THE DELPHI METHOD AS APPLIED TO PUBLIC INVESTMENT DECISIONS

William D. Gunther and J. F. Vallery, Jr.

University of Alabama

This article considers some recent developments in the area of "opinion technology" and the potential use of these developments in formulating regional development policy. In particular, we explore the potential role of the Delphi Technique for eliciting and refining local "informed opinion" in the determination of regional development plans and policies. Basically, the objective is to incorporate into the regional analysis the "expert" opinion of local citizens in a meaningful manner. It is our contention that the quantitative economic data and the feasibility of development programs can be improved through the use of this source of information. The objective of tapping this source is especially important in light of the "new regionalism" of today in which local participation may often be a prerequisite to financial assistance.

The Role of Local Opinion

In this section, we shall trace briefly the historical developments in the use of local groups or committees in the development planning process. We are particularly interested in the attempted use of informed local opinion as distinguished from mere speculation. The distinction is perhaps one of degree, in which we can think of a continuum with factual knowledge at one end, speculation at the other, and informed opinion somewhere in between. It is this middle ground, where there is an objective basis for the opinions expressed by individuals but insufficient evidence to qualify as knowledge, that is referred to as opinion. This potential "data" source has long been ignored, primarily because of the many problems of effectively exploiting it as an input in the decision-making process. Nowhere perhaps is this slighting more obvious than in the broad area of regional economic planning.

On the surface it appears that this may be a "straw-man," for most economists are all too aware of the role of regional development councils in policy formulation. But, as we shall point out shortly, the role played by these committees is far below their potential. Let us briefly trace the developments leading up to the use of local groups in development plans.

Following World War II, a surge in development activity at the state and local level began replacing the large scale federal programs common with the "new deal" philosophy. By 1957 a survey revealed over 14,000 public and private organizations dealing directly or indirectly in local and regional development.[1] However, much of this activity was the result of a shifting of emphasis from the depression and war-related activity to the industrial post-agricultural era. Communities became aggressive in seeking to attract and keep industry, and local industrial development councils spread rapidly across the country. Unfortunately, most of the agencies created did not have the resources or authority to develop the type of comprehensive plans needed to overcome the complex problems they faced. Only seven percent of these agencies actually established formal development plans. Local problems were poorly analyzed and programs with long-run implications were seldom undertaken. The agencies did, however, provide an opportunity for local participation in planning for the directions of development and consequently developed a favorable "climate" of opinion for further goals.

The precise role of local participation is viewed as one of mobilizing the community for action.[2] Getting local communities to think and discuss

their problems is felt to be an essential part of mobilizing local resources. The federal government's role is to provide financial assistance which will enable the area, region, or community to initiate a realistic program designed to aleviate and cure the development problem. Local responsibility for the direction of these programs seems to be the major theme in the "new regionalism" of the 1960's.

An example may help to illustrate the above argument. The Economic Development Administration (an agency created by Public Works Economic Development Act, 1965) requires a local OEDP (Overall Economic Development Plan) group to prepare and present such a plan. However, the committee writing the plan must be "representative of the community so that all viewpoints are considered in its discussion and decision-making and all available local skills are engaged in program formulation."[3] The final plan must explicitly state (1) community goals and (2) a realistic action program.[4] Through "technical assistance" provisions of the Act, local communities can receive aid in securing the assistance of "skilled technicians," and specifically indicates that "the communities... take every opportunity to use 'assistance and technology' in developing or improving continuing action programs."[5] The "skilled technician" presumably incorporates local opinion into the analysis, as does the OEDP Committee in passing on the technical document. It is doubtful that the technician makes any systematic attempt at using "opinion" in a technical report, and the OEDP Committee will find it almost too easy to accept the report as submitted. This neglect may represent a significant loss of "information," and in addition may be a violation of the spirit of most recent Federal legislation.

Several areas in which the use of local "opinions" could be quite useful (and in which "hard" data at the sub-state level is quite superficial) are:

(1) Assessing the relative status of existing public facilities;

(2) Assessing the priorities which the local community feels are necessary; and

(3) Developing plans which are cognizant of the political feasibility of such programs.

Let us examine each of these possibilities. Point one is rather obvious. The development technician typically communicates or interacts with various segments of the local community in assessing the quality of local public facilities. A high-spirited committee may even discover their local neglect of the public sector and resolve to do better. If the committees are skillfully handled, it is quite possible that they will venture into active discussions resulting in positive suggestions for progressive change.

When cause-effect relationships of economic development are discussed under the second point, however, a long list of cure-alls tends to emerge in face-to-face group discussions. The fact is, in many cases, that few participants will openly suggest proposals which might offend some influential member of the committee. In the event that a less timid committeeman should make an "out of line" proposal, he is immediately vulnerable to an attack from special interests. The problem lies in the area of questionable propositions which might have real merit, but which will never be given full consideration. Whether suspected local factors in the cause-effect relationship are uncovered by "informed local opinion" or simple intuitive speculation, they will receive "professional" attention by the technician only if they emerge as "suspects."

