

## The (Non-) Impact of Support on Offer Processes in Electronic Negotiations

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In negotiations the formulation of offers is a means to various ends. Expressing a demand by determining options for the issues under negotiation is already a challenging task, especially if alternatives provide the same utility. Still, elaborating an offer is more than just that. With this proposal to settle the negotiation a negotiator not only claims value for herself, but also signals the opponent her readiness to make concessions or reciprocate concessions received. In electronic negotiations, negotiation support systems (NSS) provide, besides communication functions, many tools (like preference elicitation, utility calculation or graphical representation of the negotiation history) to assist negotiators in their demanding task. Similarly, e-mediation expert systems aim to provide analysis and behavioral advice in negotiations to increase flexibility and help to overcome impasses and therefore improve the prospects of agreement.

Based on a literature review of bargaining models, we consider three properties of offer processes to be important for the success and outcomes of negotiations: (i) Concession making, (ii) reciprocity and (iii) value creation. Using data from a recent set of negotiation experiments, we investigate to what extent negotiation processes actually possess these properties, how they develop over time in ongoing negotiations, and how they are related to the results of negotiations. Furthermore, we study the effect of two support tools – the decision support of the NSS *Negoisst* and the mediation functionalities of *VienNA* – on negotiation processes with respect to these dimensions.

As negotiations differ considerably in their duration as well as the number and frequency of offers, negotiation processes cannot be directly compared. To aggregate process data across negotiations, and make results from different negotiations comparable, we developed an innovative approach which we call “standardized interpolated path analysis”. This approach uses linear interpolation to approximate the status of negotiations (e.g. positions of parties in utility space) at standardized points in time. Data referring to the same points within different negotiations can then be aggregated or compared across negotiations and statistical tests can be employed to evaluate differences between negotiation paths. Using these standardized negotiation paths, we can evaluate process dimensions (like the extent of concessions), and also the progress of outcome dimensions (like distance to the efficient frontier) over time in negotiation.

As could be expected from literature, negotiation paths leading to an agreement on average show a tendency of higher concessions. However, although successful negotiations also exhibit more value creation during their middle phases, towards the end of the negotiation parties quite often make offers that destroy rather than create value, even in successful negotiations. Both successful and unsuccessful negotiations show declining reciprocity over time. However, successful negotiations are characterized by a tendency towards more balanced outcomes already quite early during the negotiation. These results confirm the impact of the process characteristics we study on outcomes.

Concerning our second research question, the impact of support methods on negotiation processes seems to be rather limited. To obtain a compact representation of concession patterns, we estimated an Actor-Partner Interdependence Model (APIM) on standardized concession data and tested for the impact of support tools on the parameters of this model. Results indicate that both types of support used in the experiments, analytical support as well as behavioral support, do not have a significant impact on the concession process. In view of the fact that the concession processes we observed have considerable deficiencies (for example destroy rather than create value), this lack of positive impact of support tools is particularly disturbing.

This underlines the importance of new, proactive approaches which are able support the negotiation process in generating offers that fulfill desirable criteria like concession making, reciprocity and value

creation. This type of intervention seems to be necessary to guide negotiators' behavior and the resulting negotiation processes towards better outcomes.

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