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Online Dispute Resolution: The Benefits Of Enhancing Alternative Dispute Resolution Through The Use Of Internet Technology

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Abstract

Alternative dispute resolution (ADR) has become an established alternative method to litigation in solving disputes in many western jurisdictions. Online dispute resolution (ODR), the application of ICT in ADR has become a new and enhanced technique for dispute resolution. Most current ODR projects have been developed in the area of e-commerce. In this paper we discuss the emerging field of ODR research, point at some challenges for technology and outline strategies we have and are developing for supporting ODR including an integrated environment for supporting ODR and the use of trade-offs and compensation strategies for providing negotiation support.

Key words: Alternative dispute resolution; online dispute resolution, negotiation decision support, dispute resolution processes

1. INTRODUCTION

Within a legal context, negotiation is a process of submission and consideration of offers until an acceptable offer is made and accepted (Black 1990). In the wider community, negotiation can be viewed as a process by which two or more parties conduct communications or conferences with the view to resolving differences between them. Whilst law proposes formal procedures for resolving disputes, most negotiation is informal and indeed the participants may not even realise they are engaging in the negotiation process. Jennings et al (2001) claim that negotiation theory incorporates a broad range of phenomena and makes use of many different approaches (such as from artificial intelligence, social psychology and game theory). They claim that given the wide variety of possibilities, it should be clear that there is no universally best approach or technique for automated negotiation. Rather, there is an eclectic bag of methods with properties and performance characteristics that vary significantly depending on the negotiation context. Alternative dispute resolution (ADR) has moved dispute resolution away from litigation and courts. Online dispute resolution (ODR) extends this trend (Clark & Hoyle 2002). Information technology, especially the Internet, has opened up new modes of dispute resolution.

In this paper we argue that ODR, the application of Internet technology to ADR, has become an alternative method for resolving disputes that arise both from online transactions and in the offline context. It suggests that the potential of the application of the ODR technology in various domains is imminent, though the technology itself is still in its early development stage. We argue that developing an ODR system that integrates a “reality test” of the parties’ position is not only a challenge but also a promising approach.

2. ALTERNATIVE DISPUTE RESOLUTION

Alternative dispute resolution (ADR) is commonly recognised as applying to processes that are alternatives to the traditional legal methods of solving disputes (Charlton 2000). Many researchers (Astor & Chinkin 2002; Clark & Hoyle 2002; Hong 2003; Meadow 2003) recognise that it is difficult to construct a concise definition of ADR, but have noticed that negotiation, mediation and arbitration are often being chosen as processes for resolving disputes. Astor and Chinkin (2002) also note that it is difficult to get a clear dividing line between ADR and formal justice systems, as many courts have adopted their own version of ADR. In Australia, the National Alternative Dispute Resolution Advisory Council (NADRAC 2003) explains, “ADR refers to processes, other than judicial determination, in which an impartial person assists those in a dispute to resolve the issues between them”.

The idea of seeking an ADR rather than judgment from formal authorities has a long history. The modern ADR movement has been profoundly influenced by Sander (1976), in which he introduced the idea of the “Multidoor
Courthouse”. Several researchers (e.g. Astor & Chinkin 2002; Charlton 2000; Meadow 2003) have commented that ADR has become, for disputants, an established alternative option to litigation. Ross (1980) states “the principal institution of the law is not trial; it is settlement out of court”. Recent figures from a survey in The Netherlands illustrate this statement. Around 48% of all disputes were settled out of court and just 4% is decided by litigation (Velthoven & Ter Voert 2004). In the United States, Williams (1983) notes that whilst the figures may vary in different jurisdictions, of all the cases listed before the courts only about 5% of the cases are ever heard by the court and only 1% of the cases result in judicial decision-making. Nevertheless, judicial decision-making has a major influence on the outcome of negotiated settlements, because judicial decisions serve as the very basis from which negotiations commence, they take place in the shadow of the intervention by a court (Williams 1983; Daughety 2000).

The ADR movement has revolutionised thinking about the nature of dispute resolution, away from an adversarial model to a collaborative one. Disputants have the possibility to approach their conflicts in a different way, with a goal of producing win-win solutions for the disputants, rather than the distributive win-lose results available in court. Some most cited advantages of ADR, especially mediation, include: efficiencies; the ability of preserving party relationships; promoting active party participation and not creating precedential value. Research by Astor and Chinkin (2002), Brown and Marriott (1999), and Meadow (2003) has shown that the application of ADR is particularly successful in resolving disputes in the area of commercial law, family law and employment law.

