DISSEMINATION AND UTILIZATION OF KNOWLEDGE THROUGH EXPERIMENTAL SOCIAL INNOVATION

by

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INTRODUCTION

The dissemination and utilization (D&U) of new and innovative knowledge plays an integral role in creating social, technological, and organizational change. As a practice, dissemination and utilization of knowledge is an age-old phenomenon, however informal or unplanned it may be. For example, the diffusion of technological innovations (e.g., gunpowder, horse-drawn plow, penicillin, etc...) from one culture to another was the saving grace for many early recipient cultures. Although in many of these cases, the D&U process was not a formalized one, its importance in creating change, whether good or bad was undeniably great.

As a field of study, the dissemination and utilization of knowledge has remained relatively fragmented. Researchers in several fields have developed D&U models (e.g., Miles, education, 1964; Havelock and Benne, industry, 1967; and Gallagher, culture, 1964); however few have taken a macroscopic approach assessing the entire process from basic research to widespread adoption and subsequent evaluation. Instead, they seem to focus on isolated aspects of D&U theory, whether it be research, development, intervention, diffusion, or adoption.

Havelock (1971), identifies three distinct perspectives of knowledge dissemination and utilization:

(1) the Research, Development, and Diffusion (RD&D) perspective; (2) the Social Interaction perspective; and (3) the Problem Solver perspective.

The RD&D perspective places heavy emphasis on the research and development of knowledge irrespective of consumer demand. The D&U process begins with the research and development of knowledge and then proceeds to trickle down this newly found information to interested consumers. Havelock (1971), says of this process:

> "Although consumer needs may be implicit in this approach, they do not enter the picture as prime motivators for the generation of new knowledge. Research does not begin as a set of answers to specific human problems. Rather, research starts as a set of facts and theories about the nature of the universe, knowledge which can only be made useful to men through an extensive process of development. In development, basic theories and data are used to generate ideas for useful products and services and these ideas are turned into prototypes which have to be tested and redesigned and retested before they represent anything that is truly useful to the bulk of humanity."

The R&D model is typical of many scientific studies. Emphasis is often based on laboratory research, and the diffusion of information to potential users is largely passive. For example, biomedical and agricultural research appear to more of a knowledge seeking activity rather than a solution to a specific set of problems.

The second model, the Social Interaction approach, focuses on the diffusion aspect. Social Interaction theorists view society as "a network of roles and channels of communication with organizational and formal and informal associations forming barriers and overlapping connections." (Havelock, 1971). One of the most recent and complete works on the subject is that of Rogers and Shoemaker, 1971. The authors cover in detail the main elements in the diffusion of new ideas, with the major thrust being that communication is a necessary requirement in order to undergo social change.

Proponents of the Problem Solver approach emphasize an active role of the outside change agent as an impetus for the desired social or organizational change. This model is social-psychological in nature and is highly characteristic of the human relations school of organization theory. Typically, in the human relations studies, an outside change agent acting in a collaborative manner with the client system, identifies a need and systematically searches for an optimal solution.

Havelock (1971), likens this problem solving process to the psychological theory of need reduction. This type of theory is exemplified by Maslow's theory of human motivation. (Maslow, 1943). As Maslow based his theory of human motivation on the successive attainment of basic needs, Havelock identifies a "need reduction cycle" in which

various needs may be systematically filled. This need reduction cycle (Figure 1) is a six step process beginning with the identification or "diagnosis" of a need and ending with an overall need reduction and subsequently a new target condition.

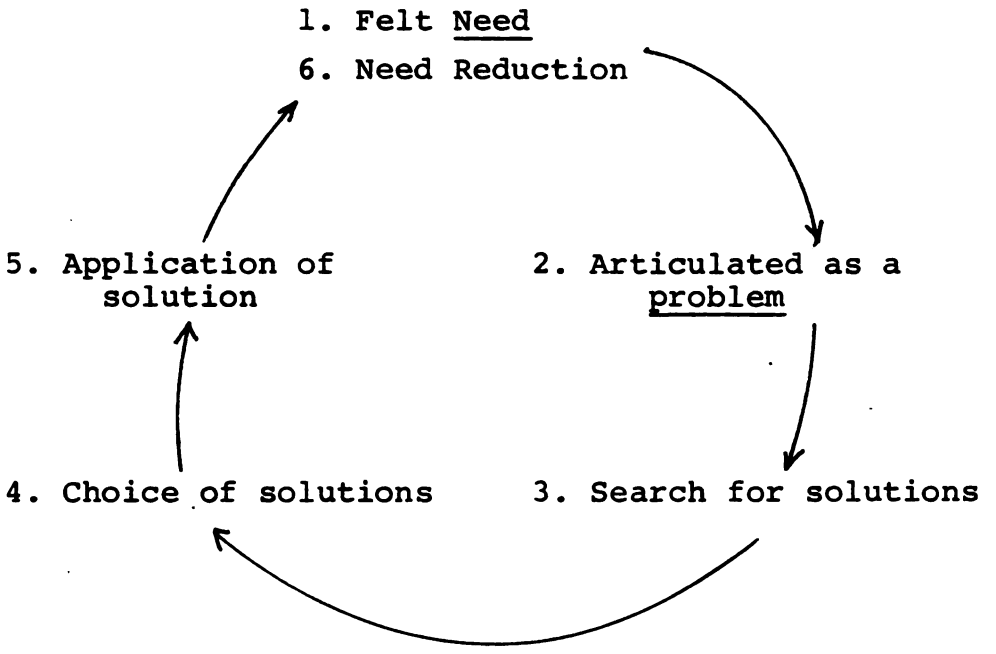
This process of constant reformulation of system needs or "objectives" so characteristic of the Problem Solver perspective is labeled "action research" by Thelen (1967). Thelen succinctly describes this process as the "application and correction of policy adopted to specific situations." His model, however, includes one aspect not addressed within the needs reduction cycle. Thelen's action research process begins with a determination of the crucial variables relative to change adaptiveness and analyzes their relationships within the total system before advocation of a specific change. This analysis is done through three related procedures:

> "(a) extensive 'life-space' interviewing of principals including change agents;
>
> (b) initial participant-observation experiences of the researcher;
>
> (c) assessment instruments and questionnaires which become standardized and used in a wide variety of organizational-change situations so that we can compare situations and talk together about them." (Thelen, 1967).

