A RETROSPECTIVE STRUCTURAL INQUIRY OF THE PREDICAMENT OF MANKIND PROSPECTUS OF THE CLUB OF ROME

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Abstract:
Churchman dedicated his career to sensitizing systems scientists and other inquirers to the existence of what he referred to as "enormous problems." In his view these are problems that cannot be addressed by a single discipline or a single inquirer but by interdisciplinary teams of inquirers. This chapter tells the story of how a group of researchers, in the context of the Club of Rome (CoR) Prospectus on The Predicament of Mankind, proposed in the early 70s a very forward looking and innovative systems approach. It took over twenty years of research and development for the emergence of a paradigm of Structured Design Science (SDS) that has been tested in the arena of practice for the last fifteen years.

The CoR prospectus introduced the concept of the *Problematique* as the "enormous problem" of the 20th Century. In 1993, twenty-three years after the conceptualization of the *Problematique,* a small team composed of three of the original architects of the CoR proposal employed the SDS paradigm to conduct a retrospective inquiry of the global *Problematique*. The findings from this inquiry demonstrate that no significant progress had been made in terms of resolving the root causes of the *Problematique* in the ensuing twenty-thee years, i.e., 1970-1993. It is conjectured that a similar inquiry conducted today, i.e., ten years later, will reaffirm the lack of progress in resolving this enormous problem of humankind. The implications of these findings are significant for all systems scientists, and especially for students of Churchman's work.

Key words: dialogue, structured dialogue, Club of Rome, *Problematiqu.* Democracy, systems approach, stakeholders, ***CogniScope,*** social systems designing.

1. INTRODUCTION

In the late 60's an Italian industrialist, named Aurelio Peccei, was traveling around the world meeting with world leaders trying to persuade them that there was an unprecedented global crisis. Peccei had written a book titled *The Chasm Ahead* (Peccei, 1969). In this book Peccei was making the case that there was an ever-growing gap between the technologically developed North America and the rest of the world, including Europe. He was forecasting that this technology gap would materialize in the next twenty years in a major global crisis between the developed and the less developed regions of the world, unless some measures were taken by world leaders to close the gap.

Even though Peccei dedicated all his energy and significant resources to influence the stream of world events, he gradually came to the realization that he was not being very effective in his discussions with world leaders. In 1968, at a conference in Belagio, Italy, Peccei met an American planning theoretician named Hasan Ozbekhan. Ozbekhan had delivered a very thoughtful lecture at the conference titled "A General Theory of Planning." This lecture was published later in a book edited by Erich Jantsch (Jantsch, 1969). Ozbekhan and Peccei became very good friends, and during one of their meetings, Ozbekhan was able to persuade Peccei to adopt the systems approach (Churchman, 1979) for influencing the stream of world events.

Ozbekhan had worked for a number of years in the corporate planning department of the General Electric Corporation in New York City. At the time of meeting Peccei, he was the Director of Corporate Planning for the System Development Corporation (SDC), a think-tank headquartered in Santa Monica, California. Ozbekhan was considered one of the most prominent planning theoreticians in the 70s. This was the golden era of systems thinking, and California with such famous think tanks as the Rand Corporation and the SDC was the Mecca of such thinking. Ozbekhan's proposal to Peccei to employ the systems approach advocated by Churchman and others for studying the global situation was accepted by Peccei in 1969. The intent was to use the findings of such a study in discussions with world leaders in order to maximize his effectiveness.

The two men agreed to a new strategy for the future. A new institution was created called "The Club of Rome." The name Club of Rome (CoR) was decided for two reasons: (a) Peccei was fascinated with the American concept of the "club," and (b) that a new club was to be created, the membership of which would be people of different nationalities, different cultures, and different disciplines. In other words, the major criterion in the formation of the CoR was not homogeneity, as is usually the case in most clubs, but heterogeneity. The mission of the CoR would be to conceptualize the new systems approach and to fund projects by researchers around the world, all of which would be focusing on the impending global crisis. All of these projects would be funded by the Executive Committee of the CoR in the context of a systems approach suitable to meet the challenges of the 20th century.

An Executive Committee of the CoR was formed consisting of a diverse multi-cultural group of members representing such countries as England, the Soviet Union, Germany, Austria, Switzerland, Italy, and the U.S.A. The Executive Committee

commissioned Ozbekhan to write the prospectus of the Club of Rome. Ozbekhan produced within six months the first draft of the prospectus titled "the Predicament of Mankind." In 1969 Ozbekhan hired me as a consultant to the Executive Committee.

2. THE PREDICAMENT OF MANKIND

The Predicament of Mankind prospectus was written in 1970 (for a review of the prospectus visit http://www.cwaltd.com/pdf/clubrome.pdf). The subtitle of the document was "Quest for Structured Responses to Growing World-wide Complexities and Uncertainties." The prospectus was distributed to the Executive Committee of the CoR, the members of the Club, and a variety of philanthropic foundations and institutes such as The Rockefeller Foundation, The Battelle Memorial Institute, and others. A number of prominent systems scholars of the time, such as Erich Jantsch and West Churchman, reviewed the document. The reviews were mixed. About half of the reviewers acclaimed it as an outstanding prospectus. The other half, especially those trained in traditional analytical disciplines like systems engineering, thought the document was lacking in methodological rigor. Most of the latter reviewers, did not realize that the prospectus was intended as an architectural design concept rather than an engineering blueprint.

In retrospect, the prospectus incorporated the seeds for a paradigm shift in designing social systems. It was sufficiently iconoclastic to be rejected by those in the social science and engineering community who were accustomed to the practice of normal science, and hence were eager to reject any attempt for a shift to a new paradigm. West Churchman was among the systems thinkers and philosophers that expressed great enthusiasm when he read the prospectus. Later on Ozbekhan and Churchman taught together at the Social Systems Sciences program at the Wharton School of the University of Pennsylvania established by Russell Ackoff during the 70s.

As an example of the iconoclastic character of the prospectus I will quote below two paragraphs included in the Introduction of the document:

> *"The source of our power lies in the extraordinary technological capital we have succeeded in accumulating and in propagating, and the all-pervasive analytic or positivistic methodologies which by* ***shaping our minds as well as our sensibilities****, have enabled us to do what we have done. Yet our achievement has,*

in some unforeseen (perhaps unforeseeable) manner, failed to satisfy those other requirements that would have permitted us to evolve in ways which, for want of a better word, we shall henceforth call 'balanced.' It has failed to provide us with an ethos, a morality, ideals, institutions, a vision of man and of mankind and a politics which are in consonance with the way of life that has evolved as the expression of our success. Worse, it has failed to give us a global view from which we could begin to conceive the ethos, morality, ideals, institutions, and policies requisite to an interdependent world -- this, despite the fact that the dynamics of our technologies and our positivistic outlooks are global in their impacts, their consequences, their endless profusion and, more importantly, in the promises they proclaim and in the promises they imply.

