LOOKING BEYOND THE ADOPTION DECISION IN INNOVATION RESEARCH: INVESTIGATING INNOVATION IMPLEMENTATION

DISSERTATION

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By

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ABSTRACT

Innovation has been linked to important organizational outcomes such as economic growth and competitiveness. The field of innovation research has predominantly been concentrated on the adoption of innovations. Researchers have long been calling for an increased focus on a process-oriented approach to understanding the implementation of innovations.

This research builds upon a framework of implementation originally proposed by Klein and Sorra in 1996, and empirically tests an enhanced model of antecedents and consequences of innovation implementation. Specifically, climate for implementation, compatibility, and project slack were hypothesized to be related to the proximal outcome of innovation, i.e., successful implementation effectiveness. Implementation effectiveness was hypothesized to be related to the distal outcome, innovation effectiveness, or the consequences to the organization. Reinvention (the degree to which the innovation has been modified) was expected to moderate this relationship. It was also proposed that the perceived need to maintain fidelity to the original innovation model would moderate the relationship between extent of reinvention and innovation effectiveness.

The data for this study was derived from a longitudinal field project, and consists of data gathered from key informants in fifty mental health agencies in

Ohio using surveys and interviews. Data analyses included examining reliability of scales, examining reliability and agreement indices to justify aggregation from individual-level data to the level of the project/innovation, bivariate correlations, principal component analyses, simple linear regression, and, mediated and moderated regression analyses.

Climate for implementation, compatibility, and project slack were each significantly related to implementation effectiveness. Interestingly, climate for implementation explained the most variance in implementation effectiveness. Implementation effectiveness was related to innovation effectiveness, but this relationship was not moderated by extent of reinvention. Reinvention was negatively related to innovation effectiveness, and this relationship was moderated by the perceived need to maintain fidelity to the original innovation model.

Overall, implementation effectiveness mediated the effect of compatibility and project slack, respectively, on innovation effectiveness. Implementation effectiveness, however, did not mediate the influence of Climate for implementation on innovation effectiveness.

This research makes a number of contributions to the innovation literature. Implications for theory development and application are discussed.

To

Amma, Appa, Sriram and Praveen.

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CHAPTER 1

INTRODUCTION

The history and development of the world's economy reveals that innovation has always been crucial in its progress. In fact, formal economic models acknowledge the value of innovation in growth rates. In recent times, several factors have magnified the importance of innovations, such as structural changes within and between nations, changing demands of consumers, concerns about the environment and natural resources, upheavals in political milieu, evolving societies, and dynamic changes in the modes of global transactions. Further, advancing technologies themselves (the internet, for example) call for new ways of conducting operations. Today, the survival and success of entities; whether economies of entire nations, large corporations or incipient start-ups, hinge upon their ability to respond to changing conditions (e.g., Jick, 1995; Slocum, McGill & Lei, 1995).

Innovation has been convincingly linked to critical organizational outcomes such as economic growth and competitiveness (McFarlan, 1984; Porter & Millar, 1985; Reddy, 1990; Sproull & Goodman, 1990). It has been suggested that innovation improves a firm's performance not only by enhancing its competitiveness, but that the very process of engaging in innovation may

somehow change internal processes such that the firm becomes more adaptive. However, in 1985, Alvin Toffler asserted that no problem facing American business was more important or less understood than that of innovation. We have come a long way since then, but the puzzle is nowhere near solved. The cumulative understanding of innovation research has been scathingly referred to as inconclusive, inconsistent, lacking explanatory power (Bigoness & Perreault, 1981; Damonpour, 1988; Nord & Tucker, 1987; Pennings, 1987, Rogers, 1983; Wolfe, 1994), fragmentary (Kelly & Kranzberg, 1978), contradictory (Kimberly & Evanisko, 1981), beyond interpretation (Downs and Mohr, 1976), and as offering little guidance to the innovation researcher (Meyer & Goes, 1988; Van de Ven & Angle, 1989).

One of the reasons for this lack of clarity about innovation research, despite the substantial number of studies and reviews, may be traced to the implicit assumption that the very act of creating something new, or adopting a new idea / technology will bring significant benefits. In other words, there exists a tacit expectation that once innovations are adopted, all the benefits attributed to the innovation will unquestionably be realized by the adopting organization. Consequently, while the literature is surfeit with models and studies on determinants of the decision to adopt innovations, it is markedly barren with respect to what follows the adoption, or the outcomes of innovation implementation (Klein & Sorra, 1996; Tornatzky & Klein, 1982; Voss, 1988). It is this lacuna that the present research intends to fill.

Implementation in the Innovation Literature

In locating implementation within the context of the field of innovation research, the narrower area of organizational innovation is relevant for the purpose of this research. In his review of the innovation literature, Wolfe (1994) notes that although organizational innovation tends to be referred to in an amalgamated and cohesive tone, it is composed of three distinct streams that have developed almost sequentially, namely, diffusion research, innovativeness research, and process theory research.

Diffusion Research

The diffusion of innovation research examines the spread of an innovation through a population of potential adopters. Pioneered by the work of Rogers (1983, 1986), the objective of this research is to explain and predict adoption rates and patterns of innovation adoption. Consequently, the unit of analysis is the innovation itself. Factors that have been identified as influencing diffusion include; (a) adopter characteristics (such as education and attitude towards change), (b) innovation attributes (such as relative advantage and complexity), (c) promoter characteristics (accessibility and socio-economic status), (d) social network of the adopter, and (e) communication about the innovation (Rogers, 1983).

Initially emerging from the investigation of innovation adoption by individuals, this approach was later extended to the organizational level. Characteristics of the organizational leader, and the organization's structure replaced the characteristics of the individual as variables of interest. However,

since the process of organizational innovation is very different from adoption of innovations by individuals, the approach has been criticized for its erroneous 'anthropomorphizing' of organizational characteristics (Yin, 1979). The failure to incorporate unique organizational issues is posited to be one reason for the disappointingly low explanatory power (Rogers, 1983).

Innovativeness Research

The central focus of research on innovativeness is to understand what determines an organization's propensity to innovate. The unit of analysis is thus the organization and the variable of interest is typically operationalized as the rate of adoption of innovations (e.g., Baldridge & Burnham, 1975; Bigoness & Perreault, 1981; Daft, 1978; Kimberly & Evanisko, 1981). Other variants are number of awards won (Blau & McKinley, 1979), or number or patents acquired (Hull & Hage, 1982). Categories of determinants that have been examined in this regard span the environmental (e.g., competition; Utterback, 1974), organizational (e.g., size; Baldrige & Burnham, 1975), and managerial characteristics (e.g., educational background; Rogers & Shoemaker, 1971). Of these potential determinants, organizational characteristics have received the most emphasis.

The foremost limitation of this approach, according to Wolfe (1994) is its static, deterministic orientation and consequent inability to capture the dynamic nature of innovation development and use. Researchers (Downs & Mohr, 1976; Meyer & Goes, 1988) also criticize this approach on methodological grounds. They assert that aggregation of different innovations to create a composite score

of innovation adoption is inappropriate because it ignores the context of each innovation, and incorrectly assumes homogeneity of the innovations. Each innovation (and its characteristics) will uniquely interact with the organization (and its characteristics). They claim that this approach has led to erroneous conclusions about effects. Additionally, the approach completely neglects post-adoption processes. The next approach discussed addresses this issue.

Process Theory Approach

The process theory approach examines how innovations emerge, develop, and are implemented in organizations. Within this approach, two distinct perspectives have developed, namely, the stage models and the process models. The two perspectives are briefly described below.

Stage models. Stage models conceptualize innovation in terms of a series of stages that are expected to unfold. Stage models are further distinguished on the basis of whether the innovation is internally (source-based) or externally developed (user-based), in relation to the adopting organization.

Source-based stage models deal with internally developed innovations. Within this context, an innovation is defined as a new product, service, or technology that an organization develops, and seeks to either disseminate it in the market, or use in internal operations. Consequently, source-based models describe the innovation process from the perspective of the developer of the innovation, and the stages include research, development, testing, manufacturing, and finally, marketing/ dissemination (Amabile, 1988; Kanter, 1988; Tornatzky & Fleisher, 1990).

User-based stage models deal with externally developed innovations. Within this context, an innovation is viewed as any idea, technology, or practice "being used for the first time by members of an organization, whether or not other organizations have used it previously" (Nord & Tucker, 1987; p. 6). These models follow innovations from the initial awareness of an idea by a potential user to the time that the innovation is implemented in the organization (Beyer & Trice, 1978; Nord & Tucker, 1987; Tornatzky & Fleisher, 1990). For example, Ettlie (1980) proposed a user-based stage model consisting of five stages - awareness, evaluation, trial, adoption, and implementation. Meyer and Goes (1988) proposed an alternate three-stage model where the three stages are, knowledge-awareness stage, evaluation-choice stage, and adoption-implementation stage. Other authors (such as Daft, 1978; Rogers, 1983; Tornatzky et al., 1983; Zaltman, Duncan & Holbek, 1973) have proposed variants of this model.

More recently, to develop a unitary framework of the innovation process, the source and user-based models have been incorporated into a dual-process model (National Science Foundation, 1983; Meyer & Goes, 1988; Cooper & Zmud, 1990). This framework links the perspectives of the source /developer (diffusion) and the user /adopter (innovativeness) while simultaneously incorporating the process approach. Further, the dual-process model (Figure 1.1) locates implementation in the innovation process (in both internally developed and externally developed innovations) as beginning after an innovation has been adopted, and continuing until the innovation is assimilated into organizational practices.

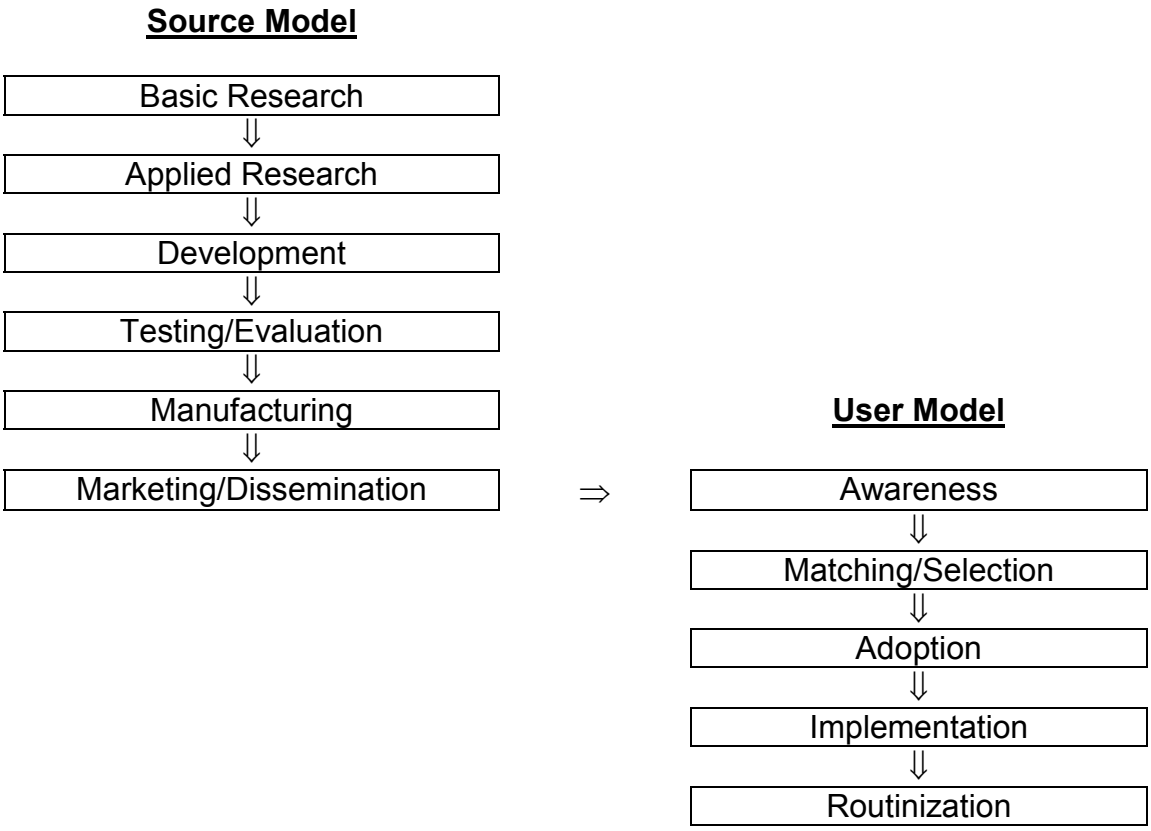

Figure 1.1: Dual innovation process (adapted from National Science Foundation, 1983).

By focusing on the different phases of the adoption process, the stage models succeeded in identifying the stages involved in the process of developing, or adopting, and ultimately using an innovation. However, critics asserted that linear and sequential stage models do not adequately represent

innovation processes (Schroeder, Van de Ven, Scudder & Polley, 1989). This led to the next generation of process models.

Process models. The second generation of work within the process theory approach includes those approaches that focus on describing the conditions that determine innovation processes. These models are thus efforts to describe in greater depth, the dynamic nature of the innovation implementation process (Rogers, 1983; Van de Ven & Angle, 1989; Van de Ven and Rogers, 1988). Consequently, this approach is characterized by more inductive, longitudinal research involving theory building, such as the work of Van de Ven and his colleagues (1989) who, over a period of 17 years conducted 14 longitudinal studies of innovation processes in diverse settings. This approach examines how phenomena develop over time and methodology includes analyses of archival data, published reports, interviews, questionnaires and real time field data.

Why Has Implementation Research Been Neglected?

As noted, innovation research has neglected the behavior and activities following the decision to adopt an innovation decision processes. Two broad explanations are hereby offered to explain this bias.

One reason for this neglect could be linked to the domination of the diffusion research tradition. Reviews of the innovation literature reveal that the preponderance of the research stresses the adoption decision, as if that were synonymous with the end outcome. This limited conceptualization is justified from the point of view of the seller of an innovation, because adoption is essentially the decision to buy a product, which is indeed the outcome of interest

for the developer/seller. However, from the point of view of the purchasing or adopting organization, such a myopic focus neglects the fact that mere adoption does not guarantee success, as defined by the user. Innovations must also be implemented and assimilated. The usefulness of conceptualizing innovation success as adoption is thus limited, and implementation should be included as an outcome variable of interest.

The second reason for this oversight can be traced to the pro-innovation bias that is fostered by the innovativeness research tradition. This pervasive bias is the assumption that adoption of an innovation will bring about beneficial results to the adopter (Abrahamson, 1991; Kimberly, 1981). The error of this bias is substantiated by the fact that there are several instances of well-substantiated innovations (such as total quality management, statistical process control and computerized technology) that have failed in organizations (Klein & Sorra, 1996). Explanations for the development of this bias include strong cultural beliefs in progress through technology, and from an evolutionary perspective, man's inherent desire for the new. This bias has resulted in heavy emphasis on the adoption/diffusion phase of innovations and a simultaneous de-emphasis on the implementation phase.

With this focus on innovation adoption, it is commonly assumed that implementation occurs naturally and routinely after the adoption decision. However the truth is, where a new technology is involved, however meritorious, implementation tends to be problematic (Fuller & Swanson, 1992). In fact, research suggests that rapid and thorough implementation of innovative

technologies is the exception rather than the rule (Fichman & Kemerer, 1999; Howard & Rai, 1993; Liker, Fleisher & Arnsdorf, 1992). Indeed, several organizational scientists contend that the reasons for the high failure rate of innovations may be faulty implementation rather than inherent deficiencies in the innovations themselves (Bushe, 1988; Hackman & Wageman, 1995; Klein & Ralls, 1995; Majchrzak, 1988; Reger, Gustafson, DeMarie & Mullane, 1994). Moreover, ineffective implementation can incur not only material costs (resources, time, and energy) but can also incur future (and perhaps even more damaging) costs by nurturing uncertainty and resistance to future innovations. This underscores the importance of paying attention to implementation processes.

Challenges in Implementation Research

In order to comprehend why innovations succeed in some organizations and fail in others, researchers have called for a shift in focus to the implementation of innovations (Beyer & Trice, 1978; Hage, 1980; Kimberly 1981; Klein & Sorra, 1996; Pressman & Wildavksy, 1973; Roberts-Gray & Gray, 1983; Tornatzky & Klein, 1982; Tyre, 1991; Voss, 1988). Despite the increasing awareness of the need for implementation research, there are logistical and methodological issues that hinder progress in this field.

From a logistical perspective, by its inherent nature, innovation implementation research calls for rigorous longitudinal designs that require significant time and effort, and are substantially cost-intensive. This can be a significant deterrent. Thus, the foremost drawback stems from the fact that

implementation research has been dominated by single-site case studies (Klein & Sorra, 1996, Schierer, 1983; Tornatzky & Klein, 1982;). Cross - organizational studies are rare, resulting in inadequate generalizability of conclusions and relationships. Thus, theory-building in implementation research has been severely stunted.

From a methodological point of view, disparate and inconsistent operationalizations of implementation effectiveness have plagued the empirical literature. Clearly defining and operationalizing the dependent variable, i.e., the concept of implementation success has been problematic as success is multidimensional. Moreover, many aspects of implementation outcomes are often innovation-specific. No consensus has emerged on either the definition or measurement of implementation outcomes (Linton, 2002). O'Connor, Parson, Liden and Herold (1990) summarized the scattered measures on implementation success into four categories of implementation outcomes:

1. Implementation, integration and institutionalization. Measures in this category assess the extent of implementation of the innovation using indicators such as fidelity of implementation (Pressman & Wildavksy, 1973), the extent of utilization (Zmud & Apple, 1992), the integration with work process (Ettlie, 1986), and routinization (Yin, 1979).
2. Human partnership dynamics. Measures in this category assess the changes reflected in the organizational employees due to the innovation using indicators such as change in attitudes (Ramamurthy, 1995),

management structure (Argote & Goodman, 1986), and changing patterns of interaction and responsibilities (Tornatzky, 1986).

3. Operational effectiveness. These set of measures assess the utility of the innovation, in terms of improvements in operations that may not necessarily be quantifiable. For instance, an innovation may improve quality of production (Munro & Noorie, 1988) or customer responsiveness (Ettlie, 1986).
4. Economic performance. Measures of this category assess objective economic indices such as costs (Argote & Goodman, 1986; Chao & Kozlowski, 1986), or return on investment (Ettlie, 1986; Munro & Noori, 1988).

In the empirical literature, with each case study using different definitions and operationalizations of innovation outcomes, it has been difficult to generalize and arrive at meaningful conclusions. More recently, a significant step has been taken towards synthesizing these measures by the Klein and Sorra (1996) framework, which proposes two categories of outcomes – implementation effectiveness (or successful implementation of the innovation) and innovation effectiveness (obtaining the benefits of the innovation). This distinction is elaborated later in this document.

In summary, within the arena of innovation literature, implementation research has been neglected due to prohibitive costs, methodological difficulties, misguided assumptions and narrowly defined constructs. The empirical literature on innovation implementation consists almost exclusively of single-site qualitative

studies. The present study responds to a call by Klein and Sorra (1996) bemoaning the absence of multideterminate, multilevel frameworks to capture the innovation implementation phenomena. Building on their framework, the present research tests a model of innovation implementation. The next section reviews the theoretical and empirical work in the field of innovation implementation.

Review of Literature

In this section, a review of the prominent frameworks in innovation research that go beyond the adoption decision are presented, namely Rogers (1983), Nutt (1986), Meyers and Goes (1988), Yin (1979), Voss (1992), and finally Klein and Sorra (1996). Figure 1.2 attempts to locate the principal components of these theories within the three phases of the innovation process - adoption, implementation and innovation outcome. These frameworks lend the theoretical background for the conception of this study, the development of hypotheses, and the operationalization of constructs.

A review of the innovation implementation research must begin with the theoretical underpinnings provided by the work of Rogers (1983). Rogers proposed a stage model of the innovation process in organizations in which he divided the innovation process into two distinct phases: initiation and implementation (see Figure 1.3). According to the model, initiation consists of all the activities (data gathering, conceptualizing, and planning) that lead up to the adoption decision. The initiation phase has two stages, namely agenda setting (where the problems are diagnosed or potential innovations are made aware of),

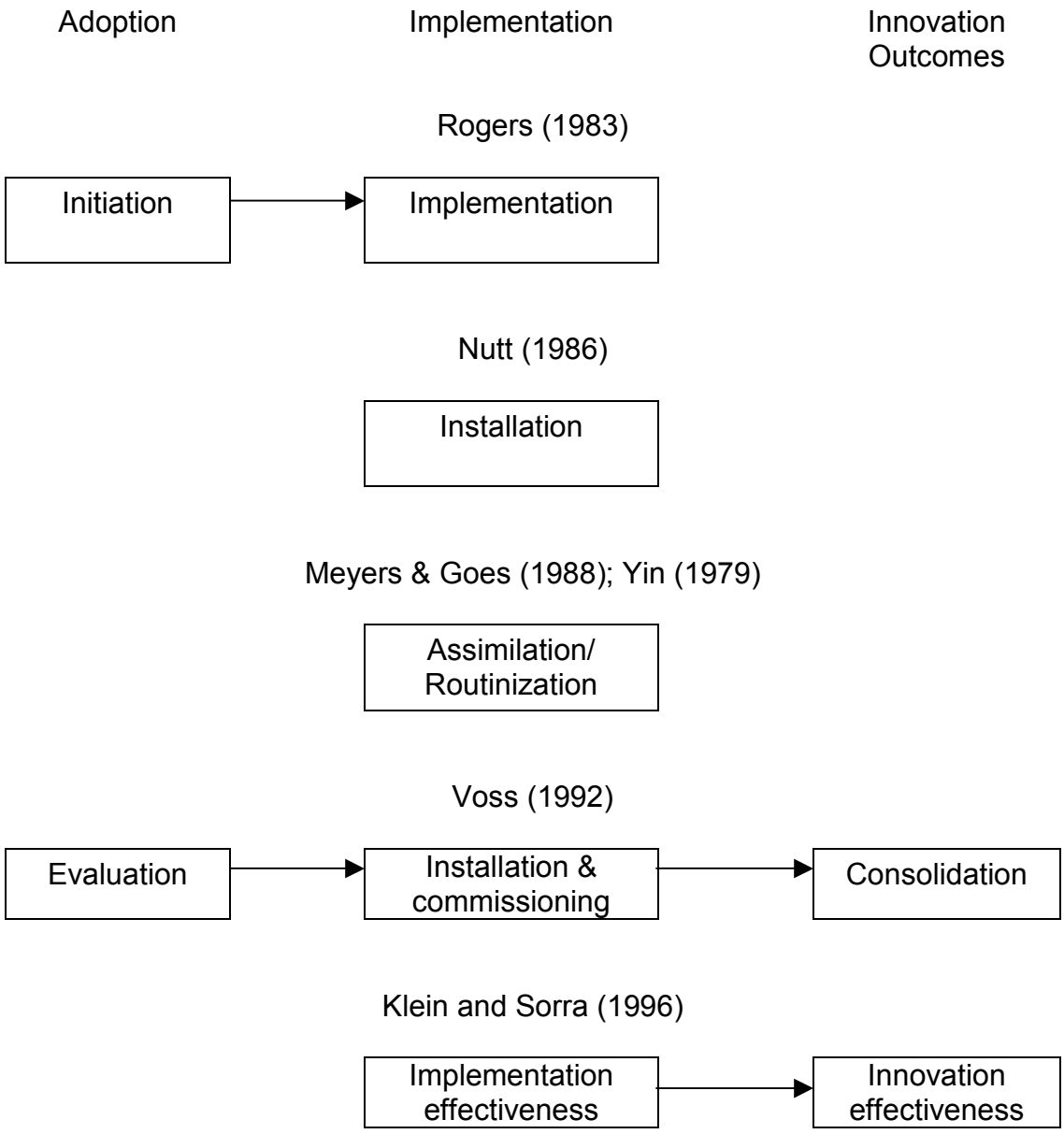

Figure 1.2: Innovation implementation research: Frameworks that look beyond the adoption decision

and matching (assessing the fit between a potential innovation and the organizational needs). The second phase, the implementation phase consists of all the actions and decisions involved in actually putting an innovation to use. This phase comprises three stages: (a) the redefining/restructuring stage which involves modifying the innovation to fit the organization and/or changing certain features/policies of the organization to accommodate the innovation, (b) the clarifying stage which involves communicating the nature of the implementation of the innovation to organizational members, and finally, (c) the routinizing stage which is the stage when the innovation is still practiced, but ceases to be perceived as new; it is integrated into organizational practices.

This model is especially suitable for externally developed innovations (Eveland, Rogers & Klepper, 1977; Rogers, 1995). Using the case study of Dial-a-ride as an illustration (a demand-responsive transportation system attempted in Santa Clara, California, in 1974), Rogers (1983) developed some preliminary propositions to explain variability in innovation success and failure. For example, he suggested that inadequate clarifying of what would be entailed in implementation, or inadequate restructuring to ensure fit of the innovation to the organization, could lead to an implementation failure in the adopting unit.

While Rogers' (1983) work sets the foundation for examining actions and processes that follow the adoption decision in determining effective use of an innovation, a more in-depth, process-oriented approach towards examining such factors was undertaken by Nutt (1986, 1992, 1993).

Stages in the innovation process	Major Activities at each stage in the innovation process
Initiation	*All the information gathering, conceptualizing and planning leading up to the adoption decision*
Agenda-setting	▪ Defining organizational problems ▪ Perhaps diagnosing a performance gap ▪ Scanning of external environment for potential innovations
Matching	Assessment of fit of a solution (innovation) to the problem
Implementation	*All the events, actions and decisions involved in putting the innovation to use*
Redefining/ restructuring	▪ Modifying the innovation to fit the organization ▪ Modifying organizational features (structures, policies) to facilitate the innovation use
Clarifying	▪ Clarify the relationship between organization and innovation and the details of its use and effects ▪ Communication of the changes involved, actions expected before implementation
Routinizing	▪ Innovation becomes an inherent part of the ongoing day-to-day activities of the organization ▪ Ceases to be seen as “new”

Figure 1.3: Stages in the Innovation process in organizations (Adapted from Rogers, 1983)

His research program involved the study of formulation and implementation of strategic decisions. He proposed a stage model (formulation, concept development, detailing, evaluation and installation) but acknowledged the non-sequentiality of the stages. Nutt also believed that actions and processes at every stage would influence implementation of the decision. He employed a retrospective approach that consisted of contacting key informants in participating organizations. They were asked to recall one change project and all information relevant to the decision-making and implementation of that project was gathered. He was thus able to develop a normative framework of formulation tactics and implementation strategies that were likely to predict successful implementation of decisions.

Nutt's (1986) work is very valuable in its systematic investigation of implementation processes and activities that would influence the actual success of an innovation. A shortcoming of Nutt's conceptualization of success is that it was a simple dichotomous measure, where success meant that the decision was implemented and failure meant that the decision was not implemented. For example, a management information system was a failure if the old system continued to be used, or a merger was a success if it was completed. While his model ended with the 'installation' of the idea/decision, and thus captured the primary outcome of decision-making, it does not examine the quality or consistency of implementation. Nutt (1986) acknowledges that while indicators such as frequency of use and extent of institutionalization could lead to a greater depth of understanding, these measures could not be obtained in the study due

to logistical reasons. Presumably, the wide variety of change projects that were examined precluded the possibility of gaining more complex operationalizations of success that would be comparable across these decisions.

Meyer and Goes (1988) addressed this deficiency to some extent in their influential study of innovation that broke away from the existing tradition of examining organizational innovativeness. In their study involving 12 medical innovations in 25 hospitals, they conceptualized the dependent variable, assimilation, as innovation's "full acceptance, utilization and institutionalization" (p. 807) in an organization. To understand assimilation, the researchers investigated the influence of five sets of variables: (a) environmental (e.g., urbanization), (b) organizational (e.g., size), (c) leadership (CEO tenure), (d) innovation attributes (e.g. risk), and (e) innovation decision attributes (aspects of the organization that were specifically related to the innovation, such as compatibility). Using this model, they were able to explain 59% of the variance in assimilation.

The research by Meyer and Goes (1988) is a landmark study as it incorporated the study of multiple innovations across organizations and extended the innovation process beyond the adoption decision by examining the determinants of assimilation. However, the study had a few drawbacks. First, the operationalization of assimilation was flawed. The researchers conceptualized assimilation as a nine-step decision process that began when the organization's members first hear of an innovation's development and extended to the institutionalization of the innovation (i.e., organization's complete utilization

of and acceptance of the innovation). A 9-point Guttman scale was created where a higher score indicated that an organization was further along in the innovation process. Thus, although referred to as assimilation, the operationalization of the measure would identify the stage of the innovation adoption models that each organization was in, rather than the extent of assimilation. In effect, the independent variables would be predicting different outcomes for the organizations in the sample. Thus while CEO education may predict organizational members' awareness of the innovation, it may not be useful in predicting the assimilation of the innovation. This might explain their weak findings in some of the hypothesized relationships.

Similar to the idea of assimilation of innovations, the construct of routinization of innovations has been presented by Yin (1979). In discussing the life history of innovations, Yin suggests that each innovation passes through several cycles before becoming routinized. Yin also points out one of the most critical difficulties in the assessment of implementation success, the fact that the point at which an innovation becomes 'routinized' is hard to define in any absolute sense. Indeed, at any given point, an innovation can be judged as being marginally, moderately or highly routinized. Yin further proposed that routinization follows a series of stages, the improvisation stage, the expansion stage and the disappearance stage (where its practice continues, but is no longer viewed as new). Using case studies, Yin (1979) identifies some conditions that could enable routinization, such as the role of an innovator (or innovation team), the training of

front-line implementers, support from the implementers, the available evidence about the efficacy of the innovation, support of top management, etc.

