The Competitor

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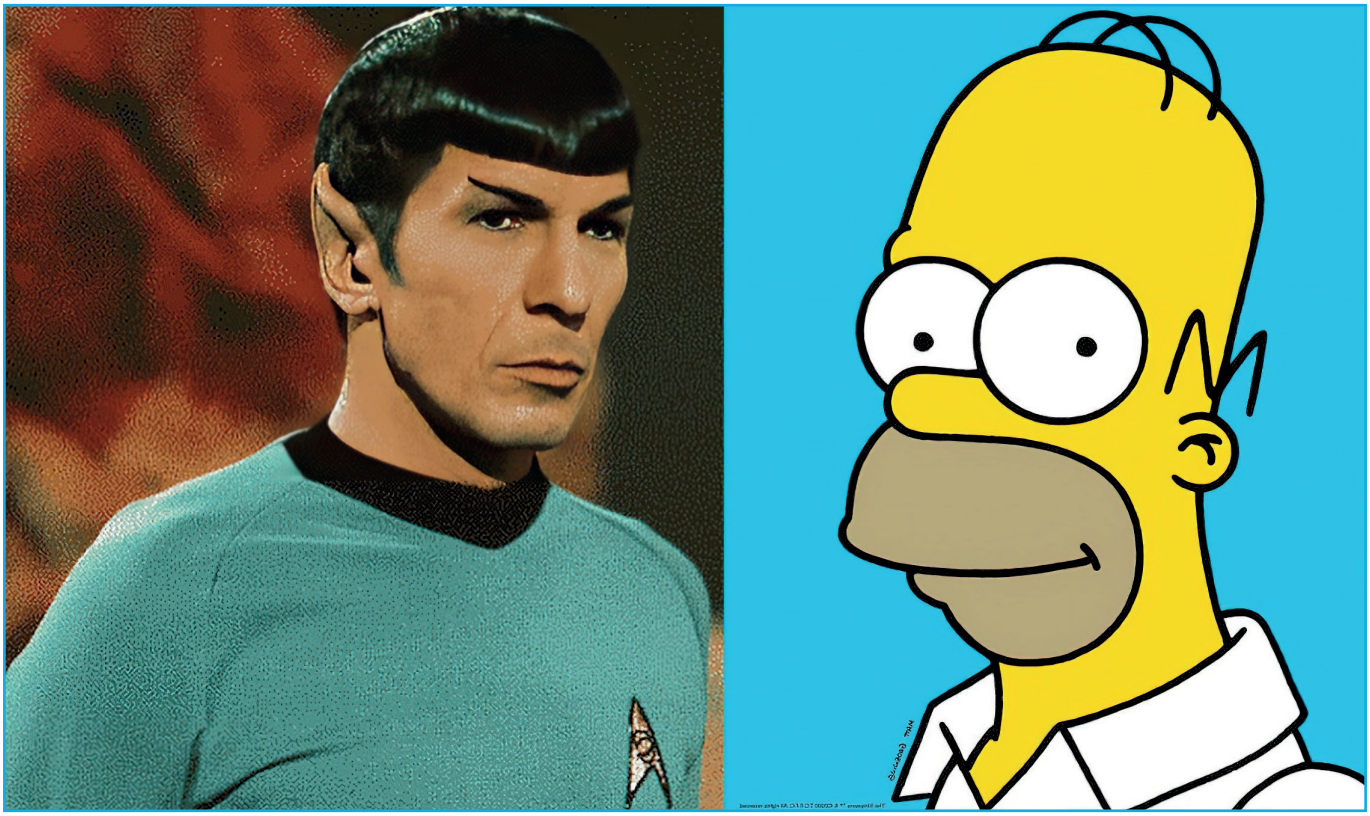

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Sometimes, reality makes for the best stories. This is the case when prominent scientists who study undesirable behaviors such as selfishness or dishonesty engage in misconduct themselves.

Francesca Gino has researched fraud and published a book called *"Rebel Talent: Why It's Worth Breaking the Rules in Work and Career."* Now, she is accused of manipulating data in numerous cases for her own research. It almost seems that she took her own advice too much to heart. By the way, the forensic report on the case is fascinating and can be read at *www.datacolado.org*. As a result of the allegations, Francesca Gino was suspended from her position at Harvard Business School. A few days after her suspension, she sued the authors of the forensic report and her dean, seeking damages of no less than $25 million.

The interest in inconsistency and the need to behave consistently with one's identity can itself be seen as a kind of bias. Behavioral economics, like classical economics, deals with human behavior but focuses on situations that the assumption of rationality cannot explain. Behavioral economics can, therefore, provide additional insights for negotiations. Read more in the article *"Beyond Rationality: Heuristics and Biases in Negotiations."*

A highlight of this issue is the interview with Holger Arendt, Head of Purchasing at Vattenfall Wärme Deutschland. He provides intriguing insights into the challenges and solutions arising from, among other things, the switch to carbon-neutral power generation, the trend towards decentralized heat generation, and the increased volatility of raw material prices in procurement.

The final article presents an example of how large language models such as ChatGPT can aggregate employee ideas, solutions, or suggestions to provide a basis for better decisions. For example, large language models can enable more accurate and faster processing of suggestions submitted during employee surveys.

This is the final issue for 2023. The next issue will be published in the first quarter of 2024 and will include a renewed focus on behavioral economics in negotiations. It will also focus on sale auctions. While in economic theory, sale and purchase auctions are mainly considered equivalent, there are significant differences in practice.

Another topic we will address in 2024 is the use of rule-based bargaining outside of procurement procedures. Mechanism design is well suited for optimizing awards, but incentive-compatible rules can also be developed and applied in classical bilateral negotiations. A bargaining mechanism in a bilateral negotiation is a sequence of demands with positive or negative consequences.

The credibility of a mechanism is a crucial determinant of its effectiveness. The higher the implementation costs of an announced consequence, the more difficult it is to achieve credibility. Therefore, when implementation costs are high, additional commitment must be signaled, for example, by writing the announced consequence down or starting to implement it.

