

*** AMAZON CONFIDENTIAL ***

Simulation Modelling for Evaluation & Optimisation of the Outbound Amazon Logistics Supply Chain

by

Priy Werrij

BSc Business Analytics, VU University Amsterdam (2014)

Submitted to the Faculty of Sciences, VU University Amsterdam
in final fulfilment of the requirements for the degree of

Master of Science in Business Analytics

at the

VU University Amsterdam

April 2017

Author
Priy Werrij BSc
Faculty of Sciences, VU University Amsterdam
Operations Research Scientist Intern, Amazon Logistics

Supervisor
Peter Bodnar PhD
Operations Research Scientist, Amazon Logistics

Thesis Supervisor
Sandjai Bhulai PhD
Department of Mathematics, VU University Amsterdam

Second Assessor
Bram Gorissen PhD
Department of Mathematics, VU University Amsterdam

© MMXVII,

Priyanto Wibisono Werrij.

All rights reserved.

Simulation Modelling for Evaluation & Optimisation of the Outbound Amazon Logistics Supply Chain

by

Priy Werrij BSc

Submitted to the Faculty of Sciences, VU University Amsterdam on
April 1, 2017 in final fulfilment of the requirements for the degree of
Master of Science in Business Analytics

Abstract

To keep up with the ever-changing customer demand, Amazon Logistics needs to be able to quickly make informed decisions on operational plans. Current solutions to provide visibility over the expected flow of shipments in the outbound transportation network are often isolated, resource-intensive or have limited areas of focus. This thesis presents a discrete event simulation model embedded in a scalable web framework to provide holistic insights into the feasibility and risk associated with any planning scenario.

A vast number of verification and validation experiments were performed demonstrating the model's capabilities to accurately capture movements of trucks and shipments. Although several opportunities to improve the model are identified, resulting precision metrics suggest that the model is able to evaluate scenarios with a sufficient level of accuracy. Consequently, the range of output elements the decision support system offers, should give the user an indication of feasibility and risk for any simulated scenario.

Supervisor: Peter Bodnar PhD

Thesis Supervisor: Sandjai Bhulai PhD