AIRLINE PASSENGER SATISFACTION

АНАЛІЗ ГОЛОВНИХ КОМПОНЕНТ

ДАНІ

CODEBOOK

Airline Passenger Satisfaction

Team Four

1 Variable Information

№	Variable	Attribute Type	Label	Units of measurement	Details
1.	id	numerical	id number of the passengers	-	not used in our research
2.	Satisfaction	binary class label	airline satisfaction level	-	2 class labels: “dissatisfied” and “satisfied”
3.	Gender	nominal	gender of the passengers	-	2 terms: “female” and “male”
4.	Customer type	nominal	the customer type	-	2 terms: “loyal customer” and “disloyal customer”
5.	Age	numerical	the actual age of the passengers	year	integer numbers from 7 to 85
6.	Type of travel	nominal	purpose of the flight of the passengers	-	2 terms: “personal travel” and “business travel”
7.	Class	nominal	travel class in the plane of the passengers	-	3 terms: “eco”, “business” and “eco plus”
8.	Flight distance	ordinal	the flight distance of this journey	km	integer from 56 to 4893
9.	Inflight Wi-Fi service	ordinal	*	-	from 0 = least satisfied to 5 = most satisfied
10.	Departure/Arrival time convenient	ordinal	*	-	from 0 = least satisfied to 5 = most satisfied

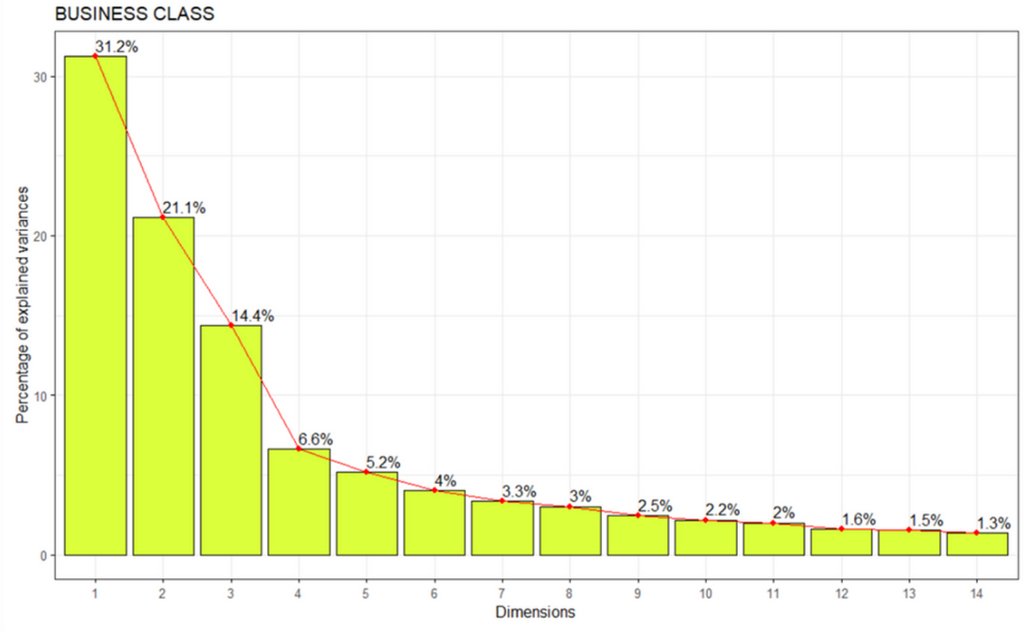
ДОЦІЛЬНІСТЬ ПРОВЕДЕННЯ PCA

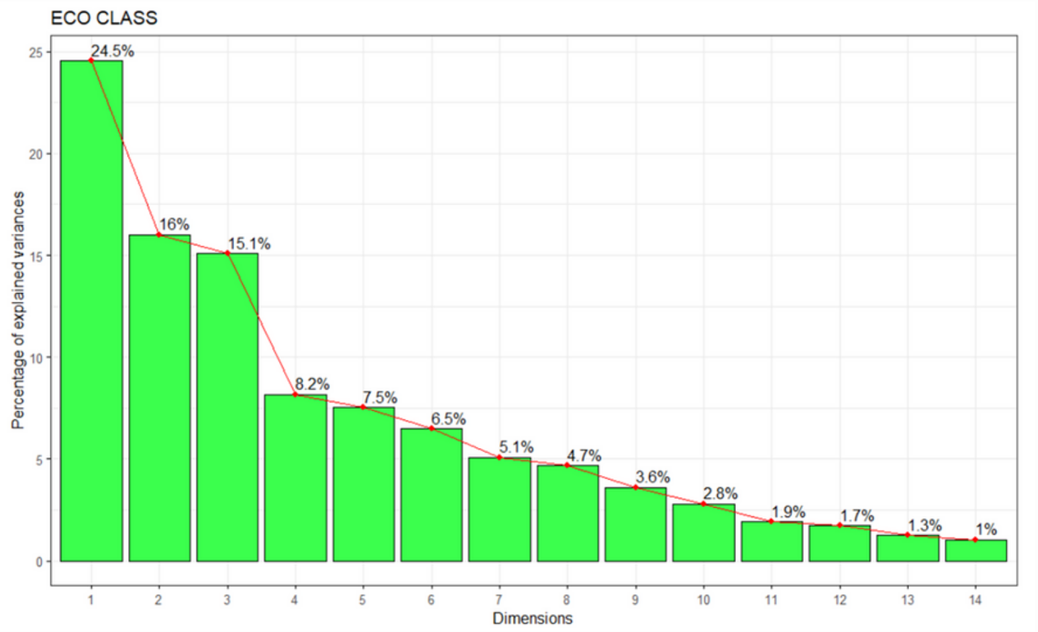
Нульова гіпотеза тесту Бартлетта стверджує, що дисперсії залежної змінної однакові для всіх груп. Якщо *p-value* менше заданого рівня значущості, то ми відхиляємо нульову гіпотезу і стверджуємо, що дисперсії неоднорідні.

