A cycling mobility study case: the European Cycling Challenge 2015 in Naples

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ABSTRACT: In May 2015, the City of Naples and forty others European cities have joined the fourth edition of the European Cycling Challenge. This event has been created to promote the bicycle as a sustainable transport mean in urban areas, and lasted for all the month of May.
The event organizer, SRM Reti e Mobilità, provided an app where all citizens/cyclists could enroll and track their cycle journeys; the app was tracking, with a time interval of five seconds, the cyclist position (using GPS) and some journey details (journey name, length, speed, besides day and schedule).
These data were registered by the app and saved in a database. Several months after the event, each database has been sent to the participating cities.
Naples' database has been utilized to evaluate, for the first time, the cycling mobility in the city. Indeed, the City of Naples developed a cycle network longer than twenty kilometers in the recent years. Therefore, this evaluation aimed to understand how, when and where the cyclists have been using these paths.
The evaluation required the development of a methodological framework to analyze the database, with operations in Gis, Excel and Access environment.
The final product has been disaggregated in two categories, the territorial evaluation and the temporal evaluation. The territorial evaluation contains O-D matrices, an analysis involving Naples' districts, and a flow count analysis for road. The temporal evaluation includes an analysis for each day of the month, for each day of the week (Monday, Tuesday,and so on), and for two time slots (7,30 – 9,30 A.M. and 4,30 – 6,30 P.M.).
The overall results registered over 7961 kilometers covered and 1308 registered journeys, with an average journey length of 6,07 kilometers and a massive use of the Waterfront cycle path (Via Francesco Caracciolo and Via Partenope).

1 EXECUTIVE SUMMARY

In the last ten years Italian cities extended considerably their cycle route networks. Indeed, the "Urban Mobility Report" (ISTAT, 2013) reveals that the length of the urban cycle routes is increased by 40%, from a value of 13,5 km per every 100 km^2 of urban surface in 2008 to a value of 18,9 km per every 100 km^2 of urban surface in 2013.

Then, the analysis of the cycle route use is important for cities, because of the need of quantifying the transiting flows and getting information useful for future planning: having useful tools is necessary.

The aim of this paper is to analyze the results extracted from the 2015 European Cycling Challenge (ECC) edition in Naples – utilized as a case study – defining a methodology for the data processing and showing the obtained results.

The methodology foresees progressive steps: in this way, the repeatability to all future surveys based on a similar georeferenced database was guaranteed. This analysis represents the first cycling mobility survey carried out in the City of Naples.

1.1 *The European Cycling Challenge – Event Description*

The ECC (www.cyclingchallenge.eu) - whose first edition was held in 2012 - is a challenge among urban cyclists which starts every May 1st and ends up in May 31th. The event foresees a virtuous competition among the citizens of involved cities based on the total mileage that the active cyclists/citizens of each city will have traveled in that month. To participate, is necessary to register all journeys by bicycle through the free App "Cycling365", or input own journeys manually via the event website.

All journeys are permitted and included in the database except journeys with an average speed

greater than 30 km/h, a maximum speed higher than 40 km/h, or a length bigger than 30 km.

At ECC can participate all citizens using the bike within the boundaries of the involved city, including also residents out of the city who move themselves into the city by bike. For the 2015 Edition, 99 citizens of Naples (and from the neighboring urban centers) have registered their journeys in the month of May.

2 THE CYCLE ROUTE NETWORK IN NAPLES

The City of Naples has an area of 117,27 km^2, a road network of approximately 1200 km long, and it is divided in 10 Districts (Figure 1). Naples owns a population of 974.074 inhabitants - reference to 31/12/2015 - and every District has a population grouped in a range from 80.000 to 140.000 inhabitants.

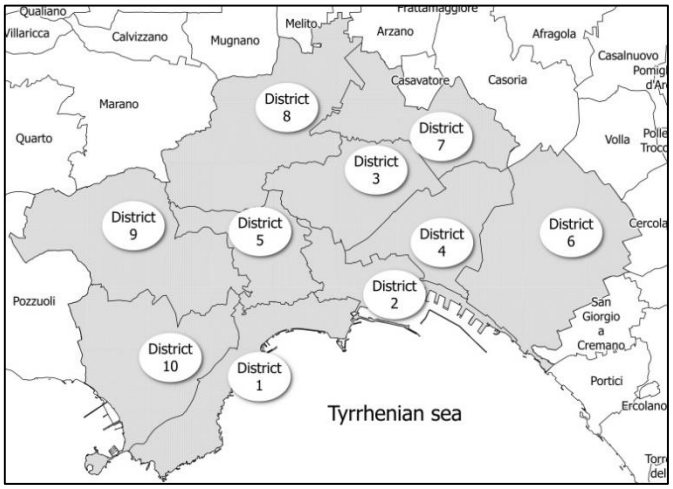

Figure 1. The City of Naples, its Districts and the neighboring cities.

