

■ Research Paper

Learning from Conflict Resolution: An Opportunity to Systems Thinking

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Systems thinking (ST) and conflict resolution (CR) have much to gain from mutual informing and learning. This review article attempts to introduce the systems community to the research and practice of CR. It outlines the strands, development and frontiers of CR and analyzes its relevance to and similarities with ST. The article then discusses the implications for further systems research. Copyright © 2012 John Wiley & Sons, Ltd.

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INTRODUCTION

The existential challenge to systems thinking (ST) has been a topic frequent for debates in recent years within the systems community (e.g. Bailey, 2005; Jackson, 2009; Rosenhead, 2009; Mingers and White, 2010). Despite decades of fruitful research and practice, the current situation of this field of inquiry appears not all the promising. Witnessing the 'decreasing number' of its members, for example, some worry that ST is facing the danger of becoming 'a second [class] discipline' (see, e.g. Bailey, 2005). The critics may have their point. Although there have certainly been new developments, such as problem structuring methods (Rosenhead and Mingers, 2001; Rosenhead, 2006), group modelling building (Vennix, 1996;

Andersen *et al.*, 1997) and whole systems working (Hudson, 2006), by and large, the systems community is focusing on fine tuning the systems ideas and methodological guidance established by the pioneers tens of years ago who might or might not be able to foresee the emerging challenges in the fast moving world of the 21st century. Even the 'age profile' of the key originators and proponents of systems methodologies, if one bothers to look at it, does not look great (Rosenhead, 2006).

Instead of painting a doom and gloom prediction, we suggest that ST can survive and thrive in our turbulent time should systems workers actively seek, among other things, new insights from other disciplines. By learning from others, we can inject new momentum for revitalizing and developing ourselves. In this spirit, with this article, we intend to introduce the systems community to the field of conflict resolution (CR). CR has a long history and yet develops strongly in recent years on both theoretical and practical

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fronts, and generates deep insights and wide range of applications, with a firm focus on dealing with messy situations, solving complex problems amid conflicts and improving participants' learning experience.

Looking back to history, we found some contacts between ST and CR: the two fields shared some of their founders (see the third section of this article); both fields have been deeply influenced by Kurt Lewin's action research (Lewin, 1948; Peters and Robinson, 1984); some CR pioneers conducted studies from the perspective of problem solving (e.g. Burton, 1990); Mason and Mitroff (1981) developed their method to surface and integrate assumption conflicts; Martinelli and Almeida (1998) explored the relations between negotiation and ST; more recently, CR scholars actively incorporate insights from complexity science (e.g. Daniels and Walker, 2001; Andrade *et al.*, 2008). Despite these interactions, a systemic link between ST and CR remains underdeveloped, and the similarities and implications between the two are still waiting for investigation.

As the main readers of this journal are in the systems community, in this article, we shall focus on presenting an overview of the CR discipline and exploring how achievements of CR can inform and enrich ST. The article unfolds as following. First, it presents a brief introduction of the historical development, current strands and recent topics of CR. Then, it explores the similarities between CR and ST. In the final section, we discuss the implications of CR to future systems research.

A HISTORICAL OUTLINE OF CR

Conflicts arise when concerned parties hold competing claims to scarce status, power and/or other resources or when parties have substantial or perceived divergence of beliefs, opinions or interests. It is widely acknowledged that conflicts are the norm, not exception, in human affairs. There are different kinds of conflicts: interpersonal conflicts, organizational conflicts, labor management conflicts, workplace disputes, public policy disputes, environmental conflicts, international

conflicts and so on. It is further acknowledged that conflicts can be destructive as well as constructive.

Inspired by Tidwell's (1998) three-area differentiation,¹ we can identify four strands in contemporary conflict studies: international relations and peace research; management and organizational studies; alternative dispute resolution; and public dispute and environmental CR. In the following pages, we first present the history, evolution and recent focus of each of the strands. Then, we introduce the field-building efforts that accelerated the formation of CR as an integrated field.

As shown below, CR is an extraordinarily broad and sprawling field that has been developing substantially because of decades of efforts of scholars and practitioners from various disciplinary perspectives, for example, social psychological, anthropological, economical, managerial and organizational, juridical, political, industrial relations and international relations. CR can be studied from structural-systemic perspective, interest perspective, cognitive perspective and emotional perspective. Given the limited space of an article, the outline presented below will be highly broad-brush and selective.

