User acceptance in different electronic negotiation systems - a comparative approach

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Abstract—In line with the progress of artificial intelligence, electronic negotiation theory has developed a great variety of promising negotiation models. These models have been evaluated in several ways. Besides formal evaluation, which could prove a lot of optimality properties, some researchers have already examined the user acceptance of these models. However, there are no studies that compare different negotiation models under identical frame conditions. This paper thus aims at contributing to IS research by filling this gap. From the perspective of temporary employment job allocation, we prototyped a pure auction negotiation system, a semi-structured argumentation-based negotiation system, and a structured argumentation-based negotiation system and evaluated these systems regarding their user acceptance with an identical test setting (application domain, tasks, and laboratory setting). The results contribute to IS-research by systematically revealing specific acceptance characteristics and differences between the negotiation approaches regarding performance, effort and usage intention.

I. INTRODUCTION

Particularly in the last ten years, negotiation research has developed and evaluated many promising negotiation models including auction-based models (e.g. [1]–[6]), semi-structured negotiation approaches (e.g. [7,8]), and argumentation-based models (e.g. [9]–[18]). Previous conceptual work shows that some differences exist in the utility and the quality of the outcome of different forms of these negotiations. [19], for example, shows that negotiation and especially argumentation can be automated by using suitably equipped software agents. [10] demonstrated that argumentation can improve the quality of an outcome of a negotiation, whereas it never decreases it. Empirical papers indicate that the graphical presentation of information and the design of the negotiation support system influence the negotiators’ behavior and negotiation outcomes [8,20]–[22]. Since IT acceptance is a key factor for later IT success [23]–[26], a variety of research has already examined negotiations from a user centered perspective and evaluated the user acceptance of one certain negotiation model or its presentation (e.g. [26]–[31]).

However, very little research has been conducted into the comparison of user acceptance between different negotiation models very few research has been done, with the exceptions of [7,32]–[36]. Nevertheless, despite the considerable importance of the UTAUT model (cf. [37]) as the leading acceptance model in IS-research, there is no work based on UTAUT that systematically evaluated different negotiation models using the same test setting (e.g., identical application domain, tasks, and laboratory setting).

That is why, our aim is to contribute to this gap in IS-research by providing the first study empirically comparing the user-acceptance of different negotiation models based on the UTAUT model using an identical test setting. Hence - to deepen our understanding in IS acceptance research - we set up three different negotiation models (test system A, B and C) and evaluated their user acceptance in the application domain of temporary employment. These three models were evaluated and compared regarding their performance expectancy, effort expectancy, and usage intention from a user centered view. As the focus is on job allocation for temporary employment, the systems are based on realistic job interviews that fit business needs.

The paper is organized as follows: First we consider related work for automated negotiations and user acceptance and consequentially deduce our hypotheses. Then we present our research methodology, test settings and measurements. Next the results of our test are given and discussed. Finally we discuss the limitations of our results and indicate future work.

II. RELATED WORK

A. Electronic negotiations

Electronic negotiations (for overviews see [38]–[41]) are negotiation models using information and communication technology (ICT) where a negotiation is defined as an iterative communication and decision-making process as suggested in [42,43]. Following [44]–[46], there are three different models of electronic negotiation: game-theoretical models, heuristic models and argumentation-based models. Game-theoretical models assume perfect rationality, unlimited resources and perfect information and find perfect outcome equilibriums regarding different optimality criteria (e.g. [47]–[49]). Heuristic models relax the restricting assumptions of the game-theoretical models by using thumb rules [50,51]. Argumentation-based models simulate a talk in which the negotiants try to persuade each other by exchanging arguments (e.g. [52,53]).

Argumentation-based models can (partly) automate one part of the negotiation process, the communication phase, by offering the negotiants the possibility of evaluating and possibly adapting their position by using the arguments of the negotiation partner [44,54]. Depending on the degree of the structuring, semi-structured and structured argumentation-based negotiation models exist [42]. For the decision-making part of the negotiation process, game-theoretical models (especially auctions) are favorable, as they lead to optimal solutions assuming complete information [44].

As a huge part of our daily tasks is based on negotiations, automatising or semi-automatising them covers a huge potential (e.g. [55]) which can only be fully tapped if users...
accept the automation of the underlying negotiation models. Therefore, in the following sections we summarize the state of the art regarding auctions, semi-structured and structured argumentation-based negotiations and their user acceptance.

