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COULD BICYCLE SHARING SYSTEMS BE A TOURIST ATTRACTION?

CASE STUDY OF LUGANO

Master dissertation

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List of abbreviations

BS – Bicycle sharing
BSP – Bicycle sharing program
BSS – Bicycle sharing system
CBSM – Community bicycle sharing model
CHF – Swiss Franc
GPS – Global Positioning System
LPN – Lugano-Paradiso network
PBS – Public bicycle system
PT – Public transportation
USD – United States Dollar
USI – Università della Svizzera italiana
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Introduction

Bicycle sharing systems are innovative transportation services in urban areas. The service provides bicycles for shared use on a short term basis to local communities. But not only local residents can use Bicycle Sharing Systems (BSSs). Many existing BSSs also grant bicycle access to tourists. This research paper will provide insight into tourists’ motivation to cycle by means of BSSs. The phenomenon is the chosen subject of research due to the author’s personal interest in urban mobility, tourism and cycling. The geographical proximity of the BSS to the research institute was also a significant factor for choosing the research topic.

Research focus

In recent years the concept of BSSs acquired much attention from academics as a new urban mobility concept. Bicycle sharing can be described as a mode of transportation providing the users with point to point transportation options by means of bicycle. BSSs promote ecologically safe mobility and create a new positive image for cities, underlining the growing importance of non-motorized urban transportation. The systems provide affordable access to bicycle transport for users in urban areas while simultaneously decreasing traffic congestion, noise and area pollution. Playing an essential role for the city governments, the network of BSSs has rapidly increased worldwide reaching more than 300 programs (Sood, 2011).

According to recent studies, the main target group of BSSs are city residents, which could use bicycles without ownership rights (Toole Design Group, 2012). The early bicycle sharing programs exclusively targeted local residents and pre-registered users. The introduction of Vélo’V BSS in Lyon, France made it possible for casual users to subscribe to the system with a credit card. As a result, tourists now play a significant role among the users of BSSs. They have proven to be an important force facilitating day subscriptions for bicycle sharing (Bonnette Consulting, 2010). Visitors can explore the destinations where BSSs are available and save money by not using other modes of transportation. Now the most visited European cities like London, Paris and Barcelona have launched BSSs (Euromonitor International, 2011), providing visitors with alternative public transportation options. Bicycles provide tourists with a personalized pace to travel to and from major attractions, which grants freedom of movement with only minor infrastructure constraints. In general, cycling gives tourists a chance to experience a city more up-close (DeMaio & MetroBike, 2009). According to related research, bicycle sharing riding is described as a slow travel option (Dickinson & Lumsdon, 2010).
The literature published on BSSs goes into the field of urban transportation, investigating the problems of system planning (Jenn-Rong Lin & Ta-Hui Yang, 2011), system maintenance (Vogel, Greiser, & Mattfeld, 2011) or the economic impacts of BSSs (Lathia, Ahmed, & Capra, 2012). There is no literature on tourist mobility in transportation magazines which emphasizes BSSs. Also, the bicycle sharing concept is not present in literature on tourism. That is why the current research paper aims to link BSSs to the field of urban transportation and tourism.

Public BSS Velopass has been chosen as an object of study due both to its proximity to the research institute (USI) and for its day subscription function offered to visitors, both of which are essential for the research. The system was launched in 2010 with four stations set up around the city of Lugano, Switzerland. It is included into the Swiss national network of BSSs Velopass, with headquarters in Lausanne. The Velopass Lugano-Paradiso currently has six bicycle stations with a fleet of 68 bicycles.

**Purpose and Research Question**

There is no clear evidence if there is an impact of BSSs on the number of tourists coming to the cities which have them (Schuetze, 2012). There are no academic publications on the role of bicycle sharing for urban tourism. That is why the current research work is an attempt to fill the gap between tourism studies and transportation studies. This paper will identify the role that casual subscriptions play overall in Velopass total operations. That is why the main research question is: “Could bicycle sharing systems be a tourist attraction?” or is it only targeted for residents of Lugano? The research paper looks closely at the motivation tourists have to use a Public Bicycle Sharing (PBS).

In order to answer the proposed research question, the following objectives have been set:

- investigate the tourist demand for current BSS in Lugano
- outline the visibility of Velopass among the visitors of Lugano
- define the motivations for Velopass users to use a bicycle sharing system
- reveal new strategies to improve Velopass usage for tourists

Reaching these objectives will provide an understanding of the reasons that make Velopass attractive/not attractive for tourists. For this study research, it is assumed that day subscriptions of Velopass are associated with tourism activities. Though short-term subscriptions could also be the
users who want to test the system without a long term commitment, which might require an annual subscription (Bonnette Consulting, 2010).

Surveys and interviews were used as main methodological tools in order to answer the proposed research question. The interview portion is linked to the operational aspects of Velopass, explaining how the system is organized in general. Two questionnaires were developed to collect responses from tourists and Velopass users. The information from both the interviews and surveys will provide ideas on how to improve the current public BSS in Lugano. Thus the paper could be used as a recommendation for Velopass improvement. This research paper will contribute to the existing literature on BSSs. It also will provide a background for future investigation in the field of slow travel, combining public transportation and tourism.

**Thesis structure**

This study is divided into three chapters: conceptual aspects of BSSs, Velopass Lugano-Paradiso description and the research, which includes the methodology and the questionnaire results.

**Chapter one** concentrates on the literature review concerning BSSs. This chapter includes the definitions of BSS, the history of the concept and a description of its existing models. Next, the key success factors for BSS are pointed out based on the previous research. Then the user benefits of bicycle sharing are listed as an argumentation for further model development.

**Chapter two** concentrates specifically on the studied subject, which is the Velopass BSS in the Lugano-Paradiso agglomeration. This chapter includes information on the background of BSSs as well as the structure, sponsorship models and collaboration with external partners. Extracts from interviews with representatives from Lugano municipality are also included in this chapter. The patterns of subscriptions for day and annual passes are presented and interpreted. Costs and revenue tables are included in this chapter in order to exhibit Velopass financial operations. Finally, this chapter provides a map of all the Velopass docking stations in Lugano.

**Chapter three** presents the results of the conducted surveys. This chapter identifies user profiles for both current and potential Velopass users in Lugano in order to understand what kind of person uses this particular BSS. In this last chapter ways to improve the system will be described. These suggestions will be based on the best practices of BSSs from all over the world.
Chapter 1. Literature Review: Bicycle sharing

1.1. Bicycle sharing definition and overall history

In this section of the chapter the definition of BSS will be given and the concept will be explained. The overview of the bicycle sharing history will be provided. The emphasis will be placed on the European countries, as BBS, originated there. Some case studies will describe BSS in the USA and Canada, a new dynamic market for bicycle sharing.

In general bicycle sharing is an urban mobility concept that presupposes the shared use of a bicycle fleet in order to help to address sustainable strategies for urban development (Shaheen, Guzman, & Zhang, 2010). PBS have been launched in order to make transportation system more accessible, free of charge or with affordable fee. PBSs aim to alleviate traffic congestion and reduce noise-air pollution. The integration of bicycle sharing into public transport (PT) helps riders to take the bicycles or leave them whenever they want before they reach their desired destination (Jenn-Rong Lin & Ta-Hui Yang, 2011). Incorporation of bicycle sharing makes transportation systems convenient and easy to use. The feature which distinguishes bicycle sharing from bicycle renting is that bicycles do not have to be returned to the same spot. Although they share one feature: individuals use bicycles without the costs and responsibilities of owning a vehicle. BSP covers the costs of the bicycles, stations installation as well as operating costs (Shaheen et al., 2010). Self-service is common for pick-up and drop-off locations. The concept of bicycle sharing (BS) has spread around the world and as of September 2011, there is an estimated around 300 BSS programs (Sood, 2011). Summaries of some of these programs are provided in Appendix 4.

According to De Maio and Shaheen there have been four major BSS generations over the last 50 years: Free Bicycle Systems, Coin-Deposit Systems, IT-Based Systems and Smart Bicycle Sharing System (DeMaio & MetroBike, 2009); (Shaheen et al., 2010). The first generation of BBS, originated in the Netherlands in July of 1965, when a non-governmental organization “Provos” run “White Bikes” or “Witte Fietsen”. “White Bikes Plan” was seen as the solution for solving the congestion problems in the city of Amsterdam. It started with Anarchists painting 50 bicycles white color and then left for free use. They contained locks with the combination indicated on the bicycles (Kempton, 2007). Within several days the bicycles were stolen or damaged. The plan failed after its launch. Despite an unsuccessful initial experience, the concept spread to different cities throughout Europe. The first generation of the BS is usually called “free bikes systems”. The main characteristic of the pioneering BSP was that the bicycles were left unlocked for public use and colored one bright color. There were several other attempts to implement the free bicycle concept: La Rochelle, France and...
Cambridge, the United Kingdom. The BBS in Cambridge followed the same pattern as the one in Amsterdam failed – around 300 bicycles were stolen (Midgley). The La Rochelle BS became the first successful example because bicycles were brought back by the residents and the usual stealing patterns were not as common. The BS program initiator was Michel Crépeau, a center-left politician and mayor of La Rochelle, who not only installed the system, but created the cycling infrastructure: he created streets exclusive to cycling and pedestrians. The program is still running today in the city, but it is not free of charge as initially planned (Midgley, 2011).

Second generation BSPs were first developed in Denmark: Farsø, Grenå and Nakskov. Initially bicycle sharing programs were small and had no more than five stations. The large scale second generation bicycle sharing started in Copenhagen and was called Bycylken (Bycyklen, 2012). It was the first coin deposit BS model. There were 1100 bicycles which were specially designed and locked. The bicycles were spread around the city center. The main characteristics of the BS of the second generation were special design of the bicycle, availability of the docking stations and the deposit system to unlock, borrow and return the bicycle (Shaheen et al., 2010). The use of extra facilities and the creation of the docking station increased the price of the BSS in comparison with the free bicycle systems. The high price of the implementation was not the only problem of this system. Due to the anonymity of the users, theft was also an issue. Second generation BS was also unable to limit the time usage of bicycles. Later the coin deposit model was transferred to other Northern European cities: Sandnes, Norway in 1996, Helsinki, Finland in 2000 (Shaheen et al., 2010) and Arhus, Denmark in 2005 (Bycykel, 2012). The Finish model relieved limited support from the local municipalities and had a lack of advertising which lead to program and consequential closure.

Advanced technologies helped to develop the third generation of BSS or IT-based BSS models. The first model was implemented in 1996 in England on the territory of Portsmouth University. Students were able to use cards in order to hire a bicycle (DeMaio & MetroBike, 2009). Shaheen (2010) mentions the SmartBike program in Rennes as the first of the third generation BSP. The most significant role for popularization of the IT-based BSS was done by the program launched in Lyon, France. The program is run by JCDecaux, an outdoor advertising company, it consists of 334 stations with 3000 bicycles around the city (Borgnat, Abry, Flandrin, & Rouquier, 2009). Lyon BS was the largest third generation program for the day when it was launched. The IT-based BS created a successful model for introducing the large-scale use of non-motorized vehicles in the city. There were less problems with theft as the third generation BBS required user registration. The smartcard used to unlock the bicycle traced the bicycle movements. Normally if the vehicles are not returned on time,
there is a penalty which covers the cost of the non-returned bicycles. Thus the main concern of the first two generations of BSP was overcome.

