Tools for Good Governance
An Assessment of Multiparty Negotiation Analysis

By : Les Metcalfe and David Metcalfe

2002
Contents Table

1. Introduction ................................................................. 3
2. Obstacles to progress: pessimistic assumptions and oversimplified models .......... 4
3. Negotiation as a managed process ........................................ 4
4. Assessing the benefits of IT-based negotiation analysis ...................... 5
5. Methodology: negotiation analysis .......................................... 6
6. Case study: the natural gas negotiations ...................................... 8
7. Practical uses ........................................................................ 10
8. Rigorous structuring provides a negotiation map ............................... 10
9. A quantitative negotiation model structures complexity ..................... 10
10. Reservation values point to jointly feasible outcomes ...................... 11
11. Mathematical solutions help identify fair agreements ...................... 12
12. Conclusions ....................................................................... 12
1. Introduction

The purpose of this article is to show how quantitative techniques drawn from decision theory can help negotiators improve the process and outcomes of international negotiations. More specifically, we use a case study from EU energy policy to examine whether quantitative tools can enable the representatives of national governments and international organizations to deal more successfully with the growing complexity of the problems they face.

The importance of international negotiations has increased enormously during recent years. With the advance of globalization and the development of regional integration in Europe, Asia and the Americas, national governments and international organizations have come to rely more than ever before on reaching decisions through multilateral negotiations. Arenas of international debate and decision-making are multiplying. The stakes are higher and the outcomes have more pervasive and penetrating effects on the level of economic performance and distribution of social welfare. The growing importance of multilateral negotiation is linked to the proliferation of international regimes in fields of public policy such as trade and economic policy, environmental policy, defence and development aid. While it is not the only factor, the development of regimes is undoubtedly one of the reasons for the current vogue for 'governance' (Young, 1999). Regimes are decentralized systems of 'governance without government'. And the absence of a central authority means that their effectiveness in making and managing policies depends critically on the adequacy of institutional capacities for multilateral negotiation (Zailman, 1994).

The pervasiveness of multilateral negotiations is no guarantee of their success. Often the outcomes are disappointing because there seem to be too many players trying to deal with too many issues in too short a time. Such situations make for cumbersome procedures and breed suspicion and mistrust about the motives and intentions of those involved. But the real problems lie elsewhere, in the inadequate development of capacities for managing the negotiations. Multilateral negotiation at the international level is a complex and delicate process. Effectiveness depends on having the requisite variety of capacities to match emerging challenges (Metcalfe, L., 2001). The simple functional theory that the growing demand for global governance will spontaneously create its own supply of negotiating capacities is not only wrong but also dangerously misleading. Viable institutional solutions have to be deliberately designed and the capacities to make them work systematically developed (Keohane, 2001).

Recent events in a variety of international arenas have revealed the inadequacy of capacities for successfully concluding negotiations where multilateral agreement is a prerequisite for policy coordination or subsequent joint action. For example, in the European Union, successive Inter-Governmental Conferences over the last decade, from Maastricht through Amsterdam to Nice, have made painfully slow and limited progress in negotiating the institutional reforms necessary to prepare for the EU’s coming eastward enlargement. The violence that accompanied the World Trade Organization's meetings in Seattle and Vienna highlighted both the limited effectiveness of the process and its precarious legitimacy. The failure in late 2000 of the United Nations Summit at the Hague to reach agreement on how to deal with global warming and the refusal of the incoming Bush administration in early 2001 to endorse the Kyoto Protocol have added to the general mood of criticism of international organizations and the processes of multilateral negotiation they are responsible for mediating.

These high profile failures illustrate the precariousness and fragility of the negotiating processes in which national governments are increasingly involved. Failures have contributed to a more general mood of criticism of international organizations. Some of this is deserved and some is
misplaced. International organizations are easy targets and convenient scapegoats. But the problems are due as much to inadequacies at the national level as in the international organizations themselves. In multilateral negotiations, by definition, power is dispersed rather than concentrated. And, if the process is to be effective, national governments as well as international organizations need to be equipped to play their part. The heroic assumptions of neorealist theorists about the strategic capacities of single-minded national governments are empirically unfounded. Shortcomings and breakdowns are often the unintended and unwelcome consequences of deficiencies in national capacities for managing negotiations rather than the result of deliberate strategic choice. The disparities have become so marked that there is a real concern that governments have become committed to a mode of international governance that has serious flaws. The question is what if anything can be done to remedy this situation. On one hand, improvements are badly needed. On the other, little has been done to upgrade the way negotiations are managed because it seems that the needs are so distinct that specialized tools are required to ensure good governance.

