A Structuration View of E-negotiation System Use

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Abstract

E-negotiation systems (ENSs) have been designed to support online negotiations. Previous studies on ENSs focused on the users' perceptions of the various system features and the impact of these features on the negotiation performance. Questions regarding these systems usefulness and the features' usefulness remain insufficiently addressed. Most studies are based on experiments providing data for variance models with a very limited use of negotiation context. The context can be explicitly used in Giddens's structuration theory which also allows for an approach that is complementary to variance modelling. This work aims to employ structuration in the investigation of ENS use and its effects on negotiators' perception, behaviour and performance. E-negotiation is conceptualized as a structuration process that takes shape through the social construction of an e-negotiation protocol. A two-level conceptual model is proposed together with a set of propositions explaining the negotiation structure effects, the system effects, the co-adaptation effects, and the time/space effects on negotiator's perception, behaviour and performance.

1. Introduction

Business negotiation has traditionally been a key commerce activity taking place in physical markets. Electronic negotiation (e-negotiation) has emerged in the decade of the rapid and significant progress of information and communication technologies (ICTs), in particular, the wave of e-commerce and e-business.

E-negotiation can be conducted via e-mail. In addition, a range of information systems (ISS), which are called e-negotiation systems (ENSs), have been designed and developed with the purpose of supporting e-negotiation [Yuan, Rose et al. 1998; Kersten and Noronha 1999; Schoop, Jertila et al. 2003].

Earlier studies proposed models to investigate the determinant factors in ENS acceptance or ENS success [Yuan, Rose et al. 1998; Kersten and Noronha 1999b; Vetschera, Kersten et al. 2006; Yuan and Turel 2007]. The purpose of these models was to study the users' perceptions of the system features (e.g., analytical support, message exchange and visualization tools) and the impact of these features on the negotiation process and results. The findings indicate that system features impact users' attitude to use the system. Other studies focussed on the relationships between a type of negotiators and their personality traits and the results they achieve [Kopelman 2000; Kray, Galinsky et al. 2002; Stuhlmacher, Citera et al. 2007]. In these studies, the interaction process is hidden from the researcher who sees process as a proverbial black-box.

If the process is black-boxed, then the focus is on the inputs to and the outputs (outcomes) from the process but not on the process itself. In many situations this is justified because observing the process may change it (e.g., the participants act differently) or it may not be possible to see the process events (e.g., we cannot observe secret discussions or "get into the mind" of a negotiator). The whole process becomes not only a single phase but also one aggregate activity.

Taking into account the consideration of the activities and events we can distinguish two extreme perspectives on process modeling. On one extreme we have the opaque perspective in which the process is black-boxed and reduced to a single binary variable describing its existence and the focus is on the input and outcome variables. On the other extreme we have the transparent perspective in which all the process activities and events, and their relationships and evolutions are visible and observed in detail. In social scientific research these two perspectives are associated with two broad classes of approaches: the variance theory and the process theory [Mohr 1982].

Negotiation research that is based on process theory is well established and precedes this theory formulation [e.g., Douglas 1957; Bednar and Curington 1983]. More recently, a number of researchers studied the negotiation process in order to construct process models, determine salient features and turning points, and relate the negotiators' characteristics with their behaviour [Olekalns, Brett et al. 2003; Moore 2004; Adair and Brett 2005]. While these experiments studies processes in face-to-face (f2f) negotiations, interesting studies focused

on studying processes and/or constructing process models in e-negotiations [Koeszegi, Pesendorfer et al. 2006; Gillesberger, Graf et al. 2007; Koeszegi, Pesendorfer et al. 2007]. These studies extended the traditional negotiation process research to technology-mediated negotiations, but they black-boxed the technology. A few studies made a limited attempt to add the technology dimension and negotiators' interaction with technology in addition to their interactions with other negotiators [Kohne, Schoop et al. 2005; Weber, Kersten et al. 2006].

An important problem that researchers of e-negotiations and other technology-mediated social processes need to address is the simultaneous opening of two black-boxes: the process box and the technology box. In this paper, we do not attempt to solve this complex problem here; instead we propose a path which may help addressing it in a comprehensive way. The first tenet on which our proposition relies is e-negotiation protocol [Bichler, Kersten et al. 2003; Kersten and Lai 2007] and its role in the negotiators' use of technology and interaction with and through technology. The protocol allows viewing ENS use as a social construction process, which is the second tenet proposed here and which leads us to consider the structuration theory perspective to study e-negotiations.

The reminder of this paper is organized as follows: Section 2 introduces e-negotiation and ENSs, further reviews relevant literature introduced above and formulates objectives of this study. Section 3 presents structuration theory as the foundation and some implications of its application in IS research are presented. A structuration view of ENS use and the conceptual model are also presents in this section. Section 4, discusses implications and limitations of this study. Finally, Section 5 sums up this work and presents directions for future research.

