




Transdanube.Pearls - Network for Sustainable Mobility along the Danube

<http://www.interreg-danube.eu/approved-projects/transdanube-pearls>

Guideline for bike rental Transdanube.Pearls

Final Draft

	WP/Action 3.1
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	Version/Date 3.0, 23.11.2017

Document			Revision/Approval	
Version	Date	Status	Date	Status
3.0	23/11/2017	Final draft	xx.xx.xxxx	final



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More information about Transdanube.Pearls project are available at
www.interreg-danube.eu/approved-projects/transdanube-pearls



Abbreviations

BSS	Bike Sharing Scheme
ECF	European Cyclists' Federation
POI	Point of Interest
PT	Public Transport



Table of content

Contacts.....	2
Bike Rental.....	5
Execuive summary	5
1. Best practice examples from across Europe	6
2. Framework conditions for implementation	12
3. Requirements of target groups.....	22
4. Quick-Check of implementation.....	24
5. Recommendations for implementation	25
6. Key success factors from existing best practice examples.....	35
7. Suggestions for transnational evaluation of pilot activities.....	36
8. References.....	39
Overall conclusions	40
Bibliography.....	41



Bike Rental

Executive summary

The bike rental manual was developed by the Bratislava Self-Governing Region in cooperation with external specialists from the Institute of Spatial Planning. The manual was compiled during June and July 2017.

The purpose of the task was to map the development potential of tourism services using sustainable and environmentally friendly transport.

Part of the document includes examples of good practice from Europe (and the world), which can be applied in the countries of the Danube region. The document also serves as the basis for fourteen international partners of the TRANSDANUBE.PEARLS project, which creates a conceptual framework for the subsequent implementation of specific activities to process their regional development studies.

The manual deals with the issue of bike rentals for public. The document consists of several parts: identification of best practice examples within Europe, framework conditions for implementation, identification of target group requirements, overview of the possibilities for implementation, recommendations for implementation, identification of key success factors, suggestions for transnational evaluation of pilot activities and references.



1. Best practice examples from across Europe

The bike sharing system (BSS) represents one of the parts of public transport system. The BSSs are spread around the world. The biggest BSSs are operated in China (the city of Hangzhou, with a population of around seven million, operates the world's largest bike share program with around 78,000 bicycles and 2,700 stations). The largest BSS outside of China is operated in Europe (Vélib' in Paris).

The examples listed below were chosen taking into consideration the BSS with the most bicycles for sharing and recommendation of the experts working in the respective field.

Paris, France

The bike sharing program, called [Vélib'](#), is the largest bike share system in Europe, with around 23,600 bikes and more than 1,800 stations located every 300 meters, Vélib offers an



alternative way to move in Paris. The BSS was launched in July, 2007. For release and return a bike you need to go to terminal at a Vélib station and follow on-screen instruction. Note: There's no booking and the first 30 minutes of each trip are always free of charge.

Source: <https://www.ecowatch.com/8-of-the-worlds-best-bike-sharing-programs-1882105476.html>



London, England

The bike sharing program, called [Santander Cycles](#), is the 2nd largest bike share system in Europe, with around 13,600 bikes and more than 800 stations. The BSS was launched in July, 2010. For hire a bike you need go to the nearest docking station terminal with your debit or credit card and touch the screen to begin and follow the on-screen instructions and take the printed release code. Note: You can hire up to four bikes at the same time.



Source: <https://tfl.gov.uk/modes/cycling/santander-cycles/community?intcmp=5390>

Barcelona, Spain

The bike sharing program, called [Bicing](#), is the 3rd largest bike share system in Europe, with around 6,000 bikes and more than 420 stations. The BSS include also e-bikes and network of 45 stations for e-bikes. The BSS was launched in March, 2007. Most of the docking stations are located at subway, train and public car parking.

Warsaw, Poland

[Veturilo](#) is one of the largest urban bike systems in Europe available since July 2012. Alternative means of transport, allowing quick navigation through our city. It is a good complement to public transport in Warsaw. Cyclists Veturilo are available to 337 stations and 4925 bicycles. Beside standard bikes you can use electric bikes, children bikes and tandems as well.



Nederland

The bike sharing program of towns and cities in the Netherlands is called [OV-fiets](#). The BSS was launched in 2003 and it consists of more than 5,000 bikes and almost 300 stations located all over the country. Locations include train stations, bus and metro stops, several town centres and P+R sites.

Vienna, Austria

The bike sharing program is called [Citybike Wien](#). Bikes can be hired at over 120 bike stations across Vienna. The BSS was launched in June 2003 and it consists of more than 1,500 bikes. To use Citybike Wien you have to make a one-time registration. You can register online on BSS website, with Maestro Card or credit card directly at any station. Note: The first hour for using a bike is for free.

Budapest, Hungary

The bike sharing program is called [MOL BuDi](#). The MOL Bubi public bike-sharing scheme is a



new mode of public transport in Budapest, which consists of 112 docking stations and 1,286 bicycles. You can use MOL Bubi with a quarterly, annual or a semi-annual pass using a 24-hour, 72-hour or 7-day ticket every day around the clock. The BSS was launched in 2014.

Source: https://molbubi.bkk.hu/photos/25_szazadik_allomas/szazadik_allomas_01.jpg



Milan, Italy

[BikeMi](#) is Milan's Bike Sharing service. The service runs 365 days a year, from 7 am to 1 am. The timetable could be prolonged in spring/summer and on occasion of special events. It is a sharing public transport system therefore it has to be used by as many people as possible. For this reason the first 30 minutes of each use are free for traditional bikes. BikeMi is the first example in the world of an integrated Bike sharing system between 3,650 traditional bicycles and 1,000 e-bikes, unique in terms of size, complexity and innovation.