B. Auctions

Recent research in auction theory made substantial progress on proving optimality criteria (e.g. [56,57]) and improving auctions mechanisms. Innovative and faster auction mechanisms were generated [1]–[3,58,59], the macroeconomic impacts of auctions were examined [27,60], optimal bidding strategies (e.g. [4,61]–[64]), especially in iterative auctions (e.g. [5,6,65]–[67]), were investigated and reputation mechanisms were developed to address the problem of incomplete information (e.g. [68]–[72]).

In addition, specific research has been carried out concerning the violation of psychological contracts between seller and buyer [73], the reputation consequences of feedback text comments in online auction marketplaces such as eBay [71,74]–[76], the role of marketplace intermediaries such as Amazon on buyers’ trust [77,78] or the impact of additional information in markets with uncertainty [79].

Concerning user acceptance, there exist some research papers that examine the acceptance of auction systems by individuals, companies and the public sector in general (e.g. [80]–[84]) and the acceptance of particular features of auctions, for example, surplus [27], rating and other trust systems [85,86], overbidding [87,88] and the virtual presence of others [89]. Nevertheless, comparisons of the acceptance of several auction and negotiation approaches with identical test settings are rare. In the remaining parts of the paper, we will refer to an auction without any prior information exchange by using the term “pure auction negotiation system (PAN-system)”.

C. Semi-structured argumentation-based negotiations

According to [42], semi-structured argumentation-based negotiations (SABN) are negotiations which have specified rules but leave flexibility and freedom in the decision-making and information exchange activities to the negotiators. Thus, most of the common negotiations among people are semi-structured with stated and unstated rules [42]. As SABN-systems (contrary to PAN-systems) allow argumentation, they can improve the quality of the negotiation outcome, but – according to the analytical results of [10] – never decrease it. However, as empirical results such as [8,21,22] indicated, the graphical presentation of information and the design of the SABN influence the negotiators’ behavior and the negotiation outcomes.

For a long time, researchers have analyzed different forms and elements of SABNs (e.g. [90]) and important antecedents for their acceptance. Excelled expectations on the performance of SABNs [91,92], product quality and price transparency [93], perceived collaborative atmosphere [92] and trust [94] (depending on the transmission of social experience, cultural cues and personal signals [95]) are shown to influence the acceptance of SABNs positively. Additionally, [7] and [35] discovered that negotiants prefer having a formal and an informal respectively non-binding means of negotiating. To conclude, the possibility to communicate and negotiate in a personal and informal way with little restrictions seems to be very important for the acceptance and adoption of negotiation models. In the remaining parts of this paper, we will join a SABN and an auction to a combined auction model and refer to it as a “SABN-system”.

D. Argumentation-based negotiations

Because negotiations are omnipresent in our daily routines, [55] and [96] already expected 30 years ago that automating them would result in a considerable financial gain. Current frameworks for structured argumentation-based negotiations (ABN) are about to automatize negotiations and already satisfy this expectation, e.g. [9,38,40]. Recent research on the topic stresses the development and improvement of time-tested frameworks (e.g. [11]–[13,97]), the authentication in ABNs (e.g. [14,15]) or the application of ABNs in different areas where multi-agent-systems are used (e.g. [16]–[18]).

However, to the best of our knowledge, there is no research on the user acceptance of structured argumentation-based negotiations. This may be the case because its deployment is focussed on software agent theory. However, behind every software agent there is a human or a human concept, such that user acceptance of ABNs should not be underestimated. In the remaining parts of the paper, we will join an ABN and an auction to a combined negotiation model and refer to it as an “ABN-system”.

E. Acceptance research on negotiation systems

The previous sections II-B, II-C and II-D revealed that there is already some research into user acceptance of negotiation systems without argumentation (on auctions) as well as on user acceptance of semi-structured argumentation-based negotiations (SABN). User acceptance for structured argumentation-based negotiations has not been investigated yet.

On the comparison of the user acceptance of different negotiation models very little research has been conducted with the following exceptions: [32] makes propositions that provide different negotiation systems with semi-autonomous and adaptive amendments to improve human acceptance. [33] compares the user acceptance of the visual display of different negotiation systems. [34] contrasts four different automated negotiations models and finds differences in the inclusion of user’s beliefs, user’s intelligence and user’s commitment which ease the effective participation of the user in the negotiation process. [35], [7] and [36] compared negotiation models with formal and informal ways to negotiate and found that negotiants prefer having the possibility to communicate in an informal way.