International Relations and Peace Research

The period between the outbreak of World War I and the end of World War II was the preludes for the research and social innovations of international or large-scale CR (Kriesberg, 2010). During the 1950s and 1960s, the threat of the cold war, associated with numerous regional crises and widespread national liberation struggles, all stimulated the research and theorizing of conflicts and the pursuit of effective ways to solve such conflicts instead of resorting to violence (Harty and Modell, 1991; Kriesberg, 2007a, 2007b, 2009). With the efforts of scholars like Kurt Lewin (1948), Georg Simmel (1955), Lewis Coser (1956), Kenneth Boulding (1962), and Morton Deutsch (1973), sources and dynamics of international or

¹ Tidwell's classification of areas is as follows: international relations and the peace movement, organizational development and management science, and alternative dispute resolution. However, the contents and boundaries of areas here, to some extent, are different from those of Tidwell's.

large-scale conflicts were identified, and the theoretical bases of CR took shape.

A catalyst of the development of CR was the problem-solving workshop established by Burton and other members of the Center for the Analysis of Conflict, which provided conflict researchers with an opportunity to investigate the ongoing international conflicts, which in turn enabled concerned parties of the conflicts to meet and discuss possible solutions (Hill, 1982). In 1957, the *Journal of Conflict Resolution (JCR)* was launched with Kenneth Boulding playing a prominent role (Tidwell, 1998, p.14). In 1959, Boulding, Rapoport, von Bertalanffy and others established the Center for Research on Conflict Resolution (CRCR) at the University of Michigan. The event signified a rapid institutionalization of the CR field (Kriesberg, 2009).

With the goal of developing an 'inter-disciplinary theory of conflict and formal methods of analysis' (Harty and Modell, 1991), the launch of *JCR* and CRCR was a symbolic attempt to institutionalize this newly emerged field of social science and was regarded as the beginning of the first CR movement. Meanwhile, CR study began to grow outside America. CR centers were established in some European countries like Norway, Sweden, West Germany and Britain (Kriesberg, 2009). In America, the movement enjoyed its 'golden years' in the early 1960s and dispersed by 1971, when the CRCR was closed because of both internal and external reasons and the *JCR* was transferred to Yale (Harty and Modell, 1991). However, the promise of international CR and peace research continued, and the seeds spread widely. With interactions with other strands and benefited from the latter field-building efforts, this strand of CR revived and developed into today's movement with greater concentration on real-world problem solving.

After decades of rapid development, CR in this area appears still prosperous. Some recent issues includes the following: civil conflict and CR in wars (e.g. Gershenson and Grossman, 2000; Collier and Sambanis, 2002); post-conflict management and reconciliation (Bar-Simantov, 2004; Kriesberg, 2007a); CR approaches in peacekeeping, peacemaking and peacebuilding (Ramsbotham *et al.*, 2011); intractable and deep-rooted conflict (Kriesberg *et al.*, 1989; Burgess

and Burgess, 2006); history, emotion, identity and CR (Rothman, 1997; Retzinger and Scheff, 2000; Rothman and Olson, 2001; Tint 2010a, 2010b); and specific CR applications in post-9/11 era.

Management and Organization Studies

The earliest thought of this strand might be dated back to Frederick Taylor, who advocated a cooperative and creative way of dealing with class conflict by means of 'scientific management' (Taylor, 1911). Mary Parker Follett was perhaps the earliest advocator for using conflicts positively for managing organizations (Fox and Urwick, 1973, pp.1–20). She argued that in the 'three main ways of dealing with conflict', 'integration', which enables both short-term joint-gain and long-term fairness, is much better than 'domination' and 'compromise'. Furthermore, she articulated her method as 'uncover the conflict', 'breaking up wholes' and creative settlement beyond 'either-or situation'.

