RESULTS FROM A CIPS AND TWS PARTNERS SURVEY

GAME THEORY EMPOWERS PROCUREMENT
CIPS and TWS Partners conducted their second annual survey designed to explore the understanding, awareness and application of game theory within Procurement.

Building on the findings of their first survey conducted in 2017, the results show that Procurement professionals’ awareness of the concept of game theory as a powerful methodology is well known and growing. However, the in-depth application in a buyer’s day-to-day business, especially in the UK, is still relatively limited. The survey found that this is due to a lack of game theory related education and experience, as well as the absence of structured, company-wide initiatives to adopt the methodology.

Overall, in comparison to 2017, the survey shows that there has been a significant growth in the application of game theory. Most organisations recognise the potential of game theory within their business and the majority are convinced that game theory empowers Procurement.
KEY FINDINGS FROM THE SURVEY ARE:

- **Knowledge of game theory is widespread**
  88% of Procurement professionals have at least a basic knowledge of game theory (an increase of 10%).

- **Application of game theory is growing fast**
  40% of the participants apply game theory in Procurement, compared to just 9% in 2017.

- **Game theory is less prevalent in the UK**
  Only 24% of UK participants apply game theory in Procurement, compared to 41% of the participants from Germany, Austria and Switzerland.

- **Game theory is more likely to be applied in larger companies**
  62% of the Procurement professionals who use game theory, work in companies with more than 10,000 employees.

- **Game theory increases bargaining power**
  93% of the participants believe that game theory improves the bargaining position with suppliers.

- **Game theory enables organisations to gain a competitive edge**
  85% of the respondents confirm the application of game theory helps companies to gain an advantage over competitors.

- **Game theory empowers Procurement**
  98% of the respondents are convinced that game theory turns Procurement into a value driver.
WHAT IS GAME THEORY?

A Nobel Prize-winning branch of economics, game theory is the scientific modelling of interactions between different parties each pursuing their own interests. The parties interact and choose their actions mindful of what the other parties might think and do.

Economists call these interactions ‘games’ and the decision makers ‘players’. In business, the application is twofold: Firstly, game theory is a method for understanding the ‘rules’ of an interaction and for finding the best strategy in that setting, e.g. in negotiations. Therefore, game theory finds the best strategy for you in a specific setting. Secondly, game theory is a method for structuring interactions such that the participating parties are steered towards a desirable outcome. This means game theory helps to design and shape a playing field, where everyone is working towards the best outcome for themselves.

In Procurement, the design aspect of game theory is particularly effective, as the buyer typically sets the rules for the negotiation process and the clauses that govern the contractual relationships following supplier nomination.
WHY THIS SURVEY?

Upon launch of their knowledge partnership in 2017, CIPS and TWS Partners conducted their first global survey on the application of game theory in Procurement to investigate the current level of awareness for the topic and the degree of its application. The results demonstrated a genuine and pronounced interest amongst Procurement professionals in game theory and the value it can add. Yet it also uncovered uncertainties about what game theory is really ‘all about’ and how it can be effectively used to improve the performance of Procurement.

After recognising the value of the insights gained, CIPS and TWS Partners decided to conduct a second survey this year. It was apparent that the awareness of game theory and its application in day-to-day business is growing, especially in large companies. However, there are still significant gaps of in-depth knowledge, expertise and the availability of training. This second survey has explored the differences in the awareness and application of game theory across countries, leading to some interesting conclusions. For example, the survey found that game theory is much more widely used in Procurement in Germany, Austria and Switzerland, which can be attributed to the fact that Procurement professionals in these countries receive more game theory related education either from university or on the job.

Overall feedback from the survey participants once again reassured CIPS and TWS Partners how important it is to provide thought leadership to CIPS members across the globe. The results will help CIPS and TWS Partners to further create articles tailored to the needs of professionals working in Procurement, offering CIPS members a leading resource for game theory knowledge.

“Over the last months, the Chartered Institute of Procurement & Supply (CIPS) and TWS Partners saw great interest in game theory and in how the methodology can help Procurement professionals and the organisations they work for to respond to the future challenges that the profession will face.

The feedback from over a dozen of branch events delivered in the UK and Europe by TWS Partners demonstrated how important it is for CIPS to be at the forefront of this development, providing continuous thought leadership to our members. These events also surfaced the need to learn from best practise examples.

This is now the second year that CIPS and TWS Partners conducted a global survey on the application of game theory in Procurement. In response to our members, special emphasis was set on benchmarking the application of game theory across different regions.