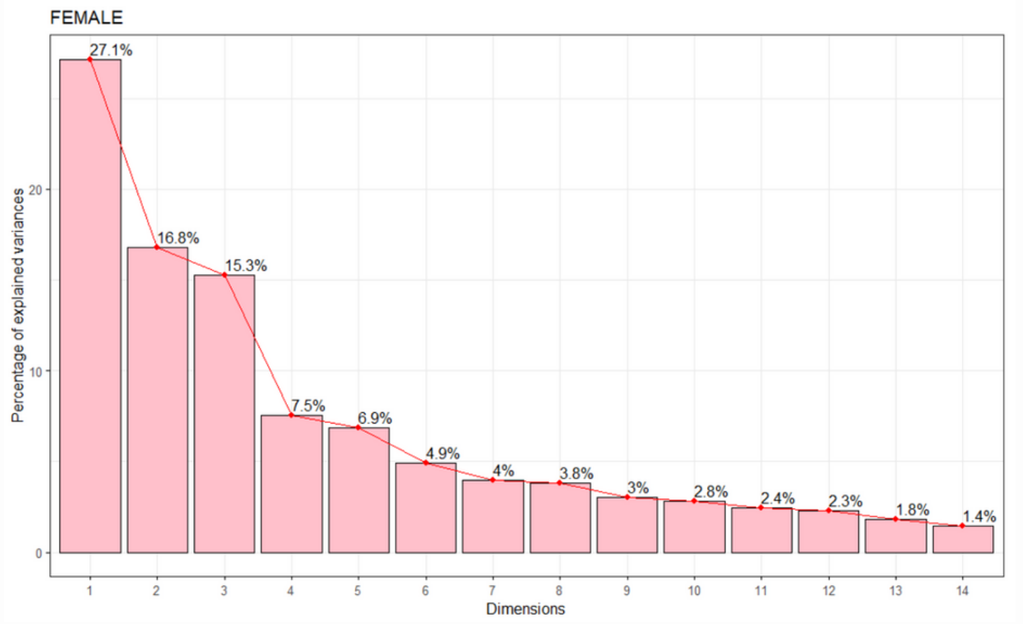
Bartlett's test: p-value = 0

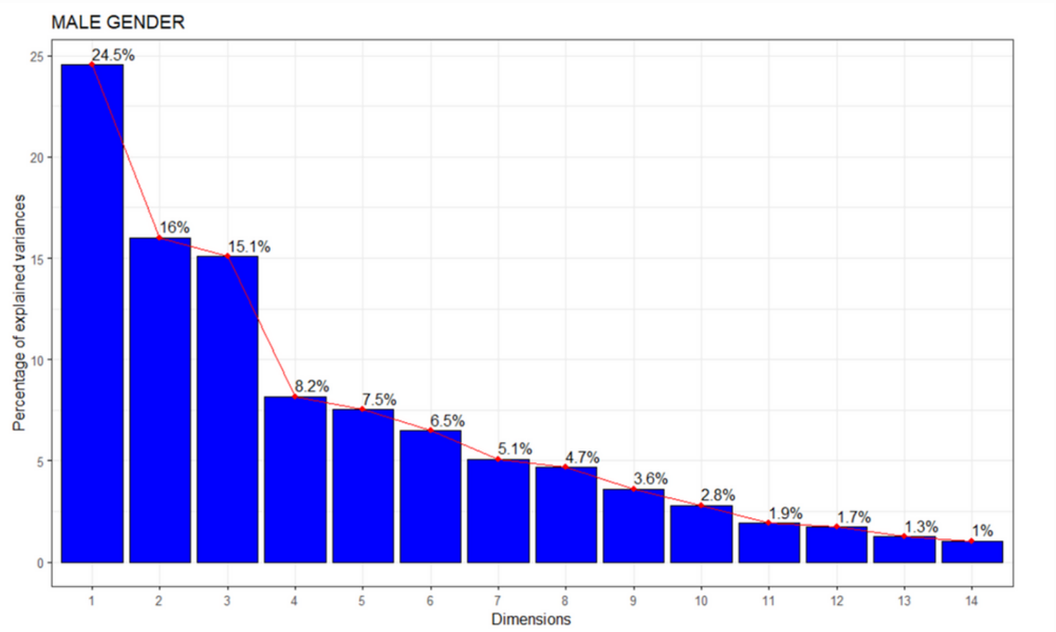
Результати показують, що значення p < 0,001 і є статистично значущим. PCA можна застосувати.

SCREE PLOTS

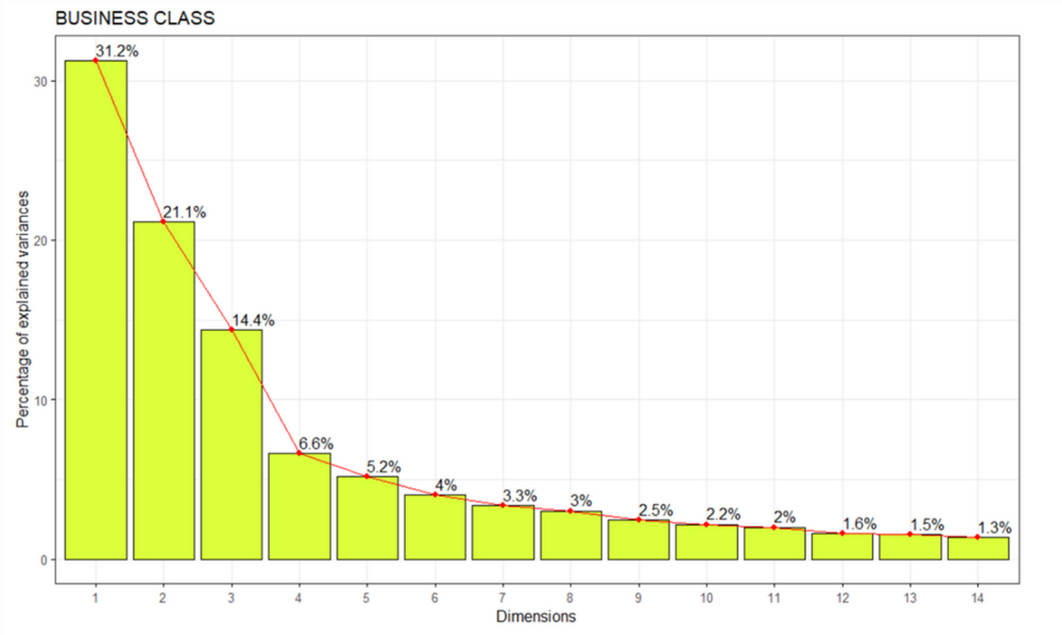

BUSINESS CLASS
Percentage of explained variances
Dimensions
31.2%
21.1%
14.4%
6.6%
5.2%
4%
3.3%
3%
2.5%
2.2%
2%
1.6%
1.5%
1.3%

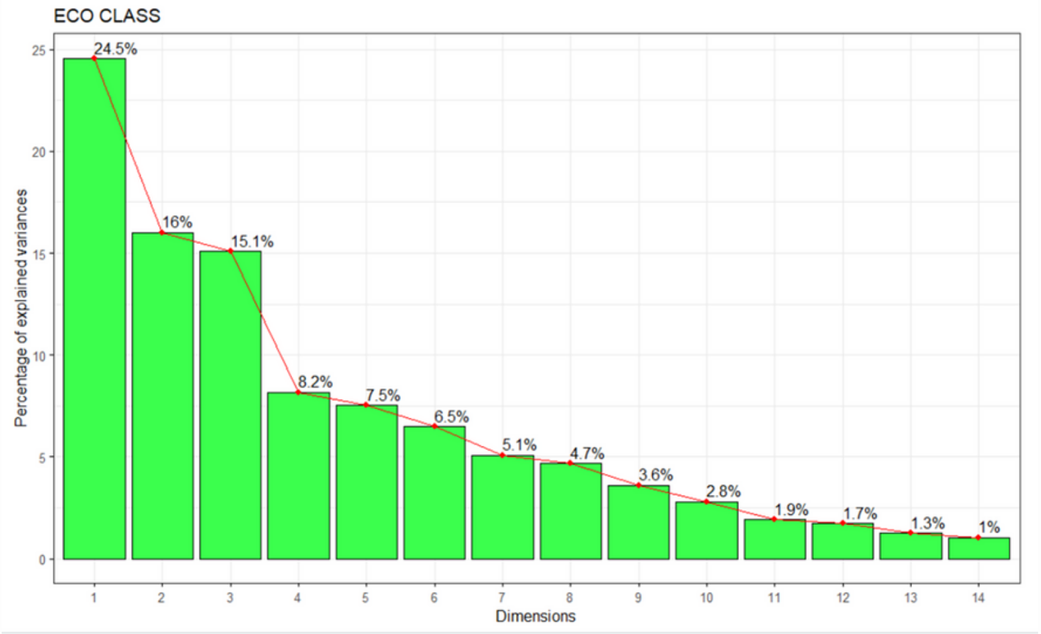

ECO CLASS
Percentage of explained variances
Dimensions
24.5%
16%
15.1%
8.2%
7.5%
6.5%
5.1%
4.7%
3.6%
2.8%
1.9%
1.7%
1.3%
1%


FEMALE
Percentage of explained variances
Dimensions
27.1%
16.8%
15.3%
7.5%
6.9%
4.9%
4%
3.8%
3%
2.8%
2.4%
2.3%
1.8%
1.4%


MALE GENDER
Percentage of explained variances
Dimensions
24.5%
16%
15.1%
8.2%
7.5%
6.5%
5.1%
4.7%
3.6%
2.8%
1.9%
1.7%
1.3%
1%