The fourth generation BS is appearing nowadays. It shares the main features of the IT-based BSS, but has more emphasis on usability, sustainability and efficiency (DeMaio & MetroBike, 2009). BIXI, the BSS from Montreal, Canada, marks the beginning of the fourth generation of BSSs. One of the significant innovations of the system is the use of the docking stations which could be easily removed and transferred to different locations. Solar panels aim to reduce the operating costs of the stations. Another improvement of the fourth generation of BSS in comparison with previous ones is the bicycles redistribution. Demand responsive automate systems relocate the bicycles according to necessity. This innovation reduces the use of the designated vehicles for moving the bicycle from one location to another. Shaheen (2010) suggests that also user-based redistribution will be pushed forward, when cyclists will get extra credit for docking the bicycle at an empty station. Integration of the BSS with PT is another feature of the BSS of the fourth generation. The users of Vélib’ BSS in Paris can access the bicycles using Passe Navigo which also works for the metro, buses and trains within the city. Multifunctional cards foster users to use PT more frequently because of convenience. Global Positioning System (GPS) is another area of the advancement for the last generation of BSS (Shaheen et al., 2010). The areas which have a hilly terrain start to provide e-bicycles, which help unprepared cyclists to use BS. In the second half of 2012, the San Francisco BSP installed 45 e-bicycles to serve the needs of the students at the University of San Francisco, Berkley (Cameron, 2012). BSPs are adapting to the growing demand for electro bicycles to make the programs more attractive and affordable for everybody’s needs. Swiss BSS, PubliBike, already has several docking stations with e-Bikes in it.

1.2. Benefits of bicycle-sharing systems

BSPs offer a number of benefits which can range from the reduction of gas emission to the promotion of the destinations using a “bicycle friendly” trend. The positive effect of the implementation of BSP explains its popularity among urban developers and city residents. Tourists are also getting benefits out of BSS. They save money on public transportation and have an alternative mode of exploring the areas of their interest. The introduction of BSSs increase ridership of cyclists owning a private bicycle, reduce congestion and foster the growth of bicycle sales. According to the authors of the report on bicycle sharing opportunities in NYC, there are four categories of benefits which BS brings: transportation, economic and job creation, health and city image (NYC Dept. City Planning, 2009). The positive environmental impact could also be added as a category for the benefits of BSS.
Concerning the transportation benefits, BSSs give more options for users to make short trips around the city, simplifying the access to other PT modes of travel like trains, buses or metro. BSSs allow the users to increase the transit distance between two or multiple modes of travel. According to a survey conducted in Paris, 89 % of the users of Vélib’ stated that BSS allowed them to travel around the city more comfortably and easily. In Barcelona around 60% of local BSS, Bicing, subscribers use the program for commuting (NYC Dept. City Planning, 2009). The case from Lyon proves that BSP reduces the pressure on the overcrowded routes, giving cyclists a chance to ride to less crowded places. 50 % of the Vélo’v users would make their trips using other public transportation options or cars if the BSS would not exist, 50% would walk (Bührmann, 2010). Moreover switching from car driving to bicycle riding on a daily basis will reduce the need for creating additional parking spaces for cars in the future.

The environmental benefit of BSS lies in the amount of carbon emissions which have been lowered due to residents using eco-friendly vehicles – bicycles instead of cars. A bicycle is known as an emission-free mode of transportation. According to SmartBike.com leading website on BS there are 50 000 bicycle trips per day made by BSPs users worldwide. This could be transformed into 200 000 km per day. A car covering the same distance would estimate 37, 000 kg of CO2 emissions (SmartBike Division, 2008). As of October 2009, BSS from Hangzhou, China, produced 172 000 trips, the estimated length of the ridership is 1 032 000 km, which is 190 920 kg of CO2 gas emission (Shaheen et al., 2010). The numbers above give an overall picture of the environmental benefits which BSSs bring to the societies where public transportation is not widely used.

Economic benefits of BSPs have been justified in a number of studies. Vélib’ in Paris generates 30 million euros a year. This money is only generated by BSP subscriptions and rental fees. Money which Vélib’ earns from subscribers goes to the Paris municipality budget. SOMUPI, a subsidiary of JCDecaux also has to pay an annual fee of 3.4 million euros a year to the city for the advertising rights (Nadal, 2007). In this way the city council does not spend taxpayers’ money, create a unique mobility network and revenue from this. JCDecaux expects to get about 59 million euros revenue a year from the advertising billboards installed at the docking stations throughout the city (Erlanger, 2008). Washington BSP (D.C., USA) also has a similar structure of sponsorship as Vélib’, so money from membership fees and fines paid by riders are going to the city. In addition the group of researchers which developed the plan for BSS in New York stated bicycle sharing programs also increases sales of bicycle related products like helmets, sport wear, tools and personal bicycles (NYC Dept. City Planning, 2009).
Concerning social benefits, BSPs create jobs, especially for young and “at-risk” population. The maintenance of BSP requires positions of drivers, mechanics, software engineers, program managers, call center assistants, etc. The Parisian Vélib’ has more than 400 staff members, with a minimum 20 hours per week employment and 300 full time staff (Price, 2008).

The health benefit of BS arises by introducing people to cycling culture. The users who started to use BSP tend to continue to do so and are more likely to buy a private bicycle. Previous researches prove that a person who uses the bicycle at least one hour per week has less than half of the coronary attack rate of non-cyclists (Unwin, 1995). Another study from Denmark shows that people who cycle to work had 39 % less mortality rate than those who did not cycle (Andersen, Schnohr, Schroll, & Hein, 2000). The use of the bicycles from BSPs can ensure daily physical activity for riders. On average, in Lyon, 45 % of the membership subscribers rode the shared bicycles more than five times per week (NYC Dept. City Planning, 2009).

BSP creates a positive image of the city by promoting a sustainable mode of travel. A “green” image of the city can increase tourism and foster strong business climate. Positive national and international attention is already drawn to the BSPs in Lyon, Paris and London. Many studies have been done and publications written on proposed BSS like the one in New York, which is going to be launched in summer of 2013. Positive media and scientific attention is supported by the users opinion about BSP operation. According to the survey conducted after the year of the Vélib’ BS, 94% of the respondents were satisfied with the program. About the same percentage of people said that the scheme improves the image of Paris and makes the city more likeable for visitors (Hemne, Orsoto, & Wassenhove, 2010).

1.3. Key success factors for bicycle sharing system

Installation and development of BSSs depends on number of factors ranging from the urban cycling culture to profitability of projects. According to Jonathan Gifford, Professor at the School of Public Policy at George Mason University, the primary key success factor of bicycle sharing programs is demand or ridership (Gifford & Campus, 2004). BSS is developing in countries where travelling by bicycle is significant. Moreover the cities have to be relatively densely populated to realize the need for the public mobility. The customer profile of the cyclist also has an important role. Depending on the location, the average age of the BSS user, but it’s different mostly young people in their twenties and thirties. Culture of ridership also differs from country to country. In Northern European countries bicycles are used by cyclists of different age groups and occupations. In these countries cycling is
considered to be a common mode of travel. On the contrary, in the USA cycling has a recreational use and stands for “fringe mode” (Pucher, Komanoff, & Schimek, 1999).

The second factor which influences the success of the BSS is safety and cycle facilities. One of the indicators of the bicycle facilities is modal share, i.e. the percentage of travelers using a bicycle as a transformational mode. Generally the higher bicycle modal split the higher chances BSS will be used. In the Netherlands for example, 27% of all the trips are done by bicycles. This relatively high number of ridership can be explained by the government policy aiming to facilitate non-motorized mode of travel (Martens, 2004). Additional characteristic of urban cycling facilities is sufficient space for racks/parking to guarantee access to bicycles (Midgley, 2009). Examples of Paris and London BSSs show that even historically dense populated cities with sophisticated transformational networks are able to provide urban space for the development of smart bicycle systems. Cycling infrastructure is also related to safety. Having proper lanes, intersection and traffic signals will increase the safety of cyclists. Safety of the riders makes cycling more attractive for everyday users. Making cycling safe is not easy because safer cycling requires the change of the behavior of two main participants of the traffic: cyclists and car drivers (Pucher et al., 1999). One more prerequisite for the development of the BSS is mutual respect between cyclists, pedestrians and car drivers (Midgley, 2009). In the United States the increased cyclist injuries are considered as entirely perils of cyclists. This belief is due to the lesser enforcement of national cycling training programs in comparison with European countries. This policy is developed with new traffic rules (Pucher et al., 1999). Education is a possible way to introduce new customers of the BSS to the traffic rules and regulations to increase safety. The research shows that 96% of the users of Vélo'v and 79% of Vélib’ have never bicycled in the center of the city (Bonnette Consulting, 2010).

Another factor which is important for the success of BS is profitability of the programs. The operators of BSSs and potential investors who are entering into the market need to make profit, otherwise there is no interest to make an investment towards development. The difference between early bicycle sharing program developed in small communities and the bicycle sharing in big cities like Paris and Barcelona, is that key business ideas have added profit to the programs. Money was received from different sources, but the most important one is advertisement provided on the bicycles and the bicycle sharing stations. Other examples of revenue include users subscriptions, per-ride fees as well as fines for not returning bicycles to the station on time (Westervelt, 2011).

The difference between European and American bicycle sharing business models is that American ones have to work with no subsidies from the government or other public sources. Although rare, public-private partnerships do exist in the USA too. Both Denver and Minneapolis bicycle sharing
programs are operated by nonprofits (Westervelt, 2011). They sell advertisement space and also get financial support by local subsides. Back in 2002, when BSPs just began their development, a pioneer in BS research, Paul DeMaio, believed that “not-for profit smart bicycle programs were likely to be more successful than for-profit programs” (DiDonato, 2002). Now with the rapid growth of the BSSs across the world and financial success of the programs, there is evidence that privately owned as well as public-private partnership are the most common models of BSSs ownerships. The biggest BSP in the United States, Citibike from New York, was launched in May 2013 and belongs to the commercial organization Alta Bicycle Share. Citi bank is the major sponsor of the system, having the rights to add the bank name to the BSS name as well as use the advertisement rights on systems facilities. The system has no city subsidies.

The costs of the programs are generally divided into two categories: the capital costs and operating costs. Depending on the implemented software and hardware, city density and fleet size, the capital costs and operating costs vary (DeMaio & MetroBike, 2009). Capital costs of BSS include manufacturing of the bicycles as well as stations, program software (which could be used by as license or specifically developed), the vehicles which are needed to distribute bicycles and installation. The capital cost of Vélib’, Paris is 4’400 USD per bicycle with total capacity of 20’600 bicycles. Bixi, Montreal estimates 3’000 USD per bicycle, where the total capacity is 2’400 bicycles. The US example from SmartBike, Washington has a capital cost of 3’600 USD per bicycle, where total capacity is 500 bicycles (Midgley, 2011). The numbers above show that bicycle costs vary from country to country depending on the technical characteristics of the vehicles BSSs use.

Costs of operation include BBS maintenance, bicycle distribution, office space, storage facilities, website maintenance, electricity, membership card issuing and legal expenses. Depending on the city, the cost of operation ranges between 1’200 USD (Bixi, Montreal) and 1’700 USD (Vélib’, Paris) per bicycle (Midgley, 2011).

