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Effects of Organizational Climate, Feedback-Seeking Environment and Innovation Characteristics on the Implementation of a 360-Degree Feedback System

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EFFECTS OF ORGANIZATIONAL CLIMATE, FEEDBACK SEEKING ENVIRONMENT AND INNOVATION CHARACTERISTICS ON THE IMPLEMENTATION OF A 360-DEGREE FEEDBACK SYSTEM

by

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ABSTRACT

EFFECTS OF ORGANIZATIONAL CLIMATE, FEEDBACK SEEKING ENVIRONMENT AND INNOVATION CHARACTERISTICS ON THE IMPLEMENTATION OF A 360-DEGREE FEEDBACK SYSTEM

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The present study examined the effects of organizational climate, feedback seeking environment and innovation characteristics on the implementation of a 360-degree feedback system within a large financial holdings company. The effect of user attitudes toward the 360-degree feedback system was also assessed. A sample of responses from 255 360-degree feedback system users was collected over a 14-month time period. LISREL was used to test the hypothesized structural model. Overall goodness of fit for the model was poor (using generalized least squares estimates: the Non-Normed Fit Index (NNFI) =.95, Comparative Fit Index (CFI) = .96; Root Mean Square Error of Approximation (RMSEA) = .16; using maximun likelhood estimates: NNFI =.37, CFI = .48; RMSEA = .18) thus failing to provide support for the hypothesized model. Limitations of the present study and suggestions for future research are discussed.

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CHAPTER I

INTRODUCTION

In today's competitive market, there has been a clear shift in the structure of organizations. Intense global competition, pressures to cut costs and improve performance, and changing workplace demographics have changed the work environment for most companies (Mirvis, 1997). The by-product of this environment is that change, and the management of change, has become an inevitable aspect of organizational life (Cummings & Worley, 1993).

One form of organizational change is the introduction of an innovation. In their continued efforts to remain competitive, organizations have tried—and continue to try—numerous innovations (Laborforce 2000; McCain, 1991; Mirvis, 1997). Within the area of human resources management (HRM), one recent innovation that has received considerable attention within the practitioner literature has been the use of 360-degree feedback (Westerman & Rosse, 1997; Wohlers & London, 1989).

360-degree feedback involves soliciting feedback about a target individual's performance from relevant organizational members. Where traditional appraisal systems use the supervisor as the only significant rater, 360-degree feedback systems use coworkers, subordinates, peers, customers, and others under the assumption that these sources can provide relevant, yet unique, information about an individual's performance and developmental needs (Borman, 1991; Hazucha, Hezlett, & Schneider, 1993).

The use of 360-degree feedback has grown rapidly within the last 15 years. Many large firms, such as AT&T, British Petroleum, Chrysler, General Electric, Levi Strauss, Du Pont, and Amoco, have implemented and are expanding their commitment to 360-degree appraisal systems (Moravec, Gyr, & Friedman, 1993; Santora, 1992). Moreover, as Westerman and Rosse (1997)

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have argued, with the increasing movement toward flatter, more team-based organizations, interest in 360-degree feedback systems is likely to continue.

While there has been increased interest in 360-degree feedback from practitioners, there has not been a corresponding increase in research regarding 360-degree feedback systems (Bernardin, Dahmus & Redmon, 1993; McEvoy & Beatty, 1989). As Church and Bracken (1997, p. 151) have argued, the lack of scientific research in this area has been problematic—it has forced practitioners to rely solely on "personal experience and/or trial and error approaches" when developing, implementing, and maintaining this system. More critically, Dunnette (1993, p. 373) has argued that "the available 360-degree feedback research is a hodgepodge of techniques, testimonials, cautions, methodological problems...and a lack of overall cohesion." Much of the limited research in this area has focused on the psychometric properties and acceptance of multisource feedback (for examples of this line of research see Atwater, Ostroff, Yammarino, & Fleenor, 1998; Furnham & Stringfield, 1998; Greguras & Robbie, 1998; London & Smither, 1995; Mount, Judge, Scullen, Sytsma, & Hezlett, 1998; Yammarino & Atwater, 1993). While this research is important, its specific focus provides little help for the practitioner trying to understand the nature and dynamics of these systems within the larger social context (Funderburg & Levy, 1997). Moreover, there is little empirical evidence that 360- degree feedback leads to positive individual and organizational outcomes.

The lack of research supporting the efficacy of 360-degree feedback is not new (Johns, 1993). A plethora of research has shown that many organizational interventions are unsuccessful (Macy, Bliese, & Norton, 1991). For example, in their review of the effectiveness of interventions, Porras and Robertson (1992) found that 38 percent of organizational development interventions had a positive change, 53 percent had no change and 9 percent had a negative change. Recently, researchers have argued that the failure of many innovations is due to the poor implementation of the innovation rather than due to a fundamental flaw in the innovation itself

(Bushe, 1988; Hackman & Wagman, 1995; Reger, Gustafson, DeMarie & Mullane, 1994). Klein and Speer-Sorra (1996) define innovation implementation within an organization as the process of gaining targeted employees' appropriate and committed use of an innovation. Implementation failure occurs when employees use the innovation less frequently, less consistently, or less assiduously than required for the potential benefits of the innovation to be realized (Klein & Speer-Sorra, 1996).

Drawing from two distinct lines of research (i.e., innovation-implementation and 360-degree feedback), the present study examined the factors that affect the implementation effectiveness of a 360-degree feedback system within a large financial holdings company. The following literature review is divided into three parts. First, it provides a review of the literature on 360-degree feedback. Next, it discusses the literature on innovation implementation. Finally, it will develop a model to understand the antecedents and consequences of the 360-degree feedback implementation process.

360-Degree Feedback

The premise of 360-degree feedback is well-established (London & Smither, 1995). Assessment centers developed by the German military during World War II recognized the value of gaining performance insights from multiple perspectives (Fleenor & Prince, 1997). Early methods of 360-degree feedback were survey-based and were used to gather employee opinions on a variety of topics such as compensation, benefits, leadership, and so on. The use of 360-degree instruments for individual assessment was rare prior to the 1980s. However, since the 1980s there has been increased use of 360-degree feedback for individual assessments as organizations have become more interested in the perspectives of various constituents (i.e., peers, direct reports, customers) when rating job performance (London & Smither, 1995). Although existing research is scant, it shows that 360-degree feedback systems have acceptable levels of reliability and can provide the user with unique perspectives on their performance (Arvey & Murphy, 1998).

Uses of 360-Degree Feedback

Feedback received from 360-degree assessments can be used for almost any initiative that requires extensive information about an employee's effectiveness (Fleenor & Prince, 1997; Tornow, 1993). Generally, these initiatives fall into two categories: feedback for development and feedback for administrative purposes (e.g., salary increases, promotion decisions). The key difference between these approaches is ownership of the data and how they are used (Dalton, 1996).

When 360-degree feedback is used exclusively for development, the feedback is generally available only to the user (i.e., the person being assessed) and sometimes to a facilitator trained to help the user understand the feedback. Here, there are often few limits on how the data may or may not be used by the user. It is often left up to the individual to choose how to use the data. Moreover, when used for developmental purposes, it is usually communicated in advance that the data will not be used for administrative purposes. In contrast, when used for administrative purposes, the data are usually available to the person conducting the appraisal, typically the employee's supervisor, and are often used for administrative decisions.

There is considerable debate about whether 360-degree feedback should be used for developmental or administrative purposes (Arvey & Murphy, 1998; Bracken, Dalton, Jako, McCauley, & Pollman, 1997; Crystal, 1994; Dalton, 1996). The crux of this argument is that ratings used for administrative decisions are different than those used for development (Zedeck & Cascio, 1982). Some suggest that using 360-degree feedback for administrative purposes inflates both self-ratings and peer-ratings (Antonioni, 1994; Fleenor & Prince, 1997). Beyond rating inflation, Hedge and Borman (1995) have argued that involving peers and subordinates in administrative decisions increases inter and intra-group conflict.

Others counter that users will not take the process seriously unless the 360-degree feedback process is tied to administrative decisions (e.g., Sternbergh, 1997). Antonioni (1994) found that managers viewed upward appraisals more favorably when they were given under conditions of accountability. Some organizations have begun using 360-degree feedback for both developmental and performance appraisal purposes (Dunnette, 1993; London & Beatty, 1993). When this is done, however, researchers suggest that the feedback should be used for developmental purposes first in order to acclimate employees to the system (Jones & Bearley, 1996). This will ensure that the feedback will be accepted and effective for both developmental and decision-making purposes (Romano, 1993). Researchers suggest that it also may be necessary to develop separate assessments for each purpose since developmental ratings often focus on providing the 360-participant with information on how they can improve their current performance rather than an evaluation of the past year's performance (Harvey, 1994; Yukl & Lepsinger, 1995). Overall, when reviewing this research, it should be remembered that much of it is based on personal experiences and case studies published by practitioners.

Suggested Benefits of 360-Degree Feedback

360-degree feedback systems are believed to have a number of advantages over traditional appraisal systems (Hazucha et al., 1993; London & Beatty, 1993; London & Smither, 1995; Mount et al., 1998; Tornow, 1993). Four of these advantages are discussed below.

First, 360-degree assessments offer new perspectives by which an individual's performance can be judged (Ashford, 1993; Mohrman, Resnick-West, & Lawler, 1990; Smither, Wohlers, & London, 1995). Because 360- degree-feedback assessments obtain input from multiple raters, the feedback creates a more complete picture of an individual's performance and skills (Fleenor & Prince, 1997). Research on alternatives to the traditional "top down" or superior source of appraisal has shown that additional sources of appraisal information, such as peers and customers, provide valid and unique sources of information about performance and reduce rater error (Jones & Bearley, 1996; Murphy & Cleveland, 1991).

Second, 360-degree feedback assessments provide the unique opportunity for individuals to rate themselves (Dunnette, 1993; London & Beatty, 1993; Hoffman, 1995; Jones & Bearley, 1996; Smither, London, Vasilopoulos, Millsap, & Salvemini, 1995) and adds yet another perspective from which performance and behavior can be observed (Fleenor & Prince, 1997). It is argued that the act of self-assessment can positively affect the implementation and administration of the process as well as its feedback because employees tend to place more trust in a process in which they themselves participate (Fleenor & Prince, 1997; McEvoy & Buller, 1987).

Third, 360-degree feedback increases self-awareness and self-image evaluation (London & Smither, 1995). London and Smither (1995) have suggested that 360-degree feedback identifies performance discrepancies through differences in self and other's perceptions that can lead to changes in goals, behaviors and performance.