Threats, promises, assurances, and warnings can be distinguished depending on whether the consequences are negative or positive and whether implementation costs are associated. The word "threat" has a negative connotation in common usage. However, if the threat is credible, it has the advantage over a costly consequence that does not necessarily have to be carried out. The paradox of a threat is that in order to be credible and thus avoid the negative consequences of implementation, it must be carried out at specific intervals.

Christoph Pfeiffer

Challenges For the Procurement Function in the Wake of the Energy Transition

Following is an Interview with Holger Arendt, Purchasing Manager at Vattenfall Wärme Deutschland, conducted by Gero von Grawert.

Today I'm talking to Holger Arendt. He is the head of purchasing at Vattenfall Wärme Deutschland. First of all, who is Holger Arendt?

I'm glad that it worked out, Gero. And yes, I'm looking forward to the interview. A bit about myself and my background: I was born in Dresden and live with my family in Berlin. After completing my apprenticeship as a precision mechanic, I studied business administration at the Technical University of Dresden.

I am a father of twins and try to do as much sports as possible in my free time. Especially in nature on a mountain bike or in winter on cross-country skis.

How long have you been working for Vattenfall? And what exactly were and are your tasks?

I joined Vattenfall 24 years ago as a trainee in materials management and purchasing in the lignite division, which has not been part of Vattenfall since 2016. In the course of the group's expansion in Germany in the early 2000s, I was exposed to cross-divisional issues at an early stage. Among other things, I was involved in two group-wide optimization programs in procurement, as well as several smaller projects. Later, I took on international responsibility for conventional generation. Since 2015, I have been the Head of Heat Procurement in Germany, and, in addition to smaller "satellites" in Hamburg and Rostock, I am responsible for the Heat Berlin business unit and, in particular, for the portfolios of major projects.

What do you see as the challenges for Vattenfall's heating business?

First and foremost, this means converting our large and complex facilities and grids to increasingly carbon-neutral generation in the shortest possible time. All of this is under the premise that we will continue to operate our existing assets to ensure the security of supply for our customers.

At the same time, there is a trend towards decentralized heat generation. This leads to smaller procurement projects with a demanding, not always easy, competitive situation.

In addition, there were significant price increases in primary energy sources such as gas and coal. Although these have now come down significantly, volatility remains high, making long-term positioning difficult.

How do political goals, especially CO2 neutrality, affect your activities?

Our own targets are more ambitious than the political ones. Specifically, we want 40 percent

of our generation to be climate-neutral by 2030 and to phase out coal altogether. Lignite has not been used in Berlin's heating sector for several years, and the coal-fired power plants that are still in operation will be shut down by 2030. Ultimately, we want to generate 100 percent climate-neutral heat by 2040.

In purchasing, we are focusing on a CO2 reduction program with our major contractors, and we are developing a roadmap with concrete targets and Key Performance Indicators(KPIs) for ourselves as a team. And we have started to consider sustainability issues in our sourcing decisions and will continue to do so.

Impressive goals. And in general, what are your biggest sourcing challenges right now?

First, of course, there is high inflation and continued volatility in commodity prices. We are much more resilient in the commodity groups because we have a high degree of coverage through long-term framework agreements and benefit from the fact that the effects are felt only with a time lag and piecemeal.

In the maintenance of our facilities and in the construction of civil engineering and heat distribution pipelines, higher collective wage agreements and steadily rising minimum wages are having an impact. We also continue to experience disruptions in some of our supply chains, particularly in the form of significantly longer delivery times for some critical components. A particular flashpoint for us is the availability of suitable suppliers and bidders. We are seeing this both for older power plants at the end of their life cycles and for new investments. In the conventional sector, it is becoming increasingly difficult to find suitable suppliers: Market players are moving to more attractive markets, and there are shakeouts and concentration effects. In the case of new investments, the capacities of potential suppliers are heavily utilized, and as a buyer, we are competing with other utilities, among others. In other words, we are in a very challenging competitive situation.

In summary, I can say that the significant changes in the market are forcing us to take a critical look at our long-established procedures and, ultimately, to adapt our bidding processes.

And how can procurement respond to these challenges?

First, by focusing much more on the supplier market at an early stage. For example, by conducting the most comprehensive market research possible. We have already established this as a key component of our sourcing strategies for large, critical projects. Automation and digitalization in market communications are also a must today. The paperless office has been largely implemented in our purchasing department, driven in no small part by the widespread use of e-sourcing tools.

Negotiations are largely conducted virtually, but there is still interest in face-to-face meetings for larger issues.

In addition to the external focus, we are also taking a closer look at our internal processes. In addition to critically reviewing our prequalification requirements, we are working to reduce the complexity of our bidding documents. Together with all parties involved in the bidding process, we are discussing how we can streamline the respective submissions and documentation packages. Despite the sometimes strict procedural requirements, we want to introduce more flexibility rather than a one-size-fits-all approach. After all, we need to be able to adapt our Request For Proposals (RFPs) to the available bidder market and the size of the procurement item.

Sounds like a challenging task.

Absolutely right! We are talking about a tough nut to crack in terms of content and the number of people involved.

Especially since each area, including purchasing, tends to defend its own standards and minimum requirements. But I think that by piloting selected tenders, we can set a positive example and thus create momentum for further processes.

Are there any other measures?

Yes, we try, for example, to open up contractual obligations accordingly and to discuss alternatives, i.e., in the future, we will be increasingly open to partnership approaches for suitable procurement projects. If the competitive situation allows, we try to make an early decision in the bidding process in terms of stratification and focusing on promising bids up to a preferred bidder approach, simply to minimize the effort for us and the stratified bidders. We believe we will find applications for this in the future.

This is very interesting. Can you give some examples or possible solutions?