Vandalism and theft is also an important factor which should be considered before implementing BSS. The example of Paris shows that after the first year of operation, theft and vandalism was higher than expected. The annual cost of the bicycle replacement and repairing was 3 to 6 million euros. It was estimated that 3000 bicycles have been stolen or vandalized over the course of the year after the launch (Nadal, 2008). That counted for 15% of the fleet of the BSS (Bonnette Consulting, 2010). Thefts took place despite the innovations – use of smartcards or credit cards, which records the information about the bicycle usage. The information includes name of the user, time and duration, location and distance. As it was mentioned above, new generation BSS are provided with the Global Positioning System (GPS) that aims to reduce the level of vandalism and theft. Lyon BSS, which
implemented GPS tracking abilities, has experienced only 2.5% of lost bicycles out of the total amount of operating bicycles. Implementation of the GPS into bicycles increases the capital and operating costs of BBS. Hangzhou’s BSS and BIXI in Montreal naturally have relatively low rate of vandalism and theft (Shaheen et al., 2010), which could be explained by the cultural and psychographic characteristics of the residence of the country.

One more essential key success factor for BSS is topography and climate. Several researches are devoted to this topic. Studies from the USA show that climate with mild winters and little rain attracts more cycling activities than extremely hot, humid or cold climates. Toronto represents an exceptional case as it has cold weather and has the highest rate of bicycle use in North America (Pucher et al., 1999). At the same time, weather and climate conditions of the places for BSS development may be exaggerated. Northern Europe with its ocean climate zones has the highest cycling level in comparison with other places in the world. Topography of the place is an essential motivator for daily use of bicycles. Places with hilly terrain require more physical power from cyclists which could impose restrictions for those who cannot do uphill. The slopes which range from four to eight percent incline pose significant constraints and those which are above 8% are just impractical (Midgley, 2011). Some of the BSS are closed in winter because of the cold weather, snow and ice. In North America, Montreal and Boston BSSs do not operate while others are partially opened (like Boulder BSS) or fully opened (like Toronto BSS) for public use (Meddin, 2012).

The interconnection of BSS with other modes of transport has an exceptional role, especially in the downtown area of big cities, where biking is ideal for commuters. Bicycle stations are normally located at places that serve transit users. The bike-and-ride concept refers to the use of bicycle and PT within one trip. There are different combinations possible for the use of BSS. One of them is “access trips” which mean the home-end of a trip. Another combination is “egress trip” characterized as the activity-end trip. Also the combination of both modes take place (Martens, 2004). Bicycles have advantages in comparison to walking as they are faster and compared to public transport, more flexible. The advantage of a bicycle over a car is the relatively low cost of bicycle and its operation. The reduction of the use of private cars could be gained through the interconnection of public transport and BSS (Keijer & Rietveld, 2000).

Strong commitment to sustainable urban mobility and the promotion of cycling by the municipalities’ representatives is another point concerning success factors for BSS implementation. This point may correlate with others which have been mentioned above. Many BSSs have been implemented due to the initiatives of cities’ mayors (in La Rochelle by Michel Crepeau, in London by Boris Johnson, in Paris by Bertrand Delanoë etc.).
Marketing is an important factor for BSSs to become successful products. Both marketing and branding require work with local stakeholders to create design elements. It involves logo and website development, public relations and social media channels maintenance, marketing materials issuing. For BSSs it is important to develop a full-scale marketing plan to gain the membership prior to any system launch.

Fleet and system maintenance and management (operations) are the last key success factors of BSPs. These factors help to ensure bicycles are in top operating order and there is sufficient amount of vehicles available for users. Bicycle availability at each station is supported by bicycle relocation from one place to another by special motorized vehicles (vans in London or barges in Paris). Records from the European bike sharing systems show that at peak business time some stations are either full or empty. This makes renting or returning bicycles impossible. Advanced information technologies (IT) for BSP development are used to balance the bicycle distribution patterns in different locations and at different time. Some latest BSSs give bonuses (additional riding time i.e.) if users bring the bicycle to uncomfortable locations (Antoniades, 2009).
Chapter 2. Background of bicycle sharing system Velopass in Lugano

This chapter will describe Velopass BSS in Lugano-Paradiso network (LPN). It provides the information on the history of the project implementation, structure, costs and sponsoring schemes. The information for the chapter was retrieved from the official documents of Velopass, personal communication (Appendix 3) with the representatives of Lugano municipality and USI (Balmelli, 2012) who are responsible for Velopass activities. The author’s personal experience of BSS bicycle usage is an essential part of the Velopass description.

2.1. “Lugano in Bici” initiative

The important stage of the implementation of BSS in LPN was the initiative “Lugano a misura di bicicletta” or “Lugano in bici” which has been launched by the Ticino section of ATC (Associazione traffico e ambiente). The aim of the initiative was to accelerate the creation of a network of cycling paths in LPN. The actions on designing cycling routes have been included into the plan of TPL (Trasporti Pubblici Luganesi) for the Lugano agglomeration development. One of the main achievements was the creation of the cycling trail "Via del Lago" (Sito ufficiale della città di Lugano, 2012). The trail aims to promote ecological and relaxed mobility in the city. The route extends to over 11 km with a maximum elevation of 140 m. It goes through many landmarks of Lugano such as Parco Ciani, Piazza Riforma, via Nassa and the Commune of Paradiso. There are several rules which have been created to ensure the safety of both pedestrians and cyclists: in the center cyclists have to get off their bicycles if there are many pedestrians around. Also Parco Ciani can only be accessed during the working hours and crossed following the signs.

In general the initiative “Lugano a misura di bicicletta” calls for (ATA, 2011):

- an extensive network of cycle paths to safely connect the neighborhoods and most important places such as the town center, schools and tourist attractions

- certainty that the critical points are represented by intersections and roundabouts

- an adequate number of parking spaces for bicycles in particular in the vicinity of the city attractions and PT hubs

All the measures of the initiative are due to be implemented no later than December 2015. The implementation of the BSS is considered to be an integral part of the initiative (ATA, 2011).
Following the goals of the initiative “Lugano a misura di bicicletta”, which aims to promote bicycle mobility in Lugano, the working group on Velopass implementation was created. It was coordinated by the municipal government (Amministrazioni Stabilimenti e Porti comunali, 2009) and includes the representatives from Police, Regional Development Office, Tourism Office and the Commune of Paradiso. Some other internal partners were also involved in the development of the BSS in LPN:

- SGA (Switzerland’s leading Out of Home advertising company)

- Swisseroule (BSS from Lausanne)

- TPL (Transporti Pubblici Luganesi – Lugano Public Transport)

- Fondo Clima Lugano Sud

2.2. Velopass establishment and its organizational structure

On the 19th of August 2009, prior to the implementation of the BSS Lugano municipality decided to investigate two BSSs in others cities: Lausanne and Milan. The operations of two of the systems were viewed by the representatives of Lugano municipal government. Advantages and disadvantages of the systems were taken into developers’ consideration.

Lausanne-Vevey (Suisseroule)

The project drew the attention of the Lugano municipality because it is the first BSS in Switzerland and in the future Lugano and the Commune of Paradiso could possibly join the network of BSSs in the country using one unique card for all the stations. The BSS Suisseroule was launched in Lausanne in 2003 and in 2010 it was replaced by Velopass. Velopass, with the headquarters in Lausanne, became the national provider of BSS service. Still Suisseroule remains the local operator which maintains Velopass in Lausanne-Morges-Riviera (RTS, 2010). Based on the analysis of Suisseroule, the proposed system of LPN will have the attributes which are described below (Amministrazioni Stabilimenti e Porti comunali, 2009).

Each person can access bicycles after obtaining a special card issued by the city public service and can use BSS seven days a week. Bicycles can be taken from a station and returned at another one. There is a centralized network management with real time monitoring of bicycle availability: some stations have too many or too few bicycles. This system allows intervening and maintaining the necessary balance at different stations of the city. The website of the system, www.velopass.ch, allows users to view real-time situations and bicycle availability at different locations.
Subscriptions require user’s name and address so it is always known who uses the bicycle. The subscription is done to limit or prevent bicycle theft and damage. The bicycle usage is limited to 12 hours a day.

The bicycles for BSS have the same design as most branded bicycles, but the spare parts are unique only for the Swiss network of BSSs. This insures less theft, because the spare parts are not suitable for other bicycles: the transmission is secure; the saddle is locked in the frame, wheel size is not regular.

米兰 (项目 BikeMI)

The project BikeMi was chosen because of its geographical proximity. It is similar to Suisseroule and system success has already been proven in other European cities (Barcelona, Strasbourg, Stockholm) (Amministrazioni Stabilimenti e Porti comunali, 2009).

There are thought two main differences between Suisseroule (Velopass) and BikeMI which were important for the working group:

- the project could only be individual and could not be merged with other cities in Switzerland in the future

- access to the bicycle unlocking can occur even with a mobile phone (WAP system) charging the costs to the number with which it is called

It was decided that the BSS from Lausanne would be chosen as the model for implementation in LPN. On the 19th of July 2010 Velopass Lugano-Paradiso was opened for public use.
Velopass Lugano-Paradiso could be described as the third generation of BSS, because it requires users subscriptions. Smartcards serve to unlock bicycles from a docking station. Currently, several Velopass subscriptions exist: an annual national pass (natiopass), an annual pass with car sharing combination, an annual regional pass (regiopass) exclusively for the Lugano-Paradiso network, regiopass for USI students and day subscriptions (carta giornaliera). The national pass costs CHF 60, regional pass – CHF 25 and day pass – CHF 7. Lugano card holders benefits from a 20% discounts for subscriptions. The members of ATA (Associazione traffico e ambiente) can benefit from a 10 % discount for the BSS subscriptions and have 10 extra hours of bicycle usage. The first thirty minutes of each ride are free; starting from the 31st minute, there is a charge of CHF 1/hour. The daily Velopass card (carta giornaliera) allows riders to use same bicycles all day long with no extra charges. There is no need to bring bicycles to docking stations every half hour to avoid paying 1 CHF/hour. A daily card is useful for tourists in Lugano who want to explore the city on a public bicycle which are available in the city center. Big cities like Paris, London or New York do not provide an opportunity to rent out single bicycles for the whole day, even if it is a day pass subscription. These systems stimulate short rides and thus circulation of bicycles take place. The price of riding a bicycle in these systems increases exponentially after 30 minutes of use. Thus it could be concluded that Velopass of LPN combines the features of rental facilities and bicycles sharing systems.

Velopass docking stations do not provide access to day cards. Prior to using Velopass bicycles costumers have to buy a day card at one of the following points around Lugano (Figure 2).
Initially the project Velopass Lugano-Paradiso had five stations (Amministrazioni Stabilimenti e Porti comunali, 2009):

- Contrada di Verla: 20 spots for bicycles
- Campo Marzio: 14 spots for bicycles
- Paradiso Centro: 12 spots for bicycles
- Fornaci: 13 spots for bicycles
- Stadio: 13 spots for bicycles

A new sixth station in front of USI was created in February 2011 with 12 spots for bicycles. The idea to install an additional station at the University belonged to the project SOSTA which is responsible for campus sustainability and USI Orientation service (Servizio orientamento). USI took a decision to cover the costs of students’ annual subscriptions. The installation of the USI station was carried by the BSS and paid by the city government. Before the installation of Velopass, the University had their own “orange” bicycles. All USI students, professors and staff were provided with free access to the bicycles which could be used for up to 24 hours (Balmelli, 2012).