According to the data provided by the "2011 Italian Census" (ISTAT, 2011), the City of Naples is interested - on a typical working day - by 574.916 journeys; approximately the 59% (342.109) of journeys are within the city, while the remaining 41% are classified internal-external or external-internal journeys. Of the latter, 193.928 journeys are towards Naples, while 38.880 depart from Naples; these numbers confirm the importance of the city of Naples as the principal regional aggregator. These data have been disaggregated for transport modes in Table 1.

	Internal	**To Naples**	**From Naples**	**Total**
Railway/ Underground	38.019	59.914	2.793	244.176
Bus	60.135	29.482	4.585	100.726
Car	115.081	98.660	30.435	135.813
Pedestrian/ Bicycle	128.874	5.872	1.067	574.916

Table 1. Working daily journeys in Naples (for transport modes).

In 2011, the City Administration started the construction of the first cycle route - from Bagnoli to Castel dell'Ovo (Via Nazario Sauro), with a length of 7,7 km - ended up in 2012. The City Administration was well aware of the benefits of the cycling in an urban contest highly congested by traffic like Naples (Van Hout, 2008) and the construction of a new cycle route wanted to increase the modal split between private vehicles and the bike in favour of the second.

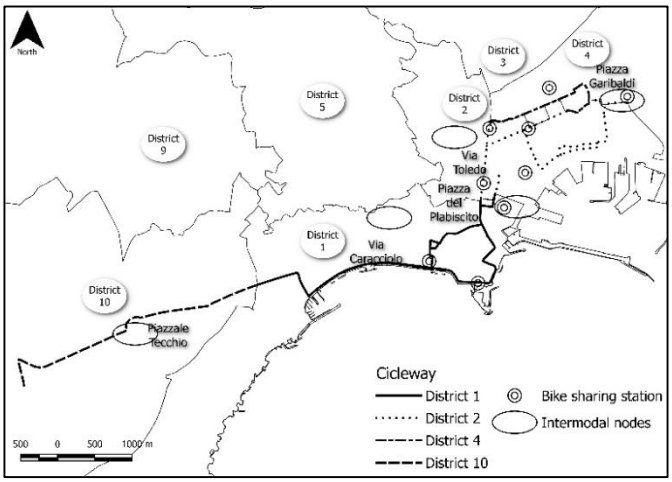

Figure 2. The cycle route network in Naples.

The cycle route network in Naples was finally established with the Major order n.1233 of the 9th November 2012. The cycle route network goes through 4 Districts, and has a length of about 19 km.

The existing cycle routes in the city of Naples can be classified in 3 categories:

- Type 1: separated cycle routes. The routes separated from the road, having a width of 1,25 m for lane (total width 2,50 m) and defined by delineator strips of width 12 cm. Plus, they have a separator curb from the road - in concrete - with a height of 20 cm and a width of 50 cm, and are separated from the footpath by the verge (variable width between 30 and 50 cm);
- Type 2: routes on footpaths. They are indicated through delineator strips having a width of 12 cm, the orange coloring the intermediate zone and an overall width of 2 m (the width of the single cycle lane is 1 m). Pedestrians have priority over cyclists;
- Type 3: routes in pedestrian areas or Restricted Traffic Zones ("RTZs"). The cyclists follow the rules of the other road users, and have indications through markings drawn on the road/ pedestrian area (the bicycle symbol).

2.1 *The cycle route network in District 10*

The cycle route falling into the District 10 is unique and has a length of about 3,6 km. The cycle route starts from Via Nuova Agnano and ends up in Via Caio Duilio. However, the path is not interrupted but continues towards Piazza Sannazzaro - through Galleria delle Quattro Giornate - in District 1.