For example, as part of our transformation portfolio in Berlin, we are discussing how we can reimburse bidders who do not ultimately win the contract for the costs of preparing their bids, particularly for high-value projects. However, this is still under discussion and will always be decided on a case-by-case basis; after all, the necessary additional funding must also be provided by the demand side. When drafting the contract, we first try to reach a common understanding with the bidders about the risks and their costs in the contract. The goal must be to organize the allocation of risk between the customer and the contractor in such a way that the party that is best able to bear and share the risk is the one that bears it in the contract - as opposed to a blanket and one-sided delegation of risk responsibility to the suppliers.

Understandably, risks always have to be paid for in the end. If the amount of loss and the probability of occurrence are beyond the control of any party to the contract, this distribution is rational.

The same logic applies to reducing risks from price fluctuations or anticipated price increases. We are increasingly using price escalation formulas, even in projects, which was not the case in the past. We want to make these risks transparent from the outset and remove them from the calculation.

In other areas of optimization, we try to delegate as much engineering responsibility as possible to the bidders where the scope is appropriate. We have received feedback from the market that this increases the attractiveness of the bid packages and, at the same time, strengthens the innovation potential of the suppliers for better solutions.

Supplier development is also a very important issue. We deliberately lower existing barriers to market entry, with a particular focus on our recurring requirements. We do this by taking suppliers by the hand and giving them access to our requirements and processes through appropriate development activities.

Last but not least, a very new and important topic: We are currently in the process of testing new communication models and piloting them in a number of tenders, e.g., to place advertising measures for supplier acquisition in projects in line with the market. For example, we are using the LinkedIn Sales Navigator, a tool for structuring one's own LinkedIn network, to find relevant contacts for current procurement topics and requirements and then to contact them effectively or stay in touch on a long-term basis.

Are you doing this to increase competition from other vendors or to meet your own demand?

Through the network, with a focus on the critical, more complex measures, we can identify bidders who may not show up in traditional tools or search platforms or who may not reach our contract notices. Ultimately, it's about working together in a pragmatic way to identify suitable opportunities and, last but not least, keeping in contact for the future.

Interesting. And what opportunities do you see to intensify the competition between the winning bidders?

In particular, the above-mentioned circumstances make it necessary to tailor lots and contract packages to the competitive situation, both in the conventional sector

and for new construction projects. The first objective is to achieve the broadest possible participation of all potential bidders based on the results of a comprehensive market survey. The interests, capabilities, and capacities of bidders are relatively inhomogeneous, especially in the case of tenders for recurring requirements. The size of our lots and the degrees of freedom we allow have a significant impact on the number of bidders and their bidding behavior. Concrete levers to enable each bidder to participate fairly in the competition include targeted lot design, deliberate asymmetries and groupings in so-called super lots, and flexible designs. We try to balance the interests of all bidders as best we can. This is a real benefit for bidders. Of course, we don't do this out of pure altruism. After all, we also benefit from this flexibility in the form of the most cost-effective award.

Given the very tight bidding markets in which we predominantly operate, a second issue is the complication of market splitting. We always keep a critical eye on the bidding markets, and if there are anomalies, we look for the best possible solutions. For example, about five years ago, we re-tendered a large bundle of important framework contracts where the bidders' bids showed a price increase of 50 percent. Given the general market trend, this was completely incomprehensible to us.

How did you respond?

We quickly sought support from game theorists and tried to find a temporary solution with all internal stakeholders.

First, we stopped requesting services from existing framework agreements and switched to individual orders, consciously accepting a significantly higher internal effort. At the same time, our communication with bidders and existing suppliers was non-binding and unclear to create a degree of uncertainty. Finally, with the support of professional game theory, we relaunched the whole issue in the market with a completely new RFP and negotiation design and a modified implementation of the negotiations. As a result, we were able to win the contracts at almost the same price as the six-year-old contracts. It was an incredible success story. This success opened the door for further game theory-based tenders in the heating sector and throughout the Vattenfall Group.

What is your overall opinion of the game theory support?

Even though this negotiation approach means that we have to give up some of our freedom in the contracting and negotiating process, and this may be resisted by some at first, the results of these projects are absolutely impressive.

In the meantime, we have also seen a significant improvement in acceptance among bidders, as they perceive these procedures to be very transparent and fair. The legal framework to which we are subject, e.g., European Union (EU) procurement law, is not an obstacle to the application of game-theoretic approaches to bidding and negotiation. Looking inward, I can say quite clearly that we are seeing a significant change in the buying mindset: Our buyers now place a very high priority on the design of their RFPs and see it as critical to the subsequent success of the RFP. More than ever before, the expected participation and behavior of bidders are being critically scrutinized from the outset.

Taking a step back, how does the job of a buyer today differ from that of a buyer 20 years ago?

The pure handling of procurement processes is clearly receding into the background. The focus is clearly shifting to the preparation of the RFP to ensure optimal bidder participation through the design of the RFP. I also see a clear trend that purchasing today has to interact and negotiate not only with bidders but also with various internal stakeholders. It's about balancing different interests without losing sight of your own and the company's goals. We see very rapid changes in product ranges and procurement markets, even in a relatively traditional business like heating. As far as the qualifications of buyers are concerned, this brings methodical

purchasing knowledge that can be used flexibly to the fore.

Given the market challenges described above, it can be said that purchasing still sets the rules and drives the process. In some core areas, however, it faces a bidding market with many alternatives, especially in very tight markets.

The short end of the market has the most bargaining power, which makes it all the more difficult to negotiate successfully. But resources are scarce not only in the supply market but in other areas as well, especially in the labor market. Have you had similar experiences?

Absolutely. We are facing a very tight labor market. Unlike in the past, the reputation of the company and its industry is at least as important as the job itself. In this context, traditional recruiting tools such as job ads are becoming less important. It is becoming more important to proactively recruit people, for example, through contacts or appropriate networks such as LinkedIn. A key focus for us is to attract talent from within our own ranks, particularly from the area of trainees and dual students. We make it possible for them to enter the world of purchasing and try to retain them for the long term - with exciting tasks, a high degree of autonomy, and good development prospects, but also with motivating teamwork in which the fun of the job is not neglected.

I am very fortunate to work in a team with great colleagues, and I know only too well how critical this is to the success of our work and the challenges we face.