Another theoretical framework that addresses the implementation of innovations was proposed by Voss (1992). He postulated a tri-phasic life cycle model of the implementation process consisting of evaluation, installation and commissioning and consolidation. The first phase, evaluation, includes those factors prior to installation that can influence the final outcomes. This stage ends with the decision to adopt and is referred to as pre-installation. The second stage involves installation and commissioning, and ends when the project is in place and is working successfully (similar to Nutt's, 1986, conceptualization of success). Finally the third phase, consolidation includes post - installation activities that move the organization from technical success to realizing business success. Voss (1992) applied this framework to understand the implementation of an advanced manufacturing technology by 15 companies, using a case study approach.

The Klein and Sorra Framework (1996)

A significant contribution to the innovation literature was made by Klein and Sorra (1996) who proposed a framework of innovation implementation. This framework is presented below (Figure 1.4). The present study builds upon this model.

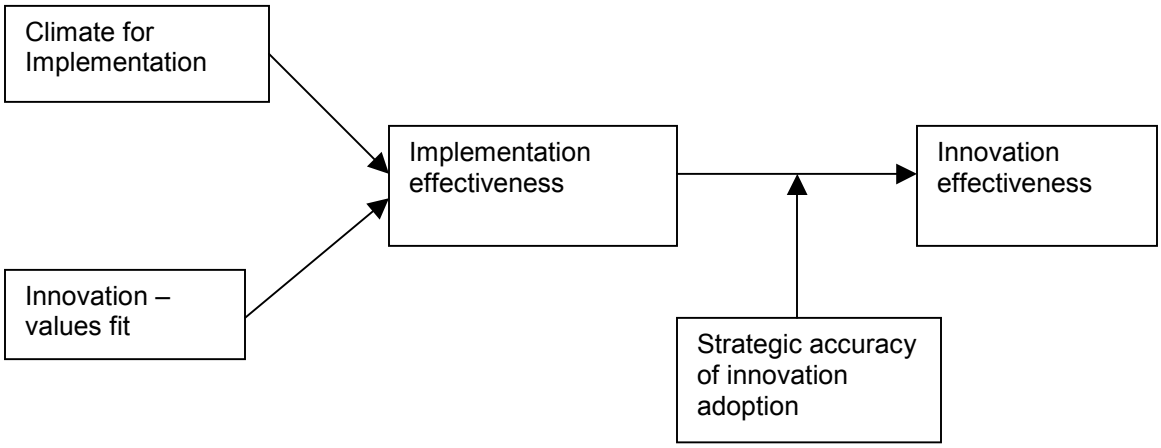

Figure 1.4: Framework of innovation implementation (Adapted from Klein & Sorra, 1996)

One of the central components of their framework is the conceptualization of the outcome variable. The authors underscore the separation of innovation outcomes into two categories, implementation effectiveness from innovation effectiveness. Klein and Sorra (1996) define implementation effectiveness as "the aggregate behavioral phenomena of innovation use" (p.1073). In other words, they suggest that the success of the innovation implementation would be reflected by the extent to which the end users use it skillfully, consistently and in a committed manner. With this defining criterion, innovation use could be operationalized as a continuum ranging from avoidance (nonuse), to unenthusiastic (compliant) use to skilled, consistent, and enthusiastic

(committed) use. These outcomes may thus be thought of as the proximal goal following innovation adoption.

On the other hand, the second category of innovation outcomes, innovation effectiveness, is defined as "the benefits that may accrue to an organization as a result of successful innovation implementation" (Klein & Sorra, 1996; p. 1073). This construct refers to the actual impact on the organization as a direct result of innovation use, as may be reflected in increases or improvements in profits, sales, quality, customer services, or efficiency. This category of outcome measures may thus be considered to represent the more distal goals of the innovation adoption. In the literature, this distinction between the two categories of outcomes seems to be recognized at times, assumed at other times, or often blurred.

Interestingly enough, the link between the two categories of outcomes is also a presumed one. Organizational scholars do acknowledge that implementation effectiveness is a necessary, but not sufficient condition, for innovation effectiveness. It is quite likely that even though implementation occurs successfully, the benefits of the innovation may not be gained by the organization (Klein & Sorra, 1996; Linton, 2002). Klein and Sorra (1996) suggest that the strategic accuracy of innovation adoption could be one potential moderator of this relationship.

With respect to the determinants of implementation effectiveness, the model emphasizes the primary influence of two constructs, an organization's

climate for implementation of a specific innovation, and the fit of the innovation to the values of its users.

Klein and Sorra's (1996) arguments for the implementation climate construct are derived from their analysis of the innovation implementation literature. They note that, owing to the fact that every implementation case study examines a different subset of implementation policies and practices, no general conclusions can be drawn about their value as determinants of implementation effectiveness. They posit a new composite climate construct to highlight the collective influence of an organization's multiple implementation policies. Climate for implementation is defined as "targeted employees' shared summary perceptions of the extent to which their use of a specific innovation is rewarded, supported and expected within their organization" (p. 1059). The components of this construct would include all the specific practices or policies that encourage the use of the innovation. For instance, a strong climate for implementation might include adequate training regarding innovation use, additional assistance in innovation use on an ongoing basis, ample time for the employees to learn and use the innovation, addressing employees' concerns and doubts, or even complaints regarding the innovation, providing easy access to the innovation itself, monitoring systems to track the progress of the innovation, and rewards or incentives for the effective use of the innovation.

The amalgamation of these varied factors into a single composite construct is notable and becomes particularly interesting, as the authors posit that within this construct, the individual components are compensatory,

cumulative and equifinal. According to the authors, the absence or low quality of some effective practices may be compensated for by the presence of other high quality practices supportive of implementation. Further, they reason that the effect of the component factors is cumulative, in other words, the more the better. For example, one organization may achieve successful innovation implementation because adequate pre-implementation training was provided. Conceivably, another organization may achieve more effective implementation, because they had all the training systems in place and additionally, had installed a system to monitor progress, and provided rewards. Additionally, the success in implementation that a particular organization gains from providing additional training may perhaps be realized by another organization that provides rewards for implementation instead, thus demonstrating the equifinality of the components. Thus, the authors claim the construct allows comparisons across organizations and conclusions to be drawn about implementation policies and practices.

Klein and Sorra (1996) further justify the use of implementation climate to explain implementation effectiveness by emphasizing that the climate for the implementation of an innovation plays a more significant role as a predictor of implementation effectiveness rather than the more commonly investigated variable in innovation research, openness to change. They suggest that attitudes, such as risk aversiveness or openness to change, might better predict the rate of adoption (and thus be more useful in studies of innovativeness). Indeed, research on organizational climate seems to suggest that climate for a

specific outcome influences behavior regarding that outcome (Schneider & Gunnarson, 1990).

The authors propose that while a strong climate for implementation provides incentives and disincentives for innovation use, the actual use of the innovation by the employees would also depend on the fit of the innovation to the employees' values. Thus, the second variable proposed in their model is innovation-values-fit, referring to the congruence between the innovation and the values of the target users. Drawing on the commitment literature (O'Reilly & Chatman, 1986; Sussman & Vecchio, 1991), Klein and Sorra (1996) liken implementation climate to the compliance component of commitment (i.e., accepting of influence in order to gain rewards and avoid punishments) and the congruence of the innovation to the users' values is likened to internalization, or acceptance of influence because of perception of congruence with one's values. Thus they propose that when organizational members perceive the innovation to be congruent with their values, they are more likely to be enthusiastic in their use of the innovation.

There are two fundamental contributions of the Klein and Sorra's (1996) framework. Firstly, it formally divides implementation outcomes into two categories that was hitherto either assumed or ignored. This separation promises to be very useful in explaining mixed results of earlier research. Secondly, the proposed construct of a climate for implementation, a composite of several variables could consolidate disparate research results.

Empirical Testing of the Klein & Sorra (1996) Model

Klein, Conn and Sorra (2001) partially tested this framework by conducting an empirical investigation of the implementation of one specific innovation (a manufacturing resource planning software) in 39 manufacturing plants. The researchers proposed that implementation climate was not synonymous with implementation policies and practices, but rather followed it. Further, they proposed that management support and financial resource availability were antecedents of implementation policies, which consequently would mediate the relationship between these antecedents and implementation climate. Lastly they hypothesized that implementation climate would predict implementation effectiveness, which was further expected to be linked to innovation effectiveness (Their proposed model is represented in Figure 1.5). Their data was gathered by surveying various representatives in the organization. Two years after the initial data gathering, measures on the outcome variables were administered again, to explore the relationship between implementation effectiveness and innovation effectiveness at Time 1 with implementation effectiveness and innovation effectiveness at Time 2.

Their analysis of the data did not support the hypothesis that implementation climate was derived from implementation practices and policies. Instead, the data suggested a revised model (Figure 1.6) in which both implementation policies and implementation climate simultaneously predicted implementation effectiveness. The effect of management support and financial resource availability on implementation effectiveness was mediated respectively

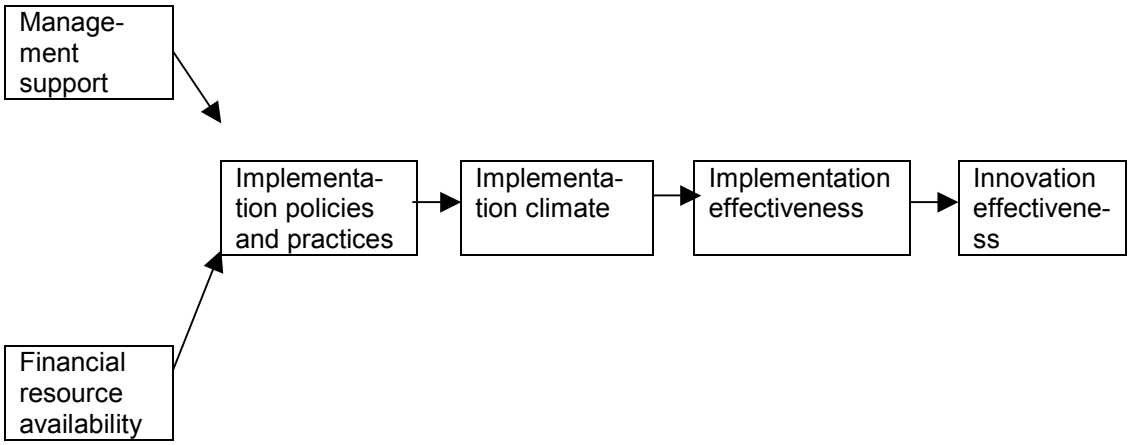

Figure 1.5: Hypothesized relationships in Klein, Conn and Sorra (2001)

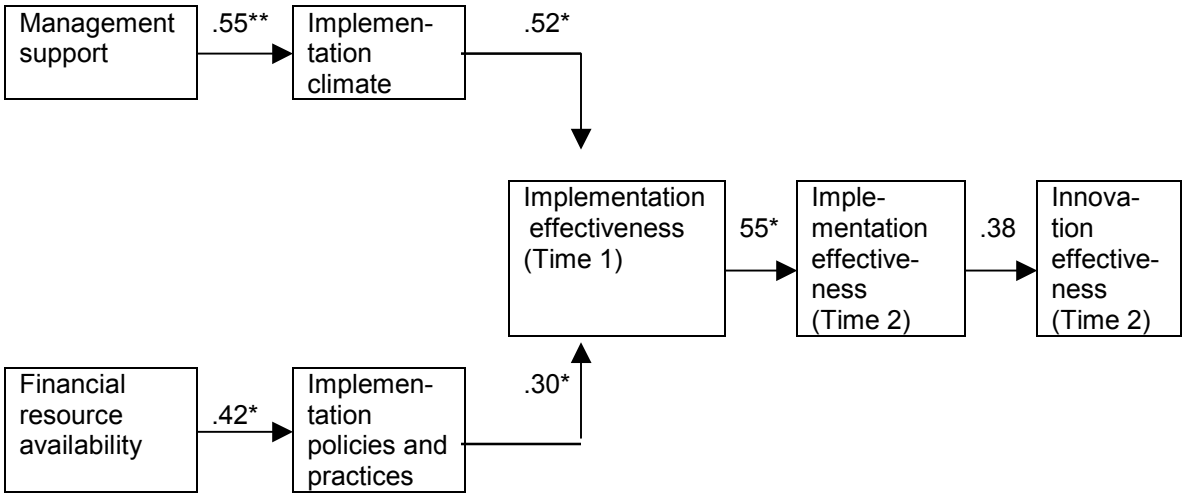

Figure 1.6: Revised model of implementation effectiveness (Klein, Conn & Sorra, 2001)

by implementation climate and implementation policies and practices. With regard to the outcome variable, implementation effectiveness at Time 1 was related to implementation effectiveness at Time 2. The relationships between implementation effectiveness and innovation effectiveness (at both Time 1 and Time 2) were not shown to be significant, after controlling for plant size and the length of time the innovation was in place.

This study was the first quantitative multi-organizational assessment of the antecedents and consequences of implementation effectiveness and thus makes a significant contribution to the innovation literature. However, one of the major limitations of the study is that it is an investigation of a single innovation. This precluded the examination of the influence of innovation characteristics. Innovation characteristics (such as complexity, trialability, and observability) have been the focus of substantial research in the innovation literature. Recently, there has been considerable evidence to support their importance in predicting implementation (e.g., Meyer & Goes, 1988).

The second limitation of this study is the separation of climate for implementation from organizational policies and practices. The question raised is, whether climate results from organizational policies or practices or in fact *is* the organizational policies and practices. Operationally, this is a very difficult distinction to make, particularly when both the constructs are assessed by perceptions of employees, making it difficult to separate the two.

Lastly, the authors acknowledged the plausibility of potential moderators in the relationship between implementation effectiveness and innovation

effectiveness. Investigation of potential moderators may help clarify the relationship between implementation effectiveness and innovation effectiveness.

Innovation Diffusion and Adoption Research Project

The Innovation Diffusion and Adoption Research Project (IDARP, Panzano & Roth, 2000) was undertaken based on the theoretical foundations and empirical research in the innovation literature reviewed above (such as Damanpour, 1991; Klein & Sorra, 1996; Meyer & Goes, 1998; Van de Ven & Poole, 1989; Rogers, 1983; Nutt; 1986, Yin, 1979). The objective of Innovation Diffusion and Adoption Research Project (IDARP; Panzano & Roth, 2000) was to gather extensive and comprehensive data on antecedents and consequences of innovation adoption and implementation. The research investigates the predictors of adoption of innovations and also investigates the influence of a range of variables on innovation implementation. Notably, the research retains the Klein and Sorra (1996) distinction between implementation effectiveness and innovation effectiveness. The author was involved in the IDARP research and the measures and data collection presented an opportunity to test the Klein and Sorra (1996) model of innovation implementation.

Present Study and Development of Hypotheses

One of the primary objectives of this research is to systematically investigate the antecedents of innovation implementation. As mentioned earlier, while innovation researchers have been prolific in identifying factors influencing innovation adoption, it is conceivable that these factors have a dissimilar effect on innovation implementation (Tornatzky, Fergus, Avellar, & Fairweather, 1980).

For instance, while it has been suggested that a more costly innovation is less likely to be adopted, perhaps the larger investment motivates the more effective implementation (Tornatzky & Klein, 1982). This example clearly illustrates the need for specific investigation of the determinants of innovation implementation. The present research examines the influence of three variables, climate for implementation, compatibility, and project slack on implementation effectiveness.

The second purpose of this study is to shed light upon the consequences of innovation implementation, specifically by examining the relationship between implementation effectiveness and innovation effectiveness.

This research tests a framework of innovation implementation that is derived from the work of Klein and Sorra (1996), with some variation in the definition of constructs. Additionally, it expands on the original framework by including other variables that are particularly relevant in innovation research. The model proposed for this study is presented below (see Figure 1.7). This model will be empirically tested using data gathered from a longitudinal study of innovation implementation, involving multiple innovations and multiple organizations.

Antecedent Variables

Climate for Implementation

Within the rather intimidating and prolific literature on climate, after prolonged contentious debates on units of theory (Guion, 1973; Hellriegal & Slocum, 1974; James, 1982) the construct of organizational climate has emerged as distinct from that of psychological climate (Drexler, 1977; James & Jones,

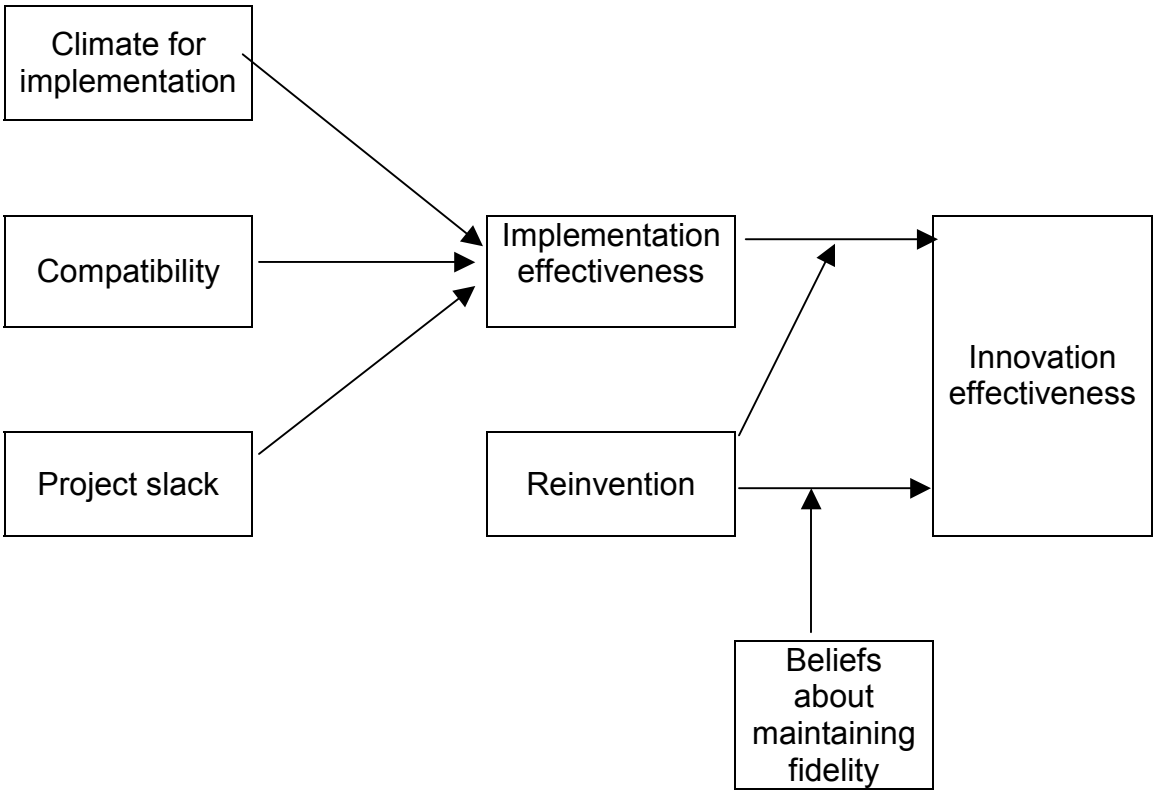

Figure 1.7: Proposed model for the current research

1974; Powell & Butterfield, 1978). The multiple definitions of organizational climate concede that it can be characterized as a descriptive property of the organization, often assessed by employees' perceptions of events, practices and procedures (Schneider, 1990; Schneider & Rentsch, 1988; Field & Abelson, 1982). Over the years, researchers of organizational climate have been persuaded towards the consensus that different climates exist in organizations (Jones & James, 1979; Schneider, 1975; Schneider & Gunnarson, 1990). One of the most vocal proponents of this idea of multiple climates, Schneider (1975) argued that a broad "organizational climate" is an abstract construct that

apparently includes everything that exists in an organization, and thus suffers from a lack of parsimony and utility. He suggests that the more useful strategy would be to identify a focal construct of interest (such as safety, innovation, or in this case, implementation) and then identify those aspects of the organizational climate that would be theoretically relevant. This logic lends the rationale for the construct of organizational climate for implementation, proposed by Klein and Sorra (1996).

Indeed, there seems substantial empirical support for the idea and utility of multiple and specific climates. For example, Schneider (1990) showed that climate for service predicted customer service. In the training literature, climate for transfer of training has been consistently linked to actual training transfer (Tracey, Tannenbaum & Kavanaugh, 1995). Other researchers have empirically demonstrated the relationship between organizational climate for safety and the company's safety record (Zohar, 1980), climate for innovation at the group/ team level and innovativeness (Burningham & West, 1995; Bain, Mann, & Pirola-Merlo, 2001).

With this theoretical and empirical backing, the present research retains Klein and Sorra's (1996) proposed climate for implementation construct indicating employees' perception of a climate supportive of implementation, as a potentially useful predictor. Thus, it is proposed,

Hypothesis 1: Organizational climate for implementation will be significantly related to implementation effectiveness.

Compatibility

In the present study, compatibility is defined as the fit of the innovation with the training of the organization's employees and organizational philosophies. Compatibility is thus conceptualized as an innovation characteristic that varies across organizations.

Innovation characteristics have received considerable attention in the literature. One of the most recognized scheme of classification of innovation attributes was developed by Rogers (1983) and includes five characteristics, namely, (a) relative advantage (the degree to which an innovation is perceived as being better that the idea it replaces), (b) compatibility (the extent to which an innovation is perceived as consistent with the existing values, past experiences and needs of the potential adopters), (c) complexity (degree to which an innovation is perceived as difficult to understand and use), (d) trialability (the degree to which an innovation may be experimented with on a limited basis), and (e) observability (the degree to which the effects of an innovation are visible). Since then, several other attributes have been added to the literature, such as applicability (the extent to which an innovation can be used for different purposes/contexts) and reliability (the extent to which an innovation is consistent in its results; Dearing et al., 1996), adaptability (Tornatzky & Klein, 1982), risk (Mohr, 1969), and uncertainty (Zaltman et al., 1973), to name a few.

While most of the empirical investigations have focused on the link between innovation characteristics and innovation adoption, some research has also examined their role in explaining variability in implementation effectiveness.

For example, Nord and Tucker (1987) concluded, not surprisingly, that innovations that are less complex or radical are easier to implement. The influence of other innovation attributes, such as transferability, complexity and divisibility (Leonard-Barton, 1988), and risk, skill and observability (Meyer & Goes, 1988), on the extent of implementation have also been examined.

Examining innovation characteristics in implementation research has lagged because most investigations are single-site case studies of a specific innovation. Of the two notable exceptions to the case study approach, one investigated a single innovation (Klein, Conn & Sorra, 2001) precluding the examination of innovation characteristics. The other study, by Meyer and Goes (1988) did investigate innovation characteristics (such as risk, skill and observability) and found that these variables explained 37% of the variance in the assimilation of innovations.

While several innovation attributes may be relevant in predicting implementation effectiveness, compatibility is specifically investigated in the current study because the importance of compatibility in the innovation process has been one of the most consistent findings in the literature (Tornatzky & Klein, 1982). Indeed, an innovation that builds upon existing competencies should be easier to implement (Hitt & Ireland, 1985; Prahalad & Hamel, 1990; Abernathy & Clark, 1985). Thus, it is proposed that,

Hypothesis 2: Compatibility of the innovation with the organization will be significantly related to implementation effectiveness.

Project Slack

As with innovation characteristics, the relationships between organizational characteristics and innovation adoption have been extensively investigated (see Damanpour, 1991 for a review). However, there may be reason to believe that the effect of organizational characteristics on implementation may be different than that on adoption (Marino, 1982; Zaltman et al., 1973; Zmud, 1982). For example, it has been suggested that while conditions of low levels of formalization and centralization facilitate the initiation of innovations, the opposite kind of conditions would facilitate the implementation of innovations. Perhaps the implementation of innovations is supported by organizational mechanisms and structures that are more formalized and centralized. This again points to the need for specific investigation of the influence of organizational characteristics on implementation.

In the implementation research, organizational characteristics that were found to influence implementation effectiveness include aspects such as size and structure, complexity, market strategy, and culture (Meyer & Goes, 1988; Quinn & Kimberly, 1984; Stock, 1999; Zammuto & O'Conner, 1992). Of the range of organizational characteristics that could be potentially useful predictors of implementation effectiveness, this research focuses on the role of slack.

Slack has been defined as "that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy as well as to initiate changes in strategy with respect to the external environment" (Bourgeois, 1981;

p. 30). With respect to innovation, it has been suggested that slack resources allow an organization to invest in the purchase of new innovations, take risks, absorb failure if necessary and bear the costs of instituting innovations (Rosner, 1968). Additionally, the fact that larger firms may have slack resources which help in identifying, evaluating, and implementing new technology may explain findings indicating that size favors adoption and implementation of new technology (Linton & Cook, 1998; Tornatzky & Fleischer, 1990). However, empirical investigations of the role of slack in implementation are lacking. The one exception is a qualitative study by Nord and Tucker (1987), conducted in the banking industry. The authors reported that innovation implementation was most successful in those banks that had sufficient financial resources to invest in training, hiring of consultants, and to endure lowered organizational performance during the implementation.

Within IDARP, a distinction is made between overall organizational slack and project-specific slack. It has been argued that while organizational slack may be a valid determinant of an organization's ability to adopt new innovations, the specific implementation of a given innovation may be more related to the slack available for the project (Panzano & Roth, 2000). While Klein, Conn and Sorra (2001) examined financial resource availability as an antecedent of implementation policies, this research proposes to examine the more direct role of project slack on implementation effectiveness. It is proposed that,

Hypothesis 3: Project slack will be significantly related to implementation effectiveness.

Outcome Variables

Implementation Effectiveness

Various researchers have defined implementation effectiveness in different ways, and have used different indicators. As already stated, Klein and Sorra defined successful implementation in behavioral terms, as the skillful and consistent use of the innovation by organizational employees. Table 1.1 summarizes other definitions in the literature with a few representative operationalizations.

Based on a review of the literature, the present study defines implementation effectiveness as the extent to which the innovation has been implemented in the organization and the degree to which the innovation in incorporated into the organization's routine activities. Thus this definition incorporates the ideas of assimilation, routinization and extent of use (see Table 1.1). Infusion (use of the innovation in a complete way) is not used as an indicator of implementation effectiveness, and this issue will be addressed later in this chapter.

Innovation Effectiveness.

A corollary of extending the focus from adoption to implementation would be to evaluate the influence of an innovation on organizational performance. These consequences may refer to the changes incurred on outcomes like profitability or productivity, sales, customer satisfaction, or employee satisfaction, as a result of the innovation. Indeed, these consequences are the ultimate end of the adoption decision. In reviewing the literature on innovation, Rogers (1983) stated that

Measure	Conceptual definition	Example Operationalizations
Extent of implementation	The extent of use of an innovation, across people, projects or organizational units	Percentage of stores using scanners (Zmud & Apple, 1992) Volume and breadth of EDI use (Massetti & Zmud, 1996)
Routinization	The extent to which an innovation has become a regular part of organizational procedures	Routinization of government innovations (Yin, 1979) Routinization of supermarket scanners (Zmud & Apple, 1992)
Assimilation	The extent of assimilation of an innovation, where assimilation extends from initial awareness to complete institutionalization	Guttman scale for healthcare innovations (Meyer & Goes, 1988) Guttman scale for software process innovations (Fichman & Kemerer, 1997)
Infusion	The extent to which an innovation's features are used in a complete and sophisticated way	Infusion of supermarket scanners (Zmud & Apple, 1992) Infusion of MRP (Cooper & Zmud, 1990)

Table 1.1: Measures of implementation effectiveness (Adapted from Fichman, 2000)

innovativeness, the much-studied object of innovation research was itself only a predictor of a more important ultimate dependent variable, the consequences of innovation. Despite this, outcomes have not received systematic investigation by innovation and diffusion researchers. As suggested earlier, the pro-innovation bias is partially responsible for the notion that an innovation should be adopted by all and as quickly as possible (Kimberly, 1981). The heavy stress on adoption and diffusion detracts from examining the consequences.

Apart from this bias, there are other challenges in measuring the outcomes of innovation implementation. For example, empirical studies include the use of measures such as management satisfaction (Ramamurthy, 1995), goal attainment (Bickson, Gutek & Mankin, 1981), and payback (Ettlie, 1984). Linton (2002) highlights a few controversial issues with the use of such measures. The measure of satisfaction/dissatisfaction with implementation has been criticized as highly value-laden. Because of the tendency of goals to become equivalent to outcomes (Pressman & Wildavksy, 1973), goal attainment has been questioned. Payback, or cost-benefit analysis of an innovation, is usually calculated before implementation (Gold, 1988) and is inherently unreliable (Neale, 1989). The questionable nature of pre-implementation payback figures and the lack of post implementation figures make payback a defective measure.

There are other methodological problems in assessing the benefits of an innovation to an organization. First, research methodologies must necessarily be sufficiently longitudinal to track the consequences of an innovation. Second, hard

measures of innovation outcomes are difficult to gather. Furthermore, there is the problem of confounds; that is, even if hard measures were gathered, it is very difficult, if not impossible, to accurately assess the proportion of benefits directly attributable to the innovation. The alternative, judgments of innovation outcomes, are necessarily subjective, value-laden, and biased (Rogers, 1983). Voss (1988) states that it often is the case that "one must choose between simplistic methods, or the subjective measures which relate more closely to definitions of success, but are based on more subjective data". (p. 288). Given the difficulties of obtaining valid objectives measures, the use of subjective reports, though value-laden, may be necessary. Indeed use of subjective data is preferable to ignoring innovation outcomes entirely. Consequently, the current research uses multiple subjective measures to assess the impact of the innovation implementation on the organization. These subjective measures also have the advantage of being comparable across innovations.

