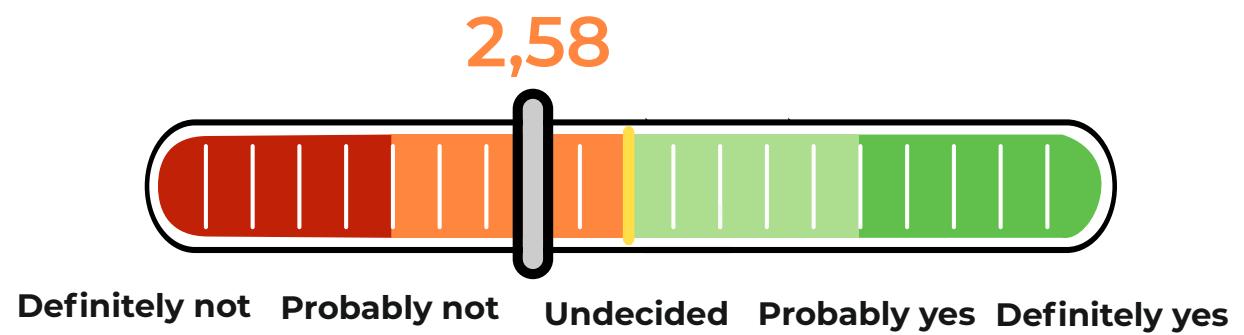
CLUSTER 2



CLUSTER 3



CLUSTER 4



PROFILING SUMMARY

Our target is a 23 years old man who lives in Milan with his roommates.

He belongs to cluster 2 being the cluster that is most willing to try our service since he thinks that scooter sharing is a safe and environmentally-friendly way to move around the city of Milan.

He often moves using public transports and he is inclined to use shared mobility. As regards the latter, his preferred means of getting around Milan is the bicycle (widely preferred compared to car sharing and especially motorbike sharing).

What he is not satisfied with public transports is the punctuality, being he a student who must always arrive on time for lessons. With respect to the other clusters, he is not satisfied about the safety and the cost of this service. For his journeys around the city he often takes a single ticket instead of buying season tickets. He spends about forty minutes a day on public transports.

Concluding, our persona could save time using the scooter and spend more less the same amount paying the minute tariff (A option) instead of the single ticket; reason why he prefer a consumption tariff and not a monthly subscription.



Consider that the service costs 0,15€ per minute of use. How likely are you going to try the service?



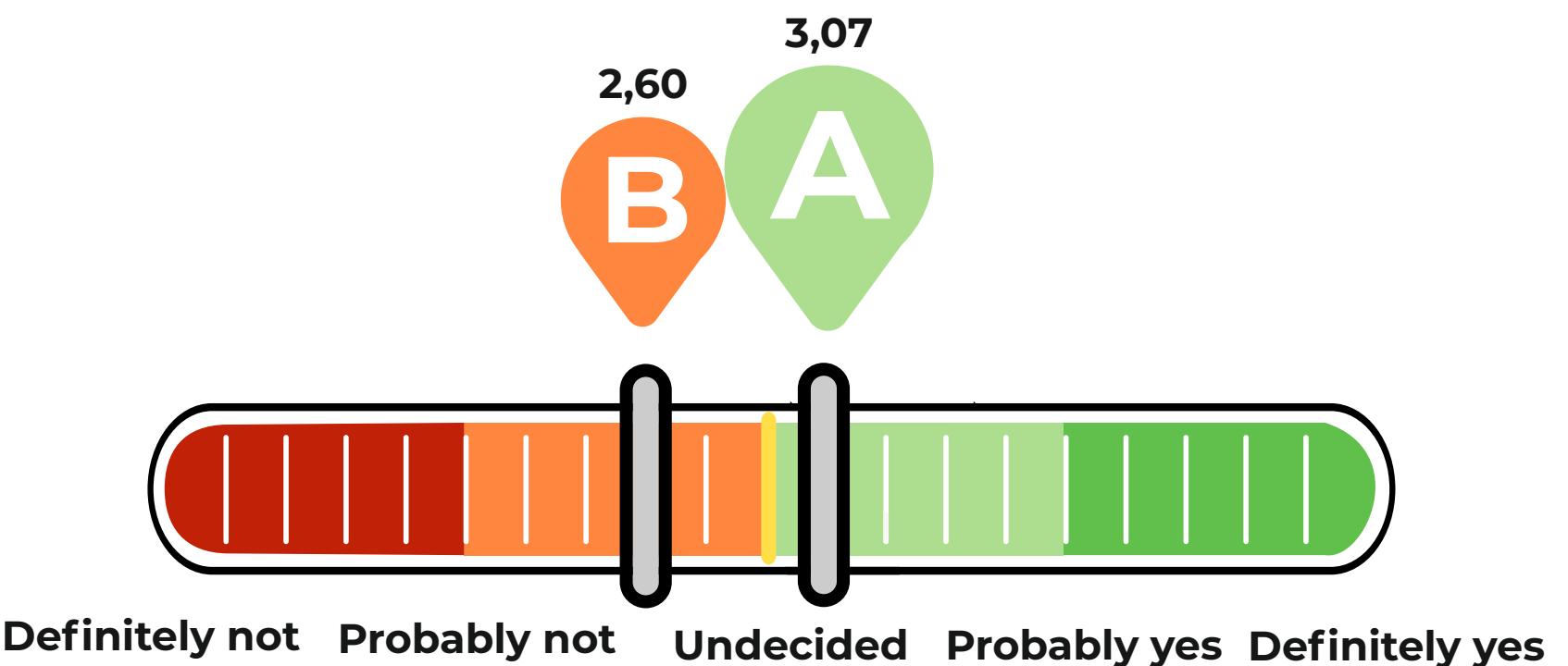
Consider that the service requires a monthly subscription of 8€, and costs 0,05€ per minute of use. How likely are you going to try the service?



A / B TEST

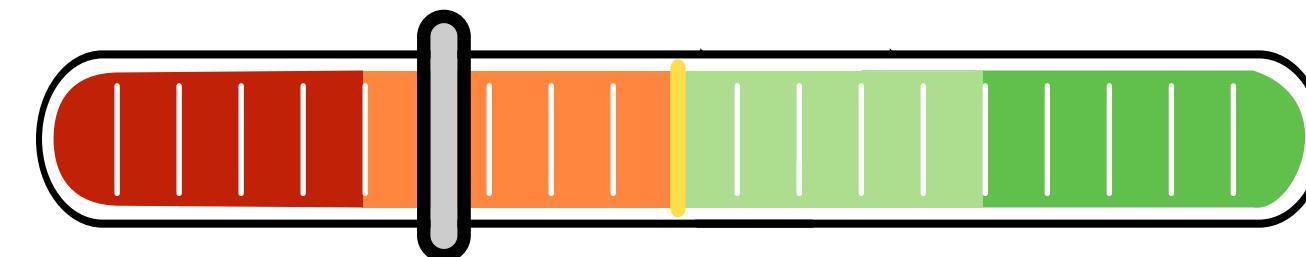
QUESTION 20

This results are referred to all dataset, and they show that generally the most welcomed solution is a plan without monthly subscription.



