Research Methodology for New Public Management

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Abstract

This paper summarizes the basic elements of New Public Management and, given its current stage of evolution, offers recommendations for improving research methodology. The recommendations are grouped within the five stages of the research process: Formulating the research question and specifying the units and levels of analysis; choosing the research design; gathering the data, coding and analyzing the data; and interpreting the results. Two ongoing programs of research (one on innovation and the other on the dynamics of social organization) demonstrate the efficacy of the recommendations.

Research Methodology for New Public Management

Although each research project undertaken has its unique aspects, there are five basic stages in any research process regardless of the phenomenon that is studied: (1) Formulating the research question and specifying the units and levels of analysis; (2) Choosing the research design; (3) Gathering the data; (4) Coding and analyzing the data; and (5) Interpreting the results. Research methodology, broadly interpreted, encompasses all five stages of the research process, and is defined as the "system of explicit rules and procedures upon which research is based and against which claims for knowledge are evaluated (Nachmias and Nachmias, 1982, p. 15). Alternatively, research methods can be defined more narrowly to mean certain research stages of the research process when different design options are examined (stage two), different data gathering strategies are considered (stage three), and different techniques for coding and analyzing the data are explored (stage four). We take the former approach here and consider the term research methodology to apply to all five stages of the research process. Our purpose in this paper is to identify the research methods that are particularly germane to New Public Management at this point in its evolution.

We organize the paper into sections that parallel the five stages of the research process. Our intent is not to be comprehensive. Instead, we concentrate on particular aspects of the research process which we believe merit attention given the current status of New Public Management. For example, the first section summarizes the distinctive elements of New Public Management as they have been reported in the recent literature. Against this backdrop, we address the formulation of the research question, not in terms of specific content, but in terms of the level and unit of analysis selected. Given its conceptual foundations, we believe that New Public Management research would benefit from rethinking what levels and units of analysis are employed.

Section two probes issues concerning research design. We find extensive use of "one-shot" case studies, and although this pre-experimental design is useful in exploratory research — especially for the purpose of developing conceptual frameworks, theoretical systems and models that can be tested at later points in time — we believe that longitudinal case studies offer a greater advantage. They are particularly important in the investigation of process rather than variance theories, or theories that attempt to explain **how** something occurs rather than **what** occurs (Mohr, 1982). Comparative case studies also have attractive design features since they permit us to identify the underlying elements of New Public Management across a number of domains and socio-cultural contexts.

The third section examines issues concerning the collection of data. In our view, New Public Management researchers would benefit from expanding their range of collection methods to include observational, survey (including socio-metric instruments) and unobtrusive techniques, especially if comparative case studies, either one-shot or longitudinal, are being used. Reliance on multiple techniques avoids the problems with validity and reliability that single-data collection techniques can introduce.

Section four explores issues surrounding data coding and analysis. We are interested in analytical tools that are well suited to the study of the relationships among social actors over time. In this regard, event and sequence analysis and network analysis are highly recommended, especially when theory informs their application.

Section five addresses the last stage of the research process — the interpretation of results. If researchers have followed the path outlined above, it is possible not only to develop and test current New Public Management theory, but it is also possible for researchers to extend their disciplined based view of organizations and management to draw on concepts and principles of organization from the natural sciences. For example, some research programs, following the procedures outlined above, are using their data to test hypotheses derived from chaos theory (often referred to as complexity theory) and holonomic theory. These attempts at cross-disciplinary linkages have tremendous implications for social science, especially since preliminary results suggest a new way of thinking about and empirically explaining social organization.

The last section of the paper enlivens our examination of research methodology by summarizing two active research programs in which the authors have been involved. The first is the Minnesota Innovations Research Program of which the first author was a principal. The second is the nation-wide study of urban communes which the second author directed. Although each research program explored topics and content different from the thrust of New Public Management, their research methodologies illustrate the efficacy of the above recommendations.

We conclude by discussing the implications of our suggestions for improving New Public Management research methodology. If implemented, these suggestions will require teams of researchers who complement one another's skills and knowledge and who are committed to collaboration in the pursuit of long-term programs of research.

Stages of the Research Process

Stage One: Formulating the Research Problem/Question

Characteristics of New Public Management have been explored in conferences and publications (Hood, 1991; Jones, Schedler, and Wade, 1997; Pollitt, 1993). Although a contested phenomenon (Linn, 1997), New Public Management does have elements on which there appears to be some agreement. We summarize these elements in Table 1, and as a point of reference, contrast them to comparable features of Public Administration. For example, the environment of public administration is described in terms of laws, institutions, and political processes while New Public Management's environment is described in terms of competitive markets, individualistic self interests, and customer orientation.

Insert Table 1 About Here

Researchers documenting the world-wide movement from Public Administration to New Public Management view it as a "paradigm shift" (Gore, 1993; Jones and Thompson, 1997; Osborne and Gaebler, 1992). The assumptions, values, organizational designs, and operating systems of the two approaches are considered to be so different that the transition from one to the other is described as "transformational" and "radical" (Osborne and Gaebler, 1992; Pallot, 1997). But despite the acknowledged interdependencies among the elements, researchers tend to specialize and focus on a subset of the New Public Management elements in their work. Economists examine economic markets and their incentives (Scott, Bushnell, and Sallee, 1990), financial management experts focus on accounting models, measures of performance and different control mechanisms (Guthrie, Olson, and Humphrey, 1997; Harr, 1990; Thompson, 1994), and organization specialists are concerned with designs features such as jobs, structure, and the technology of work (Barzelay and Armanjani, 1992). Not surprisingly, research in New Public Management tends to be disciplined-based, with each speciality opting for in-depth of study of its own elements rather than system-based, requiring an overall examination of the complex admixture of elements and their interactions.