Source: www.bikemi.com/en/service-info/info/whats-bikemi.aspx

Turin, Italy

The bike sharing program in Turin is called [\[TO\]Bike](#). It consists of more than 1,200 bikes and more than 140 docking stations. The BSS was launched in March, 2011. [TO]Bike is the new bike sharing service for Turin and for all the people who come into town for work, recreation or tourism. By subscribing the service, it is possible to take the bicycle in one of the stations in the city and return it to any other station with free docking points. Designed for short trips, the bike sharing today is the most convenient and cheapest form of urban transport. Thanks to the electronic card, you will be able to use the bicycle every day 24 h, avoiding traffic and parking problems.



Source: www.tobike.it/frmRegistrazioneUtente.aspx



Lyon, France

[Vélo'v](#) is 4,000 rental bikes which can be found at 348 docking stations in Lyon and Villeurbanne. This service is available for riders who are 14 and older. It's available 24/7, 365 days a year. Each station has a terminal with a touch screen for accessing the various offers and a series of attachment posts for parking the bikes. Whatever the offer chosen, the first 30 minutes of use on each new trip are free of charge! Vélo'v is a service, offered by Lyon Métropole and operated by JCDecaux France.



Source: <https://velov.grandlyon.com/en/how-to-use.html>

Dublin, Ireland

The bike sharing program in Dublin is called [dublinbikes](#). It consists of about 950 bikes and more than 100 docking stations distributed approximately every 300 meters. The BSS was launched in September, 2009. Coca-Cola Zero dublinbikes stations are distributed throughout the city centre to enable easy access and optimal use. Located in close proximity to each other, every station has a minimum of 15 stands.

Valencia, Spain

The bike sharing program in Valencia is called [Valenbisi](#). It consists of 2.750 bicycles distributed in 275 stations, in close proximity to each other in different parts of the city.



Hamburg, Germany

The bike sharing program in Hamburg is called [StadtRAD Hamburg](#). It consists of more than 1,000 bikes and more than 70 docking stations. The BSS was launched in July, 2009. You can rent a bike via terminal or by phone. For the first 30 minutes, you can use every StadtRAD Hamburg free of charge; after that, you pay the low price of 6 ct./min.

Greece

The most popular (and the first Greek) bike sharing program in Greece is called [EasyBike](#). It



Source: www.easybike.gr/%CF%84%CE%BF-%CF%83%CF%8D%CF%83%CF%84%CE%B7%CE%BC%CE%B1-easybike/?lang=en

consists of more than 1200 bicycles distributed in more than 120 docking stations located in 20 cities throughout the Greece including Greece islands (from Nicosia with 320 bikes to South Kinouria with 10 bikes). EasyBike is a modern bicycle sharing system launched in 2008. It allows access to shared bicycles in an automated way and calculates the real-time of use and the corresponding charge. The system can serve for permanent users with a special electronic card for rent a bike and for occasional users by mobile phone and a credit card for rent a bike.



2. Framework conditions for implementation

Before the discussion about implementing of BSS scheme in particular region it is necessary to consider several factors that are described in this chapter. As the main information source the *"Optimising Bike Sharing in European Cities", A Handbook, June 2011* was used.

Exogenous factors

Not all BSSs are the same. They consist of different features and characteristics that can (and should) be adapted depending on the exogenously given context (city size and climate).

City size

The BSS can be implemented in large cities as well as in small cities but of course with different conditions. For the purpose of this text the cities were classified by the number of inhabitants as follows:

- Large cities: more than 500,000 inhabitants;
- Medium cities: 100,000 to 500,000 inhabitants;
- Small cities: 20,000 to 100,000 inhabitants.

Technology

Bike sharing technology generally differs according to city size. In most cases, large cities provide technologically advanced schemes, while smaller cities more often provide low-tech schemes.

Scheme size and density

Schemes in large and medium sized cities offer more slots and bikes per station for automated schemes than small cities. This eases the redistribution of bikes which is necessary in most schemes due to uneven demand.

Service availability

Bike sharing availability differs between city sizes. Large cities tend to provide a 24-hour service, while smaller cities tend to close the service during the night. There is also interdependency between scheme technology and opening hours. Schemes that rely on a person in charge for operation are likely to close during the night.



Charges

More of the small and medium-sized cities have schemes that are free of charge for at least 30 minutes.

Rentals

The number of rentals per bike is one of the most important direct success indicators of BSSs. Rentals per bike are usually higher in large cities than in smaller ones. Therefore, schemes in large cities often offer higher station density, easy-to-use high-tech schemes and higher density of destinations, which influences the number of rentals in a positive way. In some cities, where PT is crowded, BSSs provides an alternative mode of transport.

Climate

The local climate is an important influencing factor for cycle usage in different seasons. During the cold season, the BSS demand is probably not only influenced by the weather itself but also by cycling infrastructure conditions (e.g. whether snow and ice have been cleared). More schemes in cold cities than in warm cities closed down during winter. At times of the year when demand is high, additional staff and maintenance activities might improve service quality.

Endogenous factors

Endogenous factors of BSSs can be grouped into the following categories:

- hardware & technology,
- service design;
- operators,
- contracts and
- financing.

Hardware & technology

Access technologies

The access technologies of BSSs are diverse and depend on the size of the system, available financing and the technology used:

- **Cards:** the most common means of access is a (smart)-card. Different types of cards can be used, such as magnet cards, chip cards, credit cards or RFID cards.



- **RFID (radio-frequency identification):** contactless communication gives the operator the opportunity to provide any physical form of means of access. RFID tags can be glued to ID Cards and mobile phones or mounted into key ring pendants.
- **Code-based rental:** the user calls a number or sends an SMS with the required data to a central number and gets an access code or any other access information onto their handset.
- **Key:** some schemes work with keys. The users receive the key for a bike from a device or kiosk where they have to identify themselves before the rental.
- **Person in charge:** some small scale systems do not have any rental technology at all. The bike or the access to it is provided by a local person in charge.