Nevertheless, despite the considerable importance of the UTAUT model [37] in IS-research, no work exists based on UTAUT that has systematically evaluated different negotiation models using the same test setting (e.g., identical application domain, tasks, and laboratory setting).

That is why our aim is to contribute to filling this gap in IS-research by providing the first study empirically comparing the user-acceptance (especially performance expectancy (PE), effort expectancy (EE) and behavioral intention (BI) (cf. [37])) of a PAN-system, a SABN-system and an ABN-system using an identical test setting.
III. HYPOTHESIZING

In the following, we draw the hypotheses from the state of the art in sections II-A - II-E:

Both the SABN-system and the ABN-system are function-richer and permit the exchange of information whereas the PAN-system does not give this possibility. Therefore, based on the results of [10], which states that the exchange of information can never decrease the quality of outcome, we hypothesize:

\[ H_1: \text{The performance expectancy of the PAN-system is lower than the performance expectancy of the SABN-system.} \]

\[ H_2: \text{The performance expectancy of the PAN-system is lower than the performance expectancy of the ABN-system.} \]

Second, as SABN-systems are more expressive than ABN-systems (each formal argument of the ABN-system can also be mentioned in the SABN-system) and because negotiators prefer having an informal way to negotiate [7,35], we hypothesize:

\[ H_3: \text{The performance expectancy of the SABN-system is higher than the performance expectancy of the ABN-system.} \]

Since both the SABN-system as well as the ABN-system are function-richer and thus more complicated compared to the pure PAN-system (cf. [9,40,42]), we hypothesize:

\[ H_4: \text{The effort expectancy of the PAN-system is higher than the effort expectancy of the SABN-system.} \]

\[ H_5: \text{The effort expectancy of the PAN-system is higher than the effort expectancy of the ABN-system.} \]

A collaborative and trust building atmosphere is perceived to be very important for negotiators within negotiation processes (e.g. [92,95]) and informal conversation possibilities were revealed as key factors building such a negotiation atmosphere (e.g. [7,35]). Since the SABN-system enables such informal conversation possibilities (e.g. [42]) and the more automated ABN-system (originally developed for software agents) lacks any possibility to exchange informal arguments (e.g. [40]), we assume that users are more familiar and comfortable with the SABN-system compared to the ABN-system. Thus we hypothesize:

\[ H_6: \text{The effort expectancy of the SABN-system is higher than the effort expectancy of the ABN-system.} \]

Since the performance expectancy has much more influence on the behavioral intention compared to the influence of the effort expectancy (cf. both [98, p.332] and [37, p.458]) the intention to use a pure (more function-lacking) PAN-system (cf. \(H_1\) and \(H_2\)) should be smaller compared to a SABN- or an ABN-system. Thus we hypothesize:

\[ H_7: \text{The behavioral intention of the PAN-system is lower than the behavioral intention of the SABN-system.} \]

\[ H_8: \text{The behavioral intention of the PAN-system is lower than the behavioral intention of the ABN-system.} \]

As we expect PE and EE for the SABN-system to be higher than for an ABN-system, following [37], the behavioral intention to use the system should also be higher for the SABN-system.

\[ H_9: \text{The behavioral intention of the SABN-system is higher than the behavioral intention of the ABN-system.} \]

IV. METHODOLOGY

To test our hypotheses, we chose the application domain of temporary employment negotiations and set up three prototypes. The application domain, the prototypes and the test setting are briefly outlined in the following sections.

A. Application domain

About 9.5 million employees around the world are temporary employed. The market size of temporary employment added up to more than 340 billion US$ worldwide in 2007 [99, pp. 11] and is still growing [100], though regarding which it is difficult to find reliable data [101]. The Job Allocation Problem (JAP), of how to efficiently allocate Temporary Employment Workers (TAW) to requests for labor, and the problem of determining the offered wage, are two key problems any Temporary Employment Agency (TEA) faces.

In practice, the matching of TAWs and requests for labor is a labor intensive (and hence costly) process and is done to best suit the TEAs needs. Having no influence over their work environment (including salary) TAWs have in general a lower job engagement, which correlates with lower productivity [102].