What has been lacking most of the RD&D, Social Interaction, and Problem Solver models is a scientific

Figure 1

Havelock's Need Reduction Cycle



methodology for evaluation of alternative approaches. In order for D&U research to advance and increase its meaningfulness to those involved in creating social change, there should first evolve some consistent methodology for discovering what approaches work and why.

Fairweather (1967), developed a model to address such problems. His paradigm, labeled "Experimental Social Innovation" (ESI) was designed to "determine the degree to which selected variables influence innovation and dissemination." This approach is quasi-experimental in nature and is applied to successive stages of the D&U process. At each of these stages, seemingly significant variables are either controlled or independent and the results of experimentation on this basis are evaluated for future study. A summary of the ESI approach, along with the three previously mentioned D&U perspectives is given in Table 1. In the remainder of this paper, I will take the reader through the ESI process as it could possibly be applied to the dissemination and utilization of an innovative ride-sharing model.

PHASE ONE: EXPERIMENTAL INNOVATION

Table 1 Dissemination and Utilization Perspectives

	Experimental Social Innovation	Research, Development and Diffusion	Problem Solver	Social Interaction
Phase I Model Creation & Development	Model is created by ESI team using research, client population, feedback, and target organization in planning. Model is implemented on a pilot basis in a formal longitudinal experiment. Evaluation determines subsequent dissemination.	Using basic research data, a model is packaged or engineered. Little input from client population or target organization. Limited emphasis on formal evaluation of the model.	Change agent focuses on organization's needs and desires. Works to improve greater communication, empathy, role clarity, articulation of goals, and the like.	Unspecified
Phase II Model Adoption & Dissemination	Alternative ways of approaching, persuading, activating and diffusing adoption of the validated model are compared experimentally. Any technique is legitimate providing it is ethical, is nonviolent, and works.	Rational information about the model is disseminated to an interested target audience.	Unspecified	Adoption-dissemination proceeds through channels of formal and informal social interaction and communication.

Source: Fairweather, George; et al; Creating Change in Mental Health Organizations; New York: Pergamon Press; 1974

I. BACKGROUND FOR THE PROPOSAL

In this automobile oriented society parking needs have developed wherever people congregate, especially in downtowns where parking demands have risen more rapidly than their daytime populations. For a community, an under-supply of parking in the Central Business District can affect the public's entire expectations of an auto trip downtown. In a national survey of public attitudes towards downtown parking, 60% of the respondents stated that they felt that downtown parking was relatively inconvenient (Alexander, 1974). Whether or not this assessment is true is insignificant in relation to the effect of public perceptions. In this sense the "parking problem" is more of a "perception problem".

The high demand for downtown parking puts these spaces at a premium. In 1975, commercial parking rates in the City of Los Angeles were reported at $35/month per space (Shoup et al., 1982). These rates are typically paid by the business rather than the employee using the lot. Pratsch (1979), broke down the total trip costs for a downtown employee taking a ten mile trip. He found that approximately 36% of this cost would be paid by the employer in the form of parking expenditures. This compares to a 22% figure for the driver's out of pocket costs. It can be seen from this that the driver often does not pay his fair share of the driving costs.

One means of reducing work related parking pressure and expense has been the practice of carpooling or ridesharing. Although successful in many isolated instances, it has not been implemented to a great extent in the form of urban-wide or regional programs. (Pratsch, 1979). Two of the major difficulties inherent in implementing a prearranged ridesharing program are: 1) "lack of knowledge concerning ridesharing; and 2) lack of favorable attitudes towards ridesharing" (U.S. DOT, 1981).

Lack of knowledge concerning ridesharing can be inferred to include public officials as well as the general public. Study of the reasons why people will or will not share a ride on a regular basis is necessary before any worthwhile implementation takes place. Traditionally, the use of priority parking spaces has been used as an incentive for ridesharing. This strategy, however, is not necessarily the only or best technique to induce carpool activity.

Shoup and Pickrell (1982), designed a ridesharing strategy based on direct financial costs of parking as a user incentive. In this section I will formulate a research proposal based on an elaborated version of their model.

II. DESCRIPTION OF THE "TRADITIONAL" MODEL

In the traditional model of ridesharing, priority parking is offered as the inducement for participation.

These priority parking spaces are generally the closest and most convenient to the place of work with a specific space assigned to each registered carpool. No other incentives are offered, and no stipulations of carpool size are made.

III. DESCRIPTION OF THE PROPOSED MODEL

The innovative ridesharing program is based on direct financial incentives related to the cost of parking in the Central Business District. Within this model, employers leasing parking spaces from the municipality will offer parking subsidies to employees who elect to carpool to work. This innovative method of ridesharing inducement will be comprised of a subsidy rate corresponding to the number of people commuting to work per automobile. If the organization pays $50 for each employee parking spot per month, then a carpool of two persons could be expected to decrease the employer's monthly expenditure by that same amount. Under this proposed model, the $50 saved would be funneled back to the carpool in their paychecks constituting a parking subsidy of $25 per carpooler. Likewise, a three-person carpool would create a $100 parking subsidy to be split three ways ($33.33 each). It should thus be apparent that the greater the number of people belonging to a particular carpool, the greater the parking subsidy to any

individual member of that carpool. In this manner, the proposed model is designed as an incentive to create more and larger carpools. Those employees who choose not to join carpools, and drive to work alone, will incur the same parking costs as before, and are no worse off.

To act as sort of a policing function to alleviate fraud of the system, carpools will have to be registered and will be issued a window sticker for a carpool of that particular size (e.g., a two person carpool would have a red sticker; a three person carpool would have a blue sticker; etc...). The parking attendant will issue to any carpool auto with the proper amount of people in it a validated parking receipt. These parking receipts will then be turned in to the ridesharing office per pay period so that the parking subsidies may be calculated and paid to the carpoolers. A carpool without the proper number of people in it as specified by the carpool window sticker will forfeit that day's parking receipt.

