



Management briefing

# 5 signs of superior profit-boosting optimization

SUPPLY CHAIN PLANNING AND OPTIMIZATION





**Dramatic improvements  
in KPIs are possible with  
effective optimization.  
The key word is *effective*.**

At best, ineffective optimization leaves money on the table. At worst, it produces 'solutions' that are so divorced from reality that they cannot be used.

So how can you tell whether a particular solution provider is capable of the kind of world-class optimization that adds significant sums of money to your bottom line?

At Quintiq, our approach to optimization has set world records in complex optimization challenges, and transformed efficiency and customer satisfaction at many of the world's leading enterprises.

Here are the top five features you should be looking out for.



## 1. Does it fit your world perfectly?

This is critical. Unless the solution fits your operational reality perfectly, the optimized plans cannot be executed – and will be ignored by those on the ground.

Beware of compromises. An optimizer that doesn't 'know' some of your business rules will violate those rules constantly to produce better KPIs. For example, it may assume that your depot and loading area are in exactly the same place, or that a late delivery is the same as a non-delivery.

A solution that ignores aspects of your operations will optimize a fantasy world.



## 2. How broad are the provider's optimization capabilities?

Can they optimize your entire supply chain - from procurement all the way through to distribution and workforce planning? Will you be able to achieve the vertical, horizontal and functional integration that characterizes integrated business planning and maximizes profitability?

While you may want to start with a point solution, that solution should be part of a comprehensive optimization platform that supports your progress through every stage of the supply chain journey.





### 3. Is interaction between planners and optimizers easy and intuitive?

Effective optimization keeps planners in control. It should be easy for planners to:

- Refine solutions with their soft knowledge; for example by prioritizing a rush order from an important customer.
- Selectively re-optimize solutions when disruptions make it impossible to optimize the entire plan.
- Configure the optimizer to capture changing priorities; for example by prioritizing due dates at the expense of inventory levels or vice versa.

### 4. How deep is the provider's expertise?

A vendor that solves a small instance of an optimization challenge may not be capable of tackling the entire problem. How many large-scale, complex supply chain projects has the provider implemented? Some of its largest customers may not be on its website. Ask.

### 5. Can the provider combine a range of algorithms for maximum effect?

Look for providers who are constantly broadening their range of algorithms and extending their experience of how to combine them. The best results are often achieved by intelligently combining the most appropriate algorithms. (Hint: Be skeptical about approaches that rely heavily on just one or two techniques.)



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“Figuring out the right combination of algorithms to apply is more than a science. If it were just a science, you could present the same puzzle to other optimization experts and they’d arrive at the same solution. Optimization is about experience and creativity. What we’ve demonstrated over and over again is that our optimization team has the experience, knowledge and, yes, creativity to be true artists in this field.”

– David Rijsman, Optimization R&D, Quintiq

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# The ever-expanding Quintiq algorithm suite

## Quill – the secret sauce

Quill lies at the heart of Quintiq's optimization suite. This proprietary configuration language is used to achieve that all-important 100%-fit with your operational reality. In addition, Quill employs:

- **Construction heuristics** that reflect the way planners work and make it easy for them to construct plans that achieve a 100%-fit.
- **Local search algorithms** that enable a large number of small changes to be evaluated automatically. This helps planners improve solutions and minimize the effects of disruptions.
- **'Combining algorithms'** that knit various algorithms together to form a single powerful solver.

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– Professor Wim Nuijten,  
VP of Optimization, Quintiq

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## Mathematical programming

Mathematical programming is a mature and broadly used technology in the world of optimization. Decades of academic research and practical experience have gone into shaping it, and Quintiq has extensive knowledge of how best to use it.

## Path optimization algorithm

The path optimization algorithm (POA) is our proprietary large neighbourhood search technology for puzzles such as vehicle routing and manufacturing scheduling. A major advantage of POA lies in the way it enables us to explore a much wider range of solutions.

## Constraint programming

Constraint programming is capable of handling a broad set of constraints. It systematically eliminates possibilities in order to reduce the size of the 'search space' and rapidly identifies feasible solutions that can then be optimized.

## Graph programming

Many practical puzzles have a graph component and we have successfully applied graph programming to puzzles such as crew diagramming, shortest path problems, resource-constrained shortest path problems, maximum flow problems, and minimum spanning tree problems.

To discover more about effective supply chain optimization, visit [www.quintiq.com](http://www.quintiq.com) or **contact us**.



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