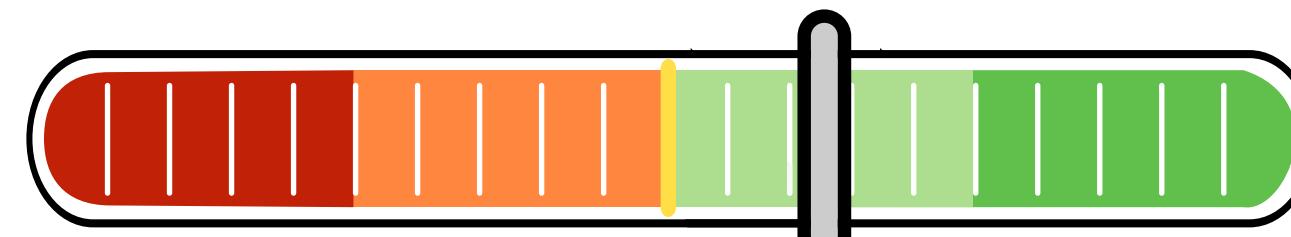
QUESTION A

CLUSTER 1



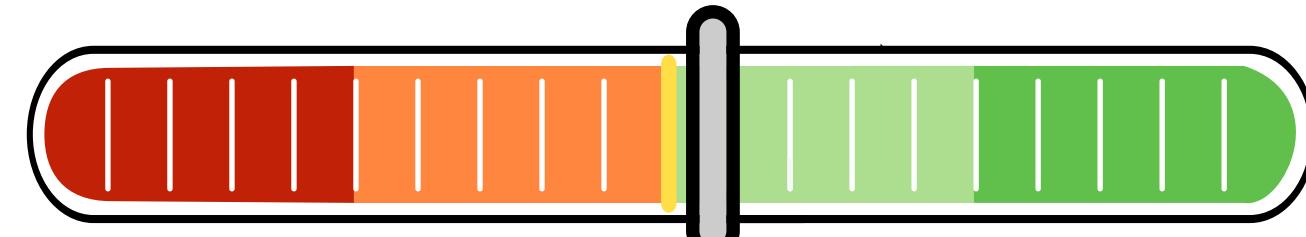
Definitely not Probably not Undecided Probably yes Definitely yes

CLUSTER 2



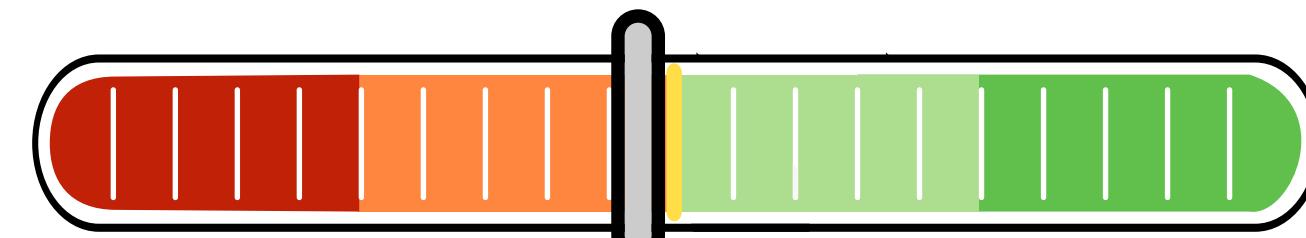
Definitely not Probably not Undecided Probably yes Definitely yes

CLUSTER 3



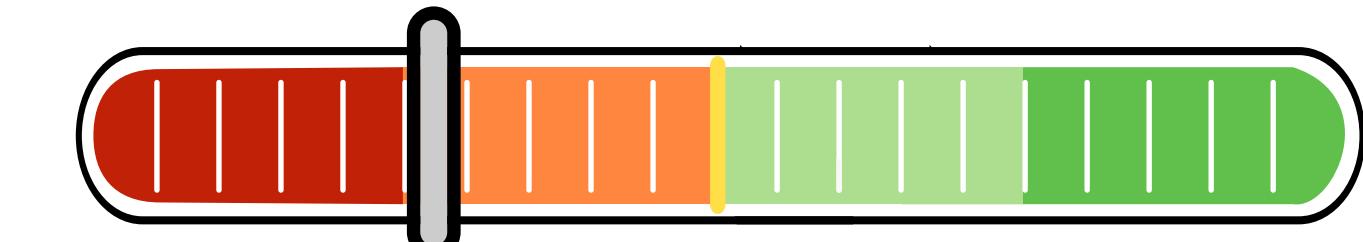
Definitely not Probably not Undecided Probably yes Definitely yes

CLUSTER 4

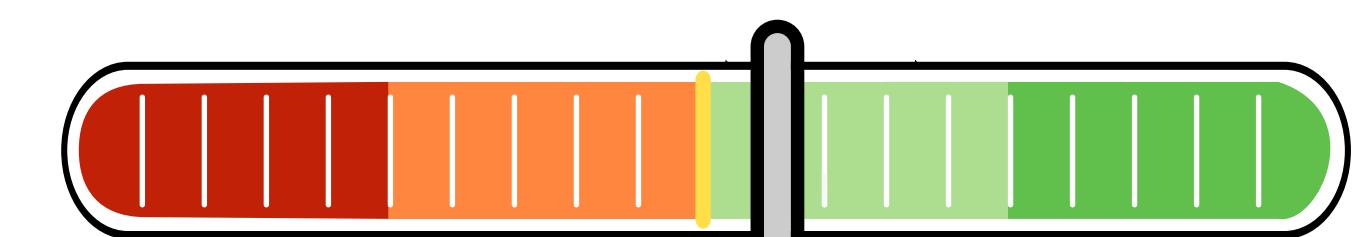


Definitely not Probably not Undecided Probably yes Definitely yes

QUESTION B



Definitely not Probably not Undecided Probably yes Definitely yes



Definitely not Probably not Undecided Probably yes Definitely yes

A / B
TEST
QUESTION 20

The above graphs show the A/B test computed per each cluster; The results generally reflect the one computed for the entire dataset (without distinguishing the questions, that are in the slide 16) but there are some differences. The highest gap is in the cluster 4 where if we propose the option A the users are undecided instead with the option B are almost completely unwilling to try the service. So we can conclude that the option A is the one with more conversion in our sample.



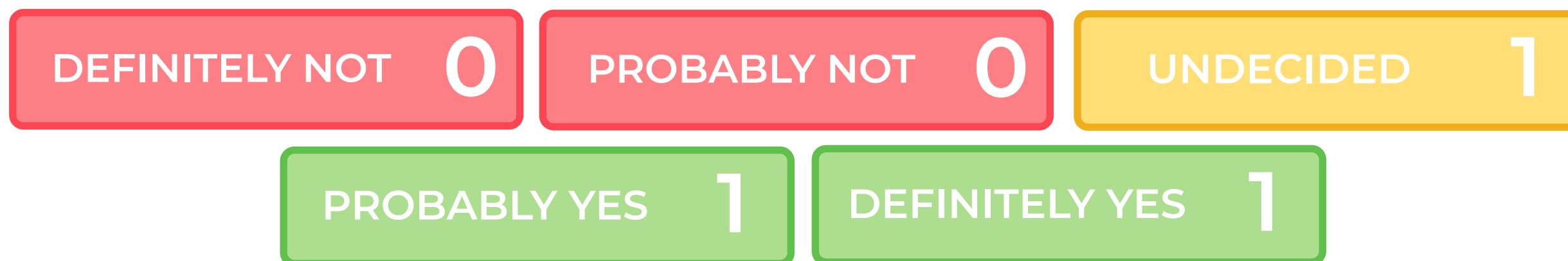
REGRESSION

In order to set the best marketing campain we have to understand which are the factors that are correlated with the decision of trying or not the scooter mobility.

To do this we have preformed a regression to accomplish at two objectives:

- What answer would they have given to question B who answered question A? And viceversa;
- Understand the variables that positively or negatively affect the last decision.

To perform the regression we have chosen as target values the answer to question 20 (that asks if the person would try or not the scooter); but to simplify the model we have edited it, trasfoming the answers in boolean values:



The algorithm chosen to make the regression is the Logistic one.

With this data we have made two models splitting the dataset in who have answered at the Question 20 A and who have answer at Question 20 B. Finally we predicted with those the complementary part of the data set: Model trained on A with the people that have answered to B and viceversa.

Using the correlation matrixs that are in the appendix we have chosen the variables that were better correlated with the target in order to achive the best performance of the models. Here some of them.