ADR and litigation are fundamentally different approaches for resolving disputes. Most ADR processes are concerned about bargaining and trade-offs, whereas litigation is primarily concerned about justice. Even arbitration, the most rigid ADR process, differs from court proceedings in that the rules of substantive and procedural law are relaxed, they can be adapted to the specific needs of the forum and institutionalised within the formal justice system (Solovay & Reed 2003). Although there are an enormous variety of ADR services (Brown & Marriott 1999), three basic forms of dispute resolution can be identified: negotiation, mediation and adjudication (arbitration and litigation). Mediation and arbitration are commonly used ADR processes in western jurisdictions. Negotiation itself may not be an alternative to litigation, as it usually precedes alternative dispute resolution processes and litigation. But since the emergence of ODR, technology assisted negotiation systems may very well be qualified as ADR.

2.1 Negotiation

Negotiation is a process where the parties involved modify their demands to achieve a mutually acceptable compromise (Kennedy et al 1984). The essence of negotiation is that there is no third party whose role is to act as facilitator or umpire in the communications between the parties as they attempt to resolve their dispute (Astor & Chinkin 2002). It is the most cost-effective and efficient method of resolving disputes between parties, but it is a process that is not without problems. People are likely to engage in positional bargaining and face several cognitive (psychological) biases, such as the tendency to be overly optimistic about their positions (Kahneman & Tversky 1995) and the tendency to devalue proposals made by adversaries (Ross 1995; Neale & Bazerman 1991). Positional bargaining and these biases may result in the failure of a negotiation, leaving parties with the options of going to court, opting for an ADR procedure or not resolving the dispute at all. A facilitative negotiation process focuses on the management and conduct of bargaining between the parties while the content is about the issues - the facts and substance in dispute.

2.2 Mediation

Folberg and Taylor (1984) define mediation as “a process by which the participants, together with the assistance of a neutral person or persons, systematically isolate disputed issues in order to develop options, consider alternatives, and reach a consensual settlement that will accommodate their needs”. Mediation emphasises the separation of issues of the dispute and develops options for the disputants. In Australia, NADRAC (2003) has developed its own definition of mediation as “a process in which the parties to a dispute, with the assistance of a neutral third party (the mediator) identify the disputed issues, develop options, consider alternatives and endeavour to reach an agreement”. A mediator has no advisory or determinative role in regard to the content of the dispute or the outcome of its resolution, but may advise on or determine the mediation process, that is the steps and stages involved in the process, whereby resolution is attempted (Charlton 2000). In recent years it is argued that mediators, although they primarily facilitate the negotiation between the parties, may evaluate the content of the dispute (Riskin 1996; Brown & Marriott 1999).

Mediation most often is a voluntary and non-binding process in which a third party neutral assists the parties in formulating their own resolution of the dispute. It is a confidential process in which the confidentiality is protected by an agreement between the parties and the mediator or by statute (such as in Australia). The fundamental difference between negotiation and mediation is the presence of an impartial, neutral third party
who is not a partisan for one of the disputants but rather assists both or all the parties towards reaching an agreement (Astor & Chinkin 2002).

Mediation is not suitable for all disputes or for all parties. The parties must be willing to do, and capable of doing, what the process requires of them (Astor & Chinkin 2002). Astor and Chinkin (2002) explain that willingness, in the sense that the parties are volunteers, is often cited as one of the great strengths of mediation. It also implies that the parties are prepared to make a good faith attempt to negotiate an outcome to their dispute. Capacity implies that the parties have an ability to express and negotiate for their own needs and interests. Mediation is strongly discouraged when there is a history of violence between the disputants. According to Pryles (2002) mediation may be mandatory (for example in many Australian jurisdictions, mediation is mandatory - see Alexander 2004), discretionary (in the sense that it may be undertaken at the discretion of a particular person) or voluntary (the parties to a dispute may voluntarily decide to attempt settlement through mediation).

