Problem Statement
A NYC Bike Sharing System

We provide a comprehensive survey of bicycle-sharing service planning problem studies. We offer a systematic classification of the problems. We introduce a novel planning process for bicycle-sharing services. We identify potential research gaps.
We provide future research directions.

Decision-making level	Planning activity	Major independent inputs	Outputs/Decisions
Strategic	Bikeway network design	Network topology (including vehicular roads and sometimes existing bikeways and bike stations) Bike origin–destination (OD) demand data Bikeway characteristics Budget	New bikeway layout (and sometimes bikeway type)
	Bicycle station design	Network topology OD demand data/station demand Station characteristics	Station locations Station sizes
	Fleet sizing design	OD demand data/station demand Station locations/characteristics Budget	Initial station inventory levels Total bicycle fleet size

Tactical	Static bicycle relocation	Bicycle station network Relocation fleet (The capacity and number of vehicles in the relocation fleet) The initial state of each bicycle station	Vehicle routes Pickup and drop-off quantities of all stations
	Static demand management	Bicycle station network Nominal OD demand data/arrival and departure rates	Demand regulation strategies (e.g., incentive details such as locations, prices; and parking space reservation)
Operational	Inventory level management	Bicycle station network Users' departure and arrival rates/time-dependent OD demand realizations The probability that a bicycle is returned to a station in an unusable condition (when broken bikes are considered)	Target inventory levels/the target range of inventory levels, and/or the number of broken bikes at all stations

Dynamic bicycle relocation	Repositioning fleet information (Repositioning vehicles available, vehicle capacities, and operating costs) Bicycle station network Initial bicycle level and capacity at each station Target bicycle and bicycle rack levels at each station in each period Time-dependent bicycle rent and return data Time-dependent travel speed	The repositioning routes of all vehicles Loading and unloading activities at every visited station (for bike repositioning) Bicycle flow per each pickup and drop-off station pair in each time interval (for relocation service)
Dynamic demand management	Bicycle station network Time-dependent OD demand data/arrival and departure rates	Demand management strategy in *each time interval* within a day (e.g., incentive details such as time, locations, prices, and parking space reservations)