There are advantages to taking a disciplined-based view of New Public Management, of course. Choice of variables, units and levels of analysis can follow acceptable standards of research practice in a particular field. In organization theory, for example, organization structure becomes a unit of analysis, organization the level of analysis, and differentiation, formalization, centralization/decentralization some of the variables of interest

(Hall, 1999). Documenting a shift from one type of structure to another would support hypotheses designed to test the existence and effectiveness of the new structural arrangements under New Public Management.

Sole reliance on disciplined-based research has its disadvantages, however. Research on one or two of the elements of New Public Management puts the emphasis on the parts and not on the whole. Researchers may become expert at how one or two elements are evolving, but they may miss not only the interaction affects among the elements, but how the "system" is performing as a totality. When paradigms collide, under conditions of transformation and radical change, it may be time to reconsider what research questions we ask and what units and levels of analysis we employ. If we assume that New Public Management does represent a new paradigm and the paradigm is made up of the constituent parts summarized in Table 1, then system-based rather than discipline-based research questions, units and level of analysis may be more appropriate.

New Research Questions and Level of Analysis. System-based research questions address concerns of the total system and its functioning. It is a form of research which some have referred to as contextualist and processual in character (Pettigrew (1985; 1990). It "draws on phenomenon at vertical and horizontal levels of analysis and the interconnections between those levels through time. The vertical level refers to the interdependence between higher and lower levels of analysis upon phenomena to be explained at some further level" (Pettigrew, 1990:269). One example is how the changing socioeconomic context impacts on features of introrganizational context such as group behavior. "The horizontal level refers to the sequential interconnectedness among phenomenon in historical, present, and future time" (Pettigrew, 1990:269) An approach that offers both vertical and horizontal analysis is considered to be contexutalist in character (Pettigrew, 1990). The following questions serve as examples:

> (1) How closely to public agencies as a system fit the New Public Management paradigm represented in Table 1? What variations exist among agencies, policy areas, nations, and at what levels of analysis? What can explain this variation? What are the consequences of this variation?
>
> (2) In changing from Public Administration to New Public Management, do system elements change together or is there a pattern in the change process e.g. changes in direction kick off changes in incentives, then changes in structure etc.? If there are different patterns to the change process, what are the impacts and consequences? Do some patterns lead to better outcomes than others?
>
> (3). Are hybrid agencies that meld some elements of Public Administration and Public Management possible and feasible? If hybrids exist, are they good performers or does hybridization lead to poorer performance?

These system-based research questions are comparable to a line of inquiry researchers have been pursuing to document the existence and performance of organizational configurations. A configuration is a "constellation of conceptually distinct characteristics that commonly occur together" (Meyer, et.al. 1993, 1175). Configurations, often referred to as "gestalts"or archetypes, represent a clustering of attributes (e.g. environment, strategy, structure, culture, beliefs, processes) that fall into coherent patterns. Rather than treating reality as composed of constituent elements that may be adjusted or fine-tuned independently of other elements, configurations take a "holistic stance" and assume that the elements of the configuration "take their meaning from the whole and cannot be understood in isolation" (Meyer, et.al. 1993, 1176). Thus, elements are expected to cohere and be related in stable and understandable ways. Inquiry then can be based on the patterning of organizational elements rather than relying on bivariate analysis, (Miller and Friesen, 1984, 15).

Since there are parallels between New Public Management and a configuration — both are composed of conceptually distinct elements that take their meaning from the whole and are expected to cohere as a total set — it is reasonable to treat New Public Management as a new configuration and use research questions like those listed above to drive the research process. Issues of configurational efficiency and effectiveness then become the central features of the research endeavor while questions about specific elements are of concern to the extent that they support a clearer understanding of the whole system or configuration.

Unit of Analysis. The variation among the descriptions of New Public Management suggest that there is not complete agreement on what elements or units of analysis constitute New Public Management. Do the elements listed in Table 1 represent the necessary and sufficient elements for system transformation from Public Administration to Public Management? Are other elements involved, if so, what are they? System-level comparison across nations requires some agreement on which units to compare and contrast.

In keeping with the questions and system's perspective above, a new unit of analysis could be added to future research studies. Instead of only considering the unit of analysis as an entity — a person (e.g. a manager) or a thing (e.g., new management technique), a researcher might consider the relationship between entities. We represent this distinction in Figure 1. The two nodes represent the entities and the line between them represents their bond or relationship. Shifting the unit of analysis from the node to the bond makes sense for a number of reasons.

Insert Figure 1 About Here

Reliance on market incentives and the attendant intra- and inter-organizational interactions they prompt are prominent features of the New Public Management. Transactions across formal lines of authority are creating partnerships and networks among entities which are less concerned with the boundaries that separate them and more concerned with the relationship that bind them. For example, outsourcing a particular management function, say claims processing for a state unemployment bureau, creates a reliance on an "outside" contractor who is expected to perform services that were once handled internally by stage agency personnel. The contract between the agency and the outside supplier continues to the extent that the relationship between the two entities is judged to be mutually advantageous. Neither the characteristics of the state agency nor the characteristics of the supplier are as important as the bond they forge between them. That bond can be examined in terms of its strengths, type, and frequency, to name just a few variables. Independent, autonomous entities are rare in a networked-based structures. Changing the unit of analysis from an entity to the relationship between and among entities is more consistent, we would argue, with the relational character and the emergent networks of New Public Management.

