

# Data-driven Solutions for Large-scale Agile Demand Forecasting at Digital Platforms\*

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## Abstract

Optimizing on-demand deliveries is of existential importance to platform businesses, which, given their size, requires planning ahead in real time using automated forecast procedures. Platform businesses that can swiftly adapt to newly incoming demand data streams which exhibit strong seasonality, irregular growth patterns and nonlinear dynamics can obtain a competitive advantage. We propose a fast streaming demand forecast approach tailored towards these characteristic features of platform data and build in a dynamic adaptation of the model when forecast performance starts to worsen due to a rapidly changing environment. We empirically demonstrate the benefits of such an approach on all UK delivery areas of an on-demand last mile delivery platform. We find strong performance gains against several industry benchmarks across different forecast error loss functions. We study managerial implications for the platform business by computing financial metrics based on economic loss, by computing operating costs, and by establishing relationships between size of the delivery areas, their location, market growth, and forecast performance.

JEL Classification: G12

Keywords: E-commerce; Platform econometrics; Streaming data; Forecast breakdown.

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