On the other hand, technicians (those with professional training in the science of economic development) may be masters of functional relationships of growth theory. When the chips are down, however, and the art (or black magic) of diagnosis, prognosis, and prescription are required, the development expert is forced to work from a rather limited data base in small areas. Census data, neatly arranged and massaged by such analytical technique as shift-share analysis, stacked in the age-bracket pyramids or converted into labor force participation rates are interpreted in terms of weaknesses in the local economic structure. To be perfectly blunt about the matter, out-of-date and out-of-context data which are really proxy measures of the variable the technician wishes to evaluate, are typically interpreted as deficiencies in school systems, surplus labor supply, riches in the form of the area's natural resources, or any number of other pronouncements.

The point is that there is a significant chance of error in the technician's interpretation of this data. Worse yet, the possibility of error is sufficiently evident to "laymen" committee members that the technician's "findings" are subject to challenge if the policy implications are out-of-line with the committee's predetermined, and sometimes highly biased, opinion. In order to protect the technicians from error as well as to familiarize the committee with available knowledge, a systematic approach to opinion technology offers significant advantages.

The third point of possible help from the Delphi Technique, determination of a feasible political program, may possibly fall beyond the scope of the technical methodology. We propose, however, that the technique may prove useful in setting priorities in the array of developmental projects which offer a reasonable chance of success. This ranking of public investments within a framework of local goals, if even reasonably successful, would contribute significantly to the success of regional planning.

Since there are no "facts" in regard to value judgments, a poll of select local citizens on a policy-formulation committee may be considerably less "scientific" than the typical public-opinion survey. Nevertheless, the pragmatic need for a local commitment to some stated matrix of clear-cut objectives is essential in developmental planning. By philosophical and legal design, however, the technician is only to aid the local committee in arriving at a logical development plan. But although his role requires a professional level of detachment, his work is sometimes characterized by personal judgment and often based upon his perception of local values. Even when an attempt is made to present policy alternatives, the technician's contract calls for a finished document and the "plan" must be written. As the perusal of several "regional plans" will convince the reader, the technician usually interprets and prescribes but, in self-defense, his prescription list is long, general, and typically noncontroversial. Local government is then armed with the "comprehensive plan" and is free to pick and choose among many recommendations without further reference to the analytical content of the development plan or the intent of the investment.

One possible solution would be to incorporate the technician into the various committees and allow him to become less detached from the "feasibility" of programs. As Professor Ackly points out, the economist should "... be willing to understand that not all courses of action are equally feasible, and often the ideal course of action must be compromised in favor of a good course that can be carried through successfully."[6] In the past, the problem has died here for want of a practical "technology" since qualified technicians cannot be permanently incorporated in local development organizations. Delphi, however, is now offering the possibility of a systematic determination of "good" solutions.

On the Nature of Committee Performance

There is a considerable body of literature which suggests that committees are an effective mechanism for determining solutions to complex problems, particularly when a variety of skills would be most appropriate to the problem.[7] This increased accuracy of committees over individual response could be partially explained by the higher probability of obtaining at least one "superior" member on the committee. Another argument contends that individual accuracy is improved through discussion, thereby increasing the group's accuracy over what could be expected from individuals.

Committees also exert pressures toward conformity among their members. This may, in many cases, detract from the advantages of committee performance if conformity and accuracy are largely unrelated. Such a divergence would be quite likely if the individuals are preoccupied with sociopsychological needs, such as status, ego, and group conformity norms. It seems quite likely that most committees formed for the purpose of task evaluation would face these problems, and consequently diminish the advantages of group versus individual results. The real problem then is how to obtain the benefits of group performance while minimizing the limitations so often found associated with committees.

The Delphi Technique: Methodological Review

Most of the sociopsychological problems of committee members are associated with the face-to-face meetings where individual personalities carry a weight often unrelated to any special knowledge of the problem area. However, the discussions of problems in these group meetings is a very desirable feature, in essence being the information accumulation process. The Delphi Technique is a compromise between the advantages of "group discussions" and the limitation of face-to-face confrontation.

The Delphi Technique is a systematic procedure for electing and refining group responses in an anonymous fashion. Its most distinguishing features are the use of anonymous questionnaires as a means of eliciting a response and the systematic "feedback" of the results of these questionnaires.

Originally developed by Olaf Helmer, the technique as a practical tool is still largely in the embryo stage.[8] Much of the literature dealing with the procedure suggests that group results will tend toward a consensus which is as accurate as any given individual determination of the actual fact.[9] Several other tests have attempted to measure the "accuracy" of this conseusus determination at "testable" facts, such as the population of a little-known country, and although results are inconclusive, the results do suggest the process is at least as accurate as the open committee methods.[10]

Briefly, the technique replaces the face-to-face meeting of the committee with a series of questionnaires which both ask for and feed back relevant information. Reasons for particular responses to a questionnaire are collected, summarized, and presented in subsequent rounds. During each subsequent round, members of the committee reevaluate their position in view of this new information.

This process systematically and unemotionally presents to all members the reasons for a particular position or view on the problem. Consequently only the relevant information is introduced in the evaluation and sociopsychological influences are substantially reduced. After a series of rounds, the result will tend toward a consensus of opinion based upon a systematic consideration of the relevant information, and one that theoretically tends toward the "correct" facts.

