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# Optimisation of key performance indicators along a value chain

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## Abstract

The purpose of this research is to determine a single measure of performance for a supply chain model. Furthermore, the supply chain was modelled using simulation techniques. The supply chain model chosen is the coal corridor in South Africa. Various frameworks were evaluated and the performance of the supply chain model was done using an adapted model originally suggested by Aronovich et. al 2010. The results from the adapted framework show that the Transnet supply chain model performed at 45% for the 2014 year. Improvement scenarios were then formulated based on the worst performing phases in the supply chain: rail transportation and shipping distribution. The rail element of the supply chain model was simulated using the Anylogic simulation package. Discrete event simulation methods were used. It was found that if Transnet Freight Rail upgraded the single track at Overvaal, utilised 100 wagon trains instead of 200 wagon trains and eliminated Ermelo as a hub they could increase their throughput by 20%. Furthermore, recommendations were made suggesting that the framework should be further adapted to include the need for multiple suppliers and the simulation model should incorporate the transport of coal via trucks.