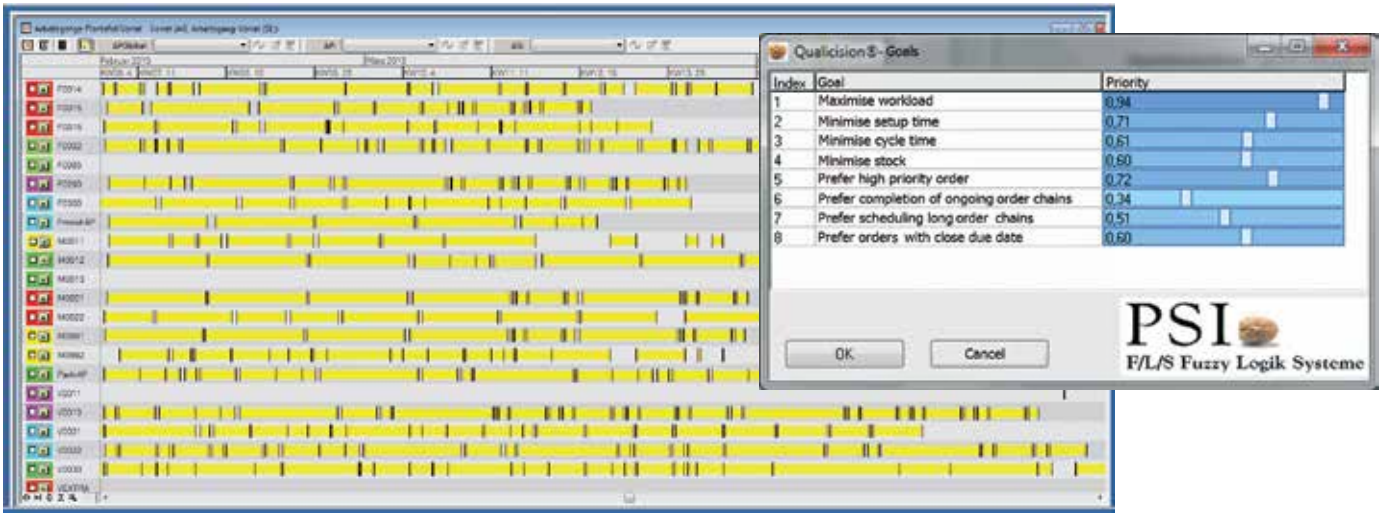
Customer report: Planning and control in production

KPI-controlled optimisation using PSI*penta*/Finite Capacity Scheduling with Qualicision®

One of the decisive tasks of production control is to combine production factors in a manner that ensures compliance with delivery deadlines and the efficient use of capacities and resources. KPIs can be used to describe economic efficiency. Qualicision® optimisation logic helps ensure that these KPIs are utilised during production control instead of determining them retrospectively. Qualicision® sees KPIs as optimisation targets and gives the controller an opportunity to influence them. Qualicision® technology is a form of fuzzy logic that balances the pros and cons of different solutions by means of a special extension. The underlying Qualicision® technology, tried and tested around the world in planning and controlling automotive production processes as well as in other areas of application, is now also available in PSI*penta*/Finite Capacity Scheduling from PSIPENTA.

PSI*penta*/Finite Capacity Scheduling supports users in developing detailed plans of the order situation in the short to mid-term range. The focus is on harmonised processes and the efficient use of production resources. Optimum resource allocation depends on a variety of parameters. The objectives often have opposite effects, i.e. the optimisation of one parameter simultaneously can have a negative impact one or more other parameters. Classic planning algorithms either do not function at all or only to a certain extent under these conditions. The tried and tested Qualicision® technology makes it possible to view multiple optimisation objectives simultaneously. Target functions are mapped by key performance indicators (KPI). The KPIs can be derived from business objectives or other up-to-date specifications. Examples of optimisation objectives include, for example, maximise workload, minimise stock, minimise cycle time, minimise setup times, prefer high priority order and prefer orders with close due date. Optimisation objectives are weighted from 0 to 100. This enables priorities to be taken into account when fine-planning production depending on a given situation. The user can also make manual adjustments to the occupation plan when automatic planning is complete. This achieves the greatest possible flexibility during production planning while taking individual circumstances into account. It is also possible to add project or customer-related optimisation objects to those already listed above. Examples of customer-related optimisation objectives include "maximise energy efficiency" and "minimise labour during off-peak times".