Before we discuss our proposed use of the Delphi, a brief review of a few applications (as opposed to methodological tests) which have been made of the process will clarify the potential advantages and rather questionable limitations of the technique. This list is probably not exhaustive, but does represent some of the "readily" available material. Although an indication that some "in-house" use has been made of the technique, no systematic attempt has been made to determine this.[11]

An early attempt to utilize the Delphi method for practical results was made by Farmer and Richman in 1965.[12] Their study revolves around the theme of variations in managerial activity and economic growth in an international setting. These variations were initially attributed to problems of managerial efficiency, but it soon became obvious that the external environment was a critical factor. In an attempt to isolate these environmental factors, Farmer and Richman utilized the Delphi method as a research tool in seeking consensus on the managerial problem in less developed economies. The result of the application formed a large part of their analysis of comparative management problems.

The steps recommended by Farmer and Richman and generally followed in their study are presented in the following outline. This outline presents a comprehensive list of relevant steps. They readily concede, however, that it may not be necessary to duplicate each step to insure the methodological soundness of the approach. Such deviation as may be required by the nature of the problem must be carefully examined to determine its significance to the established procedure. They were able in their study to establish a rather exhaustive list of internal and external constraints faced by international management in establishing branch plants in foreign countries.

Following the same general procedure, Dicer utilized the Delphi in an attempt to determine the important environmental constraints on the logistics operations of international firms.[13] While Dicer did complete the study, the paper was essentially descriptive and the result of the Delphi did not become input for any real-world managerial decision. His major thesis, however, that the methodology is practical in actual application to real problems, is convincing.

The nature of both the Farmer and Richman and Dicer applications required the use of "experts" who possess both knowledge and predictive reliability.[14] Knowledge is a relatively straightforward criterion; on this basis "expertise" is a relative term which depends upon the task of the group or committee. Predictive reliability refers to the historical record of performances relative to producing the "correct" solution to the factual information sought. This may be quite difficult to assess in many areas where "opinion" must be converted to usable "fact" now, and where the proof of reliability will eventually become an historical but irrelevant datum. Such is the case in the suggested use of Delphi in this paper. We would expect on a priori grounds, however, that the process of anonymous group evaluation would result in a movement toward a "correct" solution, especially when one considers that on at least a relative basis, "experts" are being utilized.

The Delphi in Regional Analysis

The main purpose of our research is to explore the use of the Delphi process in applications involving regional development. In so doing, we hope to demonstrate the potential extent to which local opinion can be incorporated in the decision-making process of the regional planning. The major advantage envisioned in the use of Delphi is that policy formulation will be based upon the best possible understanding of underlying factual consideration by the committee charged with policy recommendations.

STEPS TO BE TAKEN IN APPLYING THE DELPHI TECHNIQUE IN QUESTIONNAIRES

Step 1 Define the problem to be solved.
Make the answer quantifiable wherever possible.

Step 2 Determine areas of expertise which bear on the problem.
These can concern the total problem or sectors of it.

Step 3 Select experts to be used in solving the problem.
- A. Must have requisite knowledge and be able to apply it to problems.
- B. Must have good performance record in their areas.
- C. Must be rational, objective, and impartial.
- D. Must be available over a period of time (2-4 weeks).
- E. Must be willing to participate in the study.

Step 4 Contact experts being considered.
- A. This can be done in person or by letter.
- B. Explain the total study being undertaken.
- C. Explain the central problem under consideration.
- D. Explain the role they will be expected to play in solving the problem. (Responding to questionnaires and analyzing data between questionnaires.)

Step 5 Prepare the first questionnaire.
- A. Restate the problem under consideration in specific terms.
- B. Request a numerical estimate of rating at this time.
- C. Also include questions which bring out:
  1. The respondent's reasoning;
  2. The factors which he considers relevant;
  3. Information as to the kind of data he feels would enable him to arrive at a better appraisal of these factors and thereby at a more confident answer to the primary question.

Step 6 Distribute the first questionnaire.

Step 7 Analyze the results from this questionnaire.

Step 8 Prepare the information which is asked for and examine the factors which are being considered.

Step 9 Initial Feedback
- A. Feedback information that was either requested by some one of the experts or which deals with factors and considerations which are considered relevant.
- B. Take care to conceal opinions of the other experts.
- C. Correct misconceptions about empirical factors or theoretical assumptions underlying those factors.

Step 10 Prepare the second questionnaire.
- A. Included here is a statement of how the questions appear to have been broken down, i.e., list items which are taken into consideration and what these lead to.
- B. Ask questions about their agreement or disagreement with the basic considerations listed; ask them to revise this list.
- C. Ask for a revised estimate of the answer to the basic question.

Step 11 This procedure of distributing questionnaires and controlled feedback between them is continued until the consensus is considered accurate

enough to be used as an estimate for the answer to the problem.

Step 12 Correct final responses.