Traditional approaches to solve JAPs have come from the Operation Research community. These approaches normally assume complete information. The JAP at hand, however, involves human beings in a social environment, who have personal and private interests, preferences and agendas. In order to exchange such information, some possibility to negotiate is needed and in order to reduce costs it should be as automated as possible [55], but at the same time strongly accepted by the temporarily employed workers. This makes the JAP an ideal application domain for testing user acceptance in different negotiation models.

B. Description of prototyped negotiation models

We set up three different prototypes to be able to compare the user acceptance for different models of negotiation. All prototypes were programmed in PHP and HTML and are FIPA-ACL conform as they are implemented using the java framework JADE. To ensure a basic usability of the prototypes themselves, all three prototypes were iteratively improved based on in-depth interview results from pre-test users, cf. [103]. An overview of the prototyped test systems and their specific differences within the information phase is given in figure 1.
Information phase

- Pure Auction Negotiation (PAN, no exchange)
- Semi-structured Argumentation-based Negotiation (SABN, information exchange via informal chat)
- Structured Argumentation-based Negotiation (SABN, information exchange via structured arguments)

Auction phase

- Auction mechanism
- Input: (base salary, bonus for overachieving targets, overtime premium)
- Auction formula: \( w^* = \arg \min_{w \in W} c_T E A (r_1, r_2, r_3) \)

Fig. 1. Negotiation stages and test system differences within the information phase

1) Auction phase mechanism of all three systems: Each applicant was told that he/she was an idle worker and received three successive different requests for labor for the duration of half a year each. For each job description he/she had to give a minimal recompensation-package under which he/she would accept the job offer (bid). The recompensation-package was composed of \( r_1 \): base salary, \( r_2 \): bonus for overachieving targets in percent of base salary and \( r_3 \): overtime premium in percent of hourly base salary. For each job \( j \) each worker \( w \in W \) gives a bid composed of the recompensation values \( r_1^w \), \( r_2^w \) and \( r_3^w \). The TEA has a cost-function \( c_T E A : \mathbb{N}_0^3 \to \mathbb{R} \) evaluating the bids. Thus, the computation of the (secret) auction consists of finding the worker \( w^* \) with the cheapest bid: \( w^* = \arg \min_{w \in W} c_T E A (r_1^w, r_2^w, r_3^w) \). The worker \( w^* \) is assigned the job \( j \) and receives the recompensation \( (r_1^{w*}, r_2^{w*}, r_3^{w*}) \). Thus we equally implemented a simple (sequential) auction mechanism within the negotiation phase of all three systems A, B, and C since we aimed to compare only the alternative pure negotiation approaches (Fig. 1). Therewith we reduce inference effects of more complicated auction models such as [104]. The specific differences of the three test systems within the information phase are explained in more detail in the following.

2) Information phase of test system A: In test system A, the employer and the applicants had no possibility to negotiate. Applicants were shown the job description and they had to make a bid on the job request. Then the job allocation was computed via the above described auction mechanism. System A thus implemented the PAN-system from section II-B. A screenshot of the test system A can be found in figure 2.

3) Information phase of test system B: According to [8,21,22,105], we implemented in test system B an informal way to support the communication between the negotiation partners. Therewith, in test system B, applicants were able to talk to the employer via an informal chat after reading the job description (cf. figure 2). After the conversation, the applicant made his/her bid and the job allocation was computed via the above described auction mechanism. System B thus implemented the SABN-system from section II-C.

4) Information phase of test system C: Test system C was similar to test system B, but the informal chat was replaced by an ABN protocol, which used Dung-style argumentation (DSA, [52]) to model exchanged (possibly conflicting) arguments. Our protocol proceeded by playing moves by turns [97]. At the beginning of the dialogue, the joint set of accepted arguments was empty. After \( n \) moves, the arguments accepted by both agents formed a DSA framework \( AF_n = (A_n, R_n) \). As the dialogue continued, \( AF_n \) changed dynamically based on the played moves, where \( AF_{END} \) denoted the final state. To obtain a common view – that was the jointly accepted arguments in \( A_{END} \) – the agents agreed to use common single-status extension semantics \( \mathcal{E} \) which determines the status of arguments in \( A_{END} \). In practice, applicants began by selecting arguments from a list and sending them to the employer, who could accept or reject them. Afterwards the employer selected arguments from a list and sent them to the specific applicant, who could accept or reject them. This procedure was repeated until a set of arguments \( A_{END} \) was found, accepted and not tried to be extended by both negotiants. If no agreement was reached after five minutes, the negotiation was aborted and the current set of accepted arguments was set as \( A_{END} \). We provided a set of 14 fixed arguments which concerned the current labor market conditions, job and employer specifics as well as job seekers characteristics. Employers and applicants could then agree upon a subset of these arguments. After the termination of the dialogue, participants proceeded by giving bids. System C thus implemented the ABN-system from section II-D. A screenshot of the test system C can be found in figure 2.
C. Test setting

