



## NLPP Case Study: Bosch

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### **Automotive supplier Bosch achieves savings by implementing innovative price analysis software**

Purchasing departments resort to a variety of methods when looking for areas in which they can potentially cut costs. In its search for new and innovative approaches, German automotive supplier Robert Bosch tested criteria-based price analysis software which promises to deliver a valid price target calculation for large families of parts: NLPP, short for Non-Linear Performance Pricing. The department was immediately impressed by the software's potential. Bosch's central purchasing department, which works directly for the Gasoline Systems Direct Fuel Injection business unit, began deploying NLPP several months ago — and the results have been outstanding. Thanks to the NLPP analysis, significant savings have already been achieved in the area of materials under evaluation. Today, the software is applied at various Bosch sites, including Livonia (MI).

Konstantinos Alefasidis, now departmental manager for specialised purchasing at the Robert Bosch GmbH site in Zuffenhausen/Germany, looked at numerous methods and software solutions in his former role as negotiation consultant. "I was responsible for purchasing methodology," explained Konstantinos Alefasidis.

Moreover, conventional methods are only able to compare prices for products which are technologically identical, which considerably restricts their scope. So the challenge was to find a method which would be able to compare non-identical parts, and show the potential savings per part.

dimensional, non-linear regression analysis which considers the technical aspects of the product in relation to the price of the product. This enables the software to determine which distinguishing features impact the price, and to what degree — for example, whether the weight of a part affects the price to a greater extent than a certain bore or the required surface treatment. The software compares non-identical products by calculating target prices and — based on all data — worst, target, and best practice benchmarks. It also reveals complex cause-effect relationships, calculates the potential for lowering the costs of individual products and enables price forecasts for new parts which need to be procured. Thanks to the fact that

Naturally, analysing suppliers and procurement prices played a major role in this context. Purchasing agents all want to know exactly how much a certain part is allowed to cost. Classic cost analysis methods such as shadow price calculations and cost breakdowns require a high level of data transparency and accessibility. This, however, is rarely avail-

#### **New approach: How do distinguishing features influence price?**

Konstantinos Alefasidis was first introduced to the NLPP price analysis software around five years ago. The approach taken by this software was completely innovative: NLPP determines whether the prices for complete groups of products are reasonable, basing its calculations on a multi-

NLPP is able to generate analyses very quickly, the method can be used for both small and large families of parts.

Konstantinos Alefasidis, an industrial engineer, was immediately attracted to the innovative approach of NLPP. “Right from the start, I was won over by this method,” he explained.

But naturally, we didn’t just rely on a gut feeling — we screened the software thoroughly and also compared it to competitors’ products which made similar claims. However, NLPP offered the most sophisticated solution.

### Trialling machined parts

In 2014, Konstantinos Alefasidis was appointed group manager in project procurement for the Direct Fuel Injection business unit, which is a part of the Gasoline Systems Division. In contrast to commercial purchasing, which divides materials into groups and completes the purchasing process by means of contracts, price negotiations and ordering, project procurement takes care of the technical and project management-based concerns for all the products required by a complete business unit. This means that project procurement acts as an interface between commercial purchasing, the technical departments and quality control.

Most of the products purchased here are machined parts. These account for some 60% of the business unit’s purchasing volume.

After spending several weeks getting to grips with NLPP, I was convinced that this family of parts was ideal for an NLPP analysis. Firstly the extensive family comprises of

some 180 parts, making manual analyses virtually impossible. Secondly, by definition, each group of products also includes parts which have consistent distinguishing features — which is precisely what you need for an NLPP analysis, because the whole point is to compare parts based on their characteristics, and thus draw conclusions about the target price.

### The goal: to determine target prices for 180 parts

Konstantinos Alefasidis initiated a significant NLPP project: NLPP was to analyse all machined parts and calculate a valid target price for each individual part. The specialist purchasing department would then monitor these target prices and use the information — in close collaboration with project procurement — to develop a specific strategy for negotiations, ultimately increasing the potential for savings thus revealed.

**Kick-off: focus on distinguishing features:** The first step was to organise workshops to define which distinguishing features of the machined parts might be potentially relevant.

Working out which characteristics were actually important took a lot of brain power. By and large, we knew instinctively which parameters were impacting on price. But we made a conscious effort to think outside the box, so that features which initially seemed irrelevant were also included in the analysis. Looking back, this decision paid off. Following the NLPP analysis, we were surprised to see the extent that certain distinguishing features influenced

price in some areas. Conversely, some characteristics which we believed would affect price greatly proved to be of little significance.

### NLPP — a breeze in comparison with the bottom-up calculations:

Once the characteristics had been determined, Konstantinos Alefasidis asked an intern to manually compile the features for the 180 parts. A regular member of the team provided support at various stages.

Naturally, this laborious work initially used up a lot of resources — but it’s not a recurring task. Once all the data has been fed into the NLPP database, the analysis can be completed at the press of a button,

Alefasidis reported. And he added:

It’s a breeze compared to the bottom-up calculations. If you do a bottom-up calculation for a part manually, and you don’t have any data, one calculation can take up to two weeks ? and that’s just for one part! In contrast, it took two people just three months to enter the data for 180 parts. It would have taken us considerably longer to complete follow-up calculations for 180 parts! So the work was relative.