2.3 Arbitration

Arbitration is an adversarial process whereby an independent third party (or parties), after hearing submissions from the disputants makes an award binding upon the parties. An arbitrator can be part of a court-annexed scheme, or the parties may choose an arbitrator who is not necessarily legally qualified. The choice of arbitrator may be based on his or her particular expert knowledge of the subject matter, for example an engineer or accountant. Arbitration is a process, which is most often confused with mediation in the public mind. The arbitration process could be as close to judicial determination as one can get (Charlton 2000).

Arbitration is an ADR process that has been used in Australia since European settlement. The English Arbitration Act 1697 provided a procedure whereby parties to a civil action could refer their matter to arbitration and have the ensuring award enforced as a judgement of the court. The establishment of the Institute of Arbitrators Australia in 1975 provided a professional organisation for the development of an arbitral identity and for the training of arbitrators (Astor & Chinkin 2002). The process includes many elements of courtroom trials, a formal hearing, examination and cross-examination of witnesses, the use of experts, and the submission of evidence (Solovay & Reed 2003). Arbitration is an enforceable process and often subject to the governance of law enforcement (Astor & Chinkin 2002). Australia law on arbitration is based on international conventions, legislation (both federal and state) and the common law.

Mediation and arbitration are both ADR processes, but have distinct purposes and hence distinct moralities. Astor and Chinkin (2002) argue that the morality of mediation lies in optimum settlement in which each party gives up what she values less, in return for what she values more. The morality of arbitration lies in a decision according to the law of contract. In Australia, under the Commercial Arbitration Act, a court may not set aside or remit an award on the ground of error or fact or laws on the face of the award. Under Model law, the Model law restricts judicial intervention and provides, in Article 5, that no court shall intervene except as provided in the law (Pryles 2002). Mediation is generally regarded as more economic, efficient and flexible than arbitration (Astor & Chinkin 2002; Solovay & Reed 2003).

2.4 The Benefits of Integrative Negotiation

Traditionally, lawyers have tended to adopt an adversarial approach that reflects the litigation model. In this view, resources are limited and must be divided and what one party gains the other must lose. Information about one’s real preferences must be jealously guarded. If a negotiation fails, the court will declare one party a winner, awarding money or an injunction. And although a court generally declares one party a winner, this party may not get everything she requested. Successful negotiations represent a compromise of each party’s position on an ordinary scale of numerical (usually monetary) value (Meadow 2003).

Walton and Mckersie (1965) propose that negotiation processes can be classified as distributive or integrative. In distributive approaches, the problems are seen as “zero sum” and resources are imagined as fixed: “divide the pie”. In integrative approaches, problems are seen as having more potential solutions than are immediately obvious and the goal is to “expand the pie” before dividing it. Parties attempt to accommodate as many interests of each of the parties as possible, leading to the so-called “win-win” or “all gain” approach.

Silbey and Merry (1986) distinguish two significant mediator settlement strategies: bargaining and therapeutic. However, they note that many mediators use both styles depending on the circumstances of the dispute. Bush and Folger (1994) state that the purpose of more therapeutically oriented mediation is not about settlement, but settlement may be a by-product of mediation.
In developing principled negotiation, Fisher et al (1992) state that the ADR process should separate the people from the problem, focus on interests not positions and generate a range of options before deciding on an outcome. Fundamental to the concept of principled negotiation is the notion of know your best alternative to a negotiated agreement (BATNA). The reason you negotiate with someone is to produce better results than would otherwise occur. If you are unaware of what results you could obtain if the negotiations are unsuccessful, you run the risk of: (a) Entering into an agreement that you would be better off rejecting; or (b) Rejecting an agreement you would be better off entering into.

Meadow (2001) insists that the result of the mediation should be based on some objective standard. She asserts that the model enhances the number of interests that can be considered, thereby avoiding the need to divide single, opposing demands. Astor and Chinkin (2002) comment that the problem-solving model emphasizes diverse categories of human needs - legal, economic, social, psychological, religious, moral, and political.

3. ONLINE DISPUTE RESOLUTION

Online dispute resolution (ODR) draws its main themes and concepts from ADR processes such as negotiation, mediation and arbitration. The word online is a broad description of the method or resolution not of the subject of the dispute. It covers both the online delivery of traditional methods of ADR and the online resolution of disputes directly between the parties themselves. Solovay and Reed (2003) argue that ADR is being adapted to the online environment in three main ways: (a) Offline ADR professionals, particularly mediators, are using the Internet to augment their practices; (b) ODR providers are setting up shop on the Internet and moving ADR processes entirely online, making the necessary changes to fit the online environment; and (c) The technological options available on the Internet have spawned ADR mechanisms unique to the online environment.