Bikes

The bikes in BSSs differ in design and quality. Nevertheless they share the following general characteristics:

- **Robust parts:** to minimise vandalism damage and to facilitate maintenance, bike sharing operators use robust parts that are easy to replace.
- **Unique design:** to avoid theft and to make the bikes more visible in public spaces, operators use a unique design, which differs from regular private bikes.
- **One size for all:** BSSs almost always offer only one type of bike. Adjustable seat posts make them suitable for most users.
- **Advertising space:** operators financing the scheme with advertising on the bikes, design the bikes accordingly. Frame and parts provide visible spaces for advertisements.
- **Bike locks:** Bikes in schemes with high-tech physical stations are usually locked electronically or mechanically to the docking stations.

Stations

Stations are a feature of most BSSs. They differ mainly in the technology involved. BSSs without stations are not very common, but exist.



- **Low-tech stations:** the bike is locked to the docking point mechanically either with a lock on the docking point or a lock on the bike itself.
- **High-tech stations with docking points:** the most common type of bike sharing station includes docking points and a rental terminal - connected with each other. The bike is locked to the electronically controlled docking point.

Software

Software is needed to operate the system at the back-end (all IT-systems running on the operator's side, invisible to the customer) and at the front-end (all IT-systems with interaction and usage opportunities for customers and potential users).

Service design

Scheme size and density

The scheme size and density is determined by the size of the city or region itself, target groups, financial strength and goals of the BSS. Most urban schemes cover only central, dense areas of the city but provide a station every 300 meters or so, giving the user enough opportunities to move around in the system. Regional schemes are less dense but are usually designed for longer rentals.

Service availability

The service hours and service seasons differ among the cities. Most schemes offer a 24/7 service. However, some close overnight. This is likely to depend on regional characteristics reflecting the climate and/or demand, and also costs of redistribution (fixed personnel cost during nights, for example).

Registration

Registration is required in almost all BSSs to avoid the loss of bikes by anonymous users and to ensure billing and payments. Most systems offer various types of registration to keep access barriers low: at the station, on the internet, by post, by telephone or in person. Registration costs differ from € 0 to some tens of €, depending on the registration period. The registration periods various from one-off registration to yearly registration.

Charges

Charges are designed to support the goals of the BSSs. Most schemes encourage daily short-term use. Thus the first 30 minutes of each ride are free in most systems. The rental



price increases exponentially after the free period, or costs starts from the first minute with a linear charge per time unit reaching a lower daily maximum. Most BSSs also include fines or withholding the user's deposit for not returning or damaging bikes.

Information

Information channels are available to communicate all BSS-related issues from awareness rising to registration and rental. Apart from traditional channels (such as advertisements, websites, newsletters, service centres and call centres), some operators have started using applications (Apps) for mobile handsets and Smartphones.

Public transport (PT) integration

- **Information integration:** bike sharing information is combined with PT information. Station locations can be found on bike sharing maps, websites link to each other and intermodal routing is possible.
- **Physical integration:** bike sharing stations are implemented as a parallel service to relieve PT in peak hours or in areas where PT cannot cover all mobility needs. Bike sharing stations are often located near PT stations.
- **Access & charges:** some schemes offer access to PT and bike sharing with one card. PT users receive special conditions in some cases, such as a single daily charge or discount when using a BSS and other modes.

Target groups and trip purpose

Most BSSs have more than one target group. While the main focus in urban schemes is the daily user who rides to work or to leisure activities, regional schemes often focus on the tourist market. Different target groups are addressed by different communication channels and different charges (table below).



Table 1 Trip Purpose Requirements & Problems

	Work + Education	Leisure	Errands	Tourism
Requirements	Dense station network	24/7 service	Dense station network	Stations near PT
	Stations near PT stations and living quarters	Safety during the night	Lock on bike	Stations near points of interest
	Bikes & slots available	Easy registration (various paying systems, multi language)		Easy registration (various paying systems, multi language)
		Bike parking outside existing docking stations		Bike parking outside existing docking stations
Problems	Lack of rush hour availability	High prices for longer rental	Lack of options to carry goods	High prices for longer rental

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011

Operators

Operators of BSSs can be divided into five main categories:

- Advertising companies, street furniture providers or other public services (e.g. JCDecaux, Clear Channel, Cemusa);
- Publicly or privately owned transport companies (e.g. Call a Bike – DB Rent, EFFIA, Veolia);
- Bike sharing businesses (e.g. nextbike, Bicincittà, C'entro in bici);
- Municipal operators (e.g. Vitoria Spain);
- Associations, cooperatives (e.g. Greenstreet in Gothenburg, Chemnitzer Stadtfahrrad).

Among these, the first two are pertinent to large-scale systems, while the latter two are characteristic of small-scale systems.

Contracts

Usually a contract between the municipality and the operator of a BSS is agreed. Contracts differ in terms of infrastructure ownership and length of the value-chain for each contracting party.



Table 2 Contract Types

	Infrastructure	Operation
Option A1	Contractor	
Option A2	Contractor A	Contractor B
Option B	Contractor	Municipality
Option C	Municipality	Contractor

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011

Bikesharing in Bratislava

Citizens and tourists in Bratislava will be able to rent bicycles at strategic locations in spring 2018. There are 75 seats and 750 bicycles planned in the system. Electric bicycles will also be offered within. Bikesharing is built on a network of stands that are connected over the internet. User, after registration and paying a fee, can borrow the bicycle at one place and return it to the other. The city has a budget of 460 000 Eur for the project. Private company - Slovnaft will contribute up to 1.5 million Eur. The advantage for the city is that Slovnaft will be responsible for the operation itself, including costs estimated at 200 000 Eur per year.

Costs and Financing

Costs and financing are crucial issues in bike sharing. Two different points of view that are often mixed up have to be considered: the costs for investment and operation of a BSS (operational point of view); and the costs arising in connection with the setting-up of a contract with an operator (municipal point of view).

The main costs from an operational point of view can be divided into two main categories: infrastructure & implementation and running costs.