I hope you will benefit from reading this report and the guidance and resources we are able to share with the CIPS community through our partnership with TWS.”

Helen Alder, Head of Knowledge and Product Development at CIPS, about game theory
122 PROCUREMENT PROFESSIONALS FROM DIVERSE BACKGROUNDS IN TERMS OF NATIONALITY, INDUSTRY, POSITION AND COMPANY SIZE, COMPLETED THE SURVEY.

37% of participants were based in the UK, and 28% were based in either Germany, Austria or Switzerland.

A wide range of industries, including manufacturing and engineering, automotive, health sector or governmental and public services, are represented.
Over 50% of the participants work in top or mid-level management.

Professionals from companies of very different sizes responded. From smaller companies with Procurement departments of less than 10 people and an annual sourcing volume of less than GBP 100 million, through to large organisations with over 200,000 employees and annual sourcing volumes in excess of GBP 50 billion.
**Game Theory in Procurement in 2018 — The Results**

**How broadly is game theory applied?**

Overall, the results of the 2018 study confirm what was observed in 2017, and the comparison of both studies reveals some trends on the application of game theory in Procurement.

*Game theory is very widely known,* with 88% of the respondents aware of the methodology (an increase of 10% on 2017).

*Game theoretical concepts are becoming better understood.* Game theory is a ground-breaking, yet complex, field of research. Naturally, there is a big step from gathering basic knowledge in the area to actually applying it in real world Procurement situations. For example, Nash Equilibrium and Backward Induction, two game-theoretical concepts, are now better understood than they were in 2017. Of those respondents who had come across game theory before, 64% and 56% have at least a basic knowledge of Nash Equilibrium and Backward Induction, respectively, compared to only 41% and 30% in 2017. Yet, only 13% and 7%, respectively, would rate their knowledge as ‘very good’.

**How would you rate your knowledge in the following theories and concepts: Game theory**

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<thead>
<tr>
<th>Level</th>
<th>12%</th>
<th>41%</th>
<th>27%</th>
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<tbody>
<tr>
<td>Never heard</td>
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**How would you rate your knowledge in the following theories and concepts: Nash equilibrium**

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<th>Level</th>
<th>36%</th>
<th>33%</th>
<th>18%</th>
<th>13%</th>
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<td>Never heard</td>
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<td>Basic</td>
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<td>Very good</td>
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**How would you rate your knowledge in the following theories and concepts: Backward induction**

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<th>Level</th>
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<th>33%</th>
<th>17%</th>
<th>7%</th>
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<td>Never heard</td>
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**Game theory can be self-taught as well as formally learned.** 33% of the respondents gained their game-theoretical knowledge from their job, while 25% studied it in University. However, there are also 23% who stated to have gained game-theoretical knowledge by personal interest, and 23% who learned about it via CIPS. It is encouraging to see a large proportion of individuals are actively seeking information about the power of game theory.

**Better understanding of game theory leads to a higher application.** The significantly higher rate of application goes hand in hand with the better understanding of game theory amongst participants. Only 9% were using game theory in their day job in 2017, but this has significantly increased to 41% in 2018.

**Game theory is more likely to be applied in larger companies.** 62% of respondents using game theory work in companies with more than 10,000 employees, but only 20% of those not using the methodology.

**DO YOU CURRENTLY APPLY GAME THEORY IN PROCUREMENT?**

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<th>No / I don't know</th>
<th>Yes</th>
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<tbody>
<tr>
<td>59%</td>
<td>41%</td>
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**USERS: WHAT IS THE TOTAL NUMBER OF EMPLOYEES IN YOUR ORGANISATION?**

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<th>1-99</th>
<th>100-999</th>
<th>1,000-9,999</th>
<th>10,000-49,999</th>
<th>50,000-99,999</th>
<th>100,000-199,999</th>
<th>200,000 and more</th>
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</thead>
<tbody>
<tr>
<td>4%</td>
<td>12%</td>
<td>22%</td>
<td>38%</td>
<td>12%</td>
<td>10%</td>
<td>2%</td>
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</table>

**NON USERS: WHAT IS THE TOTAL NUMBER OF EMPLOYEES IN YOUR ORGANISATION?**

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<th>1-99</th>
<th>100-999</th>
<th>1,000-9,999</th>
<th>10,000-49,999</th>
<th>50,000-99,999</th>
<th>100,000-199,999</th>
<th>200,000 and more</th>
</tr>
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<tbody>
<tr>
<td>11%</td>
<td>31%</td>
<td>38%</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
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Game theory is not being used to its full potential. In most instances, individuals are primarily applying game theory to straightforward supplier negotiations. Broader strategy applications, such as developing incentive schemes (applied only seldom or never by 49% of the users), or designing general sourcing processes (applied only seldom or never in 34% of the users) are still less in focus. Nevertheless, in straightforward supplier negotiations the survey shows that game-theoretical methods are used in a wide range of products, including OPEX projects of varying complexity, CAPEX projects, as well as negotiations of both new and existing contracts.