The path falling in District 10 has Type 1 stretches (Viale Augusto and Via Caio Duilio) for a length of over 1,2 km, Type 2 stretches (Via Nuova Agnano and Viale J.F. Kennedy) for almost 1,8 km, and Type 3 stretches (Piazzale Tecchio and Largo Lala, pedestrian areas). There are several intermodal points that intercept the cycle route: Underground Line 2, Underground Line 6 (under construction), the railway line called "Cumana" and the bus station located in Piazzale Tecchio.

2.2 *The cycle route network in District 1*

The overall length of the cycle routes falling into District 1 is about 7 km. In District 1 there is a main cycle route and two secondary routes that are linked to the main. The main route carries on from Galleria delle Quattro Giornate and ends up in Via Toledo, entering into Historical Centre. The secondary paths start from Piazza Vittoria, crossing the historic area of Chiaia neighborhood (Piazza dei Martiri, Via Morelli, Via Chiaia) and Via Toledo, through Via Santa Brigida and Via Paolo Emilio Imbriani, ending up in Piazza Matteotti.

In this District there are Type 1 stretches (Galleria delle Quattro Giornate and the "Waterfront" from Via Francesco Caracciolo intersection Via Sannazzaro to Via Nazario Sauro intersection Via Raffaele De Cesare), for a total length of 3,5 km, while the rest is Type 3 in pedestrian areas (Via Toledo, Via Chiaia, Piazza Plebiscito) or in promiscuous with vehicles (the "30 km Zones" in Via Santa Lucia and Via Cesario Console). Again the intermodal points are numerous along the cycle network: Underground Line 1, Underground Line 2, Underground Line 6, the Cumana railway, and the Central and Chiaia funiculars.

From 2015, bike-sharing stations (currently suspended service, but in reactivation) are present near Castel dell'Ovo, Piazza Vittoria and Via Partenope.

2.3 *The cycle route network in District 2*

The cycle routes crossing the District 2 are connected to the Historic Centre of Naples (UNESCO World Heritage), have a total length of 5,2 km and the characteristic of being only in a promiscuous way with vehicles and pedestrians (cycle routes Type 3). The main cycle routes are two: the first, defined as "Decumano del Mare", originates from Piazza Garibaldi, and ends up in Via Roma after crossing Via Benedetto Croce. This cycle route is developed both in pedestrian areas and on footpaths, 30 km Zones and the RTZ so-called "Mezzocannone".

The second cycle route starts from Via Toledo, continuing the cycle route coming from District 1, and ends up in Piazza Dante, foreseeing ramifications in Via dei Tribunali and Via Benedetto Croce, and has been developed in pedestrian area (Via Toledo) and on footpaths (except for the section near Piazza Dante, RTZ). The intermodal points located in the District are several, but the principal is Piazza Garibaldi - the main intermodal hub of the city - where converge: Underground Line 1, Underground Line 2, the railway called "Circumvesuviana" (which connects all the cities around Vesuvius, starting from Naples) and the bus hub, starting point of the main city bus lines. In the area it is also possible the connection with the ferry area starting and arriving in the Port of Naples (Calata Porta di Massa). From 2015, there are stations of bike-sharing located in Piazza Bovio, Via Brin, Via Toledo corner Via Diaz and Piazza Dante.

2.4 *The cycle route network in District 4*

The cycle routes located in District 4 transit both into the Historical Center and ends up in Piazza Garibaldi, following two parallel routes. Indeed, the two cycle routes (exclusively Type 3) move through the pedestrian area of Via dei Tribunali and Via San Biagio dei Librai. The cycle route network in District 4 has a total length of 3 km, and it has been developed in pedestrian areas and into RTZ of the Historical Center.

The first cycle route, called "Decumano Maggiore cycle route" with the historical reference to the road on which the route stands, starts from Via Benedetto Croce, and ends up in Piazza Garibaldi. The second cycle route, named "Decumano Superiore cycle route" (similarly to the previous), starts from Piazza Dante, and ends up in Piazza Garibaldi too. Unlike other Districts, intermodal connections are scarce because of the size of the streets and high population density: indeed, the only exception is the Duomo station of Underground Line 1, next to activation. However, in this District were located since 2015, the bike-sharing stations of Largo Donnaregina, Via Benedetto Brin and Piazza Garibaldi (side District 4).

3 THE METHODOLOGICAL FRAMEWORK

The App "Cycling 365" saved, for each journey registered and with a frequency of 5 seconds, the cyclist position (using GPS) and some journey

details (journey name, length, besides day and schedule) in a database from the start to the end of the journey. Several months after the event, each database was sent to the participating cities.