In the 1960s, tackling conflicts became the focus of management research. Schmidt and Tannenbaum (1960) discussed the factors that lead to conflicts and compared different strategies to manage them. Blake and Mouton (1964) compared five ways of dealing with conflicts and advocated the use of problem-solving method. Also influential were Deutsch's (1973) differentiation between cooperative–constructive and competitive–destructive conflicts as well as Rahim's (1983) study of conflict styles in organizational settings (Ma *et al.*, 2008). This strand gradually developed into more detailed, systematic researches in interpersonal conflict (Barki and Hartwick, 2004), intragroup conflict (Jehn, 1995; Medina *et al.*, 2005) and intergroup conflicts (Fisher, 2006).

A significant development of CR was the publication of the book *Getting to Yes* in the early 1980s (Fisher and Ury, 1981), which aroused wide public interests in dispute resolution and negotiation. Since then, interest-based bargaining and win–win solution became common language in CR. Together with associated publications (e.g. Ury, 1993; Fisher *et al.*, 1994), the Harvard Program on Negotiation played a significant role

in the dissemination of CR concepts and techniques to the general public and executive managers. Although there were some criticisms towards these 'popular texts' (Tidwell, 1998), the popularity of these publications and programs were powerfully instrumental for making the principles and methods of interest-based problem solving pervasive in other strands of CR.

As for recent developments, themes like workplace conflicts, management styles and cultural differences in conflict management, and the impact of group conflict on work performances have gained increasing attention (Ma *et al.*, 2008). Another recent focus is organizational conflict management system that refers to 'the structures (and the values supporting these structures) that are developed in an organization to facilitate processing conflict in the workplace' (Conbere, 2001). Power-based, right-based and interest-based approaches were differentiated and integrated (Ury *et al.*, 1988). Principles or models of 'dispute system design' were proposed (Costantino and Merchant, 1996; Slaikeu and Hasson, 1998; SPIDR, 2000).

Alternative Dispute Resolution

Alternative dispute resolution (ADR) concerns a set of dispute resolution processes and techniques designed to provide alternatives to adjudicated conflict settlements, which aims to reduce caseload of traditional court and litigation expenses, to give disagreeing parties more control over the process and result of the dispute resolution and to achieve more mutual satisfaction.

Methods other than litigation have long traditions in many countries. In ancient China, for example, disputes within family, clan and village were generally settled by appealing to respected unofficial mediators or village elders (Wall and Blum, 1991). In the USA, institutionalized ADR practices can date back to 1888 federal legislation authorized arbitration in railway labor disputes. During both World War I and World War II, the US government used ADR to defuse labor strikes (Kovick, 2005). In 1970s, the USA started to witness a rapid growth of ADR movement (Fan, 2007, p.193). In 1972, Society for Professionals in

Dispute Resolution was established. Since the 1976 Pound Conference (cf. Resnik, 1995), ADR has sparked an intense debate of judicial reform (Sternlight, 2009), and courts began experimenting with the 'multi-door courthouse' (Kovick, 2005); major ADR techniques, such as mediation and arbitration, have undergone a rapid development. Later, the ADR movement spread out of the USA. Britain, Japan, Australia and many Western and Northern European countries all introduced ADR since 1980s (Fan, 2007, p.165).

ADR is also used in other areas, including family, workplace and employment, community and neighborhood, civil rights and social justice. During the 1990s, ADR was incorporated into all three branches of the US federal government by several legislative acts (Nabatchi, 2007). Thereinto, the Administrative Dispute Resolution Acts of 1990 and 1996 required each federal agency to adopt a policy on using ADR, the Negotiated Rulemaking Acts of 1990 and 1996 encouraged agencies to use negotiated rulemaking (Harter, 1982) as an alternative to the traditional adversarial rulemaking process and the Alternative Dispute Resolution Act of 1998 required federal district courts to establish and use ADR processes.

Topics related to mediation have been intensively investigated in this area (James *et al.*, 2001). In recent years, alternative meditation methods such as narrative mediation and transformative mediation have been explored and contingent mediation approaches advocated (Pruitt, 2006). Other research and practice in this area includes community mediation center (O'Brien *et al.*, 2000; Shonholtz, 2000; Hedeem, 2004) and ADR use in the public policy arena.