2. Background

2.1 E-negotiations and e-negotiation protocols

E-negotiations are processes in which information is exchanged via electronic means. E-negotiations have been claimed to be more efficient than f2f in several fields [Bichler, Kersten et al. 2003]. E-negotiation has been used in contracting, procurement and retail.

Researchers and practitioners have designed and implemented several ENSs study and support e-negotiations, for example, Inspire [Kersten and Noronha 1999], Negoisst [Schoop, Jertila et al. 2003], SmartSettle (http://smartsettle.com/) and WebNS [Yuan, Rose et al. 1998]. These enss contain different system features (e.g., analytical support, message exchange and visualization tools) to provide various supports in e-negotiations, such as cognitive support, communication support, analytical support and graphical support.

Each ENS is built on a specific e-negotiation protocol (ENP), which defines negotiation process and the rules that govern negotiation interactions among negotiators and systems [Kersten and Lai 2007]. In particular, ENP governs the use of ENS features and tools by making them available to the users and by associating them with negotiation phases and activities.

The recognition that the users may require or wish to use different protocols even in very similar negotiations (e.g., due to the organizational requirements, cultural differences and abilities) led to the construction of software platforms capable of supporting multiple negotiation protocols, for instance, GNP [Benyoucef, Alj et al. 2001], SilkRoad [Strobel 2001], and Invite [Kersten, Law et al. 2004]. While the built-in e-negotiation protocols differ in defining how the e-negotiations are conducted, they also differ in addressing different types of e-negotiations, that is bilateral, multi-bilateral, and multilateral negotiations.

ENP should be differentiated from protocols that negotiators may choose to adopt. The former are formulated by the ENS designers while latter are agreed by the negotiators. Negotiators who use an ENS need to conform to its protocol, but this protocol may provide a wide scope for different behaviours. The negotiators may introduce certain rules to make the process more efficient and/or effective. For example, negotiators who use email need to conform to email protocol (e.g., time-e-stamp of offers, sequencing and format) but they may agreed on exchanging emails at particular time intervals, replying within 48 hours, separating issues, and so on.

Some ENSs provide communication facilities but do not support their users or actively engage in e-negotiations. Their protocols are easily accommodated by the negotiators' own protocols as they are very limited and—with the exception of media leanness and asynchronous communication—they do not affect the process. In a sense, their impact extends letter-based and fax-based communication but otherwise it does not affect the negotiators' cognitive capabilities. Thus they may be relevant if negotiations via such ENSs are compared with other negotiations.

In contrast, protocols which are embedded in ENSs providing support, visualization, intervention and other facilities restrict the negotiators' actions. This is because they need to collect, interpret and process information and provide users with relevant support and advice. Practically every technological solution allows for certain flexibility in its usage even if such a usage has not been envisioned by the designers. This is especially the case with the solution based ICTs. Therefore, we need to distinguish between the designed protocol which is embedded in the system, that is, *initial* ENP and the protocol that is actually used by the system users, that is, *actual* ENP. It is the actual protocol constructed by the negotiators that we are interested in.

2.2 Overview of e-negotiation studies

Two main streams of research have been discussed in e-negotiation literature.

The first stream focuses on the negotiators' ENS acceptance or success, particularly their perceptions of the system features. Several studies used Davis's TAM model [Davis 1989] and DeLone and McLean's model [DeLone and McLean 2003] of IS success [Kersten and Noronha 1999b; Yuan, Head et al. 2003; Vetschera, Kersten et al. 2006; Yuan and Turel 2007]. Because these models are variance models, the investigation is concerned with the determinant factors on ENS acceptance. Inline with this research focus, most of the studies adopted quantitative methodologies for testing their models. The findings from the laboratory experiments showed the effects of system features on user's perception of enss.

They also demonstrated that the usefulness of different features is perceived differently [Lim and Benbasat 1992; Kohne, Schoop et al. 2005]. Chen and Kersten [2006] tried to overcome this controversy by integrating a strategy perspective into their model. However, as they focused on users' perceptions of the effect of strategic analysis on negotiation performance, the way that negotiators use ENS to perform their negotiations still remains in a "black-box".

The second stream, based on the approaches used in f2f negotiation research, employs traditional theories to investigate the negotiation process, protocols, and strategies, such as decision theory, game theory, and negotiation analysis. Consequently, the main approach used in this stream is qualitative methodologies, particularly in data analysis. For example, Sokolova and her colleagues [2006] analyzed the text in negotiation transcripts generated by the Inspire experiments to identify the language pattern of successful negotiators.

Pesendorfer and Koeszegi [2006] studied the communication modes in e-negotiations; Koeszegi et al. [2007] conducted an episodic phase analysis of e-negotiations with coded and categorized data of negotiation protocols of experiments in different communication modes. In this stream the negotiation process is emphasized and much effort put in the qualitative data analysis of negotiation transcripts. The focus is on the construction of the process model. To make the analysis sharper the context in which the data was generated is assumed away and, out of necessity, the analysis of the negotiation process is conducted ex post limiting the models' explanatory powers regarding the negotiators' behaviours and perceptions.