A. This can take the form of replacing some of the individual component estimates with a consensus of estimates.
B. The median of the responses can be used.
C. Some weighted average taking into account the relative expertise of the participants can be used.
D. Unsatisfactory participants can be ignored.

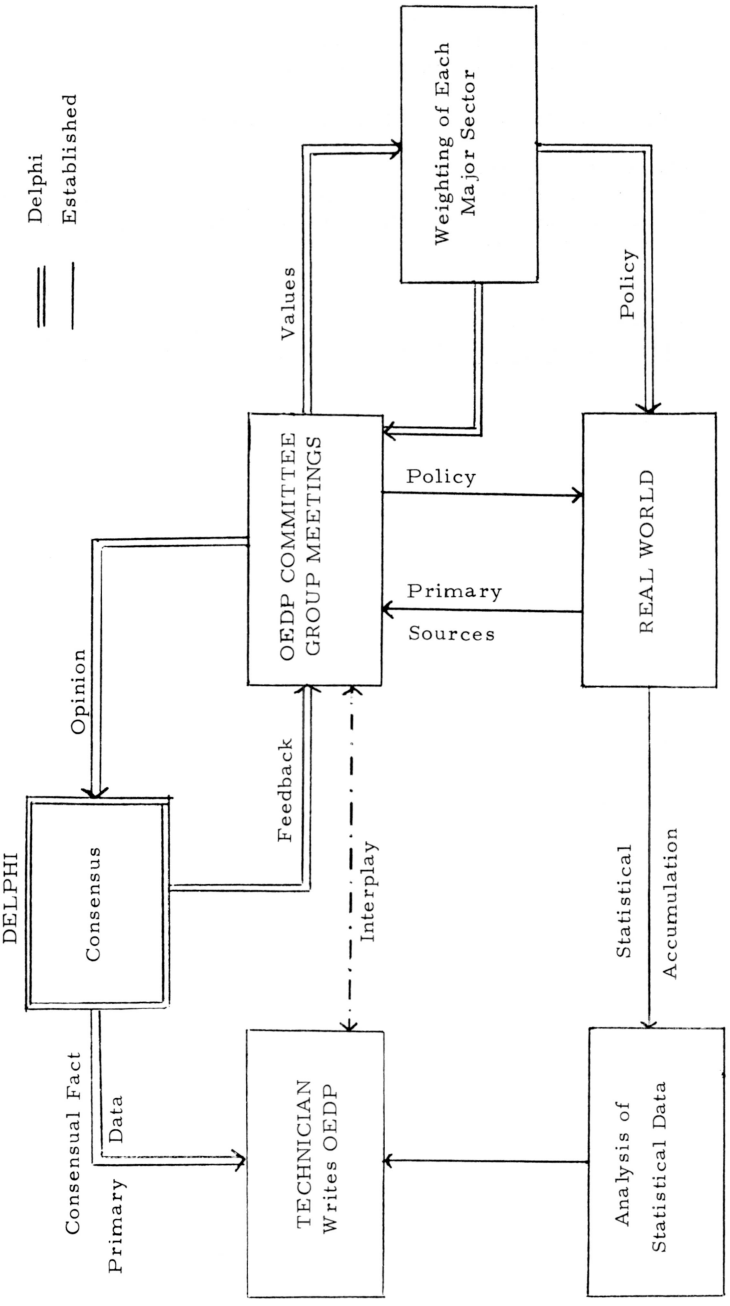
Step 13 Apply the final consensus to the original problem (in whole or in part).

Step 14 Acknowledge assistance.

A. In publication allow respondents to review the final answer.
B. Acknowledge their assistance and identify the possible shortcomings of the method.

Source: Richard N. Farmer and Barry M. Richman, Comparative Management and Economic Progress (Richard D. Irwin, 1965), p. 332.

FIGURE I - DELPHI FLOW CHART



The advantages envisioned for the Delphi Technique are illustrated in Figure I. Under established procedures (single lines), the OEDP committee (or other group as illustrated in the center rectangle) is a sample drawn from the "real world," which is shown as the bottom-center rectangle. The committee draws its "expert" knowledge of the factual situation from having been a part of the environment; they qualify as policy-makers on the basis of local interest, involvement, and success.[15] The statistical accumulation (or proxy indicators of the factual situation) is shown as flowing to the analysis rectangle where the technician, in his role as a development expert, works with whatever data is available to identify potential development problems.[16] Next, the actual writing of the analytical and policy document is presumably influenced by the interplay between the technician and committee members where he received additional information, presents alternatives, and acts as a staff member in writing the plan. Members presumably consider the facts and make decisions. The dotted line for "interplay" isolates the basic problem--these flows tend to be highly imperfect.

The proposed use of the Delphi Technique is to strengthen the interplay. Rather than using crude and perhaps dated statistical sources to identify problems, the development expert (or technician) asks the situation experts to directly identify problems. If the answers should contain assessments which appear contrary to statistical indicators, this additional information is fed back in subsequent rounds along with anonymous comments from the questionnaires. The facts established by the movement toward a consensus and incidentally, fully integrated into thought patterns of committee members, can be no worse than "facts" established by the statistical analysis of the technician working with secondary sources and imperfect communication channels.