Link between the Outcomes Measures

It seems reasonable to suppose that if a well-substantiated innovation (i.e., one with sufficient scientific and empirical evidence) was successfully implemented in an organization, the organization is likely to realize the benefits of the innovation. However, the link between implementation effectiveness and innovation effectiveness is more presumed than proven and awaits systematic investigation. Hence, it is proposed that,

Hypothesis 4: Implementation effectiveness will be significantly related to Innovation Effectiveness.

Indeed, recent findings from IDARP indicate support for this (Panzano, Roth, Seffrin, Crane-Ross & Chaney Jones, 2004). In the other quantifiable study on innovation outcomes, Klein, Conn and Sorra (2001) found that implementation effectiveness was related to innovation effectiveness at both Time 1 and Time 2 (r = .45 and .38 respectively). However, this relationship was not significant when the control variables were included. They also point out that there may have been moderators influencing this relationship that were beyond the scope of their study.

In this context, the concepts of reinvention and fidelity seem worthy of further examination. These two constructs may be thought of as two sides of the same coin. Reinvention refers to the degree to which an innovation is modified by the adopting organization in the process of implementing it (Rogers, 1978). Fidelity refers to the match between the prescribed use and the actual use of an innovation (e.g., Lewis & Seibold, 1993). Intuitively, one may imagine that a significant amount of reinventing would be expected in the implementation of an innovation by an organization, particularly in the case of a "prepackaged" innovation.

The frequency of reinvention has been established in the literature (e.g. Berman & McLaughlin, 1978; Larsen & Argarwalla-Rogers, 1977; Rice & Rogers, 1980; Rogers, 1983, 1988; Tornatzky et al., 1983). Child, Ganter and Kieser (1987) observed, "Where senior management did intend changes in work organization, these can become modified, diluted, or otherwise resisted by

traditionally minded middle management or by functional specialists who have their own preferred solutions" (p. 99).

According to Eveland et al. (1977), reinventing may occur to both the innovation as a tool as well as its use. In analyzing ways of reinventing, several typologies have been proposed (Harvey, 1970; Larsen & Agarwalla-Rogers, 1977; Rice & Rogers, 1980; Roitman, Gottschalk, Mayer & Blakely, 1983). Lewis and Seibold (1993) summarized these typologies with a two-dimensional classification, where the first dimension is an evaluative component (e.g., ideal, acceptable or unacceptable modifications), and the second dimension is a descriptive component (e.g., operational, technical or organizational changes, adding components vs. selectively choosing components).

Several factors may have some bearing on the extent of reinvention. For instance, Larsen and Agarwalla-Rogers (1977) argued that reinvention is more likely if the innovation is complex, irreversible, and where the role of the external consultant is less than optimal. Additionally, Yin (1979) suggested that reinvention might occur as a result of users' dislike of some component of the original version of the innovation. Rice and Rogers (1980) proposed that when the original innovation does not in its entirety match the organizational structure or its problem, competent organizational members may make judicial changes to the innovation to enhance its utility. It is indeed a fact that innovations are frequently bundles of components and therefore, organizations (or users) may choose to accept a few components and reject others. Rice and Rogers (1980) illustrate this with their case study of ten sites that had implemented a public

transportation system. In its original form, the innovation had twenty-four components. In the implementation, the sites ranged from those incorporating four main components to more complex implementations with up to sixteen components.

Despite the prevalence of reinvention, the question of whether reinvention is functional or not is the subject of some debate. On the one hand, some researchers claim that reinvention of prepackaged innovations (presumably designed by experts) would create a "diluting effect" and may be responsible for failure to attain the benefits of the innovation (e.g. Calsyn, Tornatzky & Dittmar, 1977). From this viewpoint, the criterion for successful implementation would be fidelity, which consequently would be a necessity to obtain the marketed benefits of the innovation.

On the other hand, other researchers contend that reinvention is beneficial, arguing that customization of the innovation to fit the organizational structure or needs can be expected to enhance the success of the innovation. In other words, reinventing leads to increased fit and thus facilitates successful implementation. For example, Leonard–Barton (1988) emphasized that discrepancies between the requirements of a new technology and the existing organizational conditions, required constant adaptation of both. This idea is consistent with the work of Rogers (1983) who emphasized that an apparent solution to an organizational need would only be successful after the innovation is adapted to fit the organizational needs and its characteristics. This suggests that the greater the degree to which an external innovation is modified to fit

unique organizational characteristics, the more likely the innovation is to yield the expected benefits. An even more extreme position is held by some researchers who claim that reinvention itself is an indicator of successful implementation (Glaser & Backer, 1977; Larsen & Agarwalla-Rogers, 1977). Researchers subscribing to this point of view use indicators of reinvention to assess implementation success. (Buller & McEvoy, 1991; Hall & Loucks, 1977).

Despite the apparent prevalence of reinvention, the literature is markedly sparse with respect to systematic empirical investigation. This research proposes that the relationship between implementation effectiveness and innovation effectiveness will be moderated by the extent of reinvention. Due to the lack of prior empirical research and the ambiguity of theoretical reasoning, the exact nature of this relationship is not predicted. Thus it is hypothesized,

Hypothesis 5: The extent of reinvention of the innovation will moderate the relationship between implementation effectiveness and innovation effectiveness.

However, it is recognized that the functionality of reinvention may depend on several things, one of which is the innovation itself. Specifically, the extent to which an innovation requires fidelity will determine whether reinvention is beneficial or not. To explore this further and since the innovations studied involved innovations that vary in the degree of fidelity required by the experts (Panzano & Roth, 2000) this allows the exploration of this question. Thus, it was proposed,

Hypothesis 6: Beliefs about maintaining fidelity to the original model will moderate the relationship between reinvention and innovation effectiveness.

Based on the arguments in the literature, it is reasoned that a highly structured innovation that is intended by the designers to be closely adhered to (implemented in the prescribed manner with respect to all the components), may be successful only if the implementing organization does not deviate significantly from the innovation. Thus, if beliefs about maintaining fidelity are high, reinvention may have a detrimental effect and maintaining fidelity will be beneficial. However, some innovations may not need to adhere strongly to the prescriptions in order to be successful. In such cases (low beliefs about fidelity), perhaps reinvention may lead to an improved fit and thus be more likely to lead to innovation benefits, rather than implementing the innovation without modifying it. Figure 1.8 presents a graphical representation of the proposed effects of the interaction of reinvention and beliefs about maintaining fidelity, on innovation effectiveness.

Given that the desirability of maintaining fidelity may depend on the innovation itself, measures of infusion (see Table 1.1) will not be used to assess implementation effectiveness, even though it has been advocated in the literature. Measures of faithful implementations are more appropriate in studies examining single innovations with a high prescribed value for fidelity.

Finally, the model also proposes specific mediational relationships for all the three independent variables. It is proposed that the relationship between each of the three antecedent variables and the distal outcome of implementation, i.e., innovation effectiveness, will be mediated by the proximal outcome of

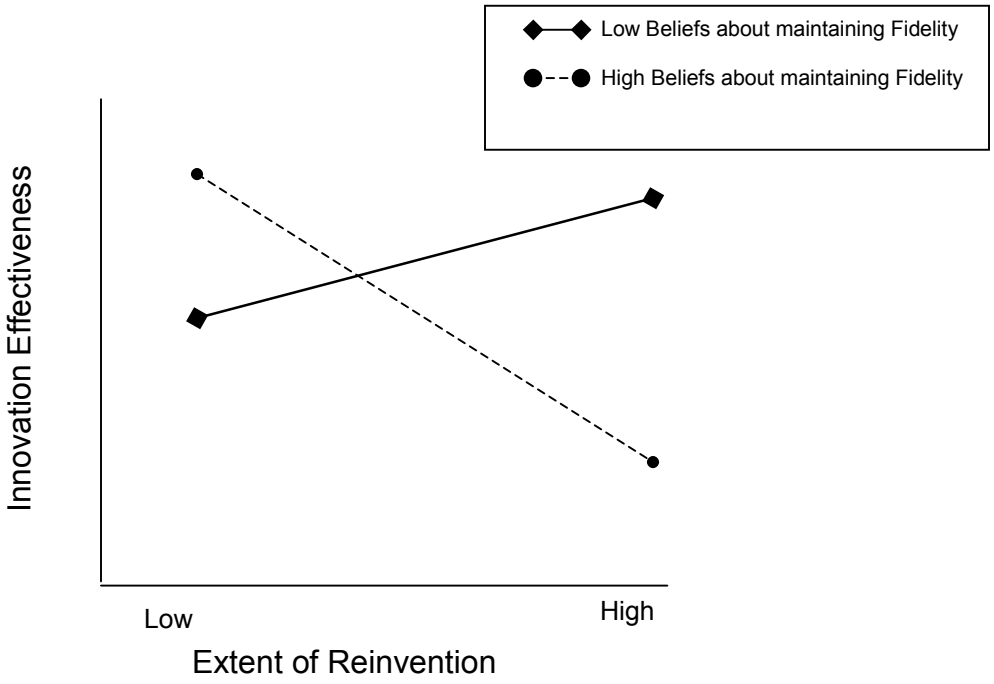

Figure 1.8: Graphical representation of the hypothesized interaction of reinvention and beliefs about maintaining fidelity with innovation effectiveness as the dependent variable

implementation, i.e., implementation effectiveness.

Hypothesis 7: Implementation effectiveness will mediate the relationship between climate for implementation and innovation effectiveness.

Hypothesis 8: Implementation effectiveness will mediate the relationship between compatibility and innovation effectiveness.

Hypothesis 9: Implementation effectiveness will mediate the relationship between project slack and innovation effectiveness.

In summary, a model of innovation implementation is presented that expands upon the Klein and Sorra (1996) framework by introducing three constructs. First, project slack is included as an antecedent of implementation effectiveness. Second, reinvention is added as a moderator of the relationship between implementation effectiveness and innovation effectiveness. Finally, beliefs about maintaining fidelity to the original innovation is added to further clarify the relationship between reinvention and innovation effectiveness.

Another difference between the Klein and Sorra model and the framework proposed in this research lies in the definitions of compatibility and implementation effectiveness. Compatibility, in the present model, is expanded to include compatibility with the organization's training and philosophy, and is not just the match between the innovation with individual employees' values. As for implementation effectiveness, the original model defines it as an aggregate of the behavior of the organization's employees, specifically their skillful, committed and consistent use of the innovation. On the other hand, the present research defines implementation effectiveness as the extent to which the innovation is assimilated in the organization. A successfully implemented innovation would be one that is well used extensively in the organization and is routinized into the organizational practices. In other words, implementation effectiveness in the present study is related to the integration and institutionalization, whereas the Klein and Sorra conceptualization seems close to the ideas of human behavior dynamics, as categorized by O'Connor et al. (1992).

This study also extends the findings from the Klein, Conn and Sorra's (2001) empirical investigation which was an investigation of a single innovation in manufacturing plants. The present study tests hypothesized relationships in innovation implementation using data gathered in a different context (behavioral health care) and involves multiple innovations. Since these innovations were chosen for their variability in critical features (Panzano & Roth, 2000), it allows the investigation of patterns and relationships in major variables across innovations, thus increasing the generalizability of the findings. The present study also includes constructs that were not investigated in the Klein, Conn and Sorra (2001) study, specifically, compatibility, project slack, reinvention and Beliefs about maintaining fidelity. Lastly, the current research uses different operationalizations of constructs that are examined in both studies (climate for implementation, implementation effectiveness and innovation effectiveness).

CHAPTER 2

METHODS

The objective of the present research was to understand the influence of specific organizational and innovation factors in explaining successful implementation of innovations. In contrast to the dominant approach in the innovation literature, which focuses on innovation adoption as the dependent variable, the current research investigated implementation effectiveness and innovation effectiveness as the variables of interest.

A framework originally proposed by Klein and Sorra (1996) was extended and applied to data collected within the mental health system in Ohio, in the context of mental health agencies adopting and implementing externally developed innovations. The research context, the methodology, and the measures used in this study are discussed below.

Research Context

The present study is part of a larger research endeavor, The Innovation Diffusion and Adoption Research Project (IDARP), undertaken by Decision Support Services, Inc., Columbus, Ohio (Panzano & Roth, 2001). The project is jointly funded by the Office of Program Evaluation and Research (OPER), the research division of the Ohio Department of Mental Health (ODMH) and the MacArthur Foundation. The fundamental research objective of IDARP is to

investigate the factors and processes that influence the adoption and assimilation of evidence-based practices by mental health service providers. The adoption phase is approached from the perspective of decision making under risk. The implementation phase examines the influence of variables at five levels, namely, (a) innovation, (b) the project, (c) adopting organization, (d) inter-organizational relationship, and (e) environmental. It is expected that the findings from this project will impact policy making related to funding, training, and resource support for innovations at the state and national level.

The author has been a part of the IDARP team, and has participated in literature review, development of scales, and data collection and analysis. The current research was conceived in the course of the author's involvement with the IDARP study. The present study focuses on testing a specific research model of innovation implementation using a subset of the data gathered by IDARP. This research involves operationalizations of constructs, and hypothesized relationships that are different from, and/or are extensions of the original IDARP study. The existing measures were reframed to operationalize the constructs in the model. Further, there was some opportunity to include a few specific measures of interest to the present research. A brief description for the context of the larger study is presented below, followed by the research design.

The overall mission of the Ohio Department of Mental Health is to establish quality mental health practices, and to provide comprehensive and accessible services for a population with diverse needs. Towards this end,

improving clinical quality of services, reducing inefficiencies, and providing outcomes that are valued by customers have emerged as the steering posts guiding policy making and service delivery. In keeping with the overall mission, ODMH is promoting the adoption and assimilation of evidence-based practices (EBPs) by mental health services in Ohio.

To facilitate the diffusion of the EBPs, structural mechanisms called Coordinating Centers of Excellence (CCOEs) have been established under the leadership of the ODMH Medical Director. Each CCOE is intended to be the statewide technical expert on a specific EBP. The function of each CCOE is to disseminate information about an EBP to service providers, provide technical assistance (training and consultation) and in general, provide overall support for the adoption and successful implementation of the innovations by agencies.

The selection of EBPs that would be supported by the ODMH-funded CCOEs was primarily made on the basis of two criteria. Of fundamental importance was the political and programmatic salience of the EBP on the ODMH strategic issue agenda. Since the EBPs ranged widely in the level of empirical evidence for their effectiveness, the scientific support for the value of the EBP was the second deciding factor. A list of eight EBPs was arrived at after taking into consideration other pragmatic concerns like methods, timelines and budgets.

Of the eight EBPs sponsored by the CCOEs, a narrower sample was selected to be the focus of the IDARP project. Some of the factors that went into this decision were (a) variability in the complexity of the EBP, (b) visibility and

immediacy of the outcomes, (c) variability in evidence and salience of the practice, and also (d) interest expressed by the CCOE to participate in the research (Panzano & Roth, 2001). The four EBPs chosen to be the focus of the IDARP study are briefly described below.

The Ohio Medical Algorithm Project (OMAP). OMAP is a medical model that advocates the use of pre-specified medication algorithms to improve the quality of treatment of major mental disorders. The medication algorithms are designed to incorporate current knowledge about diagnosis and treatment into systematic approaches that are of value to practicing clinicians. In effect, the medication algorithms operationalize typical clinical guidelines such as sequence of medication, dose ranges and criteria of response.

Cluster-Based Planning Alliance. Clustering is a research-based consumer classification scheme. The architects of this framework advocate using this classification as a framework to organize treatment and service planning within mental health organizations. Further, it also provides a recommended classification to design staff training and guide the management of consumer outcomes.

Substance Abuse and Mental Illness (SAMI). Developed at Dartmouth University, this model is an integrative and comprehensive treatment approach for individuals with both mental illness and substance abuse disorders. Often referred to as dual-diagnosis integrated treatment, it is derived from the philosophy that there is a distinct population of mental health clients with dual diagnoses who are not ideally served by two disparate sets of treatments.

Multi-Systemic Therapy (MST). The MST model involves the use of treatment teams to provide intensive home-based treatment to youth. A key concept in this approach is to incorporate multiple systems, including family, peers, school, medical and legal services and the community to provide an integrative and congruent treatment environment.

Evidence-based practices are interventions for which there is consistent scientific evidence as to their effectiveness on outcomes of interest (Drake et al., 2001). These EBPs vary considerably in their empirical support for effectiveness. However, because these EBPs are state of the art practices, it was expected that they would be perceived as new by the adopting organizations (Panzano & Roth, 2001). Since an organizational innovation is defined as an idea or product that is new to the adopting organization (Damanpour, 1991; Daft & Becker, 1978; Hage, 1980; Hage & Aiken, 1970; Zaltman, Duncan & Holbek, 1973; Zammuto & O'Connor, 1992), for the rest of this document, the terms EBP and innovation will be treated as synonymous.

Research Design

In order to track the innovation process from adoption through implementation, a longitudinal research design was used for IDARP. Three waves of data collection were planned for each organization participating in the project, with each point of data collection about six to eight months apart. At each point, the data gathering instruments were customized to the stage of the innovation cycle that the organization was experiencing at that point. For example, if an organization had just started implementing the innovation when

first contacted, appropriate measures (assessing processes related to implementation) were administered. When the organization was contacted six to eight months later, measures assessing the outcomes of the implementation were administered. Thus, in following the adoption and implementation process, a very active effort was made to minimize retrospection, which has been the conventional approach in innovation research.

While the larger project includes organization that have decided against adopting the innovation and organizations that are still considering adopting the innovation, the subset of organizations included in this study are those that have actually implemented the innovations.

Subjects

The four CCOEs for the chosen innovations were contacted to provide the names of mental health agencies who had considered adopting the innovations. The agencies were then contacted by the IDARP team, briefed about the study and their participation solicited. Typically, the chief decision maker (usually the Chief Executive Officer) was the initial point of contact, who was asked to provide the names of organizational employees who would be key informants in this study, either on the basis of their position in the organization or their role with regard to the implementation of the innovation. In general, at least three informants were targeted for each organization, with (at least) one respondent from each of the following groups: (a) the executive management (usually, the Chief Executive Office or the equivalent), (b) front line implementers (often a clinical supervisor or a psychiatrist, and (c) fiscal or administrative staff.

Data collection began in December, 2001. As the innovations continued to be diffused in Ohio, more agencies were solicited for participation. The present study includes data gathered up to March, 2004.

Data Sources

There were two sources of data, interviews with the key informants, and surveys responded to by key informants.

Interviews

An interview protocol was developed for this project primarily based on the work of Nutt (1986, 1992), Yin (1979), and Hickson, Butler, Cray, Mallory, and Wilson (1986). All the members on the IDARP team were trained on the interviewing techniques for the protocol. During the Summer and Fall of 2001, the interview protocol was pilot tested on organizations that were not involved in the research sample. Each interview involved a single key informant and two IDARP researchers, one playing the role of the interviewer and the other, the scribe. The interview typically took about an hour and consisted of four parts. (See Appendix A.) In Part A, the interviewer would brief the respondent about IDARP, assure the participant about the confidentiality of responses, and answer any questions that the interviewee might have. Part B consisted of a few structured questions to obtain descriptive data related to the respondent (e.g., job title and tenure) and the organization (e.g., number of employees in the organization). Part C of the interview protocol used a process reconstruction approach. With a few probing questions, the interviewer attempted to reconstruct the story of the adoption and implementation of the innovation ("When did you

first hear about this innovation?", "What happened after that?"). This was followed by a series of structured questions (Part D). A similar procedure was followed at Waves 2 and 3 of data collection.

Surveys

At the end of the interview during each wave of data collection, participants were asked to complete a survey and return it within two weeks. (See Appendix B.) The return rate for the surveys was 92%.

In sum, the structured questions at the end of the interview and the survey provided measures of numerous constructs, some of which are relevant to the present research. These will be described below.

Focal Unit, Level of Measurement and Level of Analysis

If every organization had adopted only one innovation, the appropriate unit of analysis would be the organization (Downs & Mohr, 1976). However, in the current data set, since six organizations adopted two innovations each, the focal unit or the level of reference (Rousseau, 1985) in this research is the innovation project. It must be clarified, that each project was treated as independent, i.e., key informants were sought for each project, and data gathered independent of responses to other innovation projects that the organization was implementing.

Rousseau (1985) states that for each focal unit, there exists a level of measurement and a level of analysis. The level of measurement refers to the level to which data are assigned. Since the data are gathered from individual organizational members, the level of measurement in this research is the individual. The level of analysis is the unit to which "data are assigned for

hypothesis testing and statistical analysis" (Rousseau, 1985, p. 4). This study investigates the implementation of innovations within organizations making the level of analysis the project. Meyer and Goes (1988) also refer to this level as the innovation-organization level. The outcome variables in this study refer to the outcomes of the implementation of an innovation in an organization (project level constructs), namely implementation effectiveness and innovation effectiveness. The predictor variables too, specifically address either aspects of the organization that are specific to the innovation (climate for implementation and project slack), or aspects of the innovation that are specific to the organization (compatibility).

Key Informant Methodology

Key informant methodology was used to obtain data for IDARP. Using key informants is appropriate when the constructs of interest are such that surveying a representative cross section of organizational members may not lead to accurate or complete information. Whereas typical survey respondents report feelings, attitudes or behaviors, key informants are asked to report or describe certain organizational properties or related phenomena (Seidler, 1974). In the present research, the constructs of interest are relevant to the innovation project rather than personal attitudes or behaviors. Further, the innovations that are a part of this study are not necessarily organization-wide innovations. Sometimes they involve only a particular department or team. Consequently, surveying a random sample of organizational employees would not be appropriate. For example, employees who are not a part of the team of implementers of the SAMI

project may not be knowledgeable about organizational policies with regard to the implementation of SAMI or the compatibility of the innovation. This was the logic for choosing key informants as respondents in the data gathering effort.

According to Kumar, Stern and Anderson (1993), key informants are usually organizational members who have the most knowledge about the question of interest. Kumar et al. (1993) also suggest that key informants are often chosen because of their formal role in the organization. Various researchers have used either relevant global measures (such as tenure with a firm, e.g., Philips, 1981) or specific measures, such as level of knowledge about a specific issue (e.g., Cusumano & Takeishi, 1991) to assess respondents' competency as key informants. For IDARP, informant competence was assessed primarily based on the informant's role with regard to the innovation implementation project.

Recently, several authors have argued for the use of multiple respondents for increased reliability and validity (Bagozzi, Yi, & Phillips, 1991; Golden, 1992; Philips, 1981; Schwenk, 1985). One of the most persuasive reasons is that using multiple respondents can offset the biases of individual respondents. As noted earlier, in the present research, at least three informants were targeted from each organization. Again, representative sampling was not used to choose the respondents. Rather, knowledge of the variables of interest and familiarity/involvement with the innovation project was used to identify respondents.

The use of multiple respondents is accompanied by the problem of perceptual agreement, or rather the lack of it. In other words, the different respondents may not agree on their assessment of organizational phenomena. Kumar, Stern and Anderson (1993) elaborate on three methods that can be used to reconcile these differences in perception. The latent trait approach uses structural equation modeling to partition the variance and thus isolates informant bias from the variance in the construct and random error (e.g., Anderson & Narus, 1990; Bagozzi et al., 1991). The second approach, statistical aggregation involves pooling the informants' responses to remove differences (e.g., Chaterjee, Lubatkin, Schweiger & Weber, 1992; Van de Ven & Walker, 1984). And finally, the consensual approach requires that multiple informants develop a shared position, or in other words reconcile their differences on those items on which they initially disagreed (e.g., Eisenhardt & Bourgeois, 1988; Nutt 1986).

In the empirical literature, innovation studies using multiple respondents (e.g., Klein, Conn & Sorra, 2001; Fuller & Swanson, 1992) have administered different surveys to different respondents in order to deal with the issue of perceptual differences. For IDARP, the matching of surveys to respondents was conducted on the basis of respondents' expertise, role in the implementation effort, and role in the organization. Scales that address common organizational phenomena were administered to all key informants. If there are acceptable levels of agreement, then aggregation of the data is justifiable (e.g., Klein, Dansereau & Hall, 1994). While in general, convergence was expected among the key informants, it was proposed that if statistical tests of homogeneity show

low levels of agreement, then for each case the response given by the most knowledgeable informant will be used.

Measures: Operationalizing the Constructs

As stated earlier, the measures used to operationalize constructs in the present research are a subset of the measures gathered through interviews and surveys for the IDARP study. Selected measures have been reframed to fit the purposes of the present research. All the measures described in this section (with the exception of four measures) were developed for IDARP by the principal investigators (Panzano & Roth, 2001). The four scales that were added by the author are Removal of obstacles, Goal Clarity and Communication, Reward, and Monitoring of Progress. (All the scales and the items are reported in Appendix C.)

In presenting the operationalizations of the constructs, the antecedents in the model are presented first. Then the outcome variables are presented, starting with the proximal outcome of implementation effectiveness, followed by the distal outcome of innovation effectiveness. Finally the operationalizations for the hypothesized moderators, reinvention and beliefs about maintaining fidelity are presented (see Figure 1.7 for the proposed model).

Response Scales

The scales vary in response scales. To avoid redundancy, the most frequently used response scales are now described. Many items were assessed on either an extent scale, or an agreement scale. Unless otherwise mentioned, the agreement scale is a 7-point Likert-type scale anchored thus: 1= Strongly

disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Slightly agree, 6= Agree, 7 = Strongly Agree, and N/A = Don't know/ Not applicable. The extent scale is a 7-point Likert-type scale anchored thus: 1= No extent/not at all, 2 = Very small extent, 3 = Small extent, 4= Moderate extent, 5 = Considerable extent, 6= Great extent, 7 = Very great extent, and N/A = Don't know/ Not applicable. Other response formats are described for specific scales.

Antecedent Variables

Climate for Implementation

The conceptualization and measurement of organizational climate for implementation in this study conforms to the "perceptual measurements – organizational attribute" model presented by James and Jones (1974), i.e., existing at the level of the organization/project and reported by individual key informants. In using such a model, the central issue is the validity of aggregation of individual responses. Having defined climate for implementation as an attribute of the organization, informants should report on the organization's climate, not on their own psychological climate (Glick, 1985). Schneider (1995) recommends that a measure of organizational climate that depends on individual perceptions must provide respondents with the appropriate frame of reference. Thus, in this case, the items assessing organizational climate for implementation were statements using the organization or the project as the referent. For example, "The top management has clearly communicated its expectations with regard to the outcomes of the implementation" was used in the present research, rather than "I was given clear expectations with regard to the outcomes of the

implementation". Glick further stresses that treating survey respondents as key informants describing organizational characteristics, and not as individual employees expressing their unique experiences, would lead to reliable assessments of organizational climate.

Thus, key informants were asked to describe the organization's climate for implementation. The operational measures of this construct are presented in two categories, namely, organizational policies and practices, and managerial attitudes.

Organizational policies and practices. Organizational policies and practices were assessed using the following six sub-scales: Access to Training, Freedom to Express Doubts, Goal Clarity and Communication, Rewards, Removal of Obstacles, and Monitoring of Progress.

1. Access to Training. A 4-item scale modified from the scale developed by Moore and Benbasat (1991) was used to measure access to technical assistance and training. Respondents were asked to indicate the extent to which they agreed with items such as "If questions arise during implementation, we will have access to the information we need to move forward" and "The training we need in order to implement the EBP is available to this organization".
2. Freedom to Express Doubts. A 3-item scale, adapted from the work of the Minnesota Innovation Research Program (MIRP; Van de Ven, 1989) was used to assess the freedom to express doubts. Respondents were asked to indicate the degree to which they agreed with items such as,

"Individuals were encouraged to criticize or provide information which challenges how the EBP is to be implemented".

3. Goal Clarity and Communication. A 3-item scale was developed based on the strategic management literature to assess the clarification and communication of the goals of implementation. Respondents were asked to indicate the extent to which they agreed with items such as, "The top management has clearly communicated its expectations with regard to the outcomes of the implementation".
4. Rewards. A 4-item scale, adapted from the MIRP study (Van de ven, 1989) was used to assess practices with regard to rewards for implementation. Respondents were asked to indicate the extent to which they agreed with items such as, "Individuals involved in the implementation of the EBP get recognition from their supervisors for their efforts".

For the four scales mentioned above, the 7-point agreement scale was used.

5. Removal of Obstacles. A 4-item scale was used to assess the extent to which obstacles arising during the course of implementation are addressed. Respondents were asked to indicate the extent to which they agreed with items such as, "To what extent does management remove obstacles that arise in the course of implementing the EBP?"
6. Monitoring of Progress. The extent to which top management monitors implementation and its progress was assessed by a 4-item scale, based on the literature on strategic management, with sample items such as, "To

what extent does the top management team receive updates about the implementation of the EBP?"

For the two measures above, the 7-point extent scale was used.

Managerial attitudes. The second component of climate for implementation, the attitude of the top management to the implementation, was assessed by five scales. These are described below.