Fourth, 360-degree feedback reinforces organizational values and vision, for example, values concerning empowerment and upward influence (London & Smither, 1995; London & Beatty, 1983). Firms implementing 360-degree feedback report improved communication (e.g., a greater feedback seeking environment, teamwork, feeling of empowerment, and trust). Bernardin and Beatty (1987) suggest that upward feedback systems increase team functioning by forcing management and employees to gain a better understanding of each other's jobs.

Ultimately, it is expected that 360-degree feedback will improve individual and organizational performance. However, it is important to note that there is little direct evidence that 360-degree feedback directly leads to increased performance. Indirect evidence comes from a meta-analysis by Kulger and DeNisi (1996) that examined the effects of feedback on performance. They found that the average performance difference (expressed in standard deviation units) between groups receiving feedback interventions and no feedback (control) was

.41, thereby indicating that feedback was associated with enhanced performance. (It should be noted that about one third of the effects on performance was negative, and that these studies did not specifically examine 360-degree feedback). London and Smither (1995) have argued that feedback itself does not lead to performance improvement. Rather, as Locke and Latham (1990) have illustrated, the positive effects of feedback on development and performance depend on goal setting. Setting specific, difficult and achievable goals is the key to behavior change (Locke, Shaw, Saari, & Latham, 1981).

Overall, research on the suggested benefits of 360-degree feedback is still in its infancy. Research that is available suggests that 360-degree feedback can lead to better communication and trust among organizational members and, when tied to goals, can lead to increased performance. However, as suggested by Klein and Speer-Sorra (1996), an organization will only achieve its intended benefits if the 360-degree feedback system is implemented effectively and accepted by its users.

The data for the present study were collected at Company XYZ as it implemented an intranet-based 360-degree feedback system (see the Method section for a full description of the sample and 360-degree feedback system used at Company XYZ). As this 360-degree feedback system was new to the organization, it can be viewed from the innovation implementation paradigm. The next section provides a review of the innovation implementation literature.

Implementation Effectiveness

Overview of Innovation

To understand implementation effectiveness, it is first necessary to understand the concept of organizational innovation. Organizational innovation can be defined as any new practice, process, or procedure that is new to the adopting organization (Damanpour & Evan 1984; Johns 1993). Organizational innovation can be viewed as a component of organizational change since all organizational innovations involve organizational change (Knight, 1967).

Moreover, organizational innovation is also closely related to the concept of invention. Some models of innovation pay particular attention to the inventive aspect of the innovation (e.g., Amabile, 1988; Kanter, 1983). However, as Mohr (1969) notes, it is wise to separate invention from innovation because their correlates tend to differ. Since 360-degree feedback has been used in some form, for over 25 years, it is most appropriate to view it from an innovation, not invention, perspective.

Innovation Initiation vs. Implementation

Researchers have also made a distinction between innovation initiation and innovation implementation (Glynn, 1996). The initiation stage has been defined as "all activities pertaining to problem perception, information gathering, attitude formation, and evaluation, and resource attainment leading to the decision to adopt" (Damanpour, 1991, p. 562). Generally, the impetus for organizational innovation arises when the organization's management perceives that the organization's present course of action is less than ideal, or current techniques are perceived as unsatisfactory (Daft, 1978; Downs & Mohr, 1976; March & Simon, 1958). The organization may either develop or buy the technology to address the performance gaps (McCain, 1991).

Once the decision is made to purchase or develop the innovation, the next step is the implementation stage. Innovation implementation can be defined as the process of gaining targeted employees' appropriate and committed use of an innovation (Klein & Speer-Sorra, 1996). It is important to note that innovation implementation presupposes innovation initiation—that is, a decision, typically made by senior management, that employees within the organization will use the innovation in their work. Researchers have also suggested that implementation effectiveness is a necessary but not sufficient condition for innovation effectiveness (Fullan & Pomfret, 1977; Klein & Speer-Sorra, 1996). Although an innovation is extremely unlikely to yield significant benefits to an adopting organization unless the innovation is used consistently and well, effective implementation does not guarantee that the innovation will, in fact, prove to be beneficial for the organization (Klein & Speer-Sorra, 1996).

Overall, there has been little systematic research on innovation implementation in organizations (Nord & Tucker, 1987; Kimberly, 1981). Qualitative, single-site case studies have dominated this literature (Klein & Speer-Sorra, 1996; Markus, 1987; Roitman, Liker, & Roskies, 1986). These studies have suggested that several characteristics may influence innovation use, such as training in innovation-use (Fleischer, Liker, & Arnsdorf, 1988), user support services (Rousseau, 1989), time to experiment with the innovation (Zuboff, 1988), praise from supervisors for innovation use (Klein, Hall, & Laiberte, 1990), financial incentives for innovation use (Lawler & Mohrman, 1991), job reassignment of those who do not use the innovation (Klein et al., 1990), budgetary constraints on implementation expenses (Nord & Tucker, 1987), and the user-friendliness of the innovation (Rivard, 1987).

Most of the quantitative research in this area has focused on the effects of organizational structure on the implementation process (see Damanpour, 1991 for a full review) and has not examined social and contextual factors that are also important to understanding implementation effectiveness. Katz and Kahn (1978) and others (Bartle & Davis, 1998; Damanpour, 1991; Hausser, 1980) have found that organizational structure is insufficient to understand individual behavior and attitudes since organizational designs are incomplete; actual human behavior is more complex and variable than any organizational design can accommodate.

Taking a somewhat different approach, Klein and Speer-Sorra (1996) have argued that implementation effectiveness is a function of the organization's climate for the implementation of an innovation. Drawing on Schneider's (1975) research on work climate, Klein, Cunn and Speer-Sorra, (1999) define an organization's climate for the implementation of a given innovation as the employees' perception of the importance of the innovation implementation within the organization. As Klein and Speer-Sorra (1996) argue, the more comprehensively and consistently implementation policies and practices are perceived by the targeted employees to *encourage*, *cultivate*, and *reward* their use of a given innovation, the stronger the climate for the implementation of that innovation.

Climate for implementation differs from other forms of climate in that it specifically focuses on the innovation process (Klein & Speer-Sorra, 1996). This construct is also congruent with the perspective that there are many differing types of climate within an organization, for example, climate for service (Schneider, Wheeler & Cox, 1992), safety (Zohar, 1980), and innovation (Abbey & Dickson, 1983), to name a few.

Drawing on the 360-degree feedback, innovation and climate for implementation research literatures, a model of 360-degree implementation effectiveness is proposed below. This model expands beyond traditional models to include important antecedents (e.g., feedback seeking environment, climate for innovation), process variables (e.g., innovation characteristics) and consequences (e.g., feedback acceptance, goal setting, performance intentions, and increased communication and trust) associated with the effective implementation of a 360-degree feedback system.

360-Degree Feedback Implementation Model

The model that was tested is depicted in Figure 1. The model is divided into three parts: antecedents, process variables and consequences. The process variables will be discussed first followed by the antecedent and consequence variables. This approach was used as to provide a description of the variables central to the thesis of the present study (i.e., Psychological Climate for 360-Degree Feedback Implementation and User Attitudes Toward the Innovation) followed by their predictors and outcomes. In all cases, the paths and the expected direction of the relationships (i.e., positive or negative) are discussed.

Process Variables

User attitudes toward the innovation. Klein et al., (1999) and Kossek (1989) have shown that attitudes formed about the innovation during its implementation are important elements of implementation effectiveness. Research in the area of performance appraisal has also shown the importance of user attitudes toward system use (e.g., Bass & Barrett, 1981; Bernardin, Dahmus & Redmon, 1993; Bernardin & Beatty, 1984; Berndt, 1992). For example, Carroll and Schneier (1982) have argued that regardless of the system's psychometric soundness, it will be unsuccessful if it is not accepted and supported by its users.

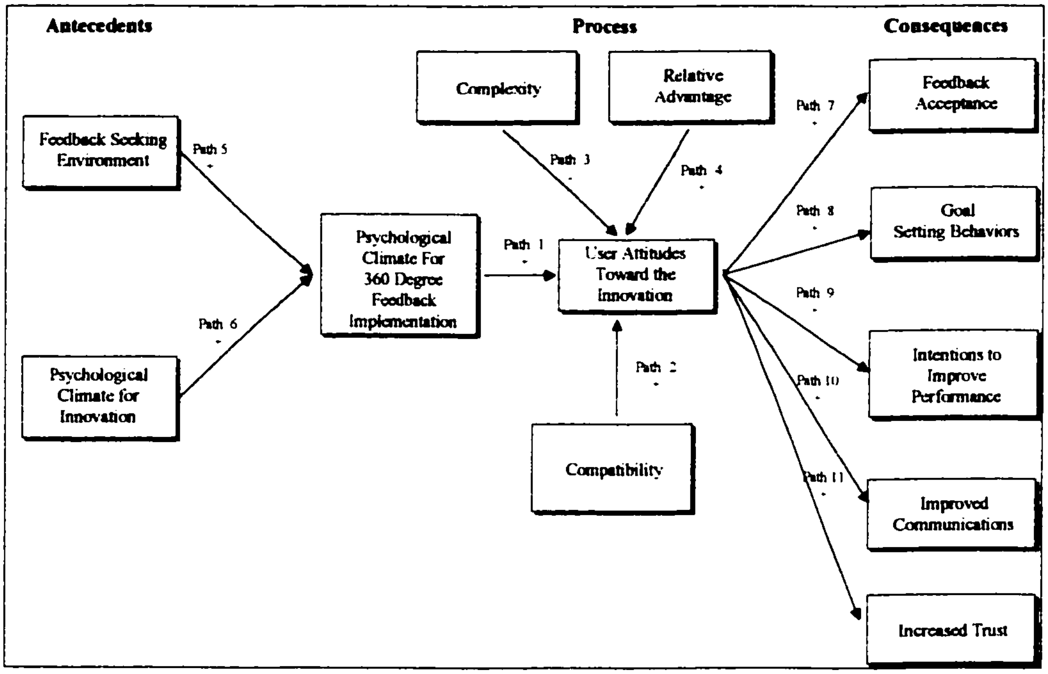

Figure 1. Hypothesized model of 360-degree feedback implementation.

The present research examined two facets of user attitudes toward the innovation: user satisfaction with the innovation and user commitment to the innovation. Within the innovation literature, when examining user attitudes towards the innovation, researchers have focused on user satisfaction and commitment to the innovation (Steele, 1997). In the area of satisfaction, most of our understanding comes from the study of management information systems (Meyer & Goes, 1988; Rivard, 1987; Steele, 1997) and marketing literatures (Oliver, 1980, 1981). In the management information systems literature, user satisfaction (operationalized as user behaviors and affective reactions toward the information technology) is often viewed as a surrogate for information system effectiveness (Gatian, 1994; Rivard, 1987; Steele, 1997; Zviran, 1992). Likewise, research in the area of consumer satisfaction has shown that consumer perceptions of the degree to which product performance exceeds, meets, or falls short of expectations significantly correlates with satisfaction with the product and other post-usage phenomena (Heath, Hultberg, Ramey, & Ries, 1984; Oliver & Bearden, 1985).