Second Stage of the Research Process: Choosing a Research Design

Research in New Public Management tends to rely heavily on pre-experimental designs, most notably the one-shot case study. A one-shot case study involves an observation of a single group or event, most often after some phenomena that is expected to produce an effect occurs (Nachmias and Nachmias, 1981, pp. 107-109). In contrast to quasi-experimental and experimental designs, there are no controls over the sources of internal and external validity. This type of design is therefore limited in its causal inferential powers; it cannot be used for testing causal relations, although certain multi-variate statistical analyses can improve them.

The one-shot case study does have utility for theory construction, however. It can be used as exploratory research to develop theory rather than test it. Researchers can use the rich case study data for hypotheses generation and then rely on more rigorously designed studies at a later point in time for hypothesis testing. One-shot case studies are an excellent way to develop theory as long theory construction rather than pure description is the researcher's intention. Unfortunately, the potential of one-shot case studies remain underdeveloped because researchers often stop at description, leaving the most important work of theory construction for someone else to do. If New Public Management researchers continue to do one-shot case studies, then theory construction should be their goal, especially the formulation of theories and hypotheses that pertain to system-level functioning.

There are two variations of the one-shot case study that are particularly useful and could be utilized to great advantage as this point in the development of New Public Management: comparative case studies and longitudinal case studies. The comparative approach is perhaps the most general and basic strategy in the social sciences. It involves the examination of several comparison groups in order to distill what is common to all of them despite the variation in locale and context. Glaser and Strauss (1967) point out that the discovery of

new theory from data is facilitated by maximizing the differences among groups because this brings out the widest possible coverage of all aspects that are necessary for the elaboration of theory.

We could envision, for example, a comparison among the countries in which a transition from Public Administration to Public Management is occurring. Separating out the elements that were common to all countries and the elements that were unique would be an important aspect of the study. In this cross-country comparison, perhaps we could even identify the potential sources of variation among the elements, such as the institutional context and the constitutional arrangements of each country. Comparative case studies have made their appearance in New Public Management, but the unit of analysis tends to be a functional element of the system rather than the system as a whole. Hence we find cases of financial management changes in OECD Nations (Guthrie, Olson, and Humphrey, (1997), and performance auditing in OECD nations (Barzelay, 1997). To our knowledge, system-level comparisons among nations transitioning to New Public Management have yet to be done. Given the international scope of the New Public Management Network, cross-national comparisons seem like a likely next step, especially since case studies that document the evolution of New Public Management at the national level are appearing (e.g. Boston et. al., 1996).

Longitudinal case studies offer another variation in terms of research design. Rather than only examine **what** elements change in the transition from Public Administration to New Public Management, longitudinal designs enable us to examine **how** changes among the elements actually unfold over time. The distinction between the "what" and the "how" is the distinction made between variance theories and process theories. "Variance theories" examine the interrelationships among variables measured at a single point in time. In other words, independent variables statistically explain variation in dependent variables, and rely on correlations and regressions to examine the variations among variables either at one point in time or at successive times by a panel technique (Mohr, 1982). "Process theories," in contrast, explain the temporal order and sequence of a discrete set of events that occur based on a story or historical narrative (Abbott, 1988). A process approach would be searching for any patterns and sequencing of events over time in terms of some underlying generative mechanisms that have the power to cause events in the real world, documenting the particular circumstances or contingencies when these mechanisms operate (Tsouskas, 1989).

From our perspective, longitudinal designs have an advantage because they enable researchers to search for causal relations, patterns and sequences in the transition from Public Administration to New Public Management. Do all elements of New Public Management changed concurrently, or is there a developmental path to the change process — perhaps certain elements of New Public Management prompt movement in other elements? Only a longitudinal design permits researchers to pose and answer these type of process questions. Hence, process explanations address how something occurs; they identify order in the sequence of change and are very different from variance explanations that only describe what happened. From our perspective, some of the more interesting questions about New Public Management require a process rather than a variance approach and we encourage its pursuit. We provide examples of research on process questions below.

Third Stage of the Research Process: Collecting Data

Three general forms of data collection have been identified: observations, survey research, and non-reactive techniques (Nachmias and Nachmias, 1981). Observation is considered to be the archetypical method of scientific research. However, care must to taken to ensure that observations are systematic. They must be carried out with reference to three critical issues: what is observed, where and when to observe, and how much to infer when recording observations (Nachmias and Nachmias, 1981). Decisions on these issues depend on the research problem and the research design. For example, the most controlled observations test hypotheses experimentally, explicitly define the units of observation, chose the setting (laboratory or field), draw a time sample, and systematically record observations with a little observer inference as possible. The least controlled observations, participant observation, enables the observer to gain membership in or attachment to the group he or she wishes to study. In this instance, the research purpose is broadly defined, enabling the researcher to make ad hoc identification of the units of study in the field, requiring neither samples of events nor time

samples to be drawn, and allowing observations to be recorded with a great deal of inference (Nachmias and Nachmias, 1981).

Survey research is an important data collection technique (Bradburn et.al., 1979; Fowler, 1993; Labaw, 1980). Three variations are found, each with its advantages and disadvantages: the mail/e-mail questionnaire, the face-to-face interview, and the telephone interview. Non-reactive techniques, or those that directly remove the researcher from those being researched, are intended to produce data free from errors that can be introduced with reactive methods such as interviews and questionnaires. There are three general types of non-reactive measures: physical traces; simple observation; and analysis of archival records. Physical traces document erosion (the selectively wearing out of certain objects) and accretion (the deposit of materials). Simple observation occurs when the observer has no control over the behavior in question, such as in observation of exterior body and physical signs, analysis of expressive movement, physical-location analysis, and language analysis. Analysis of public and private archival records includes the examination of diverse sources such as actuarial records, governmental documents, and mass media.