In the context of dispute resolution, ODR introduces a “fourth party” (Katsh & Rifkin 2001) at the table, which is the technology that works with the mediator or arbitrator. Katsh and Rifkin (2001) propose an assumption that a “dispute resolution space” serves as a vehicle for resolving disputes, which is interested in opportunities to repair and improve relationships and to settle transactional disputes. Most current ODR sites have been developed to negotiate upon commercial disputes. Examples include CyberSettle, SquareTrade, and ClicknSettle. Rule (2002) states much of their effort in online resolution now focuses on “hybrid” processes, where face-to-face meetings are combined with online tools to create a more efficient and effective overall process. In addition to attempting to adapt traditional arbitration, mediation and negotiation processes to the online environment, the Internet already has spawned its own ADR innovations. Some of these methods, such as blind bidding and computer-assisted negotiations, seem to speed up and simplify dispute resolution. Figure 1 illustrates a conceptual ODR model that envisions the ‘fourth party’, the (online) technology.

ODR has now gone through three broad stages of development: (a) the "hobbyist" phase where individual enthusiasts started work on online ADR, often without formal backing; (b) the "experimental" phase where foundations and international bodies funded academics and non-profit organisations to run pilot programs; (c) and the "entrepreneurial" phase where a number of for-profit organisations launched private online ADR sites; ODR appears now being entering an "institutional" phase where it is piloted and adopted by a range of official bodies (Conley Tyler & Bretherton 2003).

Numerous researchers (e.g. Katsh et al 2000; Schultz 2003) describe the [potential] advantages of ODR, the most common are: speed: efficiency; low cost; and their capacity to bring parties located at some distance together. Among the disadvantages for e-mediated are: the challenges to mediators and to disputing parties to settle a dispute without face-to-face contact; and the need for specific ICT training for mediators. Another problem facing all ODR processes is the digital divide, that is, not everybody has access to the Internet and/or sufficient knowledge to be able to use computer systems.

3.1 Features of Online Dispute Resolution

ODR offers the opportunities for disputants to use both synchronous and asynchronous communication mediums. For example, in a synchronous model, the disputants can use online chatting or video conferencing tools that brings geographically distant disputants into cyberspace, which can ensure the communication is still
live and in real time. In an asynchronous model, the disputants rely on delayed communication method such as secured email systems.

The most distinguishing characteristic of ODR from ADR is its ability to offer asynchronous communication. Conley Tyler and Bretherton (2003) indicate that most agencies prefer asynchronous tools such as bulletin boards. The asynchronous nature of ODR stops the dispute resolution process from taking place in real time by using communication methods such as emails and online discussion mechanisms instead of making face-to-face meetings. Solovay and Reed (2003) argue that the results of such asynchronous communication will be more productive, and its content more reflective, less hostile, and even more democratic.

Rule (2002) argues that ODR has many benefits that enhance ADR. Although the online environment is also beneficial to arbitration, it is especially useful for negotiation and mediation. One such example is that of reframing pre-communications. Helping parties to frame their communications in a way that enables them to more effectively explain their position to their opponents, is an essential component of moving a dispute towards a resolution. In the context of the process of concurrent caucusing, Rule (2002) states that while some mediators refuse to caucus with individual parties during mediation sessions, others rely on it quite heavily. The ability to talk about issues with one side in a confidential way, can be extremely valuable in moving parties towards a resolution. Rule (2002) also argues that caucusing can be a crude tool in face to face mediation sessions, however, the mediator usually has to call the joint discussion to a stop, and then has to decide which of the parties should caucus first. The other party is then sent outside to wait while the mediator caucuses with the first side. Online dispute resolution allows the mediator to caucus through the entire mediation, even when the discussion is progressing well (Rule 2002).

Issues related to cost, speed and convenience are most likely to influence disputants in choosing ODR as a dispute resolution process. Also, ODR is useful for disputants who are highly emotional. Asynchronous communication allows them to cool down, removing the possibility of physical confrontation.