In the area of user commitment to the innovation, most of our understanding has come from research on organizational commitment (Mathieu & Zajac, 1990). Generally, this research has looked at the attitudinal aspects of commitment (i.e., the relative strength of involvement and identification with an organization; Williams & Hazer, 1986). Research in this area has shown a significant relationship between organizational climate, organizational commitment, and numerous attitudinal and behavioral outcomes (see Mathieu & Zajac, 1990 for a review). However, it is important to note that most of this research has focused on organizational commitment and not commitment to an innovation as defined here. Unlike in the job satisfaction/job commitment literature where there is evidence that job satisfaction and organizational commitment are similar yet distinct constructs (Mathieu & Zajac, 1990), most research in innovation combines user satisfaction and commitment to the innovation into a single construct (Klein et al., 1999; Steele, 1997). Unless not supported by the confirmatory factor analyses, user attitudes towards the innovation will be treated as a single latent variable in the research study described here.

Psychological climate for 360-degree feedback implementation. Path 1 suggested a positive relationship between psychological climate for 360-degree feedback implementation and user attitudes toward the innovation. Research has shown that an organization's positive climate for a specific outcome may influence behaviors and attitudes regarding that outcome (Klein et al., 1999). For example, research has shown the following: climate for service predicts customer service (Schneider & Bowen, 1985; Schneider, White & Paul, 1998); climate for transfer of training predicts training transfer (Roulliler & Goldstein, 1993; Tracey, Tannenbaum, & Kavanaugh, 1995); climate for technical updating predicts technical performance among engineers (Kozlowski & Hults, 1987); and climate for innovation predicts the number of innovations within the organization (Abbey & Dickson, 1983; Paolillo & Brown, 1978; Scott & Bruce, 1994; Siegel & Kaemmerer, 1978). More specific to the present research, Klein et al., (1999) found that climate for the implementation of resource planning software predicted the consistency and quality of software used by target users as well as their positive attitudes toward the system.

What are the dimensions of psychological climate for 360-degree feedback implementation? Drawing from their review of the research on technological innovation implementation (i.e., Klein & Ralls, 1997; Rivard, 1987; Rousseau, 1989; Zuboff, 1988), Klein et al., (1999) have identified several policies, procedures and practices that may affect implementation effectiveness. These include the quality and quantity of training provided to employees on the use of the new technology, user support for the system, rewards for technology use, and the provision of time to use the system.

When applied to the implementation of 360-degree feedback, implementation climate is inherently psychological. One would expect that individual level differences, such as individual thinking styles, personality, and cognitive processes affect users' perceptions of the degree to which they feel rewarded for using the system, trained to use the system, supported for system use, and have sufficient time to use the system.

Innovation characteristics. A large body of literature focuses on whether the characteristics of innovations influence their adaptability (Rogers & Shoemaker, 1971; Rogers, 1995), and whether these relationships vary across settings (Downs & Mohr, 1976; Tornatzky & Klein, 1982). In their meta analysis of 75 innovation adoption studies, Tornatzky and Klein (1982) found a significant relationship between three characteristics of innovations (i.e., compatibility, relative advantage, and complexity) and rate of adoption and implementation. Each of these constructs is discussed below.

Compatibility refers to the degree to which an innovation is perceived as being consistent with the existing values of potential adopters (Rogers, 1995). To understand how compatibility affects users' attitudes, one must look at individual values.

In their review of the literature, Meglino and Ravlin (1998) made the distinction between values "inherent within an object" and values "possessed by a person" (see also Rokeach, 1973). Values possessed by the person refer to the terminal (i.e., self sufficient end states of existence that a person strives to achieve such as comfort, life wisdom) and instrumental (i.e., modes of behavior such as honesty, wisdom) values. On the other hand, values inherent within an object refer to the values that an individual places in an object or outcome (e.g., the value an individual places in pay). As with the valence term used in the expectancy model of motivation (Vroom, 1964), these objects or outcomes acquire value through their instrumental relationship with other outcomes which, in turn, are instrumental to other objects or outcomes. It is important to recognize here that objects or outcomes do not possess innate value apart from the value attached to them by individuals (Meglino & Ravlin, 1998). The present study takes the latter view of values (i.e., the value an individual places in an event or outcome). With 360-degree feedback, values refer to the individual's value for feedback from managers, peers, direct reports, and customers.

Rogers (1995) proposed that innovations that are compatible with the values of potential users will be adopted more rapidly than innovations that are incompatible. Outside of the innovation literature, research has shown that perceived value congruence between the individual and the organization relates positively to affective outcomes, including satisfaction, commitment, and involvement (Cable & Judge, 1996; Chao, O'Leary-Kelly, Wolf, Klein, & Gardner, 1994; Harris & Mossholder, 1996; Klein & Speer-Sorra, 1996; Lee & Mowday, 1987) and relates negatively to job search behavior and intention to leave the organization (Cable & Judge, 1996; Lee & Mowday, 1987).

Overall, these findings suggest that working in an environment that is consistent with one's values is a more positive experience at many levels (Meglino & Ravlin, 1998). Thus, Path 2 suggests a positive relationship between users' perceptions of innovation compatibility (i.e., users' value for feedback) and their attitudes toward the innovation.

Complexity refers to the degree to which the innovation is perceived as difficult to understand and use. Within the information technology literature, this construct is often termed "user friendliness of software tools" (Geisler & Rubenstein, 1987). Meyers and Harper (1984) suggest that a user-friendly tool is one that requires the user to learn only a few new concepts and is easy to remember in order to get started. Beatty and Gordon (1988) found that perception of quality, accessibility and user friendliness of the technology can affect its implementation (Beatty & Gordon, 1997). Moreover, in a related line of research, Steele (1997) found that perception of innovation complexity was negatively related to user-satisfaction with the system.

Relative advantage refers to the degree to which an innovation is perceived to be better than the idea that supersedes it. According to Rogers (1995), it does not matter if the innovation has a great deal of objective advantage; rather, what is important is if the individual perceives the innovation to be advantageous in comparison to the status quo.

Taken together, this research suggests that if the innovation itself is perceived by its potential users as complicated, poorly designed and not "adding value" to the process, it is unlikely that users will modify their behavior (Gross, Giacquinta, & Bernstein, 1971). As a result, the innovation will be much more difficult to implement and will require substantially more implementation resources. Thus, Path 3 suggested a negative relationship between complexity and user attitudes toward the innovation and Path 4 suggested a positive relationship between relative advantage and user attitudes toward the innovation.

Antecedents

Researchers have identified numerous antecedents to climate, such as elements in the physical and socio-cultural environment, structural characteristics, culture, size, technology, leadership behavior, and policies and practices (e.g., James & Jones, 1974; Litwin & Stringer, 1968; Tesluk, Farr, & Klein, 1997). The present study will focus on two antecedents: feedback seeking environment and psychological climate for innovation. Each of these antecedents is discussed below.

Feedback seeking environment. Innovations operate within a larger organizational context (Tesluck et al., 1997). One important element of this organizational context is the organization's culture (Schein, 1990). Culture represents the basic values and norms that underlie the policies and procedures within the organization (Schneider, Gunnarson & Niles-Jolly, 1994; Schneider & Rentsch, 1988). It represents the "unwritten rules" concerning what is tolerated within the organization.

Research has shown that culture is multidimensional (see Furnham & Gunter, 1991 for a review). With specific reference to 360-degree feedback, organizations will differ in their receptivity or ease with which employees can seek and feel comfortable seeking feedback, especially from non-traditional sources (i.e., peers and reports). Levy and Steelman (1994) found that individuals who felt encouraged and rewarded to seek feedback by the organization were more likely to do so than those who believed seeking feedback was not supported by the organization. With specific reference to 360-degree feedback, Funderburg and Levy (1997) found that a positive feedback environment explained unique variance in employees' attitudes toward a 360-degree feedback system. Thus, Path 5 suggested a positive relationship between feedback seeking environment and psychological climate for 360-degree feedback implementation.

Psychological climate for innovation. Path 6 suggested a positive relationship between psychological climate for innovation and psychological climate for 360-degree feedback implementation. Previous research at both the organizational, group, and individual levels has offered empirical support for the effects of climate for innovation on levels of innovation within an organization (Abbey & Dickson, 1983; Paolillo & Brown, 1978; Siegel & Kaemmerer, 1978) and innovative behavior (Amabile & Gryskiewicz, 1989; Scott & Bruce, 1994). It is also important to note that some researchers have argued that the impact of organizational characteristics differs during the adoption and implementation stages in the innovation process (e.g., Duncan, 1976). However, meta-analysis by Damanpour (1991) has found little support for this model.

More recently, researchers have suggested that a climate that promotes innovation will have a positive effect on the implementation of that innovation. For example, in a conceptual model that examines the effects of individual and organizational intelligence on innovation, Glynn (1996) proposes that organizational characteristics that promote innovation will positively influence the implementation of the innovation. Researchers have also suggested that innovative organizations are characterized by a general orientation toward change and the acceptance and promotion of new ideas (Scott & Bruce, 1994; Siegel & Kaemmerer, 1978).

Climate for innovation has been traditionally treated as an individual or psychological level construct (for example see Scott & Bruce, 1994). Others have aggregated this construct and used it as an organizational level construct (see Davis & Dickinson, 1999). For the present study, climate for innovation was defined at the individual or psychological level. The large amount of change that has occurred within Company XYZ during the past two years reduces the likelihood that there is a single, unified climate within the company. One would therefore expect the majority of the variance in perceptions to occur at the individual level. However, unlike other conceptualizations of this construct that use the "organization" as the referent, for theoretical and measurement parsimony, this study will use the "individual" as the referent.

Consequences

For the purposes of the present study, five outcomes of user attitudes toward the innovation were identified: feedback acceptance, goal setting, intentions to improve performance, increased communications and improved trust. Each of these consequences is discussed below.

Feedback acceptance. The facilitative effect of feedback upon performance is well-documented (Ilgen, Fisher, & Taylor, 1979; Ilgen & Moore, 1987). As part of any formal or informal appraisal process, feedback serves the following two functions: it keeps goal-directed behavior on course, and it can act as an incentive to stimulate greater effort among workers (Cascio, 1991). However as Ilgen et al. (1979) have argued, user acceptance of feedback impacts the degree to which the feedback system will be used and whether it will continue to be used after its development and implementation (Bass & Barrett, 1981; Berndt, 1992; Kavanagh, 1981).