Based on our cursory review of new public management studies, it appears that researchers tend to rely more on reactive as opposed to non-reactive techniques. Of those studies that rely on reactive measures, surveys and interviews tend to be the most common form of data collection. Observations, when utilized, tend not to be controlled: they typically do not test hypotheses, explicitly define the units of observation, draw a time sample, or systematically record observations with a little observer inference as possible. Interviews and observations that document ongoing activities also are rare. When utilized, interviews tend to be retrospective, (e.g. interviewing participants in a change process after the change process has been completed), most likely reflecting the difficulties of capturing the dynamics of ongoing change that can span years.

To avoid some of the pitfalls common to these techniques, we recommend the use of real-time rather than retrospective interviews whenever possible since memory lapses and the success or failure of an intervention have been shown to bias findings (Fowler, 1995; Labow, 1980). Reliance on a single technique, especially reactive techniques, are to be avoided since they can introduce errors. Standard references to data collection all underscore this basic point. Multiple data collection techniques are preferable to reliance on only one (Bradburn et.al., 1979; Fowler, 1993; Nachmias and Nachmias, 1981). We know, for example, that if researchers use either observational or survey techniques, then they are sensed by a social system. If they are sensed by a system, then they are part of it (Barley, 1990). Being part of a system, they affect it. When they affect it they cannot observe it in its natural state and end up reporting what the processes of a disturbed system look like. This dilemma in social science illustrates a well-recognized principle in the physical sciences known as the Heisenberg Uncertainty Principle. Researchers only report the processes of a disturbed system when they rely on reactive measures (Van de Ven and Huber, 1990). Consequently, we recommend a triangulated data collection effort to provide important cross checks on the data. Each technique provides different strengths: interviews can offer depth and nuances; documents distill "facts;" and direct observation can help researchers distinguish between what people say and what they actually do.

Fourth Stage of the Research Process: Coding and Analyzing the Data

If researchers have followed the recommendations in the first three stages of the research process, especially the use of longitudinal, comparative case studies that employ multiple data collection techniques, then they rapidly generate an overwhelming amount of rich raw data. The danger here, as Pettigrew refers to it, is "death by data asphyxiation." The information processing requirements of large, complex data sets quickly exceed the capabilities of even the most experienced researchers. Organizing and evaluating these data becomes a very challenging task; in fact, new strategies and techniques for coding and analyzing these type of data often have to be devised. Although we uncovered no studies in New Public Management that can serve as exemplars in this regard, we offer two strategies that might be helpful to researchers of New Public Management at this stage in its evolution.

The first, event coding and sequence analysis, is ideal for longitudinal case studies that investigate any type of change process, especially those that rely on real-time observations and permit the transformation of qualitative data into quantitative measurements. Network analysis, the second strategy, is particularly useful in exploring how interactions and relational patterns change over time. We highlight only the basic steps in these strategies below; since each will be addressed in greater detail in the following section when we describe two research programs in some depth.

Incident Coding and Sequence Analysis. This strategy has evolved from longitudinal studies that investigate the innovation process (Van de Ven, et.al., 1989; Van de Ven and Poole, 1990). In the course of their studies, seven steps emerged for coding and analyzing the data:

"(1) Define the qualitative datum as an incident, bracket raw data collected from the field into these incidents, and enter this information into a qualitative incident data file.

(2) Evaluate the reliability and validity of classifying raw data into incidents by (a) achieving consensus and consistent interpretations of decision rules among at least two researchers performing this task, and (b) asking organizational participants to review the chronological list of incidents that occurred in their innovation or change effort.

(3) Code each incident in terms of the presence or absence of theoretical events constructs, and add these codes to the incident data file.

(4) Evaluate the reliability and validity of the event coding scheme by following conventional procedures for establishing construct validity and interrater reliability of measures.

(5) Transform the qualitative codes into dichotomous variables, or a bit-map event sequence data file, which permits time-series analysis of process theories of organizational change or development.

(6) Analyze temporal relationships between variables in the event sequence data file using a variety of statistical time series procedures appropriate to the theoretical question at hand. Enrich the interpretation of statistical results by reading and content analyzing the relevant sequence of incidents in the qualitative data file (developed in steps 1 to 3 above).

(7). Analyze developmental patterns or phases in organizational change or innovation by defining and examining coherent patterns of activity among temporal events in the incident data file" (Van de Ven and Poole, 1990:333).

Coding, Database Construction and Network analysis. Network analysis is the research methodology par excellence for studies that focus on the organization of social relationships. In contrast to all other social science methodologies, where the measurement unit (and unit of analysis) is centered on or derived from the individual, in network analysis the measurement unit is relational— the social tie or bond between two actors i and j. The following procedures are central:

(1). To set up the sociometric data for structural analysis, a dyad file must be created. The basic record in a dyad file contains data on the relation between a given pair of individuals. For each dyadic relations there are two records: one record containing the data on i's perception of the relation with j, and a second record containing j's perception of its relation to i. For example, in a group of ten individuals, the data file will contain ninety dyadic records or (N(N-1)) relations.

(2). For longitudinal studies, each time period over which the relations are mapped must be signified and separated in the database by a wave identifier.

(3). For structural analysis the raw relational data must be converted, by recoding into binary code (1 for the presence of a relation or tie; 0 for its absence or otherwise), into an adjacency matrix showing all possible pair-wise relations for a given relational content.

(4). For each different content analyzed (e.g. the bond could represent power, affect etc.) or for different values of the relations of a given content, a new adjacency matrix must be constructed.