This failure is often regarded as having created a number of separate and discrete problems capable of being overcome by the kind of analytic solutions our intellectual tradition can so readily generate. However, the experience of the past twenty or thirty years has shown with remarkable clarity that the issues which confront us in the immediate present, as well as their undecipherable consequences over time, ***may not easily yield to the methods we have employed with such success in the bending of nature to our will.*** *Such apparent resistance could be attributable to many things, none of which must be pre-judged, but about which certain assumptions might be made. It could be due, for instance, to the magnification of the problems we must grapple with -- that is, to the fact that almost all of them are global in scope, whereas the socio-political arrangements we have created are ill-equipped for dealing with issues that fall outside their strictly established jurisdictions. It could be due to heightened yet often obscure interactivity among phenomena, whereas our manner of solving problems owes its strength and efficiency to the identification of rather clear and direct lines of causality. It may be due to rapid rates of change, especially in the technological sector, whereas our institutions, outlooks and minds are geared by long-time habit to beliefs in slow unfolding and permanence -- beliefs which have sustained certain relatively stable concepts of polity, of social order and of intellectual orderliness. In brief, whatever it is due to, the conjuncture of events that surrounds us is to all evidence world-wide, complex, dynamic, and dangerous.*

These statements, written in 1970, appear apocalyptic, and even more applicable and relevant to our contemporary situation, i.e. the beginning of the 21st century.

It is not my intent in this chapter to engage in revisiting the power of the concepts so masterfully described in the Club of Rome prospectus. There are, however, two aspects of the prospectus which provided the intellectual and inspirational foundations for subsequent work by many researchers in the development and validation of the Structured Design Science (SDS) paradigm (Banathy, 1996; Christakis, 1973, 1987, 1988, 1993, 1996, 2004; 2005; Christakis and Brahms, 2003; Christakis and Harris, 2004; Magliocca and Christakis, 2002; Warfield, 1994, 1999; Warfield and Christakis, 1987; Warfield and Cardenas, 1994).

The first aspect is the idea of the *Problematique.* The second is the idea of the "value-base." It is important to appreciate both of these concepts, as well as their relationship to the development of the Structured Design Science paradigm.

3. THE *PROBLEMATIQUE*

The idea of the *Problematique* was introduced in the CoR proposal as a way to draw a linguistic, and hence conceptual, distinction between the well-bounded problems that we are accustomed to perceive and articulate and the meta-problem (or **meta-system of problems**) that emerges as a result of the interactivity and interdependency among these problems. In essence, it is the equivalent concept to Churchman's conceptualization of "enormous problems."

It is the nature of our languages, hence our manner of perceiving reality, to see and call the dissonant elements in a situation "problems." Although it is true that there are certain problems (mostly within one discipline and usually in the field of engineering and physical sciences) that can be addressed in their own domains by applying problem-solving techniques, it has become empirically evident over the last sixty years, that critical issues in the social arena are not capable of being solved in their own specific domains.

When we consider the truly critical issues of our times such as "environmental pollution," "poverty," "homelessness," "criminality," "population explosion," "urban deterioration," "racial and cultural discrimination," etc., we recognize that it is virtually meaningless to view these as problems that exist in isolation. The burning of Los Angeles in the summer of 1992, after the verdict on the Rodney King human rights trial, provides evidence that criminal justice cannot be divorced from race, poverty and slum

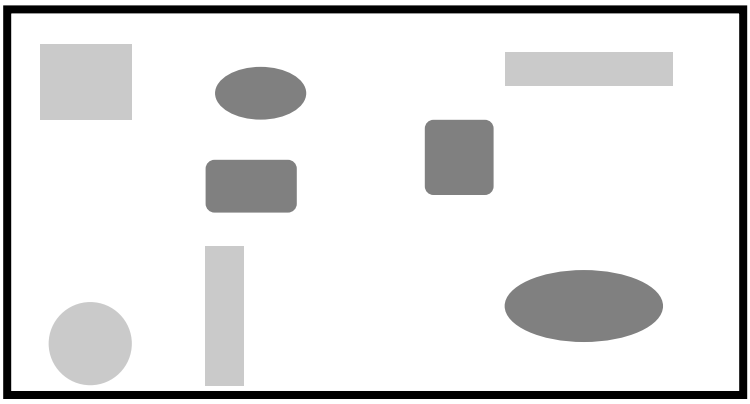
living conditions. Similarly, problems clustered under words such as "hunger" or "malnutrition" in Somalia cannot be separated from social, economic, and geo-political problems on the global scale. Trying to solve any of these problems in isolation exacerbates the intensity of the *Problematique*, whose solution is beyond the scope of the concepts and methods we have traditionally employed during most of the 20th century.

As a means to visualize the interactivity of problems it is useful to look at Figure 1. This Figure provides a graphic portrayal of the dynamic and interactive development of the *Problematique* in the 20th century. It shows problem areas in five frames with approximate dates. In each frame, a particular problem area is symbolized by differently shaped shaded areas. One sees that at the start of the 20th century (Frame A) each problem area is distanced from the others. Because each area is separated from the others it is meaningful to think and tackle these as independent problem areas. It is with reference to this type of situation that most of our problem-solving methods were developed and applied in the 20th century.

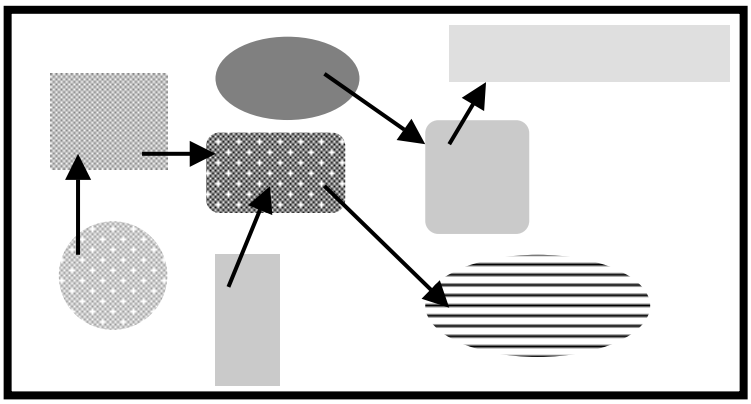
By the middle of the 20th century, the problem areas begin to interact because of the escalation of the intensity of each problem area (Frame B). These interactivity trends continued at an accelerated rate during the next twenty years. The individual problem areas began to strongly interact in the 1970s (Frame C). The emergence of large scale metropolitan areas where it is meaningless to separate the transportation problem from the pollution problem from the population explosion problem, and so on, provides an example of this interactivity as shown visually in Frame C.

Figure 1: Dynamics of the Problematique for the 20th Century

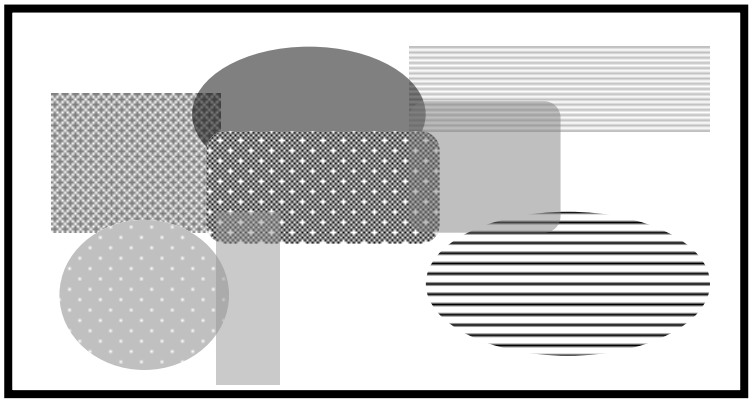
Frame A: Year 1900



Frame B: Year 1950



Frame C: Year 1970



By 1980 the situation becomes to look more as an "enormous" complex problem that cannot any more be dealt with in terms of its individual problem areas but must be addressed in its entirety (Frame D). Attempts at fragmentation of the reality of the

Problematique over the previous two decades have contributed to serious social and technical disasters, such as the burning of Los Angeles in 1992, the escalation of the nuclear arms race in the 1980s, the mythology promoted by the World Bank of social and economic development of third world countries, and the nuclear disasters at the Three Mile Island and the Chernobyl power plants in the 1980s.