Employers will not experience any change in parking expenditures, however, they will be able to reap the benefits of increased employee satisfaction, additional parking for customers, and the greater social benefits of decreased congestion, pollution and energy consumption.

IV. HYPOTHESIS

Employees exposed to the proposed ridesharing program based on direct financial incentives will be more likely to carpool than those exposed to the traditional priority parking program.

V. EXPERIMENTAL DESIGN AND OUTCOME MEASURES

The proposed ridesharing program will be compared to the traditional program in terms of population and sample demographics, employee attitudes, and parking and economic data. (Table 2). The outcome measures of this program are listed in Table 3.

TABLE 2

Experimental Design

	Pre-Implementation	Post-Implementation
Traditional Program	Demographic Data Parking Data Attitudinal Survey	Demographic Data Parking Data Attitudinal Survey Economic Data
Financial Incentive Program	Demographic Data Parking Data Attitudinal Survey	Demographic Data Parking Data Attitudinal Survey Economic Data

TABLE 3

Outcome Measures

Social Change Outcome Criteria:

1. % of eligible employees using program;
2. % decréase in the number of parking spaces occupied by employees;
3. % of passengers who are from non-car owner households;
4. % change in carpooling.

Performance Measures:

1. Cost/Revenue;
2. Cost/Passenger;
3. Passenger/Automobile.

Attitudinal:

1. Willingness of people to rideshare if this program were not available;
2. Satisfaction or dissatisfaction of employees with the program.

VI. PARTICIPANT VARIABLES

Participant variables for the programs are listed in Table 4. All of the variables listed are independent as they cannot be controlled in a study of this nature. These variables will be measured in the pre-program and post-program demographic and attitudinal surveys.

VII. SOCIAL SITUATIONAL VARIABLES

Social situational variables for the programs are listed in Table 5. These variables, both internal and external, can help to define the social parameters of the program as well as provide a basis for replication.

TABLE 4

Participant Variables

Independent	
Age Sex Race Religion	These variables may effect a person's willingness to car-pool with others on a regular basis.
Income	The effect of income on desire to take part in program.
Ability to drive	Automobile availability for trip, based on: 1. automobile ownership; 2. condition of automobile owned; and 3. need to share car with other member of household.
Alternatives	The existence of alternative modes of transportation (e.g., bus, walk, train, etc...).

TABLE 5

Social Situational Variables

Organizational Components	
Hierarchical structure	Both of the programs will be run by staff members under the general supervision of the project director. The staff members will be responsible for the formation of carpools and the daily monitoring of the program. The hierarchical structures of the two institutions will be nearly the same.
Size	Size of the organization will be approximately equal in each program. This is based on the number of employees and the percentage of employees driving to work.
Complexity	The proposed ridesharing model will be somewhat more complex than the traditional model as it requires careful monitoring of parking receipts, and will involve the assistance of the parking attendant.
Formality/Informality	Both conditions will have the same degree of formality in terms of marketing and carpool formulation.
Group Dynamics	This should be nearly identical under both conditions; however, it is expected that a greater amount of peer pressure will be existent in the proposed ridesharing model.
Norms	These will be established independently by each group. It can be expected that norms will be nearly the same between programs.

TABLE 5 (Continued)

Leadership	As with norms, this is in both conditions a product of small group dynamics particular to each group.
Composition	Participants in each program will be grouped by home residence. No attempt will be made to match riders on any other basis. Participants in each program are limited to the employees of that particular institution.
Morale	This would be more of a fluctuating variable in the proposed ridership model due to the higher degree of peer pressure. It can be expected that morale will be the highest when the carpool was full and lower when the carpool subsidy is forfeited because of group member absence. In the traditional model morale will be more stable, however at a lower level than that exhibited by the proposed ridesharing model.
Reinforcement	In the traditional model this will be in the form of better parking spaces for those who elect to carpool. In the proposed ridesharing model, reinforcement will be in the form of parking subsidies to the carpoolers. Internal reinforcement or peer pressure will exist to alleviate carpooler absenteeism. In both conditions reduced gasoline expenditures, automobile servicing costs, reduced driving time, etc. will help reinforce carpooling activity.
Fiscal Processes	
Income	Funding for each of the programs will be obtained through grants from the Department of Transportation.

TABLE 5 (Continued)

Cost	The costs of each condition will involve primarily the administrative costs of operation. In addition, for the proposed model, costs will be incurred through payment of parking subsidies.
Membership	
Voluntary/Involuntary	Carpools in each condition will be formed on a voluntary basis only.
Turnover	Participant turnover will be an independent variable in each condition. Turnover rates are expected to be approximately equal. Measures will be taken to assure consistent staff over the experimental period.
External Variables	
Social Climate Specific Socioeconomic Indicators General Socioeconomic Indicators Geographical Location Folkways and Mores of Community Time	The two conditions are being implemented in the same community over the same period of time so these variables will be identical for each condition.
Folkways and Mores of Institution	The two conditions will be implemented in institutions of the same size and type, thus it can be expected that these variables will be approximately the same for each program.
Measurement Objectiveness	Regular monitoring of the program's progress by the project director without directly impinging on any of the processes will take place to insure that the program is properly measuring the desired variables.

TABLE 5 (Continued)

Publicity and Media Exposure	This variable will be held constant. This is to be insured by administrative agreements with the institutions involved.
Legal Constraints	This will be examined before implementing programs to assess their legality within the particular municipality.

TABLE 6

Experimental Plan

Program Phase	Time Schedule	Activities
Planning	minus 9 months	Develop research proposal; Apply for funding.
	minus 6 months	Initiate negotiation of administrative agreements; Develop instruments.
	minus 4 months	Test instruments and modify where needed.
	minus 3 months	Finalize administrative agreements; Interview possible staff members; Select acceptable institutions.
	minus 2 months	Train staff members; Set up office space.
	minus 1 month	Gather archival data from each institution.
Program Initiation	0 months	Distribute pre-program attitudinal and demographic surveys; Begin intra-institution marketing programs; Begin intake of participants.
Program Operation	plus 1 month	Begin matching of participants by address. Registration of formed carpools.
	plus 12 months	Conduct attitudinal and demographic surveys.
	plus 13 months	Analysis of data.