МЕТОДИ ОЦІНКИ ОПТИМАЛЬНОЇ КІЛЬКОСТІ КОМПОНЕНТ. МЕТОД 1





Eigenvalues

	Dim.1	Dim.2	Dim.3	Dim.4	Dim.5	Dim.6	Dim.7
Variance	4.372	2.958	2.011	0.929	0.725	0.562	0.467
% of var.	31.227	21.130	14.362	6.635	5.177	4.014	3.339
Cumulative % of var.	31.227	52.356	66.719	73.354	78.531	82.545	85.884

Eigenvalues

	Dim.1	Dim.2	Dim.3	Dim.4	Dim.5	Dim.6	Dim.7
Variance	3.436	2.242	2.114	1.145	1.057	0.906	0.711
% of var.	24.542	16.015	15.102	8.177	7.547	6.474	5.082
Cumulative % of var.	24.542	40.557	55.659	63.837	71.383	77.857	82.939

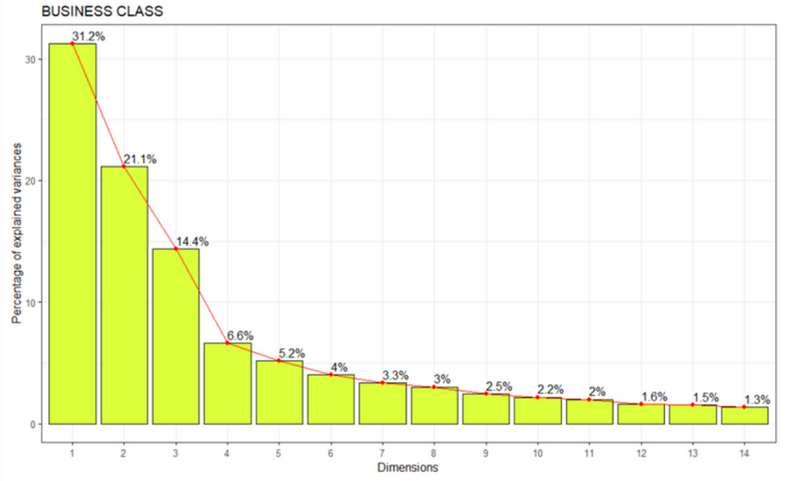
Для **бізнес-класу три** змінні описують кумулятивну дисперсію на рівні 66%.

В **економ-класі** такий самий рівень дисперсії описують **п'ять** змінних.

МЕТОДИ ОЦІНКИ ОПТИМАЛЬНОЇ КІЛЬКОСТІ КОМПОНЕНТ. МЕТОД 2

Parallel Analysis Results

Method: pca
Number of variables: 14
Sample size: 62147
Number of correlation matrices: 300
Seed: 42
Percentile: 0.95



Component <dbl>	Mean <dbl>	0.95 <dbl>
1	1.025	1.030
2	1.019	1.023
3	1.015	1.018
4	1.011	1.014
5	1.008	1.011
6	1.005	1.007
7	1.002	1.004
8	0.998	1.001
9	0.995	0.998
10	0.992	0.995

num [1:14]
4.372
2.958
2.011
0.929
0.725
...

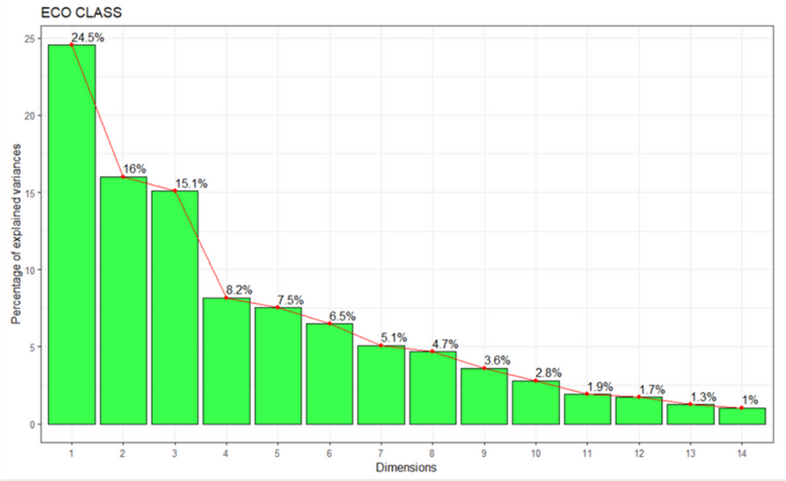
Parallel analysis

Parallel analysis, also known as Horn's parallel analysis, is a statistical method used to determine the number of components to keep in a principal...

Wikipedia / Aug 18, 2022

Parallel Analysis Results

Method: pca
Number of variables: 14
Sample size: 58293
Number of correlation matrices: 300
Seed: 42
Percentile: 0.95

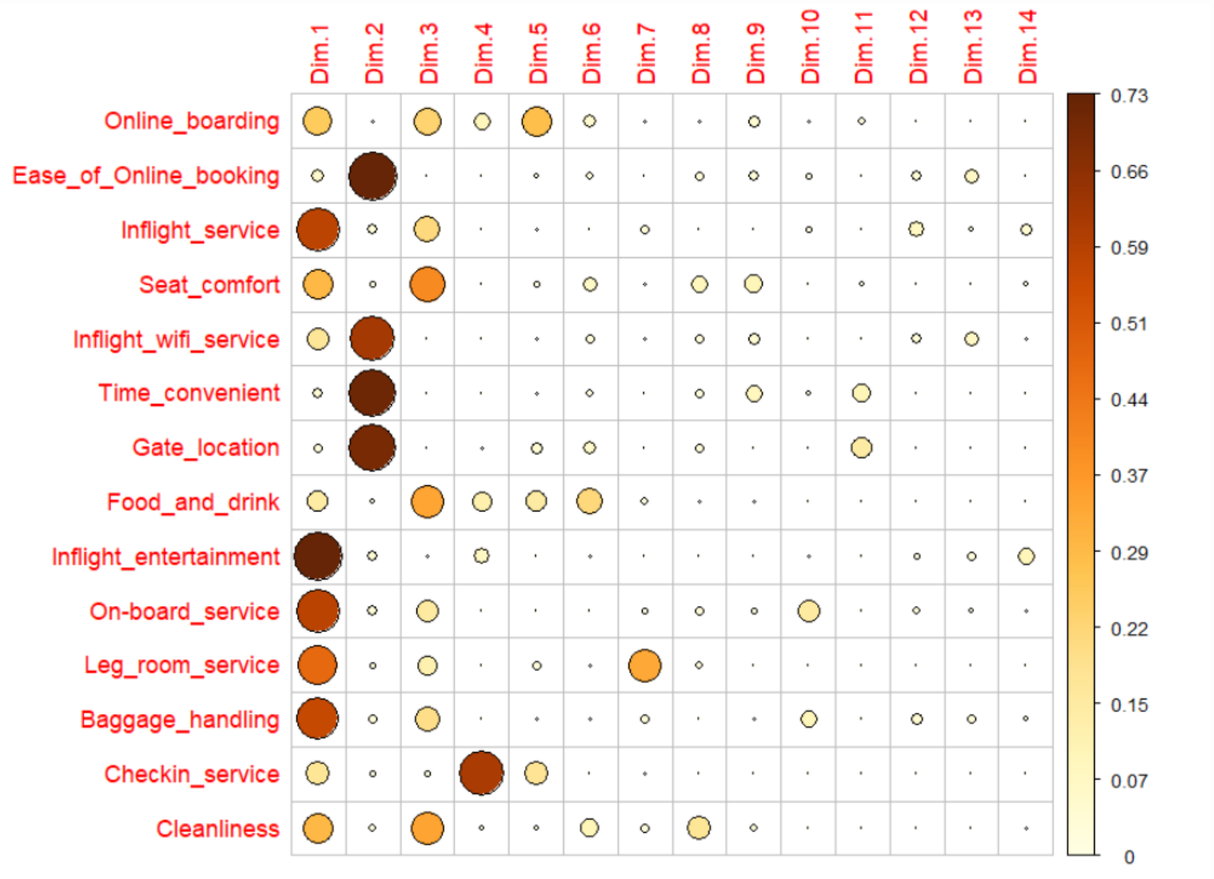


Component <dbl>	Mean <dbl>	0.95 <dbl>
1	1.026	1.030
2	1.020	1.024
3	1.016	1.019
4	1.012	1.015
5	1.008	1.011
6	1.005	1.008
7	1.001	1.004
8	0.998	1.001
9	0.995	0.997
10	0.992	0.994

