ANALISIS PENGARUH KRITERIA 4M1E TERHADAP KUALITAS PRODUK MENGGUNAKAN SEM-PLS PADA PT XYZ

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ABSTRAK

PT XYZ menghadapi isu terkait kualitas produk non-woven Felt, di mana tingkat kecacatan (*defect*) produk seringkali melebihi target yang ditetapkan perusahaan yaitu di bawah 3%. Permasalahan ini mengindikasikan adanya inefisiensi dalam proses produksi. Penelitian ini bertujuan untuk menganalisis pengaruh simultan dari lima faktor utama produksi, yang dikenal sebagai kriteria 4M1E (*Man*, *Machine*, *Material*, *Method*, dan *Environment*), terhadap Kualitas Produk. Metode yang digunakan adalah *Structural Equation Model–Partial Least Square* (SEM-PLS) dengan pengumpulan data melalui kuesioner yang disebarkan kepada 50 responden karyawan pada departemen produksi, *quality control*, dan *maintenance*. Hasil penelitian menunjukkan bahwa hanya faktor *machine* (p-value = 0,011) dan *environment* (p-value = 0,000) yang memiliki pengaruh positif dan signifikan terhadap Kualitas Produk. Sedangkan, faktor Man, Material, dan Method tidak berpengaruh signifikan. Kemudian, variabel environment teridentifikasi sebagai variabel yang paling dominan dalam memengaruhi kualitas produk berdasarkan nilai Effect Size (f^2) sebesar 0,700 yang termasuk kategori pengaruh besar. Usulan perbaikan meliputi peningkatan sistem pengendalian suhu dan kelembaban melalui instalasi HVAC, sistem terintegrasi menggunakan software CMMS dan penerapan TPM yang berfokus ke jadwal kalibrasi mesin.

Kata Kunci : Kualitas Produk, 4M1E, Produk Cacat, Non-Woven, SEM-PLS

ANALYSIS OF THE EFFECT OF 4M1E CRITERIA ON PRODUCT QUALITY USING SEM-PLS AT PT XYZ

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ABSTRACT

PT XYZ faces issues related to the quality of non-woven Felt products, where the product defect rate often exceeds the company's target of below 3%. This problem indicates inefficiencies in the production process. This study aims to analyze the simultaneous influence of five main production factors, known as the 4M1E criteria (Man, Machine, Material, Method, and Environment), on Product Quality. The method used is the Structural Equation Model–Partial Least Square (SEM-PLS) with data collection through questionnaires distributed to 50 employee respondents in the production, quality control, and maintenance departments. The results show that only the machine factor (p-value = 0.011) and the environment (p-value = 0.000) have a positive and significant influence on Product Quality. Meanwhile, the Man, Material, and Method factors do not have a significant effect. Then, the environmental variable was identified as the most dominant variable in influencing product quality based on the Effect Size (f^2) value of 0.700 which is included in the large influence category. Proposed improvements include improving the temperature and humidity control system through HVAC installation, an integrated system using CMMS software and the implementation of TPM that focuses on machine calibration schedules.

Keywords *: Product Quality, 4M1E, Defect Products, Non-Woven, SEM-PLS*