<table>
<thead>
<tr>
<th>Name of the place</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dicastero Giovane ed Eventi</td>
<td>Via Trevano 55, Lugano</td>
</tr>
<tr>
<td>Sportello Foce</td>
<td>Via Foce 1, Lugano</td>
</tr>
<tr>
<td>Lugano Turismo</td>
<td>Palazzzo Civico, Riva Alberolli, Lugano</td>
</tr>
<tr>
<td>Puntocittà Lugano</td>
<td>Via della Posta 8, Lugano</td>
</tr>
<tr>
<td>Chiosco Centro</td>
<td>Vea Degli Albrizzi 1, Lugano</td>
</tr>
<tr>
<td>Osteria Bianco e Nero</td>
<td>Via Trevano 100, Lugano</td>
</tr>
</tbody>
</table>
Currently there are six permanent stations around the city (Figure 3) and one mobile station (Velopass, 2012b). The mobile Velopass station could be transported around Lugano during concerts, festivals, competitions or other events organized in the city. It aims to serve the needs of the residents and tourists by providing the opportunity to dock bicycles at the most convenient place. All Velopass stations, with the exception of one, are located in easily accessible locations. Fornaci is the only station located on a steep incline (Velopass, 2012b).

The system is maintained by the Youth and Events Department (Dicastero Giovani ed Eventi) of Lugano municipality. The role of the department is to control the availability of the bicycles at each station, issuing day and annual pass cards, bicycle maintenance and repairing (Maccanelli, 2012).

Balancing the bicycle fleet of Velopass is maintained by two mechanics which drive a van from station to station. The use of the vehicle to distribute bicycles is the most common approach. The distribution maintenance mostly takes place in the morning by filling the stations which are outside of the city center and emptying the spots in the central locations. In the evening the opposite actions take place: the stations which are outside of the city are emptied and the central stations are filled. The mechanics check bicycles on a daily basis and repair broken bicycles if needed. Once a week the bicycles are cleaned and lubricated (Maccanelli, 2012). The Velopass van has distinguished green and white colors with the Velopass logo on it. The mechanics of Velopass are hired by the city government through SOTELL which offers temporary job opportunities for Swiss nationals or people who have a valid work permit in Switzerland. Apart from the mechanics, there is one more full time position and one half-time position of Velopass customer service representatives (SOTELL, 2012). The governance and operations control is maintained by the representatives of Lugano city government: Fabio Schnellmann who was the initiator of BSS in LPN, and the marketing specialist of Youth and Events Department Claudio D'Agostino (Maccanelli, 2012).

2.3. Costs of the project, profitability and sponsorship

The information for this part of Chapter 2 was extracted from the official documents of the Lugano municipality (Amministrazioni Stabilimenti e Porti comunali, 2009). The costs and revenues of the project will be provided. The revenues of Velopass come from the subscriptions and fees which are paid for bicycles extra use. Salaries and social expenses (operational costs) are the second biggest cost of the project after the system installation (capital costs). About one fifth of the total project costs is the money that Velopass Lugano-Paradiso network has to pay to the headquarters of the program.
in Lausanne. The costs of the project are covered by the municipalities of Lugano and Paradiso and some external partners.

The initial costs for the project, including four stations, (Campo Marzio, Stadio, Lugano Centro, Fornaci) are:

- 48 bicycles (already adapted to Velopass system) CHF 890/bicycle (CHF 42’720)
- 4 information kiosks CHF 10’000/kiosk (CHF 40’000)
- 60 magnetic attachments for a bicycle CHF 2’700/attachment (CHF 162’000)
- installation costs CHF 1800/Station (CHF 7’200)
- project management and training (CHF 6’600)

The total cost of implementation is **CHF 258’520**

Costs of IT management and technical support are CHF 40’000 per year which includes license of Bicincittà, stations insurance and data transmission.

Fondo Clima Lugano Sud is supporting the project with an amount of CHF 35’000

Touring Club Svizzero (TCS) and La Societlà Generale di Affissioni (SGA) has covered the costs of the stations and bicycles contributing a total of CHF 74’400

Aziende Industriali di Lugano (AIL) offered the track for moving bicycles around the city for a total cost of CHF 54’000
<table>
<thead>
<tr>
<th>Costs and revenues of Lugano Velopass for year 2011 (CHF)</th>
<th>Cost</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>333 347,91</td>
<td>24 138,52</td>
</tr>
<tr>
<td>Salaries and social expenses</td>
<td>253 411,00</td>
<td></td>
</tr>
<tr>
<td>Office materials</td>
<td>1 188,40</td>
<td></td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>3 018,55</td>
<td></td>
</tr>
<tr>
<td>Advertisement</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Technical installations and accessories maintenance</td>
<td>624,15</td>
<td></td>
</tr>
<tr>
<td>Vehicle maintenance</td>
<td>6 403,51</td>
<td></td>
</tr>
<tr>
<td>ADSL network renting</td>
<td>804,00</td>
<td></td>
</tr>
<tr>
<td>Vehicle insurance</td>
<td>1 302,50</td>
<td></td>
</tr>
<tr>
<td>Phone calls</td>
<td>831,75</td>
<td></td>
</tr>
<tr>
<td>Vehicle tax</td>
<td>570,00</td>
<td></td>
</tr>
<tr>
<td>Services of third parties</td>
<td>65 194,05</td>
<td></td>
</tr>
<tr>
<td>Cards issuing</td>
<td>24 138,52</td>
<td></td>
</tr>
<tr>
<td>Net cost</td>
<td>309 209,39</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Costs and revenues of Lugano-Paradiso Velopass for year 2011.

2.4. Usage patterns

The information provided in this part has been taken from the official documents of Lugano municipality. The period of observation is August 2010 – July 2012. Three graphs have been created based on the information on usage patterns (Figure 5-7).

![Figure 5. Number of Velopass day cards issued during the year.](image-url)
Figure 5 demonstrates the number of day cards was issued during the year. Velopass day cards were issued more frequently during warm months of the year with July being a peak month (107 cards). The lowest number of cards sold was in January and December. These months are characterized by gradually falling daily temperatures decreasing from nine °C to below three °C (WeatherSpark, 2012). This fact proves that seasonality is a crucial factor for tourism and BSS.

The total number of cards issued as of by July 2012 is 1 148 cards (Velopass Sàrl, 2012). Compared to large-scale European BSSs in Paris, London or Barcelona Velopass Lugano-Paradiso does not provide an option to buy a day pass at a docking station via Credit Card or paid SMS. Tourists can only access bicycles by buying a day card at the selling points which were mentioned previously (Figure 2).

![Figure 6. Number of Velopass annual cards issued during the year.](image)

According to Figure 6 annual pass subscriptions show less fluctuation and dependence on the seasonality which could be explained by the main reasons why Velopass is used in LPN by local residents – commuting to work or school. Still it is observed that during winter months the number of subscriptions decreases. There was a significant change in the number of Velopass cards issued when the station in front of USI was set-up. During March of 2012, 1’355 annual subscriptions were issued which included subscriptions for the students of the University with valid student cards. The
numbers from Figure 6 also show that during some months the overall number of the annual subscriptions decreased due to members’ cancelations (Velopass Sàrl, 2012).

Considering the ridership of Velopass, the patterns from Figure 7 show that, implementation of the station at the University significantly increased the number of monthly Velopass rides. A slight fluctuation in the autumn months of September-October (2010 and 2011) is because of the start of a new academic year when many students come back from summer holidays. Since students have free access to Velopass they commute from the city center to the University, making this pattern most frequent among all other possible routes of the system. The general increase during summer months is due to the weather conditions.

In total, by July 2012 the number of rides for Velopass Lugano-Paradiso was 40,044, which is the second best result within all Velopass networks in Switzerland (Velopass Sàrl, 2012). Only Lausanne Velopass BSS has a higher number of rides due to the number of stations and the network’s size. Currently there are 22 stations with 280 bicycles. (Velopass, 2012a).

![Graph showing number of monthly rides](image)

**Figure 7.** Number of Velopass monthly rides.

### 2.5. Velopass and Lugano Tourism

The initial idea of Velopass Lugano-Paradiso was to offer the service to tourists. For the tourists’ convenience, day cards were developed. What distinguishes Velopass from other similar BSPs is the possibility to use bicycles for more than half an hour with no extra charge. The option to take bicycles for a day for a single fee makes the system similar to bicycle renting facilities. At the same time there are some differences: bicycles can be returned to any station at any time, bicycles do not have a lock, which makes the service difficult if tourists want to combine cycling with walking. The process of getting the cards implies that tourists have to go to one of the issuing points in Lugano and Paradiso.
and fill in a form and provide personal data and credit card details in case the bicycle is broken or stolen. The instructions (Figure 8) are provided in English and Italian with detailed information: location of the stations, phone number of customer service and the addresses of the places where the day cards are issued. After getting a card the users of a daily card can take information leaflets.

![Figure 8. Velopass leaflet.](image)

Some other tourism related activities with Velopass collaboration were undertaken by the hotels in Lugano. Hotel Dante launched special offers providing an opportunity for the Hotel guests to use BSS for free for one day. Initially Hotel administration developed special packages for families. The offers were not frequently booked despite positive feedback from customers. Now all the packages of Hotel Dante like “Happy Birthday”, “Tasting Ticino“ or “Happy Family” includes day subscriptions for Velopass (Gasparini, 2012).
Chapter 3. Research on bicycle sharing system in Lugano

3.1. Methodology

This research paper aims to investigate the role of BSSs for leisure activities of the residents and tourists in Lugano. The findings will give an answer to the question if BSS could be a tourist attraction. As the literature review demonstrated there were no academic papers written on the interconnection of urban tourism and BSPs. BSP in LPN is taken as an example for the research for number of reasons:

- proximity to the author’s current residence

The ability to experience and observe BSP maintenance on a daily basis as an USI student provides an opportunity for understanding and observing tourists’ behavior. Moreover the interviews with the representatives of Velopass and its partners can be organized in most convenient time and place. Italian BSP BikeMi from Milan was also considered as a research subject due to its larger size. Disadvantages of BikeMi are its 80 km distance from the research institute and the absence of day cards which tourists can use.

- scale of city and size of BSP

The six stations which are present in Lugano are easily accessible within an hour ride by bicycle. The small size of the city gives tourists and residents few options for experiencing the city. Most of the attractions of Lugano which could be visited by bicycle of BSS are situated close to the city center.

- tourism emphasis of Lugano

Understanding the role of BSS for tourists’ mobility is possible only in a city where tourism is highly developed. Lugano is one of the most visited tourist destinations in Switzerland (Lugano tourism, 2012c). The city hosts the first stage of the Tour de Suisse race. Moreover the area around Lugano has more than 300 km of marked mountain bicycle trails (Lugano tourism, 2012b). These two aspects make Lugano a popular place among cycling amateurs.

3.1.1. Questionnaires

In order to answer the question if BSP Velopass itself could be a tourist attraction or if it is only a travel mode for the residents, a questionnaire (intercept survey) has been used. In fact two questionnaires were developed: one for those who use BSS Velopass and another one for those who
do not use it (visitors to the city). The first questionnaire aims to identify the profile of Velopass users (Questionnaire 1). Also, Questionnaire 1 describes the users’ behavior concerning the purpose of bicycle usage, ridership frequency, and level of satisfaction and geography of the trips. Questionnaire 2 helps to understand if tourists in Lugano are familiar with the concept of BSS and if they are willing to use Velopass in Lugano and at what costs (Questionnaire 2). All the questions used in the questionnaires are closed ended questions which are divided into three groups: “yes” or “no” questions, multiple choice and scaled questions. Four and five point Likert scales were used in some questions to describe the respondents’ attitudes. Both questionnaires contain the questions which aim to find out the customers’ willingness to pay for Velopass services. Some disadvantages of the intercepted surveys can be pointed out. Only one person (the researcher) is asking questions which may lead to the missed opportunities when respondents are travelling in groups. Questionnaire 2 contains fewer questions than Questionnaire 1 that is why in some cases several respondents can be asked Questionnaire 2 simultaneously.

