



CUSTOMIZE: Customer-Driven Prescriptive Analytics For Logistics Planning

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On-demand systems place customers at the heart of their operations. These services are cost-intensive businesses while being low-margin and scale-driven. Therefore, their business survival depends on providing a convenient service to the customers.

In the CUSTOMIZE project, we enhanced the customers' convenience at two different levels. First, at the strategic level, we investigated customers' delivery preferences. We used the case of medication delivery provided by PostNL. Second, at the operational level, we studied the interaction between customers and service providers (supply-demand interactions) to improve the delivery service by influencing their interactions. The latter level was introduced to the current operations of Thuisbezorgd.nl.

The proposed approach has been applied and used by meal-delivery services at Thuisbezorgd.nl. Meal delivery services are a 200B \$ market with a historical growth of 8 percent. Since the start of the pandemic, their market has doubled due to the pandemic. Similarly, most of the targeted customers at PostNL are the elderly, the most vulnerable groups for Covid, and the demand for home delivery significantly increased. The timing was perfect for this project, as both companies faced a surge in their demand that enabled us to see the real benefit of our proposed approach.

In the current practice, food delivery system uses a myopic courier-order assignment approach. Upon orders arrival, a pre-defined delivery time is shown to the customers. Once the order is placed, the closest driver is assigned to deliver the order. This approach has three main issues: first, the display delivery time does not show the reality (over-promised). Using the closest driver leads to a situation in which customers living in the city centre receives a high-quality service unlike the ones living in the suburbs. Third, this practice magnifies the spatial-temporal imbalance between supply and demand.

In this project, the proposed model tells the platform when it is suitable to steer customers' demand (e.g., prolonging the displayed delivery coupled with compensation on delivery fee) and steer couriers (relocation, waiting, service). The model has been tested and validated using the data of several European cities. A summary of outcomes is as following: 1) the average delivery

times are significantly reduced, 2) the width of delivery time distribution is decreased resulting in improving the standard deviation by 20% (reliability of the service). 3) Providing the same service level, using the proposed approach requires 8% fewer drivers.

The impact of this project can be seen from two perspectives. First, it helps the companies improve their service level operations under severe uncertainty and sudden changes while elevating the service quality for the end users. It also enhances service reliability. Second, it improves equity. That means all the customers will receive the same service level (elderly in case of PostNL).