1. Top Management Support. A single-item scale was used to assess ongoing support by top management. Respondents were asked, "Overall, how would you describe the ongoing support given to this project by top management in this organization?" The response scale ranged from 1 = "very weak" to 6 = "very strong".
2. Time Pressure to Implement. A single-item scale was used to assess this construct. Respondents were asked, "How would you describe the time pressure to get the EBP up and running within this organization?" The response scale ranged from 1 = "none" to 10 = "very high".
3. Relative Importance of Project. A single-item scale was used for this measure. Respondents were asked, "How would you rate the importance of this project compared to other organizational projects?" The response scale ranged from 1 = "unimportant" to 10 = "of critical importance".
4. Cost to Plan. A 2-item scale was used to assess the cost to plan for implementation. Respondents were asked to indicate the extent of investment of resources by responding to items such as, "How would you describe the investment of resources made to support the implementation

of this EBP?" The response scale ranged from 1 = "very low" to 10 = "very high".

5. Organizational Support. A single-item global measure of overall organizational support for the implementation was used. Respondents were asked, "How supportive is the organization as a whole toward the implementation of the EBP". The response scale ranged from 1 = "strongly opposed" to 10 = "strongly supported".

The Relative Importance of Project was adapted from the work of Hickson et al. (1986). The other four measures described above were adapted from the interview protocol used by Nutt (1986).

Compatibility

The compatibility of the innovation with the organization was assessed by a 4-item scale adapted from Moore and Benbasat (1991). Respondents were asked to indicate the extent to which they agreed with items such as, "The EBP is compatible with the treatment philosophy in this organization" and "The EBP fits well with the professional training of most of the staff in this organization". The response scale was the 7-point agreement scale.

Project Slack

The IDARP researchers made a clear distinction between organizational slack and project-specific slack. Project slack, the organization's buffer of resources specifically with regard to the innovation implementation, was assessed with three measures. These measures were developed by reviewing

the literature on organizational slack (Bourgeois, 1981; Sharfman, Wolf & Tansik, 1988; Singh, 1983) and constructing items to reflect project-specific slack.

1. Ongoing Slack. A 3-item scale was used to measure the availability of funds to keep the practice up and running. Respondents were asked to indicate the extent to which they agreed with statements such as, “We do not have the resources necessary to implement this EBP on a long-term basis” (reverse-scored).
2. Capacity to Manage Risks. A 5-item scale was developed to assess the capacity of the organization to deal with problems related to implementation. Respondents were asked to indicate the extent to which they agreed with statements such as, “ We can deal with ‘bumps in the road’ associated with implementing the EBP”

For the two measures above, the 7-point agreement scale was used.

3. Resources to Support Implementation. A single-item measure was also used where respondents were asked to indicate the extent to which resources were made available by the organization to support the implementation of this project compared to what was needed. Item response scale ranged from 1 = “much less than needed” to 5 = “much greater than needed”.

Outcome Variables

Implementation Effectiveness.

Operationalizations of implementation effectiveness in the present research are presented below in three categories, namely, (a) measures of assimilation and routinization, (b) measures of extent of use and, (c) measures of progress of the actual implementation effort.

Assimilation and routinization. Two measures were used to assess this component of implementation effectiveness.

1. Assimilation. A 4-item scale was developed based on the work of Yin (1979) and Hickson et al. (1986) to measure the degree of assimilation. Respondents were asked to indicate the extent to which the innovation had been assimilated into the organizational practices by responding to items such as, “To what extent is the EBP seen as a permanent part of the way this organization conducts business?” and “To what extent is the EBP seen as temporary?” (reverse-scored). The 7-point extent scale was used with this measure.
2. Plan to Persist. A 4-item scale was developed for IDARP based on the work of Hickson et al. (1986) to assess organizational plans to persist with the innovation. Respondents were asked to indicate the extent to which they agreed with statements such as, “The EBP is expected to be an ongoing element of this organization”, and “The EBP will be a part of the way we do business around here for years to come”. The 7-point agreement scale was used with this measure.

Extent of use. The second component, the extent of use of the innovation, was assessed using two measures.

1. Extent of Implementation. A single-item measure from the work of Nutt (1992) was used. Respondents are asked to indicate the extent to which the practice has been implemented. Possible response scale ranged from 1 = “never been implemented” to 5 = “fully implemented”.
2. Magnitude of Impact. A 6-item measure was developed based on the work of Yin (1979) to assess the extent of impact of the innovation. Respondents were asked to indicate the percentage of clients that were (a) directly impacted by the EBP and, (b) indirectly impacted by the EBP. The scale included similar items where respondents were asked to indicate percentages of staff and departmental units who are directly and indirectly impacted by the EBP.

Progress of implementation. The third component, the progress of the implementation effort, was assessed with two measures.

1. Organization Satisfaction with Implementation. A single-item measure of the progress of implementation was used (MIRP, 1989). Respondents were asked, “To what extent is the organization satisfied with the progress made toward implementing this new practice.” The response scale ranged from 1 = “not at all” to 10 = “to a great extent”.
2. Time between Adoption and Implementation. Another single-item measure was developed based on Nutt (1992) and Hickson et al. (1986) to assess the progress of the implementation. Respondents were asked to indicate

(in months and years) the time taken between the decision to adopt and the actual implementation of the innovation.

Innovation Effectiveness

The distal outcome of the innovation effort, the outcomes accrued to the organization as a result of the innovation, was assessed using six measures.

1. Innovation Effectiveness on Clients. A 4-item scale of innovation effectiveness was developed based on the work of Oliver (1990) to assess the outcomes of the innovation on the clients, the ultimate consumers of the innovation. Respondents were asked to indicate the extent to which they agreed with items such as “Implementing the EBP is contributing to the improvement in client outcomes” and “Implementing the EBP is facilitating the recovery of consumers”.
2. Innovation Effectiveness on Organization. A 5-item scale of innovation outcomes, also based on the work of Oliver (1990), was used to assess the outcomes of the innovation to the organization. Respondents were asked to indicate the extent to which they agreed with items such as, “Implementing the EBP is resulting in overall improvements at this organization” and “Implementing the EBP is improving the organization’s efficiency”.

Both these measures used the 7-point agreement response format.

3. Positive Consequences of Implementation. A 2-item scale was developed to measure the extent to which positive outcomes were realized. Respondents were asked to indicate the extent to which they agreed with

the item, “To what extent were the expected positive consequences of implementing the EBP realized?” A similar item was asked about unexpected positive consequences.

4. Negative Consequences of Implementation. Another 2-item scale was developed to assess the negative consequences incurred from the implementation. Respondents were asked to indicate the extent to which they agreed to the item, “To what extent were the expected costs of implementing the innovation realized?” A similar item addressed unexpected costs of innovation implementation.

These two measures were developed for IDARP to reflect Rogers (1995) view that the consequences of innovation implementation could either be positive or negative, and could either be anticipated or unexpected. Both these measures used the 7-point extent response format.

5. Effect on Clients, Staff and Organization. The actual impact of the innovation in relation to expectations about the outcomes was measured with a 3-item scale adapted from the work of Yin (1979). Respondents were asked to indicate the degree to which expectations were met, by responding to the item, “To what extent has the actual impact(s) of this practice on clients/ staff/organization met expectations?” The two other items in this scale are similar, but they refer to the impact of the practice on staff and the organization. Item response scale for this measure ranged from 1 = “far below expectations” to 10 = “far exceeds expectations”.

6. Overall Impact of Innovation. A single-item global measure of impact to the organization was developed based on the work of Hickson et al. (1986). Respondents were asked to assess the overall impact of the innovation implementation by responding to an item, “How would you describe the overall impact this practice is having on your organization”. Item response scale ranged from 1 = “poor” to 10 = “outstanding”.

Reinvention

As noted earlier, the innovation literature documents the fact that innovations are frequently modified, or reinvented, during the course of their implementation. A 4-item scale was developed, based on the work of Rogers (1995) to assess this construct. Respondents were asked to indicate the degree of reinvention by answering items such as, “To what extent did your organization implement the EBP to the letter as prescribed by its developers?” and “To what extent did this organization make modifications in the way the EBP is implemented?” The 7-point extent response format was used for this scale.

Beliefs about Maintaining Fidelity

As described earlier, researchers vary in their ideas about the utility of reinvention. To address this issue, the perceptual beliefs about the importance of fidelity to the original innovation were assessed with a 4-item scale developed for IDARP. Respondents were asked to indicate the degree to which they agreed with items such as, “The EBP must be implemented in a precise and prescribed manner in order to be effective” and “There is room to make some local

adaptations in how the EBP is implemented without jeopardizing its effectiveness". The 7-point agreement response format was used for this scale.

To summarize, twenty-nine measures from the IDARP dataset were used to assess the constructs relevant to the present research. The next section briefly presents the overall data analyses.

CHAPTER 3

RESULTS

As explained in the last chapter, the data for this dissertation comes from the IDARP study. As of this writing, the sample for the IDARP research consists of 90 projects. The projects span four types of organizations: organizations considering adopting one of the four innovations ("considering"), organizations that had decided against adopting ("non-adopters"), organizations that were implementing one or more innovations ("adopters") and organizations that had abandoned implementation ("de-adopters"). The following criteria were used to select projects for inclusion in the present research: (a) only organizations where an innovation had actually been adopted were included (i.e., the "adopters" and "de-adopters"); (b) only projects that had responses from both the first and the second wave of data collection were included, and (c) only projects with more than one key informant were included. Fifty projects met all three criteria and constituted the sample for the present research.

Characteristics of the Respondents in the Sample

Of the 222 respondents who were included in this project, 128 (58%) were female, 93 (42%) were male and one did not identify gender. Three (< 1%) were in the age group of 20-30 years, 25 (11%) were in the age group of 31 – 40 years, 83 (37%) respondents were in the age group of 41 – 50 years, 47 (21%)

were in the age group 51 – 60 years, and two (< 1%) were over 61 years (Data on age were not available for 62 respondents). Organizational tenure of the respondents ranged from nine months to 29 years (*M* = 9.54 years, *SD* = 7.57). With regard to the informants' role in the innovation implementation, 90 (41%) were decision-makers (e.g., Chief Executive Officers), 98 (44%) were front-line implementers (e.g., case managers or doctors) and 33 (15%) were in the support functions (e.g., Chief Financial Officers or Quality Assurance Officers).

Characteristics of the Projects in the Sample

The annual operating budget for the organizations in the sample ranged from $0.4 million to $58 million, with a mean of $11.4 million (*SD* = 10.7). The size of the top management team for the organizations ranged from one to eleven individuals (*M*= 6.4; *SD* = 1.9). The number of employees in the organizations ranged from five to 802 individuals (*M* = 155, *SD* = 138).

Of the 50 projects included in the sample, 26 (52%) of them involve the SAMI innovation and ten (20%) involve the Clustering innovation. The other two innovations, OMAP and MST comprise seven (14%) projects each. The number of informants for each project ranged from two to nine, with an average of 4.44 informants per project (*SD* = 1.78). Of the 50 projects in the sample, 47 (94%) have data from at least one decision maker; 48 (96%) have data from at least one implementer, and 29 (58%) projects have data from at least one support staff. Additionally, 26 (52%) projects have data from all the three sources (decision maker, implementer and support staff members), and 45 (90%) projects have data from at least one decision maker and one implementer.

Internal Consistency of Scale Measures

The internal consistency of multi-item scales was calculated using Cronbach's alpha. Reliabilities were computed at the individual level, as well as the level of the project, after appropriately recoding item responses so that higher numbers indicate more of a construct. The results of the reliabilities of the original scales are discussed in this section. Table 3.1 reports Cronbach alphas for the revised multi-item scales, the number of items in the scale and the number of cases used for each reliability calculation. Listwise deletion was used in the reliability calculations, so only cases with valid data for all the items in the relevant scale were retained for the procedure. The table also reports the number of valid cases expressed as a percentage of the number of informants who were given an opportunity to respond to each scale. As noted earlier, every scale was not administered to each respondent. Scales were matched according to the role of the informant in the innovation implementation project. Additionally, respondents who participated in only one wave of data collection would not have data for the other wave of data collection. Hence, the potential number of respondents for each scale varies.

Climate for Implementation Scales

Eleven subscales were used to measure the construct of climate for implementation. Of these, four are single-item scales and so are not shown in Table 3.1. Reliabilities of the multi-item scales computed at the individual level range from respectable (α = .71) to excellent (α = .92), with the exception of the

Scale	Number of Items	*N*	*N* %	Cronbach alpha at individual level	Cronbach alpha at project level
Climate for implementation scales					
Access to Training	4	109	92%	.82	.89
Freedom to Express Doubts	3	132	84%	.58	.58
Goal Clarity and Communication	3	87	85%	.71	.73
Rewards	4	93	91%	.90	.89
Removal of Obstacles	4	73	72%	.92	.89
Monitoring of Progress	4	74	73%	.91	.88
Cost to Plan	2	55	42%	.72	.73
Compatibility scale					
Compatibility	4	100	91%	.75	.71
Project slack scales					
Ongoing Slack	3	135	81%	.80	.85
Capacity to Manage Risks	5	122	74 %	.74	.81
Implementation effectiveness scales					
Assimilation	3	64	63%	.74	.69
Plan to Persist	4	55	74%	.83	.86
Magnitude of Impact	6	48	40%	.44	.46
Innovation effectiveness scales					
Innovation Effectiveness on Clients	4	83	81%	.93	.95
Innovation Effectiveness on Organization	5	71	70%	.85	.90
Consequences of Implementation	3	70	69%	.54	.55
Effect on Clients, Staff and Organization	3	48	46%	.71	.79
Reinvention scale					
Extent of Reinvention	4	73	71%	.88	.88
Beliefs about maintaining fidelity scale					
Beliefs about Maintaining Fidelity	4	101	85%	.80	.85

Note: *N* = Number of cases used in the reliability calculation procedure. Listwise deletion was used, i.e., only cases that had valid data for all the items in the respective scale were included. *N* % = *N* represented as a percentage of all the informants who were given an opportunity to respond to the scale.

Table 3.1: Scale reliabilities for multi-item scales

scale, Freedom to Express Doubts (α = .58). Reliabilities for the climate for implementation scales at the project level range from .73 to .89, except for the scale Freedom to Express Doubts (α = .58). This scale was developed for the IDARP study due to the lack of existing scales in the literature. Nunnally (1967) states that reliabilities above .50 are adequate in the initial stages of exploratory research, and hence this scale was included in statistical analyses.

Compatibility Scale

The 4-item scale assessing compatibility was judged to have acceptable reliabilities.

Project Slack Scales

Three scales were used to assess project slack of which one was a single-item scale and so is not reported in Table 3.1. Reliabilities for the two multi-item scales, Ongoing Slack and Capacity to Manage Risks indicate that the scales are acceptable.

Implementation Effectiveness Scales

Six scales were conceptualized as measuring implementation effectiveness of which three were single-item scales and are not shown in Table 3.1. The 4-item scale, Assimilation, had reasonable internal consistency (α = .64). After eliminating one item, the internal consistency improved considerably (α = .74). The 3-item scale, Plan to Persist, revealed good internal consistency both at the individual and the project level. The 6-item scale, Magnitude of Impact, revealed unacceptable internal consistency (α = .44 at the individual level

and α = .46 at the project level). Eliminating individual items did not improve the reliability of this scale. Additionally, this scale had a poor response rate (40%). So this scale was dropped from additional statistical analyses.

Innovation Effectiveness Scales

Six scales were conceptualized as measuring Innovation Effectiveness of which one was a single-item scale and is not shown in Table 3.1. Two sub-scales (two items each) were used to measure the positive and negative consequences of the innovation. The Negative Consequences subscale had very poor internal consistency (α = -.01). The Positive Consequences subscale also did not have high internal consistency (α = .52), but it marginally improved (individual level α = .54; project level α = .55) after adding one of the items from the negative consequences scale (after reverse-coding it). Thus a new 3-item scale was created to reflect an overall Consequences of implementation measure. Although the internal consistency was not very high, this scale was retained for additional analyses since it was developed to reflect Rogers' (1995) work, which is considered central in the innovation literature. Additionally, as cited earlier, using the scale with this reliability can be justified in the context of exploratory research. The other three scales, Innovation Effectiveness on Clients, Innovation Effectiveness on Organization and Effect on Clients, Staff and Organization have good reliabilities at the individual and project level.

Reinvention and Beliefs about Maintaining Fidelity Scales

The two 4-item scales, Extent of Reinvention and Beliefs about Maintaining Fidelity, had excellent reliabilities.

Based on the reliability analyses, items were combined to form the scales. Individuals who did not provide responses to at least half of the scale items were excluded from this analysis. The descriptive statistics of all the single-item measures and the multi-item scales are presented in Table 3.2. Descriptive statistics at the item level are reported in Appendix D.

As described in the Methods chapter, most of the measures have seven-point response scales with the following exceptions; Resources to Support Implementation (5-point scale), Top Management Support, and Extent of Implementation (6- point scales). The following seven measures have 10-point scales: Time Pressure to Implement, Relative Importance of Project, Cost to Plan, Organizational Support, Organization Satisfaction with Implementation, Effect on Clients, Staff and Organization, and Overall Impact of Innovation.

One single item measure, Time Taken from Adoption to Implementation, measured in months, had a very poor response rate (38%) and hence was excluded from further statistical analyses.

Overall, there are no apparent problems with range restriction, floor effects or ceiling effects.

Measures	Sample	*N*	*N* %	Min	Max	Mean	*SD*
Climate for implementation scales							
Access to Training	119	116	98%	1.75	7.00	5.93	0.98
Freedom to Express Doubts	157	150	96%	1.67	7.00	5.36	1.16
Goal Clarity and Communication	102	94	92%	1.50	7.00	5.04	1.33
Rewards	102	99	97%	1.00	7.00	4.99	1.50
Removal of Obstacles	102	92	90%	1.00	7.00	4.37	1.39
Monitoring of Progress	102	94	92%	1.25	7.00	4.28	1.55
Top Management Support	145	141	97%	1.00	6.00	4.87	1.32
Time Pressure to Implement	117	102	87%	1.00	10.00	6.34	2.62
Relative Importance of Project	151	132	87%	2.00	10.00	7.10	2.42
Cost to Plan	130	89	68%	.70	10.00	6.66	2.47
Organizational Support	151	94	62%	3.00	10.00	7.90	2.03
Compatibility scale							
Compatibility	110	110	100%	3.25	7.00	5.80	0.92
Project slack scales							
Ongoing Slack	166	152	92%	1.00	7.00	4.63	1.54
Capacity to Manage Risks	166	151	92%	2.33	7.00	5.48	0.84
Resources to Support Implementation	166	153	92%	1.00	5.00	2.69	0.86
Implementation effectiveness scales							
Assimilation	102	85	83%	1.50	7.00	5.05	1.42
Plan to Persist	74	68	92%	2.00	7.00	5.72	1.10
Extent of Implementation	104	85	82%	1.00	6.00	4.28	0.97

Table 3.2: Descriptives for measures

Table 3.2 (continued)

Measures	Sample	*N*	*N* %	Min	Max	Mean	*SD*
Organization Satisfaction with Implementation	104	89	86%	1.00	10.00	5.87	2.43
Time Taken from Adoption to Implementation	117	44	38%	2.00	84.00	16.45	16.94
Innovation effectiveness scales							
Innovation Effectiveness on Clients	102	94	92%	1.50	7.00	5.69	1.16
Innovation Effectiveness on Organization	102	97	95%	1.00	7.00	5.25	1.11
Consequences of Implementation	102	81	79%	1.33	7.00	4.26	1.21
Effect on Clients, Staff and Organization	104	67	64%	1.67	9.00	5.64	1.71
Overall Impact of Innovation	104	85	82%	1.00	10.00	6.74	2.12
Reinvention scale							
Extent of Reinvention	102	86	84%	1.25	6.50	3.14	1.34
Beliefs about maintaining fidelity scale							
Beliefs about Maintaining Fidelity	119	115	97%	2.25	6.75	4.21	1.22

Note: Sample = Number of informants who were given an opportunity to provide data on the respective scale. *N* = Number of cases used in the scale calculation, after eliminating cases that did not have valid data for at least half of the items in the scale. *N* % = *N* represented as a percentage of all the informants in the sample who were given an opportunity to respond to the scale.

Composition of Constructs

Multiple measures were used to assess the constructs of interest. These measures were combined to create construct scores, for two reasons. First, the relationships that the model proposed are relevant to the overall constructs and not the sub-scales. Additionally, the sample size was insufficient to test relationships involving each individual measure. Principal Components Analysis (PCA) and bivariate correlations were used to support this step of the analysis.

The purpose of PCA is to derive a relatively small number of components that can account for the variability found in a larger number of measures. PCA is useful for data reduction (reducing multiple variables into smaller number of components) where the components carry a maximum amount of the information in the original variables. Therefore, exploratory second order (project level) PCA was conducted. Details of the PCA analyses are reported in Appendix E.

Climate for Implementation

PCA of the 11 measures found three components. After removing three single-item measures that were not highly correlated with the other measures in this construct (Time pressure to Implement, Relative Importance of Project and Organizational Support) and the measure with the least communality (Cost to plan), PCA of the remaining seven measures found only one component (with the minimum eigenvalue for retention set at 1.00). As shown in Table 3.3, component loadings ranged from .58 to .87 with an mean loading of .75. The single extracted component accounted for 57% of the variance. Additionally, it can be seen from Table 3.4 that all the intercorrelations among the seven scales

Component Scales	Component loadings	Mean component loading	Variance explained	Mean r
Access to Training	.73			
Freedom to Express Doubts	.58			
Goal Clarity and Communication	.82			
Reward	.72	.75	57%	50***
Removal of Obstacles	.87			
Monitoring of Progress	.75			
Top Management Support	.80			

Note: Mean *r* is the average of the intercorrelations among the seven measures. ***$p < .01$

Table 3.3: Results of Principal Component Analyses for measures related to climate for implementation.

	1	2	3	4	5	6
1. Access to Training	--					
2. Freedom to Express Doubts	.42***	--				
3. Goal Clarity and Communication	.40***	.36***	--			
4. Reward	.28**	.32**	.69***	--		
5. Removal of Obstacles	.51***	.35***	.73***	.64***	--	
6. Monitoring of Progress	.37***	.34***	.67***	.54***	.74***	--
7. Top Management Support	.36***	.42***	.58***	.60***	.69***	.44***

**$p < .05$ ***$p < .01$ (All tests are one-tailed)

Table 3.4: Intercorrelations among measures of climate for implementation

were significant (mean r = .50, p < .01). Thus empirical data justified combining the seven measures to form a composite construct of climate for implementation. The seven final measures included in the construct are, Access to Training, Freedom to Express Doubts, Goal Clarity and Communication, Reward, Removal of Obstacles, Monitoring of Progress, and Top Management Support.

Project Slack

Three scales were used to assess this construct, Resources to Support Implementation, Ongoing Slack, and Capacity to Manage Risks. PCA of the three scales found only one component (with the minimum eigenvalue for retention set at 1.00). As reported in Table 3.5 the mean component loading was .83 and the extracted component accounted for 68% of the variance. Further, as Table 3.6 shows, all the intercorrelations between the three scales were statistically significant (mean r = .54, p < .01). Thus empirical data justified combining the three measures to form a composite construct of project slack.

Component Scales	Component loadings	Mean component loading	Variance explained	Mean r
Resources to Support Implementation	.81			
Ongoing Slack	.86	.83	68%	.54***
Capacity to Manage Risks.	.81			

Note: Mean r is the average of the intercorrelations among the three measures. ***p < .01

Table 3.5: Results of Principal Component Analyses for measures related to project slack.

	1	2
1. Resources to Support implementation	--	
2. Ongoing Slack	.59***	--
3. Capacity to Manage Risks	.45***	.57***

***$p < .01$ (All tests are one-tailed)

Table 3.6: Intercorrelations among measures of project slack

Implementation Effectiveness.

Four scales were used to operationalize this construct, Extent of Assimilation, Plan to Persist, Extent of Implementation, and Organization Satisfaction with Implementation. PCA of the four scales found one component that explained 50% of the variance. After eliminating the measure with the least communality (Extent of Implementation), PCA of the remaining three scales revealed one component (with the minimum eigenvalue for retention set at 1.00), which accounted for significantly more variance (63%). As shown in Table 3.7, the mean component loading was .79 for the three scales. Further, the intercorrelations among the three scales were statistically significant (Table 3.8) and the mean $r = .51$($p < .01$). Thus empirical data justified combining the three measures to form a composite construct of implementation effectiveness.

Component Scales	Component loadings	Mean component loading	Variance explained	Mean r
Extent of Assimilation	.86			
Plan to Persist	.88	.79	63%	.51***
Organization Satisfaction with Implementation	.62			

Note: Mean *r* is the average of the intercorrelations among the three measures.
***$p < .01$

Table 3.7: Results of Principal Component Analyses for measures related to implementation effectiveness.

	1	2
1. Assimilation	--	
2. Plan to Persist	.69***	--
3. Organization Satisfaction with Implementation	.48***	.35**

**$p < .05$ ***$p < .01$ (All tests are one-tailed)

Table 3.8: Intercorrelations among measures of implementation effectiveness

Innovation Effectiveness.

The five scales used to assess the construct of innovation effectiveness were, Innovation effectiveness on clients, Innovation effectiveness on organization, Consequences of Implementing the innovation, Effect of Innovation on Clients, Organization and Staff, and Overall Impact of the Innovation. PCA of

these five scales found only one component (with the minimum eigenvalue for retention set at 1.00). As reported in Table 3.9, component loadings ranged from .70 to .91, with a mean loading of .82. The extracted component accounted for 68% of the variance. Additionally, the intercorrelations among the five scales were all statistically significant (mean $r = .57$, $p < .01$; Table 3.10). Hence empirical data justified combining the five measures to form a composite construct of innovation effectiveness.

Component Scales	Component loadings	Mean component loading	Variance explained	Mean r
Innovation Effectiveness on Clients	.80			
Innovation Effectiveness on Organization	.91			
Consequences of Implementing the Innovation	.70	.82	68%	.57***
Effect on Clients, Organization and Staff	.86			
Overall Impact of the Innovation	.85			

Note: Mean *r* is the average of the intercorrelations among the seven measures.
***$p < .01$

Table 3.9: Results of Principal Component Analyses for measures related to innovation effectiveness.

	1	2	3	4
1. Innovation Effectiveness on Clients	--			
2. Innovation Effectiveness on Organization	.77***	--		
3. Consequences of Implementation	.33**	.51***	--	
4. Effect on Clients, Staff and Organization	.57***	.68***	.50***	--
5. Overall Impact of Innovation	.51***	.65***	.46***	.76***

**$p < .05$ ***$p < .01$ (All tests are one-tailed)

Table 3.10: Intercorrelations among measures of innovation effectiveness

Finally, single scales were used to operationalize the constructs of compatibility, reinvention and beliefs about maintaining fidelity. The reliabilities of the single scales were high (α = .75, .87 and .89 respectively), providing justification for the use of these measures.

Computation of Construct Scores

As reviewed, PCA results provided justification for combining the various measures to operationalize the constructs. In order to derive an overall construct score for the combined measures, it was necessary to first standardize scores in each measure, as the various scales differ in response format. To this end, each item was first standardized and then the construct score computed by summing all the items in the relevant scales. Individuals who did not provide responses for

at least half of the items included in the construct were excluded from further analyses involving those measures.

Data Aggregation

The unit of analysis for the current study is the project, i.e., all the hypotheses are at the level of the project. However, the unit of measurement is at the individual level, since all the data for this project had been gathered through surveys and interviews involving key informants. Data analysis performed at the individual level cannot be used to derive inferences/conclusions about the organization/project (atomistic fallacy; Riley, 1963). The data should be aggregated to the level of the project in order to make valid conclusions. Researchers involved in multilevel issues have recommended that, before constructs at the individual level are aggregated to a macro unit of analysis, issues of reliability and agreement must be addressed (James, 1982; Klein, Dansereau & Hall, 1994; Bliese, 2000). The issue of reliability addresses the relative consistency of responses among raters. The issue of agreement addresses the question of whether there is sufficient agreement among individuals in a group to justify aggregating their score.

Reliability

Measures of reliability evaluate between-group variance relative to total (within and between) variance, essentially examining interrater reliability for each measure across the sample. It is a construct-by-sample approach (i.e., one index across all groups). In the present research, three reliability indices were computed: ICC(1), ICC(2) and eta-squared. They are reported in Table 3.11.

Construct	ICC(1)	*F*	*p*	ICC(2)	Eta-squared
Climate for implementation	0.13	1.68	0.04	0.41	0.63
Compatibility	-0.06	0.74	0.86	-0.36	0.36
Project slack	0.29	2.84	0.00	0.65	0.56
Implementation effectiveness	0.25	2.52	0.00	0.60	0.75
Innovation effectiveness	0.20	2.09	0.01	0.52	0.68
Reinvention	0.36	3.51	0.00	0.72	0.81
Fidelity	0.35	3.41	0.00	0.71	0.71

Note: *F*= value of the F-test. *p* = Level of significance of the F-test.

Table 3.11: Indices of reliability

The first index of reliability computed is the ICC(1) (Bartko, 1976; James, 1982), also known as ICC(1,1) (Shrout & Fleiss, 1979). ICC(1) is a measure of within-group reliability, which is conceptualized as the ratio of between-group variance to total variance. Notably, this index, which is not biased by the number of units in the sample, can be interpreted as indicating the extent to which the variability in the measure is predictable from group membership (Bryk & Raudenbush, 1982). The ICC(1) can be computed from a one-way random effects ANOVA using this formula:

ICC(1) = MSB - MSW / MSB + [(k-1)* MSW] , where k represents group size.

Since the present study had varying group sizes, a formula suggested by Blalock (1972) was used to calculate k for unequal groups.