Thank you very much for this very interesting interview.

Countering Low Participation in Procurement Tenders by Improving the Cost-benefit Equation for Suppliers

Ensuring a sufficient number of bidders has become an increasing challenge for procurement professionals. Simulating the bidder's decision-making process suggests several ways to improve participation, such as compensating bidders, reducing the effort required to participate, or limiting the number of competitors.

Introduction

With capacity utilization close to its maximum, suppliers in many industries have little interest in participating in tenders that require a high effort and promise insufficient payoff.

Ensuring a high number of bidders in a tender has thus become increasingly difficult for buyers.

We examine the bidder's rationale to participate in a tender and show under which circumstances it is rational for bidders to decline participation. Based on this analysis, we point out how procurement can improve bidders' motivation to participate in a tender.

To answer the above question, we employ simulations based on auction theory as the types of negotiations examined can be approximated as auctions.

Counter Low Participation in Procurement Tenders

The Bidder's Rationale

In a first-price, sealed-bid (FPSB) procurement tender, suppliers submit a price that is not revealed to other suppliers. Abstracting from non-monetary differences, the supplier with the lowest price wins the contract.

In regulated industries, tenders are commonly awarded using a first-price sealed-bid negotiation. If alternative negotiation formats are used, we approximate them by first price sealed-bid negotiations.

In the FPSB tender, bidders add a strategic margin to their costs when determining their bids. Two opposing forces (you may call them fear and greed) influence the size of their strategic margin: A bolder participant will add a higher strategic margin. In contrast, a more fearful supplier will only add a small margin to their cost.

A higher bid leads to higher margins if the supplier wins but lowers the likelihood of winning.

The expected payoff is calculated as:

Expected payoff = probability of winning x payoff in case of a win – cost of participation

The supplier will decline participation when participation costs are higher than the probability-weighted payoff. Below, you see the expected gain of a supplier participating in a simulated FPSB tender.

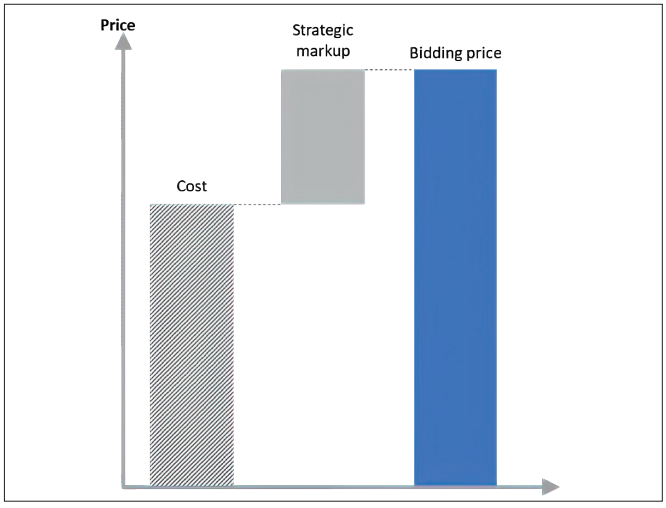

Figure 1: Image depicting a higher bid leading to higher margins

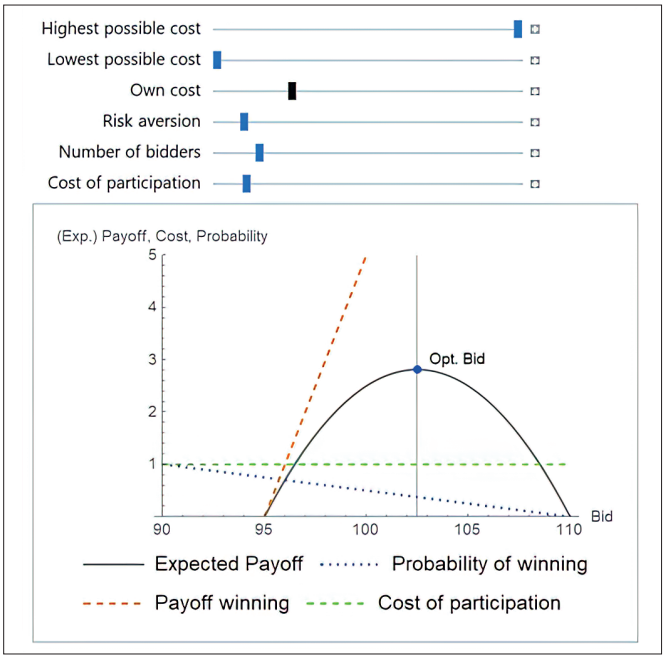

Figure 2: A simulation depicting the expected gain of a supplier participating in an FPSB tender

The X-axis shows the possible bids a supplier can submit. On the Y-axis, the expected payoff, costs of participation, and the probability of winning are displayed.

The depicted supplier has a unit cost of 95€ and estimates her competitors to have a uniformly distributed cost between 90€-110€. The optimal bid is the point on the X-axis where the curve has the highest value, 102.5€ in this case.

If the expected payoff is smaller than the cost of participation, a supplier will decline participation.

You can see the probability of winning being one at 90€ and decreasing until 0 with a bid of 110€. The payoff of winning increases linearly with a higher bid but needs to be balanced with the probability of winning. The expected payoff shows the probability-weighted payoff of winning. This graph does not include the cost of participation in the tender.

Risk aversion measures the degree to which individuals prefer certain over uncertain outcomes. For example, most people prefer 500€ guaranteed vs. a 50% chance of winning 1000€. Note that both have the same expected value of 500€.

Risk-averse bidders focus on winning the contract and care less about the conditions as long as their margin is positive. Less risk-averse bidders care more about their margin and are less worried about whether they win.

Measures to Improve Participation

Improving suppliers' participation can focus on two areas:

1. Lowering the costs of participation
2. Increasing the expected payoff. This can be achieved by:

   (a) Increasing the estimated probability of winning.

   (b) Improving the payoff in case of winning.

