Chapter 9
An Overview of Feeder Services in the Era of Mega Containerships

Olcay Polat
Pamukkale University, Turkey

ABSTRACT

In the era of mega containerships, global containership liners design their transportation service as Hub-and-Spoke networks to improve the access to local transportation markets and to reduce operational costs by using short-sea connections for low-volume transportation lines. Feeder services play an irreplaceable role as logistics service provider in global shipping because of considerable benefits resulting from an increased port range, elimination of port restrictions, small sized ships with increased service frequency, the use of mega containerships, savings in network cost, and decreased inland traffic and air-pollution. In addition to main advantages of feeder service, efficient distribution of containers to faraway regions through feeder services out of the main line regions could subsist in a worldwide market. The aim of this chapter is to analyze the role of feeder services in liner shipping and provide information about major challenges that feeder service providers face in planning their logistics networks in the era of mega containerships.

INTRODUCTION

International merchandise trade is one of the most important factors affecting the container shipping demand. Parallel to international merchandise trade, total world container shipping trade increased from 28.7 million TEU (Twenty-foot Equivalent Unit) in 1990 to 171 million TEU in 2014, and worldwide container port throughput has increased from 88 million TEU in 1990 to 684 million TEU in 2014 (UNCTAD, 2015). Despite the rise of trade, the cost of shipping containers (freight rates) has fallen dramatically since its initiation. Low freight rates, increasing oil costs and the recent financial crises of the 2000’s have tremendously affected the liner shipping industry. As a result, many shipping lines operate their service with margin losses ranging from -3% to -25% in 2011 (Alphaliner, 2016b). The

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decreasing margins resulted in increased focus of the industry to redesigning service networks in order to operate more efficiently.

Parallel to the increase in containerized trade, the complexity of liner shipping services has increased. A liner shipping carrier usually has a global service network, consisting of several main (i.e. trunk) line loops between multiple continents operating with fixed schedules. Liner shipping carriers have mainly two different design alternatives for their service networks: multi-port-calling (MPC) and Hub-and-Spoke (H&S) networks. In H&S networks, main ports are usually served by mega containerships travelling in deep seas and feeder ports are served by feeder containerships in regional seas.

The evolution of H&S networks, particularly in minor trade routes like the Black Sea, Africa and Latin America, is a recent popular challenge to deal with in liner shipping. The expansion of demand for containerized goods has developed a growing number of ports in both national and regional markets. The growths in the containerized trade, increasing global containership fleet, size of mega containerships, and the number of container ports are all results of expansion of global markets (Notteboom, 2004). This evolution has also led to the categorization of container ports into three categories: hub ports, feeder ports and trunk (main) ports (Zeng & Yang, 2002). The hub ports are located where container transshipment may take place between trunk (main) and feeder containerships. Feeder ports are regional hinterland gateways linked to over-sea ports with feeder containerships via hub ports. Trunk (main) ports are regional ports called by trunk ships due to their relatively high demand volumes.

The development of H&S networks has also driven the development of efficient feeder services. Feeder service networks comprise ships that visit a number of regional ports along predefined feeder ports and feed trunk containerships so as to avoid their calling at too many ports in the region. The container feeder network design depends on the characteristics of feeder ships, the feeder ship ports, the operating and chartering costs of the ships and bunker costs as well as container demand of the ports.

Logistics service providers play the role of intermediaries which take on the completion of logistics tasks and provide accurate and timely information among the whole partners (Spulber, 1996, 1999). Today, feeder lines are also play the intermediaries role for the complex service networks between regional shippers and trunk lines in global shipping networks. They are not only container transportation companies but also logistics service providers in trunk line for away secondary ports. It was the feeder service network design that made the entire container service economically rational, efficient and more profitable, and consequently cheaper and timely for the end users (Rudić & Hlača, 2005). While trunk lines connect main global ports to each other, feeder lines help secondary ports, which have irregular and low quantities, to survive.

The increase in market competition and new collaborations and decrease in freight rates along with uncertainty in oil prices forced the industry to concentrate on planning decisions in order to operate more efficiently. The planning decisions for a feeder line are generally include the selection of the service region, selection of feeder ports, hub port options, ship types, service frequency, ship routes, ship scheduling, fleet size and mix, fleet deployment, sailing speeds, stowage planning, environmental routing, and empty container repositioning. In this chapter, it is aimed to overview general characteristics of feeder services in the era of mega containerships and categorize the literature on quantitative decisions that service providers face in planning their networks.

The remainder of this chapter is structured as follows: firstly, the feeder services are defined and advantages and disadvantages of the service are explained. Then, feeder service networks and network design problems are described. Next, chapter categorizes main challenges in feeder services and sum-
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