(5). Depending upon the kind of structural organization expected or predicted by the substantive theory, the sociomatrix is then subjected to a structural analysis using one or more structural analysis programs. These programs analyze the relations in the sociomatrix and provide structural measure of various patterns or arrangements of the relations, either for the whole social unit or for various subsets of individuals or relational entities.

Fifth Stage of the Research Process: Interpreting the Results

The final stage of the research process, interpretation of the results, completes the theory testing or theory building efforts. Theory testing begins with a research question and the generation of hypotheses in stage one, the choice of a research design in stage two, the collection of data in stage three, the coding and analysis of data in stage four, and the interpretation of results specifying the level of support for the hypotheses in stage five. Theory building begins with a general research question in stage one and ends in stage five with a theory and hypotheses that will be tested in more controlled studies in the future.

Theory-testing research generally stays within the confines of a researcher's discipline-based boundaries as noted earlier. But interesting exceptions have emerged as researchers have begun to test theories drawn from the physical sciences. Of note are the recent efforts to apply chaos (complexity) theory (Abraham and Gilgen, 1995; Cheng and Van de Ven, 1996) and holonomic and complexity theory (Bradley, 1987; 1996; 1998a,b; Bradley and Pribram, 1998; 1997a,b) to examine social science data. While theories from the physical sciences may seem far removed from New Public Management and its domain of interest, some have some intriguing properties that may provide complementary theoretical support for New Public Management research. Chaos theory provides an example. Its principles of prediction impossibility (sensitivity to initial conditions), non replicability of past situations (time irreversibility), attraction to configurations (strange attractors), invariance at different organizational scales (fractal forms), and step-wise change processes (bifurcation) all can contribute to explanations of organizational behavior and provide alternative perspectives from which to view organizational work (Thietart and Forgues, 1995). Below, we offer two examples of how researchers use not only their own social sciences theories to interpret data, but enrich their interpretations with theories from the natural sciences.

Recommendations in Action: Two Programs of Research

Our recommendations for New Public Management research methodologies are summarized in Table 2. We illustrate how these recommendations have been put into practice by introducing the reader to two research programs: the Minnesota Innovation Research Program, led by Andy Van de Ven at the University of Minnesota, in which Roberts participated as a principal investigator (Roberts and King, 1996); and Columbia University's Nation-wide Study of Urban Communes, led by Ben Zablocki in which Ray Bradley was a principal participant. Each program is an example of our basic recommendations and serves as a model for those who wish to apply these techniques to New Public Management research.

Insert Table 2 About Here

Minnesota Innovations Research Program (MIRP)

Research Questions. Since 1983, researchers at the University of Minnesota have been engaged in a research program for the purpose of developing **a process theory** of innovation. Three process questions

inform the research: How do innovations actually develop over time from concept to implemented reality? What innovation processes lead to successful and unsuccessful outcomes? And to what extent can knowledge about managing innovations and change processes be generalized from one situation to another? Four **levels of analysis** are included — individual, group, organizational and inter-organizational. Five basic concepts or **units of analysis** provide the common framework: **people** initiate and develop **ideas** by engaging in **transactions** (relationships) with others to achieve the **outcomes** within changing institutional and organizational **contexts**.

Research Design. The research design calls for **longitudinal, comparative case studies** so that researchers can carefully observe a wide variety of innovations as they develop in natural field settings in real time. **Fourteen studies** are part of the initial set and include technological, product, process, and administrative innovations in public, private, and not-for-profit sectors. They include: the development of hybrid wheat, advanced integrated circuits, cochlear implants and therapeutic apheresis biomedical devices, public- and private-sector ventures to conduct experiments on the space shuttle, multi-institutional hospital systems, startup of a computer harware and software company, defense contracting of a naval weapon system, the introduction of nuclear power safety standards, strategic planning systems in local municipal governments, educational reforms at the state and local school levels, human resource management innovations, and organizational mergers and acquisitions. A total of fifteen faculty, nineteen doctoral students from eight different academic departments and five schools at the University of Minnesota make up the fourteen interdisciplinary research teams. Because of the limited research and theory on the innovation process, the teams are taking a grounded theory strategy (Glaser and Strauss, 1967). Rather than testing existing theories logically deduced from a priori assumptions, they seek to discover a process theory of innovation from data systematically obtained in the longitudinal, comparative studies.

Data Collection. Three overlapping stages structure data collection. First, exploratory studies enable researchers to gain entry into the field and become familiar with each innovation idea. Second, case histories and baseline data are obtained on each innovation idea. The case histories map events leading up to the initiation of the longitudinal studies and the baseline information provides a description of the institutional settings in which the innovative ideas are developing. This information draws on published reports, documents, interviews, and questionnaires. Third, researchers develop data collection instruments as soon as they are clear on what specific aspects of each innovative idea should be studied over time. Instruments consist of on-cite observation guides, interviews, questionnaires, and compilations of relevant documents. These instruments are available in a Methods Manual for Minnesota Innovation Research Program (Van de Ven et al., 1987).

Depending on the study, regularly scheduled questionnaire data collection intervals range from six to nine months. The repetitive surveys and interviews provide comparative-static observations of the concepts being tracked over time. They indicate what **differences** between the time periods on these concepts occurs. However, both regularly scheduled and real-time observations are necessary to fully document the dynamics of the change process. Difference scores between regularly scheduled observations identify **what** changes occur; real-time observations help explain **how** these changes occur.

Data Coding and Analysis. Extensive techniques have been developed to codify procedures for handling longitudinal panels of quantitative data, including constructing computer data files and analyzing longitudinal data (Tuma and Hannan, 1984; Van de Ven and Chu, 1989). Less has been written on coding and analyzing qualitative data, especially those interested in identifying patterns of change. The following steps were devised in the course of the MIRP research project (Van de Ven and Poole, 1990).