Lowering the Cost of Participation

Participation in a tender is often unnecessarily complex and tedious: Tender documents commonly comprise several hundred or even several thousand pages. Lowering the bureaucratic load and other up-front work will reduce suppliers' participation costs and improve participation rates.

Opportunity costs of participating in a tender are exceptionally high when a company is already operating close to maximum capacity. The company could put the resources to productive use elsewhere.

A simple way to reduce participation costs in a tender is to compensate bidders. When compensating bidders, procurement managers ideally avoid unintended signaling that could lead suppliers to assume low competition and hence lead to higher prices.

Increasing the Expected Payoff

Which factors influence the supplier's expected payoff from participating in the tender?

First, a higher risk aversion of bidders leads to lower prices. In the simulation below, risk aversion increases from risk neutrality to high-risk aversion. As you can see, the increased risk aversion leads to a lower expected payoff. After crossing a certain degree of risk aversion, participation in a tender is no longer profitable, and hence, participation is declined.

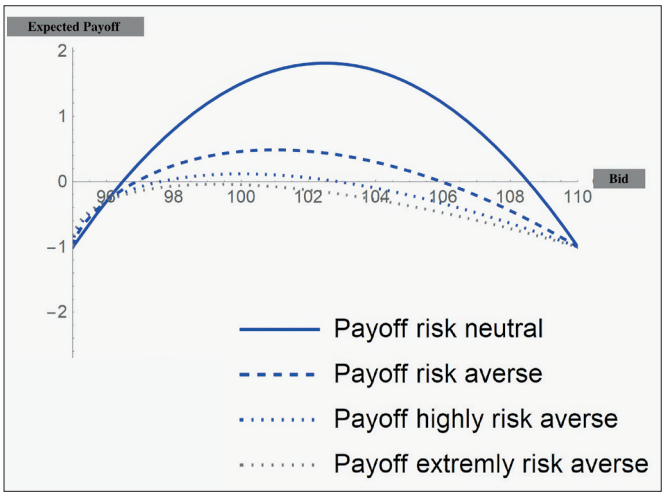

Figure 3: Increased Risk Aversion leads to Lowered Expected Payoff

Second, with a higher number of participants, the chance of winning the contract declines and hence lowers the expected payoff. The simulation models the number of competitors moving from 2 to 10. When suppliers know that the number of competitors in a tender is high, they may decline participation. Declining participation is particularly relevant for weaker suppliers with a low probability of winning.

A worst-case scenario can emerge when suppliers have similar offers and expect many suppliers to participate in a tender. This can lead to all suppliers declining participation.

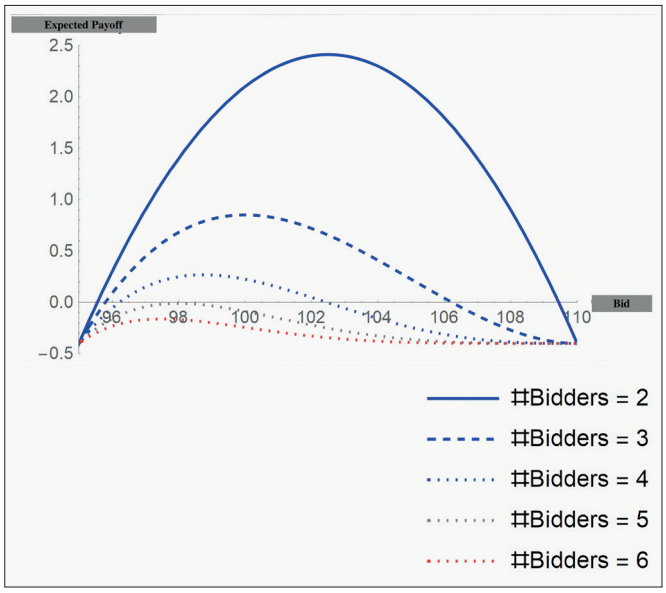

Figure 4: Simulation depicting the declining participation of bidders as the number of competitors increases

One strategy to counter this is to limit the number of selected suppliers and communicate this limitation to suppliers. Note that limiting the number of suppliers is often not directly achievable in regulated procurement. However, there are other means of reaching the same result indirectly.

When participation rates are an issue, procurement managers may consider the following points:

1. Reduce the complexity and required up-front effort to participate in a tender.
2. When suppliers have low perceived differentiation and expect many competitors, limit the number of participants and communicate the limitation to the selected suppliers.
3. Compensate bidders for their cost of participation.
4. Design and implement incentives increasing the expected payoff for bidders with desired features.

Beyond Rationality: Heuristics and Biases in Negotiations.

Economic models are based on the assumption that agents behave rationally. The rationality hypothesis has proven extremely productive for modeling. However, behavioral economics has revealed many aspects of human decision-making that contradict the rationality hypothesis. It should be noted, however, that the insights of behavioral economics would not have been possible without the standard of rational models. Criticism of the rational model of homo economicus is probably so pervasive because it is obviously wrong. What is lost sight of is that the rationality hypothesis was never intended to be a correct and complete description of human behavior but rather a gross simplification that can be used to develop meaningful models or mechanisms. The subsequent question of where these models reach the limits of their predictive power is entirely justified and allows for additional knowledge that would not have been possible without the first step.

The limits of rationality can also be seen in the well-known two-thirds game. If you are not familiar with the two-thirds game, here is a brief description: In a group of 50 people, each person is asked to pick a whole number between 1 and 100 (inclusive). The person whose chosen number is closest to two-thirds of the average of the chosen numbers wins.

For example, if the average of the numbers picked is 50, the person whose number is closest to 33 wins. Assuming the other players think the same way, the average would be 33, and you would win by 22. Continuing this iterative reasoning, we arrive at 1. At this value, further iterations lead to the same result, so 1 represents the equilibrium. Thus, the prediction, based on rational agents repeating the mental iteration a sufficient number of times, is that all participants will choose the number 1. However, the reality is typically far from this outcome. The reason is that while people take each other's perspective, and that perspective includes their own, they do not mentally repeat this process an infinite number of times. How often a mental iteration is performed varies from person to person. However, experimental studies have shown that a Poisson distribution with a mean of 1.5 provides a good description of the expected depth of iteration (see Camerer, 2003).