Earlier experimental studies show that people negotiate via ENSs in different ways. They may use the system to modify the initial negotiation problem, to collect information about the counterparts, and to verify their own perceptions [Kersten, Michalowski et al. 1991]. For example, a system may have the preference elicitation tool designed to help users to better understand their own interests and risk attitude. But a negotiator may use this tool in an attempt to discover the counterpart's preferences.

The use of the system depends on the negotiators and the negotiation problem. However, the design of the system, particularly the built-in negotiation protocols, also affects its use. In the current design of ENSs, two types of negotiation protocols are mainly used: the closed protocol and the open protocol [Bichler, Kersten et al. 2003]. The former is pre-defined and fixed before the negotiation, but the latter can be changed during the negotiation process. This distinction has been further clarified by Kersten and Lai [2007] as the initial protocol and the actual protocol.

When people use an ENS to negotiate, they follow the initial protocol to undertake various negotiation activities by using the system features or functions at different point; in an open protocol, however, negotiators are only initially restricted by the built-in protocol and they can change it during the process. Consequently, the actual protocol is then constructed through the process. For instance, the negotiators may initially intend to use an ENS to exchange offer containing all negotiated issues but later decide to negotiate the issues sequentially one at a time. Thus, the actual protocol shows the de facto way people negotiate using ENSs, which provides a new lens for examining negotiator's behaviour and performance in e-negotiations.

2.3 Motivation and objectives

Behavioural e-negotiation research can be characterized by the use of variance models that make the investigation on what happens in the e-negotiation process difficult. The reliance on pre- and/or post-experiment questionnaires does not give insights into the process. Variance models, even augmented with the questionnaires, are not sufficiently rich to analyze the evolution of the negotiators' perceptions and behaviours during the negotiation.

Assessment of the process through qualitative data analysis of negotiation transcripts requires taking into account the negotiation contexts in which the data is generated. One may expect that—in the case of e-negotiations conducted via feature- and tool-rich ENS—this context is heavily influenced by the technologies employed and used. Therefore, special attention needs to be given to the actual ENPs.

The roles of the counterparts in e-negotiations has been recently explicitly recognized and their impact on the negotiators' strategies and their perception of the process, outcomes and the system considered [Lai, Doong et al. 2006; Turel and Yuan 2007]. The ways the counterpart use the system may also affect how the negotiator uses the system.

Vetschera et al. [2006] mentions that we need more and more rigorous studies on "intention to use" or "actual use" of ENSs. Such studies are needed to better understand the roles of different technological solutions on the relational and substantive negotiation outcomes. They typically rely on data obtained from participants negotiating over highly stylized cases in laboratory settings. This may allow studying the system use and it usefulness but much less the ways the system affects its users, their behaviours and interactions.

A natural extension to the e-negotiation research would be studies of the actual use of ENS. These studies may posit questions about the dynamic relationships between people and technology, the impact of technology on people and the modification of technology by its users, including: How does ENS use influence negotiators' success in their online negotiations? How does ENS use influence their perception and behaviour? How does technology mediate the negotiators' performance?

Earlier studies on e-negotiation protocols indicate that the construction of actual protocols provides an opportunity to investigate the actual use of ENS. Through such a use the negotiator, her counterpart and the system may construct negotiation structures (or contexts) that were unanticipated by the system designers. This, in turn may constrain, enable or facilitate the negotiators further actions and interactions. For instance, a 'poor' initial offer made may lead to limiting the interactions to exchanging messages and not using the offer exchange feature. This could be done to prevent further concessions and making commitments to concrete issue values.

The reason for using a system in a particular way may be due to one user willingness to augment the power structure and constrain or enable the negotiation parties' subsequent moves. In such a way the user constructs and reconstructs the actual e-negotiation protocol, i.e. the process and the rules of the e-negotiation. This view of the process coincides with the structuration theory (ST) perspective.

In the following sections ST is used to develop a conceptual model of e-negotiations. By using ST to analyze the emergence and evolution of negotiation structures we attempt to

provide a framework for gaining insights into the negotiation process and the technology involved in the actual use of ENS. We also expect that a better understanding of the negotiators' perception, behaviour, and performance in the e-negotiation process can be achieved.

3. Theoretical developments

The theoretical foundations for this study are structuration theory and selected is research based on structuration theory. In this section, structuration theory is first introduced and several implications are drawn from its application in IS research. Our analysis of the key concepts of structuration theory as they relate to the ENS use leads us to the formulation of a conceptual model.

