

Industrial maturity level measurements model based on product complexity

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Abstrak

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Dengan semakin meningkatnya kompleksitas permintaan pasar terhadap produk manufaktur, maka usaha serta upaya industri untuk memenuhi permintaan pasar senantiasa menjadi perhatian para peneliti di dunia. Khususnya bidang kompleksitas produk (product complexity) serta tingkat kematangan industri (industrial maturity level), saat ini kajian kedua bidang tersebut dilakukan secara parsial. Kajian pada bidang kompleksitas produk mengarah pada keterkaitan antara tingkat kompleksitas produk, proses pembuatan, manajemen operasi dan sistem manufaktur. Sedangkan kajian oleh industri berupaya mendapatkan suatu model yang dapat digunakan sebagai best practice dalam menilai tingkat kematangan industri. Kajian disertasi ini untuk mendapatkan sebuah model penilaian serta pengukuran tingkat kematangan industri yang dapat diterapkan dalam konteks industri komponen otomotif khususnya aktivitas teknologi stamping berdasarkan kompleksitas produk pressed part.

Guna memperoleh model tersebut, dilakukan analisa Structural Equation Modeling (SEM) terhadap pengaruh variabel kompleksitas produk dengan kematangan industri. Pengembangan model tingkat kematangan industri berdasarkan state of the art teknologi manufaktur, serta konsep kompleksitas produk manufaktur berdasarkan fitur dan spesifikasi dari produk.

Model penilaian tingkat kematangan industri stamping telah di uji coba pada outer panel, inner panel serta supporting panel produk pressed part, serta dilakukan serangkaian uji verifikasi dan validasi kompleksitas produk terhadap tingkat kematangan industri dalam menghasilkan produk sesuai spesifikasi.

Hasil uji menunjukkan model penilaian tingkat kematangan industri stamping berdasarkan kompleksitas produk pressed part dengan tingkat deviasi 6.32%. Dengan dihasilkan model penilaian kematangan industri stamping maka diharapkan dapat digunakan sebagai acuan dalam menilai dan meningkatkan kemampuan industri komponen otomotif berbasis kompleksitas produk pressed part.

<i>ABSTRACT</i>

With the increasing complexity of market demand for manufactured products, the efforts of industries to meet the market demand have always been the attention of researchers in the world. Nowadays particularly studies in the fields of product complexity and industrial maturity level are being conducted partially. The research studies in the fields of product complexity are focussed on the relationship between product complexity level, manufacturing process, operations management and the manufacturing system. Meanwhile, the studies were carried out by industry to obtain a model which can be used as the best practice in assessing industrial maturity level. This research is to obtain an assessment model as well as measurement which can be applied in the automotive component manufacturing industry, especially in stamping

technology activities based on product complexity of pressed parts.

In order to obtain such model, Structural Equation Modeling (SEM) analysis on the relationship between product complexity variables and industrial maturity has been performed. Industrial maturity model was developed based on state of the art of manufacturing technology, and manufacturing product complexity based on feature and specification of the product.

For stamping industry maturity level model, a calculation trial on samples of outer panel, inner panel and supporting panel of pressed part products was performed. A series of verification and validation tests on the product complexity as well as expert perception tests on industrial maturity in producing products with the required specification were conducted.

Results of the verification and comparison tests show that the industrial maturity level assessment model of stamping industry based on product complexity level of the pressed parts yields deviation rate of 6.32%. In conclusions, the industrial maturity level model for stamping industry is expected to be used as a reference in assessing industrial capability based on product complexity of pressed parts. Industrial maturity.</i>