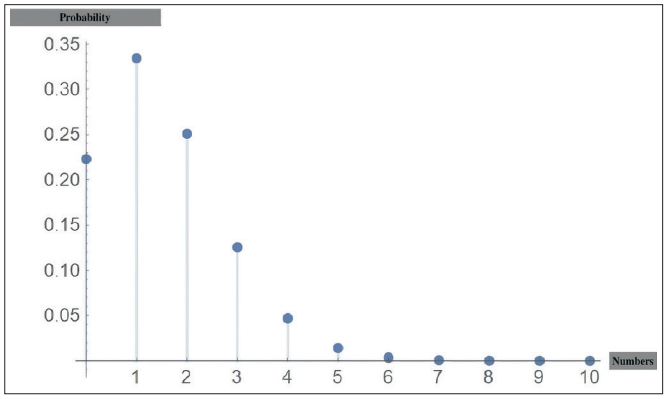

Figure 5: The expected iteration depth can be described by a Poisson distribution with a mean of 1.5.

For example, about 22% enter a random value without understanding the implications of the rules. About 33% do only one iteration. Only 0.002% of typical participants would enter the equilibrium solution 1, given these parameters. Note, however, that even with perfect rationality, it does not make sense to choose 1 since you are unlikely to win with this strategy. The best strategy takes into account the irrationality of others and tries to iterate exactly one step further than the average of the other players.

Behavioral economics assumes, among other things, that we work with mental shortcuts, called heuristics, that work most of the time and save us mental capacity. Mental work also has a cost, and we try to use mental energy as sparingly as we use physical energy. The contradiction with the predictions of the rationality hypothesis arises when the heuristics do not work.

A putative example of the failure of heuristics is the Xerox study (see Langer et al., 1987). In this study, people were observed at a copy machine in a library. As they approached the machine, a person came up and asked to be let in. Three questions were examined:

- **Question without reason:** "Excuse me, I have 5 pages. Can I use the copy machine?"
- **Question with reason:** "Excuse me, I have 5 pages. Can I use the copy machine because I'm in a hurry?"
- **Question with absurd reason:** "Excuse me, I have 5 pages. Can I use the copy machine because I need to make copies?

Without a reason (1), 60% of the subjects allowed the experimenter to stand in front of them. With a reasonable reason (2), 94% of the subjects did so. Interestingly, with an absurd reason (3), 93% of the subjects allowed the experimenter to stand in line.

The cognition-preserving heuristic used here was whether there was a rationale for the request.

With a justification, the request was considered more valid and therefore granted more often. Note, however, that requesting permission to join the photocopier queue is not a particularly important request. Thus, the use of this seemingly irrational heuristic is perfectly rational. Why waste cognitive energy on such an unimportant question? Anyone who believes that this strategy will be successful in a salary negotiation ("I want a 20% raise because I want a raise") is likely to be disappointed.

The concept of anchoring describes the tendency of people to focus on a particular

initial value (the "anchor") and use it as a starting point for further judgments and decisions. In negotiation situations, the first number mentioned (e.g., a salary proposal) can serve as an anchor and influence the course of the negotiation. The first person to name a high number can move the bargaining space in his or her favor.

If you know both sides' willingness to pay and willingness to sell, you can easily estimate the Zone of Possible Agreement (ZOPA) that is advantageous to both sides.

The art of setting an effective anchor is to dock as close as possible to the other side's lowest conceivable willingness to sell or pay. An exaggerated, unrealistic anchor will miss its target. The anchor strategy should, therefore, depend on the relative information level of the counterparty.

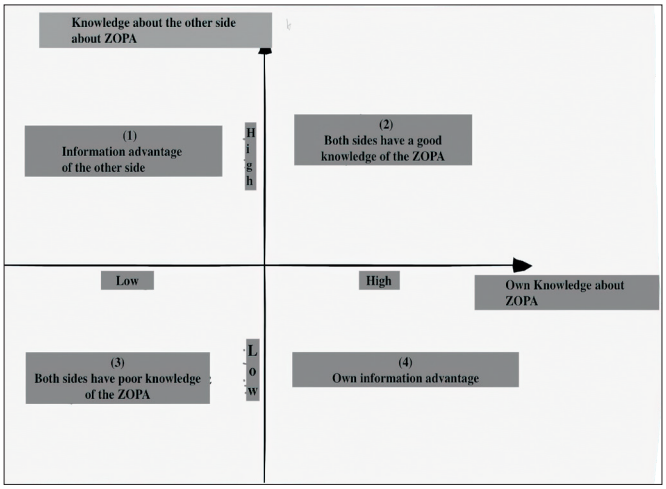

Figure 6: Depending on how knowledge about ZOPA is distributed in a bilateral negotiation, different recommendations result (see PON Negotiation Newsletter, 2008).

1. **Information advantage of the other side:** If you assume that the other side has better knowledge about the ZOPA than you do, it is risky to set an anchor. In this case, the focus of negotiation preparation should be on obtaining more information.
2. **Both sides have a good knowledge of the ZOPA:** In a long-standing relationship where both sides have a good knowledge of the ZOPA, the effect of an aggressive anchor is likely to be small.
3. **Both sides have poor knowledge of the ZOPA:** If both sides have poor knowledge of the ZOPA, an anchor can be set, but there is a risk that it will be too high or too low.
4. **Own information advantage:** In the case of an own information advantage, it makes sense to set an initial aggressive anchor.

When confronted with an aggressive anchor, do not immediately respond with an aggressive counter-anchor. It is more useful to first "defuse" the other person's aggressive anchor, e.g., by saying, "This is clearly outside my scope of action. You should then immediately make your own offer so as not to linger too long on the aggressive anchor (ibid.).

Another promising approach to applying behavioral economics to negotiations is Robert Cialdini's model of effective persuasion. Cialdini is a professor emeritus of psychology and marketing at Arizona State University.