Previous research in the area of performance appraisal has shown that appraisal system acceptability is determined most strongly by perceptions of appraisal fairness and accuracy (Kavanagh, Hedge, Ree, Earles, & DeBaisi, 1985; Bustamante & Dickinson, 1996). This research suggests that how well the appraisal system is communicated (e.g., purpose of the feedback and how rating scores are determined) and implemented (feedback training and support) will lead to greater acceptance of the 360-degree feedback. Moreover, researchers have also reported the impact of organizational contextual variables at the individual (e.g., task variability, role characteristics), group (e.g., leader trust) and unit levels (e.g., standardization, centralization) on performance appraisal acceptance (Davis & Dickinson, 1998). Thus, Path 7 suggested a positive relationship between user attitudes toward the innovation and feedback acceptance.

Increased goal setting. London and Smither (1995) have argued that feedback by itself does not lead to performance improvement. Rather, as Locke and Latham (1990) have illustrated, the effects of feedback on development and performance depend on goal setting. An important outcome of the 360-degree feedback process for Company XYZ is that employees understand their developmental weaknesses and use this feedback to create a developmental action plan to target these areas. One would expect that users who have a positive reaction to the 360-degree feedback system would be more likely to understand their developmental weakness and continue to use the system to develop their action plans. Thus, Path 8 suggested a positive relationship between user attitudes toward the innovation and goal setting.

Intentions to improve performance. Path 9 suggested a positive relationship between user attitudes toward the innovation and intentions to improve performance. Beyond the emotional and cognitive components of attitudes, a third element of work attitudes is behavioral intentions. Behavioral intentions reflect the way that an individual intends to act given certain stimuli. Research has shown a relationship between intentions and behavior. For example, Mobley, Griffeth, Hand, and Meglino (1979) and Williams and Hazer (1986) have found that intention to leave an organization correlates with turnover behavior. For the present study, an important outcome of the 360-degree feedback system for Company XYZ is whether users intend to use their 360-degree feedback to improve their performance. Path 9 suggests a positive relationship between user attitudes toward the innovation and intentions to improve performance.

Improved communication. As suggested above, proponents of 360-degree feedback suggest that this method increases communication within the organization (Bernardin & Beatty, 1987; London & Smither, 1995; London & Beatty, 1993). They suggest that by providing peers and direct reports with the opportunity for feedback, this will create a climate for feedback where increased communication is a by-product. However, it is important to note that there is little research to support this contention (see London & Smither, 1995 for a review of this literature). Despite the limited research on the effectiveness of 360-degree feedback, Path 10 suggested a positive relationship between user attitudes toward the innovation and improved communication with their coworkers.

Increased trust. A final benefit of 360-degree feedback suggested by its advocates is that by opening the review process to peers and direct/indirect reports, 360-degree feedback will lead to greater trust among coworkers (Bernardin & Beatty, 1987; London & Smither, 1995; London & Beatty, 1993) Path 11 suggested a positive relationship between user attitudes toward the innovation and increased trust in their coworkers' ability to evaluate their performance.

The present study tested the model depicted in Figure 1. It was hypothesized that the paths depicted in the model would be confirmed by the data collect at Company XYZ.

CHAPTER II

METHOD

The method for this study are presented in seven sections corresponding to: (1) participants, (2) power analysis, (3) implementation surveys, (4) measures, (5) assessment of common method variance, (6) scale development, and (7) structural model assessment.

Participants

The present study examined the implementation of a 360-degree feedback system within Company XYZ. Company XYZ was a large financial holdings company consisting of 10 separate business units located within the continental United States (locations in Central America, Asia and Europe were excluded from this study). The size of each business unit ranged from approximately 120 to over 2000 employees. From 1996 to 2001, Company XYZ had grown from fewer than 3000 employees to over 19,000 employees primarily through strategic acquisitions. Business units were overseen by corporate headquarters located in Virginia. Before the acquisition by Company XYZ, each of the major business units was a distinct company with separate operations and business cultures.

In August, 1998, corporate management purchased an intranet-based 360-degree feedback system to be implemented company-wide. The 360-degree feedback system worked as follows. An employee wishing to receive 360- degree-feedback accessed the system via a secure intranet link. Once on-line, the employee completed a self-assessment (consisting of 50 behaviorally based questions designed around seven core organizational values), selected 10 to 12 reviewers (which included their manager, peers, and direct reports). The system then notified these reviewers via email and instructed them to access the system to complete the assessment. Reviewers' responses were completely confidential; at no time could the employee identify who had or had not completed the assessment.

Once complete, the employee was required to attend a two-hour workshop to receive her feedback data. During this workshop, employees received training on how to read and interpret their report and how to complete their developmental action plan. Facilitators were also available during the workshop to answer questions and provide links to additional resources if necessary.

The 360-degree feedback program within Company XYZ was designed to be used for developmental purposes only—it was communicated to both users and reviewers that 360-degree feedback was strictly confidential and would not be tied to any administrative decisions. The 360-degree feedback system was also tied to goal setting. Upon receiving their feedback, users were required to complete a detailed action plan (with estimated completion dates) designed to address each of their top three developmental areas. An online library of support resources (e.g., training classes, developmental opportunities, and HR contact staff) was available to assist users with action planning. While users were not required to share their feedback with their manager, they were required to share their action plan with their manager.

Participants in the study included leaders receiving 360-degree feedback and other employees without supervisory responsibilities who participated in the 360-degree feedback process as part of a broader department/team-wide intervention. Everyone participating in the 360-degree process was sent a survey asking them to participate in the study. Of the 383 participants who received 360-degree feedback, 270 elected to participate in the study. This resulted in a response rate of 70 percent.

Power Analysis

A power analysis was conducted to determine the necessary number of subjects required to achieve acceptable levels of power (i.e., power >.80). Researchers have long been concerned with the possibility of rejecting the null hypothesis when it is in fact correct (i.e., making a Type I error). Less attention has been devoted to the possibility that researchers will fail to reject the null hypothesis when it is, in fact, false (i.e., making a Type II error; Murphy & Mayors 1998). While there are clear guidelines for researchers conducting power analyses with many common univariate statistics (e.g., *t* statistic, *F* statistic, *r*, and so on; see Cohen, 1988 for a review), there are considerably fewer guidelines for use in structural equations modeling (SEM) techniques, which were used in this study (Schumacker & Lomax, 1996).

MacCallum, Browne and Sugawara (1996) have developed a procedure for estimating power and associated minimum sample size based on the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). The RMSEA is an indication of model fit and is based on the population discrepancy function. RMSEA is based on the property that the minimum value of the discrepancy function is equal to (or approximated by) the Σd^2 discrepancy term, where the discrepancy term represents the systematic lack of fit of the model estimator (see MacCallum et al., 1996 for a complete discussion). Generally, RMSEA values of > .10 indicate a poor model fit, values of .05 to .10 indicate a moderate model fit, and values of <.05 indicate a superior model fit.

According to this approach, the null hypothesis (H_0) refers to the hypothesized value of the RMSEA (let this value be e_1.). If H_0 is false, the actual value of the RMSEA is not e_1 but value e_a. The value of e_a represents the lack of fit of the specified model in the population. As MacCallum et al. (1996) suggest, the difference between e_1 and e_a reflects the effect size and identifies the degree to which H_0 is incorrect. (Note that MacCallum et al. (1996) caution that the numerical difference between the two values is not the numerical value of the effect size—power depends on the particular values of e_1 and e_a chosen). In this approach, the required sample size is a function of the degrees of freedom of the hypothesized model, the expected power, and the expected fit of the model (i.e., the fit between the model and actual variance/covariance matrices given an arbitrarily defined alpha level). Because the present research can be considered exploratory, a "not so close fit" criteria were selected (see MacCallum et al., 1996 for a complete description). Given the 55 degrees of freedom in the hypothesized model, an alpha level of .05, power of .80, and a "not so close fit" of the model, the minimum sample size of $n = 200$ was required.

However, it is important to note that the estimated required sample size is not solely a function of the power of the statistic and its effect size. In SEM, the researcher often requires a much larger sample size to increase the accuracy of estimates (especially with non-normal data) to ensure representativeness (MacCallum et al., 1996; Schumacker & Lomax, 1996).

Ding, Velicer, and Harlow (1995) have proposed that a sample size of 50 is "very poor," 100 is "fair," 200 is "good," and 500 is "excellent." Bentler and Chou (1986) recommended an adequate sample size could be based on a sample to parameter ratio of 5 to 1 for normally or elliptically distributed data, and a ratio of 10 to 1 for nonnormal data. In contrast, Tanaka (1987) recommended a ratio of 4 to 1 for multivariate normal data. Boomsma (1982) has proposed a minimum sample size of 200 for testing structural equation models, while Tanaka (1987) stated that a sample size of 100 was adequate in most applications. Given the results of the power analysis and the guidelines identified above, a sample of 270 participants was collected.

Implementation Surveys

Three surveys were used to collect the data for the present study. Because the data collection plan required that participants complete three separate surveys, participants were asked to put their mother's maiden names and initial on each survey. This was done to maintain participants' confidentiality. Once their data were entered into the database, these names were deleted and the original surveys were destroyed.

The data collection plan is outlined in Table 1. The timing of the survey was intended to coincide with logical breaks in the process (i.e., before starting the process, after participants attended the Feedback Workshop, and after they had a developmental meeting with their manager) to minimize the amount of time required for respondents to complete each survey. The outcome variables (i.e., feedback acceptance, goal setting, intentions to improve performance, improved communication, and increased trust) were measured approximately ten weeks after participants started the process and four weeks after receiving their feedback. To ensure immediate follow-up on their feedback and action plans, users were given two weeks to review, refine, and begin to execute their action plans. These aggressive time goals are congruent with the culture of Company XYZ, which is extremely fast paced and aggressive. While the performance appraisal process occurs annually, employees were expected to take immediate action to address any identified performance deficiencies. Data collection took 14 months.

Table 1

Data Collection Timeline

Survey 1	*Survey 2*	*Survey 3*
Distributed to participants beginning mid-June, 1999	Distributed to participants immediately following the Feedback Workshop (approximately six weeks after starting the process)	Distributed to participants approximately one month after they received feedback

The first survey measured participants' perceptions of the innovation climate and the feedback seeking environment within their work unit as well as the compatibility of the innovation with their individual values. Demographic information was also collected in this survey. Participants were asked to identify their business unit and the length of time they were in their current position. Moreover, because most of the business units were acquired during the five years preceding data collection, participants were also asked to indicate how long they were an employee in Company XYZ. This part of the survey was sent to participants prior to starting the 360-degree feedback process. Participants returned completed surveys to a central location.