(1) *Defining a Datum as an Incident*. An incident is defined as a recurrence or change in any one of the five core concepts (units) in the MIRP framework: innovation idea, people, transactions, context, and outcomes. When an incident is identified, it is described by a "bracketed string of words" which include: date of occurrence, the actor(s) or object(s) involved, the action or behavior that occurred, the consequences (if any) of the action, and the source of the information. These "bracketed string of words about a discrete incident" are then entered into a qualitative incident data file.

(2) *Reliability and Validity of Transforming Raw Data Into Incidents*. This step attempts to establish the reliability of classifying raw data into incidents. The process begins with at least two researchers who enter incidents from raw data sources into the data file. The two researchers have to have a consensus on the application of decision rules to the incidents. However, instead of just relying on researchers' classifications and agreement, practitioners also are asked to review the resultant list of incidents and indicate if any incidents are missing or incorrectly described. This additional effort seeks to test empirically whether researchers' classifications and codes are consistent with practitioners' perception of events. Based on practitioners' feedback, revisions are made if they conform to the decision rules for defining each incident. If evidence reveals an inconsistency between researchers' and practitioners' interpretations, then researchers can still make claims about the meaning of incidents from their theoretical perspective, but claims about practitioners' reality of the incident are not appropriate. It is acknowledged that the resultant list of incidents does not represent the population of occurrences in the development of an innovation, but instead represent a sample of incidents of what happened over time.

(3) *Coding Incidents into Event Constructs*. A list of incidents is a qualitative indicator of what happens in the development of an innovation, but one additional step is needed. Researchers must code the incidents into theoretically-meaningful event constructs. MIRP researchers used the core concepts and developed multiple variables on which to code them into event constructs. For example, when incidents provide evidence of results, they are coded as representing either a positive event construct (good news or successful accomplishment), negative event construct (bad news or instances of failure or mistakes), or mixed event construct (neutral or ambiguous news indicating elements of both success and failure).

(4) *Assessing Reliability and Validity of Coding Scheme*. The actual coding of incidents into event constructs is performed independently by two or more researchers. This enables the researchers to compute inter-rater reliability.

(5) *Transforming Coded Incidents into Bit Maps for Time Series Analysis*. The next step in the procedure is the transformation of coded incidents or event constructs into what the researchers call a "bit map." A bit map is a matrix of rows which represent the incidents listed in chronological order and rows which represent the variables representing all of the event constructs. Each event construct of an incident is coded into a dichotomous variable of 1 (change occurred) or 0 (no change occurred). This transformation of qualitative data into quantitative data permits the application of various statistical techniques to examine time-dependent patterns of relation among the event constructs.

(6) *Analysis of Temporal Relationships in Bit-Map Data*. The stage is now set for examining temporal relationships and patterns among the variables in the development of innovation. The family of methods concerned with the problem of determining the temporal order among events is called sequence analysis (Abbott, 1984). It examines similarities and differences between discrete events. The bit map files can be analyzed with a variety of statistical methods to identify time-dependent patterns among the dimensions coded as 1's and 0's. The MIRP studies have utilized chi-square test and log-linear models to examine probabilistic relationships between categorical independent and dependent variables, Granger causality and vector autoregression to identify possible causal relationships between bit-map variables, and time series regression analysis on incidents aggregated into fixed temporal intervals to test specific process models. All of these methods attempt to detect bivariate relationships between coded event variables.

(7) *Analyzing Developmental Patterns or Phases in Temporal Data*. This step in the analysis uses a multi-variate technique called phase analysis. Its purpose is to identify and compare developmental patterns or stages in the temporal sequence of data. This technique can be used to both develop and test models (hypotheses) about development. One particular advantage is that it can evaluate more than one process model. For example, the MIRP researchers used this technique to compare and contrast two models of the innovation process (Van de Ven and Poole, 1990).

The phase analysis technique requires the researcher to conceptually define discrete phases of innovation activity and create a phase map. The next step is to analyze sequences and properties of the phases and to identify any meaningful patterns. MIRP researchers focused on two kinds of patterns — the types of sequences and the structural properties of sequences.

Interpretation of Results. Researchers developed a meta-theory of innovation process based on the contention that a single theory cannot encompass the complexity and diversity observed across the innovation process studies. The meta-theory identifies and classifies innovation processes in terms of levels of analysis (local or global) and type of theory (historical, functional, or emergent process motors). It also specifies situations or contingencies when each type is likely to apply. Additionally, it proposes three switching rules that may determine when to switch between models to explain innovation processes over time (Poole and Van de Ven, 1989). Interpretation of results did not stop with social science constructs, however. When research eliminated the plausible explanation that the onset of innovation can be modeled as an orderly periodic process of trial-and-error learning (Garud and Van de Ven, 1992; Van de Ven and Polley, 1992), the next step was to search for alternative explanations: that the innovation process was either random or chaotic. In examining the various patterns in time series data, researchers were able to distinguish a chaotic pattern during the initial period of innovation development and an orderly periodic pattern during the ending of the development period. The presence of chaos indicated that at certain periods, the innovation process is a nonlinear dynamical system (Cheng and Van de Ven, 1996).

National Study of Charismatic Organization in Communes

Research Question. Bradley's (1987) study of charismatic organization grew out of the Urban Communes Project (Zablocki, 1980). He asked: How does charisma transform a social structure? Charisma was defined as a form of collective organization patterned for the achievement of revolutionary or radical social change (e.g. structural transformation). It was hypothesized that two relational patterns — communion (or bonds of positive affect or love) and power (or bonds of collective control) — distinguish charismatic organization. At high levels of intensity, the interaction of these two relational patterns and the counterbalancing between them was expected to produce transformation in a social structure. The unit and level of analysis were the relational bonds of affect and power.