TABLE 6 (Continued)

Program Phase	Time Schedule	Activities
Program Operation (continued)		
↓	plus 15 months	Analysis of performance measures.
Program Termination	plus 18 months	Final Analysis. Decide on further implementation or research.

VIII. THE RESEARCH TEAM

The research team will consist of 1 project director, 3 staff members (research assistants), 1 part-time statistician, and one economist.

Project Director

The project director is responsible for the overall coordination of the programs including: securing funding, selecting and training staff, establishing administrative agreements, determination of validity, etc...

Staff

Two staff members will be responsible for the daily operation of the financial incentive ridesharing program. This includes data collection and analysis, parking receipt collection, and subsidy determination. The third staff member will be assigned to the traditional ridesharing program. She/he will be responsible for data collection and

analysis. In both programs, staff members will perform an ongoing marketing campaign keyed to their specific market populations, to inform, encourage, and convince them to use the service.

Statistician

The statistician will be used on a part-time consultant basis only. She/he will aid the project director in evaluating the progress of the programs.

Economist

As with the statistician, the economist will be used on a part-time consultant basis only. The economist will aid the project director in determining future trends in Central Business District parking costs, as well as possible revenues from longitudinal dissemination of the proposed ridesharing model. It is possible that the statistician and the economist be the same person.

IX. ADMINISTRATIVE AGREEMENTS

The project director will have to negotiate several administrative agreements prior to the start up of the programs. These agreements will be with the municipality and with each of the two institutions involved in the study.

With the municipality, agreements must be made to allow the cordoning off of a "priority zone" for carpools in a public lot; and for the use of municipal parking attendants to monitor carpool activity.

Formal agreements must be made with the two institutions to insure that the research team can function unhampered within the organization in the collection of data, and in the marketing of the program.

Additionally, agreements must be made with both the municipality and the institutions to: allow the program for the full stated time period; provide access to pertinent records such as parking receipts and costs; demographic characteristics; etc. An agreement must also be made with the municipality and the institutions to maintain secrecy as to the research nature of the programs.

X. INSTRUMENTS

Pre-Program Measures

Demographic and attitudinal questionnaires will be designed prior to program initiation. These questionnaires will be administered by the staff members. The questionnaires, created to determine employee perceptions of ridesharing programs, will first be pretested on a small group of local citizens not possessing any special knowledge of transportation.

The study populations will be given the pre-program questionnaires as a paper and pencil measure distributed with the employees paychecks or newsletters. Reliability will be tested by comparing the collected data with demographic records supplied by the employer.

Post-Program Measures

Post-program measures will also involve the administration of pencil and paper attitudinal surveys. These questionnaires will be designed to measure employee satisfaction with the ridesharing program and to note any changes in transportation behavior since program initiation.

Additionally, economic records will be used to determine such measures as cost/revenue, cost/passenger, and passenger/automobile. Staff members are responsible for the keeping of such records. Further discussion of instruments is given in the Appendix.

XI. SAMPLING

Participants for the study will be from two distinct yet similar populations. For comparison purposes they will be nearly identical in number and in type of employment. No attempt will be made to select or randomly assign employees nor will the groups be artificially limited in size. Participation in the programs is voluntary only. By allowing general sample populations inferences can be made which are applicable to real life situations.

TABLE 7

Reliability and Validity of Instruments

Instrument	Reliability	Validity
Demographic Data	Inter-rater reliability	Correlation of survey data with data obtained from other institutions
Parking Data	Inter-rater reliability	Correlation of the institution's parking data with that of the municipality
Attitudinal Questionnaire	Test-retest Correlation Coefficient	Correlation of pre- and post-program attitudinal data
Economic Data	Bookkeeping Procedures	Periodic auditing of carpool passengers, revenues, costs, etc.

TABLE 8

Instruments Used to Test the Hypothesis

Hypothesis	Measure	Test of Significance
Employees exposed to the proposed ride-sharing program based on financial incentives, will be more likely to carpool than those employees exposed to the traditional priority parking model.	Attitudinal Questionnaire	Fisher's Exact Probability Test Chi-Squared Test

XII. EXPERIMENTAL CONSTANTCY

The project director will periodically monitor the progress of the two programs to insure that they are being implemented in a consistent manner. The staff members will be thoroughly trained in procedure, especially as it pertains to the keeping of economic records, and marketing.

XIII. DATA COLLECTION AND ANALYSIS

Data collection will be done primarily by the staff members. Archival data will be gathered from both the municipality and the institutions. The staff members will distribute the attitudinal and demographic questionnaires to the populations through the in-house mail system, with instructions as to completion and return. In analysis of this data, pre-program and post-program attitudinal correlations will be observed.

XIV. CONCLUSION

Whether or not the results from this study prove to be positive or negative, further study will be warranted. Restructuring of the program either by adding or subtracting singular elements, and then retesting is probably the best way to truly assess the nature of the incentive problem. Spurious relationships must be detected and direct positive

ones encouraged. If the results do prove to be positive, it would be easy for one to state that an immediate decrease in driving costs is the incentive for ridesharing, however this must be tested many times before proven. As more research is done, increasing the reliability, the model may be disseminated on a more longitudinal scale.

PHASE TWO: DISSEMINATION BY ESI

I. A PLAN FOR DISSEMINATION

If the results of the innovation experiment prove to be positive, the next step in the research is to plan the dissemination of the innovative ridesharing model to other organizations and communities. The experimental plan for this dissemination research is outlined in Table 9. Funding will be granted for this experiment from the Michigan Department of Transportation.

The intent of this research is to determine the most efficacious means of disseminating the innovation throughout society, and subsequently aid in the dissemination process. Without an advocate, the innovation may be doomed to obsolescence, unnoticed and unimplemented. Fairweather, et al. (1977), state: "many, if not most, social innovations will never reach a widespread degree of adoption, regardless of demonstrated success, and often disappear after their initial piloting and development." To avoid this problem, I will create and plan implementation of a dissemination experiment focusing on the various factors which impact dissemination.