The extraction of results from the European Cycling Challenge database has required the development of a methodology to define all the stages of the elaboration process, from the survey objectives to the specific type of investigation to be carried out, in order to ensure the replicability and comparison of results, obtaining understandable results by an unskilled audience. In detail, interested stakeholders have been divided in two main categories:

- Municipal technical offices, having the task of assessing the current status of the situation, according to the objectives identified, and investing resources in the development of the urban cycle network;
- Decision makers and carriers of public interests: subjects that, for institutional reasons or role, should guide the choices of the public administrators in the sector.

The methodological framework foresees the following steps, and is based on the typical scheme of transport surveys (Richardson & Ampt & Meyburg, 1995):

- Definition of the objectives;
- Definition of the key factors;
- Phenomenon analysis according to the identified key factors;
- Data processing;
- Evaluation of the results.

The survey objective is to provide an assessment of the satisfaction degree and the use of existing cycle routes in the City of Naples, providing information on the city areas for developing future cycle routes. These outputs require the definition of a set of "key factors", which allow the analysis to achieve the proposed objectives. The database provided from the European Cycling Challenge has a structure in which each row show information about the registered journey (journey's identity code, single point identification code belonging to the specific journey), time information (day of detection, hour, minute and second of detection) and spatial information (latitude and longitude detected by GPS). For this reason, the key factors identified are 2: "Space" and "Time". The key factors have been disaggregated in different "layers", to evaluate different aspects of the phenomenon at different levels:

- Time key factor:
  - 0 – 24 time slot layer;
  - 7,30 – 9,30 A.M. time slot layer ("Morning" time slot);
  - 16,30 – 18,30 P.M. time slot layer ("Afternoon" time slot);
- Space key factor:
  - City layer;
  - District layer;
  - Matrix Origin/Destination (O/D), layer obtained using the start and end points of the registered journeys;
  - Street layer.

Each Time layer is referred to the entire month: for example, the 0-24 time slot layer is the overall analysis of the month of May, from 1st to 31th.

Classifications introduced allow to obtain a better detail level for the analysis. Joining one single layer belonging to each key factor allows to get a 3x4 matrix, in which each layer of the Space key factor is analyzed according to 3 different layers of the Time key factor (Figure 3).

The join permits to make a progressive detailed analysis and assesses whether there are particular phenomena, such as home-work journeys, home-school journeys, and how the movements are distributed over a time period and on the territory.

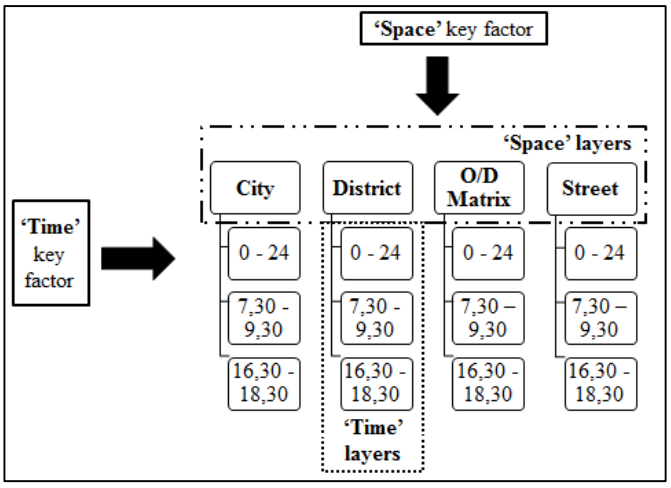

Figure 3. Methodology framework.

Data processing operations have been developed with the aid of different software tools (GIS, spreadsheet, SQL database). Indeed, the cycling flow analysis in a GIS can provide information to evaluate where cyclists choose to move and to predict where they could move in the future (Aultman-Hall & Hall & Baetz, 1997).

Operations have been performed starting from a first cleaning job of the database in GIS environment to eliminate some redundant information in the survey, such as the elimination of registered journeys outside Naples, or registered journeys on railway lines or motorways. The database thus obtained has been divided in accordance with predicted slots of the Time key factor, representing the mobility demand. The three sub-databases have been combined with the GIS containing information about the City of Naples (which represents the supply model of this procedure), using as joining factor the geographical coordinates of individual points (the database rows) presents in the sub-databases. The join of three sub-databases with the

supply model, declined in the various detail scales of Space key factor, has allowed to obtain the 3x4 matrix displayed in Figure 3.