3.1 Structuration theory

Giddens's [1984] structuration theory was originally presented to explain social construction and social practices, in which social phenomena is neither merely produced by agents' actions through their subjective interpretations nor is it only influenced by the objective social structures. Rather, by integrating these two dichotomic views, ST considers social structures as the result of agents' actions and as the context which constrains and enables agents to produce and reproduce the social structure [Giddens 1984]. This demonstrates the duality of structure, one of the key concepts of ST. In Giddens's words, structures are "rules and resources organized as properties of social systems", while structuration are the modes or conditions in which social systems are produced and reproduced through interactions of structures and agents.

Giddens identifies three dimensions of structure, namely signification, domination and legitimation. Figure 1, shows these dimensions linked with the corresponding dimensions of agency (communication, power and sanctions) through three modalities respectively (interpretive schemes, facilities and norms).

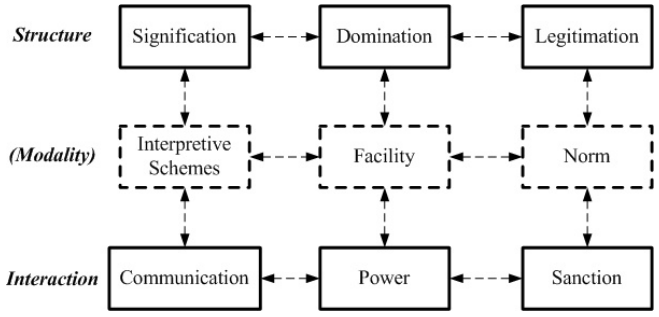

Figure 1. The dimensions of duality of structure [Giddens 1984]

Thus, modalities can be seen as the locus of interaction between the knowledgeable capacities of social actors and the structural properties of social systems. Note that the splitting of the duality of structure into these three dimensions is mainly for an analysis purpose, while in practice they are mutually interlinked. In fact, this provides a framework

for conducting structurational analysis in social practice. Furthermore, ST assumes that structures are produced and reproduced in the way that people cannot exactly determine and anticipate. Thus, Giddens stresses the unacknowledged conditions and unintended consequences of intentional actions due to the presence of other social actors and the produced/reproduced structural properties of the social system.

St has been seen as an ontological level meta-theory, which attempts to explain social phenomena without disturbing the classical dichotomies, providing a set of concepts, such as duality of structure, practical and discursive knowledge, unacknowledged conditions and unintended consequences, routinization and reflexitivity, and time-space distantiation [Jones 1997]. These concepts are particularly useful in explanation of social construction and social practices, in particular, the it practice which is a typical complex social phenomenon involving technology, people, and organizations or certain contexts [Orlikowski 2000]. Thus, although there is little work related to IS research in Giddens's original work, a number of studies using structurational model and/or structurational analysis have been conducted to explain IT practice in various contexts [Barley 1986; Orlikowski 1992; Orlikowski 2000; Walsham 2002].

Barley's [1986] describes how the introduction of a new technology in the radiology department leads to the change of skills and competencies of individuals in the unit, and how the actions (operating ct scanner) and interactions (seeking and giving advice) of these people produce patterns of their behaviour (signification and domination), which, in turn, become formal structures (legitimation). The different outcomes of the introduction of this new technology demonstrate the emergent process that includes the unintended consequences of intentional actions.

Orlikowski [1992; 2000] proposed the terms "duality of technology" and "practice lens" to study it in organizations. In her structurational model of technology, Orlikowski concludes that technology is both the product and the medium of human actions (micro-level), while the institutional properties are both the conditions and the consequences of the interaction between technology and human agents (macro-level). Adopting the ST view, Orlikowski illustrates that it practice is appropriated and improvised by individuals and organizations in a way that differs from the intentional design and implementation of the technologies. The recursive actions of social actors and interactions between them and technologies create new patterns that eventually become part of the organizational structures. These modified structures constrain the current and enact the new actions/interactions.

This brief discussion of ST and the two examples of ST use in is research points to the following three observations:

1 ST provides a conceptual framework to study complex social phenomena by considering both the role of human agents and the role of structure, rather than separately focusing either on the constraints of structure or on the actions of agents (i.e. the classical dichotomies in social science). This allows taking into account the effects of both the contexts and the users' action and interactions.

2. ST views it practice as an emergent process, in which the uses and consequences of it emerge unpredictably from complex social interactions. This is helpful in explaining

it/is usage from a process perspective, particularly where technology is as a mediation platform for human agents with different roles.

3. ST provides a theoretical foundation for conducting multi-level or mixed-level analysis. The structure that emerges from the lower level (e.g. individual level) may shape and develop new structures at the higher level (e.g. group level). Subsequently, these new structures may constrain or enable the lower levels.

3.2 A structuration view of ENS use

The complexity of e-negotiations led many researchers to use variance models. E-negotiation is a social interaction process in which two or more parties seek an agreement. While the structure of negotiation problem and initial protocol are generally pre-defined, it is difficult to predict negotiator's behaviour (actions and interactions) and performance in advance [Kersten, Michalowski et al. 1991]. During the e-negotiation process, negotiators act and interact with others and the system, various types of information is dynamically generated and updated, and the negotiation structure may change over time.

