Chapter 10

Assessment of Change

This chapter will examine the various measurements and methodologies used in the study of social change. It is organized around five themes: technology assessment, methodologies for change evaluation, use of social indicators, methodologies for forecasting change, and policy implications of change assessment. Prior to the discussion of these topics, let us briefly consider some of the more general ways sociologists go about studying change, such as the use of various survey methods, and the employment of historical data, personal documents, and records and the kinds of research objectives to which individual research objectives are suited (Dale & Davies, 1994).

The repertoire of social science methodology enables us to assess change at various levels. Although the majority of the studies in sociology deal with events at only one point in time (see, for example, Czaja & Blair, 1996), survey methods exist that can be used to measure change over time. They are employed in longitudinal studies (Babbie, 1998) designed to permit observations over an extended period and include panel, recall, and trend surveys.

ASSESSMENT TECHNIQUES

Panel Surveys

Panel surveys are used to compare the same measurements for the same sample at several different points in time. The sample in this case is called the *panel*. Panel analysis is useful in the study of the processes of change in a person's life. A classic example of this type of survey design is found in *The People's Choice* by Paul Lazarsfeld and associates (1944). The

researchers interviewed a panel of 600 residents of Erie County, Ohio, once per month between May and November of 1940 with respect to how they intended to vote in the presidential election of 1940. Of particular interest to these investigators was the process by which panel members decided to vote in the way they eventually did. Another classic illustration of such a study is the Survey Research Center's (1972) *A Panel Study of Income Dynamics* (*PSID*). In this survey, approximately 5,000 households throughout the United States were interviewed during the spring of each year from 1968 to 1972. The survey obtained detailed information about various sources of income and documented the changes in the characteristics of those moving into and out of poverty during the five-year period. Although PSID was initiated in 1968 as a short-term study, the annual sampling has continued as of 1996 with lavish funding from official and nonofficial sources. The data base is continuously updated to reflect the vast economic and demographic realities in the United States (Brown, Duncan, & Stafford, 1996). Other studies on income dynamics dealt with job tenure changes over various time-horizons (Brown & Light, 1992). Data from panel study were also used to describe alterations in occupational aspirations of high school graduates who have experienced unemployment during the first year after graduation (Empson-Warner & Krahn, 1992). In a similar vein, the Medical Expenditure Panel Survey was created in recent years to provide the health services research and health policy community with facts that discuss health care use, expenditures, payment sources and health insurance status of the U.S. population (Cohen, et al., 1997).

A special type of panel analysis is called *cohort analysis*. Such a study deals with more specific subpopulations (cohorts) as they change over time. Generally, a *cohort* is an age group, such as those born during the 1930s, but it can also be based on some other time grouping, such as people attending college during the Vietnam War, people who got married in 1969, and so on. An example of cohort analysis would be a series of national surveys, at ten-year intervals, to study the changes in economic attitudes of the cohort born during the Great Depression of the early 1930s. A sample of individuals twenty to twenty-five years of age would be surveyed in 1950; another sample of those thirty to thirty-five years of age in 1960; up to the age group sixty to sixty-five years in 1990. Although the people studied in each of the surveys would be different, each sample would represent the survivors of the cohort born between 1930 and 1935 (Babbie, 1994). Another example cohort analysis is the nationwide panel surveys undertaken in Sweden on the decline in adherence to religious beliefs from older to younger birth cohorts (Hamberg, 1991).

Roberta Ash Garner (1977) notes that a well-designed panel study allows the researcher to draw conclusions about causality. Thus, one can study change in terms of cause and effect if a study has the following design: "(1) There should be two groups, initially similar (for instance, both selected

by random sampling from the same population); (2) one group only is exposed to the possible causal factor; (3) the groups are then compared with the expectation that the one exposed to the factor ('the cause') will be in some way different from the other group" (1977:71). But she also points out that it is difficult and often unethical to establish an experimental situation of this nature for studying human beings. At times, however, such a situation is approximated. For example, in the well-known study of how the political and economic attitudes of young women changed as a result of their attendance at Bennington College would be an illustration of this design (Newcomb, 1943). In this study, the similar political attitudes of women was the dependent variable and the four years at Bennington College was the independent variable. As a control, data were gathered from students of similar background who attended two other colleges. It was found that women at Bennington College developed liberal and radical political and economic views more than did the students from the other two colleges. It can thus be concluded that something about the Bennington experience caused the changes in the attitude.

There are both advantages and limitations to panel studies. Many of the advantages relate to being able to interview the same subjects repeatedly over a period of months or years. If the researcher finds shifts in attitudes or reported behavior, he or she is in a better position to argue that there has been a real change in the population of interest than a researcher who undertakes a different kind of approach, such as the "one-shot," or cross-sectional, analysis (that is, obtaining data at only one point in time). In cross-sectional surveys, researchers know that any difference they find can be attributed either to a real change in attitude or behavior in the population of interest or to a difference caused by a sampling error (that is, even if two samples are drawn from the same population, there will be some differences in observed values due to random fluctuation). This sampling error difference can be ruled out when a panel design is used. Another advantage of panel studies is that they permit much more information to be collected about each respondent than is feasible with a cross-sectional survey design. They also avoid a heavy dependence on the memory of respondents for information about the time period covered by the panel; however, they may still rely on memory for questions about subjects' past.

Panel studies, like all research techniques utilized in social science, are obviously not without their limitations (Dooley, 1995:125–126). One difficulty is that over a period of time there is bound to be some sample mortality; that is, there will be a loss of panel members because of the difficulty in reaching them, lack of cooperation, or death. It was pointed out elsewhere in the text, for example, that approximately one out of every five Americans change residence every year. The record-keeping problems caused by such mobility for a panel study are substantial. For example, in a panel study of income dynamics, a substantial effort went into minimizing sample loss, but still only

62 percent of those in the original sample remained at the end of five years. Another limitation of panel analysis is that it takes a long time to collect data. It is also more expensive than other types of designs. Still another problem with repeated interviews with the same group is *panel conditioning*; that is, the risk of repeated contacts may sensitize the subjects. For instance, members of a panel may want to be consistent with the views they express on consecutive occasions. If this happens, the panel becomes atypical of the population it was selected to represent (Nachmias & Nachmias, 1996:142).

Recall Surveys

Another form of quasi-longitudinal design is the *recall survey*. Such a survey conducts an observation at one point in time and has respondents remember information to establish a prior observation. Such an approach is practically useless as evidence for inferring causality. Still, studies based on recall surveys occasionally appear in the literature to describe events that result in changes in perceptions, practices, or attitudes (Midanik, 1993; Scott & Zac, 1993). For example, after the United States recognized China, an investigator may want to study the impact of recognition on attitudes toward China. The investigator takes a survey of present attitudes and also asks respondents to recall their attitudes before recognition of China. He or she then compares the remembered attitudes with present attitudes to determine how much they have changed. The recall survey is the weakest kind of longitudinal design. It attempts to approximate the pretest-posttest, one-group design by recalling the pretest observation. Obviously, lacking control over history, maturation, and experimental mortality, recall designs provide a very weak basis for causal inferences. In addition, memory decay and distortion are forms of the maturational factor that is particularly likely to contribute to survey invalidity.

Trend Surveys

Trend surveys are useful for describing changes. *Trend surveys* sample a population at two or more points in time. The population is the same but different samples are drawn for different observations. Examples would be a comparison of U.S. censuses over time to determine growth in the national population, or an examination of a series of National Opinion Research Center polls to note trends in attitudes over time concerning, for instance, abortion, pornography, satisfaction with work and financial situation, sexual behavior among teenagers, AIDS awareness, or the spread of TB cases (Kilborn, 1994; Naticka-Tyndale, 1991). Trend surveys are also used to determine changes in income and wealth, work time required to buy certain consumer goods and services (*Fortune*, 1987), and, in general, to "monitor" social change in the form of social indicators (Moore & Sheldon, 1965; Harris, 1987), which will be discussed shortly.

