

# Using an Algorithm to Optimize the Utility of Container Inventory through Virtual Container Yard (VCY)

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**Abstract**—The virtual container yard is an innovative tool that reduces the cost of empty reposition cost of container shipping lines. This concept is underpinning the container interchange between carriers. This paper evaluates the feasibility of introducing an algorithm to optimize the virtual container yard. A combination of qualitative, quantitative approach has been applied and dimension reduction factor analysis was used to analyze data. The container shipping lines may reduce the cost of container reposition by 15-20 percent. Through the virtual container yard. This study reveals key factors relevant to software application that may directly influence the new container management tool namely, virtual container yard as the concept needs a computer platform to operate it in the commercial context.

**Keywords**—Virtual container yard, inventory, management

## I. INTRODUCTION

One of the most striking developments in the global economy since World War II has been the tremendous growth in international trade [1]. Shipping is a business that grew up with the world economy, exploring and exploiting the ebb and flow of trade [2]. From 1981 to 2009, global transport of containerized cargo increased approximately 3.3 times faster than the world's GDP [3]. World's very first all-container ship "Gateway city" was found in 1950 [4] and containerization was commercially implemented in the US in the mid-1950s [1] and is the driver of the twentieth century economic globalization and world container port throughput increased by an estimated 3.8 per cent to 601.8 million 20-foot equivalent units (TEUs) in 2012 [5].

Containerization was not just about ships but a new way of organizing transport [2] has made a significant change globally in the system of freight transport. However, container fleet size and the complexity of the container shipping network [6] have increased dramatically bringing more challenges to the operation of the container shipping system. Cross-border transportation is an engine to promote the foreign trade [7]. The system, that proved its potential as an increasingly efficient and swift method of transport, led to greatly reduced transport costs, and supported a vast increase in international trade.

Container inventory imbalance causes a substantial cost to carriers amounting to twenty two percent in the overall cost structure of containers. The most popular mechanism to overcome this problem is the repositioning of empty containers from the idle location to other locations where they are in demand. Also, there is no commonly accepted standard system to minimize the idle time of empty containers at storage. The virtual container yard (VCY) is a novel strategy underpinning the container interchange between carriers that could substantially reduce this ever-increasing container empty repositioning cost. And it ensures maintaining a balanced container inventory in a port through interchange between carriers. The VCY became a popular topic in the literature in the current decade as the alternative methods such as foldable containers did not prove expected results. This paper considers the operationalization of the VCY through the context of computing and information communication technology (ICT). Although bigger Container Ships (CS) were built to derive benefits of the scale of economies carriers