

INTISARI

Penerapan sistem berbasis agen telah menjadi paradigma dalam sistem manufaktur generasi berikutnya. Penelitian ini dilakukan menggunakan pemodelan berbasis agen sebuah proses bisnis virtual yang terdiri dari departemen pemasaran, desain, perencanaan dan produksi. Tujuan dari penelitian adalah mengeksplorasi pengaruh dari karakteristik individu dan kondisi operasi terhadap output *similarity*, *accuracy* dan performansi. Karakteristik individu dikelompokkan berdasarkan sudut pandang yang terdiri dari *broad use*, *memory use*, *disassembly use* dan *property use*. Kondisi operasi terdiri dari *synchronous* antara semua departemen, *concurrent* antara departemen pemasaran dan perencanaan dengan departemen desain dan produksi, *concurrent* antara departemen pemasaran dan produksi dengan departemen desain dan perencanaan, serta *concurrent* antara departemen pemasaran dan desain dengan departemen perencanaan dan produksi.

Pemodelan dilakukan menggunakan mekanisme input, proses dan output dalam *team mental model*. Input berupa karakteristik individu, proses berupa kondisi operasi, *intention* dan jaringan komunikasi, sedangkan output berupa *similarity*, *accuracy* dan performansi. Individu dialokasikan ke masing-masing departemen yang memiliki beberapa aktivitas dan variabel. Dalam setiap aktivitas, individu menilai performansi dari departemen yang ditempati, kemudian melakukan aksi perbaikan sesuai karakteristik yang dimiliki sehingga menghasilkan vektor nilai terhadap variabel. Dalam melakukan aktivitas, individu dapat membentuk *intention* dan jaringan komunikasi. Nilai *intention* mempengaruhi keputusan individu untuk melakukan aksi perbaikan. Keputusan untuk melakukan aksi kemudian mempengaruhi keterikatan antar individu atau seberapa sering melakukan interaksi (*similarity*), kecepatan agen dalam melakukan aksi (*accuracy*) dan performansi yang dihasilkan. *Similarity* dihitung dari jumlah jaringan komunikasi dari agen ke agen lain dibagi jumlah jaringan komunikasi dari agen lain ke agen. *Accuracy* dihitung dari selisih waktu aktivitas yang tersedia terhadap waktu eksekusi yang dibutuhkan agen untuk mengulang aksi hingga mencapai performansi yang diharapkan dibagi dengan waktu aktivitas. Performansi yang dihasilkan berupa pendapatan, biaya dan profit.

Pengolahan data simulasi dilakukan menggunakan desain eksperimen 2 faktorial yaitu komposisi agen dalam departemen dan kondisi operasi antar departemen. Hasil menunjukkan bahwa komposisi agen homogen menghasilkan nilai *similarity* tertinggi, kondisi operasi *concurrent* antara departemen pemasaran dan desain dengan departemen perencanaan dan produksi dan komposisi agen homogen menghasilkan nilai *accuracy* tertinggi, sedangkan kondisi operasi *concurrent* antara departemen pemasaran dan produksi dengan departemen desain dan perencanaan dan komposisi agen homogen menghasilkan nilai performansi tertinggi.

Kata kunci: kondisi operasi, karakteristik agen, manajemen proses bisnis, pemodelan berbasis agen, *team mental model*

ABSTRACT

The application of agent based systems will become a paradigm in the next generation manufacturing systems. This research was conducted using agent based modeling in a virtual business process consisting of marketing, design, planning and production departments. The purpose of this research is to explore the influences of individual characteristics and operating conditions to similarity, accuracy and performance. Individual characteristics are classified based on perspective of an object consisting of broad use, memory use, disassembly use and property use. The operating conditions consist of synchronous between all department, concurrent between departments of marketing and planning with departments of design and production, concurrent between departments of marketing and production with departments of design and planning, and concurrent between departments of marketing and design with departments of planning and production.

Modeling was conducted using inputs, processes and outputs mechanisms of team mental model. Inputs consist of individual characteristics, processes consist of operating conditions, intention and communication networks, while outputs consist of similarity, accuracy and performance. Individuals are allocated to each department which has several activities and variables. In each activity, the individuals evaluate the performance of department occupied, then perform the corrective action according to the characteristic possessed to produce a vector of value for the variables. In carrying out activities, individuals can form the intention and communication networks. The value of intention affects the individuals decisions to carry out the corrective action. The decisions to carry out corrective action then affect the connectivity between individuals or how often to interact (similarity), the speed of agents in performing action (accuracy) and the performance. Similarity is calculated from the number of communication networks from agent to other agents divided by the number of communication networks from other agents to agent. Accuracy is calculated from the deviation between available times and execution times needed by the agent to repeat the action to achieve the expected performance divided by the available times. The performance is in the form of income, cost and profit.

Simulation data processing used 2 factorial experimental design consisting of the composition of agents within department and operating conditions between departments. The results indicated that the composition of homogenous agents produce the highest similarity, the concurrent operating condition between departments of marketing and design with departments of planning and production and also the composition of homogeneous agents produce the highest accuracy, while the concurrent operating condition between departments of marketing and production with departments of design and planning and also composition of homogeneous agents produce the highest performance.

Kata kunci: *operational conditions, individual characteristics, business process management, agent based modeling, team mental model*