1) Sampling: Participants were recruited from 02/04/2012 to 13/04/2012 from a pool of extra-occupational MBA and bachelor students. All of them have professional experience, making them suited for employment negotiations. To ensure that all participants understood the scenario and the three systems, they were given introductions to temporary employment and computer interfaces. Participants’ questions were answered prior and during testing by a team member playing the role of a software supporter. The employer’s parts were taken by another team member. In a laboratory setting without any disturbing factors, participants were asked to apply for the same three jobs in all three test systems (A, B, and C), thus they had to make a bid nine times.

2) Measurements: After the bidding, user acceptance of the three systems was measured on a seven-point Likert scale via questions based on UTAUT (see [37, Table 16, p. 460] for the complete questionnaire). However, since our test settings were part of a laboratory test, measuring social influence (SI) and facilitating conditions (FC) was not reasonable because our participants could not assess SI and FC properly. Hence, we measured PE to get insights into the usefulness of our systems, EE to get insights into the ease of use of our systems and BI to find out about the intention of our participants to use our three systems. To analyze our data, we used SPSS Statistics Version 17.0.0. As our goal was to compare PE, EE and BI for the three negotiation models, we conducted the Kolmogorov-Smirnov-Test to test our sample data for normal distribution. As our sample data was normally distributed, we conducted a t-test to compare the means for PE, EE and BI for all three negotiation models.

V. RESULTS

A. Sample

31 participants were recruited and filled out the questionnaire after applying for jobs with the three different negotiation systems A, B, and C. We applied two criteria for invalid answers: (a) similar answer patterns, and (b) inconsistent responses. Four of the questionnaires contained invalid data, thus 27 evaluable questionnaires remained. The remaining participants were aged between 25 and 51 with a mean age thus 27 evaluable questionnaires remained. The remaining respondents. Four of the questionnaires contained invalid data, thus 27 evaluable questionnaires remained. The remaining participants were aged between 25 and 51 with a mean age of 30.5 of them female and 22 male. Due to our relatively small sample in this study, the current data is not well suited to running comparisons across demographic and individual characteristics of the sample such as age or gender. Therefore, the current paper excludes the exploration of the possible effects of these moderating factors on PE and EE.

B. Statistical tests and evaluation of hypotheses

Table I shows the results of the statistical tests and the evaluation of the nine hypotheses.

VI. DISCUSSION

A. Performance expectancy

The performance expectancy of both the SABN- and the ABN-system was not perceived to be higher than the performance expectancy of the PAN-system (non-confirmation of H1 and H2). At a first view this seems to be contrary to the prior research conducted by [10], which stated that argumentation can improve the quality of the negotiation outcome, but never decreases it. However, here we evaluated in our user-centric approach the subjective user-perceived performance (expectancy) of the systems – not the objective performance as [10] did it. Obviously, the system users did not perceive a better performance either of the feature-riche SABN- or the powerful ABN-system compared to the function-lacking PAN-system. This unexpected result may be explained and better understood by the comments made by several users, who said that – especially when using the ABN-system – they could not express their individuality, leading to a perceived lack of functionality. This explanation is in line with recent results from technology adaption and use research [106,107] which all stress individual factors of users such as personality or individual habits.

This result is very interesting for the user acceptance/adoption research when designing and implementing negotiation systems, since there is obviously (historically speaking) a divergence in negotiation research fostering the development of function-richer systems (especially fully automated argumentation-based approaches) and the problematic user perception of these functionalities. It is remarkable that the performance expectancy of the powerful ABN-system was much lower compared to the function-lacking pure PAN-system (table I). This phenomenon leads to a need for further investigation (see section VII-B).

Nevertheless, the perceived performance (expectancy) of the SABN-system was as expected – significantly higher than the performance expectancy of the ABN-system (confirmation of H3). This acknowledges the results of prior research (e.g. [7,35]) which discovered that negotiators regularly prefer systems with informal communication possibilities.

