

Specification of business processes

1. Business goals of the organization

"Thunder rental" is a company providing a service of scooters for rent. Scooters are placed around the big cities in Poland and are available to rent using the mobile application. They are available to rent for minutes, the user is paying for the unlock of the scooter, and then he is charged according to the time (per minute).

The main goal of the company is to **maximize profitability by increased ridership and efficient scooter operations**. To achieve this goal "Thunder rental" assumes an **increase in scooter rentals by 3% annually**. To evaluate this goal "Thunder rental" monitors two main metrics: **monthly number of rentals** and **average rental time**. It assumes that the company is successful if there is a **rising trend for both of these metrics at a level not lower than 0.25% per month**.

The other goal of the company is to **acquire as many as possible new mobile app users**. To achieve this goal "Thunder rental" assumes a **5% rise in the number of mobile app users quarterly**. To evaluate this goal "Thunder rental" monitors two main metrics: **monthly number of new registered users** and **average number of recommendations (referred users) per customer**. For a company, success is measured by achieving a minimum combined **monthly increase of 0.50% in both newly registered users and recommendations per customer**.

The main issues in the business include buying, renting, servicing and charging scooters. The customers are renting scooters via mobile app and in the same way they are ending their rentals. Each scooter available for rent is a certain version of the specific scooter model. Scooters are provided by external producers. The maintenance of the scooters takes place every day in the evenings.

The CEO of the company seeks to understand the influence of time of the day on the vehicles utilization, check if there are present any times of increased demand. Moreover, he wants to know the cities with the highest usage of scooters. In addition, the CEO wonders if the customers' decision on rental depends hardly on the battery level of the vehicle.

2. Business processes

Rental of the electric scooter

- a) A general description of the business process and a description of the performance metrics generated by this process, possible current analytical problems.

The process of scooter rental looks as follows: Customer open a special smartphone app prepared by a rental company. Customer navigates to the map with highlighted locations of scooters available to rent. He locates the preferred vehicle and finds out its exact location. Then he needs to walk closely to the scooter. A device has an qr code on its aluminum frame. Client has to open the mobile app, choose an option to scan device QR code and direct the device camera in the direction of the code. The app automatically recognizes the vehicle and starts the process of unlocking it. The system checks if the user has sufficient funds credited or if he has any connected debit/credit card. System charges user PLN10 at the start of the ride. If the verification results are successful, the start of rental is recorded in the system, device unlocks and is prepared for the ride. Users are allowed to travel within the specific area in the city and park vehicle in any safe place. Also, the user has real-time information about this rental in his mobile app. The end of the rental is resolved by clicking the “end rental” button in the app. At this moment, the system calculates the whole charge for the service and decides if it needs to charge the customer more money to line up with the charge, or if it needs to refund the part of funds. It makes appropriate operation on the user’s e-wallet or credit card and sends a bill to the connected email account. Device locks, it is not able to ride further. User receives the confirmation of the successful operation in the app. The information about the ride is saved to the database.

b) Typical questions

1. What is the average rental duration for scooters?
2. Which areas of the city see the highest demand for scooter rentals?
3. What is the average number of rentals per age?
4. What percentage of users experience failed unlocking attempts due to insufficient funds?
5. How many rentals does a scooter have per day on average?
6. Are there specific times of day or days of the week when scooter usage is highest?
7. What is the average travel distance per scooter rental?
8. What percentage of users require a refund after ending their rental?
9. What is the average battery life remaining on a scooter at the start of each rental?
10. What is the average battery life remaining on scooters at the end of each rental?
11. Give the average number of rentals per user per month.
12. Compare the numbers of rentals between various models of scooters.
13. Compare the number of rentals of the current month with the number of rentals of the previous month.
14. Compare the number of rentals between cities.
15. Show the number of rentals from each month for the last year.

c) Data

Data originates from two primary sources: the mobile application used by customers and the scooter management system employed internally. Details about the rental, user information (optional), and app usage are examples of the data collected from the mobile app. Vehicles ids, their location, battery levels, maintenance history, operational status are all tracked by the internal management system. External data is also used when it comes to maps displayed to users in the mobile app and the weather information.

Vehicles maintenance

- a) A general description of the business process and a description of the performance metrics generated by this process, possible current analytical problems.

The vehicle's maintenance process is as follows. Every day in the evenings, the employees are taking scooters, which have low battery or were reported as defective ones from the streets to the places in which they are charged. They are taking them by specialized buses. After arriving at the destination, vehicles' QR codes are scanned into the internal system and connected to the chargers. At the same time, while charging, employees are assessing the condition of the scooters and report problems and damages. After the scooters are successfully charged they are putting them back for usage in the most convenient places in the city and scanning their QR codes again. If the problem makes it necessary to repair the scooter, the defective ones are being transported to the external mechanics company. When the mechanics finish their work, the scooters will be put back for usage alongside the charged ones.

- b) Typical questions

1. What is the average time it takes to collect, charge, and redeploy a scooter?
2. What percentage of scooters require repairs after being collected?
3. Which areas of the city have the highest number of low-battery or defective scooters collected?
4. What are the most common types of repairs needed for the scooters?
5. What is the average turnaround time for repairs by the external mechanics company?
6. Which models of the scooters are ones that have the most reported defects?

- c) Data

All maintenance data are extracted from the internal management system. Management system stores information about the identification number of the

scooter, the location (coordinates) from which it was collected, the time and date of the pick-up, the employee that is picking up a scooter and scooter's battery percentage (thanks to QR code scans). Moreover, every scooter has assigned information about its model and producer in the database. Due to information about the location of the scooters we know the route which the bus has taken. The system is monitoring the charging time of the scooters. The same data collected during pick-ups of the scooter is collected when scooters are put back for usage (again due to QR code scans). When the scooter is taken to the external mechanic company, the employee enters data such as identification number of the scooter, defect that has occurred, date and time of the submission for repair, mechanic company name and later the date and time of picking the scooter back in the special CSV file.