NUMBER OF CONNECTIONS
WITH PUBLIC TRANSPORTATION



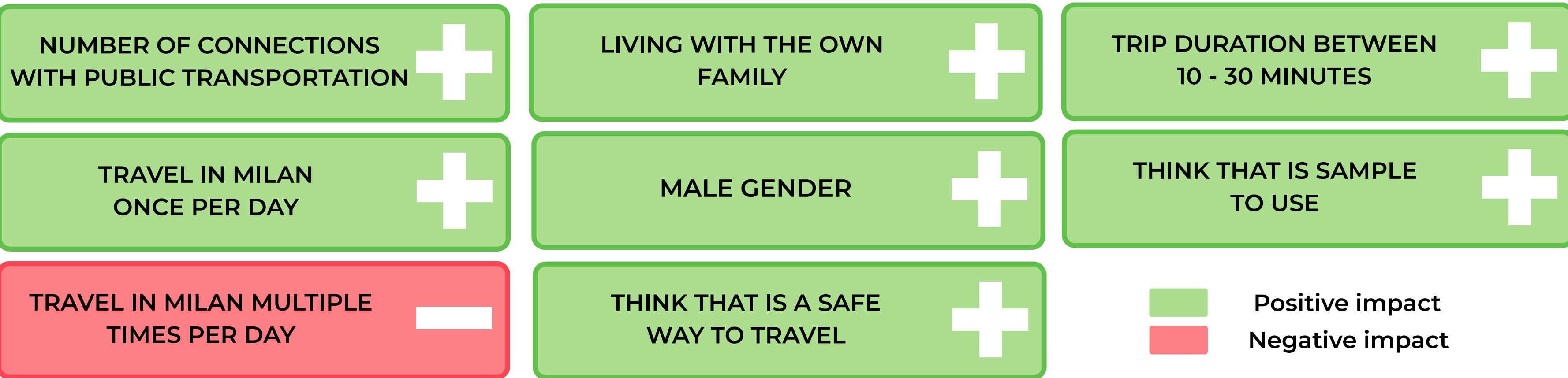
TRAVEL IN MILAN
ONCE PER DAY



TRAVEL IN MILAN MULTIPLE
TIMES PER DAY



REGRESSION



To evaluate the models made we have used as indicator 'F1 score'.
We've calculated it comparing the prediction answer A with the real answer B and viceversa.

Taking into account that the coparison analyse the answer at two different questions we can conclude that the model is good (viewing too the small dimentions of the dataset that we have).

F1 SCORE
PREDICTED A
vs ANSWER B

0,662

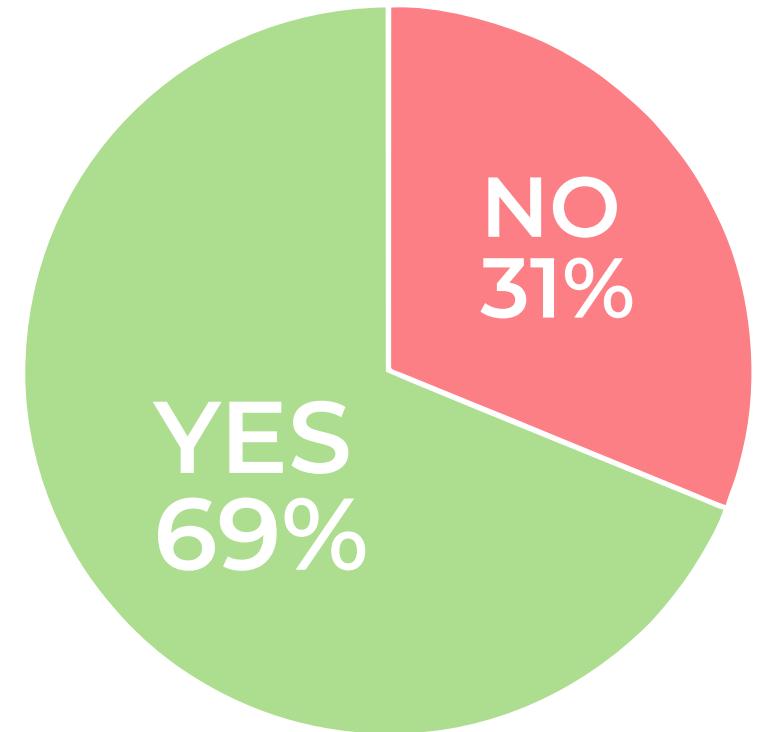
F1 SCORE
PREDICTED B
vs ANSWER A

0,712

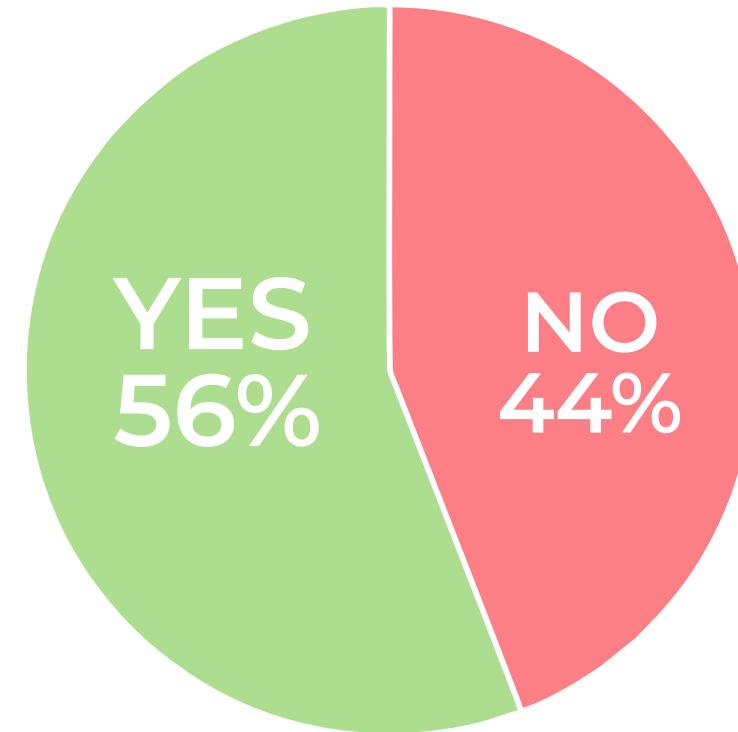


REGRESSION RESULTS

QUESTION 20 A



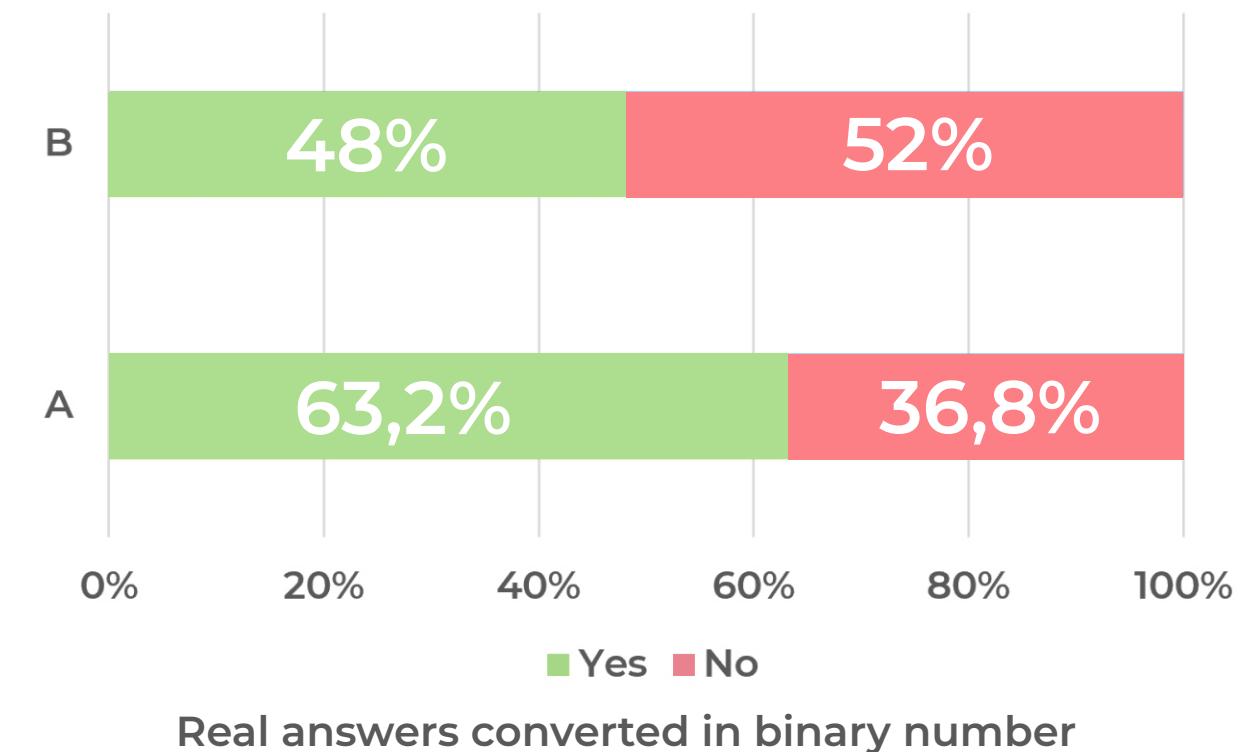
QUESTION 20 B



This percentages are calculated joining the real answer to Question A and the answer A predicted on the remaining of the Dataset, the same for the Question B.