Implementation costs in large-scale systems add up to € 2,500 - € 3,000 per bike, depending on the system configuration. A scheme without stations or a scheme with stations which do not need any groundwork (e.g. solar or battery powered stations) can be implemented at a fraction of the costs of conventional station-based schemes. Implementation costs are usually depreciated over the duration of the contract.

Running costs in large-scale systems are stated as € 1,500 - € 2,500 per bike and year in most large schemes.



Table 3 Example - Running Costs Bicing Barcelona

Running Costs	Share of total costs
Redistribution of bikes	30 %
Bike Maintenance	22 %
Station Maintenance	20 %
Back-end system	14 %
Administration	13 %
Replacements (bikes, stations)	1 %

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011

The main financing sources from an operational point of view are registration charges and usage charges paid by the customer. As many systems offer a 30-minute-period free of charge for each ride, registration charges are most likely to be the most important income source rather than the usage charges. Thus subsidies are needed for most BSSs because revenues from the scheme hardly ever cover the operational and investment costs.

Minimum quality criteria for bike rental scheme

Basic specifications (for small cities, cities with lack of funding possibilities, or with lagging cycling infrastructure)

- Low tech scheme
- Low tech stations (the bike is locked to the docking point mechanically either with a lock on the docking point or a lock on the bike itself)
- BSS service is closed during night or is provided seasonally
- Low charges during the first minutes
- Lower station density (less than 300 m)
- Bike or the access to it is provided by a local person in charge

Advanced specifications (especially in the cases to improve BSS quality in cities with high cycling modal share and already existing of several rental companies)

- High-tech scheme (i.e. using cards, RFID)
- 24-hour service
- Free of charge for at least 30 minutes
- Higher station density
- High-tech docking points (includes docking points and a rental terminal - connected with each other)
- Robust bike part and unique design



- Using specialised software
- Registration is provided by various types (i.e. web, app, post)
- PT integration (Information + Physical)
- Contract with a big (company) operator

Arguments you'll have to deal with

When discussing bike sharing, several arguments or constraints come up regularly. The most common ones are listed and described below.

The city already has a high cycling modal share; people have their own bikes.

Bike sharing is an additional option for intermodal transport. Even though people use their own bikes, bike sharing can be used as a flexible means of transport for short trips and before or after PT rides, without the need for maintenance, or risk of theft or vandalism.

BSSs are expensive.

When evaluating the costs and outcomes of a BSS, positive external effects of the scheme must be considered and compared with other measures competing for the same financial resources.

The city is too small and does not have enough funding options.

Even in small cities with up to 100,000 inhabitants, BSSs can be a useful addition to existing means of transport. PT is often not as well developed as in larger cities. BSSs can therefore be a complement or a substitute for PT. Funding can be obtained with the help of local sponsors, labour market initiatives and social organisations.

A BSS will compete with local bike rental companies.

There are measures to prevent this scenario. The most common options are progressive charges, that increase the longer you use the bikes, or to exclude tourists from the local BSS by only allowing residents to register (as for example in Barcelona). Another option is to involve local bike rental companies in the operation of the BSS.



The city does not even have proper cycling infrastructure. The BSS a) will compete for funding and b) nobody will use the BSS due to the lack of infrastructure.

BSSs should always be combined with other cycling measures. A cycling strategy should therefore comprise infrastructure (such as cycle paths, safe cycle parking stands), choices on infrastructure use, (like bike access to one-way streets, car-parking policy), support for initiatives that encourage cycling (led by user-groups, schools or employers) and communication measures that encourage cycling and other sustainable mobility options. Nevertheless, a BSS can serve as an initial boost for cycling as a daily transport option which creates a demand for additional cycling infrastructure investments requiring decisions on provision and spending.

Cycling is dangerous; a BSS will increase the number of accidents

The safety of cycling very much depends on the quality of cycling infrastructure and the level of cycling in a city. Typical experiences (such as Stockholm and Berlin) are that very high increases in cycling have not been coupled with higher accident rates, even in absolute numbers. Thus, a BSS can contribute to making cycling safer. Finally, studies show that the health benefits of cycling largely outweigh the risks. Nevertheless, accident risks should be taken seriously and measures be taken to minimise them through, for example, information campaigns targeting cyclists, but in particular also motorists.

All the trips will be one-way; there will be a distribution problem

It is important to analyse traffic flows before and after implementation and after that to optimise station planning, not only in terms of mobility needs, but also in terms of the redistribution capacity of the system. Smart algorithms for redistribution planning help optimise redistribution by assigning priorities to the respective stations.

Bike sharing will compete about street space, parking, pavements etc.

Bikes help make localities accessible with the potential to reduce congestion and promote health. It is therefore in the interest of the citizens that they are provided with the necessary means to start cycling. For groups with special needs, disabled, elderly, children etc.; and the transport sector (e.g. within retail deliveries), special arrangements like dedicated parking and time slots, are always possible.



3. Requirements of target groups

The knowledge about requirements and needs of key stakeholders represent the essential part of each successfully function system. The aim of this chapter is to describe the most important requirements regarding the BSS. As the main information source the "*Optimising Bike Sharing in European Cities*", A Handbook, June 2011 was used.

First of all we need to know who the key stakeholders are. The most important target groups within BSS should be defined as follow: politicians and decision makers, operators (advertisement companies and other supply companies, transport companies, municipalities, associations), and end-users (inhabitant, tourists).