The second survey measured participants' perceptions of the innovation's characteristics (i.e., complexity and relative advantage), perceptions of the climate for 360 degree feedback, and attitudes toward the innovation. This survey was distributed immediately after completion of the

360-Degree Feedback Workshop. By this time, participants had two hours of self-directed time and three hours of supervised instruction on the system. After completion, participants placed the surveys in an envelope, sealed it, and returned it to the 360-degree feedback instructor.

The third survey measured the outcome variables for the study (i.e., participants' acceptance of their feedback, goal setting, intentions to improve their performance, perceptions of improved communication, and trust). This survey was mailed to respondents approximately one month after completing the 360-degree feedback process and after participants had their action planning discussion with their manager.

On the front of each survey was a letter signed by the Vice President of Organizational Effectiveness. In this letter, the purpose of the study was explained and assurance was provided that the data collected from the survey would be confidential and would not affect employment at Company XYZ. A telephone hotline was also included in the communication materials. Participants were asked to call if they had questions. (See Appendix A, Table A4 for example surveys).

Measures

Psychological Climate for Innovation

Five items were adapted from Davis and Dickinson's (1999) measure of innovation, which, in turn, were adapted from measures of organizational climate developed by Gordon and Cummings (1979), Payne and Pheysey (1971), and Siegel and Kammerer (1978). Specifically, this scale measured the degree to which respondents were encouraged to try new and creative ways of performing their work. All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree," and the high anchor (5) was "strongly agree." Davis and Dickinson (1999) report alpha levels of .95 for this scale (See Appendix A, Table A4, items 1 to 5).

Feedback-Seeking Environment

Five items developed by Ashford (1985) were used to assess how favorable the organization's environment is for seeking performance feedback. Specifically, this scale measured the effort required by individuals to receive feedback in the organization (2 items) and the risk in seeking feedback in the organization (3 items). All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A4, items 6 to 10).

Innovation Characteristics—Compatibility

Meglino and Ravlin (1998) argue that when studying values, researchers should develop specific scales tailored to measure the value of interest. Ashford's (1985) three item measure of value for feedback (alpha = .72) was used. All items in this scale were rated on a five -point scale; the low anchor (1) was "strongly disagree," and the high anchor (5) was "strongly agree."

Moreover, four additional items were added to measure participants' value for feedback. On a five-point scale (where the low anchor (1) was "unimportant" and the high anchor (5) was "very important"), participants identified the degree to which the following sources of formal performance feedback are important to them: manager(s), peers, reports, and customers. (See Appendix A, Table A4, items 11 to 17 for scale items).

Innovation Characteristics—Complexity

Four items pertinent to the focus of the present study were adapted from Klein et al.'s (1999) hardware and software quality and accessibility scale. These items measured the complexity of the system such as user friendliness, system responsiveness to commands, and system functionality. All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A5, items 1 to 4 for scale items).

Innovation Characteristics—Relative Advantage

A single item was adapted from Klein et al.'s (1999) hardware and software quality and accessibility scale. This item measured the perceived relative advantage of the system over previous systems. This item was rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A5, items 5 for scale items).

Psychological Climate for 360-Degree Feedback Implementation

Thirteen items were adapted from Klein et al's. (1999) measure of implementation policies and procedures. Questions were designed around four scales: availability of training (four items), user support for 360-degree feedback (two items), time to experiment with the 360-degree feedback system (two items), level of communication about the 360-degree feedback system (three items), and reward for using the 360-degree system (two items). All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A5, items 6 to 19 for scale items).

User Attitudes Toward the Innovation

Two facets of user attitudes toward the innovation were measured: satisfaction with the innovation and commitment to the innovation. To measure satisfaction with the innovation, two items were adapted from the Kossek (1989) measure of attitudes toward HRM innovations. Additionally, two items were adapted from Klein et al.'s (1999) measure of implementation effectiveness. These items were selected since they measure users' satisfaction with the system as a whole. To measure their commitment to the innovation, three items were adapted from the Mowday, Steers, and Porter (1979) measure of organizational commitment. Items in the scale measured users' willingness to put forth a great deal of effort to make the 360-degree feedback process a success, their intention to speak favorably about the process, and their loyalty to the process. All items on both scales were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A6, items 1 to 7 for scale items).

Feedback Acceptance

Two items were adapted from the Kernan, Heimann, and Hanges (1991) measure of feedback acceptance. Participants were asked to evaluate the quality (rated on a five-point scale; the low anchor (1) was "poor" and the high anchor (5) was "excellent") and accuracy (rated on a 5-point scale; the low anchor (1) was "not at all accurate," and the high anchor (5) was "very accurate") of their feedback data. (See Appendix A, Table A6, items 8 and 9 for scale items).

Goal Setting

Three items were constructed to measure users' goal setting activities. Users rated the extent to which their 360-degree feedback has helped them to understand their job performance, helped them to understand how to improve their performance, and helped them to develop action plans to improve their performance. All items on both scales were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A6, items 10 to 12 for scale items).

Intentions to Improve Performance

Four items were constructed to measure users' intentions to improve their performance. Users rated the degree to which they intended to use their 360-degree feedback for personal development, to implement their action plan, and to follow-up with their manager in the future. All items on both scales were rated on a five-point scale; the low anchor (1) was "strongly disagree," and the high anchor (5) was "strongly agree." (See Appendix A, Table A6, items 13 to 16 for scale items).

Improved Communications

Three items were developed to measure users' perceptions of the degree to which the 360-degree feedback system improved communication with coworkers. All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree" and the high anchor (5) was "strongly agree." (See Appendix A, Table A6, items 17 to 19 for scale items).

Increased Trust

Three items were developed to measure users' perceptions of the degree to which their coworkers could fairly evaluate their performance. All items in this scale were rated on a five-point scale; the low anchor (1) was "strongly disagree," and the high anchor (5) was "strongly agree." (See Appendix A, Table A6, items 20 to 22 for scale items).

Assessment of Common Method Variance

Because the majority of the subjective measures used in this study were gathered from the same source (i.e., the 360-degree feedback users), there is the problem of common method variance. In their meta-analysis of 581 articles, Crampton and Wagner (1994) found that inflation due to self-report or percept-percept bias differs according to the content of the measure. They found that several of the self-report measures used in the present study (organizational culture, climate, demographic characteristics, satisfaction with feedback) are relatively free of percept-percept inflation. Moreover, they also found no significant self-report inflation in several of the variable combinations of interest to the present study (i.e., demographic variables and climate, performance feedback acceptance and climate, satisfaction with feedback). Bias due to self-reports of perception is believed to be minimal.

To test for this inflation, Harman's one-factor test (Schriesheim, 1979) was used. According to this approach, if common method variance is a serious problem in the study, one would expect a single factor to emerge from a factor analysis or one general factor to account for most of the covariance in the predictor and criterion variables (Podsakoff & Organ, 1986). A principal components analysis of all self-report items in the survey was performed to determine if all of the items load on one general factor. Results from this analysis will be described in the Results chapter.

Scale Development

To develop scales for this study, a confirmatory factor analysis (CFA) was used to test the measurement model. CFA is a method for evaluating whether a specified factor model provides a good fit to the data (Floyd & Widaman, 1995). Unlike exploratory factor analytic approaches (such as factor analysis), CFA does not assume that: (1) all common factors are correlated (or uncorrelated), (2) all observed variables are directly affected by all common factors, (3) unique factors are uncorrelated with each other, (4) all observed variables are affected by a unique factor, and (5) uncorrelated measurement error exists among factors (Floyd & Widaman, 1995). In particular, the CFA approach allows the researcher to specify paths between observed and latent variables, thus allowing the researcher to test the validity of a hypothesized factor structure (Bollen, 1989; Floyd & Widaman, 1995).

Floyd and Widaman (1995) suggest that CFA is most effective when it is used to assess whether a proposed factor structure adequately fits the data and whether the structure fits as well and as parsimoniously as other models. They have found that factor structures are difficult to confirm when the measured variables are individual items for a questionnaire that is even moderately lengthy—especially if this means that more than five to eight items are free to load on each latent variable. Because of item content overlap, pairs of items often share variance apart from the variance accounted for by the factors. If justified by theory, CFA models can be specified to include correlated error terms or correlated residuals that reflect this shared item variance and may provide a more accurate model for the data (Floyd & Widaman, 1995).

LISREL Submodel 3B was used for data analysis. In this approach the Lambda-Y, Psi, and Theta-Epsilon matrices were estimated to determine the overall fit of the model (Joreskog &

Sorbom, 1989; Hayduk, 1987). In this approach, the Lambda-Y matrix represents the estimated factor loadings, the Psi matrix represents the estimated covariances among latent variables and the Theta-Epsilon matrix represents the item measurement error variances and covariances (Joreskog & Sorbom, 1989; Hayduk, 1987). (When testing for the unidimensionality of the scales, the Beta matrix is not estimated).

For the purposes of this study, three goodness-of-fit indices were used to indicate model fit: the Root Mean Square Error of Approximation (RMSEA) (Steiger, 1990), the Non-Normed Fit Index (NNFI) (Tucker & Lewis, 1973), and the Comparative Fit Index (CFI) (Bentler & Bonett, 1980). These fit statistics were selected because compared to others, they are relatively unbiased estimators of the fit between the sample and population covariation matrices (Berndt, 1998; Marsh, Balla & McDonald, 1988). Generally, CFI and NNFI values of > .90 and RMSEA values of < .08 indicate a moderate model fit. CFI and NNFI values of >.95 and RMSEA values of < .05 indicate a superior model fit. To test the fit of the CFA and measurement models, only the CFI and NNFI indices were used. Berndt (1998) has found that the NNFI and CFI are the preferred goodness of fit indices for simple (i.e., models with four or fewer latent variables) to moderately complex models (i.e., models with five to eight latent variables). Due to its tendency to underestimate the fit of simple models, Berndt (1998) cautions against the use of the RMSEA for simple models. Thus the RMSEA was not used to test the fit of the CFA but will be used in the evaluation of the structural model.

As with factor analysis, CFA generates factor loadings that represent how well each item measures its associated latent variable. In CFA, factor loadings can be viewed as regression coefficients in the regression of observed variables on latent variables. Thus, the standard factor loadings of observed variables (items) on latent variables (factors) are estimates of the validity of the factors. The larger the factor loadings the stronger the evidence that the measured variables of each factor represent the underlying construct (Bollen, 1989).

Unlike factor analysis, in CFA items are assigned or "fixed" to a specific latent variable. In LISREL, *T*- values corresponding to each factor loading are generated to test their statistical significance . A *T*-value is produced by dividing the parameter estimate by its respective standard error. T^2 is distributed as chi-square with 1 degree of freedom, and an item with a loading of 1.96 or greater is significant at the $p < .05$ level and may be assigned to the latent variable.