2. Obstacles to progress: pessimistic assumptions and oversimplified models

All belief that improvements can be made is not universally shared. The forces of national and the vagaries of bureaucratic politics undoubtedly make improvements difficult even if they are acknowledged to be desirable. More generally there is a pessimistic assumption that negotiations cannot be improved sufficiently to resolve the difficult problems. Johansen (1979) drew attention to the general trend to rely increasingly on bargaining and negotiation because there is an increasing range of problems for which neither markets nor hierarchies are effective or acceptable. But at the same time hypothesised that a 'bargaining society' would fall victim to a self-defeating dynamic stemming from the 'inefficiency of bargaining' as a mode of policy-making: 'bargaining has an inherent tendency to eliminate the potential gain which is the object of the bargaining.' (Johansen, 1979: 520). The short-term distributive dynamic of claiming value dominates the long-term integrative dynamic of creating value (Lax and Sebenius, 1986). It also blunts incentives to make the process as a whole more productive. These flaws make it inadequate to the tasks of governance that are emerging with the rise of a global network society.

If this were an 'inherent' tendency the prospects would be bleak. But negotiations do not always fail and there is no reason to suppose that this degenerative tendency is inescapable (Walton and McKersie, 1965, 1991; Lax and Sebenius, 1986). Within any institutional framework there is scope for improving the outcomes of negotiations by deploying available analytical tools to provide support for decision-makers. This will not happen spontaneously. Deliberate efforts have to be made to strengthen capacities and improve methods. One powerful way of doing so is to improve negotiators' understanding and skill in applying analytical tools to cope with information overload. On the assumption that the importance and the complexity of international negotiations are more likely to grow than diminish in the coming years it is worth investigating these ways of up-grading capacities for managing them.

3. Negotiation as a managed process

Improvement is not solely a matter of new techniques. It is also a problem of overcoming old attitudes and oversimplified assumptions and models of the negotiating process. Much of the rhetoric of international negotiation and media comment harks back to earlier times when fewer participants were negotiating on a more limited range of simpler problems. In the European Union there is a nostalgic attachment to negotiations in the original community of six member states when the future prospect is union of the order of 26. More generally, the folk images and
journalistic representations of diplomatic negotiations centre on individuals and interpersonal relations. One archetype is the negotiator as a shrewd tactician, cunningly out-smarting and out-maneuvering opponents at the negotiating table. Another is the elitist image of negotiators as statesmen, such as Schmidt and Giscard d'Estaing or Reagan and Gorbachev, ignoring the detail in favour of developing personal relationships that enable them to settle key principles and clinch a deal during informal fireside chats that exclude advisors and technical experts. A fireside chat between Reagan and Gorbachev with a real fire was actually staged as a photo-opportunity to reinforce this cosy but misleading image.

Current reality is much too complex to compress into such a simple format. It is not just a matter of choosing from a few clear-cut alternatives. The case discussed later, in the field of energy policy, is the liberalization of the EU gas market. In the Gas Directive negotiations, the range of political issues on the table involved choices that might, in principle, have led to more than 20,000 different agreements.

This is not to suggest that all options are worthy of full consideration. Rather, the key point is that there is a greater prospect of bringing negotiations to a productive conclusion if negotiators have better tools for examining a wider range of options. In part this is already recognized. Multilateral international negotiation is a managed process among national and international organizations rather than a diplomatic process conducted between individuals. The process of contemporary multilateral negotiation in international fora is not reducible to the actions and interactions of individuals. It involves teams of negotiators in pains-taking preparation before they get to the table and an immense amount of detailed implementation afterwards (Gross Stein, 1989). Indeed, negotiations frequently create a continuing need for governments or organizations acting on behalf of governments to work together on a quasi-permanent basis. As Winham put it:

Modern international negotiation represents a meshing of great systems. It is a commonplace today to observe that the world is becoming more interdependent - and one symptom of this interdependence is the fact that complex political and economic problems are increasingly handled at the level of international negotiation rather than exclusively at the domestic level. Today negotiators function as an extension of national policy-making processes rather than as a formal diplomatic representation between two sovereigns. (Winham, 1977: 89)