IN WHICH AREAS DOES YOUR ORGANISATION APPLY GAME-THEORETICAL METHODS?

- Conducting supplier negotiations: 87% always, 13% sometimes
- Optimising tenders and sourcing decisions: 81% always, 19% sometimes
- Developing incentive schemes (e.g. performance-related pricing): 51% always, 49% sometimes
- Designing general sourcing processes: 66% always, 34% sometimes

HOW IS THE ADDED VALUE OF GAME THEORY PERCEIVED?

Regardless of how intensely game theory is used in practice, there is a broad consensus among both users and non-users that game theory adds significant value to Procurement. An overwhelming 93% of all participants agree that applying game theory improves the organisation’s bargaining power in negotiations with suppliers. Similarly, 85% believe applying game theory gives the organisation a competitive advantage over their competitors, and 98% are convinced that game theory positions the Procurement function as a value driver.

Naturally, non-users are more reserved towards game theory than users. Only 38% of the non-users believe game theory can shorten the sourcing process, as opposed to 55% of users who are more confident. Similarly, 29% of non-users think that game theory does not have a positive influence on cross-functional collaboration, compared with just 16% of users. However, the survey results indicate that some of the reservations people have with regards to the application of game theory deteriorate as soon as they have their first hands-on experience.

WHAT IS THE FUTURE OF GAME THEORY IN PROCUREMENT?

The survey shows a large potential for game theory in Procurement, with 98% of the participants being convinced that it can add value to their organisation, and over 50% of non-users believing that their organisation will intensify their efforts to apply game theory.

However, more must be done to help people and companies apply game theory in practice through training and the sharing of expertise. 43% stated a lack of expertise, and 39% a stated lack of training, as the two main reasons why game theory is not currently applied. 59% of all non-users believe that formal training would be the most helpful to enable the correct application of game theory in their organisation.
ARE THERE REGIONAL DIFFERENCES?

The application of game theory is much more prevalent in Germany/Austria/Switzerland compared to UK, which is still lagging behind. Just 24% of UK participants apply game theory in their day job, compared to 41% in German speaking countries.

However, this doesn’t mean that game theory is not recognised as a key value driver in the UK. Despite the lower rate of people applying game theory, 83% of all UK participants believe that game theory both improves the organisation’s bargaining power in supplier negotiations, and provides a competitive advantage over competitors.

There are also differences in how game theory is applied within countries. 33% of the UK game theory users state that they have in-house expertise for the application of game theory in Procurement, such as an internal centre of excellence. In contrast to that, 80% of German-speaking game theory users have game-theory expertise within their own organisation.

Furthermore, while knowledge about game theory is widely spread in the UK (with 78% having heard of it), German countries are even better informed. 100% of participants from Germany, Austria and Switzerland have at least a basic, if not good or very good, knowledge of game theory.

The knowledge partnership between TWS Partners and CIPS is proving to be a key driver in improving game theory knowledge in UK Procurement departments. 52% of the UK respondents who have at least some game theory knowledge report to have gained their information from CIPS. In contrast, most German-speaking respondents got their knowledge about game theory from university and/or their work.

SUMMARY

The survey confirms that although the basic concept of game theory is well known amongst Procurement professionals and acknowledged as a powerful methodology, the actual in-depth understanding and application in day-to-day business life is still lagging.

Whilst game theory is still a relatively new field in academic research, and so is its application in business, the results indicate that an increasing number of Procurement professionals are recognising the potential of game theory and applying it in their business operations.

Independent of whether they are already applying game theory, the vast majority of the surveyed Procurement professionals are convinced that the use of game-theoretical methods empower Procurement departments. Therefore, the number of organisations applying game theory, as well as the knowledge and experience of the field, is certainly growing fast and set to grow even faster.
MORE INFORMATION

If you would like to learn more about game theory and how it can be a “game changer” for Procurement, you can find articles, whitepapers, videos and case studies on our CIPS Knowledge page dedicated to game theory: https://cips.org/en/knowledge/procurement-topics-and-skills/game-theory/game-theory/