This was also the first time that all the parts from the family had been entered into a database, including their distinguishing features. This, asserted Alefasidis, was a huge step forwards.

### The analysis

The data was next imported into NLPP. At the click of a button, the

software was then able to generate an exact target price formula, based on price drivers, quantity and price within a few seconds. It also worked out how each distinguishing feature impacts on the price. The software automatically ignores distinguishing features which have no effect on the price. Based on the target price formula, NLPP then inserted the distinguishing features into the formula to calculate the target price for each part.

NLPP illustrates the parts in a coordinate system, organised according to the current price (Y axis) and the target price (X axis). Three benchmark lines are also displayed in the coordinate system: the middle benchmark line indicates the 'target price'. All points above this line indicate potential for savings. In addition, the user can switch to a tabular view where the savings are presented as percentages and in euros, for example.

### Surprising results for the price drivers

The NLPP analysis revealed surprising insights. Not only was the level of emphasis on parameters affecting cost and distinguishing features unexpected, but Konstantinos Alefasidis and his team also now had concrete proof that the target prices deviated widely from the actual prices for various parts.

The project purchasing team then contacted the specialist purchasing department and outlined the results.

Thanks to NLPP, we knew ex-

actly which area to hone in on. Rather than searching for a needle in a haystack, we were suddenly able to make a specific case when discussing each part and develop a chain of argument for price negotiations with the various suppliers. For example, we were able to pinpoint parts which were highly similar, but which were being sold to us at very different prices. With the huge amount of different parts in our portfolio, we'd never noticed these before. However, NLPP calculated the same target price for both parts. And since NLPP analyses the parts according to their distinguishing features, we were able to conclude that the parts were identical,

Alefasidis reported.

**A new understanding of product costs:** The team has come to understand product costs much more fully, claimed Konstantinos Alefasidis. And this will continue to have a positive effect on the performance of the purchasing department in the future, too. "In my view, it's simple. The better I understand pricing, the better I will be at my job." By calculating the most likely target price as well as worst and best practice benchmarks, costs become uniquely transparent. This in turn empowers purchasing agents when they conduct price negotiations.

Up to now — within just four months — we've already identified 3% savings in the volume

analysed by NLPP, two thirds of which we have already implemented.

### Two-figure savings? Nonsense!

Asked why they have 'only' achieved savings totalling 3% — when other purchasing software service providers promise two-figure potential savings? Konstantinos Alefasidis laughed. "That's total nonsense," the expert said.

If I could achieve savings of, say, 12%, at the drop of a hat, then the entire purchasing department must have been completely incompetent. But our purchasing specialists know what they're doing, and they've been doing their job expertly all along. NLPP simply provides us with additional information which has not been available to us in this format yet. We're now using this data consistently to achieve savings.

### Conclusion

NLPP provides the purchasing department with excellent analyses and realistic target prices for a large number of parts, with relatively little effort,

concluded Alefasidis.

Thus, the software opens the door to a whole new realm of opportunities for large-scale savings. I'm totally satisfied with this software.

**Practical example:** The task was to analyse the actual price for 40 part numbers from the 'machined parts' product group using NLPP software. The purchasing department defines the relevant parameters and price drivers for each part. These factors are then analysed in relation to the price.

A good source of 'correct' parameters and price drivers are the specifications given to the supplier,

e.g.:

- weight [g]
- length [mm]
- diameter [mm]
- batch size [#]
- annual quantity [#]

With the aid of this data, the software then calculates a target price formula<sup>1</sup>. In the example given here, the target price formula generated by the software looks like this:

$$\begin{aligned} \text{Target price} = & \exp \left( 0.140 + 2.305 \cdot \text{weight [g]} \right. \\ & - 0.342 \cdot \text{diameter [mm]} + 21.724 \cdot \text{length [mm]} \\ & + 1,274.239 \cdot \frac{1}{\text{batch size [#]}} \\ & \left. - 0.137 \cdot \text{annual volume [#]} \right) \end{aligned}$$

The software then automatically calculates the target price by inserting the values of the relevant parameters and price drivers for each part number into the formula. Seconds later, the purchasing agents receive the target price for each part.

NLPP also calculates the degree to which each parameter impacts the price, and pinpoints those which do not influence price at all.

This example shows how the degree of influence was calculated:

- weight [g] = 1.795
- diameter [mm] = 1.331
- length [mm] = 0.995
- batch size [#] = 0.554
- annual quantity [#] = 0.312

Interpreting the numbers is easy: in this case study, the diameter of the part (1.331) has more than double the impact on price than the batch size ( $2 \cdot 0.554 = 1.108 < 1.331$ ).

For more information about NLPP please visit our web site or get in contact with us at [info@saphirion.com](mailto:info@saphirion.com)

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<sup>1</sup>For reasons of confidentiality, the target price formula in this case study is based purely on fictitious parameters, and serves solely as an example.