Finally, by 1990 we are experiencing a situation whose morphology is drastically different because of the strength of interdependencies among the problems, giving rise to a composite core that needs to be explicated and understood for its own sake. In other words, the dynamic convergence of all these originally distinct problem areas has given rise to a new entity, namely the *Problematique* of the 20th century. The strength of couplings and overlaps is such that a new approach is required to model the situation as a single complex system, as opposed to the traditional means of breaking it apart in its component parts and assigning responsibility to various individuals or government departments with expertise in the separate areas. Such a systems approach, to be effective and meaningful, should be capable of engaging stakeholders in interdisciplinary dialogue for the purpose of articulating the *Problematique* and integrating the relevant knowledge and wisdom of the community. The approach should also redefine the notion of "the expert" so that all the voices of the people affected by the *Problematique* will be heard, independent of their education, social status, or power.

The original conceptualization of the CoR prospectus advocated the position that any attempt to resolving the global *Problematique* founded on traditional elitists, exclusionary, and disciplinary approaches is doomed to failure. As we will show by conducting in 1993 a retrospective inquiry of the *Problematique,* the evidence indicates that no significant progress has been made twenty-three years after its articulation in terms of penetrating its core and resolving it. The inquiry was conducted ten years ago employing the Structured Design Science approach for engaging inquirers in productive and meaningful dialogue on complex issues.

4. THE STRUCTURED DESIGN SCIENCE PARADIGM

Even though the complexity of the global *Problematique* demands that we avoid fragmenting reality, the fragmentation of reality is inherent to our conceptual and linguistic make up. It is a limitation that applies to all natural languages. The challenge is to transcend this limitation by enabling stakeholders to use natural language to discover collectively, systemically, and collaboratively the systemic nature of the *Problematique*.

Having discovered the essence of the *Problematique*, the same stakeholders should be engaged in designing action plans for making progress toward resolving it. In other words, in a true participative democracy the definition and resolution of the global *Problematique* should not be the responsibility of scientific experts and politicians only, but also of ordinary people if real progress is to be made. It took twenty years of research and testing in the arena of practice for a group of systems scientists to meet this challenge by developing the Structured Design Science approach (Christakis, 2005).

The discovery of the SDS was driven by the appreciation of the critical role of dialogue in the evolutionary guidance of social systems (Banathy, 2001). SDS represents findings from grounded theoretical research starting with the conceptualization of the Club of Rome proposal in 1970. The research led to the discovery of a disciplined dialogue process suitable for interdisciplinary dialogue among stakeholders engaged in designing social systems for the contemporary Age of Information. The SDS is founded on three fundamental axioms, namely: (a) The complexity of social systems designing, (b) The cognitive limitations of the observer, and (c) The relative saliency of observations. Espousal of these three axioms was instrumental in the construction of the terminology, methodology, and architecture of the SDS.

The architecture and the thirty years of evolution of the SDS is shown in Table 1. The architecture is composed of thirty-five components, six of which are laws discovered by systems scientists during the 20th century. The SDS has been applied for twenty years in the arena of practice for national, international and inter-organizational social systems designing challenges. The results have been extraordinarily satisfactory to the practitioners and the community of stakeholders. For more details the reader is referred to a forthcoming book by Christakis (2005).

TABLE 1: THE ARCHITECTURE AND EVOLUTION OF SDS

- The Architecture of SDS is composed of 35 theoretical constructs, which have been grouped into seven modules.
- The seven modules, and the approximate time period of their development, are:
    a. **The 7 Consensus Methods:** (1) Nominal Group Technique, (2) Interpretive Structural Modeling, (3) Ideawriting, (4) DELPHI, (5)

Options Field, (6) Options Profile, and (7) Trade-off Analysis (Years 1972-1982);

b. **The 3 Key Role Distinctions:** (1) Context, (2) Content, and (3) Process (Years 1982-1985);
c. **The 3 Application Phases:** (1) Discovery, (2) Design Dialogue, and (3) Action (Years 1989-2001);
d. **The 4 Stages of Inquiry:** (1) Definition or Anticipation, (2) Design of Alternatives, (3) Decision, and (4) Action Planning (Years 1989-1995);
e. **The (5 Cs) of SDS**, namely:(1) **C**ommunity of Stakeholders, (2) ***C****ogniScope*™ Team, (3) **C**onsensus Methods, (4) **C**ogniSystem Software and (5) **C**ollaborative Facility (Years 1985-1995);
f. **The 7 Language Patterns:** (1) Elemental observation, (2) Problematique, (3) Influence tree pattern, (4) Options field pattern, (5) Options profile/scenario pattern, (6) Superposition pattern, and (7) Action plan pattern (Years 1970-1989); and
g. **The 6 Dialogue Laws:** Requisite: (1) Variety (Ashby), (2) Parsimony (Miller), (3) Saliency (Boulding), (4) Meaning and Wisdom (Peirce), (5) Autonomy (Tsivacou), and (6) Evolutionary Learning (Dye) (Years 2001-2003)

Findings of SDS Inquiry

As we mentioned above, recognizing that the fragmentation of reality is inherent to our linguistic make up, the CoR prospectus broke down the global *Problematique* into its major components for the purpose of its tentative identification, and for providing a reference framework. A listing of forty-nine general statements of the most commonly recognized problems in the 1970s was identified and presented in the prospectus. The list of problems was given the general title of "**Continuous Critical Problems (CCPs)."**

In April of 1993, Hasan Ozbekhan, his wife Ann who was a partner in the early phases of the CoR project, and me, decided to use the SDS approach to search retrospectively for the essence of the global *Problematique* as manifested in the time period 1970-1993. The intent of this inquiry was to discern whether humankind has made progress in resolving some of the component problems as conceptualized back in 1970, and especially to investigate if the core of the *Problematique* had been penetrated in the ensuing twenty-three years.

In order to make transparent the systemic, interactive, inter-sensitive, and interdependent nature of the global *Problematique* we used a computer-assisted dialogue methodology - embedded in the SDS approach - called ***CogniScope*** (Christakis, 1996, 2003, 2005). We used this method to build structures, which we shall call problem-clusters and problem-trees.

To build problem-clusters the three of us engaged in a dialogue by focusing on a set of questions such as: **"Does CCP 'X' have SIGNIFICANT common characteristics with CCP 'Y'?"** "X" stands for one of the forty-nine CCPs listed in the prospectus, and "Y" for a second one. Through the help of the computer-assisted methodology we were able to produce and agree on the problem-clusters, shown in Figure 2, in about two hours of focused and open dialogue. Without the use of the ***CogniScope*** dialogue methodology the derivation of problem-clusters by a small team of three stakeholders might have taken approximately a full day.

