Store Network Design for Omnichannel Retailing

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Physical stores contribute to omnichannel retail performance not only through direct in-store sales, but also by shaping consumers' online purchasing behavior. However, the distinct effects of store network characteristics—such as proximity, store density, assortment breadth, and inventory availability—on purchasing behavior across channels remain insufficiently understood. Using longitudinal consumer-level activity data, we estimate how store network characteristics influence sales in offline, pure online, and hybrid channels, where purchases are initiated in-store but fulfilled online. We geolocate consumers and link their purchasing activity to the characteristics of the store network within their catchment areas. Our analysis distinguishes between accessibility-related factors and service-quality dimensions, including assortment variety and product availability. We find that improved access to stores increases sales across channels. In contrast, higher service quality in the physical store network boosts offline sales while reducing sales in online and hybrid channels. Through counterfactual analyses, we show that omnichannel retailers benefit from maintaining dense store networks to sustain high sales levels, challenging the recent trend toward store closures. Our framework provides a practical tool for evaluating and optimizing physical store network strategies by simulating the sales impact of network modifications.