Historical Analysis

In addition to panel, recall, and trend surveys, sociologists interested in the study of social change often use *historical data* to establish long-term trends or to test theories on a variety of topics such as women's role in the British Industrial Revolution (Tilly, 1994); abortion and adoption policies over time (Brigham, Rifkin, & Solt, 1993; Hall & Stolley, 1997); attitudes toward migrants in the United States since the 1880s (Simon, 1993); the concept of privacy from Plato to the modern times (Peterman, 1993); and the review of the Italian parliament's efforts to deal with problems posed by the Mafia (Marotta, 1993).

In a well-known attempt to study long-term trends, Pitirim A. Sorokin (1957) used content analysis (a technique to determine the content of a recorded communication by systematic, objective, and quantitative analysis) of paintings. He classified paintings of the various historical periods into two categories, religious and secular, in an attempt to learn what changes had occurred in the world view. He found that 94.7 percent of the known European paintings of the tenth and eleventh centuries were of the religious nature and only 5.3 percent were secular. By the fourteenth and fifteenth centuries, the percentage of paintings of a religious nature had dropped to 85, by the seventeenth century to 50.2, by the nineteenth century to 10, and by the twentieth century to 3, with corresponding rises in the secular category.

On occasion, historical case studies are used to test theories. In such instances, the emphasis is not so much to document trends over time as to examine in detail one reasonably limited set of historical events. One of the best illustrations of this in the literature is Kai Erikson's (1966) analysis of American Puritanism. Ever since Émile Durkheim formulated the notion that deviance served certain social functions in a society, sociologists have looked for evidence to support this contention. Durkheim had in mind the idea that a society needed its deviants in order to reaffirm continually the boundaries of propriety in society. The arguments for the importance of deviants are intriguing. They provide a novel way of showing how certain institutions in a society, if not the society itself, continue to operate. Durkheim argues, for example, that without the existence of sinners, a church could not exist. The very existence of sin provides the opportunity for believers to reaffirm the faith that has been offended by the sinner. So the worst thing that can happen to a church is to eliminate sin completely from the world and completely propagate the faith to society.

By selecting a specific case, Erikson hoped to demonstrate how, to the extent that a common morality exists in a society, the society comes to depend on its deviants for the maintenance of its social boundaries. In *The Wayward Puritans*, he shows how these theoretical notions can be applied to understand the witch hunts of colonial America. Relying primarily on secondary sources, he describes how the "moral entrepreneurs" of early Mass-

achusetts colonial society, in their zeal to maintain religious purity, launched full-scale attacks on alleged Salem witches. This particular attack on "deviants" is only one of several that Erikson documents and analyzes. Although he does not draw these parallels himself, one could, on the basis of causal historical knowledge, assume that a number of historical cases might be used as additional historical illustrations of the functional view of deviance: the McCarthyism of the 1950s, the events leading up to the laws of discrimination against Jews in Nazi Germany, the internment of Japanese-Americans during World War II, or the brutal attempts at "ethnic cleansing" by Serbs in the former Yugoslavia in the mid-1990s.

The use of *personal documents*, such as diaries, letters, and biographical statements, has long been considered useful in sociological research aimed at studying social change. Perhaps the best-known example of this form of primary data in sociological research is W. I. Thomas and Florian Znaniecki's (1918) study, *The Polish Peasant in Europe and America*. In this investigation, the authors were concerned with the adaptation of individuals to new forms of social organization. The Polish peasant in America provided an excellent opportunity for understanding the modes of adaptation and assimilation of persons transplanted from a largely agrarian to a modern industrial society. Their research was based on letters that these immigrants sent to their families in the "the old country." The data obtained from these letters, in fact, provided a continuous history of their New World experience. These letters, constituting actual interaction between persons, allowed the researchers to assess dynamics of attitude change, changing relations within primary groups, and the development of community life. Their insights about the assimilation of immigrants remain influential in adaptation studies (Conzen, 1996).

Sociologists interested in historical experiences of large groups or population aggregates often turn to available records that provide systematic historical data on large numbers of individuals. For example, when demographers seek to document rates of fertility, patterns of immigration and migration, changing food resources in society, and birthrates and death rates, they utilize existing statistical records. These records enable them to examine trends of changes on a number of levels—for a selected part of society, for a whole society, for several societies; indeed, even for the world.

Of course, historical records can be used for other types of studies of change. For example, Frances Fox Piven and Richard Cloward (1993) traced the welfare system in the United States from the Great Depression to the present, revealing a distinctive pattern of relief policy—at certain times, relief policy has been quite liberal and at other times highly restrictive. Their major thesis, which is convincingly documented through their historical investigation, is that the welfare system has been used to control and regulate the poor. "Historical evidence suggests that relief arrangements are initiated or expanded during occasional outbreaks of civil disorder produced by mass unemployment, and are then abolished or contracted when politi-

cal stability is returned" (Piven & Cloward, 1993:xiii). In a different vein, another study analyzed the presentation of abortion and adoption in marriage and family textbooks published from 1951–1987. The depiction of adoption and abortion changed over time, showing influences of societal and disciplinary orientations. Marriage and family texts show abortion as a macro, societal issue and depict adoption as a micro issue. Early texts viewed abortion as an issue of morality and ethics (Hall & Stolley, 1997).

These general comments on methodological tools for social change research are not intended to replace the more detailed discussions found in books about methods of social research. They are simply intended to provide a brief exposure to some of the strategies utilized in the study of social change. Let us now consider the subject of technology assessment.

TECHNOLOGY ASSESSMENT

In Chapter 1, it was shown that technology is one of the principal sources of social change. Technological developments have certainly brought society to an unprecedented level of comfort and prosperity, but they also have all too often brought unanticipated and undesirable consequences (see, for example, Jasanoff, et al., 1994). From environmental pollution to urban congestion, many of the major problems in society are strongly influenced by modern technology. The concern with the growing impact of technology on society and some of its deleterious effects gave rise to technology assessment. It is defined by one of its most influential practitioners and spokesmen, Joseph E. Coates (quoted by Alan Porter et al., 1990:155), as "a class of policy studies which systematically examine the effects on society that may occur when a technology is introduced, extended or modified. It emphasizes those consequences that are unintended, indirect, or delayed." Such studies should also offer alternative solutions to a problem based on their social costs, and make recommendations for policy changes or for new initiatives.

Over two decades ago, in a provocative book, *Technology and Society*, David M. Freeman (1974) stated the following reasons that remain to be valid for the necessity of increased technology assessment:

1. The new technologies advanced and diffused in recent times have shown enormous power to alter society and affect the environment on previously unknown scales. Supersonic aircraft, pesticides, nuclear wastes with half-lives of thousands of years, the decline and growth of industries relocating populations, transportation systems contributing to suburban sprawl, mind- and body-altering drugs, all these and many more produce effects felt over great space and time.
2. Nowadays there is a trend of diminishing lead times between initial technological invention and widespread diffusion and application leaving less time to make analysis and adjustment.

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2. Nowadays there is a trend of diminishing lead times between initial technological invention and widespread diffusion and application leaving less time to make analysis and adjustment.