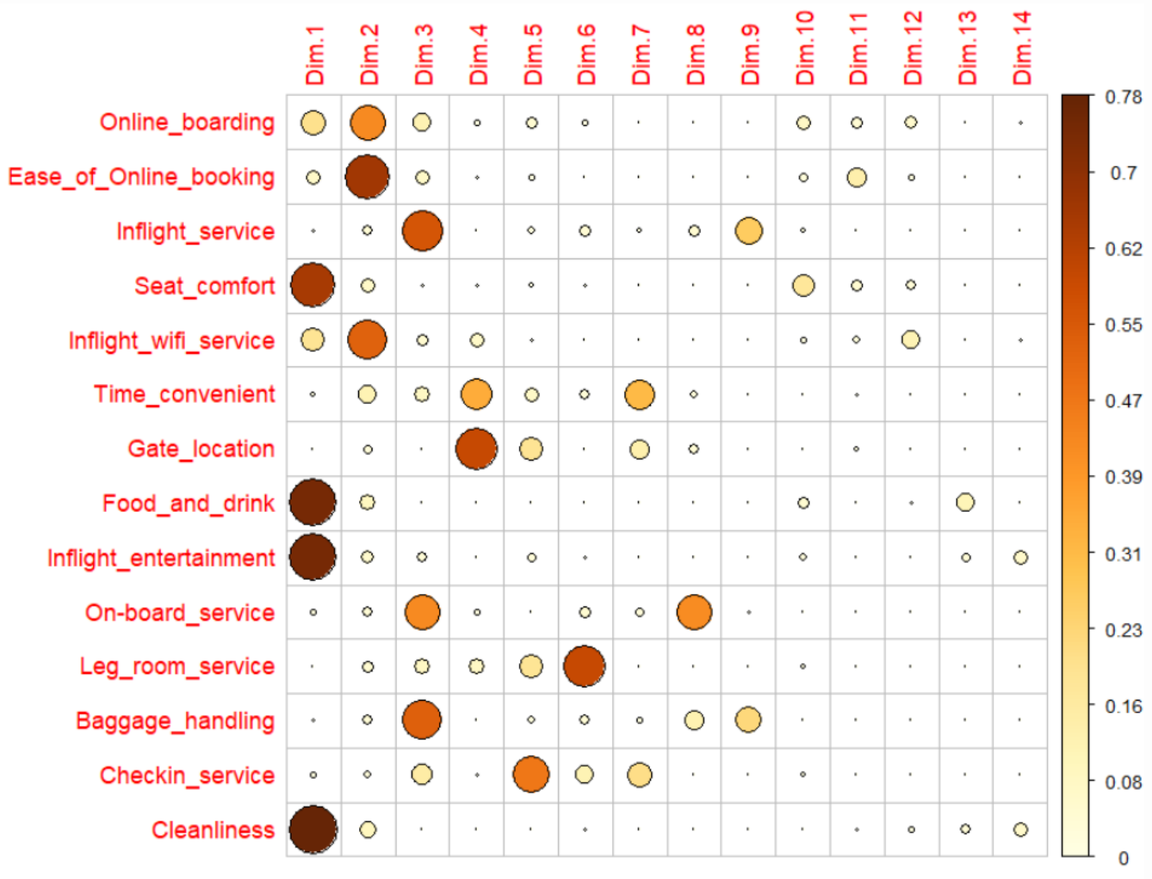
num [1:14]
3.44
2.24
2.11
1.14
1.06
...