The most important aspects of this project will be the degree of accuracy of innovation replication and inter-organizational congruency with respect to this replication. In this manner, "the change agent's role thus

becomes keeping the innovation intact so its results will be the same as those found in the prototype model." (Fairweather, et al., 1974). Table 10 shows the social situational variables which will be factors in this replication.

The analysis of the dissemination process will be based on the four action phases of adoption as outlined by Fairweather, et al. (1974). These four action phases are: (1) approaching, (2) persuading, (3) activating, and (4) diffusing. In addition, the experimental social innovation (ESI) method as developed by Fairweather will be used to evaluate this process. Using the ESI methodology, each of the four action phases will be tested experimentally to determine the factors which will impact each phase's relative degree of success. (Fairweather, et al., 1974). Figure 2 details the ESI format to be used in this experiment.

TABLE 9

Experimental Plan

Program Phase	Time Schedule	Activities
Planning	minus 15 months	Develop research proposal.
	minus 12 months	Apply for funding.
	minus 9 months	Interview possible staff members.
	minus 6 months	Train staff members; Set up office space.
	minus 5 months	Contact prospective communities about the program.
	minus 3 months	Develop administrative agreements and instruments.
Program Initiation	0 months	Approach acceptable organizations; Finalize administrative agreements with municipalities.
	plus 1 month	Random assignment of organizations to persuasion conditions; Distribute approach questionnaires.
	plus 3 months	Organizations asked to adopt; Random assignment of cooperative organizations to the two activating conditions.
Program Operation	plus 4 months	Start activating phase; Initial consultant meeting for both conditions; Distribute persuasion questionnaires.

TABLE 9 (Continued)

Program Phase	Time Schedule	Activities
Program Operation (continued)		
	plus 5 months	Action consultant meeting.
	plus 6 months	Action consultant meeting.
	plus 7 months	Action consultant meeting.
	plus 8 months	Action consultant meeting.
	plus 9 months	Action consultant meeting.
	plus 10 months	Action consultant meeting.
	plus 11 months	Action consultant meeting.
	plus 12 months	Action consultant meeting; Diffusion interviews; Follow-up data analyzed.
Program Termination	plus 14 months	Decide on further research.

TABLE 10

Social Situational Variables

Organizational Components

Hierarchical structure	The programs will be run by an organizational staff in consultation with the regional coordinator. The staff members will be responsible for the formation of carpools and the daily monitoring of the program. The hierarchical structures of the organization will vary from "vertical" to "horizontal," as this variable will not be controlled.
Size	Size of the organizations involved in the dissemination experiment will not be controlled; however, city size will be no less than 50,000 population.
Complexity	The dissemination program is quite complex, involving a large number of municipalities and organizations.
Formality/Informality	The dissemination program will have a high degree of informality in terms of individual participation. Formality and consultant communication will be much greater in the monitoring of program progress for adequate replication.
Group Dynamics	A certain amount of individual peer pressure is expected to exist. This informal variable should also be affected by the type of organizational hierarchy.
Norms	These will be established independently by each group. It can be expected that these norms will nearly be the same between programs.

TABLE 10 (Continued)

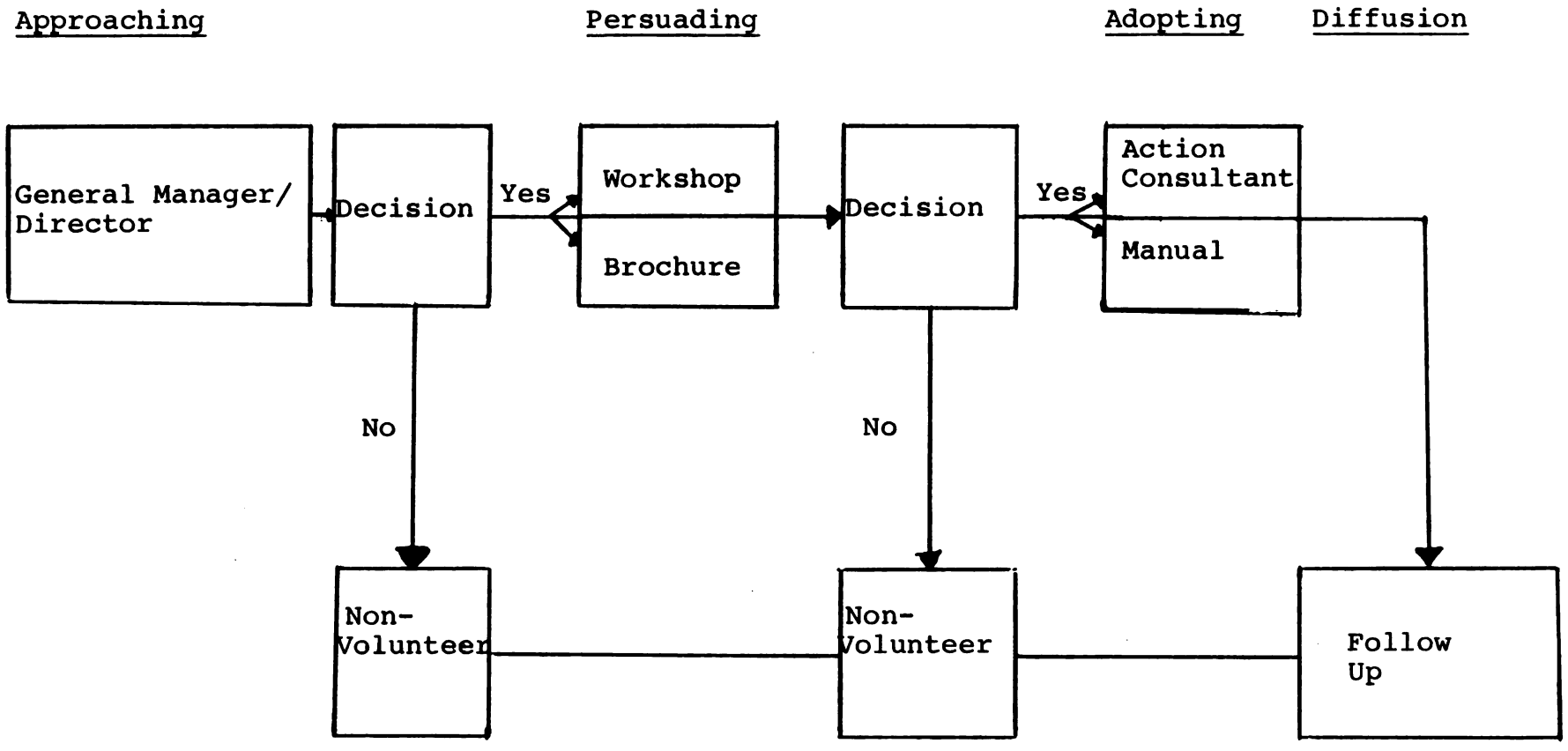
Leadership	As with norms, this is a product of small group dynamics particular to each group.
Composition	Participants in the ridesharing program will be grouped by home residence, unless they request to be grouped with specific individuals. Participants are limited to the employees of that particular institution.
Morale	This should be somewhat of a fluctuating variable relative to the degree of peer pressure. It can be expected that morale will be the highest when the carpool subsidy is forfeited due to group member absence.
Reinforcement	Reinforcement will be in the form of parking subsidies to the carpoolers. Internal reinforcement or peer pressure will exist to alleviate carpooler absenteeism. Also, reduced gasoline expenditure, automobile servicing costs, reduced driving time, etc., will help reinforce carpooling activity.
Fiscal Processes	
Income	Funding for the dissemination experiment has been obtained through grants from the Michigan Department of Transportation.
Cost	The costs of each condition will involve primarily the administrative costs of operation, including transportation costs, consultant salaries, and communications. In addition, costs will be incurred through payment of parking subsidies.