3.2 Online Dispute Resolution Systems

One of the principal goals of the law is the avoidance of litigation (Zeleznikow 2002b). Katsh et al (2000) show that many businesses and citizens prefer alternative dispute resolution to litigation. In the context of dispute resolution, the application of ICT both as a tool and process is still in their early stage of development (Clark & Hoyle 2002), although some commercial dispute resolution systems have been used in recent years. Most of the successful commercial ODR systems are used in the area of Business to Consumer (B2C) or Consumer to Consumer (C2C) relationships, e.g. the aforementioned ODR service SquareTrade, a company that handles mainly C2C disputes originating from the online auction site eBay, resolved over 200,000 disputes in 2003.

Expert systems and artificial intelligence have been used to provide ADR support. New negotiation support systems built with powerful optimisation algorithms and enhanced by maturing cyberspace are now providing a real alternative to conventional negotiation. These systems reduce negotiating time and costs by putting decision makers in control of a process that quickly clarifies tradeoffs, recognises party satisfaction on all types of negotiation issues, and generates optimal solutions (Thiessen & McMahon 2000). Zeleznikow (2003) argues that most of the commercially successful legal decision support systems have employed rule-based systems. He discusses how legal decision support systems can be used to support negotiation. Negotiations support systems can aid participants in ranking their interests, and then compute multiple resolution options.

Because computer systems have the ability to analyse and compare far more alternatives than the human brain can process, they can help the disputants to maximise the results for both parties, reaching not only a win-win solution, but also an optimum one. Another significant online innovation is blind bidding, a computer-assisted process which in general entails the parties’ submission of several rounds of secret bids. If the bids are within a pre-defined dollar amount or percentage value, the case settles for the median amount and the parties are notified. If the case does not settle, the parties have lost nothing, because their bids are not revealed to the other side. Zeleznikow (2002a) discusses how the provision of web-based legal decision support systems can help improve access to justice. Issues such as security of communication, confidentiality, impartiality, conflicts of interest, ODR disclosure policies, educational and training requirements, linguistic and cultural skills, and adequate party representation need to be fully addressed and applied to ODR service providers before the use of ODR becomes widespread.

4. OUR APPROACH TO DEVELOPING AN ODR ENVIRONMENT

Most conflicts can be resolved when the communication between parties is reestablished. Often parties in conflict have stopped communicating or only do so through their legal representatives. If there is any communication between the parties it is likely to be focused on legal positions or are even “naming and
blaming”. Reestablishing fruitful communication, communication that is focused on interests and not on (legal) positions, is a vital element of negotiation support systems (Fisher & Ury 1992). In our approach to ODR, we believe that it is essential that: (a) Disputants have a realistic assessment of what will happen if the negotiations fail; (b) Disputants be provided with support to allow them to communicate their desires; (c) Disputants be provided with decision support that allows them to perform trade-offs. Lodder and Zeleznikow (2005) are developing an ODR environment that provides disputants with the above three opportunities.

4.1 Integrating a reality test

Further research in the field of ODR will in our view benefit from several threads of research, especially insights from legal, sociological, psychological and economical research in the area of conflict resolution. Research in the area of psychology has shown that disputants have a need for unbiased negotiation advice, especially information that tests their BATNA (Barendrecht & De Vries 2004). People in conflict situations generally have an optimistic view of their chances in a court procedure, which may result in them not accepting a reasonable a negotiated agreement (Kahmaneman & Tversky 1995). One of the reasons why the appraisal of their chances in a court proceeding is exceedingly positive is that disputants have a tendency to collect more information supporting their position than information that favors the other party. When conflicts arise, disputants have a need for a ‘reality test’. A legal advisor can provide such a test. But although the quality of such advice is in general high, the downside is that it is rather expensive. Providing such an advice through a technological solution, preferably an online system, creates the possibility of providing customised advice at low costs. Integrating an application that provides such a ‘reality test’ in an ODR system is therefore beneficial to the negotiation process.

4.2 A three-stage process

Given that disputants require both negotiation advice and the opportunity to communicate about their desires, we are developing a three-stage process for developing an on-line dispute resolution environment. These stages include: (1) The provision of an appropriate BATNA; (2) A stage that enables direct communication and negotiation between the parties that does enable interest based communication; (3) A stage that provides negotiation support through the use of compensation and trade-off strategies.