For example, one question posed by the computer and displayed on a screen for the three of us to deliberate was:

"In the context of the global *Problematique***, does CCP:**

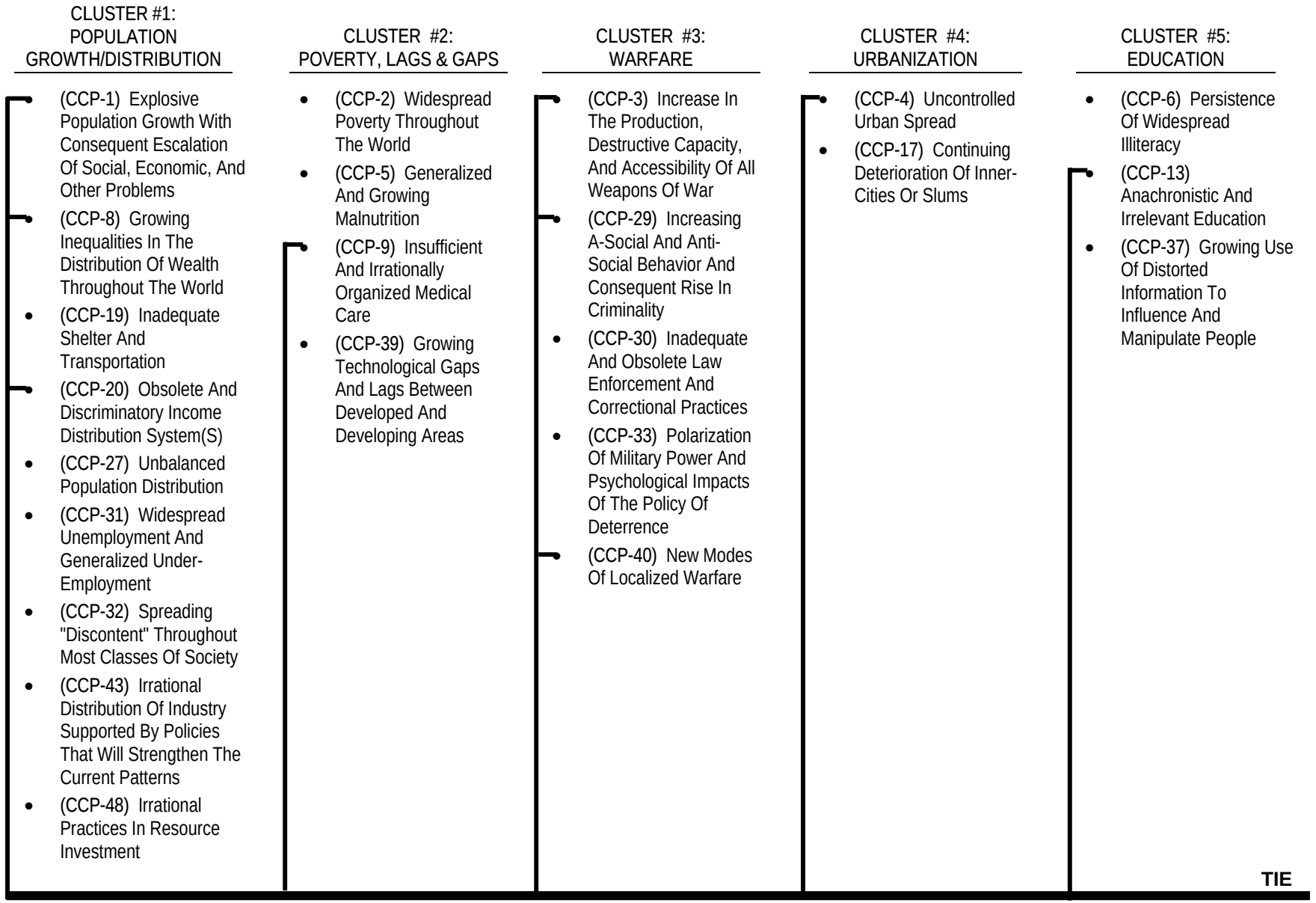
WIDESPREAD POVERTY THROUGHOUT THE WORLD (CCP-2),

Have SIGNIFICANT common characteristics with CCP:

PERSISTENCE OF WIDESPREAD ILLITERACY (CCP-6)?"

The answer we gave to the above question was "No." We agreed that these two CCPs should not be assigned to the same cluster in the context of the global *Problematique*. But when we were asked by the computer if **"Generalized and growing malnutrition,"** should be placed in the same cluster with **"Widespread poverty throughout the world,"** we decided to put these two problems in the same problem cluster. The intangible benefits of this inquiry are that by building up such problem clusters the three inquirers, although they all had made contributions in the original conceptualization of the CCPs, were able because of the dialogue to get a deeper appreciation of the underlying meanings of the CCP statements.

Figure 2: Classification of Continuous Critical Problems (CCP's) into Affinity Clusters



As shown in Figure 2, all forty-nine CCPs have been categorized in ten clusters. These clusters can be thought of as being equivalent to the geometrical shapes shown in Figure 1. However, in Figure 2 we have given names and substance to each of the shapes shown In Figure 1. For example, we have clusters named: "Population Growth and Distribution," "Urbanization," "Education," "Environment," "Value-Base," and others. These names attempt to capture the essence of the component CCPs categorized under each such problem cluster. By conducting a structural inquiry and constructing problem clusters from the linear listing of the CCPs in the CoR prospectus, we enhanced our understanding of the interdependence and interaction among the original CCP statements expressed in linear natural language.

Similar problem-clusters could have been constructed by engaging a larger team of stakeholders with more diverse perspectives. In this case, most likely the clusters produced by this stakeholder group would be different than those shown in Figure 2, because these clusters would be representative of the perceptions of the global *Problematique* by a different group of stakeholders. This implies that the definition and description of the problem clusters is **observer-dependent**, as it should be. Observer-independent science is a characteristic of First Phase science, such as classical physics. In the realm of social systems designing, the utility of such observer-independent science is marginal. In fact, in the context of the emerging Third Phase science as described by DeZeeuw (1996), the stakeholders are now demanding that their observations be included in the policy-making and allocation of resources for scientific developments at an equal footing with scientific elites. For example these days, AID patients demand that their voices be heard in research and development of antiviral drugs. Similarly, consumers of mental health services are saying "nothing about us without us," thus challenging the expertise of psychologists and psychiatrists in managing their lives.

If a larger group of stakeholders was employed in constructing the problem clusters, it would have taken much longer to produce them because the dialogue would have involved more participants. Given that there were forty-nine CCPs, a reasonable estimate for a group of 12 stakeholders to produce the problem-clusters with computer assistance is about four hours. Without computer assistance the estimate increases by at least a factor of 5, i.e., more than two days. The efficiency gains attributed to the computer support makes it feasible to engage groups of stakeholders in discovering the problem clusters through group work, which is one of the advantages of the SDS.

A cursory study of the problem-cluster presented in Figure 2 would reveal that they are interdependent, and that progress in resolving any problem assigned to one cluster will very likely influence the resolution of other problems in the same cluster, as well as in other distinct clusters. By overlaps among these clusters, I mean something equivalent to the geometric configuration graphically depicted by Frames C, D, and E of Figure 1.

In order to make the interdependencies and interactivities among the ten clusters more transparent, the three inquirers proceeded to build a problem-tree using the ***CogniScope*** dialogue methodology**.** Before constructing the problem-tree, the inquirers identified a profile of the *Problematique* by selecting a representative sample of twenty-four CCPs. They subsequently searched for the influence relationships among the members of this profile. The profile of problems that was selected is shown graphically in Figure 2 by those specific problems from each cluster that are connected to the "Tie Line." For example, we selected three CCPs from Cluster # 3, and one CCP from Cluster # 4. At least one CCP was selected from each one of the ten clusters.

The three inquirers focused their dialogue on a different set of questions: **"Supposing that humankind was able in the past two decades to make progress in the resolution of CCP 'X', would this progress help SIGNIFICANTLY the capacity to make progress in resolving CCP 'Y', in the context of the global *Problematique*?"** Again "X" stands for one of the twenty-four CCPs selected for this investigation and "Y" for another.