The first question of Questionnaire 1 helps to investigate the connection between owning a bicycle and the travel behavior of the Veloopass users. The second question goes along with the first one and answers how many rides bicycle owners do per week.

Question 3 of Questionnaire 1 gives an idea on how different types of Velopass subscription are distributed among users. The results should demonstrate what kind of share the day pass has among the total number of Velopass users. It could be assumed that day subscription for Velopass will be the most common for tourists’ use: day Velopass cards cost less than annual subscription and can be bought at several places in Lugano and Paradiso (Figure 3). Bicycles can only be used with a valid Velopass day card during the day of purchase (Lugano tourism, 2012a). Question 4 is developed in order to see how frequent Velopass is used on weekly basis. The bicycle usage demonstrates how Velopass contributes to urban mobility of the respondents. The question is not designed for those who have day passes.

The following question has an essential role for understanding the reasons why tourists and residents take bicycles and what they do with them. Users’ motivation for using BSS has been retrieved from a number of studies ((Gifford & Campus, 2004), (Nadal, 2008), (Bonnette Consulting, 2010)). The following most common options are given: tourism/sightseeing, relaxation, commuting to school/university/work, social riding: something to do with my friends, exercise, going to restaurants/bars/events, meeting and shopping. If respondents were unable to identify the reason of their choice from the available options, they could specify their answer.
Question 6 about users’ satisfaction gives the overall idea as to what extent users are satisfied with Velopass. When answering the question users have to grade the level of satisfaction from “very dissatisfied” to “very satisfied”.

If respondents’ level of satisfaction is neutral or lower from the previous question, question 7 aims to investigate the reasons for this. The following answers were given: there are not many stations in the city, the bicycles are not comfortable, 30 minutes are not enough for the ride, there is not enough of bicycle infrastructure in general, there are problems with cards.

Questions 8 and 9 deal with the money value of Velopass day tickets or annual subscriptions. Respondents are asked to grade the current monetary value of the subscription they have. The grade of the price starts from “too low” and moves to “too high”. The question about the price the users of Velopass would pay for their subscription is supplementary to the previous one. It discovers users’ willingness to pay for the chosen type of subscription. It is assumed that USI students have a free access to Velopass BSS (Balmelli, 2012), but they were asked what they think about the current prices of Velopass cards. The price is put in Swiss francs (CHF), any other currency most common to respondents will be converted.

Question (10) about travel options aims to investigate the travel patterns users of Velopass have while using bicycles. The multiple choice provides following options: Piazza Riforma, Lido, Parco Ciani, Villa Castagnola, Paradiso/San Salvatore, Università (USI), Chiesa di Santa Maria degli Angeli and Long Lake. The options have been retrieved from the list of attractions of Lugano listed on the travel website Trip Advisor (www.tripadvisor.com, 2012). The author’s experience of the city also helps to list some of the attractions.

The next two next questions are connected to the technological part of Velopass. Respondents are asked if they know about the existence of Velopass website as well as an App, which covers the information on the bicycle availability at different bicycle stations of LPN. These questions are designed in order to understand what percentage of Velopass users are familiar with the technological part of any BSS. Both App and website help to assist tourists in non-familiar places. These two information technology components make BSSs easier to use.

Questions 13 and 14 deal with the customers’ assistance at the process of the bicycle hiring and usage. If tourists or residents face problems with using bicycles, they could call the customer service center. The answers for the question aim to find out how often the respondents call costumer service as well
as the type of problems the users mostly have when they call the service. The list of the problems includes general questions, problems with cards, bicycles or payment.

Question 15 about usability investigates how clear the given instructions are for Velopass use. The instructions are printed on the stands in front of each BS station. The question helps to find ways for usability improvements both for tourists and residents. A 4 point Likert grading scale has been used ranging from “it is not clear at all” to “it is absolutely clear”.

The last question (16) of Questionnaire 1 aims to stress strong points of Velopass. It explores the reasons why BSS is used. This question helps to understand the leisure/tourism component of the system and how it contributes to overall tourists’ and residents’ experience.

Users’ profile questions go separately in Questionnaire 1 and are designed to find out the age of the respondents and the place of their residence (Lugano or not).

The second questionnaire has been developed with the intention to find out if the tourists are aware of BSS in Lugano and if they would be willing to use the system, for how long and at what price. The whole questionnaire has 6 questions.

Question 1 asks if the tourists know what the concept of BSS is. The answers have to demonstrate the number of the respondents who will not use BSS just because they do not know what it is.

Question 2 is similar to the previous one but specifically asks if the respondents know about Velopass. The numbers will prove if Velopass in LPN is visible for tourists.

Question 3 of Questionnaire 2 investigates if tourists would be interested in exploring Lugano by BSS. If a negative answer is provided then in question 6 the reasons are questioned.

In case of a positive answer for question 3 the following two questions ask the respondents to specify the price they would pay for the service per day as well as the numbers of hours they would use Velopass.

Profile questions find out if this is the first time respondents are in Lugano, the age of the respondents and also who they are travelling with.

The questions for both questionnaires have been developed in clear form. An important aspect for the research results is the profile question about the gender of the respondents was intentionally not included in the questionnaire. The questions are asked by the author personally so the gender could be identified during the communication with the respondents. In total Questionnaire 1 contains 16
questions that take about 5 to 10 minutes to answer. The questions from Questionnaire 1 are asked in front of the stations where bicycle are most commonly hired: Contrada di Verla and Campo Marzio. Both places are situated close to the lake and the city center. Also, these two stations are the closest to the points where day pass can be issued to tourists (Lugano tourism, 2012a). In order to change the order of questions or clarify unclear phrases, pretesting has been conducted. Pretesting resulted also in deleting some of the questions as they served no purpose. Questionnaire 2 is conducted along lake Lugano where the boat ticket offices are situated. The printed version of both questionnaires is in English. Italian language is used for communication and explanation of the survey, if respondents are not able to speak English. The surveys have been conducted within a week (5 hours a day): 4 days were devoted to Questionnaire 1 and 3 days to Questionnaire 2.

3.1.2. Interview

During the preparation process an interview was conducted with the representative of Lugano municipality who is responsible for Velopass BSS.

The purpose of the interview (Appendix 3) was to collect the necessary data for the research as the information is not available on the Internet or limited. That concerns the data on the history of Velopass, the structure, the financial costs and the patterns of the ridership. The other reason was to know the opinion of the Velopass representatives about the system itself.

The interviewed person was Maurizio Maccanelli. The interview took place on August 7, 2012 at the Municipality office of Lugano. The duration of the interview was 45 minutes. The questions for the interview were organized in advance and sent for familiarization to Mr. Maccanelli one week before the interview. The questions were translated into Italian and the interview was conducted in Italian. The whole interview was recorded (Appendix 3).

The answers for the questions were used in Chapter 2 where the description of Velopass is given. Some questions have not been answered that gave the impact on the development of the surveys. The main results of the interview are general information about BSS, statistics on bicycle usage and costs.

Two other interviews with the representatives of USI (Balmelli, 2012) and Hotel Lugano Dante (Gasparini, 2012) were conducted. The reason for interviewing the USI representative is because the Univeristy has a Velopass station on Campus. Hotel Lugano Dante collaborates with Velopass and provides its guests with free subscriptions for day cards.
3.2. Study results

After the conduction of two questionnaires 42 responses for Questionnaire 1 and 115 responses for Questionnaire 2 were collected. The difference in numbers of the responses could be explained by the target group of the intercept surveys. Questionnaire 1 concentrated entirely on the users of Velopass in the city at two stations (Contrada di Verla and Campo Marzio). On average there were around 20 respondents a day. Many users did not have time or desire to take part in the survey. Questionnaire 2 contained less questions and targeted tourists visiting Lugano. Even though there were many refusals, the number of people who answered the survey was rather large in comparison with Questionnaire 1.

Several observations were made for both cases. While doing Questionnaire 1 many people were coming to the Velopass station demonstrating an interest in it. They spent 1-2 minutes reading the instructions and left the station after. The observation shows that there is a strong interest in using Velopass in Lugano but there might be some restrictions which prevents people to come back and actually use the city BSS. Most responses were collected in the morning around 8 and 9 am and in the evening around 5 pm which could be explained by the numbers of commuters arriving from the outskirts of Lugano to the city center. After 6 pm the number of respondents was low. Also most of the respondents left comments apart from the questions they were asked. The intensity of the rides decreased when the weather changed and it rained. Most of the people using bicycles were single riders. The most common route the respondents followed was the University - City Center (Contrada di Verla). The riders from other stations have also been represented. Students were the majority of the users on the route USI – City Center, while the people who work in the city center represented the riders from other stations of Velopass. The observation demonstrated that students used bicycle during the whole day. Commuters who work in the center and get there from the suburbs used Velopass either in the morning or in the evening.

Questionnaire 2 was designed for the tourists of the city that is why when respondents answered that they were the residents of Lugano, further conversation stopped. The questions were asked in front of two boat ticket offices depending on the intensity of the tourists there.
3.2.1. Questionnaire 1

The results (Figure 9) show that the majority (62%) of the users do not have their own bicycle. Several assumptions could be made from this finding. The BSS might introduce people to cycling and facilitate ridership, making it more likely that people would like to have their own bicycle after. Also the users who do not have their private bicycle are more likely to try to ride. They can enjoy cycling without bicycle ownership. Among the respondents of Questionnaire 1 there were several people who are not residents of Lugano. Their answers are particularly important for the research finding because they represent visitors (tourists) of Lugano, who in comparison with the respondents of Questionnaire 2, actually use Velopass. Only one non-resident who used Velopass has a private bicycle.

Figure 9. Bicycle ownership.

Figure 10. Weekly bicycle rides frequency by bicycle owners.
Figure 10 shows that people who own their own bicycle do not ride it often. 44% of the respondents answered that they ride less than once per week. Only 25% pointed out that they are frequent bicycle users and ride their bicycles more than 6 times per week, making cycling an attribute of their daily routine.

![Figure 10. Distribution of different types of Velopass cards.](image)

As shown in Figure 11, the highest percentage of Velopass users is USI students, whom do not have to pay for the annual card due to the collaboration between University and Velopass (Balmelli, 2012). Day pass users were represented by tourists, who mostly used bicycles for a single day. Six tourists were from Italy and 1 from Norway.

![Figure 11. Weekly frequency of Velopass bicycle ridership.](image)
The answers for the question about weekly frequency of Velopass ridership demonstrates that the number of rides of Velopass holders in Lugano is almost equally spread between the first three categories which are “less than 1 time”, “1-2 times” “3-4 times”. That implies that only a quarter of respondents use their Velopass bicycles on regularly basis. Day pass holders did not have to answer the question as in most cases they rented the bicycles once and used it during the day.