REPRESENTATION QUALITY

BUSINESS

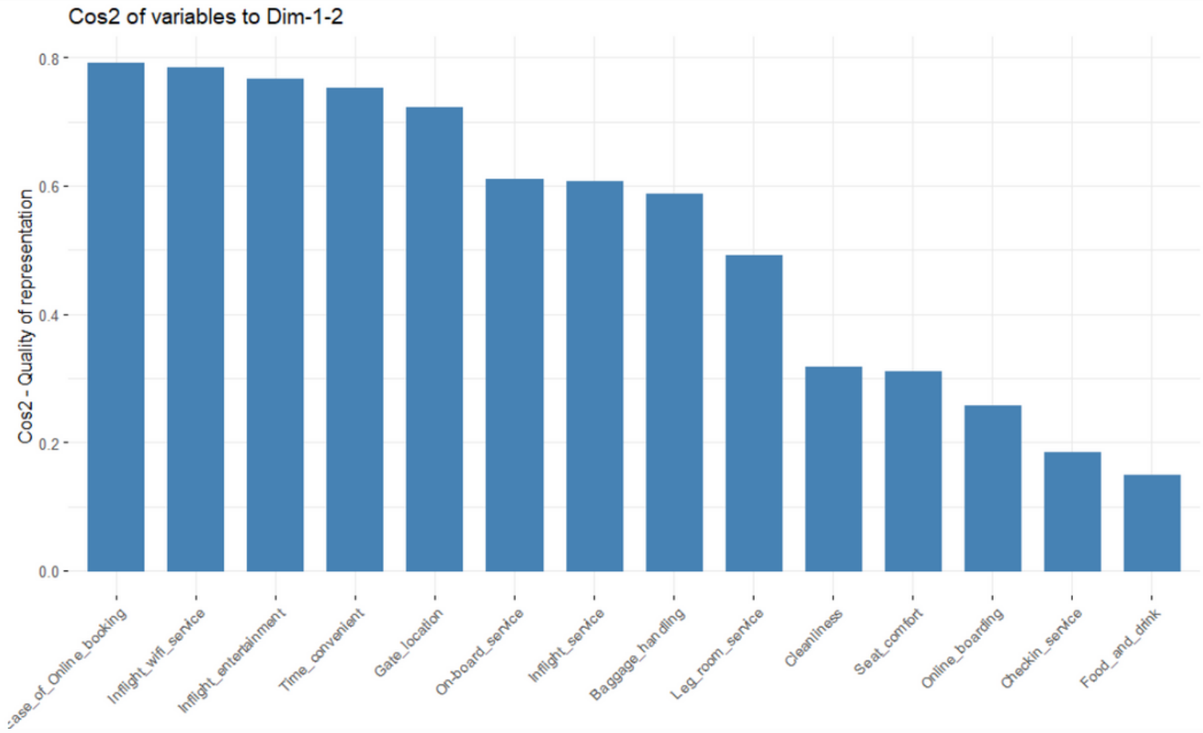


ECO

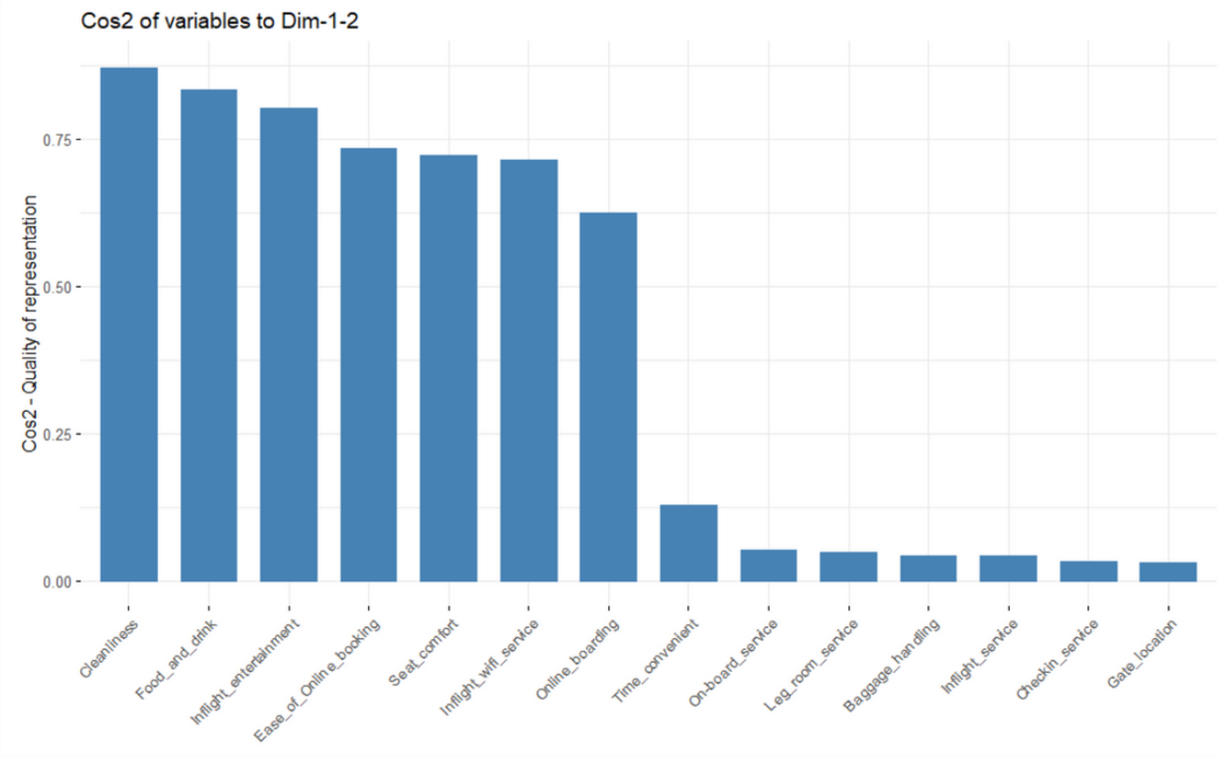


REPRESENTATION QUALITY

BUSINESS

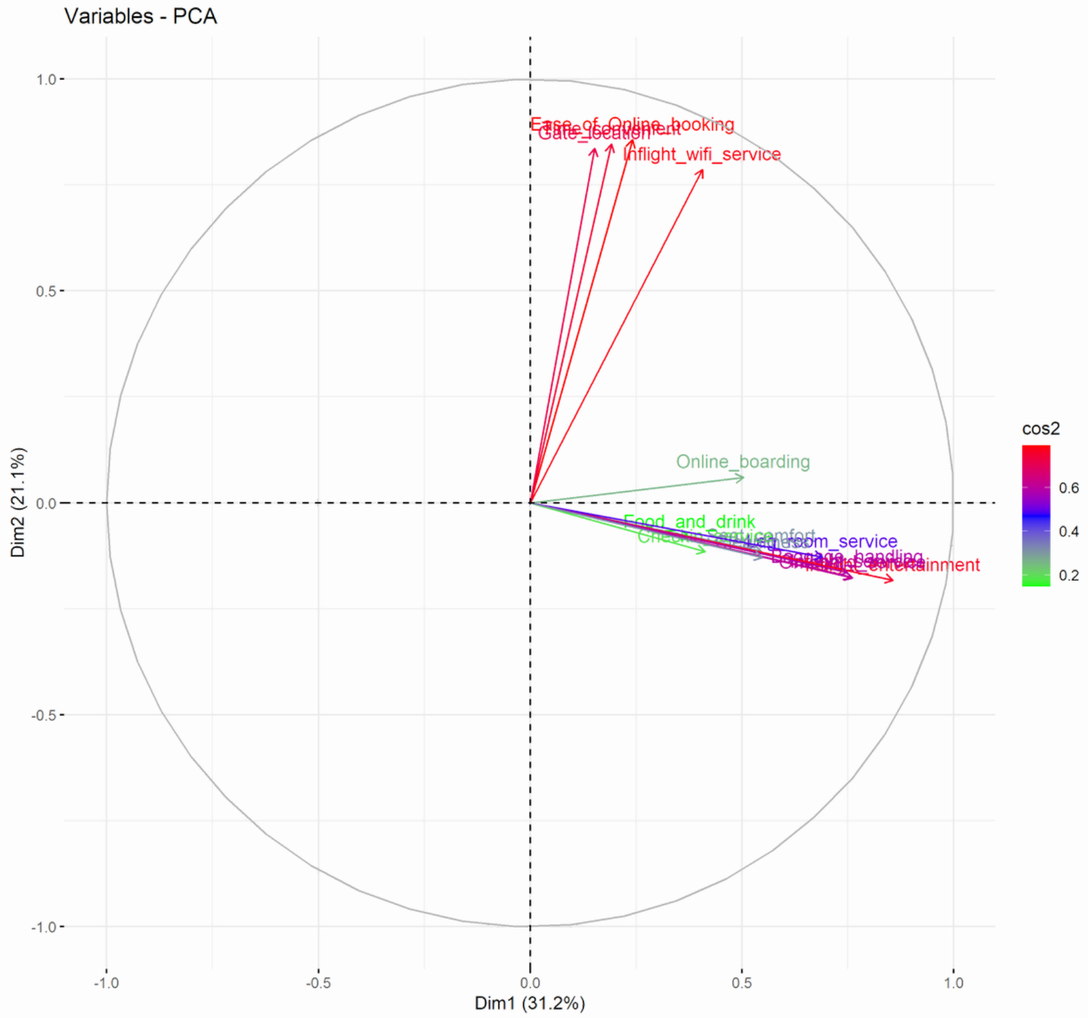


ECO