3. Various technologies are impacting on a human population of increasing size, diversity, and differentiation—developments that make technological impacts more diverse, uneven, and difficult to sort out.
4. Formerly, a small group of elites made strategic decisions unencumbered by interests of outsiders, peasants, and the urban poor. However, political revolutions of the last two centuries have all posited the ideal of participatory decision making on the part of the affected. The world is full of conflicting and cooperating groups who seek access to decisions that affect their lives and those of their children.
5. Both the beneficial and detrimental impacts of technologies are felt with increasing rapidity ever more powerfully and unevenly on diverse sectors of the population. Our technical powers, as in the past, exceed our capacity to make fully intelligent social choices with full awareness of the consequences. (1974:2–3)

In recent years, the spread of concerns with technological impacts has led governments of industrialized nations to begin thinking about new modes of technological planning and decision making (see, for example, Schot, 1992). In the United States, Technology Assessment Act was passed in 1972, establishing within the legislative branch an Office of Technology Assessment (OTA)—a move that greatly enhanced the capacity of Congress to deal with technological issues and the implications and effects of applied research and technology. Over the years, OTA has grown increasingly influential as a policy advisory body to Congress, greatly expanded its scope, and gained increasing currency among executive agencies of the federal government, corporations, and academic researches (Teich, 1997). Similarly, in Europe, technology assessment is seen as a vital part of national and international technology policies prompted by the growing free-market mentality and demand-oriented technology policy (Smits, et al., 1995).

The scope of technology assessment ranges from broad problem-oriented investigations, which many consider a major social problem (for example, energy shortage), through technology-oriented studies designed to anticipate the effects of a particular technology (videophone, for example), to the most specific form, the project assessment, which concentrates on a single application of technology (for instance, power-plant sitting) (Porter et al., 1990:155).

The approaches to technology assessment may be future-oriented, present-oriented, or past-oriented. There are two types of *future-oriented* approaches: anticipatory and responsive. The former entails forecasting new trends and their possible effects—for example, genetic engineering. The latter responds to already perceived problems—for example, new nuclear power plants. There are also two types of *present-oriented* assessments: reactive and corrective. The reactive deals with problems of unknown causes or disasters such as large-scale oil spills or earthquakes. The corrective is concerned with known problems whose effects are felt, their causes already traced, and for which corrective actions are possible, such as air or water pol-

lution. *Past-oriented* assessments are retrospective in nature. They examine the circumstances and facts of why a project was successful (for example, sperm banks), rejected, or abandoned—for example, nuclear power plants or strip mining technologies.

Recurrent Steps in Technology Assessment

In five technology assessment studies (of automotive emissions, computers and communications, industrial enzymes, mariculture, and water pollution by domestic wastes), Gabor Strasser (1973:915) identified seven general steps that still guide research and are comprehensive enough to fit most circumstances.

Step 1: Define the assessment task—discuss relevant issues and any major problems; establish scope (breadth and depth) of inquiry; and develop project ground rules.

Step 2: Describe relevant technologies—describe the major technology being assessed, other technologies supporting the major technology; and the ones that are competitive to the major and supporting technologies.

Step 3: Develop state-of-society assumptions—identify and describe major nontechnological factors influencing the application of the relevant technologies.

Step 4: Identify impact areas—ascertain those societal characteristics that will be most influenced by the application of the assessed technology.

Step 5: Make preliminary impact analysis—trace and integrate the process by which the assessed technology makes its societal influence felt.

Step 6: Identify possible action options—develop and analyze various programs for obtaining maximum public advantage from the assessed technologies.

Step 7: Complete impact analysis—analyze the degree to which each action option would alter the specific societal impacts of the assessed technology discussed in Step 5.

Methods of Technology Assessment

Technology assessment has no defined set of tools to be applied in a definite predetermined way and is most effective when applied in the early stages of research and development (Tepper, 1996). The tools are borrowed from all fields—the econometrician, the statistician, the sociologist, and the operations research analyst. These techniques include qualitative and quantitative appraisal techniques such as those used for the selection of research projects; systems analysis; decision aids, such as relevance trees and evaluation matrices; economic, technological, social, and, if it were possible, political forecasts; simulation and operations research models, especially those that are able to cope with random phenomena; questionnaires; public participation hearings; and, finally, and not to be overlooked, sheer "gut-feeling" and intuition.

As it may be expected, there are several deficiencies in the use of technology assessment. Bodo Bartocha (1973:347–348), is still correct is suggesting that the most critical voids in our knowledge regarding technology assessment are:

1. Criteria for choice and priorities.
2. Reference standards and pacing parameters sensitive to end objectives.
3. Indications and new values systems to express "worth" in other than just monetary terms.
4. Better simulation techniques and dynamic models.
5. Skilled interdisciplinary personnel and adequate resources.
6. Popularization and public understanding of long-range risk, expected values, and uncertainty.
7. Imagination.

These limitations are further compounded by the high cost of technology assessment programs. Joseph F. Coates (1977:269–270) reported in an early investigation that the costs of conducting the Alaska Pipeline study are alleged to have run about $9 million. Smaller assessment studies range from $125,000 to $300,000. A study conducted by the now-defunct Department of Health, Education, and Welfare on "violence and television" cost $1.5 million. As may be expected, the cost of carrying out comparable work is much higher today.

Environmental Impact Statement

An independent examination of methods and techniques for assessing the impacts of technology stemmed from the requirements of the National Environmental Policy Act of 1969 for the preparation of environmental impact statements (Dooley, 1995:299). According to Section 102 of the act, each agency "must include in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on: (i) the environmental impact of the proposed action; (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented; (iii) alternatives to the proposed action; (iv) the relationship between local short-term use of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved if the proposed action should be implemented" (Coates, 1977:261).

This requirement to prepare environmental impact statements has created a general demand throughout the federal system for systematic exploration of the secondary impacts of projects, and a consequent demand for the development of methodology, techniques, approaches, and procedures. Dur-

ing the first three years of the act, some 3,500 impact statements have been prepared, at an aggregate cost of about $65 million.

The 1972 World Environmental Conference in Stockholm was instrumental in creating an international awareness about the protection of environment and the conservation of natural resources. Following the model of the United States, many countries drafted legislation to create new departments on environmental protection and mandated environmental impact requirements (C. Porter, 1985:27–29). In the years since the conference, there has been a trend toward the gradual acceptance of thorough environmental investigation and evaluation of projects in most industrial countries of the world (see, for example, Therivel & Paridario, 1996a & 1996b). There has also been a growing concern with social impacts. In Australia, for example, there were many instances in which white workers were introduced into a remote or rural area with a small population. Aboriginal communities were particularly vulnerable to intrusions, and hostility often developed between an existing black community and the new white population. Even without racial conflicts, the introduction into a poorer settlement of a new highly paid work force, associated with, for instance, strip-mining ventures, can result in tensions resulting from envy of the more affluent lifestyle of the newcomers. In addition, when hundreds, if not thousands, of workers descend on a small isolated community, severe pressures are exerted on existing social organizations (schools, recreation facilities, hospitals), and conflict is likely to ensue between members of the community and the workers. Even with an urban environment, certain types of developments need attention. For instance, a major highway may geographically divide a community, as a lack of access across the highway would interfere with shopping patterns or children's movements to and from school. It is part of the environmental impact statement to consider the results of the development on the existing social environment and for the necessary commitments to be made to mitigate any adverse impacts.

Social Technology

It should be noted that the methods of technology assessment can also be used for the study of the effects of "social" technologies. The definition of technology assessment is capable of embracing changes in institutions and organizations—changes such as the invention of mass armies and the related invention of the military draft, the Land Grant Act establishing the state college system in the United States, the invention of pay-as-you-go income tax, the phenomenal advances in information technology (Laszlo, 1993), and the implications of new reproductive technologies such as the in vitro fertilization of women over sixty years of age (Shore, 1992). Social technology policy making is becoming a major issue (Sclove, 1994). One may consider legislation as a principal means of institutionalizing and regulating certain

social inventions and, therefore, clearly in need of continuing assessment. In fact, some assessments of this nature have been already carried out; for example, studies of the impact of marijuana on society, the consequences of heavy daily doses of TV violence, and the 1986 study by the Attorney General's Commission on Pornography (Vago, 1997:84).