Research Design. This research project was a three-wave, panel study of sixty urban communes sampled from six Standard Metropolitan Statistical Areas (Atlanta, Boston, Houston, Los Angeles, Minneapolis-Saint Paul, and New York). Of the fifty-seven communes included in Bradley's study (three of the sixty were excluded because membership was not completely voluntary), 28 communes were designated as "charismatic" based on the ethnographic material and evidence from questionnaires and interviews. Sub-groups of the charismatic communes included: resident charismatic communes and absentee charismatic communes. Twenty-nine served as the comparison, non-charismatic organizations.

Data Collection. Data collection took place over the summers of 1974, 1975, and 1976 and employed a combination of formal and informal data gathering instruments. Intensive field-worker contact was maintained with each commune for three to four months each summer, providing extensive observational and interview material on the structure and activities of each group. In addition, a number of formal instruments (interviews and questionnaires) were administered to all permanent member 15 years and older to gather systematic information on the social background, communal involvement, self concept, and attitudes. A sociometric questionnaire was employed to map all possible dyadic relations in each commune across a number of different relational contents. Thus, each member was asked to answer a set of questions about his or her pair-wise relationship with each of the other adult residents. The questionnaire contained a sheet of standardized questions that the respondent completed for every other individual in the commune. (i.e., N-1 sheets per respondent; they did not complete one for themselves). This generated an exhaustive mapping of the N(N - 1) dyadic relations in a group. The instrument was administered under strict fieldworker supervision to ensure that there was no collusion among members in answering the questions.

Data Coding and Analysis. This is where the major differences between network analysis and standard non-relational methods become most apparent. To set up the sociometric data for structural analysis, a dyad file must be created. This basic record in a dyad file contains data on the relation between a given pair of individuals. For each dyadic relation there are two records: one record containing the data on i's perception of his/her relation to j, and a second record containing j's perception of his/her relation to i. Thus, in a group of ten individiuals, the data file will contain ninety dyadic records (N(N-1)). For this longitudinal study when the relations are mapped over time, each time period is signified and separated by a wave identifier.

Triadic analysis, a sociometric tool, is used to analyze the structural properties of the network of relations in small to medium-sized groups. Triadic analysis subdivides the relational structure into triads, and then, through a consensus of all possible triads, measures the distribution of 64 different triadic configurations which are then classified into 16 isomorphic structural types (See Bradley and Roberts, 1989b for further elaboration).

Interpretation of **Results.** The postulated structural (relational) patterns of charismatic and non-charismatic communes were validated by the commune data. The collective belief that a particular individual possesses exceptional qualities or powers of a "supernatural" origin (Weber, 1947), were coincident with the predicted structural (relational) properties. Empirically, a densely interlocking pattern of highly charged bonds of positive affect was found in the charismatic communes, varying directly with the intensity of charismatic leadership (i.e., more likely with resident charismatic leaders). Built from fraternal love, optimism, and euphoria, and identified as communion, these highly charged bonds of affect were found to be extremely unstable. Unless they were monitored and regulated, they had destabilizing and often fatal consequences for the group. To survive under these conditions, a charismatic group required a strong collective power structure. This structure acted to harness the energy, aligning and channeling it to collective ends. Furthermore, longitudinal data analysis revealed evidence of a causal connection (observed over 24 months) between the positive affect and power and their effect on group survivability. The results showed that survival over time is highest for those in which there is a balance in the structuring of positive affect and power among the charismatic groups. In other words, there is a one-to-one correspondence between communion (positive affect) and collective power if stability is to be maintained.

Additional findings were unexpected, and required interpretation beyond existing social science theories. It appeared that survivability of non charismatic groups also were linked to the counterbalancing of the structures (relations) of affect and power (although at lower levels of intensity when compared to the charismatic groups). This finding suggested something more fundamental about the nature of social organization, especially when major sociological theories — historicist, interactional, normative, and stratificational — were unable to account for the results. Bradley then began to search for alternative explanations. In his exploration, he began to test the principles of holographic organization draw from physics and neuropsychology (Pribram, 1971; 1991) as a way to explain how the organization of the commune, as a whole, was encoded and distributed into all of the group's dyadic relations (Bradley, 1987: chapters 8-10). In subsequent work he and Karl Pribram have found a remarkable similarity between collective organization of the brain function and collective organization of social groups (Pribram and Bradley, 1998). Furthermore, there were interesting parallels with Prigogine's biochemical theory of *dissipative structures* (Nicolis and Prigogine, 1977; Prigogine and Stengers, 1984; Priogogine, 1997). Bradley speculated that the positive affect (communion) of charismatic systems could be the self-organizing mechanism that dissipates social entropy and helps transform a system, with the charismatic leader operating as an auto-catalytic agent (Bradley and Roberts, 1989a).

Conclusion

New Public Management scholars interested in the recommendations for research outlined in Table 2 will quickly realize that the character and experience of the research endeavor would be very different than what they traditionally have experienced. The lone, independent, disciplined-based researcher will joined **teams** of **inter-disciplinary** researchers in **large-scale programs** that **require years of real-time investment**. Unlikely to have the requisite experience, knowledge, and skills, each researcher will welcome other specialists who complement his/her abilities and perspective. Heavy reliance on **field-based studies** also will need the

participation of **talented graduate students** who serve as colleagues in collecting and analyzing data and stand in for faculty who, given their competing responsibilities, are unable to spend sustained periods in the field. All parties will work together in a **collective process** that requires a **high level of collaboration and trust**.