Moreover, the question of accuracy of the consensus on "factual" identification of problems becomes secondary if the Delphi process stimulates interest and a better understanding of cause-effect relationships among local development committees. "Poor schools" or "a great natural resource base" are "facts" not only in regard to technical possibilities but also on the basis of a complex array of policy trade-offs. In short, "facts" uncovered by a technician working independently may not be accepted by a committee unless the "fact" can be evaluated in terms of the developmental relationships which are not always recognized by committee members working outside of their area of expertise.

Even though relevant technical facts are dependent in part upon the policy orientation, the application envisioned does not suggest that value judgments and factual knowledge are inseparable. To the contrary, the questionnaire can be constructed in such a manner that judgments can be isolated in the early rounds and subsequent rewording of cause-effect relationships can be explicitly stated in terms of a refined statement of the objective. For example, the initial questionnaire may implicitly assume that "economic development" is sufficient basis for evaluating "new roads." In later rounds reflecting initial returns, an attempt can be made to isolate the impact of "short access roads to major highways" in inducing "labor-intensive industries" to locate in the area.

Either by gradual transition, or perhaps by an abrupt change in the questionnaire, a transfer will be made from the upper Delphi loop leading to a consensus on facts to the side loop where a consensus on the areas value judgments can be reached and converted into an explicit statement of policies to be followed.

To illustrate the procedure, a Round-One questionnaire is reproduced

in the Appendix. The format illustrates the type of questions which would be appropriate for improving the "proxy" data inputs for the technician. For example, most OEDP's make some attempt to evaluate the quality of education on the basis of census data showing the educational levels attained and annual reports on expenditures. Inferences are then made to the effect that "the school system must be improved." Little thought is given to the fact that this conclusion is a qualified judgment based on imperfect information and an implicit judgment as to the type of industry the area should seek to attract. By and large, informed citizenry could be expected to reach the same conclusion if some thought were given to the matter, and if they realize that a trade-off must be made between maximum employment increases and upgrading skill and wage levels. Delphi asks for these simultaneous conclusions directly.

In part B of the questionnaire, a forced-choice evaluation of "problems" is also the first step toward determining investment priorities for a feasible action plan. The first round result would be tabulated and the results, in term of averages or modes, would be part of the "feedback" in the second round. The input of the technician, usually technical data suggesting, for example, that the vocational education curriculum of the region is below state standards, might also be included. In effect, the entire content of area studies could be presented on a piecemeal basis directly associated with relevant "facts" upon which public investment priorities should be based.

Part C shifts from facts to pure policy judgments. This part of the questionnaire will be expanded as identifiable judgments tend to creep into Parts A and B. The "facts" in the first two parts, it should be noted, are all in terms of "what will help" in the development process. This part begins the shift to find out "what do you wish to do."

After each round of questionnaires, the data must be interpreted and the results incorporated into the next questionnaires. This procedure, together with any additional information they request will "educate" the panel and indicate the answers given to date. A re-evaluation of the question is then requested, in view of the new information at the panel's disposal. It is generally agreed that this feedback should be in the form of means and ranges of respondents. This will allow each participant to place his answer in the perspective of the total response.

Since the purpose of Delphi has been stated as one of achieving a consensus, some technique of measuring the tendency should be utilized.[17] It is possible to use the difference between measures of variation on successive rounds of the questionnaire, in which case a narrowing of this difference would indicate a movement toward a consensus. Unfortunately, this would not allow comparison between major sectors because of the differences in the number of individual parts in each.[18] To allow comparison of the consensus between the major categories, the coefficient of variation is more useful. By forming a ratio of these measures between successive rounds, the result could be more meaningfully compared. This measure has been termed the "agreement ratio," and would indicate the direction of the consensus.[19] If the ratio were 100, then no change in the panel's agreement has occurred. The higher the ratio, the further apart the panel has become, and they are moving away from consensus.

To complete the interpretation, the "agreement ratio" should be examined relative to the absolute value of the coefficient of variations to determine the relative change in consensus. For example, a large ratio together with a small V would mean a movement away from a position of close agreement, and thus perhaps not a significant change.

Summary and Conclusion

The Delphi Technique, after close examination, seems to offer real possibilities for converting informed local opinion into useful knowledge for analyses of local development problems. Scientific testing of movement toward a consensus and the production of reasonable and accurate factual estimates is convincing.

Practitioners in regional economics can expect to work more and more with committees in the future, and the time has come for us to think in terms of how to make them effective. While a psychological attack on the development problem, or "creating involvement" appears to have been the main thrust in the use of committees to date, we believe that these panels could do much more than describe the psychical condition of public facilities. Specifically, they could furnish useful data and provide real insights in the assessment of cause-effect relationships which have been considered the function of the technician in the past.

Our use of local committees as "qualified experts" is admittedly questionable. In view of the importance of "expertise" and predictive reliability suggested by previous research, how can use justify the use of the Delphi in areas of public policy, especially at the local (sub-state) level?