The evaluation of the results foresees the analysis of the information obtained during the data processing in order to provide to all stakeholders the information necessary for its own needs.

4 SURVEY RESULTS

The ECC database registered more than half a million points (equal to rows), which represent the "photographies" of all journeys made in May, with a time interval of 5 seconds.

The operations performed on the database, necessary to extract the data, have been predominantly of "spatial join" type, and various query types using the SQL environment that is present in the GIS software. Extracted data have been finally exported to a calculation sheet to create the tables available in the successive paragraphs.

The accuracy of the GPS data varies in some cases in a 5-10 meters range from the street. This is a limit also evidenced in literature (Lindsey & Hankey & Wang & Chen, 2013) because of it is impossible to understand if cyclists used cycle route or went in promiscuous with vehicles, nevertheless it allows to understand in which streets they passed.

The results have analyzed the most significant data for the survey: the registered journeys and the covered mileage.

4.1 *Overall analysis*

The total number of journeys registered in the month of May 2015 - during the ECC - is 1.293, while the to-tal mileage was 7.960 km, for a 6,16 km average mileage per journey.

The day with the largest number of registered journeys was on May 11th, with 84 journeys and a total mileage of 426,39 km (5,08 km per journey). The day with the most mileage covered was on May 19th with 448,37 km, 70 journeys and 6,41 km average mileage per journey.

Time slot	Journeys	Mileage (km)	Km per journey
0 - 24	1.293	7.960,94	6,16
Morning	213	1.616,78	7,59
Afternoon	251	1.409,01	5,59

Table 2. Overall journeys and mileage about the ECC 2015.

The analysis of the database by time slots shows that the recorded journeys are distributed during the day, without recording special spikes referable to home-work journey or home-school journey. Indeed, only 16% of the total journeys were recorded in the "Morning" time slot, while 19,4% of those registered in the "Afternoon" time slot. Furthermore, the morning journeys are longer than the afternoon journeys (7,59 km per journey in the morning time slot, compared to the 5,59 km on average registered in the afternoon time slot).

4.2 *District analysis*

The second level of analysis provides a count of the registered journeys inside the 10 Districts.

In Table 3 is shown that in the District 1 were recorded 713 journeys, while in the District 10 were recorded 542 journeys. Surprisingly, also the District 5 registers a high number of registered journeys, considering is a hilly terrain. The same trend was true also for the other time slots: however, in the District 5 journeys in the afternoon time slot are almost the same than in District 1, and higher than those recorded in the District 10. Plus, the sum of registered journeys of Districts 3, 6, 7, 8, and 9 is less than 10% of the registered overall journeys.

The journeys shown in Table 3 are higher than those counted in Table 2: this is because a single journey can go through in more than a single District.

District	Journeys per time slot		
	0 - 24	Morning	Afternoon
1	713	104	110
2	257	41	35
3	28	8	1
4	293	36	36
5	422	80	87
6	118	27	33
7	27	0	5
8	47	3	5
9	38	8	2
10	542	110	95
Total	2485	417	409

Table 3. Registered journeys inside Districts.

The District with the highest mileage registered is the District 10 with about 2.080 km, while the District 3 has registered the lowest mileage with almost 64 km. The sum of the registered mileage in District 1 and in District 10 is equal to the 50% of the overall mileage registered in the ECC, symptom that a cycle route in own way is more attractive for cyclists. Results are similar for the other time slots, with prevalence of the District 10 in the morning time slot and District 1 in the afternoon time slot.

District	Mileage per time slot (km)		
	0 -24	Morning	Afternoon
1	1.765,50	192,04	327,36

2	680,55	101,47	164,19
3	63,76	31,36	-
4	778,83	25,84	159,79
5	1.414,50	441,20	189,51
6	478,91	64,90	195,76
7	78,09	-	6,47
8	149,04	9,67	26,38
9	108,28	34,61	-
10	2.080,01	667,94	267,25
Total	7.597,46	1.569,04	1.336,72

Table 4. Mileage per registered journeys.

4.3 *O/D Matrix analysis*

The third level of detail has analyzed the origin and the end of journeys among the Districts (considered as internal centroids) and between the Naples Districts and the neighboring cities (considered as external centroids). Over 90% of the total journeys registered have been done within the city of Naples (with over 7200 km counted), with a small fraction of journeys to and from Naples (internal-external journeys and external-internal journeys).