The above results show what would be the percentages of the answer to question 20; comparing them with the real one (part of the data set that have answered at the question in reality) we can see that in both the cases the number of positive results increase, but in particular in the B case where the difference is of the 8%.

This means that many who have answered yes to question A even if they are not yet very convinced by the proposed service they would try it cause of the modest price, and they will evaluate later if use or not the scooter.



137'033 PEOPLE

The sample we considered is the population of Milan with an age between 20 and 30 years that are 137.033 people.

15 MINUTES AVERAGE RENTAL TIME

According to the question 8, it seems that people in our target cluster (Cluster 2) use public transportation for 43/44 minutes every time. Looking at this result and considering that roughly 35% of all personal trips cover distances of less than 2 kilometers, and 75% of them amount to less than 10 km, we can assume that e-scooters are typically used for trips from 0.5 km to 4 km, with an average rental time of about 15 minutes.

69% OPTION A

56% OPTION B

0,75
TIMES PER MONTH

According to the survey, in case of fare A the 68,99% of the sample will be willing to use the service, for a total amount of 94.539 users. On the contrary, in the case of fare B with a fixed monthly subscription fee, only 56% of the sample would try the service (76.738 people).

Considering the analysis related to the sharing mobility usage, our target will use the service 0,75 times per month, so the number of monthly rentals is equal to the total number of users * 0,75.

PROFITABILITY ANALYSIS

OPTION A

% OF CONVERSION	68,99%
# USERS	94'539
USAGE	0,75
# RENTALS	70'904
<u>REVENUES</u>	
PRICE/MINUTE	0,15 €
TOTAL per month	155'534 €

AVERAGE USERS' MONTHLY EXPENDITURE

1,69 €

OPTION B

% OF CONVERSION	56%
# USERS	76'738
USAGE	0,75
# RENTALS	57'554
<u>REVENUES</u>	
SUBSCRIPTION PRICE/MINUTE	8,00 €
TOTAL per month	0,05 €

AVERAGE USERS' MONTHLY EXPENDITURE

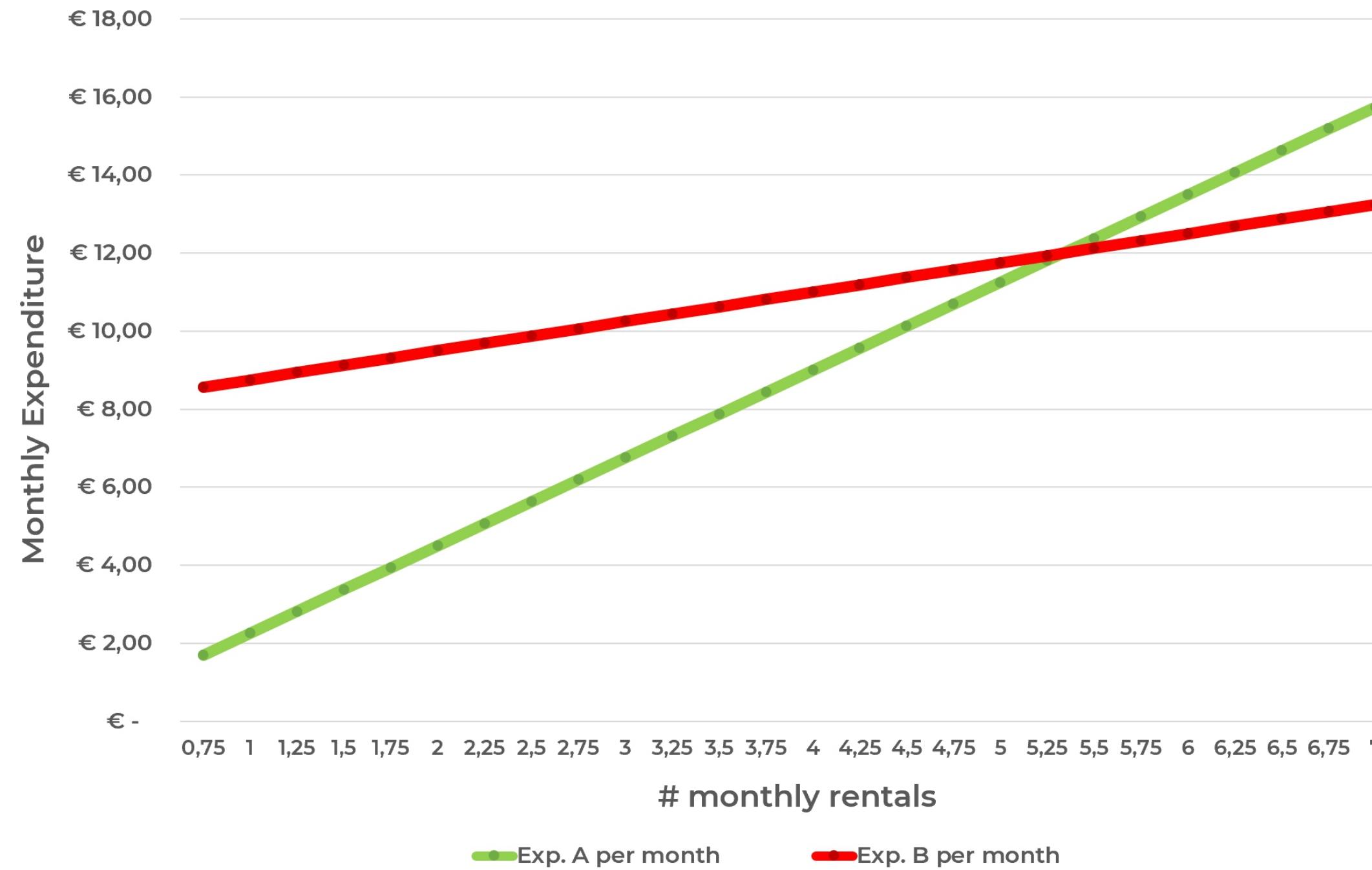
8,56 €

From the analysis (shared mobility used) emerges that people in our reference cluster will use the sharing mobility service on average 0,75 times per month (pessimistic assumption).

Since this number is lower than 1, it is reasonable to say that they will not be willing to pay a monthly subscription. It means that if we chose to apply the fare B we would lose most of our users, because it would not be convenient for them.

This is also evident looking at the average monthly expenditure per user (1,69€ with the fare A and 8,56€ with the fare B).