For each scale, the hypothesized unidimensionality of the scale was tested against the null hypothesis that the scale is multidimensional. If a good fit, factor loadings were used to identify items that do not load highly on the latent variable (i.e., factor loadings <.60) and to identify items with low item reliability for deletion (i.e., < .40). If a poor fit, exploratory factor analysis was conducted to determine the dimensionality of the scale and the process was repeated. If the scale was unidimensional, items with the lowest factor loadings were successively removed until acceptable goodness of fit was achieved.

Finally, composite reliability was calculated for each latent variable. Composite reliability is calculated by creating a ratio of the sum of the Lambda–Y values to the sum of the Lambda–Y values and their respective Theta-Epsilon values (Werts, Rock, Linn, & Jöreskog, 1977). Similar to Cronbach's alpha (Cronbach, 1951), composite reliability can demonstrate whether a latent variable is efficiently measured and is the lower bound estimate for reliability (Wertz et al., 1977).

Structural Model Assessment

The structural model specifies the causal effects and relationships among the independent and dependent factors (or latent traits). LISREL Submodel 3B was also used to assess the fit of the structural model. However, in addition to the Lambda-Y, Psi, and Theta-Epsilon matrices, the Beta matrix was also estimated. The Beta matrix represents the hypothesized paths between latent variables (Joreskog & Sorbom, 1989; Hayduk, 1987). When the Beta matrix is estimated, the Psi matrix indicates the amount of variance that is not accounted for by the measurement and structural models. In all matrices, parameter estimates in each of these matrices were examined for unreasonable values (i.e., Theta-Epsilon values greater than 1, inappropriate parameter values signs) or insignificant parameter estimates (i.e., insignificant Lambda-Y or Beta loadings).

Squared multiple correlations were examined for each causal relationship in the model. LISREL VIII (Joreskog & Sorbom, 1989) gives squared multiple correlations for each dependent latent trait. A squared multiple correlation reflects the ability of the other latent traits to predict the dependent latent trait. A large squared multiple correlation indicates a strong relationship and suggests that the model is effective.

The hypothesized model was evaluated through nested model comparisons where successive parameters in the Beta matrix were freed. These comparisons are summarized in Table 2.

Table 2

Structural Model Assessment

Model	Paths Estimated
No Causal Pathways	No estimated structural paths
Model 1	Estimate paths 1 through 4
Model 2	Estimate paths 5 & 6
Model 3	Estimate paths 7 through 11

Model 1 was tested first where all parameters in the Beta matrix were fixed to zero. Next, the process paths (i.e., paths 1, 2, 3, 4) were freed. The antecedent paths (i.e., paths 5 & 6) were then freed, followed by the consequence paths (i.e., paths 6 through 11). Comparison of the indices of fit between the models indicate whether the increasing complexity of the models can be justified. James, Mulaik and Brett (1982) have highlighted the importance of developing a sequence of tests for nested models prior to actually conducting the analyses to avoid "exploring" the data. The chi-square difference test (Bentler & Bonett, 1980) was used where successive parameters were freed, and the resultant changes to the chi-square statistic were tested against the chi-square statistic of the previous model. A significant chi-square difference statistic indicates a significant improvement in the overall fit of the revised model over the previous model (Mathieu, 1991; Williams & Hazer, 1986).

CHAPTER III

RESULTS

The results are presented in three sections corresponding to: (1) descriptive statistics and treatment of missing values, (2) confirmatory factor analyses, and (3) structural model analysis.

Descriptive Statistics

Descriptive statistics for the sample are summarized in Appendix B (see Tables B1 & B2). A total of 270 responses were collected. Analysis of the raw data indicated the presence of missing values. Analysis of the response patterns among respondents indicated several instances where a particular subject did not complete a major portion of one of the surveys. As recommended by Famili, Shen, Weber and Simoudis (1997), when more than 20% of the data points were missing from a single respondent, that respondent's score was removed from the database. This process resulted in the removal of 15 cases. To generate scores for the remaining missing values, the multiple imputation process was used (Little, 1993).

Several authors have suggested the superiority of the multiple imputation process over more traditional methods, such as listwise, pairwise deletion or mean substitution (Little, 1993; Little & Rubin, 1987). Multiple imputation works by generating a maximum likelihood-based covariance matrix and a vector of means. The process then introduces statistical uncertainty into the model and uses that uncertainty to emulate the natural variability among cases encountered in a complete database. Multiple imputation then imputes actual data values to fill in the incomplete data points in the data matrix. In the present study, Schafer's (1997) NORM program was used to replace the missing values and resulted in the estimation of 68 missing values.

CFA

CFA was used to assess the unidimensionality of the scales and to provide the data for scale development. To test for common method variance, Harman's one-factor test (Schriesheim, 1979) was used. A principal components analysis indicated that a single factor model accounted for 13% of the variance in the model. Thus, it was concluded that common method variance was not a problem in the analyses.

Within the literature, several fitting functions (i.e., unweighted least squares (ULS), maximum likelihood (ML), generalized least squares (GLS), weighted least squares (WLS)) have been used (Schumacker & Lomax, 1996). There has been considerable debate as to the appropriate fitting algorithm. The hypothesis tests conducted in the structural equation modeling context falls into two broad classes: tests of overall model fit and tests of significance of individual parameter estimate values. Both types of tests assume that the fitted structural equation model is true and that the data used to test the model arise from a joint multivariate normal (JMVN) distribution in the population from which the sample data are drawn. If the sample data are not JMVN distributed, the chi-square test statistic of overall model fit will be inflated, and the standard errors used to test the significance of individual parameter estimates will be deflated. Practically, this means that with non-normal data, one is more likely to reject models that may not be false and decide that particular parameter estimates are statistically significantly different from zero when in fact this is not the case (i.e., type 1 error) (Olsson, Foss, Troye & Howell, 2000). Analysis of the descriptive statistics generated by PRELIS indicated that many of the items in the dataset were not normally distributed.

Research has shown the appropriate selection of a fitting algorithm depends on the degree of JMVN in the distribution matrix (Schumacker & Lomax, 1996). In the case of deviations from multivariate normality, Schumacker and Lomax (1996) and Tanaka (1987) suggest the use of one of the distribution free or weighted procedures, such as GLS. However, research has shown that GLS under-performs relative to ML in the following key areas: (a) GLS accepts incorrect models more often than ML and (b) GLS returns inaccurate parameter estimates more often than ML (e.g., Olsson, Troye, & Howell, 1999). Rather than choose one estimation method, Olsson (Olsson et al., 2000) recommends the use of a triangulation method of GLS, ML and WLS. If the model provides similar parameter estimates, there is an indication that the correct structure is identified and the parameter estimates are accurate. Moreover, when this is the case, GLS may provide more accurate fit estimates (Olsson et al., 2000). As WLS requires a large sample size (i.e., n>1000) to calculate the required asymptotic covariance matrix, this fitting algorithm was not used. Hence the GLS and ML estimation methods were used.

Tables 3 and 4 summarize the results of the CFA using the GLS and ML fitting algorithms respectively. These tables depict the number of items originally in a scale, the number of items having a factor loading greater than .40, and the goodness-of-fit indices (i.e., NNFI and CFI). A factor loading value of .40 was used to judge the quality of an item because this value has frequently been used in previous research to establish the quality and unidimensionality of a scale (cf. Berndt, 1992; Krahl, 1996; Loviscky, 1996). Item means, standard deviations and correlations are reported in Appendix C, Table C1. For complete CFA details, see Appendices D and E.

Generally, parameter estimates for the GLS and ML fitting algorithms were very similar. Goodness of fit indices varied substantially with the GLS procedure indicating a moderate to strong fit for each of the scales and the ML procedure indicating a poor fit for each of the scales. This result is congruent with the findings of Olsson et al., (2000) who found that GLS derived goodness of fit indices were generally higher than ML derived goodness of fit indices in cases of non-normality.

For the Psychological Climate for Innovation, Feedback Seeking Environment, Innovation Characteristics, User Attitudes Toward the Innovation, Goal Setting, and Intentions to Improve Performance scales, items loaded significantly on their appropriate scales for both ML and GLS. However, for the Psychological Climate for 360-Degree Feedback Implementation scale, the model did not converge after 5000 iterations and was not positive definite when using the GLS algorithm. Analysis of the correlation matrix indicated that many of the items (e.g., II-12, II-13, and II-14) were highly correlated (i.e., $r_s > .60$) and thus indicated the potential for multicollinearity (Bollen, 1989). Successive items with the lowest factor loadings were dropped until a 6-item model was identified with acceptable fit (see Appendix D, Table D5b for scale measurement properties).

Table 3

Summary of CFA – Generalized Least Squares

Scale	No. of items	No. items loading ≥ .40	NNFI	CFI
Psychological Climate for Innovation	5	4	.99	.99
Feedback Seeking Environment	5	5	.92	.96
Innovation Characteristics				
• Compatibility	7	7	.99	.99
• Complexity*	4	3	-	-
• Relative Advantage*	1	1	-	-
Psychological Climate for 360-Degree Feedback Implementation	14	6	.98	.96
User Attitudes Toward the Innovation	7	6	.98	.99
Goal Setting*	3	2	-	-
Feedback Acceptance*	2	2	-	-
Intentions to Improve Performance*	4	2	-	-
Improved Communications*	3	3	-	-
Increased Trust		Dropped from the analysis		

Note. Abbreviations are: NNFI, Non-Normed Fit Index, CFI, Comparative Fit Index. *Because of insufficient degrees of freedom, final goodness of fit indices could not be calculated.

Because the model did not converge for either the ML or GLS algorithms, the Increased Trust scale was dropped from the analyses. Overall, results from the confirmatory factor analysis indicated an 11-factor model consisting of 41 items.

When the ML algorithm was used, the model did converge for the Psychological Climate for 360-Degree Feedback Implementation scale. However, the fit of the model was very poor (i.e., NNFI = .22; CFI=.34). Moreover, 8 items had factor loadings of less than .40. These items were dropped from the scale until a 6-item scale was identified. (See Table E5b for full details).

To avoid non-normality problems, correlated measurement error, and restrictions to the magnitude of polychoric correlations that occur with the use of item-level data (Drasgow & Miller, 1982), means were calculated for each scale and were used to create a single item indicator for the appropriate latent variable. Theta-Epsilon values were fixed for each latent variable using the standard formula ((i.e., $s^2_{error} = s^2_x (1 - r_{xx})$) where s^2_x was the scale variance and r_{xx} was the scale composite reliability (See Appendix D and E for scale reliabilities).

