Mahwish Anwar
Blekinge Institute of Technology
mya@bth.se
Lawrence Henesey
Blekinge Institute of Technology
lhe@bth.se
Emiliano Casalicchio
Blekinge Institute of Technology
emc@bth.se

Digitalization in Container Terminal Logistics: A Literature Review

Abstract

Many terminals that are located in large ports, such as Port of Rotterdam, Port of Singapore, Port of Hamburg, etc. employ various emerging digital technologies to handle container and information. Some technologies deemed attractive by large ports are: Artificial Intelligence (AI), Cloud Computing, Blockchain and Internet of Things (IoT). The objective of this paper is to review the "state-of-the-art" of scientific literature on digital technologies that facilitate operations management for container terminal logistics. The studies are synthesized in form of a classification matrix and analysis performed. The primary studies consisted of 57 papers, out of the initial pool of over 2100 findings. Over 94% of the publications identified focused on AI; while 29% exploited IoT and Cloud Computing technologies combined. The research on Blockchain within the context of container terminal was nonexistent. Majority of the publications utilized numerical experiments and simulation for validation. A large amount of the scientific literature was dedicated to resource management and scheduling of intra-logistic equipment/vessels or berth or container storage in the yard. Results drawn from the literature survey indicate that various research gaps exist. A discussion and an analysis of review is presented, which could be of benefit for stakeholders of small-medium sized container terminals.

Keywords: *Digitalization, Container Terminal, Artificial Intelligence, Blockchain, Cloud Computing, Internet of Things, Systematic Literature Review.*