The statistical significance of ICC(1) is based on the *F* - test. In the present sample, statistically significant ICC(1) values were observed for six of the seven constructs (see Table 3.11). The construct of compatibility had a non-significant ICC(1) value of -.06. This occurs in situations where the between-group variance is smaller than the within-group variance (thus leading to a negative numerator in the equation above). This would indicate that individual variability, relative to group mean, is an important source of variability. For the construct of compatibility (measured by items such as "The innovation is compatible with my beliefs about treatment"), it is not surprising that there exists high within-group variance. The key informants included not only employees from varied positions (including clinical directors, doctors and case managers), but also employees who varied in their involvement with the project. Further, it can also be argued that since all the projects included in the present study have already made decisions to adopt the innovation, between-group variance is likely to be low for the perceived compatibility with the innovation. Given the nature of this construct and its high agreement index (presented in the next section), the low ICC(1) value does not seem contraindicative to aggregation.

The average ICC(1) value across all seven constructs was .22. Thus, on average, 22% of the variance in individual responses can be explained by project membership. This compares favorably with other empirical studies with multilevel data (James, 1982; Ostroff, 1992; Schneider, Smith, Taylor & Fleenor,

1998). Notably, Klein, Conn and Sorra's (2001) study reported an average ICC(1) of .20.

The second index of reliability computed is the ICC(2) (Bartko, 1976; James, 1982), also referred to as ICC(1,k) (Shrout & Fleiss, 1979). The ICC(2) provides an estimate of the reliability of the aggregated group means in a sample and addresses the issue of how reliably organizations can be differentiated based on the aggregated measure scores. ICC(2) was computed for this study using the Bartko (1976) formula as well as the Spearman-Brown Formula, suggested by Shrout & Fleiss (1979).

Bartko: ICC(2) = MSB-MSW/MSB

Spearman-Brown: ICC(2) = k (ICC(1)) / 1 + (k-1) ICC(1)

In the present study, both values are identical. Glick (1985) recommended .60 as the cutoff for ICC(2) values. As seen in Table 3.11, four of the seven constructs had ICC(2) values above the cutoff (ranging from .60 to.72). Since ICC(2) is a function of ICC(1) and unit size (Bliese, 2000), the larger the number of individuals sampled per unit, the higher the ICC(2) and the more reliable the aggregated means. Given that the mean number of individuals sampled per unit in the present study was relatively low (4.44), the obtained ICC(2) values were considered adequate.

The third reliability index commonly reported in multilevel studies in the organizational literature is the eta-squared, which has been equated to the ICC(1) (Drexler, 1977; James, 1982; Glick, 1985). Like the ICC(1), it provides an indication of the extent to which individual responses vary as a function of group

membership, and like the ICC(1), it is calculated from a one-way random effects ANOVA, using this formula:

Eta-squared: $SS_{Between}/ SS_{Total}$

In the present study, eta-squared values ranged from .36 to .81. The significance of the eta-squared is tested using the same F-test as the ICC(1). As seen in Table 3.11, six of the seven constructs were significant, thus mirroring the findings from the ICC(1). Unlike ICC(1), the magnitude of the eta-squared is highly dependent on the size of the groups in the sample. It has been emphasized that when group sizes are small (as in this case), eta-squared values are inflated relative to the ICC(1). Thus it would be inappropriate to compare eta-squared values with other studies without accounting for sample sizes.

Agreement

Agreement indices estimate the degree to which ratings from individuals are interchangeable; i.e., the degree to which raters provide essentially the same rating. Establishing adequate agreement would indicate that individuals are homogenous with respect to the construct. Agreement is examined for each measure for each unit (Kozlowski & Klein, 2000), which is a construct-by-unit approach.

The most frequently used agreement index in the organizational literature is $r_{wg,}$ which compares the amount of within-group agreement that exists in a group with a null distribution (or the amount of agreement that would be expected by chance). If the within-group agreement is greater than what would be

expected by chance, then the members are considered to have high levels of agreement, and aggregation of lower level data to the level of the group is justified. James, Demaree and Wolf (1984; 1993) suggested that the observed within-group variance be compared to the expected random variance that would be observed if responses from group members formed a uniform distribution. Uniform distribution is the distribution that would be formed if group members provided the same number of responses for each response category. However, the problem with the uniform distribution is that it assumes no bias in responses, which is very rare in practice. Usually, raters show a restricted use of the response scale. Comparing this to a uniform distribution would make it seem that raters agree more than they actually do. Lindell and his colleagues (Lindell & Brandt, 1999; Lindell, Brandt & Whitney, 1999) proposed an alternative distribution. They proposed that the lower bound for the r_{wg} index be determined by the variance of a maximum variance distribution (S^2MV) which is a bipolar distribution having half of the cases in the highest category and the other half in the lowest category. They also suggest using a chi-square test to test the r_{wg} values for statistical significance, using a two-tailed test.

R_{wg} was computed using the Lindell approach for each of the 21 scales, for each project (n = 50). All r_{wg} values are reported in Appendix F.

Measure	Mean r_{wg}
1. Access to Training	0.92
2. Freedom to Express Doubts	0.89
3. Goal Clarity and Communication	0.88
4. Rewards	0.77
5. Removal of Obstacles	0.88
6. Monitoring of Progress	0.81
7. Top Management Support	0.79
8. Compatibility	0.90
9. Resources to Support Implementation	0.87
10. Ongoing Slack	0.84
11. Capacity to Manage Risks	0.93
12. Assimilation	0.86
13. Plan to Persist	0.93
14. Organization Satisfaction with Implementation	0.84
15. Innovation Effectiveness on Clients	0.92
16. Innovation Effectiveness on Organization	0.92
17. Consequences of Implementation	0.91
18. Effect on Clients, Staff and Organization	0.90
19. Overall Impact of Innovation	0.89
20. Extent of Reinvention	0.91
21. Beliefs about Maintaining Fidelity	0.91

Table 3.12: Mean r_{wg} per scale across 50 projects.

The summary findings for r_{wg} for the scales are reported in Table 3.12. As seen, the mean r_{wg} values by scale, across projects ranged from .77 to .93, with an overall mean r_{wg} value of .88. All mean r_{wg} values are above the generally acceptable level of .70 (George, 1990) thus demonstrating acceptable within-group agreement.

The mean r_{wg} for the fifty projects (across the 21 scales) are reported in Table 3.13. The r_{wg} values ranged from .72 to 1.00, with an overall mean of .89. Again, the r_{wg} values demonstrate acceptable within-group agreement. Additionally, the chi-square test was conducted for each of the 1050 r_{wg} values (21 measures * 50 projects). Overall, they were acceptable. Only three projects had non-significant chi-square values for more than six scales. Thus, it was that established that individuals within a project were homogenous with respect to the constructs of interest.

Both the reliability [(ICC(1), ICC(2) and eta-squared] and agreement indices (r_{wg}) have demonstrated that there was sufficient justification to aggregate individual level responses to the project level. Consequently, for each project, the score for each of the seven constructs in the model was obtained by computing the average of the key informants' responses. After aggregating to the project level, 42 projects had valid data on all the seven constructs. Missing data can be attributed to the following reasons: First, due to the matching of the scales to the respondents' role and expertise, some key informants were not asked to provide information on some measures. Second, some key informants

Project	Mean r_{wg} by project
1	0.94
2	0.96
3	0.79
4	0.83
5	0.78
6	0.96
7	0.86
8	0.89
9	0.85
10	0.95
11	0.97
12	0.96
13	0.92
14	0.92
15	0.97
16	0.85
17	0.91
18	0.90
19	0.97
20	0.79
21	0.78
22	0.94
23	0.81
24	0.95
25	0.95
26	0.95
27	0.92
28	0.93
29	1.00
30	0.90
31	0.92
32	0.91
33	0.81
34	0.84
35	0.90
36	0.72
37	0.88
38	1.00
39	0.80
40	0.79
41	0.74
42	0.93
43	0.93
44	0.92
45	0.87
46	0.95
47	0.89
48	0.72
49	0.75
50	0.89

Table 3.13: Mean r_{wg} per project across 21 scales.

declined to give information on measures that they did not feel qualified to answer. Finally, as stated earlier, the construct score at the individual level was computed only for those cases, where there was valid data for at least half of all the items that comprised the construct. The number of projects with missing data for each construct ranged from none to four, and hence was not considered to be a serious problem. For each construct, missing data was replaced using the sample mean for the construct. The intercorrelations among the model constructs are reported in Table 3.14. The intercorrelations among all the measures are reported in Appendix G.

	1.	2.	3.	4.	5.	6.
1. Climate for implementation	--					
2. Compatibility	.31***	--				
3. Project slack	.59***	.31***	--			
4. Implementation effectiveness	.76***	.26**	.54***	--		
5. Innovation effectiveness	.75***	.30***	.28**	.58***	--	
6. Reinvention	-.62***	-.21	-.47***	-.46***	-.47***	--
7. Beliefs about maintaining fidelity	.23	-.12	.29**	.30***	.15	-.29**

Note: $N = 50$. ** $p < .05$. *** $p < .01$ (All tests are one-tailed)

Table 3.14: Intercorrelations of model constructs

Hypotheses Testing

In general, Pearson's *r* and multiple regression analyses were used to test hypotheses. Each hypothesis and the findings related to it are discussed below.

Antecedents of Implementation

Hypothesis 1 posited that organizational climate for implementation would be positively related to implementation effectiveness. The bivariate correlation (see Table 3.14) show that climate for implementation was indeed positively and significantly correlated with implementation effectiveness ($r = .76$, $p < .01$). Thus, hypothesis 1 was strongly supported.

Hypothesis 2 predicted that compatibility would be related to implementation effectiveness. As predicted, compatibility was significantly positively correlated with implementation effectiveness ($r = .26$, $p < .05$; Table 3.14). Thus, the data support hypothesis 2.

Hypothesis 3 predicted that project slack would be significantly related to implementation effectiveness. As reported in Table 3.14, project slack was positively correlated with implementation effectiveness ($r = .54$, $p < .01$), demonstrating support for hypothesis 3.

Thus, all three independent variables, climate for implementation, compatibility and project slack were individually shown to be significantly related to implementation effectiveness. Additional analysis using stepwise regression was conducted to investigate the relative usefulness of each of these variables in predicting implementation effectiveness. The results of the stepwise regression are presented in Table 3.15.

	β	F	df	R^2
DV: Implementation effectiveness		65.19***	1,48	.58
Climate for implementation	.76***			
Compatibility (Excluded)	.02			
Project slack (Excluded)	.15			

Note: N = 50. β = the standardized regression coefficient for the variable in the step in which it was entered. F= value of the F-test. df = degrees of freedom. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation.
*p < .10 **p < .05 ***p < .01

Table 3.15. Stepwise regression analysis of implementation effectiveness on climate for implementation, compatibility and project slack.

The stepwise regression analysis retained only climate for implementation in the model as significantly related to implementation effectiveness, explaining 58% of the variability in implementation effectiveness (β = .76, F(1,48) = 65.19, p < .01). Both compatibility (β = .02, p = .826) and project slack (β = .15, p = .209) are excluded from the model, as they do not explain any significant additional variability. Thus, it was concluded that of the three independent variables, climate for implementation accounts for the most unique variance in implementation effectiveness.

Consequences of Implementation

Hypothesis 4 predicted that implementation effectiveness would be positively related to innovation effectiveness. As shown in Table 3.14, the bivariate correlation between implementation effectiveness and innovation effectiveness was .58 (p < .01), thus supporting hypothesis 4.

Hypothesis 5 proposed that the relationship between implementation effectiveness and innovation effectiveness would be moderated by the extent of reinvention. To test this, moderated regression analysis was conducted, the results of which are presented in Table 3.16.

Step	Variable entered	β	R^2	ΔR^2
1	Implementation effectiveness	.58***	.34	--
2	Reinvention	-.26**	.39	.05
3	Implementation effectiveness X Reinvention	-.04	.39	.00

Note: The dependent variable is Innovation Effectiveness. N = 50. β = the standardized regression coefficient for the variable in the step in which it was entered. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation. $\triangle R^2$ = the incremental variance accounted for by all the predictor variables entered at each step. **p < .05. ***p < .01

Table 3.16. Hierarchical regression of innovation effectiveness on implementation effectiveness, reinvention, and the interaction term.

At the first step, innovation effectiveness was regressed on implementation effectiveness. Implementation effectiveness was significantly related to innovation effectiveness, explaining 34% of its variance (β = .58, F(1,48) = 24.68, p < .01). At the next step, reinvention was entered. Reinvention was also significantly related to innovation effectiveness, explaining an additional 5% of its variance (β = -.26, F (2,47) = 15.18, p < .05). At the third step, the product of implementation effectiveness and reinvention was entered as

the interaction term in the regression equation. The interaction term was not significantly related to innovation effectiveness (β = -.04, F (3,46) = 9.97, p > .10). Thus hypothesis 5, which predicted that the relationship between implementation effectiveness and Innovation effectiveness would be moderated by the extent of reinvention, was not supported.

The analyses did however, reveal that reinvention had a significant main effect on innovation effectiveness, above and beyond the influence of implementation effectiveness (β = -.26, p < .05). This negative coefficient along with the statistically significant negative bivariate correlation between reinvention and implementation effectiveness (r = -.47, p < .01; Table 3.14) indicates that the more the extent of reinvention, the less the benefits of the innovation are attained.

Reinvention and Fidelity

Hypothesis 6 stated that the effect of reinvention on innovation effectiveness would be moderated by the perceived need to maintain fidelity to the original innovation. As shown above, reinvention was significantly negatively associated with innovation effectiveness. To test if beliefs about the necessity to maintain fidelity to the original model moderate this relationship, hierarchical regression analysis was conducted, the results of which are presented in Table 3.17.

Step	Variable entered	β	R^2	ΔR^2
1	Reinvention	-.47***	.22	--
2	Beliefs about Maintaining Fidelity	.01	.22	.00
3	Reinvention X Beliefs about Maintaining Fidelity	-.23*	.27	.05

Note: The dependent variable is innovation effectiveness. $N = 50$. β = the standardized regression coefficient for the variable in the step in which it was entered. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation. ΔR^2 = the incremental variance accounted for by the predictor variables entered at each step. *$p < .10$. **$p < .05$. ***$p < .01$

Table 3.17: Hierarchical regression of innovation effectiveness on reinvention, beliefs about maintaining fidelity, and the interaction term.

On the first step, the dependent variable, innovation effectiveness was regressed on reinvention. Reinvention was significantly related to innovation effectiveness, explaining 22% of its variance ($\beta = -.47$, F (1,48) = 13.62, $p < .01$). At the next step, beliefs about maintaining fidelity was added. It did not explain any significant additional variance ($\beta = .01$, F (2,47) = 6.67, $p > .10$). Finally, on the third step, the product of reinvention and beliefs about maintaining fidelity was added to test the interaction effect. As Table 3.17 shows, the interaction term was significant ($\beta = -.23$, F (3,46) = 5.77, $p < .10$) indicating that beliefs about maintaining fidelity moderates the relationship between reinvention and innovation effectiveness. The data support hypothesis 6.

In order to better understand the nature of the interaction, the interaction was graphically plotted using recommendations provided by Aiken and West (1991) and is represented in Figure 3.1.

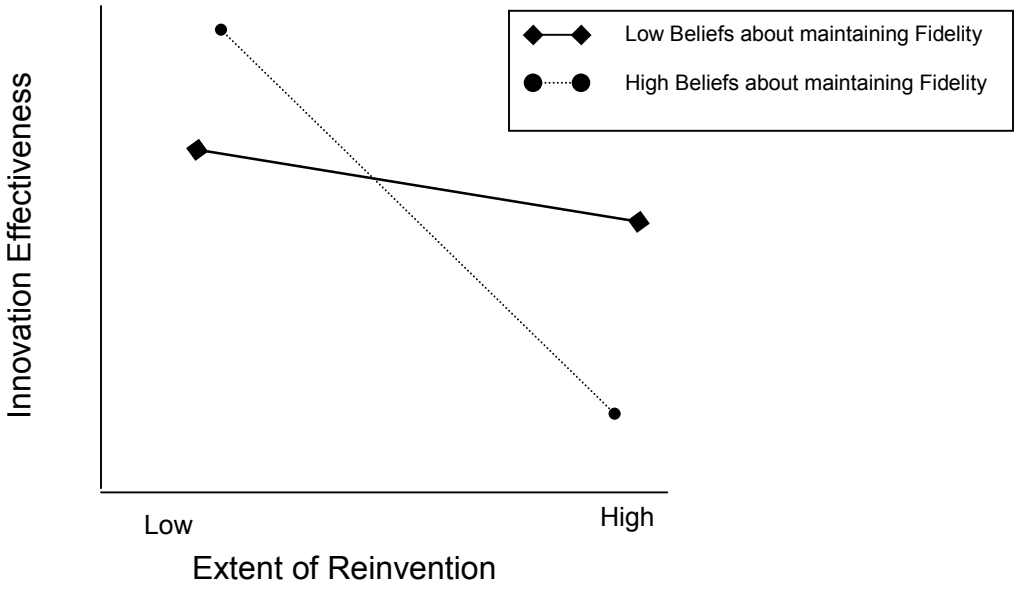

Figure 3.1: Graphical representation of the interaction of reinvention and beliefs about maintaining fidelity with innovation effectiveness as the dependent variable.

The regression slopes of innovation effectiveness on reinvention were plotted for two levels of beliefs about maintaining fidelity (one *SD* above the mean and one *SD* below the mean). At each of these two levels, the simple slope was anchored by using two values of reinvention (one *SD* above the mean and

one *SD* below the mean) and computing the regression equation derived from the results of the regression analyses reported in Table 3.17.

As shown in Figure 3.1, as predicted, a strong negative relationship was revealed between reinvention and innovation effectiveness when beliefs about maintaining fidelity were high. In other words, greater reinvention was associated with lower innovation effectiveness and lower reinvention was associated with higher innovation effectiveness. With respect to the condition of low perceived need to maintain fidelity, it was proposed that reinventing under these conditions might lead to increased fit and therefore better outcomes (than not reinventing). However the data showed that relationship is also negative, although less strongly negative than when beliefs about maintaining fidelity are low, as indicated by the flatter slope.

To summarize, all three independent variables (climate for implementation, compatibility and project slack) were found to be significantly and positively related to implementation effectiveness. Interestingly, only climate for implementation was a significant predictor when all three variables were entered as predictors of implementation effectiveness using a step-wise regression. As predicted, implementation effectiveness was related to innovation effectiveness, although contrary to the hypothesis, this relationship was not moderated by reinvention. Reinvention was negatively related to innovation effectiveness and this relationship was moderated by the perceived beliefs about maintaining fidelity to the original innovation. The nature of the interaction indicates that the relationship between reinvention and innovation effectiveness

is strongly negative when beliefs about maintaining fidelity are high, and less strongly negative when beliefs about maintaining fidelity are low.

Overall Mediation

Hypotheses 7, 8 and 9 proposed that implementation effectiveness would mediate the effect of climate for implementation, compatibility and project slack, respectively on innovation effectiveness. Overall mediation relationships in the proposed model were tested using hierarchical regression analyses. Baron and Kenny (1986) proposed a four-step approach in which several regression analyses are conducted and significance of the coefficients is examined at each step. The four steps as recommended by them are as follows.

Step 1: Regress the dependent Variable (Y) on the independent variable (X). This regression equation estimates path *c*, the total effect (both direct and indirect) of X on Y. A significant coefficient would establish that there is an effect that may be mediated.

Step 2: Regress the mediator, M on the independent variable (X). This regression equation estimates path *a*, and establishes that the independent variable is correlated with the potential mediator.

Step 3: Regress the dependent variable (Y) on the mediator (M). This regression equation estimates path *b*, and establishes that the mediator predicts the dependent variable.

Step 4: Finally, regress the dependent variable (Y) on both the independent variable (X) and the potential mediator (M). This regression equation estimates *c*', (the effect of the independent variable on the dependent

variable when the mediator is also included as a predictor) and estimates path b' (the effect of the mediator on the dependent variable when the independent variable is also included as a predictor). The coefficients for the independent variable and the mediator in this regression equation are thus estimates of the partial direct effects of X and M, respectively on Y.

Evidence for mediation is seen in Step 4 if path *b*' (partial direct effect of the mediator on the dependent variable) is significantly greater than zero, and if *c*' (partial direct effect of the independent variable) is significantly less than *c* (total effect of the independent variable on the dependent variable). In other words, this would be evidence that a significant part of the total effect of X on Y is through the mediator. If path *c*' is non-significantly different from zero, results are consistent with a full mediational model. If path *c*' is still significant, the model is consistent with partial mediation. Figure 3.2 graphically represents the paths estimated in this series of regressions to test a mediation model.

The approach delineated above was followed in testing mediational models for each of the three independent variables (climate for implementation, compatibility and project slack), i.e., whether their effect on the dependent variable (innovation effectiveness) would be mediated by implementation effectiveness.

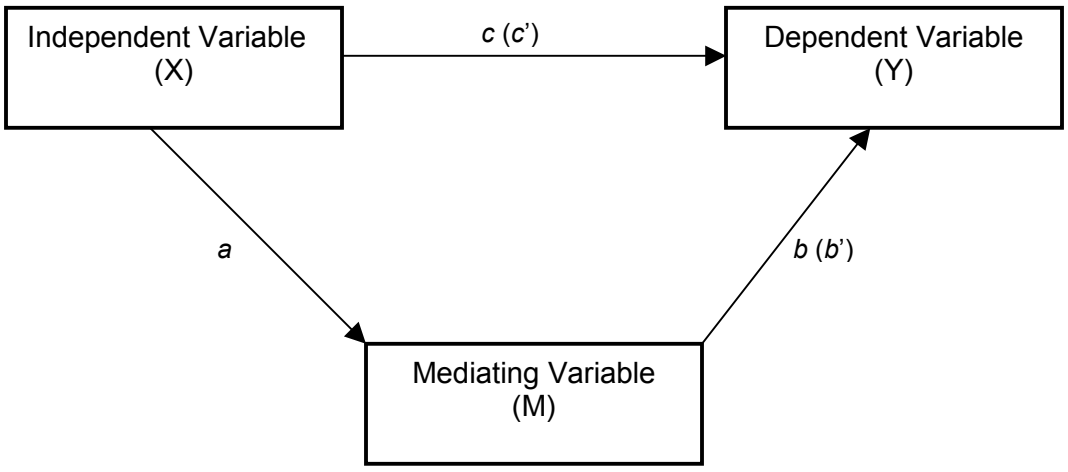

Figure 3.2: Graphical representation of a mediation model indicating total effects and partial direct effects of the independent variable and the mediating variable on the dependent variable.

Step 3 requires that the potential mediator be related to the dependent variable. In this case, the relationship of the potential mediator, implementation effectiveness with the dependent variable, innovation effectiveness has already been established (β = .58, F (1,48) = 24.68, p < .01).

Climate for Implementation – Innovation Effectiveness.

Table 3.18 reports the findings of the regression analyses relevant to the mediational model examining the role of implementation effectiveness in mediating the effect of climate for implementation on innovation effectiveness (Hypothesis 7). There was a significant relationship between climate for

			β	F	df	R^2
Step 1		DV: Innovation effectiveness		62.21***	1,48	.56
	path *c*	Climate for implementation	.75***			
Step 2		DV: Implementation effectiveness		70.99***	1,48	.60
	path *a*	Climate for implementation	.76***			
Step 3		DV: Innovation effectiveness		24.68***	1,48	.34
	path *b*	Implementation effectiveness	.58***			
Step 4		DV: Innovation effectiveness		30.50***	2,47	.57
	path *b*'	Implementation effectiveness	.03			
	path *c*'	Climate for implementation	.73***			

Note: N = 50. β = the standardized regression coefficient for the variable in the step in which it was entered. *F*= value of the F-test. *df* = degrees of freedom. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation. *p < .10 **p < .05 ***p < .01

Table 3.18. Regression analyses testing the role of Implementation Effectiveness in mediating the influence of climate for implementation on innovation effectiveness.

implementation and innovation effectiveness (β = .75, p = .000; Step 1). Step 2 revealed climate for implementation was significantly related to implementation effectiveness (β = .76, p < .01). When the mediator was added to the equation, there was a drop in the coefficient for the independent variable, however it continues to be significant (β = .73, p = .000; Step 4). Moreover, it is noted that the influence of the mediator on the dependent variable (path *b*') drops to non-significance (β = .03, p = .842) with the inclusion of climate for implementation. The results of the regression analysis would thus indicate that even though there

was a slight attenuation between path *c* and *c*', the direct effect of climate for implementation on innovation effectiveness is very strong.

In examining possible mediation, the Sobel (1982) test of significance is used to examine whether the indirect effect of the independent variable on the dependent variable (i.e., the influence by means of the mediator, the difference between c and c') was significantly different from zero. In this mediational model, the Sobel *z* value was .20 (*p* = .84). In other words, the indirect effect of climate for implementation via implementation effectiveness on innovation effectiveness is non-significant. Thus Hypothesis 7 was not supported. Figure 3.3 graphically represents the total and partial direct effect of climate for implementation on innovation effectiveness.

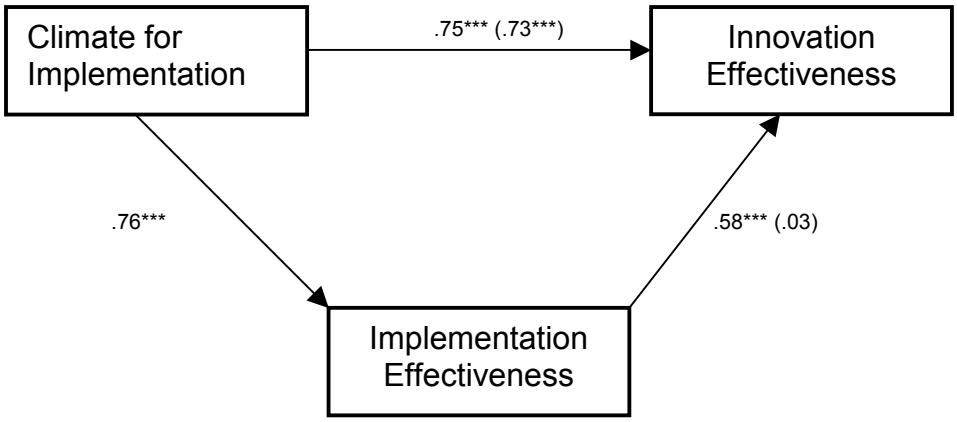

Figure 3.3: Graphical representation of the mediation model indicating total and partial direct effects of climate for implementation and implementation effectiveness on innovation effectiveness.

Compatibility – Innovation Effectiveness

Table 3.19 reports the findings of the regression analyses examining the role of implementation effectiveness in mediating the effect of compatibility on innovation effectiveness (Hypothesis 8). Compatibility was significantly related to innovation effectiveness (β = .30, p = .04; Step 1). Step 2 revealed that compatibility was significantly related to implementation effectiveness (β = .26, p < .10). When both implementation effectiveness and compatibility were used to predict innovation effectiveness (Step 4), the direct effect of implementation effectiveness was statistically significant (β = .54, p = .000) and the direct effect of compatibility reduced to non-significance (β = .16, p = .204), thus consistent with a mediational model.

The significance of the indirect effect of compatibility was tested using the Sobel test. In this model, the Sobel z score was 1.71 (p = .07), which suggests that the indirect effect of compatibility on innovation effectiveness (i.e., the effect via mediation) was significant. Since the findings indicate a non-significant partial direct effect of compatibility on innovation effectiveness and a significant indirect effect through the mediator, it was concluded that there is support for full mediation. Thus, hypothesis 8 was supported. Figure 3.4 represents the total and direct effects of compatibility on innovation effectiveness.

		β	F	df	R^2
Step 1	DV: Innovation effectiveness		4.59**	1,48	.09
path *c*	Compatibility	.30**			
Step 2	DV: Implementation effectiveness		3.42*	1,48	.07
path *a*	Compatibility	.26*			
Step 3	DV: Innovation effectiveness		24.68***	1,48	.34
path *b*	Implementation effectiveness	.58***			
Step 4	DV: Innovation effectiveness		13.34***	2,47	.36
path *b*'	Implementation effectiveness	.54***			
path *c*'	Compatibility	.16			

Note: N = 50. *β* = the standardized regression coefficient for the variable in the step in which it was entered. *F*= value of the *F*-test. *df* = degrees of freedom. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation. * $p < .10$. ** $p < .05$. *** $p < .01$.

Table 3.19: Regression analyses testing the role of implementation effectiveness in mediating the influence of compatibility on innovation effectiveness.

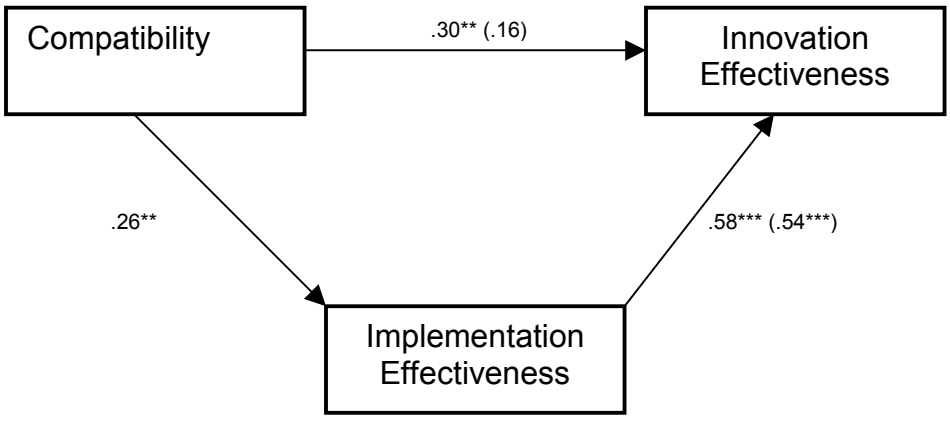

Figure 3.4: Graphical representation of the mediation model indicating total and partial direct effects of compatibility and implementation effectiveness on innovation effectiveness.