Table 4

Summary of CFA – Maximum Likelihood

Scale	No. of items	No. items loading ≥ .40	NNFI	CFI
Psychological Climate for Innovation	5	4	.99	1.00
Feedback Seeking Environment	5	5	.48	.74
Innovation Characteristics				
• Compatibility	7	7	.64	.76
• Complexity*	4	3	-	-
• Relative Advantage*	1	1	-	-
Psychological Climate for 360-Degree Feedback Implementation	14	6	.60	.76
User Attitudes Toward the Innovation	7	6	.81	.89
Goal Setting*	3	2	-	-
Feedback Acceptance*	2	2	-	-
Intentions to Improve Performance*	4	2	-	-
Improved Communications*	3	3	-	-
Increased Trust		Dropped from the analysis		

Note. Abbreviations are: NNFI, Non-Normed Fit Index, CFI, Comparative Fit Index. *Because of insufficient degrees of freedom, final goodness of fit indices could not be calculated.

Structural Model Analysis

The goodness-of-fit indices for the structural model represent how well the hypothesized relationships among the latent variables fit the covariance matrix obtained from the sample. Four nested models (see Tables 5 & 6) were compared to evaluate the hypothesized structural model. Nested modeling aids in evaluating the explanatory power of a hypothesized model by demonstrating that successive additions to the model provide increasingly better fits to the obtained data. The three models in Tables 5 and 6 depict an increasing number of structural relationships, with each addition of relationships providing another nested model. For example, the initial nested model (Model 1) depicts no causal pathways among the sets of variables, and it is nested within Model 2, which allows causal pathways between the antecedent latent variables (i.e., Psychological Climate For Innovation and Feedback Seeking Environment) and Psychological Climate for 360 Degree Feedback Implementation).

Comparison of the indices of fit and differences in chi-square values indicates whether the increasing complexity of the models can be justified. Tables 5 and 6 contain the goodness-of-fit indices for each of the four nested models, including the results for the chi-square difference tests between models and the estimation of two additional paths based on the modification indices.

Table 5

Nested Model Comparisons – Generalized Least Squares

Model	*df*	Chi-Square	NNFI	CFI	RMSEA	Δ*df*	ΔChi-Square
1. No causal pathways	55	436.74*	.93	.94	.17	-	-
2. Estimated paths 1, 2, 3 & 4	51	424.51*	.93	.94	.17	4	12.33*
3. Estimated paths 5 & 6	49	422.94*	.93	.94	.17	2	2.11
4. Estimated paths 7, 8, 9 & 10	45	319.73*	.95	.96	.16	4	103.21*

Note. * $p < .05$. *df* = Degrees of Freedom, Δ*df* = Change in Degrees of Freedom, ΔChi-Square = Change in Chi Square, NNFI = Non-Normed Fit Index , CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation.

The factor loadings, measurement error variances, indices of fit, and factor correlations for the structural model are reported in Appendices F and G. These results are summarized below. Factor loadings in the Lambda-Y matrix for GLS and ML algorithms were similar suggesting the stability of the parameter estimates. For both the GLS and ML algorithms, an examination of the Beta matrix suggested that the majority of the paths were nonsignificant except for the following paths: Compatablity ➔ User Attitudes Toward the Innovation, User Attitudes Toward the Innovation ➔ Feedback Acceptence, User Attitudes Toward the Innovation ➔ Goal Setting, and User Attitudes Toward the Innovation ➔ Intentions to Improve Performance.

Goodness of fit indices indicated a poor fit of the model (for GLS, NNFI =.95, CFI = .96; RMSEA = .16; for ML, NNFI =.37, CFI = .48; RMSEA = .18). Beta loadings for the final model are summarized in Figures 2 and 3.

Table 6

Nested Model Comparisons – Maximum Likelihood

Model	*df*	Chi-Square	NNFI	CFI	RMSEA	Δ*df*	ΔChi-Square
1. No causal pathways	55	760.95*	.00	.00	.22	-	-
2. Estimated paths 1, 2, 3 & 4	51	746.60*	-.06	.01	.23	4	14.35*
3. Estimated paths 5 & 6	49	743.40*	-.10	.01	.23	2	3.20
4. Estimated paths 7, 8, 9 & 10	45	411.36*	.37	.48	.18	4	332.04*

*Note.** $p < .05$. *df* = Degrees of Freedom, Δ*df* = Change in Degrees of Freedom, ΔChi-Square = Change in Chi Square, NNFI = Non-Normed Fit Index , CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation.

The Psi matrix indicates the amount of variance that is not accounted for by the measurement and structural models. The values in this matrix were large (1.00) for both the GLS and ML fitting algorithums indicating that only a small amount of the variance in the process and consequence latent variables was being explained.

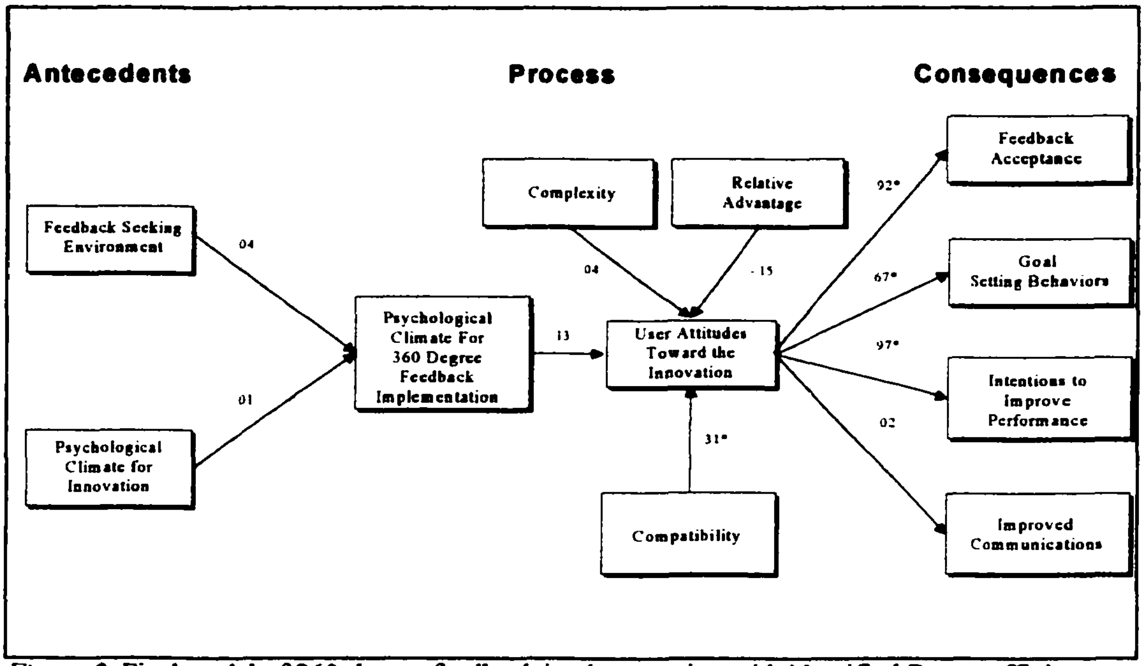

Figure 2. Final model of 360-degree feedback implementation with identified Beta coefficients using Generalized Least Squares estimation method. $*p < .05$.

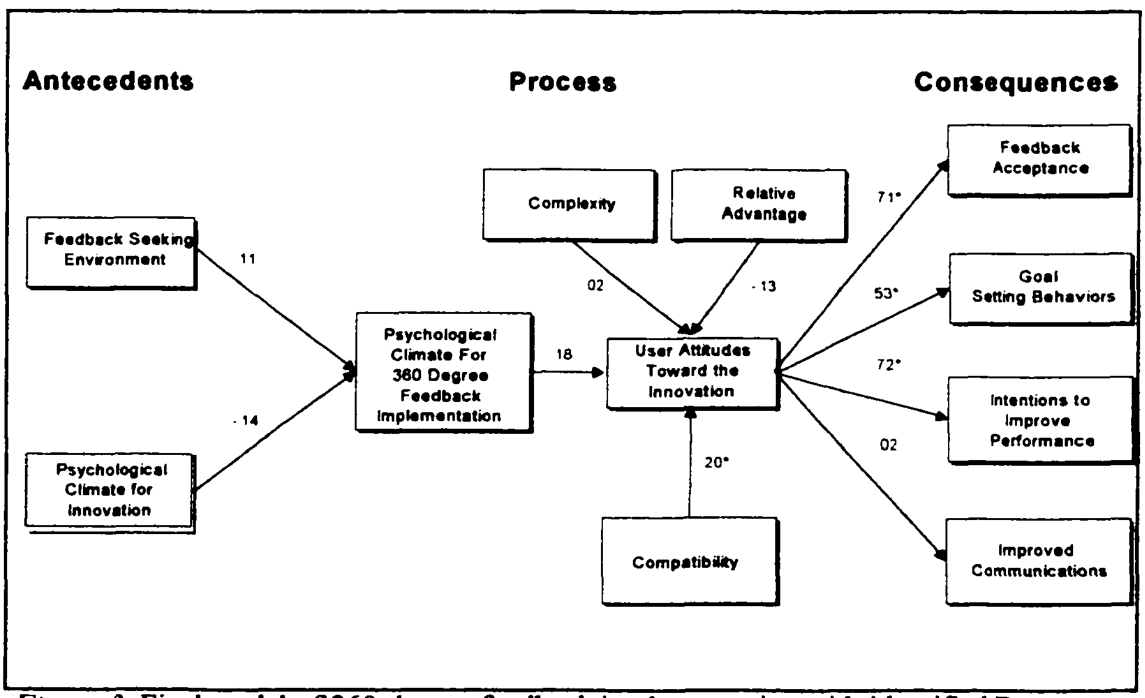

Figure 3. Final model of 360-degree feedback implementation with identified Beta coefficients using Maximum Likelihood estimation method. $*p < .05$ level.

CHAPTER IV

DISCUSSION

Drawing from the research examining innovation implementation and 360-degree feedback, the present study tested a structural model that included the effects of climate, environment, and innovation characteristics on the implementation of a 360-degree feedback system within a large financial holdings company (Company XYZ). Overall, results from this study demonstrated that the majority of hypothesized paths were nonsignificant. Exceptions to this finding were the following paths: Compatibility ➔ User Attitudes Toward the Innovation (i.e., Path 2 in Figure 1); User Attitudes Toward the Innovation ➔Feedback Acceptence (i.e., Path 7 in Figure 1); User Attitudes Toward the Innovation ➔ Goal Setting (i.e., Path 8 in Figure 1), and User Attitudes Toward the Innovation ➔ Intentions to Improve Performance (i.e., Path 9 in Figure 1).

In this discussion, the results of the structural equation modeling are discussed. Next, the limitations of the present findings are discussed, and implications for the practitioner and future research are described.