	Internal Destination	**External Destination**
Internal Origin	1193	51
External Origin	48	1

Table 5. Overall O/D Matrix, 0-24 time slot.

The journeys registered in the morning and afternoon time slot followed this trend (Table 6 and Table 7).

	Internal Destination	**External Destination**
Internal Origin	204	5
External Origin	4	0

Table 6. Overall O/D Matrix, Morning time slot.

	Internal Destination	**External Destination**
Internal Origin	197	5
External Origin	10	1

Table 7. Overall O/D Matrix, Afternoon time slot.

The preferential directions for external-internal journeys related to the 0-24 time slot (Table 8 and Table 9) are the Pozzuoli-Naples directrix (15 journeys and 113 km covered) and the Volla-Naples directrix (17 journeys and 93 km covered). Journeys from neighboring cities to Naples (47) have generated about 355 km (Table 9).

Origin City	**Journeys per time slot**		
	0 - 24	**Morning**	**Afternoon**
Arzano	2	1	-
Casoria	2	-	-
Cercola	2	-	-
Marano	1	-	1
Melito	1	-	-
Mugnano	6	-	-
Pozzuoli	15	3	1
Quarto	1	-	-
Volla	17	-	8
Total	47	4	10

Table 8. Journeys starting from neighboring cities towards Naples.

Starting City	**Mileage per time slot (km)**		
	0 -24	**Morning**	**Afternoon**
Arzano	25,93	21,85	-
Casoria	27,68	-	-
Cercola	11,81	-	-
Marano	5,05	-	5,05
Melito	23,20	-	-
Mugnano	47,06	-	-
Pozzuoli	113,68	25,89	9,65
Quarto	7,15	-	-
Volla	93,71	-	50,97
Total	355,27	47,75	65,66

Table 9. Mileage per journeys starting from neighboring cities towards Naples.

Journeys starting from Naples to neighboring cities have generated about 343 km (Table 10). Also in this case the Naples-Pozzuoli and the Napoli-Volla directrixes are the most traveled directions, the first with 143 km and the second with 80 km.

Destination City	**Journeys per time slot**		
	0 - 24	**Morning**	**Afternoon**
Arzano	2	1	0
Casoria	2	-	-
Cercola	2	-	-
Marano	1	-	1
Melito	1	-	-
Mugnano	6	-	-
Pozzuoli	15	3	1
Volla	1	-	-
Tot	17	-	8

Table 10. Journeys starting from Naples towards neighboring cities.

Destination City	**Mileage per time slot (km)**		
	0 -24	**Morning**	**Afternoon**
Arzano	20,58	2,83	2,54
Casoria	4,75	-	-
Cercola	22,40	-	-

Marano	9,90	-	9,90
Melito	21,25	-	-
Mugnano	40,16	7,34	11,58
Pozzuoli	143,73	32,18	14,10
Volla	80,92	-	-
Total	343,70	42,35	38,12

Table 11. Mileage per journeys starting from Naples towards neighboring cities.

From the internal-internal component of the matrix O/D, journeys with origin and destination falling inside the same District have been extrapolated. The District where have been registered the largest number of internal journeys is the District 1, followed by District 10 and District 5. The journeys shown in Table 12 cover the 25% of the total mileage.

District	Journeys per time slot		
	0 - 24	Morning	Afternoon
1	167	23	26
2	87	9	21
3	9	4	0
4	98	0	22
5	121	45	10
6	30	4	14
7	10	0	0
8	8	1	1
9	20	8	0
10	145	46	21
Total	695	140	115

Table 12. Internal journeys per District.

In Table 13 are presented data on total mileage divided by District and by time slots. The District 10 and District 5 registered almost the same mileage.

District	Mileage per time slot (km)		
	0 -24	Morning	Afternoon
1	1.033,73	155,03	139,67
2	542,70	78,07	162,54
3	55,76	31,36	-
4	605,82	-	129,88
5	841,90	289,69	79,51
6	344,42	37,92	188,53
7	69,96	-	-
8	85,49	7,28	16,48
9	108,28	34,61	-
10	1.437,33	568,87	157,66
Total	5.125,38	1.202,83	874,28

Table 13. Mileage per internal journeys towards Districts.

4.3.1 *District 1 and District 10 detail*

From the internal-internal component of the O/D matrix the journeys starting from District 1 and District 10 have been extrapolated, because of the data registered the highest number of journeys in that zones. For District 1 were recorded 167 journeys per 1033,73 km.