TABLE 10 (Continued)

Voluntary/Involuntary	Carpools will be formed on a voluntary basis only.
Turnover	Participant turnover will be an independent variable. Measures will be taken to insure consistent consultant staffing over the experimental period.

FIGURE 2

Dissemination Experiment by ESI



II. THE RESEARCH TEAM

The research team will consist of 1 project director, 20 action consultants, 2 statisticians, 2 office workers, and 1 lawyer.

Project Director

The project director will be responsible for the overall coordination of the dissemination experiment including: securing and managing funding; selecting and training the research team; establishing administrative agreements; determination of validity; etc.

Action Consultants

The action consultants will be available to the organizations in an advisory capacity respective to the administration of the innovative ridesharing program. The consultants will play an integral part in the persuading and activating phases of the experiment.

Statisticians

The statisticians will aid the project director in evaluating the progress of the programs.

Office Staff

The office staff will be responsible for filing of program progress information, typing letters, making appointments, etc.

Lawyer

The lawyer will assist in the drafting of the administrative agreements and the enforcement thereof.

III. THE APPROACHING PHASE

For the purpose of this experiment, only communities having a population greater than 50,000 will be studied. It is expected that it is these municipalities which will have a more developed and congested central business district, and thus would exhibit a higher propensity to adopt alternative parking strategies. Letters describing the nature of the ridesharing program will be sent to the city manager/mayor of all communities exceeding the 50,000 population level, and the first twenty positive responsdents will be selected for the program. At this point community commitment to the experimental program must be established through an administrative agreement to insure smooth implementation of the later phases involving the individual organizations (the primary unit of analysis).

The next step in the approaching phase is the selection of eligible organizations, within the selected cities, for the adoption of the innovative ridesharing program. All employers within the established central business district will be approached for program adoption. These will be selected from a listing of community businesses as supplied by the municipality. Randomly, one half of the businesses within the central business district in each community will be approached by telephone, and the

other half by letter in order to assess the organization's receptiveness to the proposed ridesharing program. As it can be expected that organizational hierarchy may differ greatly from organization to organization, with no uniformity of positions, the general manager/director of each organization will be contacted rather than varying this factor. Those organizations which positively respond to the approach phase will be started on the next phase of the experiment, the persuading phase.

IV. THE PERSUADING PHASE

Of the organizations positively responding to the approach, one-half will be relegated to a workshop condition of persuasion and the other half will be in the brochure condition of persuasion, done by random assignment of matched pairs from the previous condition. In the workshop condition, a research consultant will give a pre-arranged presentation open to all employees of the organization. In this presentation, the consultant will describe the proposed ridesharing program; and outline its benefits to the employee, the employer, and the general welfare of the community. This presentation will be drafted in advance by the project director and used uniformly across the workshop sample to insure consistency of the persuasion technique.

The brochure condition will consist of sending descriptive brochures to each of the organization's employees. Again, these brochures will contain the same information as outlined in the presentation. The list of employees will be obtained from the organization itself.

Those organizations positively responding to this phase of the experiment will then be moved on to the activating phase.

V. THE ACTIVATING PHASE

Organizations which choose to go on to this phase will be divided into two more experimental conditions. Again, organizations will be randomly assigned to these conditions on the basis of matched pairs of conditions in the previous phase. In both conditions, a consultant will meet with the organization's general manager/director to outline the procedures required for implementation of the proposed ridesharing program. In this meeting, the organization's resources relevant to the program will be discussed such as staffing, computer availability, parking waivers, the existence of similar work related transportation strategies, etc. At this point an administrative agreement must be signed by the general manager/director of the organization to insure proper replication of the original, innovative ridesharing program.

In the first condition, the consultant will give the management of the organization a "how-to" manual detailing the exact procedures to be taken in implementation, including promotion, participant matching, and data collection. After this point, the organization will be on its own to follow the methodology specified in the manual on the establishment and operation of the innovative ride-sharing program.

In the second condition, an "action consultant" approach will be taken. The consultant will make monthly visits to the organization to assist in the functioning of the program and answer any questions which have arisen. Action consultants will be available in both conditions by telephone to offer advice as major problems arise.