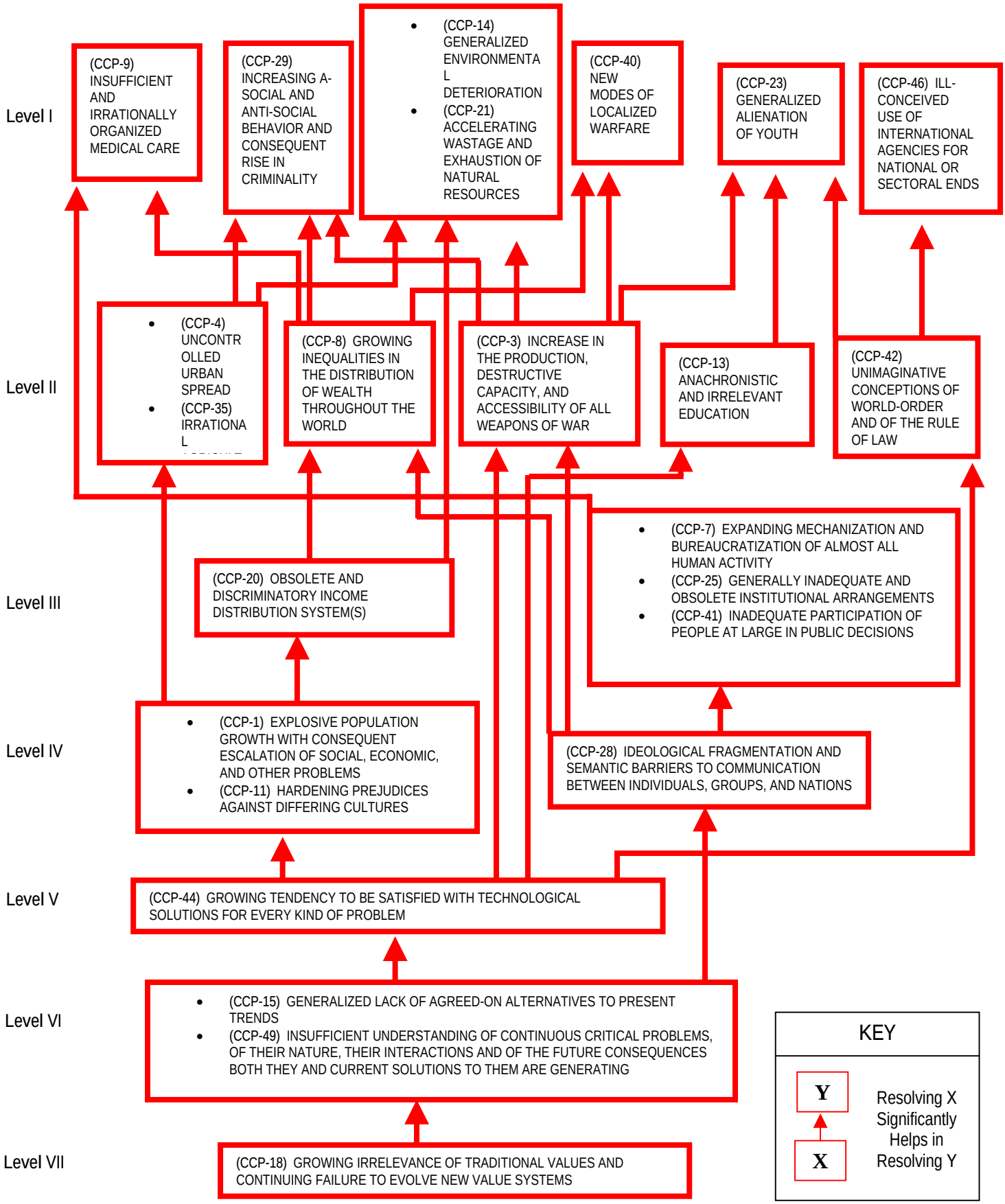
For example, in constructing the problem-tree one question posed by the computer and displayed on the screen for the three of us to deliberate was:

"Suppose humankind was able in the past two decades to make progress in the resolution of CCP:
NEW MODES OF LOCALIZED WARFARE (CCP-40),
Would this progress help SIGNIFICANTLY in resolving CCP:
INCREASE IN THE PRODUCTION, DESTRUCTIVE CAPACITY, AND ACCESSIBILITY OF ALL WEAPONS OF WAR (CCP- 3)?"
In the context of the global *Problematique***?"**

The answer we gave to this question was "No." After engaging in open and focused dialogue on this particular question, we decided that (CCP-40) would not have helped the resolution of (CCP-3) in the context of the global *Problematique*. But when we were asked the reverse question, namely if (CCP -3) would have strongly helped in resolving (CCP-40), the answer we gave was "Yes." The rationale for the "Yes" answer is that if humankind had been able to make progress in decreasing the production and accessibility of weapons we would have also made progress in terms of decreasing localized warfare. As I am writing this chapter in August of 2004, i.e., ten years after conducting this retrospective structural inquiry, I cannot help but reflect on the contemporary disastrous situation with the war in Iraq. If the threat of production and accessibility to weapons of mass destruction had been dealt with, say in the 1980s by the United Nations, there would not be any justification for the invasion of Iraq by the USA and its coalition partners in 2003. It is becoming apparent already, just from the response to the interaction between this pair of CCPs, that no significant progress has been made in resolving the *Problematique* in the last thirty-four years.

With computer assistance the three of us had to answer 120 questions, and provide alternative rationales for our responses. In three hours of structured dialogue, we were able to produce the problem-tree shown graphically in Figure 3. Without computer assistance we would have had to answer 552 pair wise questions, i.e., about 5 times more, and it would have taken at least two days to produce the snapshot of the global *Problematique* shown in Figure 3. It is very unlikely that three busy people (Hasan, Ann, and me) would have allocated two days to search for the core of the *Problematique*. Furthermore, fatigue and cognitive overload would have prevailed, and as a result: (a) we would not have completed the task even with a subset of the original list of forty-nine CCPs, and (b) without the support of the ***CogniScope*** dialogue we would not have been able to engage in a constructive learning experience by means of focused and open dialogue.

Figure 3: A Retrospective Snapshot of the Global Problematique for the 1970's



The problem-tree shown in Figure 3 titled "A Retrospective Snapshot of the Global *Problematique* for the 1970's," displays graphically the propagation of problem resolution power among the subset of twenty-four CCPs. The location of a CCP at the seven levels shown in the Figure is an indication of the strength of resolution influence a specific CCP is exerting on the other CCPs included in the snapshot. For example, those CCPs located at Level I, are at the surface of the *Problematique*, and hence they do not help resolve any other CCPs. On the other hand the CCP that is located at the bottom of Figure 3, i.e., Level VII, is exerting an influence on all the others as graphically illustrated by the streams of arrows flowing from the core of the *Problematique* towards its surface (i.e., from Level VII to Level I). One can think of the levels shown in Figure 3 as the layers of an onion, so that the core of the "onion" corresponding to the global *Problematique,* is **CCP-18: Growing irrelevance of traditional values and continuing failure to evolve new value systems,** which is located at Level VII.

The interpretation of this finding is significant. It tells us that, if in the two decades, i.e. from 1970 to 1993, humankind had made progress in resolving the "value-base problem," the resolution of this problem would have propagated and helped resolve all the other problems in the global *Problematique.* This finding should not be a surprise to environmentalists, enlightened executives, and other global thinkers who have been reflecting on the global *Problematique* for the last thirty years. What is, however, even more interesting, is that the "value-base problem" emerged in the decade of the 1990s, at least in the USA, as a very deep rooted problem in many social systems, such as: nation states, large multinational corporations, health care provision systems, and even global economic competitiveness for small and large companies. In many instances, the value-base issue was masked under the general term of "organizational culture," which became a dominant theme in the postmodern management paradigm.