Politicians and decision makers

- Improve the 'city image'
- Increase in cycling
- Reduce CO2 emissions
- Manage (public) transport demand

Operators

Advertisement companies and other supply companies

- Visibility
- Contracts across jurisdictions
- Low service and administration costs

Transport companies

- Usage
- Efficiency of investment

Municipalities

- See Politicians above, plus:
- Public benefit
- No 'bad news'

Associations

- Low investment costs
- Low running costs



End-users

- Accessibility
- Reliability
- Comfort & speed



4. Quick-Check of implementation

Before starting of bike sharing system implementation it is recommended to carry out quick-check, that will provide overview of current situation, show you needs, potentials and limits of BSS development. For smooth BSS implementation several points/issues outlined below should be taken into consideration:

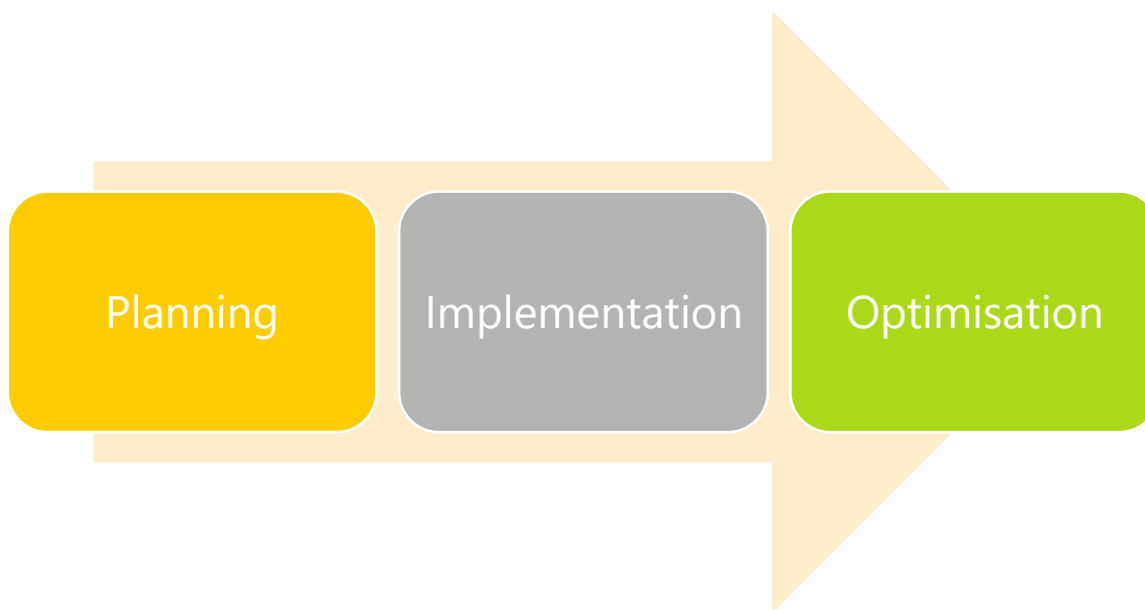
- the existence and implementation of a cycling infrastructure plan for the city or region;
- the construction and maintenance of cycle lanes or paths;
- safe cycle parking places, especially at PT stations and bus stops;
- existing basic culture of urban cycling;
- rate of cycle ownership;
- external conditions that should make cycling difficult (topography, pedestrian dimension of the city);
- the integration of BSSs with other shared modes of transport (PT, car sharing, park-and-ride, ferries);
- identification of target group (tourist and commuters) and taking into consideration its needs (target group survey);
- the existence of touristic attractions (points of interest - POIs) in your region/destination;
- the existence of sustainable mobility services to get to these POIs and to move between them;
- the distance to next railway station or bus terminal;
- the possibilities to get information about these services (e.g. info at the railway station /bus terminal);
- sustainable financing (various sources of funding).



5. Recommendations for implementation

The purpose of this chapter is to provide overview of evolutionary phases of each BSS: planning, implementation and monitoring as well. As the main information source the *“Optimising Bike Sharing in European Cities”, A Handbook, June 2011* was used.

Steps for implementation of bike rental system



Bikesharing systems are also crucial part of Smart city and regions concept Smart city and regions concepts, which combining with public transport systems creates as a smart and ecology way of sustainable mobility in the city. Table 4 Evolutionary Phases of a BSS

Planning	Implementation	Optimisation
Defining goals for urban mobility	Division of tasks: operator models	Steering demand
Defining goals for the BSS	Designing the operator contract	Enlarging the scheme
Getting information	Looking for funding sources	Optimise redistribution
Getting everyone on board		Finding new financing opportunities
Getting ideas		Developing new technologies
Defining a rough concept		Combining BSSs with other means of transport
Writing a tender		

Source: *Optimising Bike Sharing in European Cities, A Handbook, June 2011*



Planning

The planning phase builds the foundation for the success of a BSS. Objectives are set, necessary knowledge about BSSs is gained and a rough concept is developed. BSSs are a part of urban mobility and can have a considerable influence on the environment of a city. Political decision makers and municipal stakeholders of various departments and levels will get involved during the planning and implementation processes, so promoting the BSS among these stakeholders at an early stage of the planning process is highly recommended.

Define Bike Sharing Schemes as a Catalyst of Change

Depending on the size of the scheme and the city, a BSS has the possibility to have an impact on urban mobility. Typically, in successful schemes, 5-8 % of the BSS-users say that they replace car trips. Setting the general goals regarding mobility issues has been identified as an important challenge for municipal stakeholders.

- **Establish a Cycling Master Plan:** The implementation of a BSS is usually only one aspect of such a cycling master plan. Professional cycling strategies contain measures to improve cycling infrastructure and parking facilities, marketing and communication activities, educational programmes, mobility management programmes for companies, etc.
- **Invest in Cycling Infrastructure:** It is highly recommended for cities to invest in cycling infrastructure to make cycling safer and more attractive.

Define Goals

A BSS can have various direct and indirect benefits, depending on the individual design of the scheme. Before a concept for a BSS is defined, it is necessary to know these implications in order to define individual goals for the scheme. Schemes in bigger municipalities often aim to have a visible impact on cycling and urban mobility. Possible implications of BSSs that can be defined as goals are listed below.

- **Increase the cycling:** BSSs with low entrance barriers in cities with low modal share are often used by citizens who have yet not recognised the bike as a daily mode of transport. Positive experiences with cycling are likely to enhance the cycling image and will contribute to a rising awareness of cycling as a comfortable, fast, flexible and healthy mode of transport.