First, procedures which have been followed in the past are inadequate and fail to a large extent to utilize local "opinion." Political forces are strong and group meetings may rapidly deteriorate into "mutual admiration" societies. The Delphi, with "anonymous response" at least seems more tenable than current methods in regards to personality conflicts. Secondly, the procedure should generate extended debate of the relevant issues and consequently will "educate" the participants. For most regional development committees, this alone would represent a substantial achievement. Finally, individual explanations or justifications for particular views will provide the group with an evaluative procedure which, in the longer run, will improve the predictive reliability of their membership.

As Farmer and Richman have pointed out, perhaps the inability of assessing the accuracy of the final committee consensus is not fatal.[20] What is important, however, is that in reaching a Delphi consensus, relevant evidence and key points are systematically reviewed. From such a procedure, insights into the true nature of the problem and very possibly correct solutions are likely to emerge.

APPENDIX

This draft of the questionnaire is designed for use with a zero to nine rating scale. Part I results of Round One, when compiled, should give a rough approximation of relative importance among the several categories while the Part II results provide a breakdown within categories.

In one of the subsequent rounds, the categories should be condensed and partially revised, making it possible to have respondents allocate a total of 100 or 1000 points on Part I, and a similar arbitrary amount of points on each subcategory. This is simply a matter of trade-offs between complexity of the questionnaire and precision in results.

The format of this draft is flexible enough to be adopted to various sizes of regions or for a center-periphery dichotomy. The introductory statement defining the area to be evaluated has been deleted.

QUESTIONNAIRE

PART I

Below is a list and description of 9 major growth factors. Based on your knowledge of the needs of the growth pole you are evaluating and other large urban centers in Alabama, assign values to each of the growth factors. Basis of rating is a 0 to 9 scale, with 8 and 9 indicating need of factor improvement and 0 and 1 indicating adequacy of factor for present growth. Assign the factor or factors needing the greatest improvement a value of 9 and then evaluate the remaining factors according to their relative need for improvement. It is important that all factors are evaluated. If you feel a significant factor has been omitted, please add this factor under "other" with a short explanation. If you feel strongly about the influence of any factor, this is appropriate material for the "comment" section.

0 5 9 Amenities: provision of libraries, parks, golf courses, public pools, and other recreational facilities, or such things as "clean up," beautification campaigns, etc.

0 5 9 Education: improvement in basic public education, higher education, vocational education; quality improvements; also consider increased physical facilities, supplies, and guidance.

0 5 9 Health: availability of health facilities; services; programs to eliminate chronic health problems; better sanitation controls; more outpatient clinics, innoculation programs, pollution controls.

0 5 9 Housing: to fulfill housing shortages to allow for additional expansion, upgrading of substandard housing, raising level of current housing; elimination of housing slums to improve health and sanitation conditions.

0 5 9 Industrial Growth Incentives: favorable industrial taxes and tax incentives, availability of plant sites, availability of bond financing.

0 5 9 Industrial Services: provision for industrial capacity water and sewage service, job placement service; training programs

tailored for local industrial needs.

0 5 9 Local (a) Initiative Factor: local attitudes toward change; local emphasis on education and training; honest effort to recruit industry; willingness to make industrial concessions; local leadership aggressiveness.

0 5 9 Local (b) Action Factor: improvement of local government. better zoning laws, greater flexibility, greater equity in taxation; more responsive, active electorate.

0 5 9 Transportation: general improvement of water, air, rail, and road networks; attention to traffic peaks and congestion; provision of an integrated highway system to outside markets, roads connecting prime Alabama retail centers.

0 5 9 Welfare Programs: improvement of programs oriented toward cures; welfare incentives applied to retraining or education; concerted effort to remove stigma associated with welfare; provision of day-care centers.

0 5 9 Other:

Comment:

PART II

In this section of the questionnaire you are asked to evaluate the component items of a single growth factor, again in respect to the growth pole. You are asked to do this for each of the factors listed in Part I. Basis of rating is a 0 to 9 scale, with 8 and 9 indicating need of improvement and 0 and 1 indicating adequacy of the factor for present growth. Assign the component item or items needing greatest improvement a value of 9. Evaluate the remaining items according to their relative need for improvement. It is important that all items are evaluated. If you feel that a significant item has been omitted, please add this factor under "other" with a short explanation. If you feel strongly about the influence or importance of any factor or item, this is appropriate material for the "comment" section.

A. Amenities

0 5 9 1. Additional convention facilities.

0 5 9 2. Additional cultural facilities, museums, libraries, etc.

0 5 9 3. Additional recreational facilities, parks, gyms, golf courses, etc.

0 5 9 4. Beautification, clean-up programs.

0 5 9 5. Coordinated city, county, regional, and state planning (physical).

0 5 9 6. Coordinated planning (social and economic).

0 5 9 7. Coordinated public transit system.

0 5 9 8. Improvement of educational system's "image."

0 5 9 9. Increased levels of personal safety, security.

0 5 9 10. Increased public, private landscaping.

0 5 9 11. Preservation and enhancement of natural aesthetic assets.

0 5 9 12. Reduced levels of water, air pollution.

0 5 9 13. Other.