METHODOLOGIES FOR CHANGE EVALUATION

In political, social, and organizational contexts, there has been in recent years a noticeable rise of interest in applying social science methodologies to the evaluation of change. This concern is reflected in the increasing use of social science methods to monitor the impact of social legislation under the heading of evaluation research (Ewalt, 1996). It is further seen in the rapid growth of the number of social science journals that either are specifically devoted to publishing evaluation research or accept such research material for publication. Prominent among them are *Evaluation Review, New Directions in Program Evaluation, Evaluation Practice, Evaluation and Program Planning*, and *Evaluation and the Health Professions*, besides several others (Berk, 1995).

Evaluation research is a form of applied research (in contrast to pure research) whose objective is to assess the effectiveness of ongoing programs and activities intended to bring about some kind of planned change. The aim of evaluation research is to establish how successful a particular planned change effort is in achieving its goals of improving conditions for some groups or individuals (Boruch, 1996; Rossi & Freeman, 1993). There have been many attempts for planned change to eliminate some negative condition or create some positive condition that affects the lives of people by instituting various programs. The federal government, for instance, initiated a large variety of programs during the 1960s, with the purpose of eventually eliminating poverty. Similar examples of planned change efforts can be cited in the areas of school reforms (Baizerman & Compton, 1992), programs for the homeless (Cohen, et al. 1993), or attempts at local economic development (Hughes, 1991). A basic objective of evaluation research is to answer the question of whether or not such improvement-oriented programs achieve what they set out to achieve. The outcome of such research can be used in policy making to determine which programs should be changed in what way, which programs should be eliminated, and so on.

Technically speaking, there are no formal methodological differences between evaluation and nonevaluation research. Both have in common the techniques and the basic steps that must be followed in the research process. The difference is in the intent and purpose of the investigator (Smith & Glass, 1987:33). Evaluation research uses the deliberately planned introduction of some independent variable. Unlike nonevaluation research, evaluation research assumes that program goals and objectives are desirable, and

its purpose is to determine the extent to which these objectives have been attained. Essentially, "evaluative research asks about the *kind* of change the program views as desirable, the *means* by which this change is to be brought about, and the signs according to which such change can be recognized" (Suchman, 1967:15).

Carol Weiss (1972:6–8) identifies several additional specific criteria that distinguish evaluation research from other types of research: (1) evaluation research is generally conducted for a client who intends to use the research as a basis for decision making; (2) the investigator deals with his or her client's questions as to whether the client's program is accomplishing what the client wishes it to accomplish; (3) the objective of evaluation research is to ascertain whether the program goals are being reached; (4) the investigator works in a situation where priority goes to the program as opposed to the evaluation; (5) there is always a possibility of conflicts between the researcher and program staff because of the divergences of loyalties and objectives; and (6) in evaluation research there is an emphasis on results that are useful for policy decisions. Consequently, some special problems are associated with evaluation research. There might be resistance to it by administrators of programs who feel that negative results might terminate their programs. The investigator might also be subjected to time constraints because he or she must deal within the time structure of the program being studied.

Identifying Evaluation Goals

In evaluating change, a number of areas must be taken into consideration. For ascertaining the program objectives, Suchman (1967) provides a guideline for questions that should be raised:

1. *What* is the nature of the content of the objective? Are we interested in changing knowledge, attitudes or behavior? Are we concerned with producing exposure, awareness, interest, or action?
2. *Who* is the target of the program? At which groups in the population is the program aimed?
3. *When* is the desired change to take place? Are we seeking an immediate effect or are we gradually building toward some postponed effect?
4. Are the objectives *unitary* or *multiple*? Is the program aimed at a single change or at a series of changes?
5. What is the desired *magnitude* of effect? What is the extent of anticipated results?
6. *How* is the objective to be attained? What methods, procedures, and techniques will be used in realizing program objectives? (1967:39–41)

To this list, one should add: What are the *unintended effects* of the program objectives? How much does it cost? And, what are its costs relative to its effectiveness and benefits? (Rossi & Freeman, 1993:18).

Design Considerations

A number of research approaches can be used for evaluating the effectiveness of a program (Yin, 1992). One approach might be the study of a group of individuals from the target population after it has been exposed to a program that had been developed to cause change. This approach is referred to as the *one-shot study*. Another possible approach is to study a group of individuals both *before and after* exposure to a particular program. Still another possibility would be the use of some kind of *controlled experiment*. There are many different kinds of controlled experiments, and the simplest kind for evaluation research may be set up in the following way. A number of individuals are selected from the target population with the use of probability sampling. The object is to create two groups as nearly similar as possible. The usual way to do this is through the random assignment of half the selected individuals to one group and the other half to the second group.

The key aspect of experimentation is that one group, the *experimental group*, participates in the program under consideration while the second group, the *control group*, does not. Measurements of the desired goals and outcomes of the program are made both before and after the program is conducted to see whether the program produces its desired changes. This is done for both the experimental and the control group. Ideally, the measurements should show no difference between the two groups before the program commences. If, however, the program is effective, the "after" measurements should show that the experimental group has experienced a change in the desired direction, which is noticeably greater than any change registered for the control group. The "after" measurement for the control group is the means by which we take into account any of the "other changes" related to the desired outcome of the program, which may be occurring for both the experimental and control groups. If we subtract the change experienced by the control group from the change evidenced in the experimental group, the result is a measure of the program's impact.

At this point, it should be obvious that an experiment is clearly superior to either a one-shot study or a before-and-after study. The control group in an experiment eliminates the possible interpretation that "other changes" are not accounted for in the one-shot and before-and-after approaches. However, in actual situations, the use of control groups is not always feasible. In some instances, the use of control would involve the denial of certain program treatments (for example, clinical) or benefits (for instance, welfare) to individuals.

At times, these research designs are supplemented by cost-benefit analysis and social audits. *Cost-benefit analysis* is basically a method for discovering the value of a good for which no market price exists. In social research, the difficulty with cost-benefit analysis is that there are no objective

visions exist for incorporating nonmonetary elements into the calculations of cost-benefit analysis. For example, how does one assign a value to "marital happiness" or "work satisfaction"? Moreover, because a change in one part of the social system will affect other parts in the same system, it is essential to make decisions about which effects are the important ones. For example, a program for reducing speech problems may in turn create the need to retrain speech therapists for other occupations. Although there are limitations to cost-benefit analysis, at times it has proved to be a useful supplemental method in evaluation studies and there is growing political pressure for its utilization in policy making (Swanson, 1997).

Perhaps the easiest types of costs to estimate are "extra expenditures needed to add a particular supplemental service to an ongoing program" (Glaser, 1973:25). For example, the *cost per client* can be determined by adding up the costs of operating the entire supplemental services needed and dividing by the number of clients per year. *Benefits* may be measured by "estimated reductions in social costs" (Glaser, 1973:27). But Daniel Glaser (1973:36–39) also notes that many social costs are purely speculative. For example, there is no way of expressing the anguishes of rape or the emotional costs of mugging. Still, some social costs can be dealt with rationally. For instance, the costs of heavy drug usage may be viewed from the point of view of society's loss of the drug user's work power and the loss of his or her potential tax dollars.

Social audits are also used to supplement other forms of research design and are helpful in determining the efficiency of a program. In the social audit, "resource inputs initiated by policy are traced from the point at which they are disbursed to the point at which they are experienced by the ultimate intended recipient of those resources" (Coleman, 1972:18). Social audit is obviously related to research outcomes. Lack of social change may be due to two factors: (1) The resource inputs may have been ineffective, or (2) they may never have reached their intended recipients. As an illustration of social audits, one may consider the tracing of resource inputs from the point of dispersement in voluntary organizations such as the United Fund to the point at which those inputs are experienced by the intended recipients.