4.2.1 Determining an appropriate BATNA

To provide a realistic assessment of what will happen if the negotiations fail, the first stage of our integrated tool is the provision of a decision support system that advises upon appropriate BATNAs. At this moment there is no generic tool available for determining BATNAs. Providing appropriate BATNAs is a great challenge for information technology. Some of the problems of law as source of knowledge are that law: (a) Does not cover every possible situation (not everything is regulated); (b) There are different sources of law (legislation and case law) that interact which each other in different ways depending on for instance the legal system. We intend to undertake further research in this area. The current systems that use knowledge discovery from databases are focussed at specific legal areas that require all relevant factors to be known in advance (Stranieri & Zeleznikow 2004).

Split-Up (Stranieri et al 1999) is a hybrid rule-based/neural network system that advises upon property distribution following divorce in Australia. Whilst Split-Up is not a negotiation support system, it can be used to determine one’s BATNA for a negotiation and hence provides an important starting point for negotiations. Split-Up first shows both litigants what they would be expected to be awarded by a court if their relative claims were accepted. It gives them relevant advice as to what would happen if some or all of their claims were rejected. Users are then able to have dialogues with the system to explore hypothetical situations to establish clear ideas about the strengths and weaknesses of their claims. Suppose the disputants’ goals are entered into the system to determine the asset distributions for both W(ife) and H(usband) in a hypothetical example. For the example taken from Bellucci & and Zeleznikow (2001), the Split-Up system provided the following answers as to the percentages of the marital assets received by each party:

<table>
<thead>
<tr>
<th></th>
<th>W’s %</th>
<th>H’s %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given one accepts W’s beliefs</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Given one accepts H’s beliefs</td>
<td>42</td>
<td>58</td>
</tr>
<tr>
<td>Given one accepts H’s beliefs but gives W custody of the children</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 1 - Disputant goals from hypothetical example

Clearly custody of the children is very significant in determining the husband’s property distribution. If he were unlikely to win custody of the children, the husband would be well advised to accept 40% of the common pool (otherwise he would also risk paying large legal fees and having on-going conflict). During the further steps it is
likely that new information will become available (e.g. statements made by the other party) and therefore the BATNA that has determined in this stage should be kept up to date by the system.

4.2.2 Dialogues between the disputants

The second stage in our dispute resolution environment is the development of a dialogue system to allow the disputants to communicate amongst themselves. The starting point for the mediation is to form the set of issues in dispute, formally denoted as $D = X \cup Y$ where $X = \{X_1, X_2, \ldots, X_m\}$ is the set of issues that H sees as in dispute; and $Y = \{Y_1, Y_2, \ldots, Y_n\}$ is the set of issues that W sees as in dispute. The disputants can discuss any of the issues in $D$. Lodder and Huygen (2001) present an ODR-tool based on argumentation theory. The argument tool operates as follows. Statements are natural language sentences. A party using the argument tool can enter one of the following three types of statements: (a) Issue – A statement that initiates a discussion. At the moment of introduction this statement is not connected to any other statement; (b) Supporting statement – Each statement entered by a party that supports statements of the same party and (c) Responding statement - Each statement entered by a party that responds to statements of the other party.

A statement that is entered by the parties is represented as follows: $P(E, Q(C))$, where $P$ is the party who adds the statement, $E$ is the entered statement, $C$ is the statement connected to $E$ and $Q$ is the player who claimed $C$. If a statement is an issue, then we have $P(E, P(E))$. From the definition of the other statements above, it follows that: $P(E, Q(C))$ is a supporting statement if and only if $P = Q$; and $P(E, Q(C))$ is a responding statement if and only if $P \neq Q$. After a party enters a statement, an element $P(E, Q(C))$ is added to a set called the games board $G$. The first statement added to our games board is always an issue $G_1 = \{H(D_1), H(D_2)\}$ or $G_1 = \{W(D_1), W(D_2)\}$. Following the dialogue they will agree on some issues, say $A = \{D_1, D_2, \ldots, D_k\}$ and disagree on others $N = D \setminus A = \{D_{k+1}, D_{k+2}, \ldots, D_R\}$. So, if $H(OK, W(D_i))$ or $W(OK, H(D_i))$ is an element of $G$, then $D$ is added to $A$. A detailed description of our approach together with examples can be found in Lodder and Zeleznikow (2005). When viewed on a computer screen, the argument tool presents issues at the left of the screen, indents supporting statements under the statement they support, and places responding statements to the right side of the statement to which they react. For example, the game board $G$, with $H(usbhand)$ and $W(ife)$ as the parties could be described in a linear fashion as follows:

<table>
<thead>
<tr>
<th>H: I want custody</th>
<th>W: I want custody</th>
</tr>
</thead>
<tbody>
<tr>
<td>H: I will take good care of the children</td>
<td>W: I am a better parent</td>
</tr>
<tr>
<td>H: In the past I have been good to the children</td>
<td>W: You were working all the time</td>
</tr>
</tbody>
</table>

be roughly presented as the illustration above.

4.2.3 Negotiation Decision Support

The third stage in our dispute resolution environment involves the provision of negotiation support through the use of compensation and trade-off strategies. If the dialogue turns out to be not entirely successful, then $H$ and $W$ are then asked to give a significance value to each of the issues in $D = \{D_1, D_2, \ldots, D_k\}$ where $m, n \leq k \leq m + n^1$ and the sum of significance values for each of $X$ and $Y$ is 100. We hence have two sets $X_D = \{X_{D1}, X_{D2}, \ldots, X_{Dk}\}$ and $Y_D = \{Y_{D1}, Y_{D2}, \ldots, Y_{Dk}\}$ where $X_{Di} = Y_{Di}$ This information is necessary to initiate the negotiation part of our system.

Suppose we have a Family Law Dispute where Cassandra (Wife) and Paul (Husband) Jones have been married for fifteen years and have two sons aged thirteen and eleven. Cassandra wants a divorce and an immediate property settlement. She also believes that although she received income from employment throughout her marriage, her principal role was as a homemaker and a nurturer. Both parties agree to the distribution of the joint marital property consisting of a house, his BMW car, and her Mitsubishi car. In addition, she believes she is entitled to a portion of her husband’s share in his stock portfolio and his superannuation entitlements. She wishes to retain the house and the Mitsubishi car, while Paul wishes to retain his BMW car and agrees on an equal share of the portfolio and the entitlements. Cassandra believes she should receive primary residency of the children. She consults a lawyer who advises her that as the parent with current primary residency of the children, she should seek 60% of the marital property and adequate child support. The 60% mainly consists of the matrimonial

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1 $m$ is the number of issues that $H$ views as in dispute, $n$ is the number of issues that $W$ views as in dispute and $k$ is the number of issues that are in dispute. Thus $k \leq m + n$. 
home and the holiday house. She wishes to retain both of these properties. This simple example has three issues in dispute.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Husband’s ratings</th>
<th>Wife’s ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child-related</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>Property Issues</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Monetary Issues</td>
<td>10</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 2. Initial input of issues and ratings for use in the hypothetical case

The final proposed solution might involve sharing some issues (such as selling a property and distributing money or sharing the residency of children) to ensure that each of the disputants receives an equal number of points for the issues in N. It should however be noted, that unlike the situation in Bellucci and Zeleznikow (2001), the points may not be equally distributed. Our aim is to have both parties reasonably satisfied, or at least "equally dissatisfied". The distribution algorithm is basically as follows.

We use as an example the three disputed issues set forth in Table 2 – Child-Related Issues (Di3), Property Issues (Di3), and Monetary Issues (Di1), we can summarize our technique for distributing points thus:

We first calculate \( d_1 = \max \{|X_{Di1} - Y_{Di1}|\} \). Let us say this value \( i \) occurs where \( X_{Di1} = Y_{Di1} \) so that \( X \) receives the item to be distributed. Then \( X^* = X_{Di1} \) and \( Y^* = 0 \).

Choose \( d_2 = \max \{|Y_{Di2} - X_{Di2}| : i \neq i1\} \), the issue \( (Di_2) \) goes to \( Y \) and \( X^* = X_{Di2} \) and \( Y^* = Y_{Di2} \). Now if \( X^* < Y^* \), then choose \( d_3 = \max \{|Y_{Di3} - X_{Di3}| : i \neq i1 \lor i2\} \), the issue \( (Di_3) \) goes to \( Y \) and \( X^* = X_{Di3} \) and \( Y^* = Y_{Di3} \). ELSE choose \( d_3 = \max \{|X_{Di3} - Y_{Di3}| : i \neq i1 \lor i2\} \), the issue \( (Di_3) \) goes to \( X \) and \( X^* = X_{Di3} \) and \( Y^* = Y_{Di3} \).