PROFITABILITY ANALYSIS



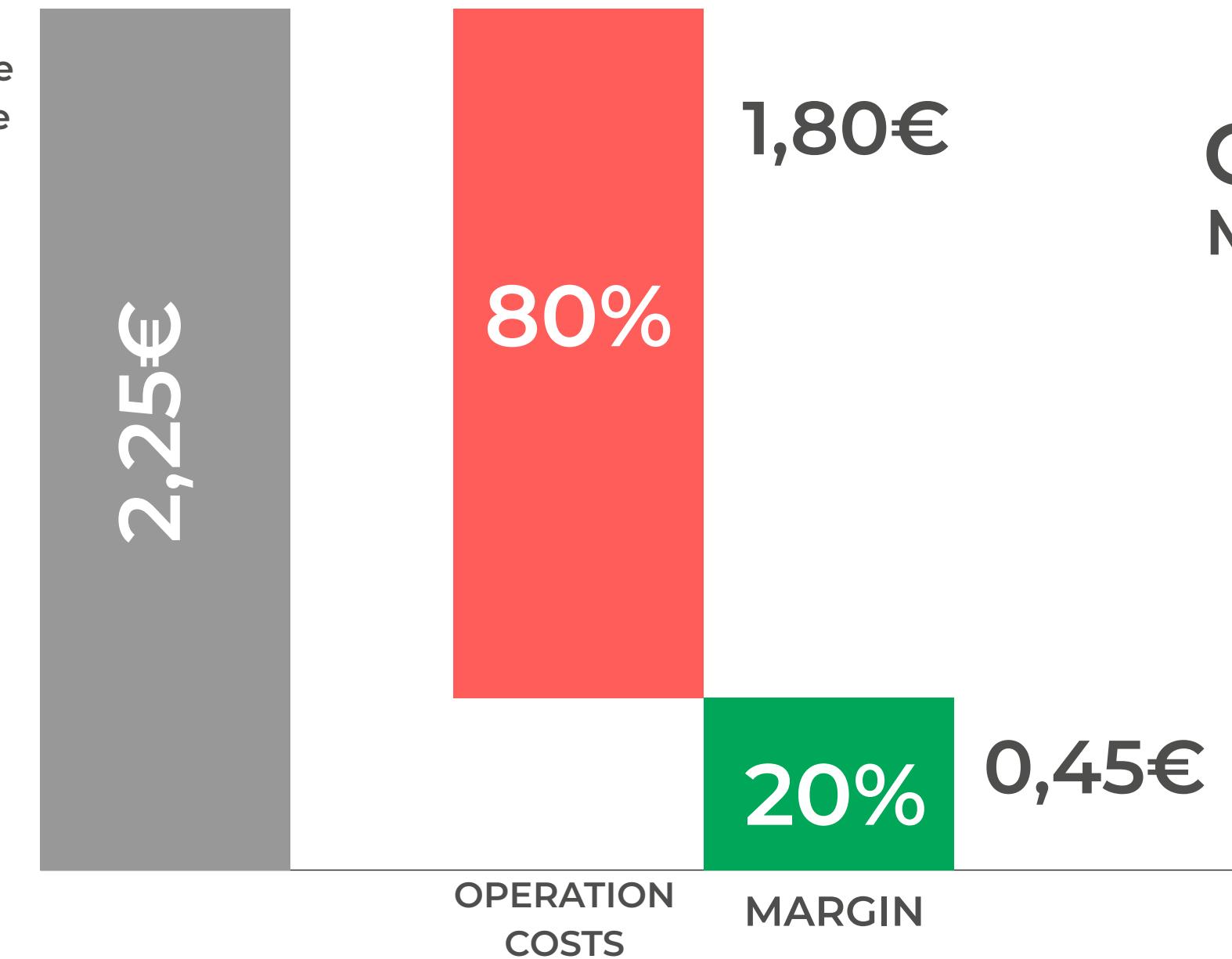
BRAKEVEN
POINT
5,5 RENTALS

Considering different values of monthly rentals, we have conducted the break-even point analysis. According to that, the fare B is only suitable for those who rent the scooter more than 5 times a month. This is another piece of evidence in favor of our decision to prefer tariff A for our target customers, that usually do not use the service more than one time per month.

PROFITABILITY ANALYSIS

COST ANALYSIS

0,15€ per minute
for average time
of 15 minutes



CONTRIBUTION MARGIN PER MONTH

31'907 €

A possible assumption on costs is that they would currently impact 80%, giving a 20% margin on total revenues. (Based on a report made by the Boston Consulting Group)

Applying these assumptions to our situation (in the case of fare A), the revenue from each rental would be 2,25€ (0,15 €/minute * 15 minutes/rental), and the margin would be 0,45 €/rental (2,25€*20%) on a monthly basis the total contribution margin would be around 31.907€ (70904 rentals/month * margin of 0,45€/rental).

PROFITABILITY CHALLENGE

The e-scooter sharing is a relatively new phenomenon, especially in the city of Milan, and reliable data on costs are not currently available.

It is possible to assume that the biggest costs arise from operations and charging.

Typically, providers collect the scooters from the roads every day and transport them to a central area for battery charging and maintenance. Then they will redistribute the scooters for the next day.

A possible solution for reducing these costs, adopted by some providers, is to “use the customers” for bringing scooters to a charging point, in exchange for extra minutes.

Some new technological solutions could be long-lasting and swappable batteries, that would allow to reduce operating costs.

Another important thing to be underlined is the fact that the offerings in this service are hard to differentiate. Consumers consider e-scooters as a commodity, because they pick the closest available scooter. Thus far, putting a high-quality, reliable product on virtually every corner is apparently all the marketing that providers have needed. But over time, companies competing with others in the same neighborhood will have to establish brand loyalty.

To build critical mass in their customer base, providers will need to spend on marketing and offer promotional discounts, which will drive up their customer acquisition costs.

Moreover, providers will be fighting on e-scooter availability. Obviously, a higher presence of scooter will increase their usage, but doing that will cause undermine asset utilization.

This is a relatively simple problem to be solved in Milan, because the municipality has granted permission to operate only to 3 providers.



SOME POSSIBLE CRITICAL MANEUVERS

OPTIMIZE OPERATIONS

To maintain, charge, and relocate several thousand e-scooters in every city of operation is a major operational challenge. Reducing these costs to well below 50% of revenue will be essential for profitability.

BOLSTER PRODUCT DURABILITY

Substantially extending the average life of an e-scooter is critical, as is improving battery life, making repair easy, and finding better solutions to manage mechanical breakdown, vandalism, and theft.

EXPAND THE OFFER

Beyond e-scooters, companies could broaden their offerings to include other mobility modes, such as shared bikes. More important, they can establish partnerships with complementary mobility providers (such as car-sharing services) to lock in users more effectively, and also with public-transports. Because e-scooter rides can complement other kind of transportation, aggregating kind into a single app would be more convenient and valuable for consumers, that could make their own journey by exploiting the means of different operators.

THE END

GROUP 28

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APPENDIX

TWO FACTOR ON Q19 RESSULTS

It seems an interesting solution
 It seems practical to use
 It seems easy to use
 It seems fun to use
 It would have positive impact on the environment
 It would have positive impact on urban transportation
 It seems clear how I should behave on the road with such a scooter
 It seems safe to use

item	MR1	MR2	h2	u2	com
1	0.81	0.29	0.73	0.27	1.3
4	0.74	0.25	0.61	0.39	1.2
2	0.73	0.21	0.58	0.42	1.2
6	0.70	0.06	0.50	0.50	1.0
8	0.49	0.20	0.28	0.72	1.3
7	0.49	0.35	0.37	0.63	1.8
5	0.19	0.79	0.66	0.34	1.1
3	0.22	0.74	0.60	0.40	1.2

THREE FACTOR ON Q19 RESSULTS

It seems practical to use
 It seems an interesting solution
 It seems easy to use
 It seems fun to use
 It seems clear how I should behave on the road with such a scooter
 It seems safe to use
 It would have positive impact on urban transportation
 It would have positive impact on the environment

item	MR1	MR2	MR3	h2	u2	com
4	0.76	0.26	0.18	0.67	0.33	1.4
1	0.72	0.25	0.37	0.71	0.29	1.8
2	0.70	0.19	0.25	0.59	0.41	1.4
6	0.69	0.06	0.19	0.52	0.48	1.2
5	0.16	0.86	0.14	0.79	0.21	1.1
3	0.20	0.67	0.18	0.52	0.48	1.3
7	0.23	0.26	0.76	0.70	0.30	1.4
8	0.30	0.09	0.58	0.44	0.56	1.5