Project Slack – Innovation Effectiveness.

The third mediational model examined the role of implementation effectiveness in mediating the effect of project slack on innovation effectiveness (hypothesis 9). Table 3.20 reports the findings of the relevant regression analyses. The effect of the independent variable, project slack on the dependent variable, innovation effectiveness was significant (β = .28, p = .000; Step 1). Step 2 revealed that project slack was significantly related to implementation effectiveness (β = .54, p < .01). When both the potential mediator, implementation effectiveness and the independent variable, project slack, were used to predict the dependent variable of innovation effectiveness (Step 4), it was seen that while implementation effectiveness is significantly related to innovation effectiveness (β =. 61, p = .000), the influence of project slack reduces to non-significance (β = -.05, p = .710).

The Sobel statistic, computed to estimate the significance of the indirect effect, was statistically significant (z = 3.11, p = .001). Since the partial direct effect of project slack on innovation effectiveness was non-significant and the indirect effect was significant, it is concluded that there is support for a full mediational model. Thus, hypothesis 9 was supported. Figure 3.5 represents the total and direct effects of project slack on implementation effectiveness.

			β	F	df	R^2
Step 1	DV: Innovation effectiveness			4.02**	1,48	.08
path *c*	Project slack		.28**			
Step 2	DV: Implementation effectiveness			19.83***	1,48	.29
path *a*	Project slack		.54***			
Step 3	DV: Innovation effectiveness			24.68***	1,48	.34
path *b*	Implementation effectiveness		.58***			
Step 4	DV: Innovation effectiveness				2,47	.34
path *b*'	Implementation effectiveness		.61***	12.19***		
path *c*'	Project slack		-.05			

Note: N = 50. *β* = the standardized regression coefficient for the variable in the step in which it was entered. *F*= value of the *F*-test. *df* = degrees of freedom. R^2 = the proportion of variance in the dependent variable accounted for by all the predictors in the regression equation. *p < .10. **p < .05. ***p < .01.

Table 3.20: Regression analyses testing the role of implementation effectiveness in mediating the influence of project slack on innovation effectiveness.

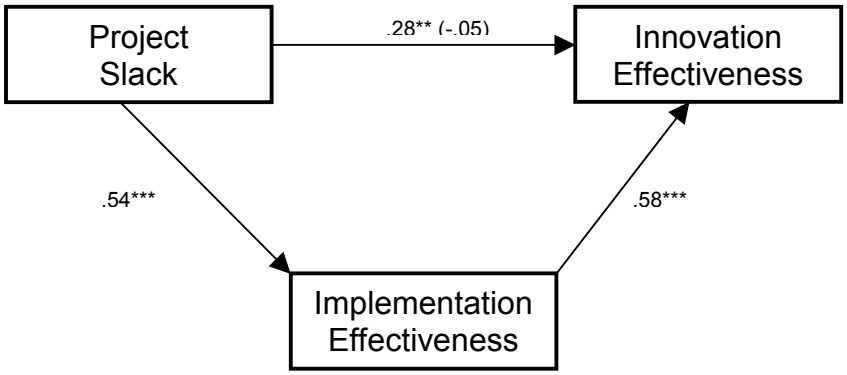

Figure 3.5: Graphical representation of the mediation model indicating total and partial direct effects of project slack and implementation effectiveness on innovation effectiveness.

To summarize, the findings from the mediational analyses show that, for both compatibility and project slack, the effect on innovation effectiveness was completely mediated by implementation effectiveness. However, in the case of climate for implementation, the direct unmediated effect on innovation effectiveness appears to be very strong.

CHAPTER 4

DISCUSSION

The primary purpose of this research was to investigate the antecedents and consequences of innovation implementation. Data gathered from fifty innovation implementation projects in the field of behavioral health care were used to test key linkages in the proposed model of innovation implementation. Data had been gathered from key informants for each project using both surveys and interviews. This chapter will consider the findings of the present research with respect to the proposed model relationships. The implications of the findings are also discussed. Finally, limitations of the study and suggestions for future research are considered.

Review of the Findings

The alternate model, as it emerged after the data analyses, is shown in Figure 4.1. It was proposed that climate for implementation, compatibility and project slack would each explain significant variability in implementation effectiveness. Support was found for all three proposed linkages and each independent variable was significantly related to implementation effectiveness.

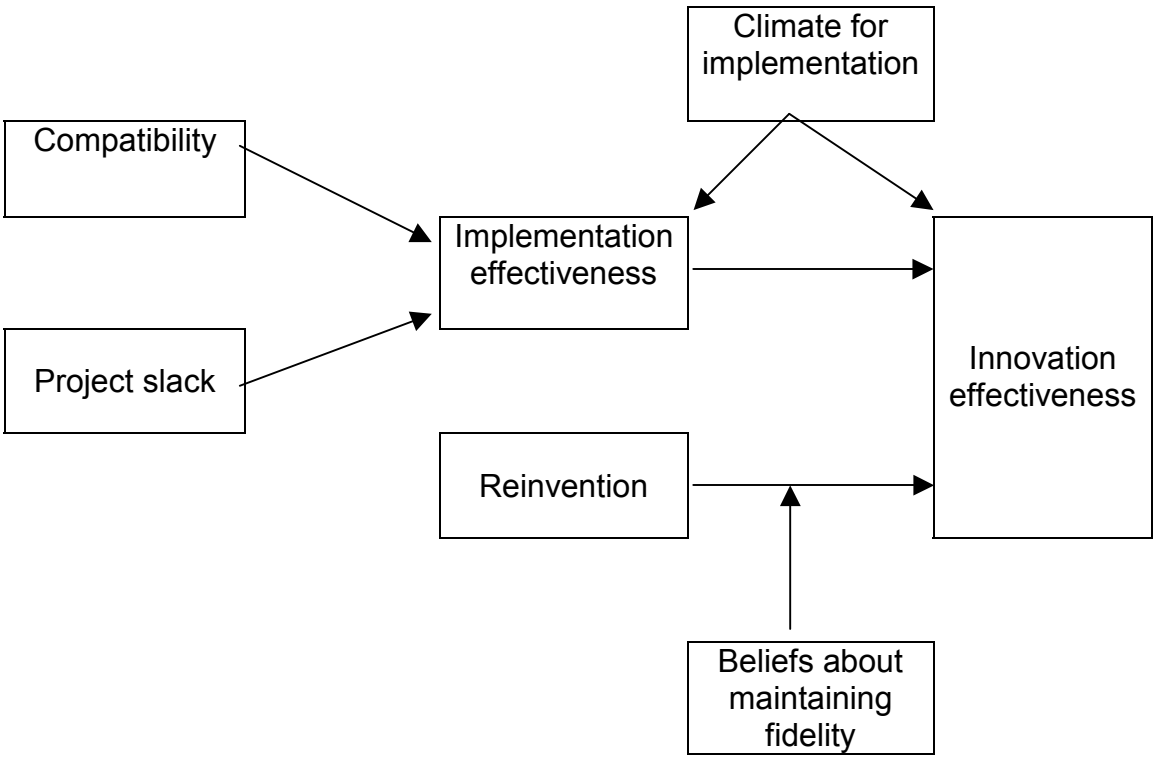

Figure 4.1: Revised model of Innovation Implementation

Of the three, climate for implementation explained the most unique variance in implementation effectiveness. Neither compatibility nor project slack explained significant variance above and beyond that explained by climate for implementation.

It was proposed that the two outcomes of the innovation implementation process, i.e., implementation effectiveness and innovation effectiveness would be related to each other. Findings did show that the successful implementation of

an innovation is associated with realizing the benefits of the innovation. Further, extent of reinvention was hypothesized as a potential moderator of the relationship between implementation effectiveness and innovation effectiveness. This was not supported by the data.

It was also proposed that the relationship between reinvention and innovation effectiveness would be moderated by the strength of the beliefs about maintaining fidelity to the original model. Data analyses showed that reinvention was significantly negatively related to innovation effectiveness. Results also showed that this relationship was less strongly negative when beliefs about maintaining fidelity were low.

Lastly, mediational analyses were conducted to see if implementation effectiveness mediated the individual relationships between the three predictor variables (climate for implementation, compatibility and project slack) and innovation effectiveness. Hierarchical regression analyses indicated that implementation effectiveness mediated the effect of compatibility and project slack on innovation effectiveness. However, climate for implementation had a strong direct and unmediated effect on innovation effectiveness.

The revised model (Figure 4.1) thus has two key differences from the proposed model (Figure 1.7). First, reinvention was not found to moderate the relationship between implementation effectiveness and innovation effectiveness. Second, implementation effectiveness did not mediate the effect of climate for implementation on innovation effectiveness. Another interesting finding was that compatibility and project slack did not explain any significant variability in

implementation effectiveness above the variance explained by climate for implementation. The next section considers these specific results and possible explanations.

Lack of Support for Moderation Effect of Reinvention

The lack of support for reinvention moderating the relationship between implementation effectiveness and innovation effectiveness was particularly disappointing, because finding a significant moderator effect would have been important for clarifying a key issue in the research model and the innovation literature. Klein and Sorra (1996) make a strong argument for distinguishing the outcomes of implementing an innovation into two categories. The conceptual difference between the two categories of outcomes has been clearly explicated; implementation effectiveness is the successful implementation of the innovation, whereas innovation effectiveness is the successful gain of the benefits of the innovation. In practice, this distinction is of particular importance, as often organizations find that even after innovations are implemented as planned, the benefits of the innovation are not gained. It was hypothesized in the present study that one of the reasons for this disconnect in the relationship was the extent to which organizations modify or selectively implement components of the innovation. If supported, the findings would have provided empirical support for the argument for separating the two outcomes of innovation implementation. However, this hypothesis was not supported by the data.

One reason to consider is range restriction on focal variables, which could explain why the hypothesized relationship was not supported. However, this

does not appear to be the case in this study. Another reason for the lack of a significant moderated relationship may be the modest sample size. It is possible that with a larger sample size, the study might have revealed reinvention to significantly moderate the relationship between implementation effectiveness and innovation effectiveness.

Lack of Support for Mediation Model Relating to Climate for Implementation

The other hypothesis that was not supported in this study predicted that implementation effectiveness would mediate the effect of climate for implementation on innovation effectiveness. It is of interest to note, that Klein, Conn and Sorra (2001) also found that their prediction that implementation effectiveness would mediate the relationship between the two antecedent variables, implementation climate and implementation policies and practices (they had separated the two constructs) and innovation effectiveness was not supported. However, in their case, they did not find a significant relationship between implementation effectiveness and innovation effectiveness, after accounting for the control variables. In contrast, in the present study, climate for implementation is strongly related both to implementation effectiveness and innovation effectiveness, and although the effect of climate for implementation reduces when the potential mediator is introduced, the direct effect is still significant.

It is possible that when employees experience a strong supportive climate for the implementation of an innovation, they perceive that they are obtaining the benefits (to clients and the organization), irrespective of the actual

implementation success (for example, whether it is well assimilated or not). This could explain the strong direct, unmediated effect between climate for implementation and innovation effectiveness.

Findings of Stepwise Regression Analyses

The findings of the stepwise regression analyses merit a closer look. Regressing innovation effectiveness on climate for implementation, compatibility and project slack showed that compatibility and project slack did not explain any additional variability above the variance explained by climate for implementation.

With respect to project slack, an argument may be made that although conceptualized as a construct distinct from climate for implementation, project slack (as measured by items such as 'How would you describe the resources made available by this organization to support the implementation of this project compared to what is needed?') could be considered as indicative of a supportive climate for implementation (measured by items such as, 'To what extent does management ensure that everything necessary for the implementation of the innovation (space, training, clerical assistance etc) is made available to the staff?') . Indeed the bivariate correlation between project slack and climate for implementation was significant ($r = .59$, $p < .01$). Additionally, collinearity diagnostics revealed that a high proportion of the variances of their regression coefficients are associated with the same eigenvalue (.72 and .80 respectively), thus indicating dependency.

Compatibility, the extent to which the innovation is compatible with the organizational values (as measured by items such as, 'The innovation is

compatible with the treatment philosophy in this organization') however, is more clearly conceptually different from both climate for implementation and project slack. Although collinearity indices (tolerance, variance inflation factor and variance proportions) did not indicate any significant problems, bivariate correlations revealed significant associations between compatibility and climate for implementation ($r = .31$, $p < .01$) and between compatibility and project slack ($r = .31$, $p < .01$), which may be some indication of dependence.

It should be noted that there was no prior theoretical reasoning or empirical evidence to suggest the relative strength of these predictors. Based on these results, it is concluded that of all the three antecedent variables to implementation effectiveness considered in this model, climate for implementation is the most powerful predictor.

Findings Related to Reinvention

The negative relationship between reinvention and innovation effectiveness has been interpreted to mean that reinvention has a detrimental effect on the organization's ability to gain the benefits of the innovation. However, given that, both reinvention and innovation effectiveness were measured at the same time in the given study, it is also a possible explanation that organizations that were not adequately gaining the benefits of the innovation engage in modifying the reinvention in order to increase the likelihood of gaining the benefits. Further, although these relationships were not hypothesized a priori, the strong negative correlations between reinvention and other constructs merit further attention. Specifically, strong negative correlations were observed

between reinvention and climate for implementation (r = -.62), and reinvention and project slack (r = - .47). Given that the antecedent variables were measured prior to the measures of reinvention, this would seem to suggest that when innovation projects do not have the benefit of a support climate for implementation, or slack financial resources, they are more likely to be reinvented.

Implications of the Findings

Climate for Implementation.

Climate for implementation was operationalized as a composite construct, an amalgamation of all the policies and practices that the management has in place in order to facilitate a specific implementation effort. Some examples of these policies/practices are access to training, top management support, reward mechanisms for those involved in the implementation, removal of obstacles in implementation etc. In the present study, data was obtained from individual employees and then aggregated to the level of the project based on reliability and agreement indices. Hence, climate for implementation is a shared construct that emerges from the extent to which individual members perceive the organization and the management as being supportive of the implementation effort. This study shows that the collective perceptions of a supportive climate for the implementation of a specific innovation will influence the actual implementation and success of the innovation. This finding is consistent with the results of the study by Klein, Conn & Sorra (2001) using the same conceptual

definition of climate for implementation, albeit using different operationalizations of the construct.

This finding provides insights about the actionable aspects of the implementation processes that have implications for successful implementation outcomes. For example, there are specific actions that an organization can take (send members to training, provide technical resources, track the progress of the innovation) that will provide the cues that convey to organizational members that there is support for the project. It should be pointed out that the findings indicate that organizations/managers should focus their efforts on improving the overall supportive climates (or, more precisely the perception of supportive climates). Following the construct definition of Klein and Sorra (1996), the relative effects of individual policies/practices were not delineated in this study. Indeed, it is offered that the feasibility and efficacy of specific actions/policies may differ from organization to organization (depending on structure, capabilities and needs) and also from innovation to innovation. As such, organizations may want to obtain feedback from their employees on which specific changes are perceived as support for the innovation. For example, in an organization implementing a technical innovation, providing access to a support call center or help-line may increase the perception of support. For another organization, this may not be as effective as providing rewards for embracing and implementing an innovation.

Compatibility.

The relevance of investigating compatibility, the fit of an innovation with the values of the organization and its staff, was particularly emphasized in the

context of this study, i.e., innovations in behavioral health care. By their very nature, each of the four innovations is clearly based on a distinct philosophy and requires significant commitment towards that philosophy. To illustrate with a specific example, the SAMI innovation is a program that is designed to provide integrated treatment for those consumers in the mental health care system who are dually diagnosed with substance abuse and mental illness. The alternative and traditional treatment model in the mental health care system involves assigning dually diagnosed consumers to two independent treatment streams - one focusing on mental illness and the other addressing substance abuse, each contained in two different arms of the State mental health system. To implement SAMI successfully, an organization and its employees would have to fundamentally buy into its core principles, one of which is harm reduction. If case managers and organizational treatment philosophies have been firmly rooted in the opposing principle of abstinence (consistent with the alternative model of treatment), then considerable training and persuasion is essential to obtain the support and commitment of the implementers. If this does not occur or fails, the resultant incompatibility between the innovation and the values in the organization will adversely affect the implementation of the innovation. As mentioned earlier, the interviews yielded extensive qualitative data in the IDARP study. Below is a quote from one implementer at an organization implementing SAMI which addresses the issue of compatibility.

> "Implementation will require a culture shift - from just treating mental health to being aware of both mental health and substance abuse. I think most of the people that were appalled by it are gone. When you commit to a particular method, and if you stay single-minded about it- people either fall in line or they go away. So people who were key to making it successful, they've either adapted or left. A couple of the therapists were much more traditionally trained who had a hard time with this - they were from the old school. Those people aren't here, anymore".

In the present study, the findings did indeed show that, in general, the compatibility of the innovation with the training and treatment philosophy in the organization was significantly associated with implementation effectiveness. This would imply that organizations would need to assess compatibility and actively address it in order to ensure effective implementation.

Project Slack

Klein, Conn and Sorra (2001) had reported the importance of financial resources on the quality of an organization's policies and practices, which in turn was related to implementation outcomes. The present study extends upon that finding by showing a significant direct effect of project slack on implementation effectiveness. Project slack, while often related to overall organizational slack, may not be synonymous with it. For example, an affluent organization may not set aside buffer resources for a particular innovation project, either due to poor planning or because the project is lower in the strategic hierarchy of priorities. On the other hand, a more moderately prosperous organization may make a decision to concentrate on a particular innovation project and allocate substantial

buffer funds. Thus, organizations can impact the successful implementation of innovations by allocating specific buffer resources such as money or personnel, to support implementation.

Reinvention and Fidelity

One of the most intriguing and unanswered questions emerging in the innovation literature is the issue of reinvention. Simply stated, is reinvention beneficial or detrimental to successful innovation implementation? Innovation developers are concerned that changing a scientifically–developed model will dilute the effectiveness of an innovation. On the other hand, practitioners argue that one size may not fit all and that an over-emphasis on adherence to the model specifications could create a program that may either be irrelevant for the adopting organization, or simply not work because it does not fit well with the existing structure or processes of the organization. Additionally, it has been contended that not modifying an off-the-shelf- innovation could produce resistance among the users of the implementation. Due to the paucity of unequivocal findings in prior studies, the main effect of reinvention on innovation effectiveness was not predicted in the proposed model. Findings showed that reinvention has a significant negative effect on innovation effectiveness. This suggests that in general, reinventing an innovation is detrimental. This is a very exciting finding for the reinvention debate, particularly since this study covers four different innovations, which increases the generalizability of this finding.

As stated earlier, these innovations were chosen for inclusion in the IDARP study in such a way as to maximize variability in various factors, one of

which is the degree to which fidelity or adherence to the model is important. Thus it was possible to test the hypothesis that the perceived need to maintain fidelity to the original conceptualization of the innovation would moderate the relationship between reinvention and innovation effectiveness. Results showed that this hypothesis was supported. When implementers believe that it is necessary to closely adhere to the original specifications of the innovation, maintaining fidelity (low reinvention) is likely to be associated with obtaining the benefits of the innovation, and not maintaining fidelity (i.e. reinventing the innovation) is less likely to lead to obtaining the benefits of the innovation. This relationship is weaker under conditions of low beliefs about fidelity.

Thus, one of the recommendations from the analyses of the reinvention-fidelity relationship it that program developers of innovations should focus on identifying core components of an innovation model that need to be followed precisely for the implementation to yield the purported benefits. Once this is documented and communicated to potential adopters, organizations can make more informed decisions to adopt by evaluating the feasibility of reproducing the core components accurately. Additionally, implementing organizations could legitimately modify the non-core components of the innovation in order to increase receptivity or improve fit, and customize the implementation to the adopting organization, to maximize the benefits of the innovation. Indeed, the observed correlation between reinvention and Beliefs about Fidelity (r = -.29, p < .01) does suggest that in general, when organizations believe Fidelity to be important, they are less likely to engage in reinvention, thus indicating that

communicating the extent to which fidelity needs to be maintained could be an effective strategy.

Limitations

Sample size

Given the nature of the proposed research model, with multiple predictors and analyses involving mediated and moderated relationships, an ideal data analytic strategy would have been to use Structural Equation Modeling (SEM). However this was not feasible given the modest sample size (n = 50). Using SEM may have further clarified the relationships between the key constructs in the model. Additionally causational statements about key relationships could have been stated more emphatically.

Although, the sample size compares favorably with other field studies in the organizational innovation literature (e.g., Klein, Conn & Sorra, 2001, report a sample of 39), it is still modest for other purposes. In the present study, the four innovations have a sample size of ten, twenty six, seven and seven projects each. Thus the study lacked the power to run additional analyses by innovation, in order to capitalize on the variation in innovation characteristics such as extent of evidence available, complexity, ease of use.

Reliability

In the current project, the number of respondents for each project ranged from two to nine, with an average of 4.44 respondents per project. This is substantial given that the data gathering methodology involved personal interviews with respondents, often top executives in the organization, and was

very time and effort intensive. Additionally, by using key informants, it was hoped to maximize the value of the information obtained. However, if there were more respondents per project, the reliability of the aggregated means might have been higher (particularly for constructs like climate for implementation and compatibility), thus increasing the ability to detect relationships.

Control variable

Considering that each organization adopted the innovation at different times, and were contacted at different stages of the innovation cycle, it would have been appropriate to control for the amount of time that the innovation was in place. However, unlike a technological or manufacturing innovation in which the date of implementation is easily identifiable, the actual dates of implementation for the innovations in the context of this study were problematic to identify. In almost every innovation project, the actual commencement of the implementation was gradual as it was slowly integrated and phased into existing programs and processes. Hence it was difficult to measure this variable.

Subjective measures of outcomes

This research study relied on soft data of Innovation outcomes. For example, implementation effectiveness was assessed using items such as “To what extent is the organization satisfied with the progress made towards implementing the new practice?” and innovation effectiveness was measured with items such as “How would you describe the overall impact this practice is having on your organization?” While not without merit, by the very nature of their subjectivity, these measures may not have accurately captured the outcomes of

the innovation implementation. However, this field study also revealed the difficulty of capturing more quantifiable hard data using key informants. For example, one of the measures asked respondents to indicate as accurately as possible, the percentage of clients, staff and organization that was directly and indirectly affected by the innovation. Quite clearly (as witnessed by the author, who participated in the data gathering), respondents were at a loss to report this information. Indeed many respondents, unwilling to be accurate, refused to answer these questions (40% response rate). Hence a decision was made not to use this measure for the present study. A similar issue arose with the measure Time taken from Adoption to Implementation. Because of the very poor response rate (38%), this measure too was not added to statistical analyses. Thus, although an attempt was made to triangulate the soft data using hard data within the self-report methodology, the issue of reliability was a barrier.

Directions for Future Research.

Klein & Sorra (1996) proposed the construct of climate for implementation and also offered that the components of this construct are compensatory, cumulative, and equifinal. This is an intriguing idea with a lot of practical implications. However, this assumption has not been explicitly tested in the present research. Future research may consider this. Additionally, future studies may investigate the influence of other potential predictors of successful innovation implementation, for example, inter-organizational dyads, other innovation characteristics (complexity, empirical evidence), to name a few.

The innovation cycle is indeed a dynamic one. It is quite possible that there could be different antecedents that are relevant to each phase of the innovation cycle. As argued earlier, overall slack could be more relevant to the adoption phase, whereas project-specific slack may explain more variability in implementation. Additionally, the same variable may have different influences on the various phases of innovation implementation. The IDARP study, as it continues to gather data on outcomes of implementation will be able to pursue the analysis of cross-phase effects in further detail.

As discussed earlier, there is a paucity of objective measures of innovation outcomes. Towards the end of clarifying the outcomes of the implementation of innovations, future research efforts should focus on the challenging task of developing and testing valid measures of innovation outcomes that are more objective in nature, yet generalizable across innovations.

Another related issue is clarifying the relationship between implementation effectiveness and innovation effectiveness. Perhaps there are other potential moderators that influence this relationship. For example, it may be argued that for some innovations, the availability of and accessibility to ongoing training and support even after implementation are crucial factors that will determine whether implementation is translated to tangible benefits. Certainly these issues are of great interest both to developers/sellers of innovative technologies as well as potential implementers.

Lastly, given the contingent nature of innovation implementation, this study should be replicated in other industries. Other investigations of innovation

implementation have been predominantly restricted to single innovations in the areas of manufacturing and informational technology. It would be useful to extend the findings of this study in other domains.

Contributions of the Study

Organizational innovation, under the current conditions created by globalization will continue to be a key factor in organizational performance and success. The present study makes significant contributions to the innovation literature.

As noted, innovation research has historically neglected the post-adoption decision processes. There have been "remarkably few attempts to study post-adoption behavior" (Kimberly, 1981, p. 90), that is, behavior and activities following the initial organizational evaluation of an innovation and consequent decision to adopt it. Innovation researchers have called for multi-organizational, multilevel, longitudinal research designs (Klein & Sorra, 1996). To the author's knowledge, this is the first quantitative study of innovation implementation involving multiple organizations and multiple innovations. Additionally, the longitudinal design allowed measurement of antecedents and consequences of innovation implementation, as they occurred, rather than the more common retrospective approach, assessing all relevant variables at one point in time. This increases the value of this study to the literature. Methodologically, using the key informant technology maximizes the validity of the obtained data. Establishing adequate reliability and agreement at the individual level to justify data aggregation, adds to the value of the findings.

The findings of the study enhance our current understanding of innovation implementation. It was shown that projects characterized by a strong climate for implementation, a buffer stack of project-specific resources, and high compatibility of the innovation with the organization's philosophy and training, are more likely to be implemented successfully and, more likely to bear the fruit of the innovation, in terms of actual benefits to clients and affecting the organization's overall functioning and outcomes. The finding that Climate for implementation explains the most variability in implementation effectiveness may be vital for further model building. The role of compatibility has often been investigated with respect to innovation adoption. To the extent of the author's knowledge, the present study is the first empirical investigation of the role of compatibility in successful innovation implementation. The findings related to project Slack (differentiated from overall organizational slack) also build upon the literature and suggests future research directions in the examination of financial resources. Additionally, with the empirical investigation of the role of reinvention and Fidelity, the first ray of light has been thrown on understanding why benefits of innovations may not be achieved despite seemingly successful implementation.

From the practitioner's point of view, little is known about what can influence successful implementation of innovations. It has been suggested that failure of innovations is often not attributable to a problem with the actual innovation, but to deficiencies in its implementation. The results of this study are relevant to organizations considering adopting, or in the process of implementing

innovations. With an understanding of the importance of compatibility and slack to innovation implementation, organizations will be able to better assess their readiness and ability to support a successful implementation before making the decision to adopt an innovation. Once adopted, managers/ organizations can take actions to improve the perception of a supportive climate to influence the successful implementation. Lastly, from the point of view of both implementers and developers, the value of identifying core components of an innovation and communicating this to the implementation users has been indicated.

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APPENDIX A

Interview Protocol for IDARP (Innovation Diffusion and Adoption Research Project)

GREETINGS AND INTRODUCTIONS

1. Hi, I'm ***name*** from _____and this is ***name*** from _____**.**
2. Thanks a lot for agreeing to talk with us.

ABOUT IDARP

1. You may know ODMH is supporting a number of Coordinating Centers of Excellence. CCOES are expected to provide information and technical assistance to organizations that are implementing new clinical practices.

2. A research team whose members are from Decision Support Services, OSU and ODMH is examining how organizations decide to try out and implement new practices. We are part of that team working on IDARP.

3. You may have received a brief summary of the project. Whether you did or not, do you have any questions concerning IDARP?

4. The purpose for our visit is to begin to understand your organization's experience to date with the EBP and the CCOE.

5. All of the information you provide today will be kept confidential and will be used only for the purpose of understanding how organizations adopt new programs and practices.

6. Today, it is my turn to be the lead interviewer; my coworker will be taking notes. (If applicable: Do you mind if _____ takes notes using a laptop?)

ORGANIZATION OF the INTERVIEW

Our interview should take about <u>an hour</u> and is divided into <u>THREE</u> parts:

1. General background about you

2. Telling the "project story" from first hearing about the EBP to getting the project up and running – We are interested in hearing about steps that occurred over this time period

3. A handful of additional structured questions related to the EBP

DO YOU HAVE ANY QUESTIONS BEFORE WE BEGIN?

BACKGROUND QUESTION:

Before talking about the EBP, we'd like a little background information about you (and about your organization)[1].

A. ABOUT YOU

1. Name
2. Job title
3. Years with organization
4. Years in similar positions
5. Formal academic background or training
6. Other information about you or your background that's important to know:

DON'T ASK, BUT INDICATE GENDER AND ESTIMATE AGE

7. *Note: gender: M or F*
8. *Note: approximate age: 20 – 30 31 – 40 41 – 50 51 – 60 61+*

ADD-ON QUESTIONS FOR the AGENCY EXECUTIVES

9. ABOUT HOW MANY PEOPLE DOES YOUR ORGANIZATION EMPLOY?
10. HOW MANY PEOPLE ARE ON the EXECUTIVE MANAGEMENT TEAM?
11. WHAT IS the ORGANIZATION'S APPROXIMATE ANNUAL OPERATING BUDGET?
12. WHAT IS the DEPARTMENTAL STRUCTURE OF THIS ORGANIZATION?
13. WRITTEN MATERIAL AVAILABLE – BROCHURE OR TABLE OF ORGANIZATION? Y OR N?
14. IF YES, WHAT CAN YOU MAKE AVAILABLE TO US?