Data Collection

In addition to considerations of objectives and research designs, evaluation research also includes plans for data collection, sampling, and measurement. Concerning data collection sources for evaluation research, Weiss (1972:53) compiled the following list:

> Interviews, questionnaires, observation ratings (by peers, staff, experts), psychometric tests (of attitudes, values, personality preferences, norms, beliefs), institutional records, government statistics, tests (of information,

interpretation, skills, application of knowledge), projective tests, situational tests (presenting the respondent with simulated life situations), diary records, physical evidence, clinical examinations, financial records, and documents (minutes of board meetings, newspaper accounts of policy actions, transcripts of trials).

As far as sampling is concerned, probability sampling plans are generally preferred for choosing people from the target population, but they are not always possible in evaluation research (Rossi & Freeman, 1993:235–263). In reality, more often than not a sample will consist of self-selected volunteers. The purpose of measurement in evaluation research is to develop measures of variables that validly and reliably reflect what the investigator is trying to measure. It is important for a program to have clear and explicitly stated goals if it is to permit valid and reliable measurements.

Problems of Research Implementation

It is important to note that the effectiveness of a program is often considered by administrators and program personnel to be secondary to the implementation of the program. Clearly, conflicts exist between the two goals. For example, as a program is being carried out, the strategies for dealing with the problem area may change because of the decisions of program administrators. It is also possible that program personnel may change or participants may drop out during the program. To cope with these and similar problems, Weiss makes the following suggestions:

1. Take frequent periodic measures of program effect (for example, monthly assessments in programs of education, training, therapy) rather than limiting collection of outcome data to one point in time.
2. Encourage a clear transition from one program approach to another. If changes are going to be made, attempt to see that A is done for a set period, then B, then C.
3. Clarify the assumptions and procedures of each phase and classify them systematically.
4. Keep careful records of the persons who participated in each phase. Rather than lumping all participants together, analyze outcomes in terms of the phase(s) of the program in which each person participated. (1972:98)

Utilization of Results

The final consideration of evaluation research involves the utilization of results. As James Coleman (1972:6) states, "the ultimate product is not a 'contribution to existing knowledge' in the literature, but a social policy modified by the research results." In many instances, however, the clients fail to utilize results of evaluation research, the negative results of evaluation

are ignored (Posavac, 1992), or the results have no visible impact on subsequent policy decisions (Weiss, 1986:216). They may feel committed to particular ways of doing things despite evidence that the program is ineffective. (This is particularly true in instances when programs were instigated by political pressures such as the various endeavors in model city programs, war against poverty, drug and alcohol rehabilitation, and corrections. As public interest waned in the later stages of these programs, there was no pressure to incorporate the results of evaluation studies into the ongoing activities.) The utilization of results could also bring about changes in relationships with funding agencies, clients, or other organizations. It is also plausible that the recommendations are economically unfeasible for the organization, and as a result, it cannot change its practices.

Obviously, there are a number of ways an organization can respond to the results of evaluation research. If the results are negative or anticipated to be so, an organization can attempt to use evaluation research in the following ways:

1. *Eyewash*: an attempt to justify a weak or bad program by deliberately selecting only those aspects that "look good." The objective of the evaluation is limited to those parts of the program evaluation that appear successful.
2. *Whitewash*: an attempt to cover up program failure or errors by avoiding any objective appraisal. A favorite device here is to solicit "testimonials" which divert attention from the failure.
3. *Posture*: an attempt to use evaluation as a "gesture" of objectivity and to assume the pose of "scientific" research. This "looks good" to the public and is a sign of "professional" status.
4. *Postponement*: an attempt to delay needed action by pretending to seek the "facts." Evaluative research takes time, and, hopefully, the storm will blow over by the time the study is completed. (Suchman, 1967:143)

The common feature of all these techniques is the attempt by the organization to manipulate evaluation research for its own interests. Evaluation researchers must be aware of this possibility and act accordingly.

In some instances in which the results of evaluation research are negative, the clients can discard the negative findings. In the field of corrections, for example, the following list of rationalizations of negative results has been used by professionals (Ward & Kassebaum, 1972:302):

> The therapeutic relationships examined or the impact of the program is "too subtle to measure with statistics."
>
> Even though they may come back to prison, they are better or happier or more emotionally stable people for having participated in the program.
>
> The effects of the program can only be measured in the long run, not just during the first six months or year after release.
>
> The program or the technique is OK but it is not designed for this particular individual.

The reason that the program failed was that it wasn't extensive enough or long enough or applied by the right people.
The program is worth it if it saved one person.

It is not too surprising to see such rationalizations from individuals and organizations whose programs are subjected to criticism as a result of evaluation research. On the other hand, dismissing the findings of evaluation research may be the result of methodological weaknesses and design irrelevance because policymakers are more likely to rely on their own experience rather than trust results of poorly executed studies. Finally, even if the study is methodologically sound and well carried out, it may not bear on the "critical issues." In spite of these limitations, evaluation research should be perceived as an important way of making the knowledge of the social sciences relevant to the study of social change, and social scientists need to be encouraged to devote more attention to it (Rossi & Freeman, 1993:389–398). In the next section, the use of social indicators in the study of change will be examined.

SOCIAL INDICATORS

There is a striking difference between how we as a nation assess our economic well-being and how we assess our social well-being. We are greatly concerned with economic performance. Hourly, daily, weekly, monthly, and quarterly, we observe precise fluctuations in a variety of economic barometers, from the Dow Jones Average to the Consumer Price Index. We have a Gross Domestic Product, an Index of Leading Economic Indicators, and an Index of Consumer Confidence. The economy's performance is continuously being monitored and data are being generated and presented to us in the form of economic indices and indicators that tell us how we are doing.

In contrast, the social well-being of the nation is reported much less frequently and without an overall view of the nation's social performance. To reduce the gap between economic and social reporting, social scientists have long felt the need to develop valid statistical measures to monitor levels and changes over time in fundamental social concerns. Since the 1960s, there has been a growing interest in the United States and abroad in measures of social conditions to supplement economic indicators with information on the quality of life and subjective well-being (Diener, 1994; Estes, 1998; Henderson, 1994). This interest resulted in proposals for social indicators that allow researchers to assess changes in the condition of a nation over time from some point in the past to the present. Measures of social indicators basically involve the identification of certain key aspects of social life such as health, crime, housing, satisfaction, use of time, and so on. These categories, in turn, are broken down into specific contents for which data are gathered over time. Generally, social indicators are conceived of as long-term measures in that the same data are gath-

ered consistently at specific intervals to allow for an analysis of changes which have taken place. Indicators range from broad measures of societal performance to specific neighborhood level activities (Sawicki & Flynn, 1996).

The social indicators "movement" is relatively recent, although there were earlier attempts. For example, in 1929 a presidential committee was appointed to undertake a quantitative analysis of American society and the changes that were occurring. It resulted in the publication of *Recent Social Trends* in 1933 (de Neufville, 1975:40). Much of the resurgence of interest in social indicators was due to the success of economists using economic indicators to predict the advantages of a tax cut upon the economy in the early 1960s. The question was posed by Raymond A. Bauer: "If we have highly organized economic indicators, why can't we set up a system of social indicators as well?" (quoted by Gross & Springer, 1969:18). The same question was in the minds of the President's Science Advisory Committee when, in 1962, it called for "the systematic collection of basic behavioral data for the United States . . . data that are comparable, systematic and periodically gathered" (Gross & Springer, 1969:18). By 1972, more than a thousand books and articles on social indicators had appeared. In the early 1980s, there was widespread reduction of funding for social research, which included social indicator work, and an apparent decline in interest by government officials in monitoring perceptions of well-being. By the late 1990s, funding for social indicators research was partially restored by both the government and private organizations, and the major journal of the social indicators movement, *Social Indicators Research*, remains vigorous, and important conceptual and empirical contributions continue to be made. Social indicators research concentrates on attempts to develop and refine measures of the *quality of life*, on indicator systems for *monitoring* an existing situation in society at a particular administrative or geographic level (for example, housing needs of low-income people), on the development of *performance measures* of public service delivery (for instance, health care for the elderly), and on *comparative techniques* (for example, analysis of predictors of life satisfaction and well-being in a number of countries or comparing specifics, such as health data, cross-culturally) (Diener, et al., 1993; McPheat, 1996; Rothenbacher, 1993).