Comment:

B. Education

Methods of improvement:

0 5 9 1. Teacher quality
- a. need for better salaries 0 5 9
- b. more attractive community 0 5 9
- c. better working conditions 0 5 9
- d. other 0 5 9

0 5 9 2. Physical plant facilities
- a. more buildings 0 5 9
- b. need for repair, upkeep 0 5 9
- c. other 0 5 9

0 5 9 3. Supplies
- a. general supplies (paper, etc.) 0 5 9
- b. teaching aids, equipment 0 5 9
- c. textbooks 0 5 9
- d. library, reference books 0 5 9
- e. other 0 5 9

0 5 9 4. Increase number of teachers--reduction of pupil-teacher ratio, class size

0 5 9 5. Alteration of curriculum
- a. emphasis on vocational preparation 0 5 9
- b. emphasis on collegiate preparation 0 5 9

0 5 9 6. Need for non-instructing personnel
- a. administrative personnel 0 5 9
- b. guidance and counseling personnel 0 5 9
- c. other 0 5 9

0 5 9 7. Other

Comment:

Academic level of improvement:

0 5 9 1. Improve pre-primary education ("headstart programs").

0 5 9 2. Improve primary education (grades 1-8).

0 5 9 3. Secondary education (grades 9-12).

0 5 9 4. Vocational education.

0 5 9 5. Junior colleges.

0 5 9 6. Colleges (4-year).

0 5 9 7. Remedial education classes.

0 5 9 8. Adult education classes.

0 5 9 9. Others.

Comment:

C. Health

0 5 9 1. Public subsidation of hospital costs or subsidation of health insurance.

0 5 9 2. Expenditures on research in chronic health areas.

0 5 9 3. Better sanitation controls.

0 5 9 4. Subsidation of school lunch programs.

0 5 9 5. Increased pollution controls.

0 5 9 6. Expenditures for local outpatient clinics.

0 5 9 7. Innoculation programs.

0 5 9 8. Construction or expansion of current hospital facilities.

0 5 9 9. Other.

Comment:

D. Housing

0 5 9 1. Need for increased housing
- a. $10,000-18,000 — 0 5 9
- b. $18,000-26,000 — 0 5 9
- c. $26,000 up — 0 5 9

0 5 9 2. Upgrading of substandard housing.
- a. to improve general appearance — 0 5 9
- b. for health and sanitation — 0 5 9
- c. to reduce crime — 0 5 9
- d. welfare, environment of minors — 0 5 9
- e. other — 0 5 9

0 5 9 3. Need for loanable funds for mortgages.

0 5 9 4. Need for restructure or zoning laws.

0 5 9 5. Other.

Comment:

E. Industrial Growth Incentives

0 5 9 1. Tax rates
- a. low general taxes — 0 5 9
- b. low industrial tax rates — 0 5 9
- c. high industrial tax rates — 0 5 9
- d. higher personal tax rates — 0 5 9
- e. lower personal tax rates — 0 5 9
- f. other — 0 5 9

0 5 9 2. Adequacy of present and potential power sources

0 5 9 3. Industrial waste treatment

0 5 9 4. Water sources

0 5 9 5. Sewer service

0 5 9 6. Financial resources, capabilities, and flexibility of area.

0 5 9 7. Availability and suitability of plant sites

0 5 9 8. Labor sources, degree of shortage
- a. unskilled — 0 5 9
- b. skilled — 0 5 9
- c. professional — 0 5 9
- d. other — 0 5 9

0 5 9 9. Other

Comment:

F. Industrial Services

0 5 9 1. Improvement of job placement services.

0 5 9 2. Improvement of industrial access roads.

0 5 9 3. Improvement of public water, sewage and waste facilities.

0 5 9 4. Alteration of vocational education programs to meet local industrial needs.

0 5 9 5. Improved accessibility to major urban services (computer-sharing, specialized repair, technical advice, assistance).

0 5 9 6. Improvement of local service sector such as banking facilities, repair and maintenance service.

0 5 9 7. Improvement of transportation, communications systems.

0 5 9 8. Other.

Comment:

G. Local Factor--Initiative

0 5 9 1. Progressive, aggressive attitude of city officials, making the most of current facilities and seeking new facilities. Making an effort to recruit industries.

- a. making most of current facilities 0 5 9
- b. creation of new facilities 0 5 9
- c. effort in recruiting industries 0 5 9
- d. willingness to "subsidize" new industry 0 5 9
- e. reduction of industrial taxes 0 5 9
- f. other 0 5 9

0 5 9 2. Need for improvement in local attitudes toward education.

- a. college-preparatory high schools 0 5 9
- b. vocational high schools 0 5 9

0 5 9 3. Need for improvement in attitude toward "foreign" corporation and "imported" management.

0 5 9 4. Flexibility of city government in fiscal policy.

- a. willingness to "bribe" industry 0 5 9
- b. willingness of people to bear tax burden of industrialization 0 5 9
- c. other 0 5 9

0 5 9 5. Other

Local Factor--Action

0 5 9 1. Better zoning laws

0 5 9 2. Greater flexibility, equity in taxation

0 5 9 3. More responsive, active electorate

0 5 9 4. Utilization of state and federal "revenue-sharing" plans.