A negotiator's perception of the system and her and the system's performance are not fully controlled by her alone. This perception is partially shaped by her counterpart. Furthermore, in terms of the negotiation success, two levels of performance may need to be concerned, the individual performance and the group performance (e.g. reaching an efficient solution). The construction of an actual protocol by the actions and interactions of negotiators and the system through the use of ENS can be seen as a structuration process, involving the dynamic change of negotiation structure at different levels that are shaped by and influence the negotiators' perceptions, behaviour and performance.

Drawing on the implications from is research based on ST, the present work intends to provide a conceptual framework to study ENS use by taking into account both the negotiation structure and the role of technology from the actual ENP construction lens. In this section, several key concepts of STare employed to analyze ENS use.

First, the duality of structure in ENS use is presented with the three dimensions (see Table 1).

1. Signification: negotiators mainly communicate with each other by exchanging messages to reach a shared understanding of the negotiation problem, identifying their roles, and exploring each other's preferences. With different cultural background, negotiators may consider sending offers in messages for "face saving".
2. Domination: negotiators use the available system features and the information they possess to build the power structure by redefining the negotiation problem with new issue proposals, setting up their own preferences, exposing or concealing preferences. While negotiators may directly evaluate counter offers to accept or reject, they may use the "power of silence" by waiting for package-offers and no response to message-offers.
3. Legitimation: negotiators may reach some norms of using the system and/or conducting the negotiation (i.e. construct actual e-negotiation protocols). For instance, they may agree on sending package-offers (parallel negotiation), negotiating one issue after another (sequential negotiation), or use only messages to exchange offers.

Table 1. The duality of structure in ENS use
[based on Giddens 1984]

	Signification	Domination	Legitimation
Modality	Interpretive scheme	Facilities & Resources	Norms
Structure	Meaning	Power structure	Norms
Action/ Interaction	Communication	Use of power	Sanctions
Examples in ENS use	Defining the negotiation problem (shared information on issues and options) Identifying negotiation roles Sending message to explore the counter-party's preference Sending offers in messages for "face saving"	Redefining the negotiation problem by proposing and negotiating on new issues Setting up preferences Exposing or concealing preferences Evaluating, accepting or rejecting offers Waiting for package-offers and no response to message-offers ("power of silence")	Negotiation roles Relationship between parties (cooperation or competition) Sending package-offers or message-offers Constructing actual protocol (rules) Negotiating one issue by another

E-negotiations are conducted via the Internet in a global environment. Therefore, the issue of time-space distantiation also needs to be concerned. For example, negotiators may adopt synchronous or asynchronous communication modes in e-negotiations, which may affect the structure and their negotiation performance. Time is also critical in terms of negotiator's perception and behaviour in different negotiation phases, for instance, they may send more messages in the pre-negotiation phase but more offers in the negotiation phase, especially at the time points near deadline.

The concept of space in e-negotiations may have two aspects: the geographical space and the "negotiation space". While the geographical location of negotiators in the real world space may differentiate their cultural background, the "negotiation space" is a virtual world containing all possible alternatives or offers and negotiators' "moves". Both aspects influence negotiators' perception and behaviour. Taking an example the culture effect, because most ENSs only support English language, negotiators whose mother tongue are English may use their "language power" and exchange offers by sending free-text messages, while Chinese negotiators "face saving" concerns may obliged them sending very short message that

accompany offers. For the "negotiation space", negotiators may propose new issues or change their own preference by exploring the counterpart's preferences and evaluating their performance, which establishes a "new space" that in turn enables and constrains their further negotiation ("positions" and "moves").

In addition, the concepts of knowledgeability and reflexivity are also applicable in ENS use. E-negotiation is a social construction process, in which negotiators are social actors, rather than passive users. They may use ENS mindfully with their perceptions of specific action/interaction, system feature, and their performance or outcomes, leading to the construction of actual ENP (actual usage of ENS) that may differ from the designed ENP (initial protocol).

3.3 The conceptual model

Based on the previous analysis of ENS use, the conceptual model for studying ENS use from the ST perspective can thus be proposed (see Figure 2). The conceptual model, differing from previous studies on ENS use that mainly employ variance model, depicts a two-level dynamic process of ens use. This helps to illustrate the complex nature of ens use and to explain negotiators' perception, behaviour and their performance in e-negotiation process.

The model can be viewed at two levels: the micro view of the structure at any time point during e-negotiation, and the macro view of the structure change (i.e. structuration) through e-negotiation process.