FOUR FACTOR ON Q19 RESSULTS

It seems easy to use
 It seems practical to use
 It seems fun to use
 It seems clear how I should behave on the road with such a scooter
 It seems safe to use
 It would have positive impact on urban transportation
 It would have positive impact on the environment
 It seems an interesting solution

item	MR1	MR2	MR3	MR4	h2	u2	com
2	0.75	0.20	0.26	0.00	0.67	0.33	2.1
4	0.73	0.26	0.19	0.13	0.66	0.34	2.4
6	0.64	0.07	0.19	0.19	0.49	0.51	2.0
5	0.16	0.88	0.12	0.03	0.82	0.18	4.0
3	0.18	0.66	0.17	0.11	0.51	0.49	0.8
8	0.25	0.09	0.73	0.05	0.60	0.39	7.6
7	0.23	0.28	0.61	0.16	0.54	0.46	4.9
1	0.63	0.24	0.32	0.66	1.00	0.00	4.4

FIVE FACTOR ON Q19 RESSULTS

It seems an interesting solution
 It seems easy to use
 It seems practical to use
 It seems fun to use
 It would have positive impact on urban transportation
 It would have positive impact on the environment
 It seems clear how I should behave on the road with such a scooter
 It seems safe to use

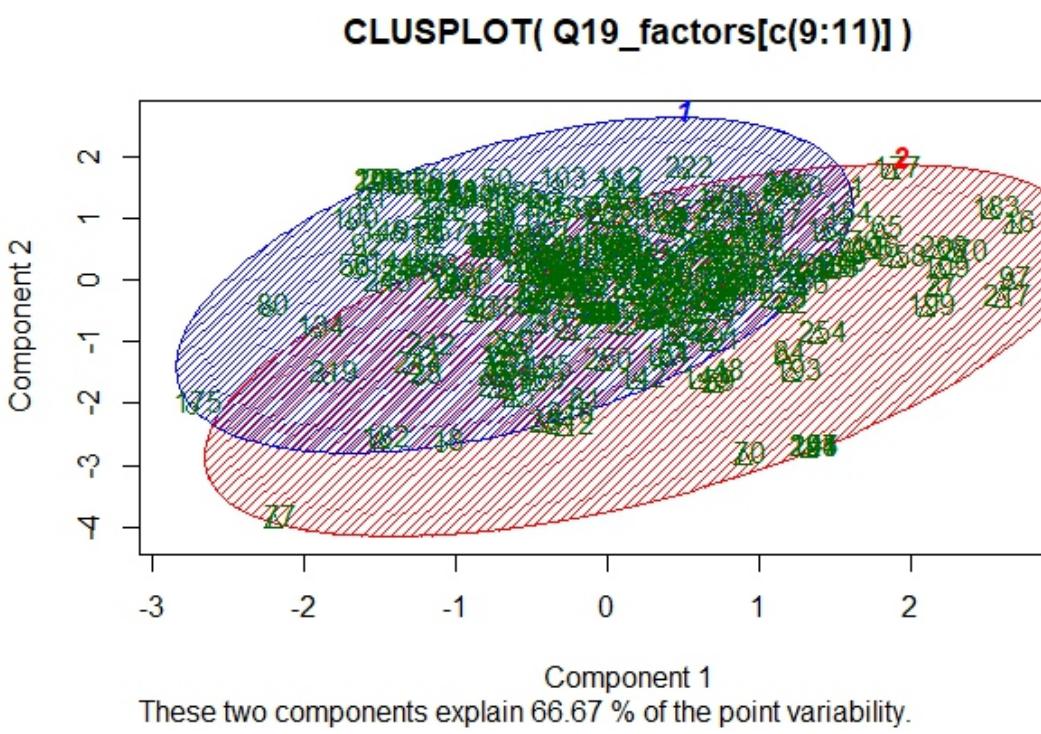
item	MR1	MR3	MR2	MR4	MR5	h2	u2	com
1	0.75	0.37	0.13	0.20	0.30	0.85	0.147	2.1
2	0.74	0.26	0.12	0.12	-0.29	0.74	0.263	1.7
4	0.74	0.21	0.19	0.14	-0.02	0.64	0.357	1.4
6	0.67	0.19	0.04	0.05	0.06	0.50	0.503	1.2
7	0.24	0.73	0.18	0.14	0.05	0.65	0.354	1.4
8	0.27	0.63	0.04	0.07	-0.05	0.47	0.525	1.4
5	0.17	0.16	0.92	0.31	0.00	1.00	0.005	1.4
3	0.18	0.18	0.37	0.73	0.00	0.74	0.257	1.8

E-VALUES AND OTHER RESULTS OF FACTOR ANALYSIS

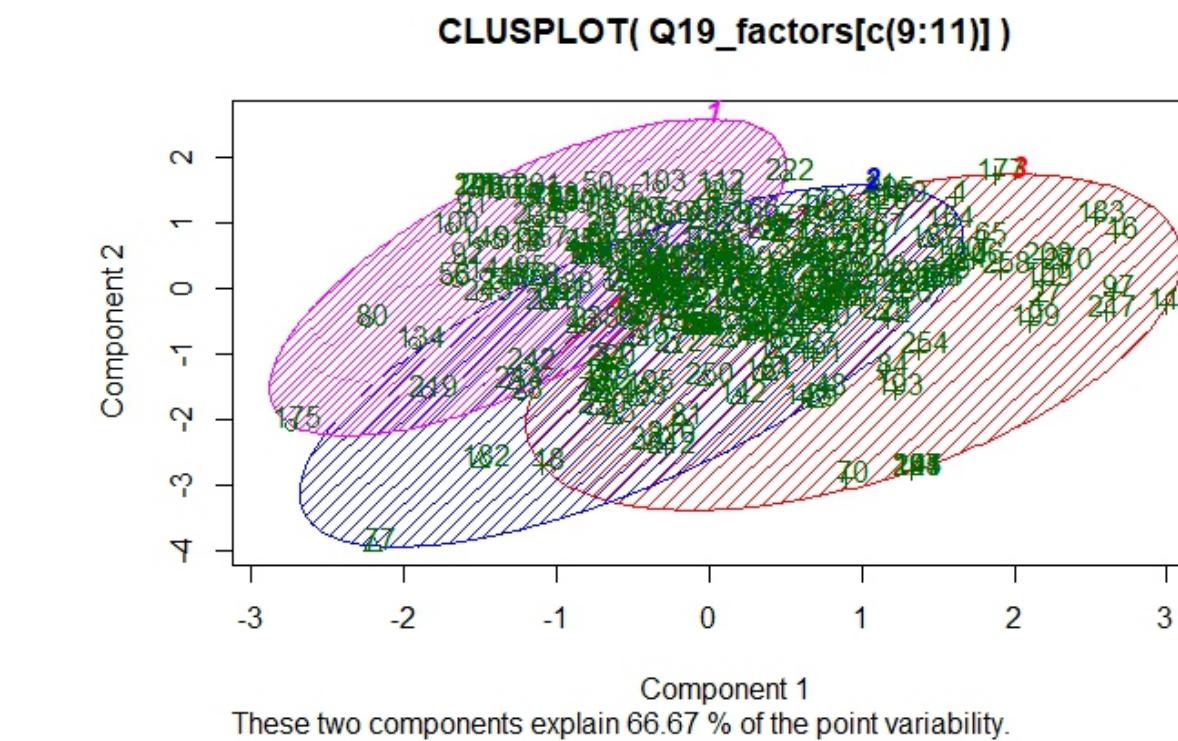
values	double [8]	3.5813 0.8462 0.5083 0.0675 0.0187 0.0100 ...
e.values	double [8]	3.952 1.197 0.918 0.484 0.441 0.373 ...
loadings	double [8 x 3] (S3: loadings)	0.717 0.701 0.200 0.756 0.163 0.692 ...
model	double [8 x 8]	0.713 0.642 0.380 0.675 0.383 0.580 0.642 0.589 0.315 0.625 0.314 0.542 0.380 0. ...
fm	character [1]	'minres'
rot.mat	double [3 x 3]	0.7363 -0.5134 -0.4407 0.4690 0.8567 -0.2145 0.4877 -0.0488 0.8717 ...
Structure	double [8 x 3] (S3: loadings)	0.717 0.701 0.200 0.756 0.163 0.692 ...
method	character [1]	'regression'
scores	double [275 x 3]	1.254848 0.473935 -0.470935 0.088564 -0.017224 -0.245308 0.103701 0.940765 ...
R2.scores	double [3]	0.791 0.790 0.667