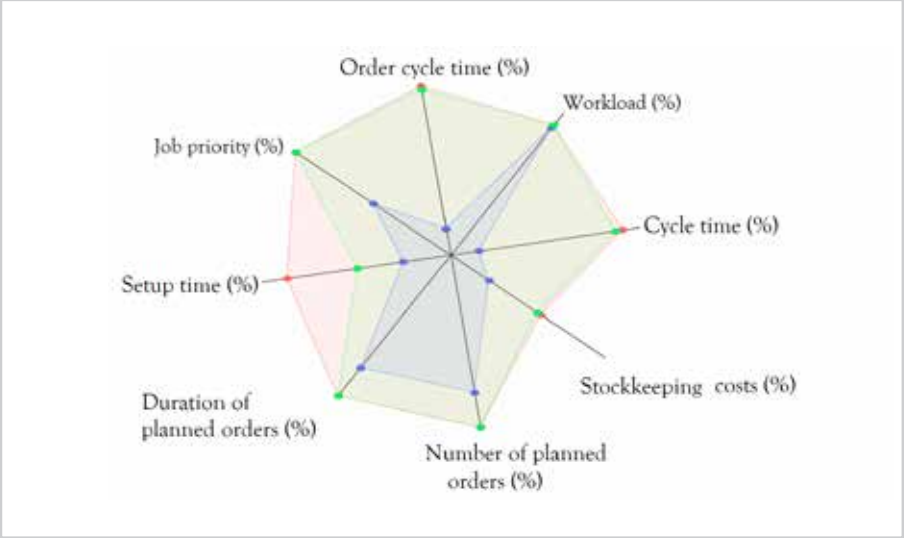


Shop floor plan with Qualicision® objectives in PSI/Finite Capacity Scheduling.

Supporting the production scheduler with learned priorities

Complex correlations between the target functions of optimisation and the given production situations can make it difficult to determine suitable priorities for the specified KPIs. Changing order situations and different specifications need to be weighed up and suitable prioritisations determined to enable the best possible achievement of objectives. To help

planners find suitable priority settings for KPIs, a heuristic algorithm can be integrated to analyse occupation plans that have been optimised according to different KPIs on the basis of different priority settings, in order to maximise the key data generated by the system. The results of KPI optimisation can be visualised as a spider chart in an explanatory component. The maximum characteristics (utopia points) that can be achieved for each KPI during the learning phase are shown in the red area. To help select a particular priority setting, the planner can enter a preference pattern (blue area on the diagram) and is then automatically shown the best priority setting (green area on the diagram). The Qualicision® planning module is integrated in PSI*penta*/Finite Capacity Scheduling. Additional key data can be included to customise optimisation.



Results of KPI optimisation as a spider diagram.

Use of KPI-based optimisation in other areas of application

The F/L/S solution for order sequencing in the automotive industry has been in use for nearly 20 years. The original solution was further developed as part of a collaboration project between PSIPENTA and F/L/S, and resulted in the creation of PSI*jis*. PSI*jis* transfers relevant aspects of sequencing to the needs of automotive suppliers. For example, the sequence of orders to be produced by a machine and plant manufacturer is determined during portfolio planning. The task lies in selecting "good" and "suitable" orders from an order pool to grant as much consideration as possible to the manufacturer's own production capacities and restrictions. When evaluating suppliers on the basis of various criteria, such as price, compliance with delivery deadlines, quality and technology, the system creates KPIs relating to supplier criteria that must be taken into consideration. These KPIs can flow with differing priorities into the classification system of Class A, B or C suppliers. Using Qualicision® as a classification method makes it possible to include all the data logged in the ERP system for the purpose of supplier evaluation.

PSI*penta*/Finite Capacity Scheduling features Qualicision® technology, alongside other Qualicision® applications that will be presented at the PSIPENTA stand at CeBIT from 10–14 March 2014 and at the Hannover Messe trade fair from 7–11 April 2014.

Presentation of the Qualicision® technology featured in the PSI*penta*/Finite Capacity Scheduling module.

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