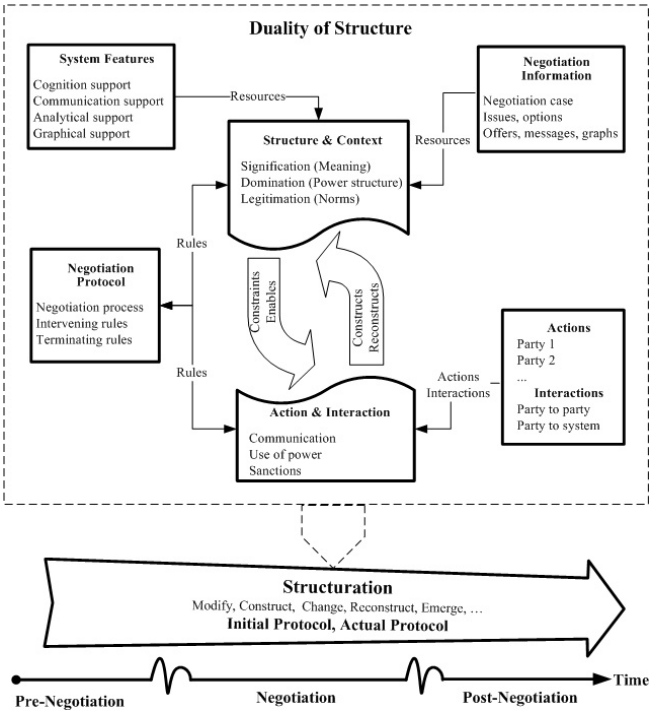

Figure 2. The conceptual model

The micro view focuses on the duality of structure of ENS use, negotiators' actions/interactions, and their knowledgeability and reflexivity. The negotiation information (e.g., negotiation cases, issues and options that define the negotiation problem; offers,

messages and graphs generated during the negotiation) and the system features (e.g., cognition support to identify the problem and issues/options, communication support to send offers and messages, analytical support to set up preferences and evaluate offers/counter-offers, and graphical support to review negotiation history) are considered as 'resources', while the negotiation protocol (e.g., process, intervening rules) defines the 'rules'. The actions of the party and the interactions between parties and with the systems construct/reconstruct the structures. The new structures then enable or constrain the subsequent actions and interactions of negotiators.

Note that the notion of "structure" here is different from the traditional understanding of negotiation structure that consists of the negotiation problem or task, the number of parties, and their roles [Jennings, Faratin et al. 2001; Kim and Segev 2003]. From the st perspective, the structure contains resources (i.e. negotiation information and the system features) and rules (i.e. negotiation protocols), which formulates the negotiation context.

The macro view focuses on the change of the duality of structure and time-space distantiation in ens use. The e-negotiation process is seen as a process of structuration, through which the negotiation problem changes over time (e.g., new issue proposals, change of preference structures), the initial negotiation protocols are modified and changed, and the actual negotiation protocols are then constructed, reconstructed, and emerged. This process is going through all the negotiation stages and phases, including the pre-negotiation phase, negotiation phase, and post-negotiation phase.

Thus, the micro view takes a "snapshot" of the structuration process at a specific time point and provides a "finer" lens to investigate ens use, while the macro view shows a bird view of the whole structuration process and "synthesizes" the micro view structures in a continues manner.

3.4 Propositions

In addition to the general description of the two levels of views of ens use in the conceptual model, a set of research propositions can be further developed to explain ens use and its effects on negotiators' perceptions, behaviour, and performance in e-negotiations.

The negotiators' perceptions assumed here are oriented towards the system and its use and towards the other components of the negotiation (e.g. the problem, the counterpart). Their behaviour comprises all actions and interactions undertaken during the e-negotiation process. They interact both with the system and their negotiation counterparts. According to Burton-Jones and Straub [for a review see Burton-Jones and Straub 2006] negotiators' performance includes both behaviour performance during the process and the outcomes from this process.

To examine ens use and its effects, the following more specific components may need to be concerned:

- The initial negotiation problem (or task): including negotiation case, issues and options;
- The negotiator's preferences: negotiator's preferences on different issues and options, the counterpart's preference;
- The negotiation information generated during the negotiation: issue proposals, messages, offers, and graphs (depicting negotiation history);

- The system features for cognitive, communication and decision support and negotiators' appropriation in use of the features;
- The built-in e-negotiation protocol: including the process model, intervening rules (by the system), and the terminating rules (by negotiator or by deadline or both);
- The negotiation phase in the process: pre-negotiation, negotiation, post-negotiation;
- The negotiators' relationship: long-term or short-term, cooperative or competitive, win-win or win-lose, trust;
- The negotiator's strategic roles: exploiter, cooperator, competitor, yielder;
- The time-space factors: communication modes (synchronous/asynchronous), negotiator's background (negotiation experience, culture, etc.), negotiator's learning experience (self, counterpart, system, problem), cultural change (emerged, shared cultural identity or norms), and preference change.

From the st perspective negotiators' actions/interactions are both constrained and enabled by negotiation structure, while the negotiation structure is constructed and reconstructed (with the outputs and outcomes) through their actions/interactions. Thus, the relationships among the components listed above should be bi-directional, rather than unidirectional. It should be also noted that, e-negotiation is a social construction process in which all the components interrelated with each other and cannot be "split" as separate or independent pieces. This has been identified by is scholars as one of the biggest challenges in applying st.