With regard to the global scale environmental crisis, Vice President Al Gore in his 1993 book *Earth in the Balance* has converged to a very similar diagnosis. He writes:

> *"The more deeply I search for the roots of the global environmental crisis, the more I am convinced that it is an outer manifestation of an inner crisis that is, for lack of a better word, spiritual. As a politician, I know full well the special hazards of using "spiritual" to describe a problem like this one. For many, it is like one of those signs that warns a motorist, Steep Slope -- Truckers Use Brakes.*

But what other word describes the collection of values and assumptions that determine our basic understanding of how we fit into the universe?"

In the same book he acknowledges the importance of abandoning the conventional wisdom and the status quo that have given us the belief that society can always muddle through. Such an acknowledgment is very similar to the meaning captured by **CCP-15: Generalized lack of agreed-on alternatives to present trends**, which is located very close to the core of the global *Problematique,* namely Level VI. It is clear to Gore that we cannot afford anymore to assume that the world will somehow solve its problems. He writes: "We must all become partners in a bold effort to change the very foundation of our civilization."

The building of such a partnership, however, can only be founded by enabling the stakeholders of the planet to engage in productive and meaningful dialogue. When a group of stakeholders is actually engaged in making the discovery that the core of the *Problematique* is the "spiritual vacuum," as compared to reading the statement by Mr. Gore in his book, they will be able to internalize the issue and become partners in the resolution of this deep-rooted problem. Without such engagement, the commitment to a common purpose is very unlikely.

Let me elaborate on this point by means of an experience. From 1975 till 1979, I offered a seminar in Washington, DC for Government Executives, under the auspices of the Graduate School of the U.S. Department of Agriculture. The topic of the seminar was "Anticipating the Future." Over the period of four years, approximately 250 executives attended the seminar in small groups of about 15 for each seminar. Each group of executives was asked to focus on the global *Problematique* from their own perspective, and to propose problem statements like the CCPs of the Club of Rome prospectus. On the average, each group produced about forty statements. We then proceeded to use the ***CogniScope*** dialogue methodology to produce problem-clusters and problem-trees, in a manner similar to the inquiry reported in the chapter.

The most interesting finding from these seminars is that, in the main, the participants did not propose any problem statements that could be categorized under the cluster called "Value-Base" in Figure 2. Only after they studied the initial structure of the *Problematique,* and were prompted by me to go deeper in terms of root problems, some groups generated ideas related to values. In light of the dominant perceptions about the

role of the value-base in the context of the *Problematique* in the 1970s, is it surprising that no significant progress has been made in terms of its resolution in the decades of 1970-1990? My assertion is that there is no guarantee that the engagement of stakeholders will contribute to significant progress in resolving the *Problematique*. However, we can be sure that without the participation of the citizens of the planet in discovering the *Problematique* we cannot expect to make progress, as the evidence from this retrospective structural inquiry demonstrates.

Figure 3 has also uncovered another interesting phenomenon, which we are unable to capture succinctly through the use of natural language. The *Problematique* includes four cycles of closely coupled CCPs. A cycle represents two or more mutually reinforcing problems. These strongly coupled problems in a cycle represent the emergence of a new entity, just like the chemical combination of hydrogen and oxygen gives rise to water, which is a new entity. Such cycles require special attention in discovering corrective actions for their resolution.

One of the cycles appearing in Figure 3 warrants some additional discussion because it was instrumental in the discovery of the SDS paradigm. This is the cycle located at Level III and containing the following three CCPs:

- **(CCP-7): Expanding mechanization and bureaucratization of almost all-human activity.**
- **(CCP-25): Generally inadequate and obsolete institutional arrangements.**
- **(CCP-41): Inadequate participation of people at large in public decisions.**

I call this cycle "pseudo-democracy." In other words, this is the cycle that demonstrates the lack of participative democracy of the type practiced in the agora of ancient Athens.

Studying the problem-tree displayed in Figure 3, one sees that four CCPs are located at deeper levels of the tree, namely Levels IV, V and VI, and they are connected to the pseudo-democracy cycle at Level III with arrows. This means that the resolution of the pseudo-democracy cycle depends strongly on making progress in resolving these four CCPs, two of which are also in a cycle. These specific CCPs are:

- **(CCP-28) Ideological fragmentation and semantic barriers to communication between individuals, groups, and nations;**

- **(CCP-15) Generalized lack of agreed-on alternatives to present trends;**

Which is in a cycle of mutual interdependence with:

- **(CCP-49) Insufficient understanding of CCPs, of their nature, their interactions and of the future consequences both they and current solutions to them are generating;**

And finally the deepest CCP mentioned earlier, located in Level VII, namely:

- **(CCP-18) Growing irrelevance of traditional values and continuing failure to evolve new value systems.**

The interpretation emerging from the problem tree displaying the *Problematique* is that without progress in the above four CCPs, it is very hard to make progress in resolving the pseudo-democracy cycle. The phenomenon of pseudo-democracy, as contrasted to participative democracy, is prevalent all over the world, including those advanced industrialized countries of Europe and North America. It is sobering to recognize how difficult it is to re-institute participative democracy without addressing and resolving these deeper problems of the global *Problematique.*

It appears that the *Problematique* has deteriorated in the last three decades, in spite of the end of the cold war. The demise of the Soviet Union has contributed only partially to the amelioration of only one of the forty-nine CCPs, namely: **CCP - 3: Increase in the production, destructive capacity, and accessibility of all weapons of war.** However, it is hard to find any solace by the amelioration of this particular CCP when we recognize that it has been replaced by another one, namely **CCP-40: New modes of localized warfare,** resulting in the reemergence and spreading of the phenomenon of Balkanization. This phenomenon was manifested by the war in Bosnia-Herzegovina during the decade of the 1990s, contributing to the death of hundreds of thousand of innocent people.

Following the structural inquiry and the interpretation of the problem-tree of Figure 3, it is now appropriate to discuss the value-base, especially in light of the discovery that the value-base is indeed positioned at the core of the *Problematique*.

5. THE VALUE-BASE

The primary aim of any social systems designing activity is to improve a situation. This can only be determined by an objective, which, itself, is external to the situation. Such an objective always entails a value, and the setting of it must therefore create the particular **value-base** that gives meaning and direction to the whole endeavor.

By constructing a retrospective snapshot of the *Problematique,* we discovered that the "value-base problem" is located at its core. In view of this finding it is essential that the approach to be applied for the resolution of the global *Problematique* must be guided by the value-base. In fact, through our structural inquiry we found evidence to substantiate that the failure to do this in the 70s and 80s is the primary reason for not having made any significant progress in improving the situation.

In light of the complexity of the *Problematique,* it becomes imperative to define a value-base that will govern the development and application of the systems approach from the outset. When we review the problem-clusters (Figure 2) and problem-tree (Figure 3), we find that all of the CCPs are **problems** in **relation** to something else -- either other problem-clusters or other problems within a cluster, and always in terms of values we take for granted because they are embedded in our current culture. Thus, for example, uncontrolled population growth is a problem when viewed in relation to a particular state of the environment that we have been experiencing in the last thirty years. It was not a problem in the beginning of the 20^{th} century, when we experience the environment differently. Similarly, the health care problem was not a problem before our technological progress and the increasing tendency to adopt and apply every conceivable medical technology. On the one hand, technology gave us the power to prolong life, and on the other it contributed to the escalation of the health care costs.