This procedure is repeated recursively until the last issue to be distributed is reached. If we were to desire that each party have an equal number of points, then the last issue would be distributed so that \( X^* = Y^* \).

In our system, we do not require the system to necessitate an equal allocation of points. The algorithm is an adaptation of the AdjustedWinner algorithm of Brams and Taylor (1996) who prove the validity of the algorithm. While we have illustrated our discussion with a family law example, the theory is generic.

If the advice suggested by the negotiation support system is acceptable to the parties, then the dispute is resolved. Otherwise, the parties agree to those issues resolved through the use of the negotiation support system and then return the remaining issues in dispute to the dialogue system. This process continues until either all issues are resolved or a stalemate is reached. A stalemate occurs when no further issues are resolved on moving from the argumentation tool to the negation support system, or vice versa. The following scenarios can arise through the use of our online dispute resolution environment: (1) No issues are resolved after use of either the argumentation tool or the negotiation support system and total failure is reported; (2) Some issues are resolved, but a stalemate occurs. One of two scenarios can then occur: (2.a) Either the parties do not agree to accept the partial resolution of the issues resolved during the process and no progress is reported, or (2.b) The parties agree to some or all of the issues resolved during the process and partial success is reported and (3) The dispute is resolved and success is reported.

We have suggested that the parties commence with an argument tool. If the parties do not reach agreement on all issues, they can then use the negotiation support system. If the proposal suggested by the negotiation support system is not acceptable, then the argument tool can be used again, to provide additional support, or a response. Moreover, the issues that were introduced when using the negotiation support system can be further discussed.

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2 We use \( X^* \) and \( Y^* \) to denote the number of points that \( H \) and \( W \) have at any stage, whilst \( X \) and \( Y \) indicate the set of issues that \( H \) and \( W \) (respectively) view as in dispute. Thus in our example, the first issue to be distributed is Monetary Issues which is awarded to the wife since, \( d_1 = 25 \). Thus \( X^* = 0 \) and \( Y^* = 35 \). We then calculate \( d_2 = 20 \) and the second issue distributed is child related issues. This is awarded to the Husband, so \( X^* = 70 \) and \( Y^* = 35 \). Since, at this stage \( X^* < Y^* \), we next calculate \( d_3 = 5 \). So the third issue distributed is property issues. This is awarded to the Husband, so \( X^* = 70 \) and \( Y^* = 35 + 15 = 50 \). The last issue to be distributed has now been reached. In our system, we do not require the system to necessitate an equal allocation of points.

3 To guarantee that the second issue is decided in favor of \( Y \), the systems checks for which issue \( Y \) awarded more points to than \( X \) where the difference is the greatest.

4 To simplify the explanations in this paper, we have only included three disputed issues in Table 2. Our algorithm would suggest monetary and property issues to \( W \) and child-related issues to \( H \). Thus \( H \) would have 70 points and \( W \) only 50. This is because there are only three issues in dispute. If the issues can be divided into sub-issues, then more trade-offs and a more equitable outcome can be suggested.
5.  CONCLUSION

ADR has become an established method to litigation in resolving dispute in many western jurisdictions. The application of ICT especially the Internet technology in ADR process has created a new alternative dispute mechanism, which provides fast, efficient and possible resolving dispute without face-to-face meeting. Currently most of the successful ODR sites are operating in e-commerce related areas. Negotiation support systems can offer the users not a solution but an optimal one. After surveying the characteristics of ODR and discussing our approach to developing enhanced ODR systems, we have proposed a three-step environment for constructing ODR systems. This environment involves: (a) Determine an appropriate BATNA; (b) Attempt to resolve the existing issues in conflict using dialogue techniques; (c) For those issues not resolved in b), use compensation /trade-off strategies to advise upon a possible sequencing and resolution of the dispute. (d) If the advice suggested in c) is not acceptable to the parties, return to b) and repeat the process recursively until either the dispute is resolved or a stalemate occurs.

Integrating and developing an application that provides an adequate and appropriate BATNA to the disputing is a promising approach to developing new ODR systems, and given the complexity and plurality of daily live disputes it certainly is a challenging approach.

6.  REFERENCES


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