EU policy-making relies substantially on negotiations conducted within intergovernmental and interorganizational networks (Peterson and Bromberg, 1999; Wallace, 2000). The key actors are governments and organizations of various kinds. Individuals play a variety of roles in this process by virtue of the organizational and interorganizational positions they occupy rather than because of personal qualities. The resulting decisions and commitments are made by, and on behalf of, organizations and governments by accredited representatives. We now turn to assess whether decision theoretic methods supported with information technology can provide tools for good governance that match the scope and scale of these tasks.

4. Assessing the benefits of IT-based negotiation analysis

The question this article seeks to answer is whether negotiation analytic tools (implemented with information technology (IT) support) enable negotiators to improve the outcomes of international negotiation. To test this hypothesis we apply IT-supported negotiation analytic tools to a real world case study - the European Union's negotiations in the period 1996-97 over the liberalization of the natural gas market.
5. **Methodology: negotiation analysis**

Negotiation analysis is based on methods and analytical techniques from the well-established field of decision theory (Raiffa, 1968; Keeney and Raiffa, 1976; Bunn, 1982). The theoretical goal of decision theory is to assist individuals to make optimal decisions when faced with complex decision problems involving conflicting objectives and vexing uncertainties. In an applied context, the goal of decision theory (or decision analysis as it is referred to in applied contexts) is to assist individuals to make better informed decisions - because optimal decisions may be impossible to define. The specific branch of decision theory used in this article is Multiple Attribute Value (MAV) theory (Keeney and Raiffa, 1976). MAV theory provides a theoretically rigorous framework to structure and weight attributes of different alternatives and to elicit preferences from decision-makers with respect to different bundles of attributes - defined as alternatives. Simplified preference elicitation can be conducted with pen and paper but software packages constitute a more streamlined and manipulable medium.

Applied and adapted to complex international negotiations, decision analysis is transformed into negotiation analysis. The negotiation is treated as a complex decision problem involving conflicting objectives - how to satisfy a party's interests given the issues on the table and the inevitable trade-offs involved and uncertainties in terms of consequences resulting from an agreement. Decision analysis is adapted to meet the particular problem characteristics associated with negotiations. These characteristics include multiple parties, shared and conflicting interests, possible disagreement on the rules of the game, jointly determined consequences and post-agreement implementation problems.

The basic logic of applying MAV theory to a negotiation is straightforward:

1. Identify the parties to negotiation.
2. Define and structure the negotiable issues and resolutions.
3. Quantify preferences for resolutions on each issue.
4. Quantify trade-offs across issues.
5. Calculate a multiple attribute value function for each party.
6. Establish reservation values for each party.
7. Analyse the preference data (possibly using game theoretic solutions).

The first six steps are now briefly explained. This framework is then applied to the EU natural gas negotiations to test the usefulness of this approach.

**Identify the parties.**

Negotiation analysis assumes that the set of parties involved in a negotiation is fungible not fixed. Identifying the parties to a particular negotiation is not just a matter of enumeration. It requires judgements about the cohesiveness of political organization because managing intergovernmental negotiations depends on capacities for managing intra-group coordination (Metcalf, L., 1994). In international negotiations the parties might include the entire membership of an international organization, or only the most 'powerful' national governments. Analysis might be limited to coalitions, or a mixture of official members and non-governmental organizations. More elaborate analyses of the parties to be included may extend to constituents of formal participants who may veto agreement at a later stage, for instance the US Senate.
Define and structure issues and proposals for their resolution.

The issues under negotiation and proposals for their resolution constitute the second building block of the model. The set of issues and proposals should be exhaustive, operational, non-redundant, decomposable (additive), hierarchical, meaningful to negotiators and of minimum size. The constraints imposed by this methodology may seem artificial but they mirror those of actual negotiating situations. The full range of resolutions proposed by negotiators should be included. It is often difficult for negotiators to formulate such judgements explicitly partly because of the inherent complexity of the problem structure and partly because they must handle the internal politics of their organizations in doing so.

Quantify preferences for resolutions.

