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A service evaluation in the shared mobility sector: Bitride Bike Sharing project

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Abstract

Zehus Spa is an Italian company that represents a European excellence in the field of human-electric transport vehicles, selling to over 120 bikes manufacturers all over the world. In 2017 the company started the Bitride Bike Sharing project, with the purpose to develop a new hybrid free-floating bike sharing program based on the award-winning “BIKE+ All In One”, the first powertrain for full hybrid bikes that does not need to be recharged from the grid.

The Bitride solution introduces several new characteristics that differentiate the model from the competitors, such as the concept of fee gamification, a multi-polar service area composed by several geo-fenced “virtual parking areas”, and sophisticated sensors embedded within the bikes.

Zehus has planned to introduce and test the service model starting from the city of Milan, thanks to a pilot project divided in two different phases: the first one with a limited number of bikes, a selected number of users and within a delimited area of the city, in order to specifically validate the technology and the service model; the second phase that will involve the entire city center and all the citizens to validate the business model.

KEYWORDS: service evaluation, service monitoring, shared mobility, bike sharing

Introduction: the context of sustainable and shared mobility

The transport sector is the fastest growing source of greenhouse gas emissions worldwide. Particularly in emerging countries, the increased use of cars is contributing to low air quality, traffic congestion, urban mobility issues, and pollution (Li and Voegelé, 2017). For these reasons, in the recent years sustainable urban mobility has become one of the most important challenges for big cities. Various innovative initiatives and best practices are emerging all around the world, tailoring and scaling services according to emerging user needs and preferences. Among these, the shared mobility phenomenon is receiving increasing attention (Osservatorio nazionale per la sharing mobility, 2016).

In this scenario, bike sharing has been growing over the past decades and it is predicted to grow at a very fast pace, providing all citizens a new means of urban transportation (Cohen and Kietzmann, 2014; DeMaio, 2009).

Zehus Spa and the “BIKE+ All In One” technology

Zehus Spa is a leader company in the world of technological innovation associated with the field of light electric mobility and hybrid power systems production for the electric bikes manufacturers. Zehus business model initially focused exclusively on developing and selling the patented hybrid technology, but the dynamic nature of the company allowed the shift from a product-based model to a service-based one. The intuition was to exploit the potential of the award-winning “BIKE+ All In One” technology to introduce a new bike sharing model into the urban context.

“BIKE+ All In One” consists in an innovative cycling solution that, using a sophisticated and ‘smart’ power pack, reduces the cyclist’s fatigue by managing energy efficiently, supporting the ride during the most strenuous actions (starts, accelerations, uphill), recovers the energy when it would be otherwise lost (decelerations, higher constant speed, downhill) and never needs to be recharged from the grid.

The Bitride Bike Sharing Service

In 2017, Zehus participated to the Horizon 2020 program of the European Commission, including service design competencies into the project and involving the Department of Design of Politecnico di Milano. Other project partners are Labor, a research and engineering laboratory, and AMAT, the Milanese Agency for Mobility, Environment and Territory, in charge of providing strategic planning and technical studies for urban mobility. The project officially started in February 2017 and it will end in November 2018.

Bitride was structured as an action-research using the traditional phases of a service design process, including:

- The definition of the research framework, the analysis and exploration of the shared mobility context, with a particular focus on the Milanese one (research phase);
- The interpretation of the research insights and the generation of ideas useful to define the final bike sharing service concept (concept generation phase);
- Design and implementation of the service solution and the Bitride App (service development phase);
- Design, execution and monitoring of the two phases of the pilot project (validation phase);
- Refinement of the service solution and the Bitride App (implementation phase).

In order to improve the creative process and organization of the project, awareness of customers and internal cooperation on innovation, and better matching offer and needs from a user perspective (Steen, Manschot, and De Koning, 2011), every step of the process has been conducted in a co-design perspective (Holmlid, 2007; Sangiorgi, 2012), involving all the project stakeholders and partners. Co-design activities have been structured in the form of collaborative creative sessions (such as workshops, meetings and user tests) aimed at generating and testing solutions, sharing ideas and taking decisions through collaboration.

The result is the Bitride Bike Sharing service, a premium free-floating bike sharing service that provides hybrid bikes empowered by the “BIKE+ All In One” technology. Coherently with leading free-floating services worldwide, Bitride is an app-based service that allows users to register, locate, and rent the shared bikes through the Bitride App. Accordingly, the service is cashless, since it exclusively implies digital payments, and the fare system is based on a ‘pay-per-ride’ approach: users charge credit into a virtual wallet on their app, which is deducted according to their use of shared bikes.