Arrival District	Journeys per time slot		
	0 -24	Morning	Afternoon
10	53	11	5
2	35	5	7
3	6	-	1
4	38	1	3
5	20	4	9
6	5	2	-
7	1	-	-
9	9	-	1
Total	167	23	26

Table 14. Journeys starting from District 1 towards the other Districts.

The mileage counted for the District 1 - District 4 connection was 250 km, 245 km was the mileage for the District 1 - District 10 connection and 181 km for the District 1 - District 2 connection.

Arrival District	Mileage per time slot (km)		
	h24	7.30-9.30	16.30-18.30
4	312,89	81,06	23,29
10	181,69	27,29	33,99
2	63,53	-	14,87
5	257,04	3,94	15,51
3	121,90	20,18	46,70
6	50,98	22,56	-
9	4,07	-	-
7	41,63	-	5,30
Total	1.033,73	155,03	139,67

Table 15. Mileage per journeys starting from District 1 towards the other Districts.

Table 16 and Table 17 show the results about journeys starting from District 10, with 144 journeys and 1433 km. The connection between District 1 and District 10 is the most evident (449 km total), then the connection with District 2 (378 km), and District 5 (264 km).

Arrival District	Journeys per time slot		
	0 - 24	Morning	Afternoon
1	57	18	7
2	35	13	3
5	26	-	9
6	15	14	-
8	4	-	-
4	3	1	1
9	3	-	1
3	1	-	-
Total	144	46	21

Table 16. Journeys starting from District 10 towards the other Districts.

Arrival District	Mileage per time slot (km)		
	h24	7.30-9.30	16.30-18.30
1	449,52	164,95	62,63
2	378,98	171,76	17,61
5	264,86	-	64,47
6	238,90	221,93	-
8	47,15	-	-
4	28,86	10,23	9,70
9	13,14	-	3,26
3	12,04	-	-
Total	1.433,45	568,87	157,66

Table 17. Mileage per journeys starting from District 10 towards the other Districts.

4.4 *Street analysis*

The ECC database permitted an evaluation of the cycling flows transiting in the streets of the City of Naples utilizing the characteristics of a single journey (with geographic coordinates) and the map (in GIS environment) of the City of Naples, to get flows as the sum of journeys falling in a single street. Table 15 highlights the top 15 busiest streets, with in parentheses the belonging District.

Seven streets on the list are Type 1 cycle route, and fall in District 1 and District 10. Except Via Toledo - pedestrian area - the others are all main traffic streets.

Street	Journeys per time slot		
	0 - 24	Morn.	After.
Via F. Caracciolo (1)	324	54	65
Via Nazario Sauro (1)	235	40	46
Via Caio Duilio (10)	185	44	26
Via Partenope (1)	185	30	38
Galleria Laziale (10-1)	182	41	22
Via Nuova Agnano (10)	171	47	27
Via Toledo (1-2)	159	41	25
Corso Umberto I (2)	156	22	23
Viale J. F. Kennedy (10)	141	37	22
Corso V. Emanuele (1)	137	56	27
Via Bagnoli (10)	133	45	19
Via Salvator Rosa (2)	120	36	15
Viale Augusto (10)	91	22	18
Via Torquato Tasso (1)	68	31	7
Via Domenico Fontana (5)	63	11	18

Table 18. The 15 busiest streets in Naples per time slots.

5 CONCLUSIONS

The results showed that cyclists preferred Districts where there are Type 1 cycle routes (District 1 and District 10), or in close proximity. Flows drop progressively with the increasing distance from these areas, a sign that is necessary to increase the trust of citizens in the outlying areas, possibly creating new protected routes.

The results prompted the City Administration at approving the project of a cycle route in Corso Umberto, one of the busiest streets used by cyclists according to the data available. In addition, in 2013 the City Administration had already approved the construction of new separated cycle routes in the stretch adjacent to Port (Via Marina, Via Amerigo Vespucci and Via Alessandro Volta, District 2), and in the Industrial Area (Via Emanuele Gianturco, District 4) - projects currently under construction - for further another 5 km of cycle routes in the east area.

The success of the 2015 edition of the ECC was confirmed by the results of the 2016 edition, in which there were recorded 14.701 kilometers (nearly double of the 2015 edition), and where from a first flow analysis (available on the event website), emerges that the favorite routes are the same as the 2015 competition. In the future, travel demand models could be developed using information taken by this kind of survey.

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