Approaches to Social Indicators

There are several approaches to social indicators. They all have in common attempts to provide guidelines for the development of measures to fill the gaps in existing knowledge about social conditions; to try to link various measures so as to provide a picture not only of relevant phenomena but also of the relationships between them; and they all try to reduce information overload through concentration on relevant indicators and supporting data. It is obvious that whatever merit these various approaches have is determined by the criteria used to establish "relevance," what should be mea-

sured, what should be related to what, and how it should be presented. Let us now illustrate some of the more widely used approaches to social indicators (de Neufville, 1975:45–54; World Bank, 1997).

One approach to social indicators is to work on new methods for measuring hard-to-quantify aspects. Illustrations for this approach would entail the search for new ways to measure socioeconomic status, underemployment, or poverty. Experimental work is also under way to quantify and measure aspects of life such as work and housing satisfaction, housing and neighborhood quality, inequality, alienation and the use of the satisfaction concept in the wider conceptions of welfare (see, for example, Larson, 1993; Travis, 1993; Veenhoven, 1996).

Another approach to social indicators entails replication studies. In this approach, the argument is that social indicators are supposed to measure social change but in reality very little is known about how to do that. Here the emphasis is on one-time surveys, not on longitudinal time-series data. What is required is a set of measures taken in a carefully controlled way over time. To save time, the effort is to replicate studies that have already been done at least once. The objective is both to learn more about ways of collecting and interpreting indicators over time and more about the social processes themselves. Studies of social change in communities would be illustrative of this approach.

In still another approach, the emphasis is on indicators in their specific ideological, political, and organizational context. The accent is on how information can be used in a decision-making process. For example, contrary to dominant ideology, a comparative, continent-by-continent study of health data concludes that socialism is more efficient than capitalism in addressing health care needs, and in underdeveloped countries the socialist system has a clear advantage as measured by global health indicators such as infant mortality, life expectancy, birthweights, etc. (Navarro, 1993). In political and organizational contexts, United Nations agencies are searching for indicators that will help redirect particular policies of developing countries and the international organizations that influence them. Some organizations such as the World Bank and the United Nations Commissions for Trade and Development provide loans and aid to nations at least in part in relation to their performance on certain indicators. For instance, nations in the lowest quartile of the gross domestic product, literacy levels, and percentage urban population are eligible for special aid. International loans are generally given for projects perceived to increase the gross domestic product (Lengyel, 1986).

Data Collection

The principal methods of data collection for social indicators include interviews, self-reports, observations, and archives research.

The *interview* is the dominant technique because it is the most flexible. However, it is also the most expensive way of gathering data. *Self-reports*, in

which individuals or organizations provide information on themselves according to certain established formats, provide a less expensive means of getting some of the information otherwise obtainable only through interviews. It has obvious limitations, however, such as incomplete answers to questions, or failure to return the forms. *Observation* means getting information through watching, hearing, or otherwise directly sensing something. Its disadvantages include difficulties in interpretation and possible reactions in the observed. Finally, using *existing documents* is probably the easiest and least expensive way of collecting data. However, it should be noted that vital statistics, crime, and health and welfare data, which provide much of the background for social indicators, have initially been collected for other purposes. Documentary information is generally more useful in performing the activity it was designed for rather than analyzing it for other purposes.

There are many social indicators in use both internationally and nationally. International organizations, in particular the Organization for Economic Cooperation and Development (OECD), and the World Bank have been active in developing social indicators to measure the quality of life among its member countries. The OECD social indicators concentrate on general social concerns common to the twenty-four member nations and the World Bank surveys some eighty countries. The indicators include demographic, income and poverty trends; health; individual development through learning; employment and quality of working life; time and leisure; commands over goods and services; physical environment; personal safety and the administration of justice; and social opportunity and participation (World Bank, 1997). These indicators provide opportunities for intergroup, intertemporal, and international comparisons. Intergroup comparisons reveal relative levels of well-being of various population categories and thus provide guidance with regard to priorities for policy attention. Intertemporal comparisons give indications of changes that have taken place and show the quality of past government interventions. Finally, in addition to their inherent normative interests, international comparisons can throw light on how alternative schemes and institutional frameworks can effectively contribute to improve levels of quality of life in a society. The next section will consider the methodologies for forecasting change.

Methodologies for Forecasting Change

The future has always had a fascination for humankind. From the earliest times, humans have sought means for predicting the future. Kings and at least one recent U.S. president had their astrologers, while others relied on tools ranging from chicken entrails to complex mathematical models and computers—all with various degrees of success unrelated to sophistication of the tools they used. To a great extent, the ability to control the effects of change depends on being able to forecast the likely course of its development.

Current interest in forecasting methodologies can be attributed to the confluence of a number of factors. The downfall of communism in the former Soviet Union and Warsaw Pact countries brought about historically unprecedented economic, social, and political transformations that came as a surprise to most social scientists. Rapid changes in population, depletion of natural resources, and overproduction of scientific manpower have created an awareness of the importance of ascertaining optimal rates for consumption and technological growth and anticipating supply and demand levels in the advanced skills provided for youth. Forecasting of changes is also needed in social planning, in the setting of national goals, and in establishing priorities for governmental intervention and manipulation. For planning purposes, for example, it is important to estimate with some degree of accuracy what the population of a society will be ten, twenty, or thirty years later and the earth's agricultural capacity to provide for human needs (Bongaarts, 1994). The business world is preoccupied with planning for the future ranging from market conditions, leadership and competition to rethinking principles, controls and complexity (Gibson, 1997). (Organizing and being part of the growing circuit for seminars on planning and forecasting methods for business is a lucrative undertaking. The futurist gurus, including such names as John Naisbitt, Warren Bennis, and Alvin and Heidi Toffler (all mentioned in the book) are an elite group of university professors, economists, and consultants who often conduct such seminars for business and industry.) Casual reading of newspapers also suggests the importance of knowing what energy needs and natural resources will be in the future. We might also want to know whether significant changes will occur in employment opportunities in the future or whether welfare case loads or crime rates will increase or decrease.

There is no shortage of forecasting methods. In an early Organization for Economic Cooperation and Development survey, Erich Jantsch (1967) already identified more than 100 distinguishable techniques—although many of these are only variations in the choice of certain statistical or mathematical methods. In the same, 1967, the premier issue of the *Futurist* appeared and since then there has been steady parade of predicting technologies, many of them captured in the 1996 *Encyclopedia of the Future* (Cornish, 1997). For the present purposes, however, only a few of the more common (and not too mathematical) methods will be considered to illustrate briefly some of the ways in which change may be forecasted.

Extrapolative Forecasting The foundation of all forecasting is some form of *extrapolation*, namely, the effort to read some continuing tendency from the past into a determinant future in an attempt to aid rational decision making (Chalkley, 1993). The most common, and deceptive, technique is the straight projection of a past trend plotted on a line or curve. Linear projections represent the extension of a regular time series—productivity or expen-

ditures—at a constant rate. Most of economic forecasting is still based on linear projections because the rates of change in the economy seem to be of that order. In other areas, such as population, one cannot make simple predictions based on past trends. Instead, those interested in population changes talk about ranges of growth or decline that are based on a number of forecasts, and each forecast is based on a different assumption about future fertility rates. For example, a demographer might say, "If the fertility rate is 2.9 births per woman, we can expect the population to grow this way; if the rate is 2.4 births, population growth will assume a different direction," and so on. In other words, demographers will not make one flat prediction but, instead, will present a number of forecasts based on alternative assumptions about key rates.