His best-known work, Influence: The Psychology of Persuasion, first published in 1984, is a standard text in the fields of psychology, marketing, and sales. Cialdini's basic model of persuasion is divided into eight principles:

1. **Reciprocity:** Those who receive something without having done anything in return feel obligated to reciprocate.
2. **Liking:** We are more likely to make concessions to people we like.
3. **Unity:** We prefer to say "yes" to someone who belongs to our (perceived) group.
4. **Social proof:** In the face of uncertainty/risk, people look to the behavior of others, especially if they are similar.
5. **Authority:** In cases of uncertainty or risk, we will seek guidance from credible, independent experts.
6. **Commitment and Consistency:** We try to be consistent with our past statements or behavior.
7. **Scarcity:** Goods or services appear more valuable when they are rare.

8. **Contracts:** An evaluation is always relative to other variables. By influencing the frame of reference, perception can be influenced.

Cialdini's model is not only relevant for more effective persuasion but can also protect against becoming an unintended victim of these persuasion strategies. Since I cannot reproduce the entire model here, I will first briefly discuss the point of reciprocity.

David B. Strohmetz and colleagues conducted a study titled "Sweetening the Bill: The Use of Candy to Increase Restaurant Tipping," in which they examined how the gesture of giving candy with the bill affects tipping behavior in restaurants.

The experiment took place in a restaurant, and the waiters followed certain protocols when presenting the bill to customers:

- **Control condition:** The waiter does not include sweets with the bill.
- **1 Sweets condition:** The waiter placed one sweet per guest on the bill.
- **1 Candy Condition:** The waiter puts one candy per guest on the bill.
- **Spontaneity:** The waiter first gave each guest a piece of candy on the bill and then, as if spontaneously deciding to give more, gave each guest a second piece.

The results of the study showed that offering candy increased tipping. The greatest increase in tipping behavior was observed in the spontaneous condition, suggesting that generosity perceived as spontaneous had a greater impact than simply offering candy.

- In the control condition, where no candy was given, the average tip was approximately 18.95% of the total bill.
- In the 1-Candy condition, where each guest received a piece of candy, tipping increased to an average of 19.59% of the total bill.
- In the 2-Candy condition, where each guest received two candies, tipping increased to an average of 21.62% of the total bill.
- In the condition with spontaneity, in which the waiter first gave candy and then spontaneously gave another candy, tipping increased to an average of 22.99% of the total bill.

The results of this study illustrate the principle of reciprocity, which states that people feel obligated to return a favor or act when someone does something for them. In the context of this study, offering candy, especially when perceived as a spontaneous gesture, resulted in increased generosity in the form of tips.

The point about reciprocity is that a gift, even if it is small in value, can have a big impact. The value of the candy on the bill was very small. Assuming an initial tip without candy of $19, an investment of $0.10 results in an increase in the tip of about $2.62. This is a 1 to 26 return on investment.

The cognitive bias here is that the value of the gift is neglected. The focus is on the emotional aspect of receiving a gift. Conversely, this means that to remain objective, we should avoid accepting gifts in important negotiations at all costs. For example, when buying a car, it makes sense to avoid seeming freebies such as a cappuccino so as not to feel (subconsciously) obligated to buy an expensive car later, the additional cost of which is out of proportion to the consideration received.

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Improve Employee Engagement and Decision-making with Natural Language Processing (NLP)

Virtually all business decisions are made in groups. Simply, the process can be described as first identifying possible actions and then committing to a particular action.

Learning effects, reminders, and information from external sources support this process.

Often, the group of people involved in the decision-making process is small. Workshops or employee surveys can be used to broaden the decision-making process. However, in order to make the information generated, for example, from employee surveys, usable, the complexity of the individual elements must be reduced.

What can be done quickly in a five-person workshop can quickly become an enormous effort with a larger number of people and contributions. This is where Natural Language Processing (NLP) models come in.

In particular, large language models can help process and evaluate large amounts of text data. This can reduce the information bottleneck between employees and decision-makers and ultimately improve the quality of decisions.

For example, a list of 20,000 individual suggestions from an employee survey cannot simply be implemented. The individual ideas must first be evaluated, summarized, and made actionable.

NLP language models, especially transformation models, can reduce information aggregation time from days or weeks of manual evaluation to minutes.

Supervised Learning

One way to condense information is to classify it in an ontology. In its original meaning, an ontology is a "classification of being." In machine learning applications, the goal is to describe a given domain comprehensively and in sufficient depth.

For example, the ESCO (European Skills, Competences, Qualifications, and Occupations) ontology describes skills, competencies, qualifications, and occupations in a standardized way. The goal is to improve the mobility and transparency of workers within the EU.

For example, a candidate from Andalusia applying for a job in East Frisia can directly understand the requirements for a particular job if the relevant information is expressed in the job advertisement using the ESCO categories. Conversely, an employer can better assess a candidate's qualifications and skills if the candidate has written his or her resume using the appropriate ESCO categories.

In addition, ontologies form the basis for supervised machine learning applications. For example, the individual elements could be mapped to the functions of HR, Finance, Strategy, and Production. Although the four elements do not represent a complete ontology, since many functions are not mapped, this is initially irrelevant to the machine learning model.

A model that assigns an input to predefined categories is a supervised machine learning

model that requires annotated data for training. Basically, the more annotated data available, the better the trained model will perform in the end.

Language models such as BERT or GPT are already pre-trained with very large datasets so that even classification models with no (zero-shot) or few (few-shot) training data produce good results.

Unsupervised Learning

Data can be scored and clustered without a predefined structure. Similar records are aggregated into clusters. Here is a representation of an interactive cockpit we developed. Each dot represents a single input. The number of clusters can be adjusted with the slider (lower left).