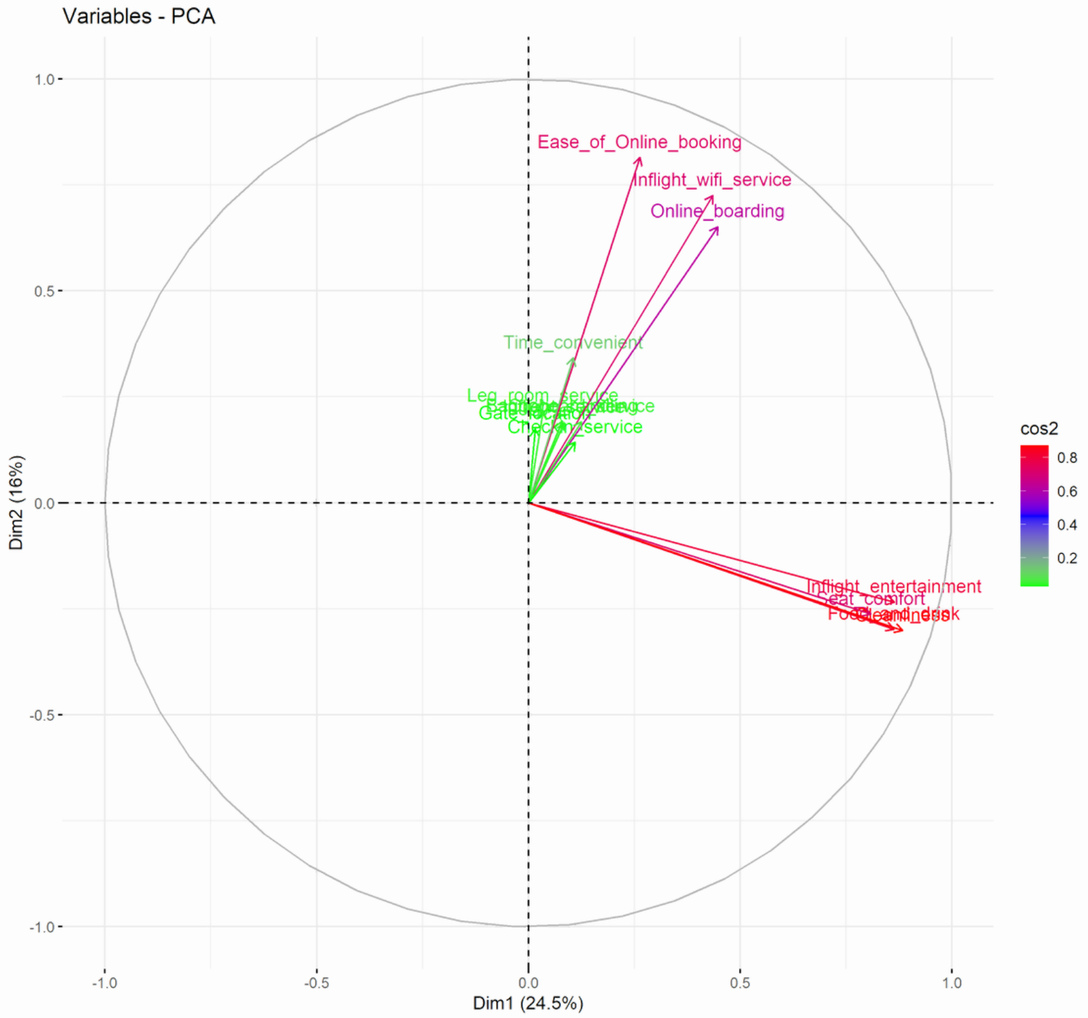


PROJECTION OF VARIABLES

BUSINESS

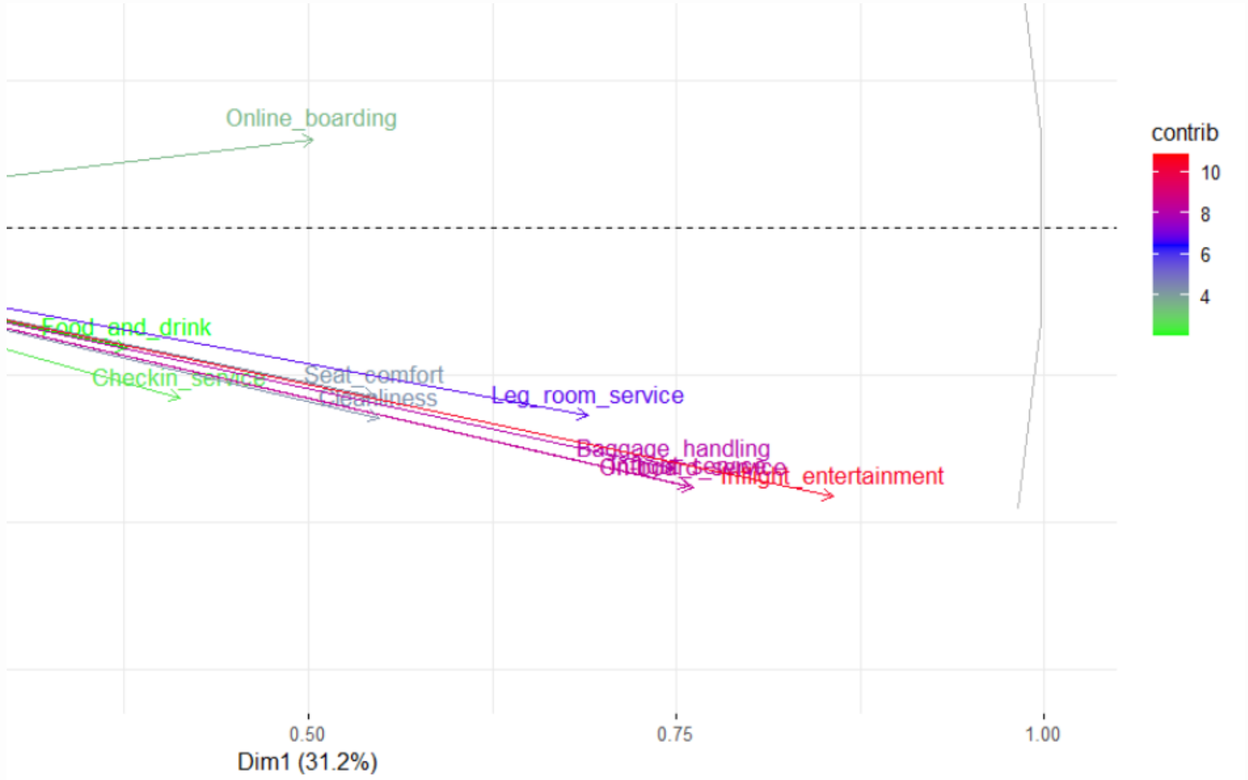


ECO



PROJECTION OF VARIABLES

BUSINESS



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