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**Abstract:** The starting point of this article is production planning and control (PPC) in job shop production, i.e., processing units in a job shop are investigated executing different operations on part types. In this context, the problem is to allocate the single operations of a production orders to processing units with respect to the underlying objectives. PPC systems, however, fail to incorporate the knowledge of production-related theory and tend to be based on relatively simple heuristics (see STEVEN 1999, pp. 319). This means that the inherent flexibility of a production system will largely be ignored. Existing PPC systems, thus, show a clear theoretical deficit. Given this background, the article aims at

- integrating production-related theory more strongly into the world of PPC, and
- exploiting developments in the area of distributed problem solving.