APPENDIX

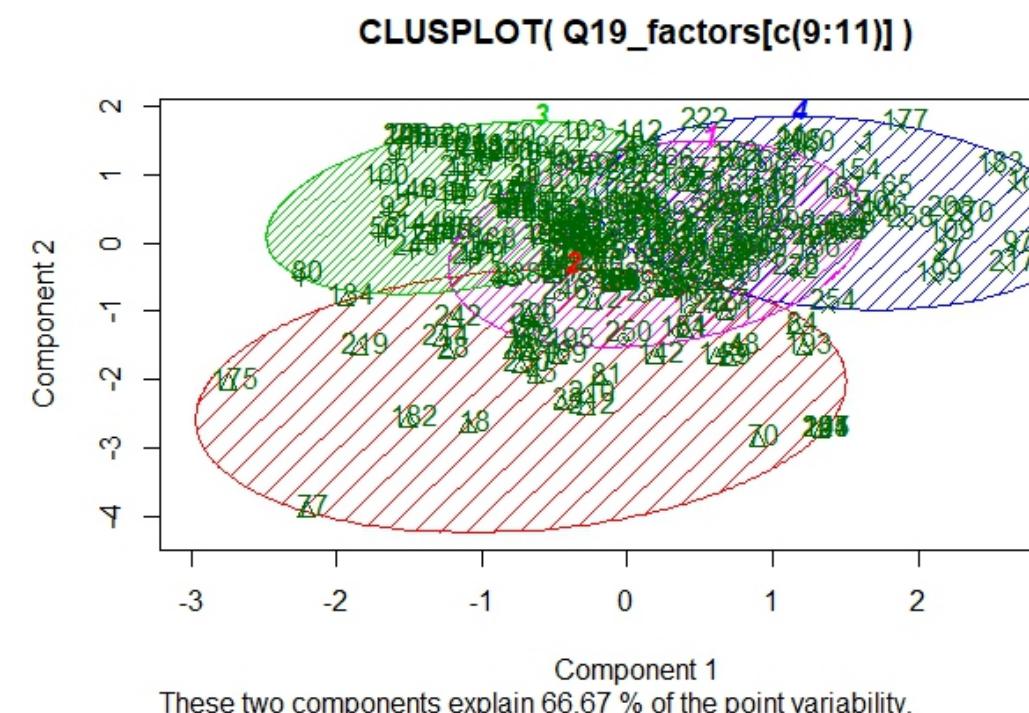
CUSPLOT 2 CLUSTERS



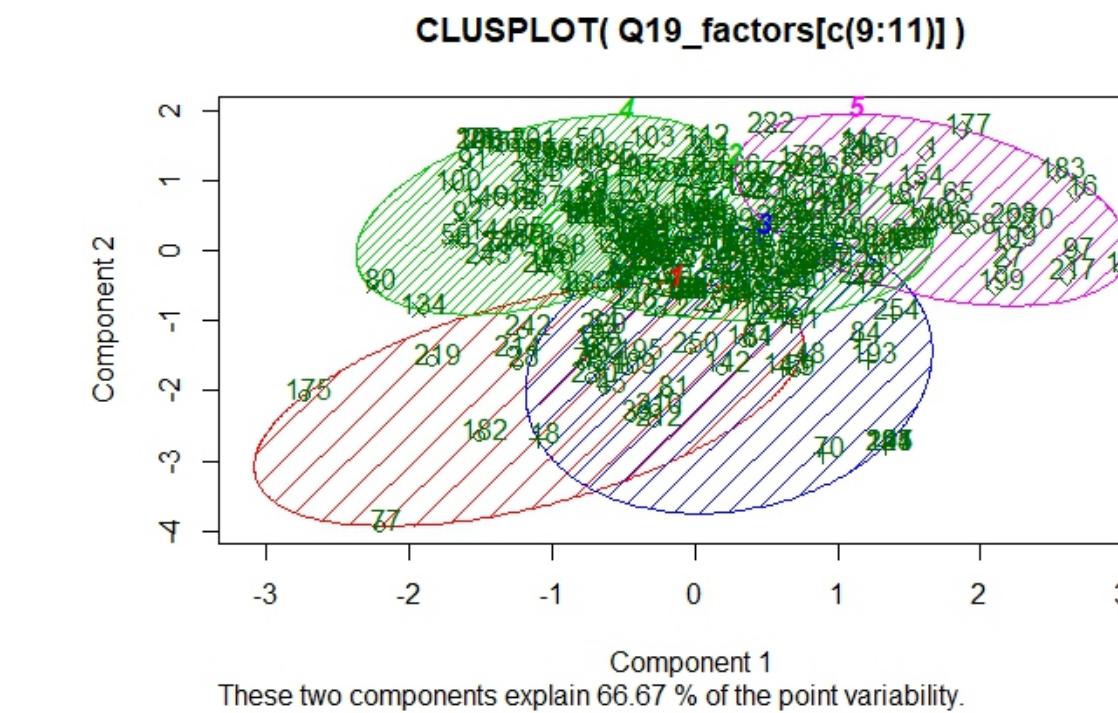
CUSPLOT 3 CLUSTER



CUSPLOT 4 CLUSTERS



CUSPLOT 5 CLUSTERS



APPENDIX

ANOVA - ENVY VARIABLE

```
Df Sum Sq Mean Sq F value Pr(>F)
Q19_4clusters$clusters 3 134.9 44.98 87.66 <2e-16 ***
Residuals 271 139.1 0.51
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> TukeyHSD(anova)
Tukey multiple comparisons of means
95% family-wise confidence level
```

```
Fit: aov(formula = Q19_4clusters$envy ~ Q19_4clusters$clusters)
```

```
$`Q19_4clusters$clusters`
  diff    lwr      upr   p adj
2-1 -0.7537897 -1.0764600 -0.4311194 0.0000000
3-1 -0.2151909 -0.5031576  0.0727758 0.2172188
4-1 -1.9337995 -2.2653118 -1.6022873 0.0000000
3-2  0.5385988  0.2237644  0.8534331 0.0000831
4-2 -1.1800098 -1.5351101 -0.8249095 0.0000000
4-3 -1.7186086 -2.0424989 -1.3947184 0.0000000
```

ANOVA - SAFETY VARIABLE

```
Df Sum Sq Mean Sq F value Pr(>F)
Q19_4clusters$clusters 3 155.5 51.84 118.6 <2e-16 ***
Residuals 271 118.5 0.44
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> TukeyHSD(anova)
Tukey multiple comparisons of means
95% family-wise confidence level
```

```
Fit: aov(formula = Q19_4clusters$safety ~ Q19_4clusters$clusters)
```

```
$`Q19_4clusters$clusters`
  diff    lwr      upr   p adj
2-1  0.75170089 0.4538642 1.0495375 0.0000000
3-1  1.90763768 1.6418338 2.1734416 0.0000000
4-1  0.71690852 0.4109105 1.0229066 0.0000000
3-2  1.15593680 0.8653330 1.4465405 0.0000000
4-2 -0.03479237 -0.3625631 0.2929783 0.9927675
4-3 -1.19072917 -1.4896918 -0.8917665 0.0000000
```