Public Dispute and Environmental CR

Strictly speaking, public dispute resolution also originated from ADR. By 'public disputes', we refer to those situations where one or more levels of government get involved as one of the parties or a decision maker (Carpenter and Kennedy, 1988, p.4). Compared with other disputes, public disputes often involve more parties, more

objectives, more issues, bigger diversity of stakeholders, regulation and statutes dependency, more technical complexity and scientific uncertainty, and more observable asymmetry in power and resources (Senecah, 2000; O'Leary *et al.*, 2005). To better address its unique contributions to the overall CR field, we introduce public dispute resolution as a separate strand.

Among the public domains in which ADR are used, environmental issues and its resolution deserves a prominent description here because of its increasing theoretical impact and widespread practice. The controversy over a flood control dam proposed on the Snoqualmie River in Washington State in 1974 and the following ADR effort are the prelude of the ECR research and practice in the following decades (Senecah, 2000). According to this line of research, environmental conflicts can be classified as upstream, midstream or downstream (O'Leary and Bingham, 2003). Upstream refers to environmental conflicts in planning or policymaking; midstream environmental conflicts involve administrative permitting; downstream environmental conflicts are often about monitoring, compliance, enforcement and clean-up.

Early studies in ECR field focused on environmental mediation (Bingham, 1986), but in the recent decade, emphasis is expanded to consensus building (Susskind *et al.*, 1999), collaborative learning (Daniels and Walker, 2001), collaborative planning (Innes and Booher, 1999, 2010), collaborative management (Koontz and Thomas, 2006; Leach, 2006) and collaborative policy making (Leach *et al.*, 2002; Innes and Booher, 2003). Besides the focus on 'collaboration', another remarkable progress was the evaluation of ECR performance (O'Leary and Bingham, 2003; Dukes, 2004; Orr *et al.*, 2008; Emerson *et al.*, 2009).

Field Building

In the above, we presented the developments of each of the four CR strands. However, it is imperative to see these strands as interacting, influencing and penetrating each other along the way. All contributed to the whole of CR: the strand of international relations and peace research

'added significantly to the understanding of human behaviour and the sources of conflict' (Tidwell, 1998); management studies helped people better understand strategies to tackle conflicts in organizational settings; ADR helped to institutionalize CR and systematic mediation; and public dispute and ECR has provided a complexity perspective to the field and developed various collaborative methods.

A notable effort for the CR 'field building' was the continuous funding from the William and Flora Hewlett Foundation. From 1984 to 2004, Hewlett Foundation had poured more than \$160 million of support into the field through almost 900 grants to more than 320 organizations, which significantly accelerated the development and coalescence of the constituent parts of CR (Kovick, 2005). The Foundation invented a 'three-pronged field-building strategy', theory, practice and infrastructure to help create the joint and inter-disciplinary field, which was previously 'driven by a diversity of interests'. Among the integrative efforts, Hewlett Foundation helped to establish and fund 18 university-based, interdisciplinary 'Theory Centers' for theory building and knowledge development; provided supports to 'lighthouse' practitioner organizations, which enabled them to 'serve as engines of innovation in the field'; and supported a diverse array of professional associations and organizations to push the continuing advancement and dissemination of practice across society and professional development of the field (Kovick, 2005). When the Hewlett foundation ended its support to this field, CR had achieved institutionalization and sustainability to a great extent and had gained the momentum to move forward. We can justifiably debate on the institutional effects of such funding, for example, it might have selectively promoted particular researches while marginalized others. However, the function of the fund in publicizing the CR field as a whole cannot be easily denied in our world of money talks.

Field building has also been facilitated by a wealth of scholarly journals such as *Journal of Conflict Resolution*, *Journal of Peace Research*, *Conflict Resolution Quarterly* (formerly *Mediation Quarterly*), *Dispute Resolution Journal* (formerly *Arbitration Journal*), *Journal of Dispute Resolution*, *Negotiation*

Journal and International Journal of Conflict Management. Academic or practice-oriented associations, such as Association for Conflict Resolution, Society for Professionals in Dispute Resolution, American Bar Association Section on Dispute Resolution, National Association for Community Mediation, and Conflict Management Section of Academy of Management, also play their part.

A multi-disciplinary field cannot be sustainable without corresponding educational programs. As of 2007, there are 88 active CR graduate programs in the USA and dozens of similar programs in other countries, and degree-associated certificate programs are growing (Kriesberg, 2009) at both postgraduate and undergraduate levels (Smith, 2007). Furthermore, CR education programs, primarily interpersonal-dispute-oriented, are being institutionalized in elementary, middle, and high schools, both in the USA and abroad (Batton, 2002; Barnes, 2007). Although the practical effect remains to be seen, the scale of such development appears nevertheless impressive.