The need for an action consultant is one of the more critical questions involved in this experiment. The need for some sort of adoption activating process was emphasized by Fairweather, et al. (1974). They state:

> "The history of social change gives many examples of promises that never get translated into tangible action, or action that destroys the nature of the innovation that is being put into effect. In short, when one is concerned with the adoption of a highly complex innovation, in an organizational context, one cannot assume the adoption will automatically follow from a decision to adopt."

This phase of the experiment should test whether the action consultant is an appropriate or necessary method of adoption activation in an organizational framework.

VI. THE DIFFUSING PHASE

This phase involves all organizations originally contacted to determine the degree of movement towards adoption of the experiment. This phase will consist of telephonic interviews with the general manager/director of the organizations which did not adopt and on-site interviews with those that did adopt. In the former case, the interview will assess the likelihood of future adoption, and in the latter case, it will serve to measure the level of innovation replication.

A cluster analysis will be performed to measure the relative influence of the social situational and demographic variables on the degree of innovation adoption.

VII. ASSESSMENT PHASE

Assessment devices will be necessary to measure the relative success of each of the methodologies employed in the four adoption phases. These devices will consist of questionnaires, demographic information, conference discussions, and consultant research journal entries. These

assessment devices are listed in Table 11. Further description of instruments is given in the Appendix.

TABLE 11

Assessment Devices

Questionnaires:

- About the initial contact of the research team with the organizations;
- Workshop effectiveness;
- Brochure effectiveness;
- Biographical information;
- Decision making processes;
- Follow-up of both adopters and non-adopters.

Demographic Information:

- Characteristics of the organization;
- Characteristics of the community in which the organization is located.

Conference Discussions:

- Interview about the persuading and activating processes;
- Recording of action consultant meetings.

Research Journal:

- Record of general program progress, problems, successes, etc.

VIII. ADMINISTRATIVE AGREEMENTS

Several administrative agreements must be made with the municipalities and the adopting organizations. Agreements must be made with the municipalities to:

1) Allow for the use of city parking attendants to monitor carpool activity;
2) To clearly state the intended use of city lease parking as a financial incentive and insure cooperation with the participating organizations in terms of parking waiver disbursement for increased carpool activity,
3) To specify time parameters of the experiment; and
4) To provide access to pertinent records, such as parking receipts and costs; demographic characteristics, etc.

Formal agreements must be made with the participating organizations to:

1) Guarantee the implementation of the innovative ridesharing program;
2) Maintain monthly meetings with the consultant, keeping him abreast of program progress and/or difficulties;
3) Maintain records of carpool registration and employee participation;

4) Provide access to pertinent records such as employee demographics and employee participation; and
5) To specify time parameters of the experiment.

IX. CONCLUSION

This dissemination experiment is intended to help assess the appropriateness of the innovative ridesharing model in an organizational context; and to aid in the acquirement of knowledge about the dissemination process itself. With the experimental social innovation methodology, this research can help determine the important impacting variables on the implementation of the innovative ridesharing model. The best action technique for each of the four phases of adoption; approaching, persuading, activating, and diffusing; may thus be determined. Cluster analysis of the social situational, demographic, and organizational variables will establish the validity of replication, as well as indicate a direction for future research.

APPENDIX: INSTRUMENTS FOR EXPERIMENTAL RESEARCH

INSTRUMENTS

Research Journal

Intended to record daily observations of the progress of the program. All daily procedures and critical events will be recorded.

Historical Questionnaire

Reliability and Validity - can be determined by checking against employer records and information received from parents, friends, relatives and acquaintances. (Fairweather et al., 1977).

Pool of Items - can be extracted from questionnaires from other projects. These items will include such things as age, race, marital status, etc.

Concepts to be measured - This questionnaire will be used to determine participant characteristics in order to perform future analysis of program results by demographics.

Behavior Rating

To determine the degree of interaction among the organization's employees.

Reliability and Validity - coefficient of concordance (W) may be used to determine inter-rater reliability.

Pool of Items - to be obtained from a literature review of related studies. Items will be selected which seem to fulfill experimental needs of determining employee interaction with peers, subordinates, and superiors.

Scale - identifies particular types of behavior; and a subscale which identifies the relationship of interactants (i.e., peer, subordinate, superior). The scale will be similar to the Social Activity Scale as designed by Goldman (1964):

1	2	3	4	5	6	7	8	9
Path.	Sleep	Null	Func. NS	P.S. Act	P.S. Behav	SG	2PG	3PG

1. Path - pathological
2. Sleep - sleeping
3. Null - unoccupied or apathetic
4. Func N.S. - functional nonsocial
5. P.S. Act. - parasocial activities
6. P.S. Behav. - parasocial behavior
7. SG - social games
8. 2PG - two person interaction
9. 3PG - three person interaction

For identification of the relationship of interactants, raters must be fairly familiar with the study environment and participants. Definitions

of each of the three relationships are as follows:

1. Peer - interaction between two or more persons of the same level within the organizational hierarchy;
2. Subordinate - interaction with one or more persons of a lower level within the organizational hierarchy.
3. Superior - interaction with one or more persons of a higher level within the organizational hierarchy.

Instructions to the Raters - to insure an adequate representation of each of the various hierarchical levels, and increase the chance for interaction, ratings must be taken in a common area (e.g., cafeteria, lounge, etc.). Depending on the particular study environment, raters should:

1. select an unobtrusive observation spot;
2. starting with the nearest person to the rater's left, count the first _____ people clockwise around the room for observation;
3. identify these people and with co-rater record them on the score sheets;
4. going clockwise around the room, observe each of these persons--one at a time, every five

minutes for a period of ten seconds simultaneously with other rater (to be determined by signal).

5. record the observed behavior rating on the score sheet, based on the ratings established on the behavior rating scale. This should be two numbers, with the first number denoting behavior type and the second number denoting relationship of interactants (e.g., 7-1, 6-3, etc.).

Attitudinal Scale

An attitudinal scale may be used to determine the attitudinal "climate" of the study population (the organization's employees) towards the concepts of ridesharing and also as a measure of organization morale.