Intuitive Forecasting It has been recognized in the scientific literature that intuition plays an important role in decision making which provides the rationale for *intuitive forecasting* (Vogel, 1997). There are two popular forms: scenario writing and the Delphi technique. The technique of *scenario writing*, popularized by Herman Kahn and Anthony Wiener (1967) and the Hudson Institute, is used widely for sociological, political, and environmental forecasting (Coyle, Crawshay, & Sutton, 1994). A scenario attempts to describe, in systematic and exhaustive but hypothetical and largely qualitative terms, the future sequence of events that would appear logically to evolve, step by step and through cause-and-effect relationships, from any given set of conditions or recognized trends. Emphasis is placed on those critical decision points from which alternative chains of events might arise and on the simultaneous interactions between events and their environment. A single set of assumed initial circumstances can generate an entire family of related scenarios (or alternative futures), any one of which may be plausible. Military strategists in the Pentagon, medical researchers, businesspeople, demographers, and many others rely on the technique of scenario writing. For example, the Pentagon continuously prepares, revises, and updates scenarios for nuclear attack in view of the changing nature of weapons technology. Medical research and planners concerned with the AIDS epidemic use scenarios that supplement other forms of projections about the future based on different assumptions about the spread of the disease (Bongaarts, 1996).

The *Delphi technique* was developed by Olaf Helmer (1966, 1994), a mathematician at the RAND Corporation. Since its introduction, it has experienced ever-increasing utilization, variants, praise, and criticism (Passig, 1997). It is designed to apply the collective expertise and intuition of a panel of experts by developing a consensus through several steps of systematic questioning and polling about future events. The polling process is carefully organized so as to minimize the biases that might otherwise arise from interacting personalities or other psychological influences within the expert panel. A feedback system is used to sharpen or narrow the forecast through

successive rounds of polling that are designed to call the attention of the panelists to factors they might have initially overlooked or dismissed and to force them to rethink or defend responses that differ markedly from the panel's overall views. The outcome typically is an approximate schedule of future occurrences. Delphi exercises can be particularly useful for exploring the future when adequate historic data are unavailable or when future developments are likely to be strongly influenced by such considerations as changing social values or political feasibility. Scenario writing and the Delphi technique have been applied to a variety of topics such as automation, electric and hybrid vehicles (Ng, Anderson & Santini, 1996), space exploration, probability and prevention of war, and population growth.

Modeling Forecasting In *modeling forecasting*, researchers increasingly use computer technology to simulate future social trends such as population growth from 1988 to 2087 in China (Shen & Spence, 1996). It is one of the most difficult forecasting techniques, and the outcomes usually tend to be rather controversial (Van Steenburgen, 1994). Still, models built on assumptions of discontinuity and nonlinearity hold promise for analyzing contemporary social change and have analytic value for testing new change theories (Hallinan, 1997).

One of the most publicized debates is the controversy precipitated by the publication of *The Limits of Growth*, in 1972, by Donella Meadows and her colleagues (1972). In their book they raised the question: What will happen to the world if current economic and demographic trends continue to increase at present rates? On the basis of data from 1900 to 1970, Meadows and her associates constructed a model composed of five key variables central to the world's ecological system—population, food supply, natural resources, industrial production, and pollution. They then constructed a set of mathematical equations detailing the processes through which the five variables interact with each other. These equations, constructed from available data, describe a feedback system in which a change in any one of the variables effects changes in the other variables, which, in turn, modify the variable that started the change process. One of the several equations describing the dynamic interactions between the variables might, for example, detail a feedback process that is set in motion by a change in population growth rates resulting in changes in demands for natural resources. This produces changes in productivity; these changes, in turn, affect the food supply, resulting in changes in population growth. After describing mathematically how the variables have interacted with each other in the past, they were prepared to simulate that same process into the future. The results are quite gloomy. They have predicted that the limits to growth on earth will be reached within the next 100 years and most likely will result in a rather sudden and uncontrollable decline in both population and industrial capacity (Meadows et al., 1972:23).

A more recent attempt in global forecasting was the *Global 2000 Report to the President*. It was commissioned by the Carter administration as an attempt to employ the huge amount of data and modeling techniques available to the federal government to develop a comprehensive and authoritative series of projections concerning the world's population, environment, and resources. It was a massive three-year study with rather gloomy conclusions. In the dramatic words of the study's summary:

> If the present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stresses involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today. (Teich, 1997:136)

Survey Forecasting *Survey forecasting* entails the use of survey instruments in either a panel design (using the same respondents in successive surveys) or in a cross-sectional design (using samples of individuals drawn at successive points in time), both with a view to identifying emerging trends in or estimates of attitudes. It is used primarily to forecast for a limited time horizon in areas such as political campaigns (Whom would you vote for?) and consumer behavior (Do you plan to buy . . . ?). As a rule, political pollsters do not consider their polls to be valid for more than a week or so, and, similarly, consumer buying and economic confidence forecasts tend to have a rather short time horizon.

Clinical Prediction In this method of forecasting, the emphasis is on what individuals, groups, or societies will do, given information about attitudes, beliefs, past experiences, and so on, and observations on their or its behavior. "The transfer of this procedure from the clinic to the society at large is referred to as 'social psychiatry'—an enterprise that is generally subject to severe criticism as being too superficial and anthropomorphic" (Harrison, 1976:7). On the individual level, fairly accurate predictions may be made based on performances on intelligence tests, standardized personality tests, other measurements and instruments (such as the various college and professional school entrance examinations), and the analysis of existing biographical information. The usefulness of this method is, however, highly questionable for the prediction of social events.

Intuitive Planning Technically speaking, *intuitive planning* is not a method of forecasting; rather, it is a subjective, nonexplicit, nonreproducible estimation of a likely course of events in a plan (Harrison, 1976:8). It is based on a combination of past experience, common sense, and a touch of

self-attributed clairvoyance and is mentioned here simply because some policy makers use this fast, inexpensive, and methodologically sloppy approach in their work.

Multimethod Forecasting Quite frequently, one finds a number of the preceding types of forecasting methods combined in various ways to produce a forecast such as involving the prediction of criminal behavior (see, for example, Harris, 1994). Obviously, it is very difficult to formulate guidelines for the best mix of methods to use for a given social forecasting problem. One may assume that if several different forecasting methods are used with the same set of data it may be more accurate than if only one method is used. However, there is no information on how much more accurate a forecast will be as to the use of combination or multitude methods.

Accuracy of Forecasts Those doing most of the forecasting research—the think tanks, corporate planning offices, government agencies, and the like—are subjected to strong economic, time, and professional prestige motivations to produce social forecasting studies that look good. Daniel P. Harrison (1976:56) notes that with the various kinds of forecasting methods, the amount of error ranged between just a few percentage points (for example, with econometric models, survey forecasting) to over 40 percent (clinical prediction), depending on the method and time horizon used. He comments that "In almost every instance where forecast accuracy was assessed in terms of estimated user needs in particular contexts of use none of the methods could be said to perform at an adequate level; this may help to account for the modest impact forecasts have had on decision making" (1976:57). The state of the art of forecasting change clearly provides vast opportunity and need for research on forecasting methods in addition to the substantial amount of work that has been done on forecasting methodology to date. In the final section, policy implications of change assessment will be considered.