The above discussion provides a basis for four research propositions which are proposed below.

Proposition 1: The negotiation structure effects

In e-negotiation process, negotiator may perceive the negotiation structure differently based on the information the negotiator possesses, and thus undertakes different actions/interactions. The outcomes of these actions /interactions then re-formulate the negotiation structure.

Information that the negotiator possesses is derived from the negotiation structure, including the case, issues, options, preferences and objectives, knowledge about the system, knowledge about her counterpart, her own expected and actual performance, and her counterpart's expected and actual performance. Based on this information, the negotiator may perceive whether the problem is tough (e.g. number of issues/options), solvable (i.e. reaching an agreement), and/or changeable (e.g. proposing new issues). Consequently, negotiators may adopt different strategies, for instance, to conduct a sequential negotiation on issue by issue if they feel it is difficult to construct a whole package offer with all issues at a time, to adjust their own preferences to re-evaluate the offers and counter-offers using the analytical support feature, to send offers directly intending to complete the negotiation shortly, or rather to send messages only. These actions/interactions then make the problem either more specific and explicit or more complex and implicit, which in turn influence negotiators' subsequent actions/interactions.

Proposition 2: The system effects

The system effects address the role of technology in ens use, including users' appropriation of system features and the construction of actual e-negotiation protocols.

Proposition 2a: Appropriation of system features

In e-negotiations, different negotiators may perceive the system features differently, and the same negotiator may perceive the same feature differently at different time points, based on the information the negotiator possesses. Consequently, they may use system features in different ways.

Users' knowledge and perception of technology can be different and can be changed over time, especially when they use the technology in different contexts. Negotiators may use the various system features in the way that they find more useful or easier within the given structure. For example, many enss support exchanging free-text messages. Negotiators may exchange pure messages (i.e. non-offer messages) for communication and building relationship only, may use them to explore the counterpart's preference, or they may prefer to send message-offers without explicit decisions. As the negotiators learn from what they did and what the counterpart did during the negotiation process, their knowledge and perception of the same system features may change.

Using the above example, negotiators may send messages in the pre-negotiation phase for communication, relation building and exploration of counterpart's preference, while in the negotiation phase they may use it for exchanging offers. Another, negotiators may use the analytical support to identify their own preference of different issues in the pre-negotiation phase, while they may use it to explore the counterparts' preferences in the negotiation phase. This is inline with is research on user's appropriation of technology features [Orlikowski 1996] and user's adaptation of it [Beaudry and Pinsonneault 2005].

Proposition 2b: Construction of actual e-negotiation protocols

In e-negotiations, the negotiators may not follow the designed initial protocols and negotiate in ways that require constructing of the actual protocols.

Social structure can be embedded in technologies. As discussed before, each ens is built on a specific enp that defines the negotiation rules. Whereas negotiators may follow this initially designed protocol to use the system for their negotiation tasks, they are not passive users but social actors with knowledgeability and reflexivity. They may evaluate the efficiency and effectiveness of the initial protocol based on the information they have. This may be called "appropriation" of e-negotiation protocols. If they use the system's features differently than assumed and thus can negotiate in different ways, they construct a new, actual protocol.

For example, the initial protocol may be a parallel negotiation which requires exchanging package-offers, while negotiators may feel it is more efficient to conduct a sequential negotiation during the process. After reaching an agreement on all issues they exchange only one final package-offer. This confirms st view of e-negotiation as a social construction process, in which negotiators act/interact among others and the system to construct/reconstruct social structures that contain emergent rules. This is also consistent with the coping model of user adaptation proposed by Beaudry and Pinsonneault [2005], which presents the adaptation of the user self, the technology and the task.

Proposition 3: The co-adaptation effects

In e-negotiation process, negotiators may adapt to each other in their perception and behaviours based on the information they possess, and thus perform different strategic roles through actions/interactions. The outcomes of these actions/interactions are then perceived by negotiators as their performance, which in turn defines their roles in subsequent negotiations.

People may adopt different negotiation strategies, such as distributing, avoiding, accommodating, integrating, and compromising [Thomas and Kilmann 1974]. The dual-concern model of negotiator's strategic roles has been proposed based on the negotiator's own strategic orientation and the expected counterpart's strategic orientation, including co-operator, competitor, exploiter, and yielder [Kersten 2005]. This is also held in e-negotiations; Lai and her colleagues' [2006] study shows significant relationships among negotiators' communication (sending more offers or messages), their perception of the counterparts' roles and their performance in dyadic e-negotiations. In fact, other studies in e-negotiation have also stressed the important role of counterparts in ENS acceptance [Turel and Yuan 2007]. Study on adaptive systems in e-commerce has addressed the co-adaptation in a shared environment [Weigand and van den Heuvel 2007].