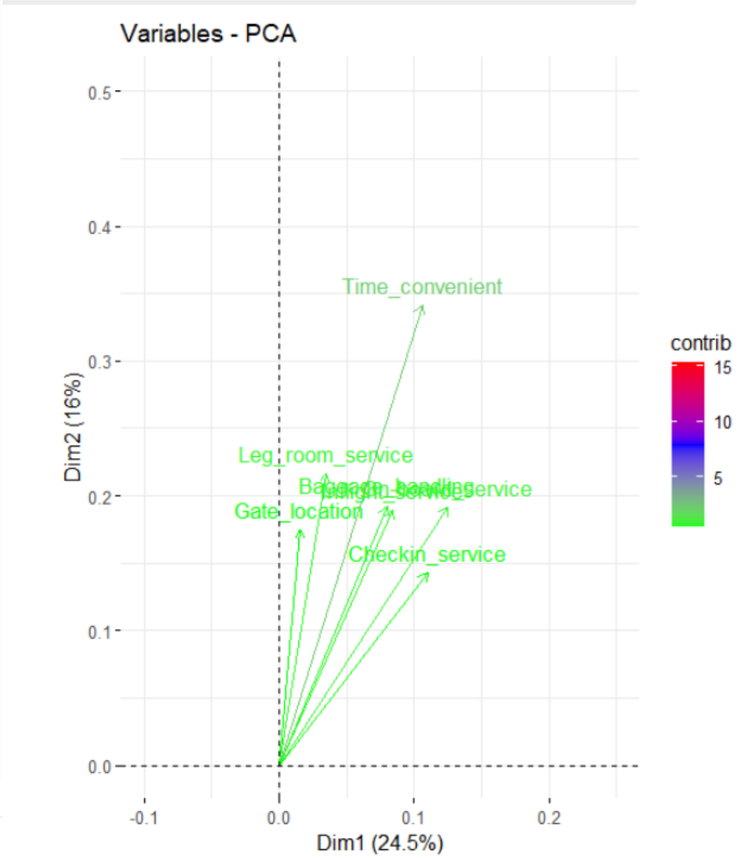
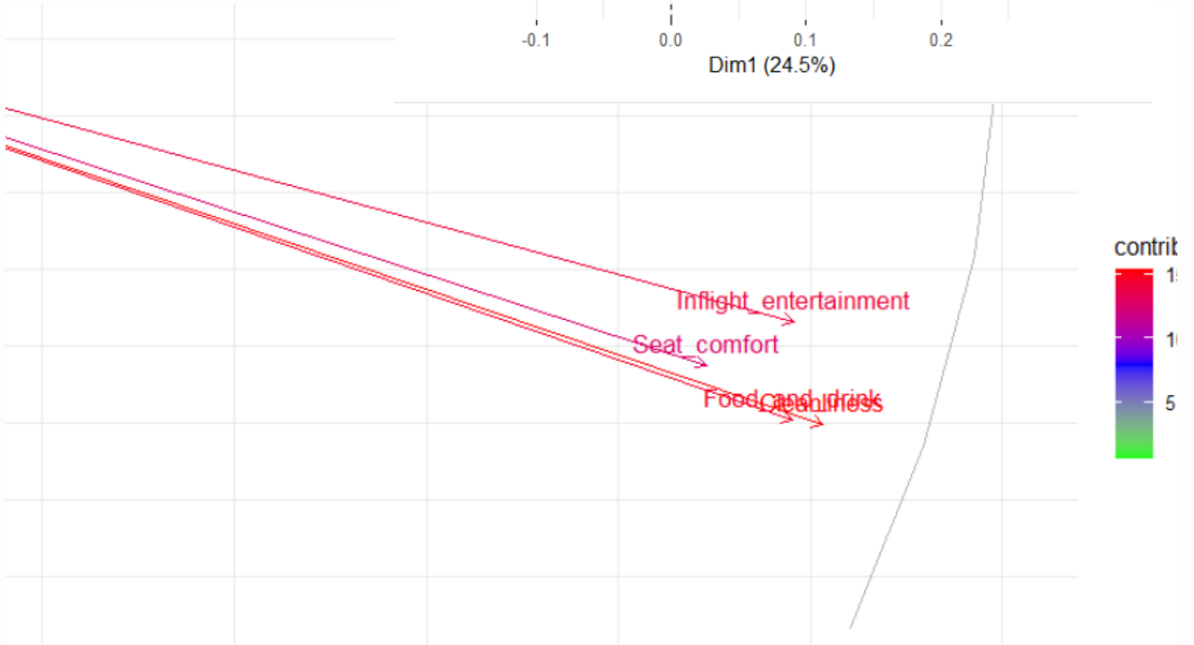
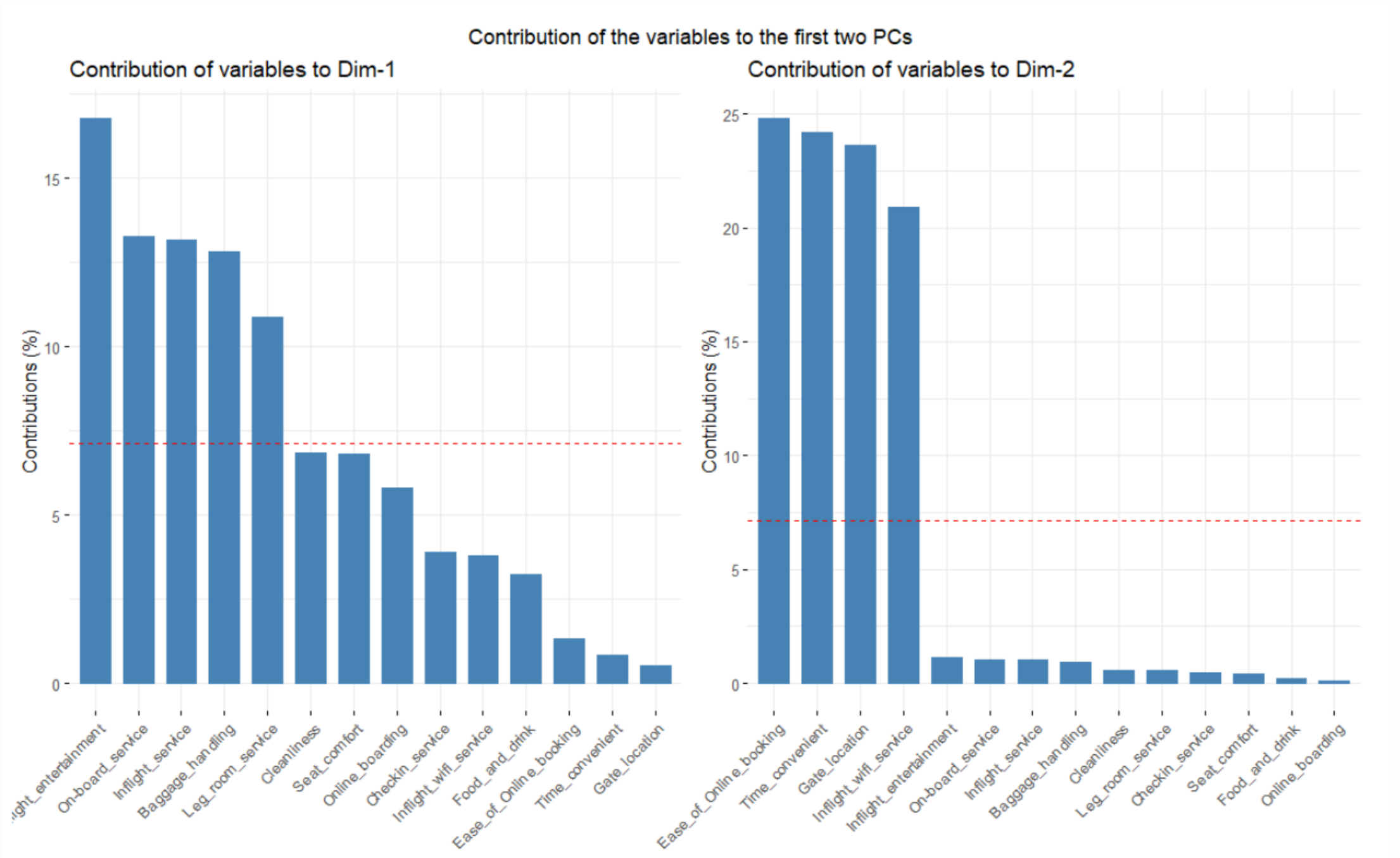
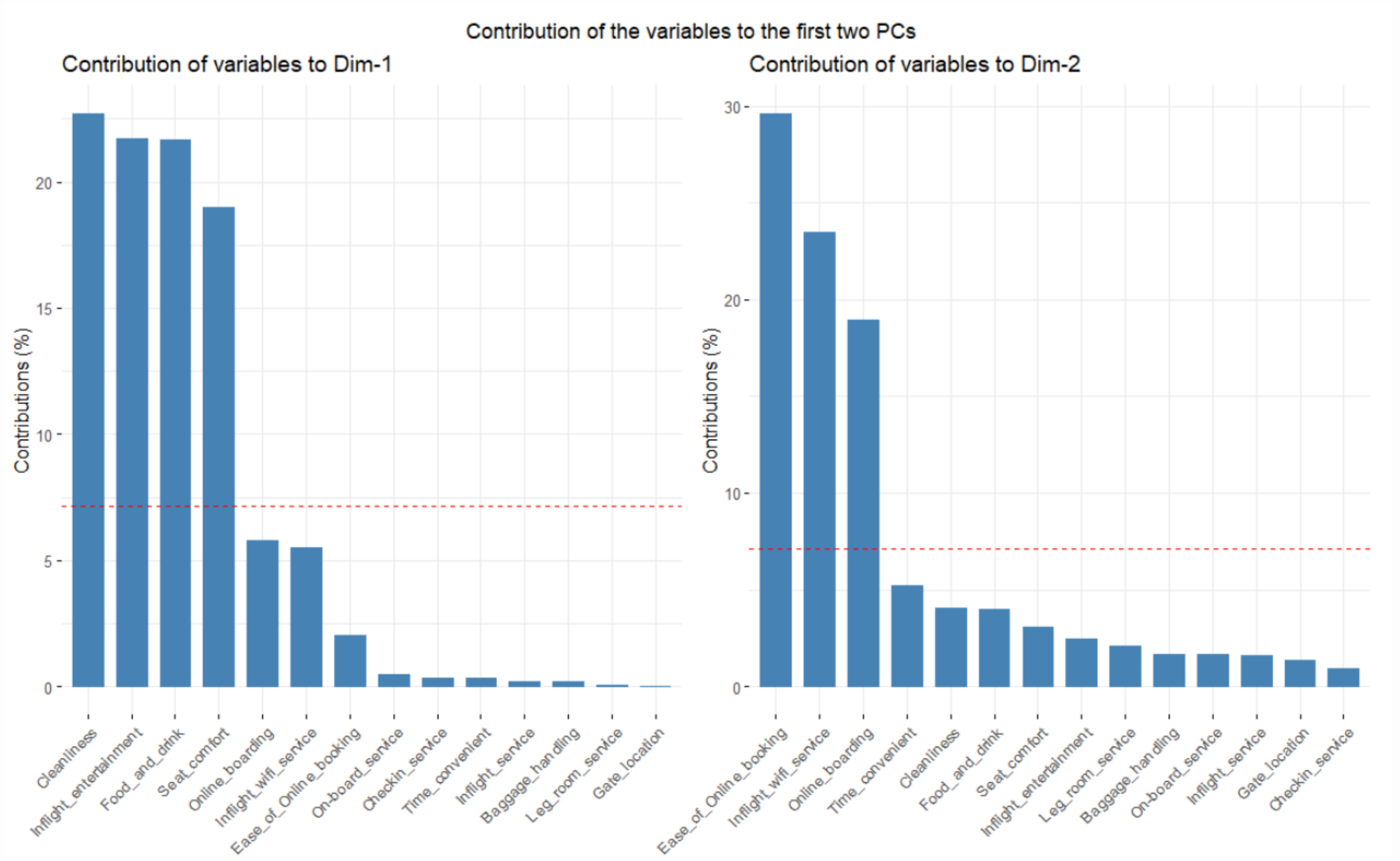
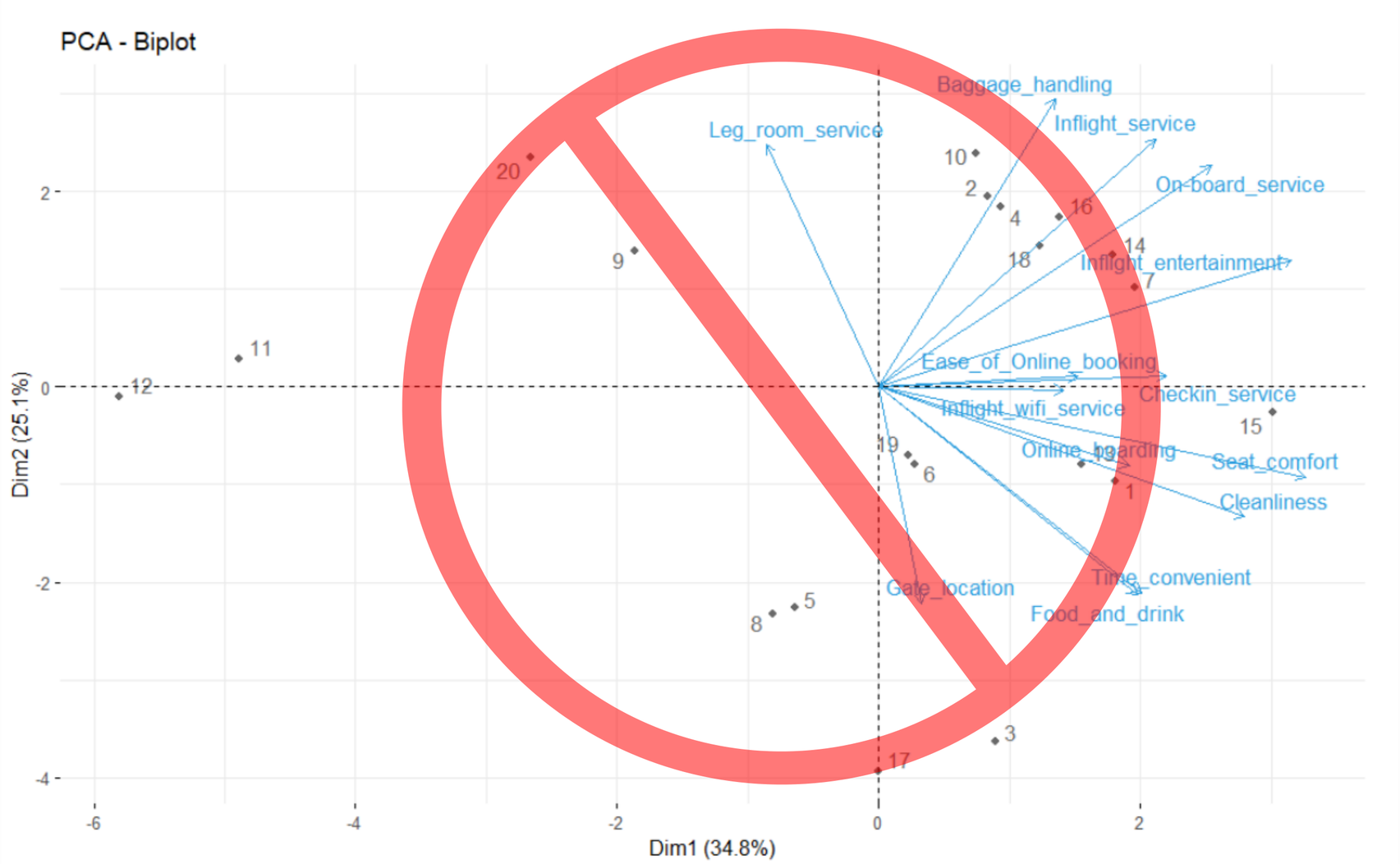