Numerous such examples can be generated. In fact these are the type of rationales that stakeholders use in exploring the relationships among the CCPs, and in doing so learning from each other. When we reflect on all those relationships we

recognize that in every instance the problematic aspect derives from an **imbalance** that affects the relationships among the individual CCPs.

Recognizing that the concept of imbalance defines the pathology of an "ecological" system, the CoR prospectus identifies the *Problematique* as being ecosystemic in character. The prospectus includes the statement:

> *"The normative statement that describes the value-content of any ecosystem is "ecological balance." Consequently it is the idea of* ***ecological balance*** *that can, and will, be taken as the underlying value-base of the study; for in the terms dictated by our situation the "good" is self-evidently and most generally capable of being defined as the re-establishment of that many-dimensional dynamic balance that seems to have been lost in the modern world."*

Revisiting the CoR Prospectus

Revisiting the CoR prospectus thirty years later, and having the benefit of all the research and development effort that has been carried out in the interim by researchers and systems scientists, it is much easier now to make the approach more transparent than it was possible in the original document, primarily because the requisite knowledge was not explicitly available in 1970. However, I can say now that the implicit architecture of the CoR proposal was founded on five fundamental premises. These are:

1. Extending the notion of the "expert" in the social systems designing arena to include interested parties that have a stake (i.e., the stakeholders) in the definition and resolution of the global *Problematique.*

2. Enabling groups of stakeholders to participate in the collective definition of the global *Problematique,* productively and efficiently.

3. Producing high quality observations for resolving the *Problematique* by not allowing the participating stakeholders to push for preconceived, premature choices of options and alternative designs.

4. Using computer-assisted methodologies, such as the ***CogniScope*** dialogue**,** to enable participants from all walks of life to structure the

variety of ideas and perspectives relevant to the design of alternative solutions without imposing on them a cognitive burden.

5. Ensuring non-threatening and authenticating full participation of all the stakeholders entering the designing arena.

All these requirements have been satisfied by means of the development of the SDS paradigm.

6. THE DEMISE OF THE CLUB OF ROME

Unfortunately, the very pragmatic and scientific SDS approach, described briefly above and displayed in Table 1, was not available at the time the architecture of the CoR prospectus was proposed. Because of this, the Executive Committee of the CoR, at a meeting in Boston in the summer of 1970, opted to adopt a much more conventional approach, which in essence invalidated the whole thrust and philosophical foundations of the Club of Rome prospectus. Let me elaborate on this experience briefly.

One of the people who were selected by Ozbekhan and me to become a member of CoR was Professor Jay Forrester from the MIT Sloan School of Management. Forrester was by formal training an electrical engineer and had written a book in 1970 titled *Urban Dynamics*. The book was based on a computer language called DYNAMO, and some notions transferred from electrical engineering regarding state and rate variables introduced in mathematical equations. The purpose of the book was to explain the deterioration of the American cities and to predict their time-development. It was essentially an attempt to apply concepts borrowed from engineering and classical mechanics to predict the dynamics of American cities. The major advantage of this type of modeling is its rigor on account of the use of mathematical equations.

When the Club of Rome members met in Switzerland in the spring of 1970, Forrester made the claim that he could very easily apply the same methodology to model the global *Problematique.* He invited the Executive Committee to visit Boston for two weeks so that he could demonstrate the power of his method.

The Executive Committee accepted the invitation.

When the Committee participated in the meeting in Boston and saw that it was possible to use the computer to predict the dynamics of the world system for the next 250 years they were absolutely amazed. The conventional engineering mentality and the seductive pseudo-rigor of mathematical equations prevailed at the expense of the philosophical and methodological foundations of the original CoR prospectus. They decided to allocate the necessary funds for the development of the "World Model," which eventually led to the publication of two separate books, one by Jay Forrester called *World Dynamics*, and one by Meadows and others, all associates of Forrester, called *Limits to Growth*.

It is my view that, neither one of these publications did justice to the essence of the CoR prospectus, namely the need for a paradigm shift. It is unfortunate that in 1970, even the Executive Committee of the CoR was unable to appreciate the deep meaning of the role of the value-base included in the prospectus. They opted to fund a project that perpetuated the dominant scientific elitism paradigm, and as result the fundamental core of the *Problematique*, namely the value-base, was never discovered or addressed by any of these modeling projects.

When the Executive Committee made this decision, Ozbekhan and I resigned from the Club of Rome. He joined the Social Systems Sciences program at the University of Pennsylvania and continued to work for the conceptualization of the new paradigm. I joined the Academy for Contemporary Problems, where I met John N. Warfield, with whom I collaborated for twenty years, and together with LaDonna Harris, Bob McDonald, Diane Conaway, Larry Magliocca, Kevin Dye, and many others we developed the SDS paradigm.

7. DEMOCRATIZING SOCIAL SYSTEMS DESIGNING

The role of social science in governmental policy has been the subject of debate, especially in the United States, ever since President Lyndon Johnson introduced his "Great Society" legislation. The 1960s marked the beginning of an explosive growth in the number of issues that government chose to address by using social science principles. Some of these initiatives were in response to the continuous deterioration of social systems. For example, the bill creating the Department of Housing and Urban Development was signed into law by President Johnson on September 9, 1965, thirty days after the beginning of, and partly in response to, the rioting of the Watts section of Los Angeles. The intent was to ameliorate the deterioration of American cities by using

ideas from social science and urban design. Social science was formally introduced in the formulation of government policy at this point in time.

Forty years and hundreds of billions of dollars later, welfare dependency, illegitimacy, violence, sexually transmitted diseases, and other acute social problems are all worse. An investigative report ordered by President Lyndon Johnson and conducted under the chairmanship of former Illinois Governor Otto Kerner after racial and urban riots in the 1960s, concluded: "Our nation its moving toward two societies -- one black, one white -- separate and unequal." In the spring of 1993, the Senate Banking, Housing and Urban affairs Committee was told by Henry Cisneros, the Housing Secretary of the Clinton Administration, that Kerner's predictions were coming true and the plight of the cities had worsened in the last 25 years.

How is it possible that a society with significant good will and major commitment of resources has not been able to resolve such acute problems over a period spanning at least a generation? The answer is that these acute problems cannot be resolved without using the appropriate social systems designing paradigm.

Even such early proponents of the formal use of social science principles in designing the Great Society programs as Senator Patrick Moynihan, changed their position by the end of the 1960s. The senator was in the late 60s an academic and began to worry about the increasing role of ideas originating in the social sciences being introduced into politics and government. He wrote: "Government has got into the business of promising more than **it knows how to deliver**; as there is little likelihood of cutting back on the promises, the success of the society turns in its ability to improve its performance (emphasis mine)."

Another academic social scientist, Nathan Glazer, sensing the ineffectiveness of social science in resolving acute social problems, wrote: "The role of social science lies not in the formulation of social policy, but in the measurements of its results." A "social indicator" movement was initiated in the early 1970s -- modeled after the economic indicators, which have been used extensively by the Federal Government to measure the health of the national economy -- with many social scientists applying indicators to measure the results of social programs. T is apparent, that the social science paradigm espoused by these two prominent social thinkers is the conventional First Phase science corresponding to classical mechanics.

In my view, the role of social science in the Great Society programs was ill conceived from the outset. The shortcomings of the American social science paradigm are to be found in the preoccupation of social scientists with mathematical modeling and techniques, while failing to notice the quality of life their techniques was constructing and destroying. By trying to become scientific through emulating classical Newtonian mechanics, they espoused a paradigm, which was unable to explain and ameliorate the social problems observed in the 1960s, just as the Ptolemaic paradigm was unable to explain the movement of planetary bodies in the Copernican era.