CR AND ST: RELEVANCE AND SIMILARITIES

In this section, we discuss the relevance of and similar insights between ST and CR.

The Shared Founders

CR and ST have had valuable connections since the early days. Boulding, Rapoport and von Bertalanffy, founders of the CRCR, were also prominent pioneers of general systems theory (Hammond, 2002). In 1954, early sessions at Center for Advanced Study in the Behavioral Sciences at Stanford 'introduced the new peace researchers to general systems theory and spawned the General Systems Society'; and *JCR*, the first CR journal, was born in 'an anteroom outside Boulding's office' (Harty and Modell, 1991). Boulding (1956) proposed a classification of levels of systems. He argued that there were, at that time, little knowledge about upper levels of systems, particularly, human beings (level 7) and social-cultural systems (level 8). CR can be

regarded as one of his responses to the study of human beings and their relationships.

Conflicts and Problems

Jackson (2003) classifies systems approaches into four 'ideal types': those for improving goal seeking, exploring purposes, ensuring fairness and promoting diversity. Perhaps except for the first type, all other three types involve conflicts, either real or conceptual. Nevertheless, instead of 'conflicts', systems workers incline to use other softer terms such as 'diversity' or 'plurality' of 'assumptions', 'perceptions', 'problem definitions', 'interpretations', 'values', 'interests' or 'option preferences' in their description of problematic situations. Similarly, they appear preferring the phases 'problem solving' over 'conflict resolution'. Perhaps 'conflict' has become in our 'postmodern' time a concept too uncomfortably, to some academic circle, close to the 'out-dated', Marxist doctrine. Under the surface, nevertheless, it appears to us that ST and CR workers share similar objectives and interests of study. Many systems approaches are useful for understanding and resolving conflicts of various kinds, so too are CR ideas and tools for ST.

Objectivity/Subjectivity

For both CR and ST, issues of objectivity/subjectivity are a key concern, which defines the evolution of the two disciplines. 'Functionalist', 'hard' ST builds its methods on the 'objectivity' assumption of systems and tries to solve problems defined as such with predefined goals. In contrast, 'interpretive' or 'soft' ST embraces 'subjectivism' and shifts 'systemicity' from 'the world' out-there to the enquiry-learning process by us human beings in here (Jackson, 2009). As for CR, objectivist and subjectivist schools also have their promoters. The 'objective' CR view believes that conflicts are created by certain 'fact-like' behaviours, situations or events, whereas the 'subjective' argues that conflicts are in, and due to, the perceptions of the involved parties. The insights one field on

objectivity/subjectivity holds great potential to inspire and enlighten the other.

Interpretation and Dialogue Methods

For dealing with subjectivity, both CR and ST have developed methods and techniques to enhance interpretation and dialogue upon systems/conflicts. In ST, such methods are proposed under the umbrella term 'problem structuring methods' (PSMs) (Rosenhead and Mingers, 2001; Rosenhead, 2006). PSMs provide analytical assistance to 'foster dialogue, reflection and learning' about issues, so as to enable participants to 'reach shared understanding and joint agreements' (Shaw *et al.*, 2006). In CR, there is always a focus on the struggle over naming, framing and reframing situations. Frame analysis and reframing are used as key CR tools (Kaufman *et al.*, 2003), especially in dealing with intractable conflicts.

Problem-solving Processes and Mechanisms

CR and ST strive to achieve just, fair and sustainable solutions. Various processes and mechanisms have been proposed in both fields. The commonality of the parallel processes is obvious. For instance, interest-based negotiation, a flagship process of CR, consists of stages like storytelling, issue and interest identifying, option generating and consensus building, while Strategic Assumption Surfacing and Testing (Mason and Mitroff, 1981), a 'soft' systems methodology, similarly structures its process as group formation, assumption surfacing, investigative debate and synthesis of views. Of course, each has its own emphasis: CR processes contribute more for reaching a deal, whereas ST places emphasis on facilitating dialogues with structuralized models.