B. Effort expectancy

The effort expectancy of the PAN-system was clearly perceived to be higher than the effort expectancy of both the SABN- as well as the ABN-system (confirmation of H4 and H5). The significant differences in the effort expectancy values show that the PAN-system was perceived to be much easier to deal with compared to both the SABN-system and the
ABN-system. In addition, the effort expectancy of the SABN-system was perceived to be higher than that of the ABN-system (confirmation of $H_6$). This result is not surprising, but should guide future research fostering the design of user-friendly function-richer negotiation systems (see section VII-B).

C. Behavioral intention

As expected, the behavioral intention to use the PAN-system was lower than the intention to use the SABN-system (see table I, BI means). However, probably due to the small sample, the t-test result was not significant – leading to the non-confirmation of $H_7$.

The very poor ranking of the ABN-system was surprising concerning the intention to use. Contrary to the latest promising results from argumentation-based research such as [9,10,16]–[18,40], users seem to tend to avoid using such ABN-systems. When identifying the causes of this user avoidance/resistance it is remarkable that both the perceived performance expectancy – as the most influential factor of the behavioral intention (cf. both [98, p. 332] and [37, p. 458]) – as well as the perceived effort expectancy were much lower for the ABN-system (see table I). In particular, the assumption of a higher intention to use the ABN-system compared to the PAN-system was not supported (non-confirmation of $H_8$).

However, the results show that users clearly preferred the SABN-system compared to the ABN-system as we found significant higher PE, EE and BI values for the SABN-system than for ABN-system (confirmation of $H_5$). This result can be seen as a confirmation of the work of [7] and [35], which revealed that users prefer to have a way to communicate informally and personally as discussed in section II-C. We showed that this result remains true even if the formal communication not only consists of document-exchange [7] but simulates a conversation.

VII. CONCLUSION

Our aim was to evaluate different negotiation systems based on the major promising negotiation approaches regarding their user acceptance. Thus, we prototyped three systems namely a pure auction negotiation system (PAN-system A), a semi-structured argumentation-based negotiation system (SABN-system B) and a structured argumentation-based negotiation system (ABN-system C). To the best of our knowledge, this is the first study that compared different negotiation models regarding acceptance from a user’s perspective with an identical test setting (identical application domain, tasks, and laboratory setting). However, such a test setting is a crucial step towards the acceptance and success of advanced electronic negotiation systems (e.g. [23]–[26]) as discussed in section I.

The results contribute to IS-research by systematically revealing specific acceptance characteristics and differences between the negotiation approaches: First, the results of our work consistently confirm the assumed effort differences between the evaluated negotiation approaches as expected and hypothesized. Second, the test system users largely evaluated the SABN-system as the most attractive alternative. This supports the work results of [7,8,21,35] which claim the requirement of informal communication possibilities to enhance negotiation systems. Third, unexpected results were revealed concerning the perceived performance of the ABN-system. It is remarkable that the test users did not perceive a better performance of the more powerful ABN-system compared to the function-lacking PAN-system as hypothesized in $H_9$. The performance expectancy of the ABN-system was even much lower compared to the PAN-system (table I). Altogether, the ABN-system was rated as the most unattractive negotiation system, having the lowest performance, effort, and intention to use values.

A. Limitations

The systems have only been tested in a controlled laboratory setting – not in the real-world, hence there are limitations concerning the generalization of the results. Furthermore, the acceptance was only tested from the temporary employment workers perspective. Additionally crucial to the success of implementations of the system(s) is the acceptance by other users such as the recruiters and the temporary employment agency, which we have not assessed in this paper.

Finally, our restriction of 27 probands did not allow us to calculate a structural equation model to evaluate the UTAUT model further.

B. Future Work

The revealed results concerning the reduced functionality-perception of feature-richer negotiation systems are interesting for future user acceptance/adoption research when designing and implementing negotiation systems, since there is obviously (historically speaking) a divergence in negotiation research fostering the development of function-richer systems (especially fully automated argumentation-based approaches) and the problematic user perception of these functionalities. That is why future design-oriented work should foster the development of user-friendly function-richer negotiation systems. In addition, future empirical work should deepen our understanding of the emerging problem of the subjective contrary perception of a lower performance when evaluating objective performance-improved systems.

ACKNOWLEDGEMENTS

We would like to thank the three anonymous reviewers, who provided helpful comments on the refinement of the paper. This research is partly funded by the German Federal Ministry of Education and Research (BMBF) under contracts 17103X10 and 03FH055PX2.

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