[1] Use with agency executives only

Part 2: Describing the EBP

A. NOW, LET'S FOCUS ON the IMPLEMENTATION OF the EBP AT YOUR ORGANIZATION…

Question for executive level interviewee: What circumstances led to your initial thinking about the EBP? In other words, is there some history here that may help us understand what lead your organization to consider the EBP in the first place and how the decision to implement it was made?

Question for case manager: Tell me when you first heard about the EBP.

B. WHAT HAPPENED NEXT?

1b- WHEN did that occur (*get approximate date)*?
1c- Can you tell me more or elaborate about that?
1d -WHO was involved in that?
1e- WHAT marked the end of that step/action/decision?
1f - HOW did you know that step was completed?
1g - ABOUT WHEN DID THAT STEP/DECISION/ACTIVITY END? (*get approximate date)*?

IF A DECISION WAS MADE:

1h – How was that decided on?
REPEAT AS NEEDED… What happened next?
See follow-up questions 1b – 1h

AT the CONCLUSION OF the STORY ASK:
Are there any upcoming events on YOUR CALENDAR OR the ORGANIZATION'S CALENDAR that deal with the EBP?

Part 3: Structured Questions

NOW WE'RE AT the 3rd PART OF the INTERVIEW
IT SHOULD ONLY TAKE ABOUT FIFTEEN MINUTES
WE WILL BE ASKING SOME STRUCTURED QUESTIONS ABOUT the EBP.
WE KNOW THAT YOU HAVE MENTIONED MOST IF NOT ALL OF THESE THINGS.
HOWEVER, WE WANT TO BE CERTAIN WE ACCURATELY HEARD YOU, SO WE ARE GOING TO ASK YOU TO MAKE A HANDFUL OF RATINGS OR RANKINGS.

STRUCTURED QUESTIONS

Section 1: The following questions deal with your introduction to the EBP.

Approximately when did you first hear about the EBP?
_____ Month _____ Year (WNHEAR)

2a)You mentioned that you first heard about the EBP from
_____ *(check off boxes below) (INISRC)*
2b1)It sounds like you also received additional information about the EBP from
_____
(check off boxes below) (SRCAD)

2b2) Were there any other sources of additional information? *(check if needed) (SRCAD)*

Audio/video: ___ Radio *(a)* ___ Television *(b)* Written media: ___ Newspaper or lay print medium *(c)* ___ Professional journal *(d)* ___ Technical or academic paper *(e)* ___ Professional association newsletter *(f)* Other (please describe) *(g)* :	Meetings/presentations: ___ Professional association meeting *(h)* ___ Conference presentation *(i)* ___ Class or seminar *(j)* Individual(s): ___ ODMH staff *(k)* ___ CCOE staff *(l)* ___ Colleague(s) within my organization *(m)* ___ Colleague(s) from another organization *(n)* ___ Client(s) served by my organization *(o)* ___ Family member(s) of client(s) *(p)*

3. The next two questions focus on the information that was needed in order to make a decision about whether or not to adopt the EBP. We are interested in how much of that information was provided to you versus how much you had to actively seek out.

a. How much of the information that you needed to make a decision about the EBP was provided to you? (ADINFO)

Please answer on a scale of 1 to 10, where 1 = none of the information and 10 = all of the information. _____

b. How much of the information did you have to actively seek out? (SEEKAD)

Please answer on a scale of 1 to 10, where 1 = not active and 10 = very active. _____

Who was the person at this agency who initiated the discussion about implementing the EBP?
a) _____ (WHOINI)
b) What was his/her formal position in the organization? (INIPOS)
____ Top manager
____ Upper level manager
____ Middle manager
____ First line supervisor
____ Staff person/line worker
____ Support staff

About how much time passed from the "thinking" stage to the decision to adopt the EBP?

_____ Years _____ Months (TMTHNK)

On a scale of 1 to 10, how did the time span between the "initial thinking" and the "decision" to adopt the EBP compare to other planning efforts in this organization? (THNKCM)

Where 1 = much less time and 10 = much greater time

_____ (9 or 10) Much greater than a typical adoption decision
_____ (7 or 8) Greater than a typical adoption decision
_____ (5 or 6) The same as a typical adoption decision
_____ (3 or 4) Less than typical adoption decisions
_____ (1 or 2) Much less than typical adoption decisions

33. Could you tell us again whether it was an individual or group that ultimately made the decision to adopt the EBP at this organization? (WHODEC)

a) (circle one) Individual Group b) Please identify: _____

Please answer all of the following questions on a scale from 1 to 10, where 1 represents “no extent” and 10 represents “great extent.”

Please use the stem along with the sentence for each question. All items in this scale can be answered by using the table below.

No Extent		Small Extent		Moderate Extent		Considerable Extent		Great Extent	
1	2	3	4	5	6	7	8	9	10

To what extent:

did [*the decision maker or decision-making group*] seek out information in making the decision to adopt the EBP? (GSKINF)
Answer: _____

did [*the decision maker or decision-making group*] analyze information before making the decision? (GANINF)
Answer: _____

were objective techniques used in making the decision? (ANATCH)
Answer: _____

was professional intuition used in making the decision? (DCPROC)
Answer: _____

was [*the decision maker or decision-making group*] effective at staying focused on crucial information? (FOCATT)
Answer: _____

Section 2a: The following questions are about interest groups internal to your organization.

To what extent did departments or units in your organization have an influence on the decision to adopt the EBP? (UNTINF)
Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

How supportive was the organization as a whole toward the adoption of the EBP? (ORGSUP)
Where 1 = strongly opposed and 10 = strongly supported

____ (1 or 2) Strongly opposed adoption decision
____ (3 or 4) Opposed adoption decision
____ (5 or 6) Neutral
____ (7 or 8) Supported adoption decision
____ (9 or 10) Strongly supported adoption decision

Section 2b: The following questions deal with interest groups that are external to your organization. (Note: this can be any group external to this organization)

To what extent did interest groups external to this organization have an influence on the decision to adopt the EBP? (EXTGRP)

Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

Overall, did external groups support the adoption of the EBP? (EXTSUP)

Where 1 = strongly opposed and 10 = strongly supported

____ (1 or 2) Strongly opposed adoption decision
____ (3 or 4) Opposed adoption decision
____ (5 or 6) Neutral
____ (7 or 8) Supported adoption decision
____ (9 or 10) Strongly supported adoption decision

Section 3: The following questions help clarify the process by which the EBP was adopted and implemented at your organization.

Who manages the implementation of the EBP at this organization? (WHOMAN)

a) _____

b) What is his/her formal position in the organization? (MANPOS)
____ Top manager
____ Upper level manager
____ Middle manager
____ First line supervisor
____ Staff person/line worker
____ Support staff

c) How much clout (e.g. formal authority, expert power, or influence) does s/he have when it comes to moving the EBP forward? (MCLOUT)
_____ Unlimited
_____ Very high
_____ Considerable
_____ Moderate
_____ Modest
_____ None

How would you describe the time pressure to get the EBP up and running within this organization? (TMPRES)
Again please rate your response on a 1 to 10 scale where: 1 = No time pressure and 10 = very high time pressure

_____ (1 or 2) No time pressure
_____ (3 or 4) Low
_____ (5 or 6) Moderate
_____ (7 or 8) High
_____ (9 or 10) Very High

17. About how much time passed from the decision to adopt the EBP to its implementation or use?

_____ Years _____ Months (TMFIMP)

On a scale of 1 to 10, how did the time span between "decision to adopt" and implementation compare to other implementation efforts in this organization? (FIMPCM)

Where 10 = much greater time and 1 = much less time

_____ (9 or 10) Much greater than typical implementation efforts
_____ (7 or 8) Greater than typical implementation efforts
_____ (5 or 6) The same as typical implementation efforts
_____ (3 or 4) Less than typical implementation efforts
_____ (1 or 2) Much less than typical implementation efforts

To what extent were you involved in planning the details of implementing the EBP? (DECINF)

Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

On a 1 – 10 scale, how would you describe the investment of resources made to plan for the implementation of the EBP? (CSTPLN)

Where 1 = very low and 10 = very high

_____ (9 or 10) Very high
_____ (7 or 8) High
_____ (5 or 6) Moderate
_____ (3 or 4) Low
_____ (1 or 2) Very low

Were any performance goals or targets set at this organization with regard to implementing the EBP? *(Could be implementation targets like the need to get the EBP up & running by a specific date, or outcomes at other levels, like motivation of case managers)* (DECINF)

a) Yes _____ *If yes, then ask:* Could you give me an example?

No_____ *If no, skip to 21.*

To what extent were you involved in setting performance goals and targets for this practice? (DECINF)

Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

To what extent were you involved in deciding about funding and resources for implementing the EBP? (DECINF)

Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

To what extent have you been involved in convincing others to implement (or support the implementation of) the EBP? (DECINF)

Where 1 = not at all and 10 = great extent

_____ (9 or 10) Great extent
_____ (7 or 8) Considerable extent
_____ (5 or 6) Moderate extent
_____ (3 or 4) Small extent
_____ (1 or 2) Not at all

Section 4: For the following questions, we would like your perspective on factors that may have hindered the implementation of the EBP at your agency. Please answer all questions on a scale from 1 to 10, where 1 represents “no extent” and 10 represents “great extent.” (PRBENC)

Please use the stem along with the sentence for each question. All items in this scale can be answered by using the table below.

No Extent		Small Extent		Moderate Extent		Considerable Extent		Great Extent	
1	2	3	4	5	6	7	8	9	10

To what extent:

have personnel recruitment problems hindered the implementation of the EBP (such as difficulties finding people who are willing or qualified to implement the practice)?
Answer: _____

has lack of clarity about goals and plans hindered the implementation of this practice?
Answer: _____

has lack of clarity about how to implement parts of the practice hindered its overall implementation?
Answer: _____

has lack of resources hindered the implementation process?
Answer: _____

have difficulties related to coordination
internal to this organization hindered the implementation process? Answer: _____

with external entities hindered the implementation process? Answer: _____

has resistance from key personnel hindered the implementation of this practice?
Answer: _____

Section 5: I just have few more questions remaining.

Which of the following things has or need to change in order to implement the EBP? (WTCHNG)

____ Rules
____ Procedures
____ Jobs (e.g., change of duties or creation of new positions)
____ Departmental structure (e.g., change scope or department responsibility, added or eliminated departments.)
____ Organizational structure (e.g., chain of command)
____ Capital allocations (e.g., facilities and/or equipment)
____ Nothing needed to change

On a 1 – 10 scale, how would you describe the investment of resources made to support the implementation of the EBP? (CSTPLN)

Where 1 = very low and 10 = very high

_____ (9 or 10) Very high
_____ (7 or 8) High
_____ (5 or 6) Moderate
_____ (3 or 4) Low
_____ (1 or 2) Very low

How would you rate the importance of the EBP compared to other organizational projects on a scale of 1 to 10? (IMPCOM)

Where 1 = unimportant and 10 = critical importance

____ (1) Unimportant
____ (2) Somewhat important - but seen as a routine effort
____ (3 or 4) Important - on a par with most of our planned changed efforts
____ (5 or 6) Very important - key power centers expected good results
____ (7 or 8) Extremely important - an important opportunity for this organization
____ (9 or 10) Critical - organizational survival was at stake

To what degree did individuals or groups within the organization believe that implementing this project or innovation was mandatory? (VOLNTI)

Where 1 = fully voluntary and 10 = mandatory

_____ (9 or 10) Mandatory
_____ (7 or 8) Strongly recommended
_____ (5 or 6) Encouraged
_____ (3 or 4) Optional
_____ (1 or 2) Fully voluntary

THANK YOU FOR YOUR TIME. WE CANNOT TELL YOU HOW IMPORTANT THIS OPPORTUNITY HAS BEEN FOR US.
In order for us to fully understand your decision process, we would like to leave you with a questionnaire. We would like you to complete this questionnaire within two business weeks. We would like the timing of the data gathering to be similar for the interview and questionnaire, because we want your thought on all of the questions to be current. So the sooner you can complete it, the better.

We do ask you to provide your name and the name of your organization on the questionnaire. This information will be used to match your interview and questionnaire responses. All identifying information will be removed once this process is complete. Findings will be summarized in aggregated form to protect the identity of participating individuals and organizations.

APPENDIX B

Survey for IDARP (Innovation Diffusion and Adoption Research Project)

Name _____

Innovation Diffusion and Adoption Research Project
Questionnaire about the the EBP

Purposes:

The purposes of this research are (1) to study approaches used by mental health providers in Ohio in deciding whether or not to adopt and implement the Dual Disorder Integrated Treatment Model for substance abuse and mental illness (the EBP) and other evidence-based practices (EBPs), and (2) to identify factors that facilitate or hinder the implementation of EBPs. Information gathered is expected to be of value to service providers wishing to implement the EBP or other EBPs. The results are also expected to assist the Coordinating Centers of Excellence and ODMH in promoting the use of EBPs throughout Ohio. We very much appreciate your willingness to contribute to this important research.

About this Survey:

This survey takes approximately 30 minutes to complete. We recommend that you work quickly without puzzling or worrying about individual items. Some questions may appear to be repetitive. This type of research is relatively new to the mental health service field; therefore, it is necessary to ask a variety of questions to obtain reliable and accurate information about your organization's experiences.

Confidentiality:

All answers you provide will be treated confidentially. Findings will be summarized in aggregated form to protect the identity of participating individuals and organizations.

Please return your survey in the enclosed envelope within 10 business days or return directly to:

Richard Massatti, M.S.W.
ODMH, OPER
30 E. Broad Street, Suite 1170
Columbus, Ohio 43215-3430
Feedback:

Participating organizations will receive a mid-term report of the research findings in fall of 2002 and a final report in December, 2003. The report will provide information about various types of approaches used by mental health organizations in adopting and implementing various EBPs and barriers and facilitators to successful implementation.

Who should complete the survey:

Although we realize that the completion of this survey could be a collective effort, given the nature of the questions and the research protocol, we ask that you complete it independently. Please provide responses based on what you know or what you think. Use the 'don't know' option as needed. There are no right or wrong answers.

Background Information:

Instructions: The following information is requested so that we can describe survey participants and group responses together for comparative analyses. All identifying information will be treated confidentially. Findings will be summarized in aggregated form to protect the identity of participating individuals and organizations.

Name: _____
Name of organization: _____
Title: _____
Area code & telephone number: _____

Questionnaire for Implementing Organizations

Instructions: Using the scale provided below, please indicate the extent to which you agree with the following statements. Enter the number that most closely reflects your response in the space provided next to each phrase. Enter "0" if you don't know.

Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

1. Management believes change usually creates more problems than it solves……. _____
2. Management believes it would be considered a serious blight on a person's career if a person tries something new and fails at it ……..….. _____
3. This organization follows standard working procedures when dealing with the CCOE _____
4. This organization rarely has disagreements with the CCOE…….. _____
5. I sometimes get the feeling that others are not speaking up although they harbor serious doubts about the effectiveness of the EBP……... _____
6. I think implementing the EBP is a very good idea……..... _____
7. This organization is committed to working with the CCOE ……. _____
8. The quality of communication with the CCOE is good……. _____
9. Individuals are encouraged to criticize or provide information which challenges how the EBP is to be implemented…… _____
10. In my opinion, implementing the EBP represents a desirable decision for this organization _____
11. Often I feel pressured not to "rock the boat" by speaking my mind about the usefulness of the EBP……..... _____
12. the EBP is a valuable addition to this organization……... _____
13. This organization is well informed about the EBP……. _____
14. This organization has the know-how to implement the EBP…… _____
15. We have access to experts who know how to implement the EBP……... _____
16. The disadvantages of implementing the EBP far outweigh the advantages……... _____
17. the EBP is compatible with the treatment philosophy in this organization……..... _____
18. From a technical standpoint, the EBP is/will be complicated to implement correctly….. _____
19. the EBP must be implemented in a precise and prescribed manner in order to be effective _____
20. I would have no difficulty telling others about the effects of implementing the EBP…... _____
21. Management believes trying new ideas is risky …… _____
22. Management places a high value on taking risks, even if there are occasional mistakes _____
23. Communications with the CCOE follow formal channels…… _____
24. There is tension between the CCOE and this organization…… _____
25. This organization has a close bond with the CCOE……. _____

Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

26. There is considerable scientific evidence that the EBP is effective…….... _____
27. The lines of communication are always open between this organization and the CCOE _____
28. The experience of other organizations implementing the EBP convinces me of its effectiveness…… _____
29. Once trained, most staff can perform the tasks necessary to implement the EBP well... _____
30. Organizations that provide funding to this agency expect us to implement the EBP….. _____
31. The number of organizations implementing the EBP suggests that it is the thing to do among organizations like this one…….…... _____
32. This organization tends to be on the leading edge when it comes to trying new things _____
33. Implementing the EBP represents a great risk to this organization…… _____
34. We are implementing the EBP on a trial basis……..... _____
35. Implementing the EBP will improve the image of this organization……. _____
36. This organization has the resources necessary to support the ongoing implementation of the EBP…….. _____
37. It's hard to take the decision to adopt the EBP seriously……..... _____
38. Organizational leadership is willing to put forth a great deal of effort to see that the decision to implement the EBP is successful...……... _____
39. There has been healthy discussion about implementing the EBP within this organization…….. _____
40. This organization knows enough about the EBP to be confident in our ability to implement. ……... _____
41. The training we need in order to implement the EBP is available to this organization.. _____
42. Implementing the EBP will improve service quality at this organization……... _____
43. the EBP fits well with the professional training of most staff in this organization…… _____
44. It is/will be easy to train staff in how to perform tasks that are necessary to implement the EBP.……. _____
45. There is room to make some local adaptations in how the EBP is implemented without jeopardizing its effectiveness. …… _____
46. Management believes change is associated with a lot of uncertainty…….. _____
47. Management places a high priority on learning and experimenting with new ideas... _____
48. The conditions/terms of this organization's working relationship with the CCOE are specified in detail in writing……... _____
49. Poor communication hinders this organization's efforts to work with the CCOE…... _____
50. I believe I could communicate to others the consequences of implementing the EBP... _____
51. Organizations that have implemented the EBP have evidence that it's an effective approach…….. _____

Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

52. There is considerable variability among individual clinicians or service providers in how well they perform the duties and tasks necessary to implement the EBP correctly…… ____
53. This organization's involvement in the implementation of the EBP is/will be voluntary. ……. ____
54. There are only a few organizations like ours that are implementing the EBP……. ____
55. History shows that this organization is averse to taking risks…….. ____
56. Implementing the EBP involves more drawbacks than benefits for this organization… ____
57. This organization can deal with any negative fallout related to the decision to implement the EBP. …… ____
58. the EBP is expected to be an ongoing element of this organization…… ____
59. Implementing the EBP is important from a political perspective……... ____
60. This organization has the resources necessary to support the initial implementation of the EBP…… ____
61. It's unrealistic for me to expect this organization to implement the EBP…….. ____
62. Organizational leadership is willing to "talk the decision to implement this EBP up" with staff as being good for this organization…….. ____
63. Staff from this organization have talked about the EBP with staff from similar organizations…… ____
64. This organization has enough technical knowledge to implement the EBP…… ____
65. If questions arise during implementation we will have access to the information we need to move forward…….. ____
66. Overall, implementing the EBP is advantageous to this organization……. ____
67. The EBP is compatible with my professional training…….. ____
68. Implementing the EBP is/will be difficult for staff…….. ____
69. Some elements of the EBP have to be implemented as prescribed but others do not.… ____
70. Management believes it is usually difficult to tell in advance whether a change will be beneficial……. ____
71. Misunderstandings are a hallmark of this organization's relationship with the CCOE……... ____
72. The effects of implementing the EBP are apparent to staff in this organization……. ____
73. The scientific evidence supporting the effectiveness of the EBP is weak……... ____
74. Other organizations that have implemented the EBP question its effectiveness…… ____
75. Once trained, only a minority of staff is capable of doing an adequate job performing the tasks necessary to implement the EBP as designed …… ____
76. This organization has no choice when it comes to whether or not we will implement the EBP…… ____

Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

77. Most organizations similar to this one are implementing the EBP or seriously considering it…… _____
78. Implementing the EBP represents little risk to this organization……..... _____
79. We are implementing the EBP for the long haul……..… _____
80. Implementing the EBP is seen as a strategic decision in this organization……..… _____
81. The organization has the manpower necessary to support the ongoing implementation of the EBP…….. _____
82. Quite frankly, I don't care if we implement the EBP or not……..... _____
83. Organizational leaders are proud to tell others they were involved in making the decision to adopt the EBP……..…….. _____
84. Staff from this organization have been in contact with professionals who are implementing the EBP at other organizations…….. _____
85. We lack the knowledge necessary to be confident in our ability to implement the EBP……..…….. _____
86. Technical assistance is available to this organization as we proceed with the implementation process…… _____
87. the EBP is compatible with my beliefs about treatment…….. _____
88. From a technical standpoint, it is/will be easy to implement the EBP correctly on a consistent basis……. _____
89. Maintaining fidelity to the EBP as defined by experts is critical to getting expected results…… _____
90. I would have difficulty explaining why implementing the EBP may or may not be beneficial…….. _____
91. There is only a limited amount of scientific evidence supporting the effectiveness of the EBP…….. _____
92. Organizations that have implemented the EBP cannot provide evidence of its effectiveness……. _____
93. Following training, the typical trainee will possess the necessary knowledge and skills to perform the duties and tasks necessary to implement the EBP as intended by its developers…… _____
94. This organization has the latitude to decide whether or not we want to implement the EBP……. _____
95. Leading service organizations are implementing the EBP……... _____
96. This organization tends to be among the early adopters of new services or technologies…….. _____
97. Benefits will outweigh costs when it comes to implementing the EBP at this organization…….. _____
98. We can deal with the "bumps in the road" associated with implementing the EBP…... _____
99. the EBP will be part of the way we do business around here for years to come……..… _____

Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

100. Outcomes for clients will be improved as a result of implementing the EBP…… _____
101. The organization has the manpower to support the initial implementation of the EBP... _____
102. It is quite likely that the decision to implement the EBP may be revised depending on how things go…….….. _____
103. Implementing the EBP will enhance the effectiveness of this organization……..... _____
104. Implementing the EBP is expected to improve the efficiency of service provision…… _____
105. We do not have the resources necessary to support the initial implementation of the EBP…… _____
106. This organization prefers to take a wait-and-see approach when it comes to trying out new services or technologies…….… _____
107. Implementing the EBP is seen as a practical necessity by this organization……... _____
108. We do not have the resources necessary to implement the EBP on a long-term basis… _____
109. This organization has a limited capacity to absorb negative consequences that might occur as a result of implementing the EBP…….. _____
110. Implementing the EBP will facilitate the recovery of consumers …….. _____
111. This organization has a history of experimenting with new ways of providing service……... _____
112. This organization's resilience will allow us to deal with implementation-related difficulties……. _____
113. This organization is highly motivated to implement the EBP……..… _____
114. This organization can manage the risks associated with implementing the EBP…… _____
115. Implementing the EBP has been risky for this organization……..... _____
116. This organization questions the motives of the CCOE……. _____
117. There are good feelings between this organization and the CCOE…….. _____
118. Implementing the EBP has required this organization to be innovative…….. _____
119. This organization trusts the CCOE…….. _____
120. The thought of working with the CCOE upsets me…….. _____
121. Implementing the EBP has required bold action by this organization……..... _____
122. This organization believes the CCOE has a hidden agenda…… _____
123. Implementing the EBP has put this organization at risk…….. _____

Instructions: Using the scale provided below, please indicate the extent to which each of the following describe the adoption decision and implementation process. Enter the number that most closely reflects your response in the space provided next to each phrase. Enter "0" if you don't know.

No Extent/ Not at all	Very Small Extent	Small Extent	Moderate Extent	Considerable Extent	Great Extent	Very Great Extent	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

To what extent…

124. is there overall compatibility between the CCOE and this organization?…….. _____

125. did the CCOE assist your organization in meeting its goals during the past six months?……... _____

126. did the feeling exist in your agency that the decision to adopt or not adopt the EBP had already been made?……..…….…….……. _____

127. was information that was used for decision making and planning readily available? _____

128. did informal discussions about the decision to adopt or not adopt the EBP take place in your agency?……..……. _____

129. were groups in your agency involved in the decision to adopt or not adopt the EBP concerned with their own goals rather than the goals of the organization?…… _____

130. did the Executive Director of your agency personally support the decision to adopt or not adopt the EBP?……..…….. _____

131. did the CCOE hinder your organization in meeting its goals during the past six months?……... _____

132. were people in your agency who were involved in the decision making process open with each other about their interests and preferences in the decision?……... _____

133. was the information used for decision making of high quality?..……..….. _____

134. did negotiation in your agency occur as part of the decision process related to adopting or not adopting the EBP?..…….…….. _____

135. was the decision affected by the exercise of power and influence among group members in your agency?……..…… _____

136. did the Executive Director of your agency exert supporting influence during the decision making process?……..…….. _____

137. was dissent allowed during decision making sessions that dealt with the adoption of the EBP?……..… _____

138. was the decision to adopt or not adopt the EBP affected by negotiation among group members in your agency?…… _____

No Extent/ Not at all	Very Small Extent	Small Extent	Moderate Extent	Considerable Extent	Great Extent	Very Great Extent	Don't Know	Not Applicable
1	2	3	4	5	6	7	0	9

To what extent…

139. is the educational background of CCOE trainers similar to that of your staff being trained?…… _____
140. is your organization satisfied with its working relationship with the CCOE?……. _____
141. has your organization implemented the EBP "to the letter" as prescribed by its developers?……. _____
142. have the expected positive consequences of implementing the EBP been realized?……. _____
143. is the continued implementation of the EBP dependent on acquiring outside funds?……... _____
144. does this organization continue to require technical assistance from outside organizations (e.g., CCOE) in order to implement the EBP?……... _____
145. are funds that are required to implement the practice part of the regular operating budget?……. _____
146. has the CCOE maintained its commitments to your organization?……. _____
147. do CCOE trainers have similar prior work experience to staff being trained?…… _____
148. is the EBP seen as a permanent part of the way this organization conducts business?…….. _____
149. does the practice implemented in your organization depart significantly from what is prescribed by its developers?……... _____
150. have unexpected positive consequences occurred during implementation?…… _____
151. is this organization capable of continuing to implement the practice with limited or no technical assistance from outside organizations?……... _____
152. is the continued implementation of the EBP possible using agency funds only?……... _____
153. can staff being trained "identify with" the CCOE trainers?…… _____
154. does this organization possess the expertise needed to continue to implement the EBP?….. _____
155. have the most critical or central elements of the EBP been implemented?…….…….. _____
156. have the expected "costs" of implementing the EBP been realized?…… _____
157. is the EBP seen as temporary?……... _____
158. do CCOE trainers "connect" with the staff they are training?……. _____
159. has this organization made modifications in the way the EBP is being implemented?…….. _____
160. have unexpected negative consequences occurred during implementation?…….. _____
161. is the EBP likely to be eliminated or discontinued if this organization faces budget cuts?… _____

Instructions: Think about the first formal presentation that was made by the CCOE staff to you and/or other members of your organization. Indicate how you felt about that presentation. Place an "X" in the box between each pair of adjectives that matches your feelings. For example, if you thought the presentation was half Good and half Bad, then place an "X" in the middle box between those two adjectives.

163.	Good	1	2	3	4	5	6	7	Bad
164.	Interesting	1	2	3	4	5	6	7	Boring
165.	Important	1	2	3	4	5	6	7	Unimportant
166.	Sleepy	1	2	3	4	5	6	7	Excited
167.	Attractive	1	2	3	4	5	6	7	Unattractive
168.	Takes Energy	1	2	3	4	5	6	7	Gives Energy

Instructions: Please fill in the answer or place a check mark next to the word or phase that most closely reflects your response to each question below.