For each issue under negotiation there will be a range of resolutions - reflecting the proposals tabled by different participants. To quantify preferences for the resolution of an issue, the same question needs to be put to a representative of each party or to an individual assuming the role of that party. The individual is asked, 'What is the relative strength of your preference for resolution A as opposed to resolution B?' The result is a numerical weighting for each resolution on each issue. This preference elicitation can be conducted efficiently and accurately using a variety of theoretically valid techniques supported by commercially available PC-based software packages such as Expert Choice Pro or Logical Decisions.

Quantify trade-off across issues.

After the negotiator has provided his or her preferences for resolutions, the negotiation analyst assesses trade-offs across issues. This trade-off is implemented in the same way as the quantification of preferences for resolutions - the same software can be used to streamline the process. The fundamental question put to the negotiator is: 'What is the relative importance of a swing from the lowest to the highest resolution on each issue?' The result is a (normalized) numerical weighting of the importance of each issue.

Produce a function for each party.

With the numerical preference data held in a PC spreadsheet it is a straightforward task to compute each party's function. This is done by multiplying resolution weights by issue weights to give a value for each possible outcome.

Intergovernmental negotiations depend on capacities for managing intra-group coordination (Metcalf, L., 1994). In international negotiations the parties might include the entire membership of an international organization, or only the most 'powerful' national governments. Analysis might be limited to coalitions, or a mixture of official members and non-governmental organizations. More elaborate analyses of the parties to be included may extend to constituents of formal participants who may veto agreement at a later stage, for instance the US Senate.

Measure the reservation value.

Not all outcomes are acceptable. Negotiators have minimum requirements that must be met if they are to conclude an agreement. Defining what is and is not acceptable is a matter of subjective judgement and the base lines or reservation values can change during the process of negotiation. In the negotiation analytic model set out here the base line is defined by
establishing the lowest possible resolution which would be accepted on each issue. This provides a benchmark against which each possible outcome can be compared. If a negotiated agreement requires consensus then the value of the outcome must exceed every party's reservation value. In the European Union, where a system of qualified majority voting operates in many policy fields, there is strictly speaking no national veto in such cases but there is reluctance to proceed without a semblance of consensus.

Measures of success

How can we measure the success of the negotiation analytic tools? The approach taken in this article is twofold. First, we assess the quality of the negotiated outcome and examine whether negotiation analysis could have assisted the parties to reach a more desirable outcome. Second, we assess whether the qualitative structuring of the 'negotiation mess' into a clearly defined negotiation problem offers insight into how to solve the problem.

Negotiation theorists concur that three desirable properties of a negotiated outcome are: (1) efficiency; (2) feasibility; and (3) equity (Raiffa, 1982; Metcalfe, D., 2001). These concepts merit a brief description.

1. Efficiency: a pareto-efficient outcome cannot be improved for one party without making another party worse off. Stated inversely, a pareto-inefficient or sub-optimal outcome can be improved for one or more parties without making a third party worse off.
2. Feasibility: a feasible outcome is valued by each and every party at least as much as its bottom line or reservation value (Raiffa, 1997). In other words, every party prefers a feasible outcome to the no-agreement state.
3. Equity: an equitable outcome enshrines a fair distribution between the parties of the excess value created by their agreement (Luce and Raiffa, 1957). Fair agreements are expected to be implemented because the parties perceive that they have acquired their fair share of the jointly created value.

These three properties are examined in the context of the natural gas case study.

6. Case study: the natural gas negotiations

To test the usefulness of negotiation analysis in the context of international negotiation this section summarizes a case study of the EU negotiations on a Directive to liberalize natural gas markets (Metcalf, D., 2001).

Background: EU Gas Directive negotiations 1996-98

Since the 1960s the EU natural gas market has been a segregated market divided by national boundaries, each national market being controlled by a monopolistic or commercially dominant company with close links to the national government (Estrada et al., 1995: 1-9). In the words of Christos Papoutsis, who was European Commissioner for Energy in the mid-1990s, '[National] gas markets have been characterised by a high degree of centralised management, and by vertically integrated often publicly-owned undertakings, enjoying a dominant or monopolistic position.