Methodological Tenets

In some sense, tenets define a methodology, a field of study and related practice. Looking at

CR and ST methodological guidance, one can easily find similar tenets. Most frequently observed principles in CR are 'show respect', 'reflective listening', 'stimulate dialogue', 'enhance creativity', 'collaboration', and 'win-win solution'. Similarly, ST highlights tenets such as 'open-minded', 'participation', 'clarification of purposes', 'stakeholder commitment', 'mutual understanding', and 'joint action'. Another shared tenet is 'learning'. Both CR and soft ST take problem solving or conflict resolving as a learning process, not only for involved parties but also for facilitators or interveners.

The Relationship with Action Research

Both CR and systems practice have intrinsic relationship with action research. It is widely acknowledged that 'action research' was proposed by Kurt Levin, a pioneer of conflict studies. Although there were lots of studies based on quantitative models (e.g. game theory) or empirical methods, particularly in the area of international conflict analysis and organizational conflict analysis, CR practitioners have been mainly following the intellectual path of action research. This is also true for ST. Furthermore, systems thinkers have contributed much on the refinements of Levin's thinking and the broader action research family (Barton *et al.*, 2009). The prominent systems journal *Systemic Practice and Action Research* is an obvious evidence of such a link.

IMPLICATIONS TO ST

As we mentioned earlier, CR and ST emerged and have since grown almost at the same time, and there are notable commonalities between them. Nevertheless, interactions between the two fields were rather thin in the past decades. By and large, CR and ST have been developing in separate tracks. Although the reasons for this can be many, one of which might be the difference in geographical concentrations: CR and ST appear to be separated by the Atlantic. For decades, the center of gravity of CR has been in the USA. As of ST, particularly its 'soft' brand,

bears a strong, distinctive British trademark (Rosenhead, 2009). If this is accurate, we believe that significant benefits can be generated by closing the 'geographical gap'. In this section, we speculate some of the potential benefits.

Conflict and Systems Complexity

Dealing with complexity is almost an eternal topic of ST. In human activity systems, a prominent source of complexity is the conflict of perceptions, knowledge, experiences and 'world views' of multiple participants. Additionally, conflict escalation is often the consequence of the failure to address such complexity.

Systems workers put great efforts in the investigation of problematic situations where conflicts, or at least 'diversity' and 'tensions', exist. Nevertheless, by and large, their major concern has mainly been with the cognitive dimension, leaving interest and emotional conflicts at the margin.

The lack of finer differentiation of the sources of conflicts might obstruct deeper understanding and better handling of systems complexity. An extreme case is tackling the 'intractable' issues. Take a strategic planning process in a newly merged organization as an example. People from previous organization A and those from previous organization B might have conflicts over the vision of the new organization. On the surface, the conflicts probably point to divergent technical judgments based on members' different experiences in the past and their assumptions of the future. However, a fuller investigation might reveal that the problem can be related to their different identity perceptions as well as different memories of their organizational 'histories'. There is no doubt that CR theories in this regard have value for systems workers to develop a deeper understanding of the sources of situational conflicts, for example, intractable components such as emotion, identity and structure factors other than merely cognitions, perceptions or 'world views'.

Another factor that often leads to situational conflicts is 'distrust'. Problem-solving interventions require an acceptable relation among participants, which enable them to sit together and

make 'authentic dialogue' (Isaacs 1999; Innes and Booher, 2003). In the policy or social arena, without addressing the trust (or rather distrust) issue that usually associates with factors, such as power structure and material differentials, tackling 'world views' or 'perceptions' will have little effect in resolving social conflicts or, in the ST jargon, 'improving problematic situations'. So far, the strongest power of (soft) ST is in the handling of the 'subjective', i.e., cognitive dimension. To improve its 'firepower' to solve real-world problems full of diversity not only in cognitive styles but also in degrees of distrust, ST is in urgent need of working on the emotional dimension. For this, we suggest, CR could provide stimulating thoughts (e.g. Lewicki, 2006; Tomlinson and Lewicki, 2006).

Richer Understanding of Intervention

Over the years, systems workers have developed a variety of intervention methods. There are also frameworks for choosing methods, for example, the 'system of systems methodologies' (Jackson, 2003). Only variety can handle variety. In a complex world, it is not wise to apply a simple grid for understanding situational contexts or choosing methods. In this regard, CR appears to have developed a wider range of conceptual schemes, which ST could find useful.