- **Flexible and attractive public transport:** BSSs are a flexible addition and complement to PT, but also an alternative: The BSS network can a) be implemented in areas where PT is not sufficiently available or b) be implemented in areas where PT is crowded. Thus BSSs are an option for PT operators to increase the attractiveness of their services with the more flexible, timetable independent and individual bike sharing offers. BSSs that are integrated into a PT system will make the whole system more flexible and thus more attractive.
- **Job creation:** BSSs need staff, infrastructure and expert knowledge and offer new employment opportunities. Local leisure oriented rental companies can benefit from the increased awareness of cycling.
- **New tourism opportunities:** If BSSs are available for tourists to use, they can be a catalyst to explore the city by bike, but depending on the price structure, BSSs are also a competitor for traditional bike rental companies. In any case, tourists on bikes will experience the city in a sustainable way, saving money on transport that can instead be spent in local businesses.
- **Increase the city image:** A BSS can contribute to the image of a sustainable and modern city, but this should not be the only motive. For big metropolises (Paris, Barcelona, London, etc.) the implementation of a BSS has been a major image factor in national and international contexts.
- **Healthy lifestyle:** Cycling is a healthy means of transport. Numerous studies illustrate that modern societies suffer from the consequences of unhealthy lifestyles. The economic benefits can therefore outweigh the costs for a BSS by far.

Get Information and Get Everyone on Board

Planning and implementing a BSS is a lengthy process which requires significant resources. Thus, getting information and advocating the BSS among municipal, political and other stakeholders at an early stage of the process is one of the most important tasks that must not be taken lightly. It is advisable to call BSS experts into these processes.

- **Activate know-how and capacities in the municipality:** In order to have a better negotiating position towards the operator, it is highly recommended to build up and concentrate practical and administrative skills within the municipality. A bike sharing



'task force' of practitioners and experts in the field of bike sharing (who are independent from any operator) help to discuss opportunities and limits of a BSS for the city/region.

- **Get the support of the politics:** BSSs are dependent on political will to a large extent. Involving politicians from the governing parties as well as from the opposition makes political support more likely over several election periods.
- **Set up a Committee with municipal stakeholders and experts:** It can be difficult to get different administrative levels to work together in a coherent way. In many cities building permissions are required for each of the docking stations. BSS stations that need construction work will compete with other interests for limited public space. In order to get building permissions, the comprehensive support from various municipal stakeholders is needed during the implementation process.
- **Involve the public transport operator:** BSSs have the potential to make the whole PT system more attractive. If the operator of the PT system also has the opportunity to operate the BSS, this should be taken into consideration. Stakeholders, especially PT operators, have to be involved in committees and round tables that identify and resolve such conflicts.

Get Ideas and Define a Rough Concept

Depending on the individual goals, the designs of BSSs are quite different from each other. The institutional and physical design should correspond to the individual goals set for the BSS beforehand. If commuters' daily routines are to be targeted, a different conception is needed from systems that mainly target tourists.

Write a Feasibility Study for your Bike Sharing Scheme

Municipalities planning to implement a BSS should set the objectives beforehand and adapt goals to their individual framework. A professional feasibility study analysing other systems, cataloguing local conditions, drafting different scenarios and analysing future operational figures, should be the foundation of a later decision. Feasibility Study should deal with the issues as follows:

- Conduct Customer Surveys (demand analysis)



- Become aware of the Exogenous Factors of your City (city population, average income, car ownership, bike ownership and mode share, cycling infrastructure, other PT, topography, climate etc.)
- Small Scale or Large Scale Systems (large scale schemes are more costly in absolute terms, however the average cost per trip is lower)
- High-Tech or Low-Tech Schemes ('pro-con' analysis is recommended)
- Station-Based or Flexible Scheme
- Compare Price Structures of Bike Sharing Schemes (according to the set up goal)
- Redistribution of Bikes is Needed
- Bike Sharing Schemes Might Need Financial Support
- Define Data Requirements to Optimise your Bike Sharing Scheme

Prepare a Mini Business Plan

Many municipal stakeholders are not aware of the system components that are needed in the background to run a BSS. The following table gives a very brief overview of this.



Table 5 Mini Business Plan

Mini Business Plan	
Staff for planning & implementation	<ul style="list-style-type: none"> - BSS experts - Financial and legal experts - Marketing and communication experts - Architects/urban planners for planning the system
Staff for operation	<ul style="list-style-type: none"> - Mechanics for repairing (possible subcontractor) - Drivers for redistributing (possible subcontractor) - Customer hotline
Costs	<ul style="list-style-type: none"> - Infrastructure & implementation costs - Running costs
Financing	<ul style="list-style-type: none"> - Schemes are often not self- sustainable - Different financing opportunities
Hardware	<ul style="list-style-type: none"> - Bikes, docking points, station terminals - Trucks for bike redistribution (possible subcontractor) - Tools to repair the bikes (possible subcontractor) - Spare parts - Spare bikes
Software	<ul style="list-style-type: none"> - Back- end - Front- end
Marketing & Communication	<ul style="list-style-type: none"> - Writing a Marketing & communication concept - Designing advertising material - Keeping the website up to date - Organisation of (media) events - Ensure media presence
Integration with PT	<ul style="list-style-type: none"> - Integrating information systems - Integrating tariff systems - Signing in PT stations (e.g. Barcelona) - Usability with the same customer card or account (e.g. Stockholm)
Space	<ul style="list-style-type: none"> - Public space for stations/bikes - Workshop space for repairing and storing the bikes and trucks (possible subcontractor)

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011



Write a Tender

Once all the figures have collected and all opinions have heard, there should be a clear and unanimous ‘yes or no’ decision within the municipality. Depending on the designated BSS, the city starts out with a tender request where the prerequisites are stated. A budget for the planned BSS should be agreed within the municipality to assess funding opportunities and the likeliness of financial sustainability. The large scale systems, supported by the local government, have the largest opportunities to both design a trade-off between public and private involvement, and be sustainable in the long term, in a public private partnership (PPP). Different contract opportunities between a municipality and an operator exist. PPPs can be designed in different ways, for example regarding who makes the investment, and who collects the revenues/stands the risk.