169. How frequently have people from the CCOE communicated or been in contact with staff from this organization?
    - ____ No contact
    - ____ Monthly or less
    - ____ About weekly
    - ____ About daily
    - ____ Every ½ day
    - ____ Don't know

170. How would you describe the overall effectiveness of the working relationship between your organization and the CCOE?
    - ____ Extremely effective
    - ____Effective
    - ____ Somewhat effective
    - ____ Somewhat ineffective
    - ____ Ineffective
    - ____ Very ineffective

171. How would you describe the resources made available by this organization to support the implementation of this project/innovation compared to what is needed?
    - ____ Much greater than needed
    - ____ Greater than needed
    - ____ Just what is needed
    - ____ Less than needed
    - ____ Much less than needed

172. How long do you expect the relationship between the CCOE and your organization to continue in the future?
    ____ Terminate soon
    ____ About six months
    ____ About 1 year
    ____ 2 – 3 years
    ____ More than 3 years
173. Overall, how would you describe the ongoing support given to this project by top management in this organization?
    ____ Very strong
    ____ Strong
    ____ Somewhat strong
    ____ Somewhat weak
    ____ Weak
    ____ Very weak

APPENDIX C

Items for measures used in the present study

Measure	Items
Climate for implementation Scales	
Access to Training	1. We have access to experts who know how to implement the EBP (R) 2. The training we need in order to implement the EBP is available to this organization (R) 3. If questions are raised during implementation we will have access to the information we need to move forward (R) 4. Technical assistance is available to this organization as we proceed with the implementation process (R)
Freedom to Express Doubts	1. I sometimes get the feeling that others are not speaking up although they harbor serious doubts about the effectiveness of the EBP 2. Individuals are encouraged to criticize or provide information which challenges how the EBP is to be implemented (R) 3. Often I feel pressured not to “rock the boat” by speaking my mind about the usefulness of the EBP
Goal Clarity and Communication	1. Clear and specific goals have been established for the implementation of the EBP (R) 2. Top management has clearly communicated its expectations with regard to the outcomes of implementing the EBP(R) 3. We would be able to clearly judge whether the goals of this implementation effort are being met. (R)
Rewards	1. Individuals involved in the implementation of the EBP get recognition from their supervisors for their efforts (R) 2. Management provides encouragement to employees involved in implementing the EBP (R) 3. Employees are given positive feedback for contributing to the implementation of the EBP (R) 4. Employees involved in the implementation of the EBP know their efforts are appreciated by the organization. (R)
Removal of Obstacles	1. To what extent does management remove obstacles that arise in the course of implementing the EBP? 2. To what extent does management adequately address concerns and questions related to the implementation of the EBP?

Measure	Items
	3. To what extent does management ensure that everything necessary for the implementation of the EBP (space, training, clerical assistance etc) is made available to staff? 4. To what extent to staff involved in the implementation of the EBP believe they are given the tools and resources they need to implement the EBP?
Monitoring of Progress	1. To what extent does the top management team receive updates about the implementation of the EBP? 2. To what extent does the top management team track progress made toward the successful achievement of implementation goals? 3. To what extent does the top management team monitor the implementation of the EBP? 4. To what extent does the top management team hold meetings to review the implementation of the EBP?
Top Management Support	1. Overall, how would you describe the ongoing support given to this project by top management in this organization? (R)
Time Pressure to Implement	1. How would you describe the time pressure to get this project up and running within this organization?
Relative Importance of Project	1. How would you rate the importance of this project compared to other organizational projects on a scale of 1 to 10?
Cost to Plan	1. How would you describe the investment of resources made to plan for the implementation of this EBP? 2. How would you describe the investment of resources made to support the implementation of this EBP?
Organizational Support	1. How supportive is the organization as a whole toward the implementation of the EBP?
Compatibility scale	
Compatibility	1. The EBP is compatible with the treatment philosophy in this organization (R) 2. The EBP fits well with the professional training of most staff in this organization (R) 3. The EBP is compatible with my professional training (R) 4. The EBP is compatible with my beliefs about treatment (R)
Project Slack	
Resources to support implementation	1. How would you describe the resources made available by this organization to support the implementation of this project compared to what is needed? (R)
Ongoing Slack	1. This organization has the resources necessary to support the ongoing implementation of the EBP. (R) 2. This organization has the manpower necessary to support the ongoing implementation of this EBP. (R) 3. We do not have the resources necessary to implement this

Measure	Items
	EBP on a long –term basis.
Capacity to Manage Risks	1. This organization can deal with any negative fallout related to the decision to implement this EBP. (R) 2. We can deal with “bumps in the road” associated with implementing the EBP (R) 3. This organization has a limited capacity to absorb negative consequences that might occur as a result of implementing this EBP. 4. This organization’s resilience will allow us to deal with implementation related difficulties. (R) 5. This organization can manage the risks associated with implementing the EBP. (R)
Implementation Effectiveness	
Assimilation	1. To what extent are funds that are required to implement this practice part of the organization’s regular operating budget? 2. To what extent is this EBP seen as a permanent part of the way this organization conducts business? 3. To what extent was this EBP seen as temporary? (R) 4. To what extent is this EBP likely to be eliminated or discontinued if the organization faced budget cuts? (R)
Plans to Persist	1. We are implementing this EBP on a trial basis. 2. This EBP is expected to be an ongoing element of this organization. (R) 3. We are implementing this EBP for the long haul. (R) 4. This EBP will be part of the way we do business around here for years to come. (R)
Extent of Implementation	1. Which of the following best describes the extent to which the practice has been implemented? (R)
Magnitude of impact	1. Percentage of clients directly impacted by the EBP? 2. Percentage of clients indirectly impacted by the EBP? 3. Percentage of organizational staff directly impacted by the EBP? 4. Percentage of organizational staff indirectly impacted by the EBP? 5. Percentage of departmental units directly impacted by the EBP? 6. Percentage of departmental units indirectly impacted by the EBP?
Organization Satisfaction with Implementation	1. Overall, to what extent is the organization satisfied with the progress made toward implementing this new practice?
Time between Adoption and Implementation	1. About how much time passed from the decision to adopt the EBP to its full implementation or use?

Measure	Items
Innovation Effectiveness	
Innovation Effectiveness on Clients	1. Implementing MST is contributing to the improvement in client outcomes (R) 2. Implementing MST is facilitating the recovery of consumers (R) 3. Implementing MST is having positive impacts on the clients we serve (R) 4. Implementing MST is seen as positive by the clients we serve (R)
Innovation Effectiveness on Organization	1. Implementing MST is improving the organization's efficiency (R) 2. Implementing MST is improving the organization's overall effectiveness (R) 3. Implementing MST is enhancing our quality of services (R) 4. Implementing MST is improving the image of this organization (R) 5. Implementing MST is resulting in overall improvements at this organization (R)
Positive Consequences	1. To what extent were the expected positive consequences of implementing the EBP realized? 2. To what extent did additional unexpected positive consequences occur in this organization?
Negative consequences	1. To what extent were the expected "costs" of implementing the EBP realized by this organization? 2. To what extent did additional unexpected negative consequences associated with implementation occur?
Effect on Clients, Staff and Organization	1. To what extent has the actual impact of the practice on clients met expectations? 2. To what extent has the actual impact of the practice on staff met expectations? 3. To what extent has the actual impact of the practice on the organization as a whole met expectations?
Overall Impact of Innovation	1. How would you describe the overall impact this practice is having on your organization?
Reinvention	
Extent of Reinvention	1. To what extent did the organization implement the EBP "to the letter" as prescribed by its developers? (R) 2. To what extent did the practice implemented in this organization depart significantly from what is prescribed by its developers? 3. To what extent did this organization implement the most critical or central elements of the EBP? (R) 4. To what extent did the organization make modifications in the way the EBP was implemented?

Measure	Items
Beliefs about Maintaining Fidelity	
Beliefs about maintaining fidelity	1. The EBP must be implemented in a precise and prescribed manner in order to be effective. (R) 2. There is room to make some local adaptations in how the EBP is implemented without jeopardizing its effectiveness 3. Some elements of the EBP have to be implemented as prescribed but others do not 4. Maintaining fidelity to the EBP as defined by experts is critical to getting expected results. (R)

Note: (R) indicates items that were reverse – scored.

APPENDIX D

Item–level descriptives

Variable	Item	N	Min	Max	Mean	*SD*
Access to training	acctat1r	115	1	7	6.02	1.21
	acctat2r	113	1	7	5.75	1.44
	acctat3r	114	1	7	5.96	1.07
	acctat4r	114	1	7	5.97	1.11
Freedom to express doubts	expdbt1	140	1	7	4.97	1.70
	expdbt2r	140	1	7	5.14	1.51
	expdbt3	147	1	7	5.86	1.44
Goal Clarity and Communication	goalcl1r	93	1	7	5.06	1.67
	goalcl2r	92	1	7	5.18	1.70
	goalcl3r	92	1	7	4.98	1.51
Reward	reward1r	99	1	7	5.18	1.61
	reward2r	101	1	7	5.10	1.61
	reward3r	96	1	7	4.82	1.57
	reward4r	98	1	7	5.05	1.66
Removal of Obstacles	robscl1	87	1	7	4.52	1.48
	robscl2	89	1	7	4.39	1.71
	robscl3	87	1	7	4.38	1.54
	robscl4	80	1	7	4.35	1.50
Monitoring of Progress	prmons1	92	1	7	4.54	1.68
	prmons2	84	1	7	3.58	2.05
	prmons3	83	1	7	4.76	1.56
	prmons4	88	1	7	4.34	1.78
Top Management Support	topsupr	141	1	6	4.87	1.32
Time Pressure to implement	tmfimp	44	2	84	16.45	16.94
Relative importance of project	fimpcm	36	1	10	5.40	2.58
Cost to plan for implementation	cstpln1	81	1	10	6.96	2.33
	cstpln2	63	1	10	6.27	2.90
Organizational support	orgsup	94	3	10	7.90	2.03
Compatibility	compat1r	109	1	7	6.06	1.06
	compat2r	103	1	7	5.17	1.27
	compat3r	107	2	7	5.90	1.17
	compat4r	108	1	7	6.05	1.33
Ongoing slack	onslck1r	149	1	7	4.40	1.88

Variable	Item	N	Min	Max	Mean	*SD*
	onslck2r	153	1	7	4.92	1.71
	onslck3	145	1	7	4.52	1.76
Resources to support implement	rescrs	153	1	5	2.69	.86
Capacity to manage risks	rskman1r	143	1	7	5.30	1.29
	rskman2r	149	2	7	5.81	.87
	rskman3	134	1	7	4.90	1.40
	rskman4r	151	2	7	5.68	.99
	rskman5r	152	2	7	5.63	.89
Assimilation	assiml1	69	1	7	3.61	2.05
	assiml2	85	1	7	4.91	1.66
	assiml3r	81	2	7	5.98	1.15
	assiml4r	76	1	7	4.33	1.91
Plan to persist	prsist1	67	1	7	5.37	1.64
	prsist2r	66	2	7	6.11	.96
	prsist3r	60	3	7	6.03	.94
	prsist4r	62	1	7	5.65	1.31
Extent of implementation	extentr	85	1	6	4.22	.97
Satisfaction with progress of innov	orgsat	89	1	10	5.87	2.43
Magnitude of impact	Magimp1	62	0	1	.24	.31
	Magimp2	60	0	1	.22	.29
	Magimp3	63	0	1	.27	.29
	Magimp4	59	0	1	.25	.26
	Mapimp5	55	0	1	.45	.31
	magimp6	53	0	1	.24	.26
Innovation effectiveness on clients	ineffc1r	93	1	7	5.63	1.39
	ineffc2r	90	1	7	5.78	1.22
	ineffc3r	94	1	7	5.84	1.21
	ineffc4r	90	1	7	5.59	1.26
Innovation effectiveness on org	ineffo1r	93	1	7	5.37	1.52
	ineffo2r	85	1	7	5.00	1.35
	ineffo3r	89	1	7	5.06	1.45
	ineffo4r	92	2	7	5.83	1.13
	ineffo5r	89	1	7	5.18	1.18
Consequences of implementation	cnsqnc1	85	1	7	4.04	1.53
	cnsqnc2	76	1	7	3.45	1.63
	cnsqnc3r	55	1	7	3.16	1.38
	cnsqnc4r	82	1	7	5.18	1.60
Effect on clients, staff and org	impact1	82	1	10	5.92	2.23
	impact2	67	2	10	5.55	1.93
	impact3	51	1	10	5.70	2.14
Overall Impact of Innovation	ompact	85	1	10	6.74	2.12
Beliefs about Maintaining Fidelity	fidhcp1r	117	1	7	4.42	1.76

Variable	Item	N	Min	Max	Mean	*SD*
	fidhcp2	107	1	7	2.94	1.55
	fidhcp3	107	1	7	3.93	1.74
	fidhcp4r	113	2	7	5.41	1.15
Extent of Reinvention	reinvt1r	85	1	7	3.57	1.51
	reinvt2	78	1	7	2.63	1.40
	reinvt3	84	1	7	3.02	1.61
	reinvt4	78	1	7	3.09	1.51

APPENDIX E

Results of Principal Component Analyses

PCA Results for all measures of Climate for Implementation measures

Communalities

	Initial	Extraction
acctrain	1.000	.759
expdoubt	1.000	.483
goalclarity	1.000	.667
reward	1.000	.754
robscl	1.000	.798
perfmonit	1.000	.665
topsupr	1.000	.884
tmpres	1.000	.834
impcom	1.000	.722
Costoplan	1.000	.422
orgsup	1.000	.747

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.536	50.331	50.331	5.536	50.331	50.331
2	1.302	11.836	62.168	1.302	11.836	62.168
3	1.197	10.879	73.047	1.197	10.879	73.047
4	.919	8.354	81.400			
5	.649	5.900	87.300			
6	.433	3.933	91.233			
7	.352	3.200	94.433			
8	.208	1.888	96.321			
9	.196	1.786	98.106			
10	.138	1.250	99.357			
11	.071	.643	100.000			

Component Matrix

	Component		
	1	2	3
acctrain	.735	-.458	-.092
expdoubt	.693	-.037	.037
goalclarity	.809	.079	-.083
reward	.833	.137	-.202
robscl	.814	-.347	.127
perfmonit	.815	-.012	-.007
topsupr	.892	-.247	.162
tmpres	.473	.780	.037
impcom	.582	.030	-.618
Costoplan	.332	.521	.729
orgsup	.587	-.065	.413

PCA Results for retained measures of Climate for Implementation Measures

Communalities

	Initial	Extraction
acctrain	1.000	.525
expdoubt	1.000	.335
goalclarity	1.000	.663
reward	1.000	.520
robscl	1.000	.762
perfmonit	1.000	.560
topsupr	1.000	.633

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.998	57.113	57.113	3.998	57.113	57.113
2	.851	12.163	69.276			
3	.627	8.962	78.238			
4	.499	7.132	85.370			
5	.475	6.790	92.160			
6	.345	4.923	97.083			
7	.204	2.917	100.000			

Component Matrix

	Component
	1
acctrain	.725
expdoubt	.579
goalclarity	.815
reward	.721
robscl	.873
perfmonit	.749
topsupr	.795

PCA Results for measures of Project Slack

Communalities

	Initial	Extraction
resrcsr	1.000	.649
ongoingslack	1.000	.745
riskmgmt	1.000	.658

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.051	68.359	68.359	2.051	68.359	68.359
2	.548	18.279	86.639			
3	.401	13.361	100.000			

Component Matrix

	Component
	1
resrcsr	.805
ongoingslack	.863
riskmgmt	.811

PCA Results for all measures of Implementation Effectiveness

Communalities

	Initial	Extraction
assimilation	1.000	.707
persist	1.000	.728
extentr	1.000	.168
orgsat	1.000	.386

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.989	49.736	49.736	1.989	49.736	49.736
2	.925	23.129	72.865			
3	.764	19.104	91.969			
4	.321	8.031	100.000			

Component Matrix

	Component
	1
assimilation	.841
persist	.853
extentr	.410
orgsat	.621

PCA Results for retained measures of Implementation Effectiveness

Communalities

	Initial	Extraction
assimilation	1.000	.735
persist	1.000	.780
orgsat	1.000	.383

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.898	63.276	63.276	1.898	63.276	63.276
2	.777	25.912	89.187			
3	.324	10.813	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix

	Component
	1
assimilation	.857
persist	.883
orgsat	.619

PCA Results for measures of Innovation Effectiveness

Communalities

	Initial	Extraction
inneffectclients	1.000	.700
inneffectorg	1.000	.835
impact	1.000	.753
ompact	1.000	.736

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.024	75.588	75.588	3.024	75.588	75.588
2	.563	14.079	89.667			
3	.245	6.116	95.783			
4	.169	4.217	100.000			

Component Matrix

	Component
	1
inneffectclients	.836
inneffectorg	.914
impact	.867
ompact	.858

APPENDIX F

r_{wg} values

Project	acctrain	expdbt	goalcl	reward	robscl	perfmon	topsupr
1	0.97	0.87	0.98	0.99	0.94	0.96	0.95
2	0.97	0.8	0.99	1	1	0.99	0.97
3	0.98	0.78	0.74	0.97	0.93	0.94	0.87
4	0.56	0.53	0.98	0.78	0.99	0.83	0.6
5	0.66	0.89	0.79	0.2	0.59	0.55	0.89
6	1	0.97	0.98	.	1	0.97	0.63
7	0.9	0.84	0.77	0.79	0.78	1	0.89
8	0.94	0.98	0.78	0.99	0.83	0.41	0.85
9	.	0.66	.	.	.	.	0.84
10	0.94	1	0.92	0.94	0.99	1	0.79
11	0.94	0.97	0.99	0.99	1	0.99	1
12	0.99	0.93	0.99	1	.	.	1
13	0.94	0.95	.	.	.	.	.
14	1	0.96	0.99	0.5	0.97	0.83	1
15	0.99	0.92	.	0.99	0.98	.	1
16	0.92	1	0.99	0.25	0.68	1	0.95
17	0.99	0.95	.	.	.	.	0.79
18	0.94	0.88	0.9	0.9	0.99	0.99	1
19	.	1	1	0.98	1	0.94	.
20	0.73	0.87	0.99	0.9	0.5	-0.13	0.79
21	0.94	0.35	-0.12	-0.33	0.69	0.99	.
22	0.98	0.97	.	.	.	.	0.96
23	0.73	0.87	0.93	0.68	0.72	0.36	0.87
24	0.97	0.99	0.99	0.98	0.88	0.83	.
25	0.99	0.99	0.78	1	0.9	.	0.97
26	0.97	0.95	.	.	.	.	1
27	0.99	0.94	0.92	0.72	0.76	0.92	.
28	1	1	.	.	.	.	0.68
29	.	.	.	.	.	.	1
30	.	.	0.99	.	0.99	1	.
31	0.99	0.85	0.94	0.98	1	0.99	0.95
32	.	0.78	.	.	.	.	1
33	0.97	0.5	.	0.38	.	0.98	0.52
34	0.98	0.96	0.98	0.63	0.58	0.68	0.43
35	0.97	0.85	0.99	0.85	1	0.97	0.63
36	.	.	.	.	.	.	0.28
37	0.97	0.98	0.98	0.99	0.99	0.97	0.15
38	.	.	.	.	.	.	.
39	0.7	1	0.7	0.74	.	.	0.92
40	0.97	0.94	.	0.38	.	0.65	0.15
41	1	1	0.38	0.6	0.83	0.58	-0.28
42	.	0.94	0.98	.	1	0.78	0.95
43	0.97	0.99	0.99	1	0.99	0.99	1
44	1	0.98	0.98	0.98	1	1	0.68
45	0.99	0.65	0.92	0.96	0.93	0.97	1
46	.	0.98	.	.	.	.	0.68
47	0.98	0.94	.	.	.	.	0.96
48	.	.	0.94	0.85	.	0.41	0.92
49	0.55	0.78	0.91	0.3	0.73	0.43	0.79
50	1	0.99	.	0.94	.	.	.

Note : Cases that did not have multiple respondents do not have r_{wg} values.

Appendix E: r_{wg} values (continued)

Project	compat	resrcsr	slack	riskmgmt	assimil	persist	orgsat
1	0.97	0.93	0.78	0.97	1	1	0.99
2	0.94	0.95	0.96	0.93	0.99	1	0.85
3	0.97	0.68	0.77	0.9	0.6	0.93	0.11
4	0.81	0.8	0.49	0.87	0.94	0.88	0.78
5	0.54	0.95	0.77	0.97	0.86	0.6	0.52
6	0.99	1	0.91	0.91	.	1	1
7	0.97	1	0.87	0.95	.	0.99	0.94
8	1	0.94	1	0.95	0.6	0.83	0.98
9	.	1	0.78	0.98	.	.	.
10	1	0.92	0.92	0.93	.	1	0.98
11	0.98	0.92	0.87	0.98	0.98	0.99	0.99
12	0.91	0.92	0.94	0.96	.	1	0.98
13	0.94	0.67	1	0.91	.	.	.
14	1	0.83	0.91	0.99	.	.	1
15	0.96	0.92	0.99	0.93	0.98	0.99	0.95
16	0.96	1	0.96	0.98	.	.	.
17	0.97	1	0.9	1	.	.	0.89
18	0.88	1	0.11	0.99	0.98	0.83	0.95
19	.	1	0.9	0.92	0.96	0.99	0.9
20	0.71	0.93	0.9	0.97	0.88	0.99	0.29
21	0.96	0.83	0.79	0.92	0.98	1	0.88
22	0.92	0.94	0.77	0.95	.	.	.
23	0.68	0.95	0.84	0.96	0.89	0.88	0.36
24	0.99	1	0.9	0.96	0.99	0.97	0.98
25	0.97	0.93	1	0.96	0.92	0.99	.
26	0.99	0.92	0.98	0.98	.	.	.
27	0.97	0.88	0.9	1	0.99	0.98	0.91
28	0.99	0.88	1	0.96	.	.	0.98
29	.	.	.	.	.	.	.
30	.	.	.	.	.	1	.
31	.	0.92	0.87	0.98	0.99	.	0.98
32	.	0.88	0.94	0.94	.	.	.
33	.	0.67	0.79	.	0.9	.	.
34	0.97	0.6	0.94	0.91	0.87	.	.
35	0.97	0.67	0.97	0.88	0.65	.	.
36	.	0.5	0.8	.	.	.	0.94
37	0.94	0.75	0.72	0.98	.	.	0.9
38	.	.	.	.	.	.	.
39	0.58	1	0.77	.	1	.	0.97
40	.	0.67	0.91	0.94	0.9	.	.
41	0.99	0.88	0.9	0.25	1	.	.
42	.	0.88	0.93	0.87	1	.	.
43	0.94	0.92	0.89	1	.	.	0.98
44	0.99	0.88	0.5	0.98	.	.	.
45	0.89	0.88	0.56	0.87	0.74	.	.
46	.	1	0.94	1	.	.	1
47	0.74	0.75	0.77	0.9	.	.	0.88
48	.	0.88	.		0.7	0.65	.
49	0.41	0.75	0.98	0.95	0.55	0.84	0.63
50	0.97	.	0.74	0.96	.	0.94	0.6

Note : Cases that did not have multiple respondents do not have r_{wg} values.

Appendix E: r_{wg} values (continued)

Project	Inneffc	Ineffo	Conseq	impact	ompact	reinvent	Fidelity
1	0.97	0.95	0.97	0.9	0.9	1	0.84
2	0.99	0.96	0.9	0.99	0.99	1	0.97
3	0.95	0.82	0.51	0.57	0.78	0.92	0.97
4	0.88	1	1	.	0.98	1	0.97
5	0.92	0.99	0.8	0.88	0.99	0.95	0.97
6	0.96	.	.	.	1	1	1
7	0.79	0.69	.	0.83	0.69	0.75	0.9
8	0.99	0.96	0.98	0.87	0.9	0.97	1
9	.	.	.	.	.	.	.
10	0.97	0.99	.	.	0.85	0.98	0.94
11	0.97	1	0.99	0.98	0.98	.	0.9
12	1	0.99	.	0.97	0.78	.	0.97
13	.	.	.	.	.	.	1
14	0.83	0.92	0.99	0.94	0.95	0.88	1
15	1	1	.	0.99	0.97	.	0.96
16	.	.	.	.	0.6	0.72	0.89
17	.	.	.	0.87	0.69	.	0.99
18	.	0.99	.	0.91	0.99	0.99	0.8
19	0.99	1	0.99	.	.	1	.
20	0.83	0.96	0.94	0.75	0.99	0.89	0.98
21	1	1	0.99	1	0.78	0.96	0.9
22	.	.	.	.	.	.	1
23	0.93	0.95	0.92	0.87	0.87	0.91	0.77
24	0.91	0.96	0.99	.	0.98	0.94	0.91
25	.	.	.	0.96	1	.	0.95
26	.	.	.	.	.	.	0.78
27	0.79	0.88	0.95	0.99	0.98	0.96	0.91
28	.	.	.	0.9	0.9	.	0.97
29	.	.	.	.	.	.	.
30	.	.	.	.	.	0.5	.
31	0.99	0.96	0.65	.	0.9	.	0.72
32	.	.	.	.	.	.	.
33	0.99	1	0.99	.	.	.	1
34	0.97	0.98	0.92	.	.	0.99	0.95
35	0.94	0.97	0.99	.	.	1	0.97
36	.	.	.	0.9	0.9	.	.
37	0.97	0.95	.	.	0.9	0.97	0.91
38	.	.	.	.	.	.	.
39	0.53	0.16	1	.	1	.	0.94
40	1	1	0.85	.	.	.	0.91
41	0.99	0.99	0.96	.	.	0.72	0.72
42	1	0.98	0.9	.	0.78	.	1
43	0.99	1	.	0.94	0.6	.	0.65
44	0.99	0.89	.	.	.	0.97	1
45	0.98	0.89	0.93	.	.	0.94	0.65
46	.	.	.	1	1	.	.
47	.	.	.	0.98	0.88	.	0.98
48	0.32	0.5	0.9	.	.	0.88	.
49	0.94	0.97	0.66	0.75	0.9	0.89	0.98
50	.	0.96	.	.	.	.	0.81

Note : Cases that did not have multiple respondents do not have r_{wg} values

APPENDIX G

Intercorrelations among Measures

	1	2	3	4	5	6	7
1. Access to Training	--						
2. Freedom to Express Doubts	.42***	--					
3. Goal Clarity	.40***	.36***	--				
4. Reward	.28**	.32**	.69***	--			
5. Removal of Obstacles	.51***	.35***	.73***	.64***	--		
6. Monitoring of Progress	.37***	.34***	.67***	.54***	.74***	--	
7. Top Management Support	.36***	.42***	.58***	.60***	.69***	.44***	--
8. Compatibility	.49***	.35***	.16	.15	.31**	.25**	.25**
9. Resources to Support implementation	.28**	.21	.42***	.50***	.60***	.42***	.71***
10. Ongoing Slack	.26**	.37***	.41***	.35***	.46***	.17	.63***
11. Capacity to Manage Risks	.39***	.72***	.45***	.31**	.62***	.42***	.67***
12. Assimilation	.31**	.35***	.54***	.62***	.61***	.60***	.60***
13. Plan to Persist	.73***	.59***	.66***	.52***	.64***	.72***	.61***
14. Satisfaction with Progress of Innovation	.04	.00	.18	.48***	.53***	.49***	.52***
15. Innovation Effectiveness on Clients	.50***	.28**	.50***	.30**	.39***	.44***	.09
16. Innovation effectiveness on Organization	.63***	.35***	.67***	.43***	.58***	.63***	.37***
17. Consequences of Implementation	.46***	.42***	.49***	.58***	.53***	.43***	.62***
18. Effect on Clients, Staff and Organization	.43***	.28**	.50***	.48***	.56***	.56***	.49***
19. Overall Impact of Innovation	.30**	.32**	.54***	.63***	.50***	.62***	.38***
20. Extent of Reinvention	-.35***	-.23	-.51***	-.47***	-.69***	-.52***	-.46***
21. Beliefs about Maintaining Fidelity	-.20	-.02	.15	.21	.20	.11	.27**

**p < .05 ***p < .01 (All tests are one-tailed)

Appendix G: Intercorrelations among Variables (continued)

	8	9	10	11	12	13	14
1. Access to Training							
2. Freedom to Express Doubts							
3. Goal Clarity							
4. Reward							
5. Removal of Obstacles							
6. Monitoring of Progress							
7. Top Management Support							
8. Compatibility	--						
9. Resources to Support implementation	.00	--					
10. Ongoing Slack	.25**	.59***	--				
11. Capacity to Manage Risks	.28**	.45***	.57***	--			
12. Assimilation	.18	.63***	.53***	.50***	--		
13. Plan to Persist	.33**	.42***	.13	.59***	.69***	--	
14. Satisfaction with Progress of Innovation	.29**	.37***	.28**	.16	.48***	.35**	--
15. Innovation Effectiveness on Clients	.25**	.05	-.17	.10	.10	.75***	.01
16. Innovation effectiveness on Organization	.39***	.26**	.17	.28**	.40***	.82***	.27**
17. Consequences of Implementation	.17	.64***	.50***	.42***	.55***	.62***	.40***
18. Effect on Clients, Staff and Organization	.37**	.16	.21	.42***	.38**	.57***	.69***
19. Overall Impact of Innovation	.36**	-.02	-.01	.26	.43***	.71***	.66***
20. Extent of Reinvention	-.24**	-.44***	-.38***	-.49***	-.52***	-.47***	-.67***
21. Beliefs about Maintaining Fidelity	-.14	.26**	.28**	.09	.20	.07	.34**

**$p < .05$ ***$p < .01$ (All tests are one-tailed)

Appendix G: Intercorrelations among Variables (continued)

	15	16	17	18	19	20
1. Access to Training						
2. Freedom to Express Doubts						
3. Goal Clarity						
4. Reward						
5. Removal of Obstacles						
6. Monitoring of Progress						
7. Top Management Support						
8. Compatibility						
9. Resources to Support implementation						
10. Ongoing Slack						
11. Capacity to Manage Risks						
12. Assimilation						
13. Plan to Persist						
14. Satisfaction with Progress of Innovation						
15. Innovation Effectiveness on Clients	--					
16. Innovation effectiveness on Organization	.77***	--				
17. Consequences of Implementation	.33**	.51***	--			
18. Effect on Clients, Staff and Organization	.57***	.68***	.50***	--		
19. Overall Impact of Innovation	.51***	.65***	.46***	.76***	--	
20. Extent of Reinvention	-.28**	-.47***	-.38***	-.62***	-.55***	--
21. Beliefs about Maintaining Fidelity	-.05	-.03	.30**	.41***	.16	-.34**

**$p < .05$ ***$p < .01$ (All tests are one-tailed)