Contribution of the variables to the first two PCs
Contribution of variables to Dim-1
Contributions (%)
0
5
10
15
ght_entertainment
On-board_service
Inflight_service
Baggage_handling
Leg_room_service
Cleanliness
Seat_comfort
Online_boarding
Checkin_service
Inflight_wifi_service
Food_and_drink
Ease_of_Online_booking
Time_convenient
Gate_location
Contribution of variables to Dim-2
Contributions (%)
0
5
10
15
20
25
Ease_of_Online_booking
Time_convenient
Gate_location
Inflight_wifi_service
Inflight_entertainment
On-board_service
Inflight_service
Baggage_handling
Cleanliness
Leg_room_service
Checkin_service
Seat_comfort
Food_and_drink
Online_boarding


Contribution of the variables to the first two PCs
Contribution of variables to Dim-1
Contributions (%)
0
5
10
15
20
Cleanliness
Inflight_entertainment
Food_and_drink
Seat_comfort
Online_boarding
Inflight_wifi_service
Ease_of_Online_booking
On-board_service
Checkin_service
Time_convenient
Inflight_service
Baggage_handling
Leg_room_service
Gate_location
Contribution of variables to Dim-2
Contributions (%)
0
10
20
30
Ease_of_Online_booking
Inflight_wifi_service
Online_boarding
Time_convenient
Cleanliness
Food_and_drink
Seat_comfort
Inflight_entertainment
Leg_room_service
Baggage_handling
On-board_service
Inflight_service
Gate_location
Checkin_service


PCA - Biplot
Baggage_handling
Inflight_service
Leg_room_service
On-board_service
Inflight_entertainment
Ease_of_Online_booking
Checkin_service
Inflight_wifi_service
Online_boarding
Seat_comfort
Cleanliness
Time_convenient
Gate_location
Food_and_drink
20
10
2
4
16
14
18
9
7
11
12
19
6
15
1
8
5
3
17
Dim2 (25.1%)
Dim1 (34.8%)
2
0
-2
-4
-6
-4
-2
0
2

СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

«Business Intelligence in Airline Passenger Satisfaction Study — A Fuzzy-Genetic Approach with Optimized Interpretability-Accuracy Trade-Off» - Marian B. Gorzałczany, Filip Rudzi´nsk, and Jakub Piekoszewski, Department of Electrical and Computer Engineering, Kielce University of Technology, Poland, 2021

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3. «Feature Analysis on Airline Passenger Satisfaction using Orange Tool» - Hannah Susan Mathew,
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