Figure 13 shows that the most common answer why respondents (24 answers) used Velopass was for commuting. Such a high number can be explained by the distribution of the Velpass cards. The previous chart (Figure 11) shows that annual subscriptions take the biggest share of all Velopass holders. The second most frequent answer was relaxation (17 answers). Tourist/sightseeing as the purpose of Velopass use was mentioned 10 times making it the third most common answer. All day card holders answered that tourism is their primary reason. The rest of the answers spread equally
among the respondents ranging from 19 % to 24 % of all the answers. Social riding, shopping, exercise, going to restaurants as well as commuting received only one response among day card users meaning that these factors are not primary reasons for them to use Velopass.

Figure 14 illustrates that there are no people who are “dissatisfied” with the service of Velopass. Among all the respondents 48 % were very satisfied and 33 % were satisfied contributing to 81 % of positive user satisfaction in total. The level of satisfaction of Lugano BSS is comparable to similar systems across Europe. User satisfaction of Vèlib BSS is 94 % (all people excluding dissatisfied) where only 19 % of the respondents are “very satisfied” (Hemne et al., 2010). In case of the Velopass there were 8 people who stated that their level of satisfaction is neutral. Six out of them were frequent commuters, holders of annual Velopass cards. Comfort was the most common answer among the respondents with neutral level of satisfaction. Other reasons were lack of infrastructure in general in Lugano (25 %), not sufficient time for free of charge ride (25 %) and problems with cards (25 %). The percentage for neutral level of satisfaction among the day card holders was lowers than overage among the users of Velopass. The result shows that, on average, day card holders are satisfied with the service which Velopass provides.

![Chart showing user satisfaction](image)

**Figure 15. Price of current Velopass subscriptions.**

Figure 15 demonstrates that 88 % of the respondents who were questioned answered that the price of Velopass cards they have is “just right”. It was pointed out in the Chapter 2 that USI students do not have to pay the annual pass fee of CHF 25. So the students were asked what they would think about the Velopass annual card price of CHF 25 if they theoretically had to pay it themselves. The results show that the monetary value of the Velopass card satisfies their users. The results on the willingness to pay show that the users would like to pay CHF 1 less for the day card on average than the current price is. On the contrary, the respondents would pay more for an annual pass. The current price is
CHF 25; while on average users are ready to pay CHF 39 with CHF 100 being a maximum offer for the service.

<table>
<thead>
<tr>
<th>Willingness to pay</th>
<th>Annual pass holders</th>
<th>Day pass holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF 39 – average price</td>
<td>CHF 25</td>
<td>CHF 8.75 – average price</td>
</tr>
<tr>
<td>CHF 0 – lowest price</td>
<td></td>
<td>CHF 0 – lowest price</td>
</tr>
<tr>
<td>CHF 100 – highest price</td>
<td></td>
<td>CHF 25 – highest price</td>
</tr>
</tbody>
</table>

Figure 16. Velopass cards current prices and respondents’ willingness to pay.

Day card holders (Lugano visitors) are willing to pay CHF 1.75 more for the service than they currently pay. At the same time all of them pointed out that the price for a day card is “just right”. The respondent from Norway suggested the day card price of CHF 14.

According to Figure 16 the place where most of the respondents go is USI (81%). Second and third most popular places are the road along the lake Lungo Lago (64 %) and Lido (57%). The majority of the respondents who answered that they used bicycles for commuting stated that they still used main attractions of the Lugano. 43 % of the respondents pointed out that they visited Parco Ciani, which provided city exploration experience for the riders. Day card holders who were visiting Lugano (seven riders) had difficulties answering the question and mentioned just the places they knew or previously visited. Significant sightseeing such as the funicular San Salvatore and Chiesa di Santa Maria degli Angeli have little representation in the list of answers. Piazza Riforma counted for 33 % of the responses being a transit point on the way from the city center to other points. It has been pointed out that day card holders have more flexibility while using their bicycles in Lugano, because they are not
charged for not docking bicycles after 30 minutes. 86% of day pass holders intended to visit Parco Ciani, 71% - Lungo Lago, 57% - Lido, the University and Paradiso – 29%. No one among Velopass day card holders mentioned Piazza Riforma or Stadio as the place to visit while exploring Lugano. Basically most of attractions for tourists to explore by bicycle are situated along the lake.

The majority (71%) of the Velopass users visited the Velopass website. Concerning the application, almost half of the respondents (48%) have never heard about the mobile App “Velopass” while only 8 (19%) respondents know about it and use it. None of the tourists had heard about the App or visited the website of Velopass.

15 respondents of Questionnaire 1 answered that they have experienced problems with Velopass and called customer service. Among most common concerns the respondents had were a Velopass card problem (87%) and an absence of free spots for bicycles (or empty stations). Only one customer experienced a problem with the credit card being extra charged. None of the tourists had called the customers service.

Concerning the explanation on how to use Velopass for 97% of the users it was absolutely clear or clear enough. It could be assumed that once the customer has used BSS, it becomes easier to use the system. The next time all tourists who bought day passes stated that it was clear enough or absolutely clear how to use Velopass.

![Bar chart showing preferred aspects of using Velopass](image)

**Figure 18. Preferred aspects of using Velopass.**

Figure 17 shows the most common answer on what customers like most about Velopass was the convienience of BSS for urban mobility and the possibility to get to the desired places faster. More than a half mentioned that Velopass is a fun activity. That is important for BSS as a possible tourist
attraction for the visitors of Lugano. Fun was on all tourists’ responses. The rest of the answers were spread equally counting for 31% and 33%. Environmental concern and saving money counted for 33% while exercise and exploration counted for 31%. It must be concluded, that not only day pass holders mentioned that they use the bicycles of Velopass to explore the city but also the residents. 86% of the tourists mentioned that fun and convenience were the attribute they like the most about Velopass. Two tourists mentioned that Velopass helps them to save money while getting around the city.

There was a following gender distribution among the respondents (42 people in total) of Questionnaire 1: half of the riders are males, another half are females. 79% of the respondents live in Lugano, and the rest 21% are either visitors or commuters from the outskirts of Lugano.

[Figure 19. Age distribution among Velopass users.]

The users at the age category 25-34 represent the biggest share among the respondents. 71% of the tourists represent this age category.

3.2.2. Questionnaire 2

In general it can be concluded that more than a half (53%) of the respondents knew what BSS was, but only 24% knew about BSS in Lugano. If the respondents did not know what BSSs were, the author of the research explained it. After the description of the concept of BSS 72% of the respondents were ready to explore Lugano by Velopass. The little percentage of respondents who knew about Velopass in Lugano can be explained by poor BSS visibility. Not knowing about the system prevents respondents from using Velopass.
Among the reasons not to use BSS Velopass respondents answered that they would prefer other forms of exploration like walking or driving. 39% mentioned other reasons, such as lack of time, travelling with private bicycle, the terrain of Lugano or the negative experience from Lugano in general.

The average price for a day ticket which the respondents would pay for Velopass service was CHF 12 with CHF 4 being the minimum and CHF 60 the maximum price. The number shows that willingness to pay for the Velopass is higher than the actual price of the day card. Concerning the time which the respondents would spend riding the bicycle around Lugano, the majority pointed out that they would like to ride for more than 2 hours: 2–4 hours (37%) and more than 4 hours (44%). Only 2% of the respondents wanted to ride less than 30 minutes a day.

The age category of 18-34 contributed to 67% of all the respondents. The respondents’ country of origin was diverse with minor domination of Germany, Italy and the German speaking part of Switzerland. 95% of the respondents were visiting Lugano for the first time
3.3. Ways to improve the Lugano bicycle sharing system

The results of the questionnaires show there is a strong interest for a bicycle sharing system in Lugano, while actually only several tourists use it (day card holders). According to Questionnaire 2, 72% of the tourists would like to use Velopass, and on average, tourists are willing to pay even more than the current price of the Velopass day card. Also the observation during Questionnaire 1 conduction showed that many tourists passing by the bicycle sharing station showed an interest in using the system but did not do so.

Currently only 24% of tourists are aware about the existence of BSS in Lugano. The system itself is not promoted enough among city visitors. The image of Lugano is not associated with bicycles. In Chapter 1 marketing and operation were mentioned as factors for a BSS success. These factors unlike climate, road safety and cycling culture etc, can be changed in the short run.

3.3.1. Marketing

The accounts of Velopass Lugano-Paradiso on social media (Facebook, Instagram, Pintrest, etc.) need to be created to maintain BSP representation. Social media updates could contain users’ feedback, Velopass plans on future development, photo and video with views of Lugano: any information that could not be found on a typical website of the BSS. The BSSs like ones in Barcelona, Paris, Milano and other big cities have a separate Facebook page which could promote BSS online. The information about Velopass LPN has to be changed on the official webpage of Lugano Tourism website in both the English and Italian version. It might contain promotional material emphasizing the advantages of
Velopass usage. The blog on Velopass should be created and maintained as the Velib blog for the Paris BSS is represented. The Blog increases tourist awareness and it presented in multiple languages. The blog of Vélib’ in Paris (http://blog.velib.paris.fr/en) is represented in two languages: French and English.

Further collaboration with hotels should be organized. Among the hotels which include Velopass day subscription to the current offers are: Hotel Lugano Dante and Hotel Pestalozzi. Besides the subscriptions, promotional leaflets could be left in most of the hotels which have info stands with free material. The information also could be put directly at front desk of the hotel with the hotel administration’s permission. Some of the systems have a separate bicycle sharing station in front of the hotels. For example B-Cylce bycicle sharing system is built in front of the Marriott hotel in Boulder (Marriott International, 2012). The only non-Italian tourist who used Velopass day card was attending a two weeks University course at USI and suggested the collaboration of Velopass and event organizations in Lugano. When events take place the participants will have a chance to preorder Velopass subscriptions to explore the city while commuting from the hotel or just around the city.

Coordinating marketing campaigns for the arriving visitors will be an effective way to introduce Velopass to the potential users at the train station. Other places of tourists concentrations could be considered as leaflet pickup points: boat stations, central bus station, parking lots, public beaches, museums, etc.

Further information extracted from the results of Questionnaire 1 help to understand the needs of Velopass customers. For 33 % of the respondents, an environmental concern was important when they ride a bicycle. The leaflets of the program could emphasize the advantages of Velopass for the environment. It will maintain a good image of the system as well as the city in general. Also the social aspect of cycling should be used on leaflet design: picture of a couple or a group of friends on bicycles.

Velopass also should be able to organize events commemorating special/important events, attracting more users to the system including tourists. For example, Barclays Cycle Hire in London created a special bicycle for the royal couple, Prince William and Kate Middleton. The 7th anniversary of Vélo’v in Lyon was celebrated by the race perched on the bicycles of BSS (Sustainable Mobility, 2012).

3.3.2. Operations

Taking into account that Velopass combines the attributes of bicycle renting and BSS, customers can use bicycles without returning them to one of Velopass stations during the day at a fixed price. Some BSS like Vélib’ in Paris introduced built-in cable locks keeping bicycle secure while making
stopovers (Transport Canada, 2012). Having a lock attached to the bicycle was one of the suggestions left by commuters. This option is especially helpful for tourists, who might need some time apart from cycling.

One of the operational improvements of Velopass would be involving more places where the cards could be issued for casual users (Kiosks, train station, bus stations, museums etc.). The existing stands with the instructions how to hire bicycles should be written in clear form, so all tourists easily understand the process of day card obtaining. When the cards are issued more information for tourists should be provided. The information can include the map with all the stations and possible routes tourists can take. The upgrade of BSS Velopass will make the process of issuing the day cards easier. Most of BSSs of the third generation allow tourists to obtain a temporary access to the bicycles directly at the stations using by a credit card. The other option for obtaining a card is on-line pre-order and pick up in any location which currently exists.