The main characteristics that differentiate Bitride from its competitors are:

- The fleet is composed by hybrid bikes that allow users to experience three unique riding modes (Hybrid, Boost and Standard);
- The Service Area is composed by Free-Floating Areas and Parking Areas, with peculiar characteristics and rules;
- The service adopts a bottom-up approach for the relocation of shared bikes, engaging end users through a Scoring System aimed at rewarding responsible behaviors and the active contribution to the service;
- A sophisticated sensing systems allows profiling activities based on the users behaviors, allowing to detect misuses and, thanks to the double mechanical plus electronical lock, helping to prevent vandalism phenomenon;
- In addition, the sensors allow to have a real time control of fleet position and to generate heat maps that track the user's movements, to have a real time control of pollution levels (qualitative data on CO₂ levels) and to collect data in real time about the road quality.

Bitride Bike Sharing is a free-floating bike sharing (FFBS), an innovative bike sharing model that saves on start-up cost, in comparison to station-based bike sharing (SBBS), by avoiding construction of expensive docking stations and kiosk machines. However, like SBBS, the success of FFBS depends on the efficiency of its rebalancing operations to serve the maximal demand as possible. To face this, Bitride hybrid free floating bike sharing service introduces new parking system concept. Zehus will create specific virtual parking areas to keep the public order and to create a homogeneous distribution of smart bikes. In the virtual parking areas, it's allowed to park the smart bike and so the user can close the ride. While the whole city will be the free floating area, the user can finish the ride just in these specific zones. This advantageous system of parking tries to solve the problem of a nonhomogeneous distribution and of public disorder found with the traditional free floating bike sharing in several big cities.

This innovative parking system is strictly connected to the Scoring System: users are encouraged to park the shared bike within one of the Parking Areas, earning the corresponding amount of points depending on the need of bikes of the area. Moreover, users can earn more points by renting 'Starred Bikes', bikes that need to be relocated and parked within a Parking Area. The Scoring System also encourages registered users in communicating issues directly or indirectly encountered while using the service. Once achieved a certain amount of points, these are automatically converted into free rides in the Hybrid mode. On the other hand, the Scoring System also attempts to discourage negative behaviors by deducting points from the user profile depending on actions that openly go against the service rules or traffic laws and that are detected by the sensors embedded on the bikes.

The evaluation process of the Bitride Bike Sharing service

To avoid the risk of wasting resources in the implementation of a poor service, and to loose competitive advantage, the service design approach envisions a validation step prior to the launch of the service solution on the market. Referring to the Bitride Bike Sharing project the validation is done through the set-up and monitoring of a pilot version of the service in a selected area of the Milan municipality. The pilot aims at verifying all the designed elements, both individually, as well as the overall system and user experience. The pilot entails two different steps of execution. The first step, called phase 1, implies the implementation of a reduced version of the bike sharing service (for example, excluding the payment process), through the deployment of 50 bikes, addressed to a selected community of users belonging to the community of Politecnico di Milano. These users, students, professors, administrative personnel, are exposed to a list of 'missions' to be accomplished over a period of three months, in order to test key dynamics of the usage process. The pilot project phase 1 is

going to be implemented from April to June 2018 in the area of Città Studi of Milan. The second step, called phase 2, implies the deployment of further 300 bikes into the pilot area, corresponding to the city center, and the implementation of service features previously excluded. The pilot project phase 2 is going to be run from June to September 2018. Moreover, this second version is not addressed to a selected community, but open to market, thus requiring promotional actions aimed at stimulating Milan citizens in subscribing to the service. The service evaluation will be conducted through a direct observation of the users' behaviours (interviews and surveys) and through the analysis of the data collected via the Bitride App. All the data collected will be used to improve the service offering and experience and to validate some business assumptions.

Future challenges and future developments

The last step of the process entails the preparation to the service implementation and the effective launch of the service on the market. It is a very delicate phase, which requires the provider organization to adapt structures, processes, relations, and competencies to the production of the service and the execution of the related performance, including communication activities necessary to promote the service offering. This also implies planning the roadmap for implementation over time, envisioning short, medium and long-term business objectives. Referring to the Bitride Bike Sharing project this phase consists of refining the service model and the Bitride App based on results of the pilot monitoring activities, so to avoid the misuse of the service. Zehus' goal is, indeed, to test and validate the system within the city of Milan and work on the scalability and replicability of the service in other contexts. After the pilot phase, Zehus will mainly work as a technology and service provider for other bike sharing operators or municipalities. Currently, the company is working on the definition of several commercial agreements with different potential clients.

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