POLICY IMPLICATIONS

In the preceding sections, several methodologies have been discussed that are used in the assessment of social change. In a sense, the development of these methodologies can be seen as a response to the growing demand for the quantification of social phenomena for decision-making purposes. Many of these methodologies are capable of generating information that can have policy or applied implications. Such information is helpful in transferring the basic knowledge and techniques for use in policy decisions or in evaluating current policies or proposed policy alternatives (see, for example, Maxfield & Babbie, 1995:322–330). Data generated through research provide policy makers with means for identifying problems and

grounds for their discussion. Availability of hard data also helps in reducing the judgmental elements in decision making and thus the personal responsibility of decision makers.

Research findings also filter through to policy makers indirectly. Often, they hear about generalizations and ideas in the mass media or pick up information during conversations with colleagues and consultants. In this sense, research enlightens them and modifies the definition of problems they face (Weiss, 1986:218–219). This does not mean, it should be noted, that policy makers always rely directly or indirectly on data in making decisions. Often political considerations, personal experience, interest-group pressures, and a host of other phenomena enter into the picture.

Still, the methods of technology assessment are being increasingly used in policy making. Technology assessment is policy- and action-oriented, and the results are being used to change or influence policy decisions. This orientation stems from the milestone events that have contributed to the establishment of technology assessments as legitimate and substantive programs within the realm of governmental activities, both in the United States and elsewhere. As it was pointed out, the recognition of the need for technology assessment resulted in the formal establishment of the Office of Technology Assessment in the United States Congress.

Technology assessment may be seen as part of a rational process of policy making with four steps: (1) identification of possible outcomes of policy alternatives; (2) estimation of the valency or probability of each of the possible outcomes; (3) estimation of the utility or disutility of each of the outcomes to the interested parties; and (4) weighing the utilities and disutilities to the interested parties and deciding whether the policy alternative is better than other alternatives (Folk, 1977:243). The importance of the methods and techniques of technology assessment for decision making is also reflected in the requirements of the National Environmental Policy Act of 1969 for the preparation of environmental impact statements for federally sponsored projects.

The use of quantitative information is increasingly built into legislation, and there are specific requirements for the evaluation of many federal programs and activities designed to induce change in some area. As it was noted, evaluation research is characterized by explicitness of policy implications in the design and execution of the research plan and the incorporation of variables specifically relevant to the problem at hand. Evaluation research allows policy makers to determine the effectiveness of a program, whether or not it should be continued or phased out, and what in-course adjustments, if any, are needed to make it more effective. But care needs to be exercised to avoid reducing outcomes to what may be called "one-number" summaries of complex and multi-dimensional programs (Broder, 1997).

Social indicators for some time now have been used for measuring and reporting changes in the quality of life and related social concerns. Lately there has been a growing reliance on social indicators in decision

making and policy debates, both at the national and international levels (see, for example, McPheat, 1996). Policy makers increasingly find it desirable to issue information designed to estimate or evaluate the state of society and in varying degrees to assess alternative courses of action. Social indicators are also used as a vehicle to focus on public discussion on changes in the quality of life, increasing the level of awareness of the public, who, in turn, can exert some pressure on decision makers to engage in alternative courses of action.

Forecasting methodologies are essential for long-term planning and decision-making efforts. As with other methodologies of change assessment, governmental and nongovernmental policy makers at various levels are increasingly relying on the use of estimates and projections for future trends so that decisions and policies can be as future-proof as possible (Coyle, 1997). With improvements in forecasting technologies, this reliance is anticipated to grow.

It should be noted, however, that once these various social science methodologies become relevant to and influential on policy, they become part of politics by definition. In such a situation, data can become tools for immediate political ends, and politicizers of data are not interested in them for their information content, but for propaganda. Ideally, the objective should be to insulate, but not isolate, the statistics from the immediate vagaries of day-to-day politics, to strike some sort of balance between political and technical considerations, permitting neither to dominate, and to concentrate on accuracy and not on advocacy.

In contributing to decisions of technological, economic, administrative, and social welfare policy, social scientists can provide skills and perspectives related to an enriched appreciation of human needs, a fuller anticipation of the consequences of new technological inventions or new policies, and a greater respect for basic human values. In order to do so, however, there is a need for a greater dialogue between social scientists and decision-making bodies.

SUMMARY

This chapter examined the various measurements and methodologies used in the assessment of change. Longitudinal designs conduct observations at two or more points in time. There are two major types: panel and cohort. Panel analysis involves the observation of the same sample at two or more points in time. Cohort analysis is the observation of a specific cohort (age group) at two or more points in time. A form of quasi-longitudinal design is the recall survey, which conducts an observation at one point in time and has respondents remember information to establish a prior observation. Trend surveys also sample a population at two or more points in time. In addition

to these types of analyses, sociologists interested in the study of change often use historical data to establish long-term trends or to test theories. The use of personal documents such as diaries, letters, and biographical statements have long been considered useful in the study of change. Researchers interested in historical experiences of large groups often turn to the use of available documents and records, which provide systematic data on large numbers of individuals.

The concern with the growing impact of technology on society gave rise to technology assessment to provide methods for identifying the implications and effects of technology on society. The methods of technology assessment may be future-, present-, or past-oriented. The common steps in assessment entail the definition of assessment task, description of relevant technology, development of state of society assumptions, identification of impact areas, preliminary impact analysis, identification of possible action options, and impact analysis. The methods of assessment are borrowed from different fields, for technology assessment has no defined set of tools. Comprehensive technology assessment programs can be very expensive. Methods of technology assessment are used also for the preparation of environmental impact statements and in the study of social technologies.

In recent years, there has been a considerable rise of interest in applying social science methodologies to the evaluation of planned change efforts. This interest is reflected in the growing emphasis on evaluation research. The object of evaluation research is to establish how successful a particular planned change effort is in achieving its goals. The designs of evaluative research include one-shot studies, before-and-after studies, and controlled experiments, supplemented by cost-benefit analysis and social audits. It also includes plans for data collection, sampling, and measurement. The differences in emphases between program administrators and researchers is a potential source of problems. If the results of the evaluation program are negative, the client might attempt to dismiss the findings or rationalize the conclusions.

The social indicator "movement" is relatively recent. Three rationales for social indicators have been described: social policy, social change, and social reporting. The approaches to social indicators include the design of "the best set of measures for a society," devising new methods for measuring the hard-to-quantify, the design of theoretical frameworks, replication studies, and the use of indicators in their specific political and organizational contexts. After a brief review of the social indicator models, methods of data collection for indicators were considered, which include interviews, self-reports, observations, and the use of existing documents. The section concluded with a discussion of the use of social indicators by the World Bank and the Organization for Economic Cooperation and Development.

The methodologies discussed for forecasting change included extrapolative, intuitive, modeling, and survey forecastings, clinical prediction, intuitive planning, and the use of multimethod forecasting. In spite of the

considerable amount of research that has been done on social forecasting methodology to date, the state of the art of forecasting warrants additional research to increase the accuracy of both short- and long-term horizon forecasts.

The methodologies discussed in this chapter have important policy implications. Technology assessment is policy- and action-oriented, and the results are being used to alter or influence policy decisions. Evaluation research is increasingly built into legislation, and there are specific requirements for the evaluation of federal programs and activities dealing with deliberate social change. There seems to be a growing reliance on social indicators in decision making, both at the national and international levels. Forecasting methodologies are essential for long-term policy planning and decision-making activities. Policymakers at various levels are increasingly relying on the methods of change assessment, and this reliance can only expand in the future as the government undertakes more responsibility and wants more information.

SUGGESTED FURTHER READINGS

Dale, Angela, and Richard Davies (eds.). *Analyzing Social and Political Change: A Handbook of Research Methods*. Thousand Oaks, CA: Sage, 1994. A comprehensive discussion of the various methods available for the analysis of social change over time, the research objectives to which the techniques are suited, and the limitations and constraints of individual methods.

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