The European Commission began initiatives to liberalize Europe's energy markets in 1988. On 20 June 1996, the Energy Council of the EU agreed on a Directive establishing a competitive
internal market for the EU's £163 billion electricity market. This opened the door for the Irish Presidency of the EU Council to begin negotiations on a Directive for Gas Liberalization. Negotiations continued under the Dutch Presidency from January to June 1997 and were concluded successfully by the Luxembourg Presidency in the second half of 1997.

**Structural analysis - building the model**

*Identify, the parties.* The Gas Directive negotiations involved the 15 member states of the EU and the European Commission. Preference data from negotiators representing these 16 parties were collected. In all cases preference data were elicited from negotiators in the Energy Council working group. These negotiators not only took part in the negotiations within their group, but attended meetings of COREPER 1 to advise their Deputy Ambassadors, and were also present at Energy Council meetings to assist Ministers.

*Define and structure issues and resolutions.*

The next step in the structural analysis is to organize the issues and resolutions into a negotiation template with additive properties (Keeney and Raiffa, 1991). We defined issues as substantive topics of debate over which parties' preferences diverged, for which different resolutions were proposed, which were considered to be of importance to the underlying interests of at least one party, and which were the subject of negotiation according to two or more negotiators. In common with all negotiation templates, each issue was required to have at least two resolutions. Interviews and modelling produced the list of issues and resolutions shown in Appendix 1.

These nine issues have between two and seven resolution levels and collectively represent the major political issues on the table in the Gas Directive negotiations. The full set of contracts is calculated by multiplying the resolutions on each issue \(7 \times 5 \times 4 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2\) = 20,160 contracts. According to this model of the Gas Directive negotiation 20,160 different contracts could be agreed, each one having different consequences. Of course many would be unacceptable to some parties.

*Quantify pre francs and trade-offs.*

After completing the preparatory preference elicitation surveys to check for preferential independence between issues, ensuring that the full range of resolutions were included for each issue, and assessing the other structural attributes of the model we proceeded to construct the elicitation hierarchy using a software package. Face-to-face preference elicitation interviews were conducted with negotiators from the member states and from the European Commission.

The preference data are presented in Table 1 and Figure 1. In Table 1, a symbol represents the most preferred resolution on each issue, and a '-' indicates a tie. The resolutions which actually appeared in the final agreement at the 8 December 1997 Energy Council are marked with an asterisk '*' symbol. Figure 1 graphically presents the trade-off data for each country and the European Commission. The same interpretation applies with regards to the height of each column and the corresponding importance of each issue. The negotiating parties are listed in the following order: Commission, Belgium, Germany, Denmark, Greece, Spain, France, Finland, Italy, Ireland, Luxembourg, the Netherlands, Austria, Portugal, Sweden, the United Kingdom.
Measure the reservation value.

The next step in the preference analysis is to measure each party's reservation value or bottom line. A review of the literature reveals a plethora of concepts seeking to describe or prescribe what constitutes or should constitute a negotiator's bottom line (White and Neale, 1991). In this research we use the term 'reservation value' and thereby keep within the terminology of negotiation analysis (Raiffa, 1982, 1997).

To define a party's reservation value the researcher proceeded along the following lines: 'On issue 3, what was the minimum acceptable resolution you could have accepted in the final agreement? Why was that?' Initial responses were probed with further questioning to ensure that no additional concessions might have been made, and in some cases the same exercise was repeated with compatriot negotiators to crosscheck validity. This series of questions produces a list of resolutions (preference values), for each issue. Summing these values produces a reservation value. This completes the data collection phase.

7. Practical uses

As currently conducted, international negotiations are painfully slow, attempts to negotiate an agreement often fail, and even when agreements are reached the outcomes can fail to fully address the problems that negotiators set out to solve. Moreover, with established practices the process of negotiating can result in a decrease in trust between parties, making future negotiations more problematic. One of the main reasons why negotiations fail to achieve desired consequences is that negotiators lack the capacities to effectively manage the negotiation process toward a successful conclusion. How do the tools described earlier help negotiators to avoid these pitfalls?

8. Rigorous structuring provides a negotiation map

A quantitative framework requires systematic analysis. The negotiation analytic perspective forces negotiators to rigorously map the participants in the negotiation. A negotiator is required to work through the entire negotiation and consider whether a party is important enough to be included in the analysis, to decide whether some parties should be grouped as a coalition, to think about parties which should be included in the negotiation but are currently excluded.