From the ST perspective, this co-adaptation happens between social actors through their interactions. For instance, when both parties are cooperative and they feel and/or actually perform well, they may continue to cooperate; however, if they realize that it does not work as well as they expected, they may change engage in competition. This may also help to explain partially why negotiators perform differently and why their outcomes are different. As discussed in Proposition 2b, the co-adaptation should also be concerned as it contributes to the social construction of the e-negotiation protocol. This may extend our knowledge of user adaptation in terms of adapting with "others" but not only adapting "self" [Beaudry and Pinsonneault 2005], i.e. in addition to adapting user self, the technology and the task, negotiator also adapts the counterpart in the e-negotiation.

Proposition 4: The time and space effects

In an e-negotiation process, negotiators' perceptions may differ at different time points, particularly in different phases, and thus they may change their actions. The outcomes by these actions influence their perception, behaviour and performance in the subsequent phases.

Negotiators' perception of the negotiation problem, the system, themselves and their counterparts may change over time as they obtain different amount and different types of information through their actions/interactions with the system and counterparts. First of all, the negotiation information generated during negotiation process differs in terms of the amount and type in different phases. For example, as negotiators focus on understanding the case, identifying the issues and their preferences in the pre-negotiation phase, they obtain information about the problem and themselves. In the negotiation phase, negotiators may know more about the problem while they may also know more about the counterpart as more interactions happen. Based on the information obtained and the information expected, negotiators may also use different supports at different stages. For example, they may use cognitive support in the pre-negotiation phase and use communication and analytical support in the negotiation phase. As addressed in Proposition 2a, negotiator may perceive system's features differently over time. This may attribute to their learning experience in using the system, as negotiators continuously evaluate the expected and actual performance of their own and their counterparts.

Note that e-negotiation is a continuous process, rather than several separate steps or isolated actions. For instance, the boundary between pre-negotiation and negotiation phase may not be so clear because negotiators may continuously explore counterpart's preferences by sending messages to identify or modify their own preferences through both phases.

As negotiators and their counterparts try to understand the problem and set up their preferences on the negotiation issues/options in the pre-negotiation phase, they jointly define the "negotiation space" which contains all possible offers or alternatives. This "space" then prescribes all the possible subsequent movements of negotiators in terms of searching and negotiating offers.

This "space" can be changed and reshaped if negotiators revise their preference. This may happen in the negotiation phase as negotiators interact with their counterparts and monitor their performance especially through some visualization tools (e.g., graphical support). Figure 3 shows the negotiators' temporal and "spatial" movements by depicting the date and rating value of their offers on a negotiation history graph (http://invite.concordia.ca/inspire/).

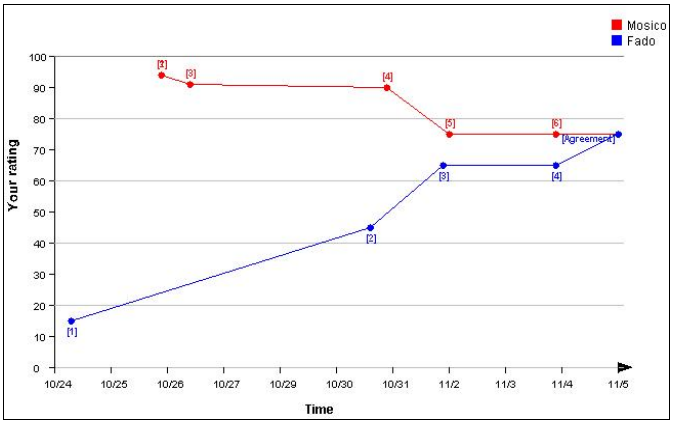

Figure 3. The negotiation history graph

4. Discussion

The adoption of the structuration theory perspective allows viewing e-negotiation as a social construction process and study the relationships that emerge among negotiators and technologies. Following Markus [1988], a process theory may be used to explain the dynamic and recursive nature of e-negotiations. This theory allows addressing performance at the individual and group levels by applying the micro and macro levels proposed in ST.

The verification of the propositions formulated in Section 3, shares similar difficulties as other studies based on ST. A long-term longitudinal approach may be preferred but unrealistic because of the fast-changing technologies. A short-term study in which data is collected through interviews is difficult to generalize and the stories formulated may be of little practical use.

The conceptual model and propositions suggest that negotiators may use ENSs and the system features in different ways and may also negotiate in the ways that differ from the designed protocol. Thus we may study what features and in what context a negotiator perceives to be useful and what features and how they are used. By addressing the role of

counterpart in the interaction among negotiators and systems, the notion of 'co-adaptation' and its effect can be introduced. This may add to our understanding of the user adaptation of it use.

Many scholars have noted that using ST in is research is difficult [Jones 1997; Pozzebon and Pinsonneault 2005]. How to operationalize the proposed concepts, design and conduct experiments, and test the propositions are the key issues that must but have not been addressed here.

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