Current Ticino Discovery Card can incorporate the service of Lugano Velopass providing a free access to the bicycles in the city for the card holders. The collaboration with tourism offices around Ticino will increase system visibility and attract additional customers.

Some of the comments during Questionnaire 1 contained the suggestions on the improvement of the city infrastructure: parking lots, separate bicycle lines and paths, specialized traffic lights and signs. Velopass is advised to lobby the interest of riders in partnership with Pro Velo Ticino, the creator of “Lugano in bici” initiative. As it was pointed out in the first chapter, cycling facilities is an important key success factor for BSSs.

The last operational improvement is related to the quality and the reliability of Velopass bicycles. Based on London BSS damage identification could be installed on each of the Velopass stations, allowing the mechanics to identify the problems before their arrival to the stations. Costumers have more chances to see the problem because they ride, most of the problems with bicycles are identified while riding.

3.3.3. Finance

One additional staff member needs to be hired at the Lugano Velopass office in order to maintain the representation of Velopass on social media. The person shoul also be responsible for the Public Relations and Marketing of Velopass.

The pricing of Velopass subscriptions could be changed. No extra charges for Velopass daily subscribers are an important advantage of BSS. Relying on the questionnaire results, tourists who did
not use Velopass were willing to pay CHF 12, while the tourists who used it wanted to pay CHF 8.15. The price of CHF 10 could be set. That price might not affect the number of tourists who will use BSS but it will bring extra revenues to Velopass.

To increase the revenue the casual users of Velopass could be encouraged to use bicycle for a second day with a discount and further pursue to subscribe for annual pass if they plan to travel to other cities of Switzerland. Taking into consideration the European business model of BSSs Lugano Velopass should consider collaboration with advertisement companies like Clear Channel or JCDecaux which could sell advertisement space at the stations and on the bicycles as their revenue source. At the same time the outdoor advertisement company can be responsible for the cost of Velopass maintenance. The collaboration cannot guarantee the coverage of all costs, but it could make the system more recognizable under big brands name.
Conclusions

BSSs are a new phenomenon of urban transportation, which originated in 1965 in the Netherlands. Now BSSs are rapidly spreading around the world. The concept has become not only for city residents’ mobility, but it has also started to attract tourists. The literature review showed that there is no academic literature devoted to the tourism aspect of BSSs. The research was an attempt to study the attractiveness of BSSs to tourists and investigate the motivations behind using the systems.

The paper provided the definition of BSSs and briefly described the history of the concept. The most significant benefits of the BSSs for users and communities were mentioned: health and environmental benefits, new jobs for communities and a positive image for cities. The examples of London and Paris BSSs proved to be successful projects due to the benefits offered to both residents and tourists of each city. Also by being a part of transportation network, BSSs provide more options for tourists to explore cities. The literature review showed that cities are more attractive when tourists can rely on the local transportation.

The paper specifically described the current BSS in the Lugano and Paradiso agglomeration. Velopass BSS, which was launched in 2010, comprises only 7 stations, six of which are fixed and one mobile. The scope of the city does not allow making the system bigger, which limits the tourists’ travel options. The greatest advantages which Velopass offer tourists are: interconnections with other networks in Switzerland, possibility to rent a bicycle for a day and a more personal method to explore the city. Daily bicycle rentals offered by Velopass distinguishes the system among other BSS networks around the world. The graph of monthly riders demonstrates that Velopass is affected by seasonality. The graph shows that the number of rides increases during warm months and decrease during cold months. The same seasonal pattern can be seen with the number of cards issued to casual users of the system. During winter months, the number of cards issued drops to ten per month. The cost and revenue analysis of Velopass showed that the system is a subsidized project and could not survive without government financial support. By making Velopass a tourist attraction for Lugano, it could become a more profitable enterprise.

All of the objectives for the research were achieved. The results of the research showed that 72 % of the visitors surveyed expressed a demand for bicycle sharing in Lugano. The remaining respondents who expressed no interest in using Velopass were mostly concerned about city infrastructure. Some concerns from the skeptics included, hilly terrain, traffic security or simply unable to use Velopass (travelling with kids or other transportation preferences). Some of the respondents would prefer walking to cycling in order to explore the city. The observation demonstrated that many visitors to
Lugano who accidentally discovered Velopass did not use it even though they had expressed a strong interest in the system.

The majority of the actual riders of Velopass, which represented both casual users and residents, considered the BSS a convenient way to explore the city and arrive faster to destinations. “Fun” and “social” aspects of the system are important for future consideration to promote the system to potential tourists.

Concerning the visibility of Velopass, it could be concluded from the research that it is not visible to tourists. Only 24 % of the tourists who were questioned knew about the existence of Velopass in Lugano, despite the fact that in general there were 53 % of tourists who knew what BSSs were. As the results show, some changes could be made in order to make sure that as many tourists as possible know about the BSS in Lugano.

By obtaining the objectives of the research, the research question could be answered. Velopass of the Lugano - Paradiso network is currently not a tourist attraction. Only 17 % of the respondents who used Velopass were casual users who bought a day pass in order to tour Lugano. However there is potential for system development and improvement which could make Velopass a tourist attraction of Lugano.

The last part of the research suggested improvements for Velopass based on the best practices from other successful BSSs. The suggested improvements can be divided into three categories: operations, marketing and finance.

The results of the research demonstrate that the main improvements of the system should concentrate on marketing. Marketing will increase Velopass visibility among the tourists. Social media could serve as an instrument for online promotion. Promotional materials could be distributed in places with a high concentration of tourists, such as, hotels, the train station and museums. Based on the answers of the riders, a new, nature-oriented and personable design of the leaflets could make Velopass more attractive for its target market. Recall from the results that the interest in Velopass resided mostly with couples and environmentally conscious people. In order to fulfill marketing improvement strategies, one additional staff member needs to be employed.

Improvements in terms of system operation start with the need to install more locations around the city which offer day passes. Next, the system needs to be upgraded to a third generation BSS, which will allow tourists to purchase a day subscription with less effort.
Suggestions for financial improvements of the system include pricing, additional stuff hiring and partnership with outdoor advertisement companies. The price of Velopass day card should be increased to CHF 10. One extra worker needs to be hired. The proposed position will deal exclusively with Velopass marketing and PR. Creation of partnership schemes with external partners will bring extra funding to the system. That will allow further Velopass development and promotion.
Limitations and future research

The first limitation to the research is the small size of the BSS Velopass, which only has six stations, which is quite small in comparison to the other BSS mentioned (London, Lyon, Paris). This limited the sample size of the survey respondents because the number of users is inevitably less than that of a larger BSS.

The second limitation to the research is the limited research published about this particular topic. The lack in background theory rendered the research process more difficult and more problematic to find supporting evidence of the connection between tourism and BSSs.

Another limitation that inevitably exists is most research is the presence of some bias or subjectivity due to the fact that the research was performed by only one researcher and the questions posed to respondents had pre-determined answers provided by the researcher.

The final limitation concerning the research relates to the constricted time period in which the questionnaires were administered. The research would be more detailed and indicative if the surveys had been conducted over a longer period of time or multiple times over certain time intervals. Extra time will give a chance to conduct more survey with tourists and exclude the residents from the responses.

The research paper could serve as a background for future studies in the field of urban mobility and investigate in-depth the role of bicycle sharing on tourism. The methodology which was used in the research could be applied to bigger bicycle sharing programs in Switzerland and worldwide. In upcoming studies there should be more emphasis placed exclusively upon tourists and BSSs. Usability study of the BSSs involving the researches from transportation and tourism would be a beneficial contribution to existing literature on bicycle sharing.
Appendices

Appendix 1. Questionnaire 1

1. Do you have your own bicycle?
   - yes
   - no

2. How many rides per week do you do on your bike?
   - less than 1
   - 1-2
   - 3-4
   - 5-6
   - more than 6

3. What kind of Velopass subscription do you have right now?
   - day pass
   - annual pass Lugano-Paradiso (not USI)
   - annual pass Switzerland
   - USI student

4. How many rides per week do you do with Velopass?
   - less than 1
   - 1-2
   - 3-4
   - 5-6
   - more than 6

5. What is your purpose for using the bicycle sharing system?
   - tourism/sightseeing
   - relaxation
   - commuting to school/university/work
   - social riding: something to do with my friends
• exercise
• going to restaurants, bars, and events
• meetings
• shopping
• other (please specify)

6. What is your level of satisfaction with the bicycle sharing system in Lugano?

• very satisfied
• satisfied
• neutral
• disfatisified
• very disfatisified

7. If the level of your satisfaction is neutral and lower please specify the reasons

• there are not many stations in the city
• the bicycles are not comfortable
• 30 minutes is not enough for the ride
• there is not enough of bicycle infrastructure in general
• there are problems with cards
• other (please specify)

8. Is the price of the bicycle sharing card you have:

• too low
• rather low
• just right
• rather high
• too high

9. What is the maximum price you would pay for a day pass (now 7 CHF) and an annual pass (now 25 CHF)?

• Day pass … CHF
• Annual pass … CHF
10. Where do you go/plan to go on a bicycle?

- Piazza Riforma
- Lido
- Parco Ciani
- Villa Castagnola
- Paradiso/San Salvatore
- Università
- Chiesa di Santa Maria degli Angeli
- Paradiso
- Stadio
- along the Lake
- other (please specify)

11. Have you visited Velopass website?

- yes
- no

12. Do you know about the “Velopass” App?

- I know about it and I have it
- I know about it but I don’t have it
- I haven’t heard about it

13. Did you ever call a customer support service of Velopass?

- yes
- no

14. If yes, what kind of issues did you have?

- general questions about use of bicycles
- Velopass card did not work
- bicycle got broken
- my credit card was extra charged
- all stations were busy
• other (please specify)

15. Is the explanation of how to use Lugano-ParadisoVelopass clear?
• it is absolutely clear
• it is clear enough
• it is not really clear
• it is not clear at all

16. What do you like most about Velopass?
• it helps me to explore the city
• it's convenient
• it helps make exercise part of my daily routine
• I save money by not using public transport
• I'm doing something good for the environment
• it's fun
• I am getting faster to the places I want to go
• other (please specify)

Respondents' profile:

Do you live in Lugano?
• yes
• no (please specify the city/country you are coming from)

What is your age?
• less than 18 years old
• 18 - 24
• 25 - 34
• 35 – 44
• 45 - 54
• 55 - 64
• greater than 64 years old
Appendix 2. Questionnaire 2

1. Do you know what bicycle sharing system is?
   - yes
   - no

2. Do you know about bicycle sharing system in Lugano?
   - yes
   - no

3. Could you imagine yourself exploring Lugano by bicycle sharing system?
   - yes
   - no

4. If yes for question 3, how much would you pay for a day bicycle sharing card?
   ... CHF

5. How much time would you need to ride a bicycle in Lugano?
   - Less than ½ hour
   - ½ -1 hour
   - 1 – 2 hours
   - 2 – 4 hours
   - More than 4 hours

6. If “no” for question 3 what would be the reasons for you not to use bicycle sharing system?
   - It is too much work to go and buy a day pass
   - I do not generally like to ride a bike
   - I do not know how to ride a bike
   - I am concerned about traffic/security issues
   - I am not ready to pay for this service
   - I would prefer other forms of exploration (walking, boat, car, etc.)
   - other (please specify)
Respondents’ profile:

Is this your first time you are in Lugano?

