

DOCTORAL PROGRAMME

CAPACITY MANAGEMENT IN RIDESHARING OPERATIONS

By

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INDIAN INSTITUTE OF MANAGEMENT
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Abstract

Many ridesharing platforms are struggling to become profitable. The answer to profitability partly depends on how well they manage their capacity. Specifically, how effectively they deal with two major capacity-related challenges - (1) providing reliable service using independent service providers (self-scheduling capacity), and (2) improving utilisation levels of the existing capacity. Motivated by the two challenges, we develop stylised models to provide insights to platforms on effective mechanisms for overcoming them.

In chapter 2, we address the challenge of improving capacity utilisation in the context of shared rides. We propose a novel pricing mechanism that incentivises riders to join the largest-size pool instead of smaller ones. Riders joining large-size pools improves vehicle occupancy, which in-turn increases capacity utilisation. The incentive mechanism also ensures no rider benefits at the cost of others. Further, we provide insights on maximum acceptable detouring to passengers in shared rides.

To deal with the challenge of providing reliable service, many platforms employ full-time service providers in addition to self-scheduling capacity. These service providers work exclusively for a platform and have limited flexibility, unlike self-scheduling service providers. For such situations, in chapter 3, we provide insights on how to deploy full-time capacity. We examine four operating models corresponding to four different ways a platform can deploy full-time capacity. Our findings show that asset-light platforms can achieve the same optimal profits using alternate operating models than what is currently being used by them. The presently used operating model risks being perceived discriminatory against self-scheduling service providers. The possibility of implementing alternate operating models can help platforms overcome this risk.

While our focus in chapter 3 is on deploying full-time capacity, in chapter 4, we determine the optimal levels of both full-time and self-scheduling capacities. We characterise the optimal mix for a platform facing random demand. Our results

show that the size of full-time capacity is not always decreasing with the size of self-scheduling capacity, which is counter-intuitive. The direction of the relationship between them, according to our results, depends on the threshold value of full-time service providers' compensation.