

Distributed manufacturing systems evaluation model for global resources management

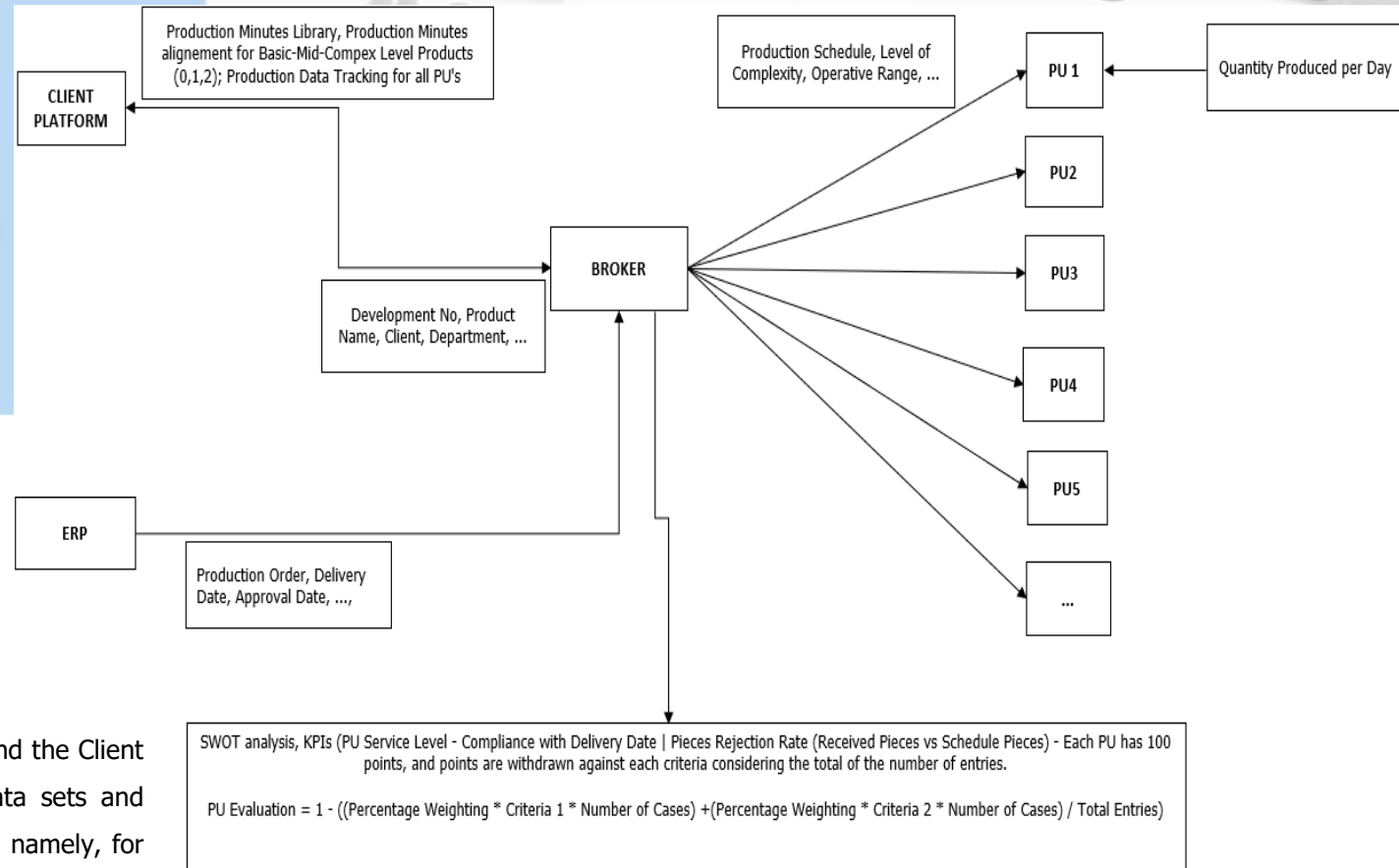
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Due to the increase of the complexity of products and client requirements communication is fundamental for companies. Considering global resources market concept, companies must consider a new way to communicate to increase efficiency on resources management. Thus, digital transition is crucial. In fact, Industry 4.0 (I4.0) [1-3] is focused on manufacturing processes and companies' organizational structures, through the decentralization of decisions, allowing efficiency and flexibility at all production levels, including in planning and control of distributed systems, e.g. based on Multi-Agent Systems (MAS).

The proposed evaluation model will be based on I4.0 principles, through a creation of a new platform (broker), by considering the ubiquitous system concept. This evaluation model considers the integration between the company ERP and client platform, allowing to do the production scheduling attending to products complexity level with subcontractors – Production Units (PU's), for efficiently collecting and processing data from PUs, and registering it directly on the distributed client platforms. Moreover, different kind of request are to be fulfilled regarding business partners and clients requests.

In this work is thus proposed the creation of a platform (broker), that will integrate ERP and the Client Platforms. The proposed platform will allow the integration of a variety of complex data sets and establish communication between diverse stakeholders, and allow a wide range of function namely, for scheduling production orders, by taking into account a broad complexity level that arises from the integration of information arising from different companies, namely at the operative level, and thus, providing a contribution in the current I4.0 context.



[1] Jay Lee, Hossein D., Jaskaran S. & Vibhor P. (2018). Industrial Artificial Intelligence for industry 4.0-based manufacturing systems. *Manufacturing Letters*, 18,20-23. doi: <https://doi.org/10.1016/j.mfglet.2018.09.002>

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[2] Legat, C., Vogel-Heuser, B. (2017). A configurable partial-order planning approach for field level operation strategies of PLC-based industry 4.0 automated manufacturing systems. *Engineering Applications of Artificial Intelligence*, 66, 128-144. doi: <https://doi.org/10.1016/j.engappai.2017.06.014>.

[3] Wang, S., Wan, J., Zhang, D., Li, D., Zhang, C. (2016). Towards smart factory for industry 4.0: a self-organized multi-agent system with big data based feedback and coordination. *Computer Networks*, 101, 158-168. doi: <https://doi.org/10.1016/j.comnet.2015.12.017>.