0 5 9 5. Other

Comment:

H. Transportation

0 5 9 1. State or interstate first-class highways connecting major growth centers.

0 5 9 2. Intercounty or regional networks of improved roads.

0 5 9 3. Local emphasis on access roads to industrial sites.

0 5 9 4. Improved residential-commercial networks.
- a. peak-hour traffic problem 0 5 9
- b. release of congestion 0 5 9
- c. reduction of travel time 0 5 9
- d. other 0 5 9

0 5 9 5. Improvement of commuting conditions for potential workers at greater distances.

0 5 9 6. Improvement of transportation network to allow shopping in larger commercial centers

0 5 9 7. Improvement of state air facilities.

0 5 9 8. Improvement of water facilities.

0 5 9 9. Improvement of rail facilities

0 5 9 10. Coordinated city traffic system.

0 5 9 11. Other.

Comment:

I. Welfare

0 5 9 1. Reform of current programs, with greater emphasis on cures.
- a. welfare incentives utilized to promote retraining 0 5 9
- b. welfare incentives utilized to raise educational levels 0 5 9
- c. welfare incentives utilized to promote birth control and family planning 0 5 9

d. other

0 5 9 2. Effort to remove stigma associated with welfare.

0 5 9 3. Provision of day-care centers.

0 5 9 4. Reduction of welfare costs.

0 5 9 5. Lower welfare payments to individuals.

0 5 9 6. Higher welfare payments to individuals.

0 5 9 7. Other.

Comment:

FOOTNOTES

[1]Donald R. Gilmore, Developing the "Little" Economies (Committee for Economic Development, 1960), pp. 14-16.

[2]See, for example, John G. Wofford, "The Politics of Local Responsibility: Administration of the Community Action Program 1965-66," in On Fighting Poverty, James L. Sundquist, editor (Basic Books, Inc., 1969), pp. 77-102, especially 74-84.

[3]Guide for Area Overall Economic Development Programs, U. S. Department of Commerce, Economic Development Administration, 1967, p. 4.

[4]Ibid., p. 8.

[5]Ibid., p. 9.

[6]Gardner Ackley, "The Contribution of Economists to Policy Formulation," The Journal of Finance (May, 1966), p. 177.

[7]Campbell, Robert M., "A Methodological Study of the Utilization of Experts in Business Forecasting." Unpublished Ph. D. dissertation, University of California, 1966, p. 15. This section largely follows that of Campbell's Chapter 3, "Indirect Evidence Related to the Properties of Information Accumulation Techniques," pp. 14-24.

[8]See Olaf Helmer, "The Systematic Use of Expert Judgment in Operative Research," p. 2795, The Rand Corporation, 1963.

[9]For example see Bernice Brown and Olaf Helmer, "Improving the Reliability of Estimates Obtained from a Consensus of Experts," p. 2986, The Rand Corporation, 1964; Norma Dalkey and Olaf Helmer, "An Experimental Application of the Delphi Method to the Use of Experts," Management Science, 1963, pp. 458-467; T. J. Gordon 1964; and Norman Dalkey, "The Delphi Method: An Experimental Study of Group Opinion," RM-5888-PR, The Rand Corporation, 1969.

[10]Brown and Helmer, op. cit.

[11]Rand material suggests that applications have been made to a number of "real" problems, but their literature frequently cited has been limited primarily to "laboratory" type tests of the methodology.

[12]Farmer, Richard N. and Barry M. Richman, Comparative Management and Economic Progress (Richard D. Irwin, Inc., 1965), pp. 325-349.

[13]Gary N. Dicer, "The Delphi Technique--A Practical Research Methodology for Business Problems," paper presented at meeting of the American Institute of Decision Sciences, New Orleans, October 30, 1969.

[14]Olaf Helmer and Nicholas Rescher, "On the Epistemology of the Inexact Sciences," Management Science (1950), pp. 43-44.

[15]Since the task of the committee is to prepare a plan for the development of the area, they can logically be considered "experts." The OEDP committee is normally a group of local businessmen and civic leaders who have shown an interest in the problems of the area. The committee is officially regarded as the "principal coordinator of the various local activities

designed to stimulate new private and public investment," and as such is expected to establish realistic development goals for the local area. Guide, op. cit., p. 5.

[16]The EDA recognized the lack of technical expertise available to most communities and will provide financial assistance for consulting help in the writing to the OEDP. Some other suggested sources of help are EDA Field Coordinator, HUD "701" planning grants, Community Action Programs (OEO) and Department of Agriculture Rural Areas Development (RAD) programs. Ibid.

[17]For a discussion of this point see Robert L. Winkler, "The Consensus of Subjective Probability Distributions," Management Science, XV, 1968, pp. B-61-B-75.

[18]Statistically, a measure of absolute variations is significant only in relation to the means of the distribution from which the measure is taken. For comparison between distributions the measure must be reduced to a relative form.

[19]Dicer, op. cit., p. 12.

[20]Farmer and Richman, op. cit., p. 325-326.