Team-based research will demand careful attention to **issues of leadership, management and ethics** (Bradley, 1982; Pettigrew, 1990). Designing a project for academic and practitioner relevance and sustaining a project's vision through the months and years of challenging work, especially given individuals' needs to complete dissertations, be promoted and receive tenure, are not trivial undertakings. Integrating and coordinating the efforts of large-scale research projects in a community of scholars is an art and a craft, not a science. Needs for social and political skills are high along with a healthy level of respect for individual differences. A **broad analytical structure** is necessary to link the comparative studies, but there also needs to be plenty of intellectual space left to accommodate personal interests and needs. **Generating funding** for large-scale projects introduces another layer of complexity as do pragmatic considerations about the sequencing of outputs and work and the requirements of funding bodies. **Ethical issues** also are paramount of this type of research: ethical issues concerning practitioners, concerning grant awarding bodies, concerning publication rights, concerning data ownership (Bradley, 1982).

We recognize our recommendations are not without costs, but we believe the benefits and the returns are well worth the effort. Having spent a good portion of our academic careers in collaborative research programs such as those outlined above, we endorse the efforts and encourage others to consider them as New Public Management enters the next phase of its evolution.

Table 1

Public Administration and New Public Management: A Comparison

Dimensions	**Public Administration**	**New Public Management**
1. Metaphor	Machine	?
2. Agency	Emphasis on Laws, Institutions,	Emphasis on Competitive Markets, Environment
	Political Processes	Individualistic Self Interests, Customer Orientation
3. Key Success Factors	Equity, Responsiveness, Political Salience	Efficiency, Effectiveness, Customer Satisfaction, Adaptation to Change
4. Direction Setting	Values	Public Interest, Concern Over Service Quality, Agency &

Conflicts Between Bureaucracy and Management Accountability,

Democracy, Stress Differences Minimize Differences Between

Between Public and Private Sectors Public and Private Sectors

Leadership Political or Policy Elites and Agency General Managers Given

Separate Political and Autonomy and Authority in

Administrative Spheres Performance Contracts with Politicians

Planning Specification of Constraints and Specification of Mission, Strategic

Justification of Costs Intent, Vision, Goals and Customer-

Driven Outcomes

5. Organization

Design:

Structure Functional Hierarchy with Networks of Self-Organizing Teams

Centralized Decision Making with Decentralized Decision Making

Jobs Standardized, Specialized, Multi-Tasked and Redesigned to

Formalized Focus on Outcomes

Technology Routinized with Standard Non-Routine, Customized,

Of Work Operating Procedures and Reengineered Based on Processes,

Sequential Processing Contracted Out and Co-Produced

With Public-Private Partnerships

Organization

Design:

Processes:

Rewards Rule & Regulation Based Incentive Based and

Dependent on Reaching

Operating Targets

Training Learn Rules Develop Mastery

Information Low-Minimal Computerization Computerized Information

Processing Management (Object-Oriented Data

Bases, Expert Systems, Networked Information Systems)

Financial Spending Plans, Cash-Based Responsibility Centers,

Management, Accounting Models, Input & Accrual-Based Accounting,

Measures, Process-Based Measures of Activity-Based Costing, Output &

& Controls Performance, Ex-Ante Controls Outcome-Based Measures of

Performance, Ex-Post Controls

6. Culture Minimize Risk, Follow Rules & Manage Risks, Identify and Solve

Procedures, Maintain Order & Problems, Improvement and Change

Stability Oriented

Figure 1

The Relationship as the Unit of Analysis

! (Node)

— > **The Bond Between the Nodes**

! (Node)

Table 2

Recommendations for New Public Management Research Methodologies

Stage One: Research Questions/Problems:

1. Research questions should address New Public Management as a total system or configuration. During a period of transformation and radical change, the whole system and the interrelationships of its parts is likely to be more important than the constituent parts.

2. Research questions should probe **how** something is occurring rather than solely focus on **what** is happening in order to capture the dynamics of change.

3. The **units of analysis** should be more clearly specified. Greater consensus on what constitutes New Public Management would enable some comparison across studies.

4. Defining **a relationship** between two parties as a **unit of analysis** also enables researchers to investigate how patterns of interactions evolve and change.

Stage Two: Research Design:

1. One-shot case studies should move beyond description to **theory development.**

2. The use of **longitudinal designs** would enable researchers to study the dynamics of change from the Public Administration Configuration to the New Public Management Configuration. Theory development and testing can then be broadened to include both **variance theories** and **process theories**.

3. **Comparative case study designs** would enable researchers to maximize the differences among cases to bring out the widest possible coverage of all aspects necessary for the elaboration of theory.

Stage Three: Data Collection:

1. **Multiple data collection techniques** need to be utilized.

2. Greater reliance on **non-reactive techniques** is advised.

3. **Real-time data** is preferable to retrospective data.

4. Greater **control over observations** needs to be exercised to minimize observer inferences.

Stage Four: Coding and Analysis:

1. **New techniques** need to be invented to handle more complex (comparative, longitudinal) data sets.

2. **Event coding and sequence analysis** is recommended for longitudinal, comparative case studies of change.

3. **Relational coding and network analysis** is useful in exploring how relational patterns change over time.

Stage Five: Interpreting the Results:

1. Interpretation of results depends on whether the researcher is **building or testing** social science theories.

2. Interpretations that include **physical science theories**, e.g. chaos (complexity) theory and holonomic theory can give complementary theoretical support to existing social science theories and also open up new avenues of research for unified theories across social and physical systems.

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