Harrison (1970) proposed an intervention continuum in terms of the 'depth of intervention': at the 'surface level', interventions deal with 'more public and observable aspects of behaviour', whereas at the 'deep level', interventions affect 'personal and private perceptions, attitudes or feelings'. Another useful differentiation scheme is proposed by Hayes (2002, pp.190–193) who suggests that interventions can be differentiated along three dimensions: diagnosed issues, the level of change target and depth of intervention required. In these works, the idea and process of intervention are refined.

Similarly, CR is able to contribute a richer range of conception dimensions about intervention for ST. One contribution of CR to ST, for example, is the role of interveners in handling the process/content in problem solving. By this

dimension, interventions could be third-party education, situation assessment, facilitation, mediation, conciliation, policy dialogue, joint fact finding, mini-trial, arbitration and so on. Alternatively, informed by both Harrison's model and CR, we can differentiate interventions along the dimension of complexity scales, i.e., organizational, societal and international. Current ST appears short of thoughts to address the intervention of social systems and international issues (see next subsection).

With the above-mentioned dimensions such as 'depth of intervention required', 'role of interveners' and 'complexity scales', we could get a richer understanding of intervention and see potentials for developing a contingent model of systemic intervention, which could serve as a toolbox for systems workers to elaborate and select context-adapted interventions.

Being an Open System Itself

ST, by definition, is an interdisciplinary field of inquiry dedicated to solve emerging problems in society. There are signs, however, that the field appears to have become too proud of its own achievements, too closed to itself, to open to effective conversations with others.

Although ST has been traditionally primarily focusing on the public sector and 'social problem solving', historic conditions have blocked ST, particularly the 'soft' brand, largely from involving in large-scale societal problems and global issues. Granted, there are ST applications in policing, prison, housing and other local government projects (e.g. Yewlett, 2001; Mingers and Rosenhead, 2004; Jackson *et al*, 2008; Parkin and Plant, 2008; Li, 2010); nevertheless, to make practical, substantial differences, ST needs to speed up its effort in effective handling of urgent challenges emerging from the early 21st century such as national debt crisis, widespread social inequity and unrest, and so on. Mingers's (2007, p.684) reflection is heartening:

When we look at the world around us, we see a world of poverty, a world of conflict, a world of religious and racial battles, and perhaps

above all, a world on a track to environmental disaster. We have to ask ourselves why, if ST and operational research promised so much, has it had so little practical effect on the large scale world of human affairs?

In comparison, with all the setbacks and problematic, the CR ambition to make greater and wider impact on the urgent problems in the real world appears encouraging (see e.g. International Crisis Group, 2011).

Over the years when ST transformed itself from a basically engineering-oriented discipline to a field of inquiry and practice that takes social problem solving to its heart, ST has greatly enlarged its source of expertise that includes philosophy, sociology, political science and organization studies. Given the current challenge, it will surely benefit ST by engaging more actively in conversation with other applied fields such as CR, policy analysis and public administration.

CONCLUDING REMARKS

This article intends to introduce the systems community to the developments and achievements of CR, a field of inquiry and practice in many ways parallel to ST. We believe that by learning from this sister discipline, systems workers can benefit much.

In addition to presenting an overview of CR, this article highlights three insights ST can beneficially draw from CR: (i) deepening understanding of systems complexity by investigating the emotional/trust aspects in addition to mere cognitive problems; (ii) enriching our understanding of the variety of the features, for example, styles and 'depths' of intervention process so that situations can be better investigated and methods chosen; and (iii) expanding ST's application in emerging large-scale, global issues. Other useful insights from the CR field may include its rich experiences in institutionalization, diffusion and education, which is essential for any field of inquiry to survive and strive in our turbulent times.

We believe that it will only benefit the systems community if its members heighten their interest and desire to be informed about what have happened and are happening in the sister field of CR. So often, breakthroughs and significant innovations happen when members of a discipline actively interact with others across boundaries. Given the multi-disciplinary origin of ST, we have good reason to believe that our effort in this paper is well fit with the ST spirit.

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