Implementation

Division of Tasks

The division of tasks between municipality and operator is the central decision in view of the call for tender and the operator contract. Contract models are diverse and consequently unique for each city or region. Nevertheless some general distinctions can be made (see table below).

Table 6 Division of Tasks

	Infrastructure	Operation
Option A1	Contractor	
Option A2	Contractor A	Contractor B
Option B	Contractor	Municipality
Option C	Municipality	Contractor

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011

The Operator Contract

Conditional on the long contract duration and the complexity of tasks, operator contracts are broad and individual for each municipality. Additionally nondisclosure makes it difficult to consult existing contracts as examples and inspiration for new contracts. Depending on the allocation of tasks, various areas have to be covered.



Funding Sources

Many large BSSs, such as schemes in Paris or Rennes, were implemented in the framework of advertising contracts. BSSs were implemented as a 'side effect' while advertising space in the city was the main concern. BSSs were implemented in the city without additional costs for the municipality and thus the false impression of schemes without the need for additional funding did arise. In fact, the schemes are financed by lost gains for advertising space. It can be assumed that combined contracts (e.g. BSSs and advertising) are less cost efficient than separate contracts.

Monitoring

Survival of the scheme is the central indicator for success. The more indicators of success developing in a positive direction and the more the stakeholders are satisfied, the longer the system will survive. Determining exactly how to measure success depends on why you are measuring success. It is also important to define the stakeholder in question beforehand.

It is important to recognise that many of these indicators are ex post, (i.e. measurable only after the implementation of a BSS). Therefore, they can only be used as guidelines for cities planning to implement a BSS by comparison with similar cities that have already implemented one.

Cycling Infrastructure of the City

Indicators for cycling infrastructure are:

- In absolute terms:
 - Length of the cycle network in terms of cycle lanes or separated cycle paths;
 - Amounts invested by the municipality into cycling infrastructure: cycle paths and lanes, cycle parking, separated crossings, traffic lights, mobility centres etc.
- In relative terms:
 - Share of the cycle network in the total length of the road network;
 - Share of the investment amounts dedicated to cycling enhancing measures in total (municipal) traffic investments.

Traditionally, these numbers are rarely directly available, so the first step would be to collect this data in the municipalities.



User Accessibility

Many indicators could be connected to this aspect:

- Station-based systems: no. of slots/1,000 inhabitants;
- Systems without stations: no. of bikes/1,000 inhabitants;
- Station density (or bike density) in the effective area of the system/km²;
- Average no. of slots/station;
- Opening hours per day/24;
- Opening days per year/365;
- Number of repairs per total rents (per time unit, e.g. year);
- Average and maximum repair service time;
- Reported number of missing bikes at a station, or parking failures (because of full station) at desired return station, as a percentage of total number of rents.

Safety

Indicators for safety are:

- Total cycle accidents per year/100,000 cycle trips;
- No. of death injuries/100,000 cycle trips.

Bike and Station Design

Indicators for bike and station design are:

- Weight of the bike;
- Number of thefts per year/no. of slots/bikes;
- Number of severe damages to bikes or stations per year/total no. of slots/bikes/stations and development over years of operation.



Financing Model

Indicators for success in terms of financing are:

- Yearly total cost (annualised investment and operation) of the system/slot (station-based system) or bike (systems without stations);
- Daily no. of trips/slot (or bike if well-defined);
- Daily no. of trips as a share of total cycling;
- Cycling modal share in total daily no. of trips with at least one end of the trip in the effective bike sharing area, for (work trips; leisure trips and business trips);
- Cycling modal share in vehicle-km travelled.

Some of these are hard to measure, especially those which require travel surveys, normally not conducted every year because of the cost.

Transport System Integration and Information Technology

Indicators for PT integration are:

- Maximum distance to nearest PT station or bus stop (over all bike sharing stations);
- Share of intermodal trips (e.g. PT + bike sharing) in bike sharing trips;
- Dummy indicator of technical integration, e.g. in the form of the same smart card;
- Dummy indicator of the existence of an integrated car sharing alternative in the same system.

Indicators for redistribution traffic are:

- Mileage of redistribution trucks and emission data of truck fleet; or
- Type of fuel and fuel consumption of the truck fleet.



6. Key success factors from existing best practice examples

Key success factors for survival of BSS should be described in following points:

- Basic cycling infrastructure and maintenance, e. g. snow clearance;
- Existing basic culture of urban cycling;
- Integral policies of cycling and sustainable mobility, and integration of BSSs in those policies;
- Accessible scheme with high bike and docking point availability, opening hours, seasonal availability;
- Usable, easy to understand, distinctive station and bike designs;
- Low theft and vandalism rate;
- Low total costs per bike/ride;
- Sustainable financing source;
- Combination and synergies with PT;
- Smooth and limited redistribution traffic.



7. Suggestions for transnational evaluation of pilot activities

Basic indicators

The list of possible indicators for evaluation is presented in table below. The indicators are linked with stakeholder's requirements.

Table 7 Evaluation indicators

Requirements	Possible indicators
Improve the 'city image'	Number of positive media articles
Increase in cycling	Change in bike mode share (% points), % change in BSS rentals
Reduce CO2 emissions	Number of car trips/total trips replaced
Manage (public) transport demand	Number of PT trips/total trips replaced
Visibility	Number of BSS stations per km ² ; number of daily BSS rents per day and night population; VAC (visibility-adjusted contacts)
Contracts across jurisdictions	Number and share of contracts in the metropolitan area
Low service and administration costs	Service and administration costs/bike
Usage	Number of daily BSS rentals
Efficiency of investment	Number of daily BSS rentals/bike
Public benefit	Time gain and financial gain of user per BSS rental
No 'bad news'	Number of negative media articles, number of accidents/thefts/cases of vandalism
Low investment costs	Annualised investment cost
Low running costs	Running cost
Accessibility	Density of stations, opening hours
Reliability	Cases of full/empty stations
Comfort & speed	Weight of the bike

Source: Optimising Bike Sharing in European Cities, A Handbook, June 2011

Questions need to be addressed

The following questions need to be addressed during the pilot activities evaluation:

Is the cycling infrastructure of the city proper and maintain?