ANOVA - FUNNY VARIABLE

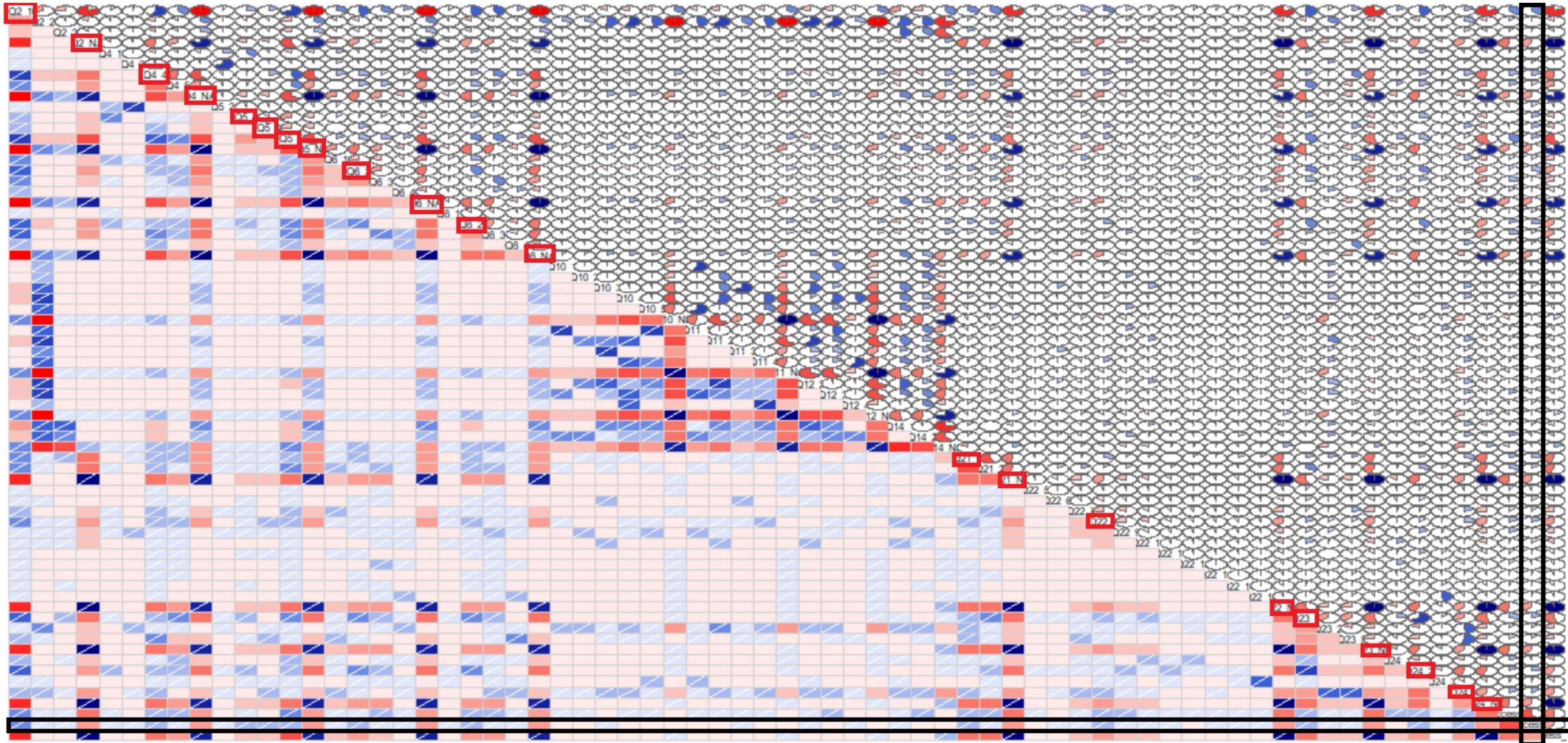
```
Df Sum Sq Mean Sq F value Pr(>F)
Q19_4clusters$clusters 3 158.2 52.75 123.5 <2e-16 ***
Residuals 271 115.8 0.43
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> TukeyHSD(anova)
Tukey multiple comparisons of means
95% family-wise confidence level
```

```
Fit: aov(formula = Q19_4clusters$funny ~ Q19_4clusters$clusters)
```

```
$`Q19_4clusters$clusters`
  diff    lwr      upr   p adj
2-1 -1.8716200 -2.166011031 -1.5772290 0.0000000
3-1 -0.1376467 -0.400375568  0.1250821 0.5291883
4-1  0.1593889 -0.143069057  0.4618469 0.5241734
3-2  1.7339733  1.446731546  2.0212151 0.0000000
4-2  2.0310090  1.707030231  2.3549877 0.0000000
4-3  0.2970357  0.001531643  0.5925397 0.0482818
```

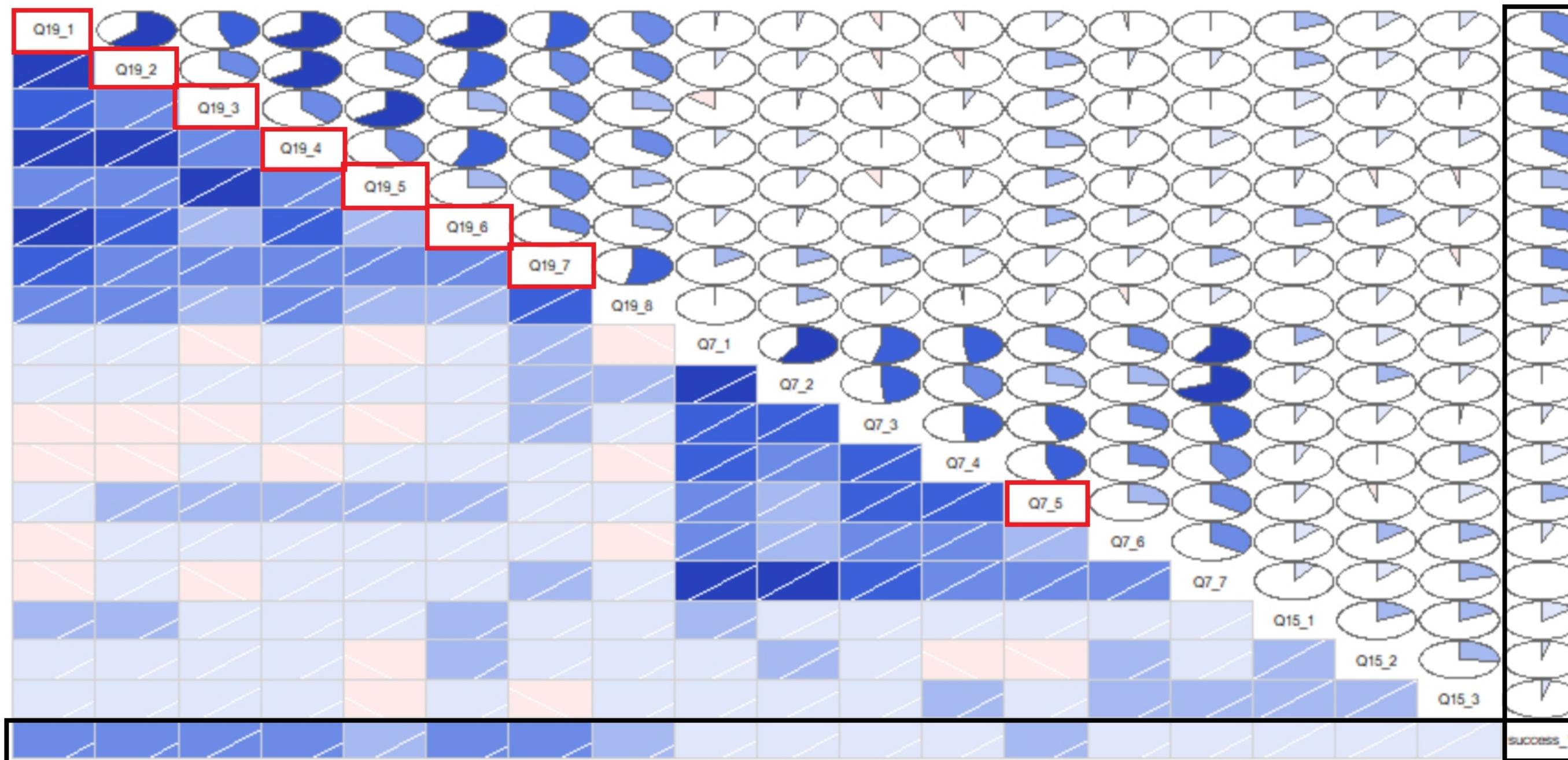
APPENDIX

CORRELATION MATRIX - CATEGORICAL



APPENDIX

CORRELATION MATRIX - LIKERT SCALE



REFERENCES

The Promise and Pitfalls of E-Scooter Sharing - Boston Consulting Group

<https://www.bcg.com/it-it/publications/2019/promise-pitfalls-e-scooter-sharing.aspx>