- Yes
- No (please specify the city/country you are coming from)

What is your age?

- less than 18 years old
- 18 - 24
- 25 - 34
- 35 – 44
- 45 - 54
- 55 - 64
- greater than 64 years old

Who are you traveling with?

- alone
- family with kids
- with my partner (husband/wife, boyfriend/girlfriend, etc.)
- with friend/colleagues(s)
- with relatives (other than kids)
- other (please specify)
Appendix 3. Interview with the representative of Lugano municipality

Interviewee: Mr. Maurizio Maccanelli

Interviewer: Mr. Dzmitry Bazhko

Place: Municipality office of Lugano. Via della Posta 9, Lugano

Date and Time: 8th July 2012, 9:30

Mr. Bazhko: What is the structure of Velopass and how many people are involved into the project?

Mr. Maccanelli: There are three people who work full time and one person who works half-time. Two people are responsible for the customer service (responds in Italian to telephone complaints). One person does it 100% of the working time and another 50%. Customer service also works on Saturdays and Sundays. The complaints concerns the billing information, subscriptions, broken cards etc.

There are also two mechanics working for Velopass. They go in the van and reload the bikes at the stations. They have different shifts depending on the schedule working from 7 am until 7 pm. The mechanics are responsible for maintaining bicycles. It means that they have checklist they need to go through every morning to every bike to make sure the brakes, tires, etc, are in order.

Mr. Bazhko: Who is in charge of Velopass Lugano-Paradiso?

Mr. Maccanelli: The Head of the Operations of Velopass is Claudio D'Agostino, but he does not work directly for Velopass. He represents the municipality of the city (SOTELL). He is also the one who checks on employees and handles problems. Fabio Schnellmann is a Project Executive. He was the initiator of Velopass. As for the ownership, Velopass was bought by LaPosta, national mail company. LaPosta plans to provide bicycle sharing systems in German cantons of Switzerland. In future, a unique card could be used for all the BSS across the country.

Mr. Bazhko: What is the relationship of Velopass Lugano-Paradiso with headquarters of Velopass in Lausanne?

Mr. Maccanelli: The idea of Velopass originally came from Bicincittà, a company based in Torino which develop bicycle sharing systems. SuisseRoule brought the project to Lausanne and changed the name of the company for Velopass. Velopass in Lausanne own the licence for the projects across Switzerland. Now the Headquarters of Velopass are called from Lugano when there is a piece broken and need to be ordered.
Mr. Bazhko: Is it Velopass the same BSS that one in Milano?

Mr. Maccanelli: No. Milan BikeMi is an absolutely different system.

Mr. Bazhko: What are the costs and revenues of the project?

Mr. Maccanelli: All the information concerning the costs could be find in the project description (Proseguimento Progetto Bici a Lugano). I just would like to mention that the project does not bring much revenue. The city funds Velopass. We received only CHF 5’000 for day cards sold over one year which is nothing in comparison with the cost of the system.

Mr. Bazhko: Who else sponsor Velopass?

Mr. Maccanelli: Touring Club Switzerland paid for 58 bicycles, 10 white bicycles were provided by Fondo Clima Lugano Sud. Paradiso commune pays their quota for Velopass subscription. It counts for about CHF 7’000 - 8’000. Aziende Industriali di Lugano (AIL) which a sponsor of many events in Lugano provided a van for redistribution of bicycles.

Mr. Bazhko: USI students have free access to Velopass. Who cover the costs of the annual subscriptions.

Mr. Maccanelli: The University does.

Mr. Bazhko: What about the offices which sell day cards, do they receive any percentage out of sale?

Mr. Maccanelli: No, unfortunately. All the revenues from day cards go to Velopass.

Mr. Bazhko: Did you have any studies on Velopass?

Mr. Maccanelli: No, nobody did any research previously. We have only some reports which I gave to you. They contain the numbers on the costs and revenues, subscriptions, ridership, etc.

Mr. Bazhko: Who is the main user of Velopass?

Mr. Maccanelli: As I know about 50 % of Velopass users in Lugano are USI students.

Mr. Bazhko: Do you know how many men/women use it? Age group? Occupation?

Mr. Maccanelli: No, we do not have this information, but it would be great to have it.
Mr. Bazhko: What are the problems of Velopass (vandalism, theft, etc.)?

Mr. Maccanelli: We experienced a little bit of vandalism at the beginning. Somebody cut tires, but almost nothing; nothing important, we changed the tires and that’s it. Once the hockey fans broke a bicycle. Nobody ever stole a bike.

Mr. Bazhko: What are the most/least used stations?

Mr. Maccanelli: I would say that all the stations are used equally, accept central one close to Manor and one in from of the University.

Mr. Bazhko: How many day cards and annual passes are issued?

Mr. Maccanelli: We have sold 1000 day passes over one year at CHF 7 each, it used to be CHF 5. The day passes are usually for tourists. They are mostly used in August and July. You could look at the report and find the information about annual passes.

Mr. Bazhko: How often the problem with full/empty stations occur?

Mr. Maccanelli: In the mornings and at night the stations need to be refilled due to peoples’ work patterns. In the morning people from outside the city center come to the city. Usually at night it is opposite from the morning in that all of the people who work in the center take the bikes to the outskirts. Then the Velopass personnel have to reload the bike stations in the center. USI is a particular case because students are using the bikes often at all hours. USI to and from the Center station is usually the most concentrated route.

Mr. Bazhko: What are the plans for the development of Velopass?

Mr. Maccanelli: There are three new stations that we are thinking of adding: one in Viganello, one in Cassarate, one in Pregassona.

Mr. Bazhko: Do you consider Velopass a successful project?

Mr. Maccanelli: Yes, I do. In 2011 the number of users made us the second most used bike sharing system in Switzerland. Lausanne was the most used but it has double the stations and double the bicycles, so that makes it an enormous accomplishment for us because we are small and we need to keep developing. It’s a huge success.
## Appendix 4. Bicycle sharing systems around the world

<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>System Name</th>
<th>Annual Members</th>
<th>Bikes / Docks / Stations</th>
<th>Member:Bike Ratio</th>
<th>Dock:Bike Ratio</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Brisbane</td>
<td>CityCycle</td>
<td>7,000</td>
<td>1,000 / N/A / 106</td>
<td>7</td>
<td>N/A</td>
<td>JCDecaux</td>
</tr>
<tr>
<td>Austria</td>
<td>Vienna</td>
<td>CityBike Wien</td>
<td>320,000</td>
<td>1,200 / 1,899 / 84</td>
<td>266.7</td>
<td>1.58</td>
<td>Gewista</td>
</tr>
<tr>
<td>Brazil</td>
<td>Rio de Janeiro</td>
<td>SAMBA</td>
<td>N/A</td>
<td>60 / N/A / 19</td>
<td>N/A</td>
<td>N/A</td>
<td>Mobilicidade</td>
</tr>
<tr>
<td>Canada</td>
<td>Montreal</td>
<td>Bixi Montreal</td>
<td>N/A</td>
<td>5,050 / N/A / 405</td>
<td>N/A</td>
<td>N/A</td>
<td>Bixi</td>
</tr>
<tr>
<td>China</td>
<td>Hangzhou</td>
<td>HZ-Bike</td>
<td>N/A</td>
<td>60,600 / N/A / 2,416</td>
<td>N/A</td>
<td>N/A</td>
<td>Hangzhou Public Bicycle Transport Service</td>
</tr>
<tr>
<td>England</td>
<td>London</td>
<td>Barclays Cycle Hire</td>
<td>128,000</td>
<td>6,000 / 9,517 / 400</td>
<td>21.3</td>
<td>1.59</td>
<td>Barclays</td>
</tr>
<tr>
<td>France</td>
<td>Paris</td>
<td>Vélib'</td>
<td>210,000</td>
<td>24,400 / N/A / 1,751</td>
<td>8.6</td>
<td>N/A</td>
<td>JCDecaux</td>
</tr>
<tr>
<td>France</td>
<td>Lyon</td>
<td>Vélo'v</td>
<td>42,000</td>
<td>4,000 / N/A / 350</td>
<td>10.5</td>
<td>N/A</td>
<td>JCDecaux</td>
</tr>
<tr>
<td>France</td>
<td>Bordeaux</td>
<td>VCUB</td>
<td>N/A</td>
<td>1,545 / 2,634 / 139</td>
<td>N/A</td>
<td>1.7</td>
<td>Keolis</td>
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<tr>
<td>France</td>
<td>Rennes</td>
<td>LE vélo STAR</td>
<td>N/A</td>
<td>900 / 1,697 / 83</td>
<td>N/A</td>
<td>1.89</td>
<td>Clear Channel</td>
</tr>
<tr>
<td>Germany</td>
<td>Munich</td>
<td>Nextbike</td>
<td>N/A</td>
<td>300 / N/A / 30</td>
<td>N/A</td>
<td>N/A</td>
<td>Nextbike</td>
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<tr>
<td>Germany</td>
<td>Hamburg</td>
<td>StadtRad</td>
<td>33,000</td>
<td>1,000 / 1,500 / 72</td>
<td>33</td>
<td>1.5</td>
<td>Call a Bike</td>
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<tr>
<td>Ireland</td>
<td>Dublin</td>
<td>dublinbikes</td>
<td>58,000</td>
<td>600 / N/A / 44</td>
<td>96.7</td>
<td>N/A</td>
<td>JC Decaux</td>
</tr>
<tr>
<td>Israel</td>
<td>Tel Aviv</td>
<td>Tel-O-Fun or Tel-Ofan</td>
<td>4,000</td>
<td>1,500 / 2,305 / 150</td>
<td>2.7</td>
<td>1.54</td>
<td>FSM</td>
</tr>
<tr>
<td>Italy</td>
<td>Milan</td>
<td>BikeMi</td>
<td>N/A</td>
<td>1,300 / 2,818 / 120</td>
<td>N/A</td>
<td>2.17</td>
<td>Clear Channel</td>
</tr>
<tr>
<td>Mexico</td>
<td>Mexico City</td>
<td>Ecobici</td>
<td>34,351</td>
<td>1,200 / 2,336 / 90</td>
<td>28.6</td>
<td>1.95</td>
<td>Clear Channel</td>
</tr>
<tr>
<td>Norway</td>
<td>Oslo</td>
<td>Oslo Bysykkel</td>
<td>N/A</td>
<td>1,200 / N/A / 100</td>
<td>N/A</td>
<td>N/A</td>
<td>Clear Channel</td>
</tr>
<tr>
<td>Spain</td>
<td>Barcelona</td>
<td>Bicing or 'El Bicing'</td>
<td>130,200</td>
<td>6,000 / 11,900 / 420</td>
<td>21.7</td>
<td>1.87</td>
<td>Clear Channel</td>
</tr>
<tr>
<td>Spain</td>
<td>Seville</td>
<td>Sevici</td>
<td>62,700</td>
<td>2,500 / 4,500 / 250</td>
<td>25.1</td>
<td>1.8</td>
<td>JC Decaux</td>
</tr>
<tr>
<td>U.S.</td>
<td>Denver</td>
<td>Denver B-Cycle</td>
<td>2,600</td>
<td>510 / 702 / 51</td>
<td>5.1</td>
<td>1.38</td>
<td>B-Cycle / Denver Bike Sharing</td>
</tr>
</tbody>
</table>

1 (Toole Design Group, 2012)
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