One important element is the construction and maintenance of cycle lanes or paths, direction signs for longer cycle routes, different safety measures at places of interaction with



cars (such as junctions) and pedestrians (such as zebra crossings and where cyclists pass bus stops), safe cycle parking places, especially at PT stations and bus stops, etc.

Is the BSS easy accessible for users?

The system is easy to access, both in space and time. It covers the ease of the registration process to make it simple to use the first time; the density of stations, or in the case of systems without stations, density of bikes at demand nodes; the dynamic access to both functioning bikes at the stations, as well as empty slots at the destination; the rapid repair of malfunctioning stations and bikes; and the hourly and yearly opening times.

Is BSS safety enough?

The BSS must be safe to use. Much of this criterion also applies to the cycling infrastructure on the whole, but some aspects are scheme-specific, for example the location of the stations as well as the visibility and functioning of the bike sharing bikes (lights, brakes, parking etc.).

The location of the stations should be safe and not inconvenience other road and pavement users. It also must not interfere with other users of the public space, such as cleaning vehicles, snow clearing, disabled access and so on.

Is the bike and station design unique and sustain?

One important criterion of the bikes, and their locking into the docking stations, is that they should be robust enough to stop vandalism and theft. The bikes should also have a uniform and distinct appearance so that they are visible in the traffic, just like other PT modes, to strengthen the identity of the system and to improve safety.

Is there an adequate financing model?

Two aspects of the BSS are decisive for the financing model: the ambitions of the local government, and the size of the system relative to the city size.

Was BSS integrated to existing transport system?

The integration of BSSs with other shared modes of transport (PT, car sharing, park-and-ride, ferries) in terms of registration, payment, common smart access cards etc. enhances the possibilities for the users to combine modes seamlessly and contributes to making their transport cheaper and more efficient.



Was the redistribution of traffic achieved?

In order to maintain the service level of the system and meet the local demand for bikes at the stations instantly, a constant redistribution of bikes from destination points to points of origin is needed. Normally, the origin and destination points shift roles throughout the day, when commuter flows change direction.

Were stakeholders involved during the preparation (planning) phase?

Stakeholders, especially PT operators, have to be involved in committees and round tables that identify and resolve such conflicts.

Was a Feasibility Study (with preliminary business plan) for your Bike Sharing Scheme elaborated?

A professional feasibility study analysing other systems, cataloguing local conditions, drafting different scenarios and analysing future operational figures, should provide basis for a later better decision.

Are practical and administrative skills of municipality experts sufficient?

It is highly recommended to build up and concentrate practical and administrative skills within the municipality.

Was Committee with municipal stakeholders and experts established?

The comprehensive support from various municipal stakeholders is needed during the implementation process.

The division and complexity of tasks between municipality and operator is clear?

Contract models are diverse and consequently unique for each city or region.

The monitoring indicators were clearly defined?

Survival of the scheme is the central indicator for success. The more indicators of success developing in a positive direction and the more the stakeholders are satisfied, the longer the system will survive. The detail information about monitoring indicator can be found in chapter 5. *Recommendations for implementation.*



8. References

Bike-share System Web Pages

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- BiciBur (Burgos, Spain): www.bicibur.es
- Bicing (Barcelona, Spain): <http://www.bicing.com>
- BikeMi (Milan, Italy): <https://www.bikemi.com/en>
- Bixi (Montreal, Canada): <http://www.bixi.com/home>
- Bycyklen (Copenhagen, Denmark): www.bycyklen.dk
- Call-a-Bike (Germany): www.callabike.de
- Citybike Wien (Vienna, Austria): www.citybikewien.at
- Cyclocity (Brussels, Belgium): www.cyclocity.be
- Dublinbikes (Dublin, Ireland): <http://www.dublinbikes.ie/>
- EasyBike (Greece): <http://www.easybike.gr/?lang=en>
- MOL BuDi (Budapest, Hungary): <https://molbubi.bkk.hu/>
- Oslo Bysykkkel (Oslo, Norway): www.oslobysykkkel.no
- OV-fiet (Nederland): <http://www.ns.nl/en/door-to-door/ov-fiets>
- Santander Cycles (London, England): <https://tfl.gov.uk/modes/cycling/santander-cycles>
- StadtRAD Hamburg (Hamburg, Germany): <https://stadtrad.hamburg.de/>
- [TO]Bike (Turin, Italy): <http://www.tobike.it/>
- Valenbisi (Valencia, Spain): <http://www.valenbisi.com/>
- Vélib' (Paris, France): www.velib.paris.fr
- Vélo à la Carte (Rennes, France): <http://veloalacarte.free.fr/rennes.html>
- Vélo'v (Lyon, France): www.velov.grandlyon.com
- Veturilo (Warsaw, Poland): <https://www.veturilo.waw.pl/>

Operators

- Advertising companies, street furniture providers or other public services (e.g. JCDecaux, Clear Channel, Cemusa)
- Publicly or privately owned transport companies (e.g. Call a Bike – DB Rent, EFFIA, Veolia)
- Bike sharing businesses (e.g. nextbike, Bicincittà, C'entro in bici)
- Associations, cooperatives (e.g. Greenstreet in Gothenburg, Chemnitzer Stadtfahrrad)



Overall conclusions

The main purpose of the document is to provide guidance (1) to bodies interested in the development of bike sharing services from its planning, implementation to operation in cities and municipalities along the whole Danube River (2) as well as to stakeholders, which in cooperation with partners providing public transport services, want to support the development of cycling infrastructure to provide increased comfort of the cycling tourism and transport.



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