

SIMULASI MODEL DISKRIT SISTEM PELAYANAN OPTIMAL UNTUK MENYEIMBANGKAN LINTASAN PROSES *RECEIVING* DI GUDANG DENGAN NILAI INVESTASI

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ABSTRAK

Kawasan Palem merupakan tempat bagi salah satu gudang pusat yang dikelola oleh PT. Erajaya. Produk yang disimpan merupakan produk-produk PO (purchase order) dari vendor. Gudang palem memiliki area *receiving* seluas 6 x 11 meter dengan kapasitas maksimal kurang lebih 55 sampai 59 palet, area tersebut tergolong cukup sempit dikarenakan sering terjadi banyaknya antrian barang. Akibatnya barang dengan status antrian akan dialokasikan sementara kedalam area penyimpanan luar sebelum akhirnya akan dialokasikan ke dalam area *receiving*. Adanya antrian tersebut diakibatkan luas area yang kurang serta tidak diimbangi dengan pelayanan (*man power* dan forklift) yang cukup. Oleh karena itu penelitian ini bertujuan menganalisis keseimbangan lintasan area *receiving* dengan pendekatan simulasi sistem yang dibantu dengan *software* ARENA. Pendekatan investasi diperlukan menggunakan metode *Payback Periode* (PBP), *Profitability Index* (PI), *Internal Rate of Return* (IRR), dan *Net Present Value* (NPV) untuk menunjukkan bahwa investasi layak dijalankan. Berdasarkan hasil pengolahan data dengan pendekatan simulasi sistem diperoleh hasil penambahan optimal adalah 2 *man power* dan 2 forklift dengan *output* yang dihasilkan 666 palet dan rata-rata antrian (number waiting) area penyimpanan luar sebanyak 5 palet. Sedangkan nilai investasi metode *Net Present Value* (NPV) bernilai positif sebesar Rp5.095.978.202. perhitungan dengan metode *Payback Periode* (PBP) diperoleh tingkat pengambilan modal yang didapat yaitu 1,33 tahun < 5 tahun. Pada perhitungan dengan menggunakan metode *Internal Rate of Return* (IRR) didapatkan hasil sebesar 31,2% > 7,8% .

Kata kunci: antrian, simulasi diskrit, kelayakan investasi, NPV, PBP, PI, IRR

SIMULATION OF A DISCRETE SERVICE SYSTEM MODEL TO BALANCE THE TRAJECTORY OF THE RECEIVING PROCESS IN THE WAREHOUSE WITH THE INVESTMENT VALUE

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ABSTRACT

The Palembang area is home to one of the central warehouses managed by PT Erajaya. The stored products are the vendor's PO (purchase order) products. Palembang warehouses have a receiving area of 6x11 meters with a maximum capacity of approximately 55 pallets, the area is quite narrow due to the frequent queues of goods. As a result, items with queued status will be temporarily allocated to the external storage area before eventually being allocated to the receiving area. There is a build-up of goods in the receiving area caused by the lack of area and not being balanced with sufficient power and forklift services, this is a problem of the line track in Palembang's central warehouse. Therefore, this study aims to analyze the balance of receiving area trajectories with a system simulation approach assisted by ARENA software and an investment value approach using Payback Period (PBP), Profitability Index (PI), Internal Rate of Return (IRR), and Net Present Value (NPV). Based on the data processing results with the system simulation approach, the optimal addition results are 2 man power and 2 forklifts. With the addition of this number, there were recorded output resulting in 666 pallets with an average queue (number waiting) of 10 pallets receiving area and an average queue of 5 pallets of 5 pallets. Meanwhile, the investment value of the Net Present Value (NPV) method is positive at IDR 4,329,020,558. The calculation using the Payback Period (PBP) method obtained a capital collection rate of 1.407 years ± 5 years. Calculation using the Internal Rate of Return (IRR) method results in 92.66% – 7.8%, and the Profitability Index method – 3.62 – 1.

Keywords: *queueing, discrete simulation, investment feasibility, NPV, PBP, PI, IRR*