Reliability and Validity - Odd-even split-half reliability can be used to control "for any systematic factors operating during the testing period that change the performance from early in the testing session to later periods." (Anastasi, 1976). Pretest-Post-test validity is an appropriate measure for this scale as it is expected that the implementation of the innovative program will affect the employees' attitudes.

Pool of items - the pool of items can easily be extracted from a literature review of related transportation innovation and organization based implementation studies. Items which would likely to be represented in the literature review include personal space, travel time, organization cohesiveness, etc.

Scale - two subscales will be used; one measuring ridesharing attitudes and the other, measuring morale. The scale will be of a five point Likert type format. The scale will be constructed by a combination of rational and empirical methods as described by Fairweather, et al. (1977). They state: "After a pool of items has been obtained that logically represents the basic concept with which the scale is concerned a number of highly inter-related items are selected that express clearly the underlying rational dimension that one is attempting to measure. Using a cluster analytic technique...these scale definers are preset in a cluster analysis so that they will define the cluster, which then becomes the scale. In this way the experimenter (not the computer) determines the logical essence of the scale."

Example Question: Ridesharing is a cost-efficient means of commuting to and from

work. SA___ A___ ?___ D___ SD___
(where SA means strongly agree,
A means agree, ? means don't know,
D means disagree, and SD means
strongly disagree).

Instructions to those completing the instrument - Below are a number of statements concerning ridesharing (def. - the commuting to and from work by a group of two or more people on a reguarly scheduled basis). Please check ( ) the phrase that most accurately describes your feelings about each particular question.

Concepts to be measured - attitudes towards ridesharing and attitudes towards the organization (morale).

Scoring of Items - the items will be scored on an interval basis, with scores ranging from one to five; assigning a score of five to the strongly agree choice and a score of one to the strongly disagree choice.

Analyses needed for the scale - cluster analysis for the selection of items and the formation of the subscales. Split-half reliabilities will need to be computed. For validity, correlation analysis will be done to determine pretest-post-test validity.

Field trial - will be done on a group of randomly selected citizens of the community to weed out unclear or ambiguous questions.

Expectancy Scale

Reliability and Validity - Odd-even split-half reliability. Validity will be determined by the degree of inter-correlation among scale items; "a predictor will have higher validity the lower are the intercorrelations among its components." (Anastasi, 1976).

Pool of Items - same as attitudinal scale.

Scale - One Likert-type scale will be used; no subscales. The scale is to be constructed by the rational/empirical methodology described earlier.

Instructions to those completing the instrument - Below are _____ questions concerning the organization's new ridesharing program. Please indicate which of the five possible responses for each question most accurately reflects your guess about the future of the program.

Example Question: I will like the ridesharing program.

_____ A great deal

_____ Quite a bit

_____ Somewhat

_____ Only slightly

_____ Not at all

Concept to be measured - expectations of ridesharing program participants. This measure is not particularly

essential for the experiment, however it can provide a measure of employee support for the program at its outset.

Analyses needed for the scale - cluster analysis for item selection. Split-half reliabilities will be computed. Correlation analysis will need to be done to determine validity.

Field trial - to be pretested on a small group of the organization's administration before full dispersal.

Open-Ended Questionnaire (taped interview)

These will be used as a basis for item selection.

Reliability and Validity - inter-rater reliability can be used to select items from the open-ended questionnaire (transcript of taped interview). This will be done by rank order correlations.

Pool of Items - to be obtained from the literature; basic concepts will be used from this literature review which seem to fulfill the experimental needs.

Scale - One nominal scale identifying the occurrance of specific items on the tape.

Instructions to interviewers - Ask the questions in a consistent order, allowing as much time as needed for the open-ended response.

Instructions to the raters - from the typescript of the taped interviews, rate the items according to the following concepts:

1. attitude and knowledge towards ridesharing;
2. attitude towards the organization; and
3. attitude towards the innovative ridesharing program.

Each item will be scored on the basis of frequency of occurrance, then ranked on the three concepts listed above. For this process, attitudes and knowledge towards ridesharing will refer to any personal experience or observation of ridesharing in general. Attitude towards the organization will refer to any reference to conditions within the employee's physical place of employment. Attitudes towards the innovative ridesharing program will refer to all items in reference to the experimental program.

Analyses needed for the scale - rank order correlation of concepts and items.

Essay Questionnaire

This questionnaire may be used to determine post-implementation participant satisfaction with innovative program.

Reliability and Validity - reliability may be determined by Q-sort rank order correlation as done with the open-ended questionnaire.

Pool of Items - to be obtained from that already developed by the open-ended questionnaire. These will be identified in terms of the same three concepts (i.e., attitudes and knowledge of ridesharing, attitudes of the organization, and attitudes towards the innovative ridesharing program).

Instructions to raters and those completing the instrument - same as with open-ended questionnaire.

Scoring - same as open-ended questionnaire.

Analyses needed for the scale - rank order correlation of concepts listed above for inter-rater reliability. Analysis of participant satisfaction will be rationally based.

Sociometric Choice Scale

To determine the cohesiveness of participating carpools, administered at mid-point of program and at its conclusion.

Reliability and Validity - Odd-even split half reliability and pretest-post-test validity.

Pool of Items - to be obtained from literature review, selecting those rationally seeming most applicable to this situation.

Scale - one scale measuring approximately five to ten criteria (selected areas including different aspects of possible association: work, play, visiting, etc.);

with the choice limited to those persons within the carpool. (Obviously for some choice to be made, this applies only to carpools of three or more persons).

Concepts to be measured - (1) the degree to which the individuals are accepted in the group; (2) relationships that exist among individuals; and (3) the structure of the group.

Scoring - will be done by listing the other individuals in the group which the participant would interact with for each particular criteria.

Rating - the cumulative scores will be entered into sociometric tables established for each group. The selections will be summed in order to make two specific measures: (1) the "social receptiveness" score--the number of people choosing a particular participant; and (2) an "emotional expansion" score--the number of people chosen by a participant.

Analyses needed for the scale - correlations between odd-even items; constantcy of choice (actual preference on first test repeated later on).

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