The Gas Directive example takes a formal negotiation forum - the EU Council - and analyzes the negotiation in terms of the formally recognized participants. But a negotiator may get more insight into a negotiation by either breaking down parties into sub-parties - for instance different directorates general in the Commission and different government departments - or by including outside parties which influence the decisions taken by formal participants - for example Gaz de France or the Energy Committee in the European Parliament. Creating and updating the negotiation map is important. Behavioural research indicates that a major failing of negotiators is that they ignore the cognitions of other negotiators (Bazerman and Neale, 1993). A negotiation map continually presents the reality of other actors in the decision-making process.

9. A quantitative negotiation model structures complexity

The greater the complexity of a problem the more value and need there is for formal analytical tools. MAV theory is a theoretically valid and practically robust method for structuring complex information into a manipulable model of quantitative data. The quality of the structuring process
is driven by the mathematical requirements of the model. This results in a negotiation template of issues and resolutions which has the properties of being mutually exclusive and comprehensively exhaustive. In addition, changes in the resolution of one issue should not impact on a negotiator's preference for the resolution of another issue. The result? Negotiators with a MAV-based model can calculate trade-offs across issues making it possible to identify otherwise concealed agreements.

Consider the Gas Directive example. By using the MAV techniques embedded in a software application and estimating other parties' preferences a negotiator generates a quantitative summary of the entire negotiation. The negotiator is forced to systematically think through the preferences of other parties - rather than simply focusing on his or her own interests. Understanding the other parties' interests is a crucial ingredient for achieving successful outcomes in interdependent decision contexts (Fisher and Ury, 1981). In addition, a negotiator now has a model that can be used not simply to track changes in the negotiation but to consider strategic moves to influence the outcome. For instance, if a specific party is blocking agreement due to opposition on a single issue, a negotiator seeking agreement can exploit the model to invent new resolutions for the problematic issue or to consider the impact of adding a new issue as a side-payment. With a quantitative model the pro-agreement negotiator can run 'What if' scenarios through the model and quickly understand the impact of different strategic moves on multiple parties.

10. **Reservation values point to jointly feasible outcomes**

Prior to final negotiating sessions, chairmen often estimate the minimum acceptable outcome for each party. With ten or more parties this is difficult to do using traditional methods. With over 20 parties it is impossible to do effectively. Using the MAV methodology, negotiation managers can use the preference data which may be collected through private elicitation sessions with negotiators or may be generated through estimation by experts - to specify a numerical 'bottom line' for each party. The scored negotiation template can then be used to identify the specific outcomes (contracts) that are jointly feasible for all parties. This describes the set of feasible outcomes: those outcomes evaluated by every party to be equal to or better than their reservation value.

By way of example, in the Gas Directive negotiation, after evaluating all 20,160 contracts against the 16 reservation values it transpires that only 87 contracts are jointly feasible for the full set of parties. This represents 0.43 percent of the total number of contracts. We can then ask, 'Is the EU Gas Directive, agreed between the member states and the European Commission at the 8 December 1997 Energy Council, a jointly feasible outcome?' According to the data collected in this study the outcome was not jointly feasible (see Table 2). The Dutch negotiator considered the final agreement to be below her country's reservation value. This quantitative finding is validated by the Dutch Minister's complaint at the closure of the negotiations. He was the only Minister to make a formal complaint. But Table 2 also shows that there were other outcomes which were jointly feasible - for instance the pure Nash solution or the pure maximum solution.

The problem here is that there may be jointly feasible outcomes available but they will be very difficult to identify when negotiators face a mass of complex unstructured information and lack tools to analyze it quickly enough. In many cases this will result in failure to reach agreement. Furthermore, as the Gas Directive data show and data from other studies confirm, in complex multiparty negotiations there are likely to be a very small percentage of jointly feasible outcomes.
(Metealfe, D., 2001). This empirical result helps us to understand why so many negotiations end in failure or partial agreement - and the finding is intuitive. The more parties involved in a negotiation the more risk there is of deadlock as multiple reservation values intersect.

11. **Mathematical solutions help identify fair agreements**

Even when parties reach an agreement, there may be problems in implementing the agreement because post hoc some parties consider the outcome to be inequitable. After the Gas Directive negotiations, the French government continued to drag its heels in implementing regulatory changes. Why? The concept of liberalizing their national energy market was contrary to widely held French economic beliefs in government and industry. If the French government felt that the agreement was inequitable then the scope of implementation problems may have been significantly larger.

