Project Title:Three-echelon Collaborative Slot Allocation Planning for Liner Shipping Revenue Management Under Uncertain Demand
研究項目:推行不確定需求下班輪運輸效益管理的三級合作艙位分配策劃
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Abstract

In the highly competitive maritime ship liner business, ship liners continuously encounter mismatches between supply and demand and intense price-cutting actions by their rivals. Most liners actively improve utilisation of mega-vessels and form alliances to lower their operation costs and enhance their service network. International liners run long-haul services with vessel slots to be used with shipments from multiple trade lanes, with the slot management considering multiple loading and discharging ports, shipment yields and empty repositioning from the perspective of local, regional and global slot planning operations. Hong Kong, with the role of providing high–value-added maritime services, is transforming to assist liners to operate and plan the loading and discharge of thousands of containers in various ports from regional and global perspectives. This involves vessel slot planning, phasing in and out of vessels in a service loop, container fleet management, service network planning and yield management. Current slot planning operations in liners only provide feasible solutions without optimising the yield of each service trade lane. Previous academic studies focus only on vessel allocation and slot planning of a single service loop on a single trade lane and thus unable to reflect and solve the real situation, which requires cargo shifting amongst multiple service loops due to possible cargo overload and port omission. There are also long-haul services that seek to utilise space by delivering short-haul shipments on the vessels' open spaces. A novel three-echelon collaborative slot allocation planning model operating with the dynamics among local, regional hub and global scales on container loading and discharge at various vessels in multiple ports. The model will assist trade traffic planners in communicating with regions for slot management and in maximising slot usage and yield, especially in the revenue leg. The importance of a vessel allocation tool also ensures that cargo dimensions and weight fall within the cargo payload capacity and verified gross mass requirements. This cargo selection and allotment could prevent vessels from sailing with excessive weight, which can result in vessel damage, excessive fuel usage and the emission of unnecessary environmentally unfriendly greenhouse gases. Maritime ship allocation planning enhancement and optimisation in daily operations will also be adopted in teaching to improve students' knowledge of complex maritime operations and advanced simulation tools.