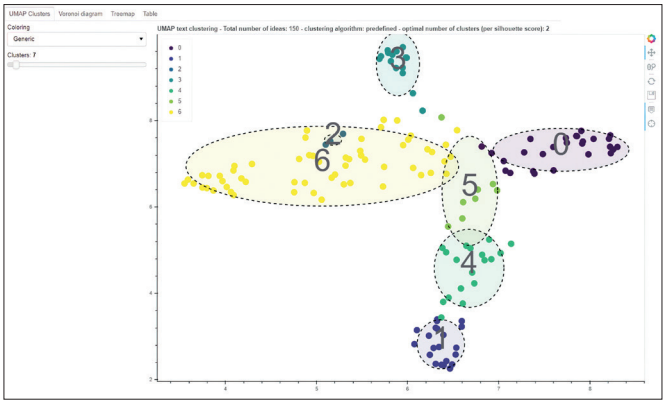

Figure 7: Online cockpit for endogenous grouping of topic clusters

The individual elements are transformed into a vector and can then be represented in a two-dimensional surface using dimension reduction methods. Of course, information is lost in the process, but the similarity of the individual elements can be assessed immediately.

Generative Models (ChatGPT)

After clustering, we know which individual articles are similar, but we do not yet have information about the content of each cluster. Generative language models can automatically generate summaries of each article. For example, a summary of this article might look like this:

This article is about how Artificial Intelligence can help to better utilize the decision-making potential of employees in companies. Decision-making is often a time-consuming process that can be made much more efficient with the help of NLP models. Language models can help analyze large amounts of textual data and reduce the information bottleneck between employees and decision-makers. The process of reducing the complexity of individual elements is not perfect, but it has the potential to improve the quality of decisions.

Online Whiteboards

With the Corona pandemic, whiteboard applications like Miro have gained popularity. Group collaboration becomes more creative and interactive. Ideas can be created in parallel by different users with sticky notes.

Using the Miro API, Miro data can be read and then analyzed, grouped and summarized using language models. In the example below, the sticky notes are initially presented in a simple, square shape:

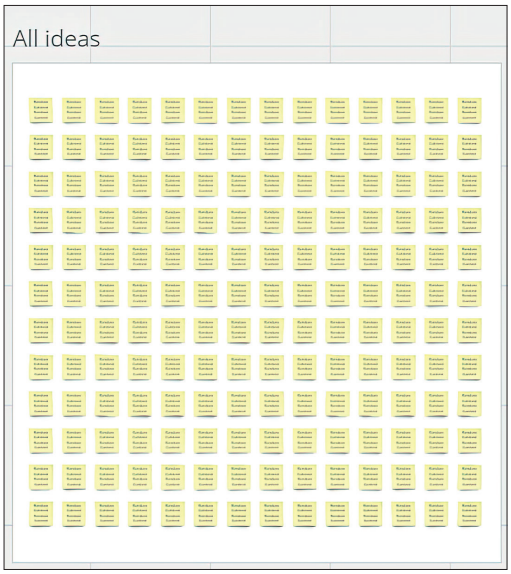

Figure 8: All ideas on the sticky notes represented in simple and squared shaped pattern

The ideas are then represented on the surface using dimension-reduction techniques. Similar ideas are closer together, and different ideas are further apart. The identified clusters are displayed in different colors.

Figure 9: Dimension reduction technique enables representation of similar ideas together and different ideas apart

The display then takes place in a circular arrangement. The derived clusters are arranged in a circle around the central question. Each cluster element consists of the original input plus a machine-generated title and summary.

As is often the case, the details are important. In employee surveys, it is likely that the input data will exceed the allowable number of words (tokens) that a language model can handle. For example, an approach that first summarizes step-by-step and then continues to summarize until the entire input has been processed is conceivable.

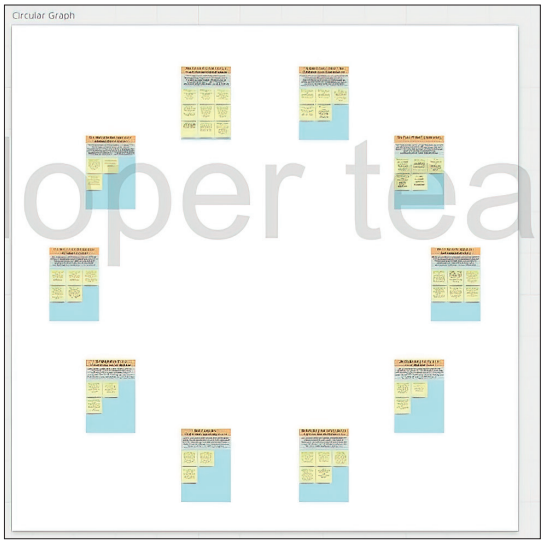

Figure 10: Circular arrangement of derived clusters

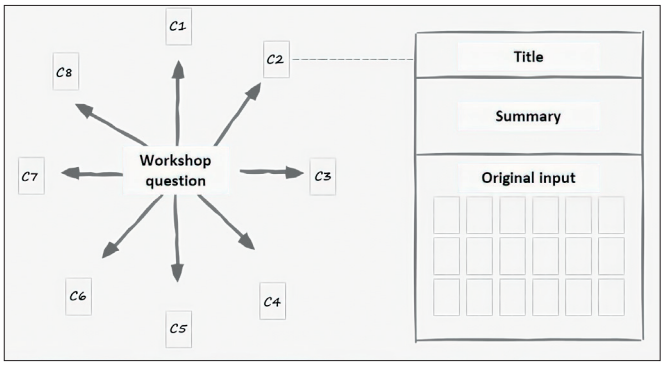

Figure 11: All clusters arranged around a central question along with the original summary and an AI generated summary

Benefits

Speed is a key benefit of AI-powered text evaluation. Increased efficiency allows a broader base of information to be used systematically.

As a result, better decisions can be made, and higher levels of employee engagement can be achieved.

In addition, the risk of overlooking information is lower in AI-powered summarization than in human summarization. For generative language models that can be used for summarization, attention must be paid to the quality and quantity of the input data. The less input data available, the greater the risk of hallucination, which is well-known in generative language models.

“Hallucination” in this context means that the model “invents” details or facts that are not based on the data provided to it.

The Competitor

If you have any questions, feedback, criticism, topic ideas, or new registrations, please send them to

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