Applied negotiation analysis can assist negotiators to identify theoretically 'fair' solutions. With preference data and reservation values for all parties, axiomatic solutions such as the Nash solution (1950) or the maximum solution (Raiffa, 1997) can be calculated in a spreadsheet program. These solutions aim to identify outcomes that result in a fair distribution of value between the participants in a negotiation. The Nash solution maximizes the product of the excesses of the negotiating parties. In other words, the solution ensures that all parties receive more value from the negotiation than their reservation value, then attempts to share out the excess value in a fair manner across the parties. The maximum solution maximizes the minimum proportion of the potential (pop) score across all parties. The potential is the value a party can claim from the negotiation assuming all other parties receive at least their reservation value. The maximum solution identifies the combination of resolutions that maximize the lowest potential achieved by any party.

In the case of the EU Gas Directive the negotiations gave the Dutch negotiator a negative excess (-1.0) and a negative Pop (-8 percent). This is not a jointly feasible solution and also fails the fairness test. Calculating the Nash and maximum solutions shows that there were alternative agreements that did meet the criterion of joint feasibility and balanced the value across all parties.' This does not mean that international negotiations can be 'solved' mathematically. But, a negotiator with a quantitative negotiation model can use game theoretic solutions to explore possible agreements that would be acceptable to all parties and would have a high probability of successful implementation because they are perceived as fair. The solutions are used as indicators of fairness and as guidelines for structuring fair agreements, they do not define 'optimal' solutions to the negotiation problem. Rather they help sketch out the envelope of feasible, efficient and fair solutions. Negotiators themselves need to examine these solutions in the light of what is practically possible and politically acceptable.

12. **Conclusions**

In this article the negotiation of the EU Gas Directive, as part of the liberalization of the EU energy market, has been used to assess whether negotiation analysis supported by information technology can be used as a tool of good governance. It provides negotiators with the means of coping more effectively with the complexity of multilateral negotiations by developing a model of the negotiating situation and clarifying and codifying the options available. More specifically, this methodology helps negotiators make better-informed decisions to achieve their goals because of four key features:
• it provides a robust framework for tracking issues and potential solutions that enables the participants to manage information relevant to the negotiations;
• it provides a rigorous methodology for analysing parties' interests and gaining insight into opportunities and constraints as a basis for defining goals;
• it forces negotiation managers to consider the interests of all parties systematically as a part of their objective setting process; and
• it applies well-defined solution concepts (Nash, maximum) to guide parties toward efficient, feasible and fair solutions.

In short it brings greater realism and flexibility to the management of multilateral negotiations by disclosing options and possibilities within existing parameters that might be overlooked by rule-of-thumb methods and incremental processes.

This type of analysis contributes to improving the performance of negotiators and negotiation processes in a number of ways. The first is to systematize search processes and provide a clearer and more extensive menu for policy choice than ad hoc incremental searches. A second is to provide realistic assessments of options in situations where errors and misunderstandings may lead to costly and avoidable failures. When the primary pressures on individual negotiators are to claim victory and avoid the impression of defeat the value of this should not be underestimated. Third, this approach not only reduces the risk of poor implementation but also enhances the probability of future success in concluding agreements. If it helps parties to avoid failure where agreement is feasible and helps mediators avoid outcomes that are perceived to be unfair it contributes to building a negotiation process that strengthens rather than disrupts long-term relationships.

Having said this, it must be emphasized that this kind of negotiation analysis is not a panacea or technical fix. Like any analytical approach it has its limitations and may be misused. Potential users should recognize what it can and cannot do and what factors limit its usefulness. First, negotiation analysis applies to the operational level not the level of organizational change. It may highlight circumstances where existing organizational structures block success but it does not provide organizations or their members with tools and techniques for institutional reform. Second, there are training costs in developing the expertise necessary to benefit from the methodology. For negotiating teams to use IT-based negotiation analysis effectively, significant training is required. Several studies have demonstrated that preference elicitation without investment in methodological training introduces inaccuracies into the data (Pbyhijnen and Hiimiil5inen, 1997). Third, the use of this approach requires a degree of trust that is liable to be absent in situations where there are direct conflicts of interest. For obvious reasons, negotiators will not reveal detailed preferences to 'opponents' with conflicting interests. While the barriers to collecting information will be reduced for mediators, negotiating parties must use expert opinion to estimate preferences of other parties. Inevitably this will affect the accuracy of preference data. Finally, this approach does not offer a once-for-all solution because interests evolve over time. In a negotiation, parties are subjected to a broad range of overt persuasion and preferential biases - such as the desire to belong to a group or the less-than rational escalation of opposition to another party's proposals. Hence information must be regularly updated, possibly with changes to the ranges of issues and of resolutions. The evolutionary nature of negotiations significantly increases the data collection workload and costs.