Let me elaborate on this point by using a personal experience. In 1965, after graduating from Yale with a PhD in theoretical physics, I returned to Greece and became an advisor to Dinos Doxiadis, a well-known Greek architect/planner. Doxiadis had a very successful urban planning firm headquartered in Athens with branch offices in various parts of the world including the U.S. He was responsible for designing and building new cities, such as Islamabad, the Capital of Pakistan. Although Doxiadis was very busy with his professional business, his main interest was to invent a new science for the planning and design of cities, or "human settlements" as he preferred to call them (Doxiadis, 1968). He was convinced that unless urban planning becomes a science capable of explaining and predicting urban phenomena, just like physics does for physical phenomena, architects and planners will continue to design cities and towns that are not appropriate for human habitation. He named the science of human settlements "Ekistics," which sounds very similar to Economics. Both words originate from the Greek work "oikos" meaning home. Ekistics was intended to be more comprehensive than the discipline of Economics, which was included as one of the relevant perspectives of the new science.

When Doxiadis heard about my background in theoretical physics he expressed a desire to hire me in an effort to *mathematize* Ekistics. He believed that by introducing the elegance and rigor of the mathematical language used so much in physical sciences, Ekistics will become a science. Adherence by the professionals to the practice of the science will improve the quality of life in the cities. According to Doxiadis "the purpose of a city is to make its inhabitants happy and safe, and to help their human development." In light of the urban crises that became the dominant phenomenon in the 60s, clearly the purpose of those social systems was not being fulfilled.

When I joined the firm in 1967, I found out that urban planners were already using concepts from physics in their city planning and design projects. There was, for example, a mathematical model, called the "gravity model," which was useful in calculating the traffic flow between different neighborhoods in a city by using the number of people residing in a neighborhood as a means to determine its "gravitational attraction." By assigning numbers to the gravitational pulls of the various communities, the model was able to assign different volumes of traffic to the streets and determine areas of traffic congestion.

I worked on building mathematical models for urban planning for a period of three years. With a small group of associates with scientific and engineering backgrounds, and including social scientists and architects, we built a variety of mathematical models, most of which were used in a project dedicated to the design of the Metropolitan Urban Detroit Area for the year 2,000. These models were reasonably good in explaining and occasionally predicting phenomena related to human habitation patterns. Even though some of these deterministic models were elegant and useful, it became apparent to me that they were not appropriate and relevant to the planning and design challenges presented by a social system as complex as a city. Furthermore, the mathematics appropriate for modeling social systems had to be such as to enable ordinary citizens to engage in dialogue. This is in essence the mathematics of stakeholder inclusion, as opposed to the mathematics of exclusion practiced by some social scientists and engineers in the decades of the 60s and the 70s.

While working for Doxiadis I had the unique privilege of being exposed every summer to some of the greatest thinkers of that era. Once a year the firm would conduct a full-month seminar on the science of human settlements and invite distinguished people to participate such as: (a) Arnold Toynbee, the famous British historian, (b) Margaret Mead, the famous American anthropologist, (c) Hasan Ozbekhan, the internationally known planning theoretician, (d) Bucky Fuller, the renaissance humanist, and others. These people will participate in the Ekistics Seminars for one or two weeks, usually spending at least one week on a beautiful ship cruising the Aegean islands, and always visiting the island of Delos on the final day of their cruise. At the ancient theater of Delos, surrounded by the ruins of the ancient human settlement of that island, the participants will read a document produced during the seminar deliberations called the "Declaration of the Delos Symposia."

Most of these documents were making pronouncements regarding the present situation and the future of human settlements. There was a lot of concern about the deterioration of cities everywhere, and the need to take drastic measures to save the planet for human habitation. Because of the expert knowledge of the distinguished participants, and the extraordinary charisma of Doxiadis to orchestrate and to synthesize the deliberations of the seminar, the nine Delos Declarations represent significant contributions to the appreciation by certain publics of the global *Problematique*. The major shortcoming of the Declarations was that they stand out as pontifications by an elite group about the predicament of humankind.

Trying to invent the mathematics of Ekistics, coupled to the extravagant seminars of distinguished scholars, led me to the belief that there was something fundamentally wrong with the dominant social systems designing paradigm. It became clear that unless the social systems designing paradigm espoused the democratic ideal of stakeholder participation in the designing process, it could not become effective in reversing the dismal trends visible today in so many social systems. The dominant paradigm was as ineffectual in terms of resolving the acute problems presented in the *Problematique*, as was Ptolemy's paradigm in explaining and predicting the motion of planetary bodies around the sixteenth century.

I learned three principal lessons from this experience:

1. The theory of social system planning and design should not be the same as that of the traditional scientific approach, i.e., First Phase science, which has largely concerned itself with applying deterministic rationality and principles of observer independent observations to explain the dynamics of physical systems.

2. The methodology for social systems designing must differ drastically from that of the traditional deterministic approach, and as a result it raises severe challenges to some of our most common and well-accepted conceptions underlying the meaning of science, such as validation, replication, and prediction. Accordingly, any activity that relates to the planning and design of social systems should be defined as a "method" if it possesses the following three characteristics:

- A defined sequence of operations which can be systematically followed in all applications;
- Ability to communicate the knowledge generated in a form that can effectively lead to improvement of the problem situation;
- An opportunity by all those (i.e., the stakeholders) who will be affected by the knowledge, when it is translated into action, to participate efficiently in the generation and organization of the knowledge.

3. Documentation of "expert" knowledge, of the type generated through Blue Ribbon Commissions (like the Kerner Commission) or the Delos Symposia Declarations, is of questionable value in terms of actually improving the social systems for the following reasons:

    - The experts do not know enough;
    - Their analyses are opaque, even to themselves; and
    - Lines of reasoning and consensus are interrupted by opaque analyses, blocking communication, understanding, ordering of thought patterns, and, worst of all, accountability.

These three lessons were instrumental in my thirty years quest to democratize social systems designing. The lessons led me to three fundamental premises:

1. There exists a diversity of values, perceptions, attitudes, beliefs, all of which are superimposed within the context of a given social system. This requisite variety needs to be explicated and appreciated before effective social systems designing can be accomplished;

2. Stakeholders participation is the most meaningful way to obtain representations of the requisite variety of reality perceptions and value structures embedded in social systems. Stakeholders are all those inside or outside of a system, who are directly affected by what the system is doing; and

3. Participation, although necessary, is not sufficient. In order for stakeholder participation to be meaningful and productive it needs to be enhanced by specially designed methods for engaging the stakeholders in a dialogue.

The above three premises motivated me to collaborate with a group of scholars and researchers over a period of thirty-five years to mount an effort, especially after the demise of the Club of Rome ideal, to conceptualize and implement a new paradigm for social systems designing for resolving the global *Problematique*.

8. CONCLUSION

I am reasonably confident that the SDS paradigm, described briefly in this chapter, is in consonance with the systems approach espoused and advocated by C. West Churchman in his profound contributions to systems philosophy and science. I also believe that a retrospective analysis of the global *Problematique* conducted today by a group of inquirers employing the SDS approach, will discover that the core is still the value base, as described by **CCP-18: GROWING IRRELEVANCE OF TRADITIONAL VALUES AND CONTINUING FAILURE TO EVOLVE NEW VALUE SYSTEMS.** This is indeed a very painful diagnosis and prognosis regarding the future of humankind. I know that West felt this pain throughout his life. He finally went home in 2004.

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