While it is important to recognize these limitations on the practicability and range of applicability of negotiation analytic tools, compared with methods currently in use, they can...
make a valuable contribution to improving the effectiveness of multilateral negotiations in many international arenas. It does seem that they could be usefully deployed in challenging contexts such as the European Union, NATO or the OECD where the increasing complexity of negotiations is making established practices obsolescent.
Appendix

Initial event of market liberalization

What should be the minimum percentage of each national market open to competition immediately following the entry into force of the Gas Directive?

- 0 percent
- 15 percent
- 18 percent
- 20 percent
- 23 percent
- 28 percent
- 30 percent.

Final extent of market liberalization

What should be the minimum percentage of each national market open to competition ten years after the Gas Directive enters into force?

- 25 percent
- 30 percent
- 33 percent
- 45 percent
- 50 percent.

Exemptions for long-term take-or-pay contracts

What exemptions from market liberalization should be incorporated into the Gas Directive with regard to long-term take-or-pay contracts?

No exemptions for take-or-pay contracts.

Exemptions for take or-pay contracts existing before the entry into force of the Directive, to be decided on by member states.

Exemptions for take-or-pay contracts existing before the entry into force of the Directive and exemptions for future take-or-pay contracts, both to be decided on by member states.

Exemptions for existing or future take-or-pay contracts to be decided on by member states with European Commission oversight.

Exemptions for emerging regions

Should exemptions from market liberalization be granted to geographically-limited regions with undeveloped or immature gas markets?

No exemptions should be accorded to 'emerging regions'.
A list of 'emerging regions' benefiting from exemptions should be attached to the Gas Directive in an Appendix.

Emerging regions should be granted exemptions from market liberalization by European Commission decisions based on strict criteria defined in the Directive.

_Treatment of offshore gas pipelines_

Should the Directive treat offshore natural gas pipelines differently from onshore gas pipelines?

Entirely exclude offshore pipelines from the Directive.

Include offshore pipelines in the Directive under a specially defined technical regime.

Include offshore pipelines in the Directive under the same technical regime as onshore pipelines.

_Public service obligations_

Should the Directive allow governments to impose public service provisions on natural gas companies which oblige them to guarantee gas supply and service at a reasonable cost independent of geographic location?

Do not allow governments to impose public service obligations on natural gas companies.

Include a provision in the Directive allowing governments to impose public service obligations on natural gas companies.

_Exemptions for natural gas distribution_

Should the Directive offer exemptions from market liberalization for natural gas distribution?

Natural gas distribution should not be exempt from the Directive's Market liberalization proposals.

Member states may refuse to grant authorization to construct or operate distribution facilities if the authorization would conflict with public service obligations or damage the general economic interest of the country.

_Exemptions for emerging markets and unconnected networks_

Should the Directive grant exemptions from market liberalization to 'immature'?

Emerging gas markets and to national networks unconnected to the continental network?

Emerging markets and unconnected networks should not be granted exemptions from market liberalization.

Emerging markets should be granted optional exemptions limited in time from the market liberalization provisions of the directive.
**Unbundling and transparency of accounts**

Should natural gas production activities be unbundled from the integrated accounts of natural gas undertakings?

Natural gas production activities should be unbundled from integrated accounts?

Natural gas production, as such, should not be unbundled from integrated accounts?

**Notes**


2. In Table 2, 'pure' refers to solutions which must resolve each issue by selecting a single resolution; 'mixed' refers to solutions which can select a mixture of resolutions for each issue. The distinction is made to illustrate the ability of negotiators to reformulate resolutions (create compromises) that meet the interests of the parties more completely.