Summary of Structural Equation Modeling Results

Prior to testing the fit of the structural model, CFA was used to test the unidimensionality and reliability of the scales. Results from the confirmatory factor analyses using the GLS fitting algorithm indicated good levels of fit for all of the hypothesized scales except for the Increased Trust scale, which was subsequently dropped from the analyses. Analysis of the Theta-Epsilon matrix indicated high levels of correlated measurement error among items within this scale. Given that the Trust scale was located at the end of Survey III, there may have been rater fatigue. Moreover, exploratory factor analysis with an oblique rotation on all scale items resulted in an 11-factor model where none of the items from the Increased Trust scale uniquely and significantly loaded on any of the latent variables. As this scale did not have the requisite measurement properties, it was dropped from the analyses.

It is important to note that the goodness of fit indices for the ML fitting algorithm were significantly lower than those generated by the GLS method. (See Tables 5 and 6). As Olsson et al. (2000) suggest, currently there is little guidance for researchers when they encounter divergent goodness of fit indices from using differing estimation algorithms. Given that the parameter estimates for the GLS and ML fitting algorithms were similar and the GLS goodness of fit indices indicated a strong CFA model, the decision was made to test the structural model. Before discussing the results from the specific paths, it is important to remember that because the fit of the overall model was poor, specific path results must be viewed with caution and are presented solely to provide a basis for further research. Results for each of the hypothesized paths are discussed below.

Process Variables

In this study, Psychological Climate for 360-Degree Feedback Implementation was operationalized as the degree to which individuals felt rewarded and supported in their use of the 360-degree feedback system. Research has shown that a positive climate for a specific outcome may influence behaviors and attitudes regarding that outcome (Klein et al., 1999). At Company XYZ, this was not the case. Results indicated a nonsignificant relationship between Psychological Climate for 360-Degree Feedback Implementation and User Attitudes Toward the Innovation (i.e., Path 1, Figure 1) using both GLS and ML fitting algorithms. This finding is incongruent with the findings of Klein et al. (1999) and others (e.g., Kossek, 1989; Steele, 1997), who report a significant positive relationship between climate for innovation implementation and user acceptance of the innovation. One potential explanation for the nonsignificant finding was that users within Company XYZ may have fully supported the process of 360-degree feedback, yet the climate for implementation (i.e., user training, user support for use, rewards for use, etc) may have been inconsequential to their support.

Likewise, users may not have supported the process of 360-degree feedback, but again the climate for implementation was irrelevant to their attitudes. Given that the 360-degree feedback system was used only for developmental purposes, users may not have taken its implementation seriously (i.e., the implementation of the innovation had limited fidelity) and may not been engaged in the training or support services offered. Future research should examine this relationship in the context of an administrative 360-degree feedback system to determine if there is a relationship between climate for 360-degree feedback implementation and user attitudes toward the innovation when the innovation is directly tied to job performance ratings. This situation would more closely resemble the study by (Klein et al., 1999) who demonstrated the importance of a strong implementation climate in the acceptance by users of a new inventory control system.

The present study did not provide full support for the Klein et al. (1999) operational definition of implementation climate. Drawing from their review of the research on technological innovation implementation, Klein et al., (1999) identified several policies, procedures and practices that affect implementation effectiveness, such as the quality and quantity of training provided to employees on the use of the new technology, user support for the system, user communication about the system, rewards for technology use, and the provision of time to use the system. Results from the confirmatory factor analysis did not provide support for the time to experiment or user support aspects of this construct. Most users responded that they did not have enough time to use the 360-degree feedback system and perform their regular jobs. Lack of variation on these items was probably due to the fact that the majority of system users were mid- to senior- level managers with high work demands. Likewise, for the user support dimension, there was considerable variation in support for users across sites within Company XYZ. At three sites, the assigned 360-degree feedback champions left the company and were not replaced immediately. Consequently, there was a substantial period of time where there was little support for system users. Moreover, it took time for the new champions to become familiar with the tool and become able to respond to questions in a timely manner. This suggests that there may have been unit level variation in feedback climates rather than just individual level differences and may have affected the reliability of the scale. Further research is necessary to determine if there are common dimensions within the implementation climate construct and if this construct is invariant across types of innovations and levels within the organization.

Results also did not provide any support for the effects of Complexity and Relative Advantage on User Attitudes Toward the Innovation (i.e., Paths 3 and 4 in Figure 1). These results are incongruent with the meta-analytic findings of Tornatzky and Klein (1982) who found a significant relationship between complexity and relative advantage and rate of implementation. Each of these nonsignificant paths is discussed below.

With regard to the nonsignificant relationship between Complexity and User Attitudes Toward the Innovation (Path 3, Figure 1), this finding is contrary to research by Beatty and Gordon (1988) and Steele (1997), who have found that user perceptions of the quality, accessibility, and user friendliness of the technology can affect attitudes toward the innovation. Second, results did not provide support for a significant relationship between Relative Advantage and User Attitudes Toward the Innovation (i.e., Path 4, Figure 1). Rogers (1995) has suggested that an important determinant of user acceptance is whether users perceive the innovation to be advantageous. This nonsignificant relationship may have been due to the same technical problems identified above (that is browser issues, lack of user support in several sites). Likewise, while there was no formal 360-degree feedback system in Company XYZ at the time of the rollout of the new system, there were other paper-based and facilitated group feedback sessions that were used in different divisions and functions of Company XYZ. Thus, there were many different systems to which respondents may have compared the functionality of the new system. This would have led to systematic error in Relative Advantage scores and may have affected the relationship between Relative Advantage and User Attitudes Toward the Innovation. Further research should control for users' previous experience with 360-degree feedback systems.

Results did provide support for the positive relationship between Compatibility and User Attitudes Toward the Innovation (i.e., Path 2). This result provides further support for the importance of innovation–values congruence in predicting desirable implementation outcomes (i.e., innovation acceptance and use) (Cable & Judge, 1996; Chao et al., 1994; Harris & Mossholder, 1996; Lee & Mowday, 1987; Rogers, 1995; Tornatzky & Klein 1982).

Overall, given the research generally supporting the positive relationship between relative advantage and positive organizational outcomes and the negative relationship between complexity and positive organizational outcomes, further research is necessary before any definitive conclusions can be made (i.e., Tornatzky & Klein, 1982).

Antecedents

Results from the present study did not support a positive relationship between Feedback Seeking Environment and Psychological Climate for 360-Degree Feedback Implementation (Path 5, Figure 1). This finding suggests that an environment where individuals are encouraged to seek feedback from coworkers does not affect whether they perceive that they have adequate training, support for system use, communications regarding system use, and have enough time and are rewarded for using the system. That is, users may separate the mechanics of the 360-degree feedback system (i.e., system support, communications regarding system use, time and rewards for system use) from the overall environment for feedback. Further this suggests that a positive feedback environment is unnecessary to create a strong climate for 360-degree feedback implementation.

Similarly, results from the present study also did not support a positive relationship between Psychological Climate for Innovation and Psychological Climate for 360-Degree Feedback Implementation (i.e., Path 6, Figure 1). Glynn (1996) and others (Scott & Bruce, 1994; Siegel & Kaemmerer, 1978) have argued that organizational characteristics that promote innovation will positively influence the implementation of the innovation. In the present study, this finding was not supported and suggests that a strong innovation orientation is tangential to creating a climate for implementation. For practitioners, these finding are limited given the nonsignificant relationship between Psychological Climate for 360-Degree Feedback Implementation and User Attitudes Toward the Innovation reported above. In the present study, Feedback Seeking Environment and Psychological Climate for Innovation were hypothesized to have an indirect effect on User Attitudes Toward the Innovation. Future research should examine if these variables have a direct effect on user attitudes.

Consequences

Results from the present study did support the expected positive relationship between User Attitudes Toward the Innovation and Feedback Acceptance, Goal Setting and Intentions to Improve Performance (i.e., Paths 7, 8 and 9). This suggests that when 360-degree feedback users are satisfied and committed to the 360-degree feedback system, they are more likely to accept their feedback and, most importantly, set goals to improve their performance.

For the User Attitudes Toward the Innovation and Feedback Acceptance path (i.e., Path 7), these results are congruent with the well-documented facilitative effect of feedback upon future performance (Ilgen et al., 1979; Ilgen & Moore, 1987). Likewise, for the User Attitudes Toward the Innovation and Goal Setting path (i.e., Path 8), results support the notion that users that have a positive reaction to the 360-degree feedback system will be more likely to continue to use the system to develop their action plans. However, this does not mean that feedback acceptance leads to actual goal setting (the present study only examined intentions to set goals).

The results do suggest that users with higher levels of feedback acceptance reported an increased willingness to set developmental goals.

Finally, for the User Attitudes Toward the Innovation and Intentions to Improve Performance path (Path 9), these results are congruent with the often-cited benefit of 360-degree feedback appraisal systems, which is that they lead to performance improvement (e.g., Hazucha et al., 1993; London & Beatty, 1993; London & Smither, 1995; Tornow, 1993; Mount et al., 1998).

Results did not provide support for the expected positive relationship between User Attitudes Toward the Innovation and Improved Communication with coworkers (i.e., Path 10, Figure 1). This may have been due to the fact that 360-degree feedback is an one time event and not an ongoing process designed to facilitating the ongoing communication between an individual and his/her's peers/direct reports (such as a weekly staff meeting, email, conference calls or other communication mechanisms) . Obtaining feedback from peers and direct reports in a survey format will not necessarily improve communications with these individuals. Rather, ongoing and candid dialogue from all parties is necessary. Therefore, practitioners should be cautious when espousing increased communication as a potential benefit from 360-degree feedback.

Overall, the present study provides tentative support for the facilitative effects of 360-degree feedback on performance. However, given the poor fit of the overall model, these results should be viewed with caution.

Limitations of the Present Study

Because the fit of the model was poor and the model explained very little of the obtained data matrix, implications of the present study are limited. In the section below, limitations are discussed and suggestions for practitioners are provided.

One limitation of the present study was the potential method effect in data collection. Data collection for the present study took approximately one and a half years. Within this time, there were numerous changes within Company XYZ including a major reorganization and the acquisition of several new business units. These changes may have confounded the results by adding extraneous variation into the model. Future research should attempt to control for this variation by using a multi-organizational sample, or by selecting a sample that is more stable and not participating in rapid organizational change.

A second limitation of the present study was that during the data collection phase, there were periodic network problems that affected the performance of the Intranet-based 360-degree feedback tool (e.g., users' browsers would lock up causing the deletion of all entered data, servers were down when a reviewer tried to provide their feedback, etc). Moreover, these issues were more prevalent at certain locations and times (i.e., during the middle part of the data collection period when there were server upgrades at several sites). These issues may have affected some user's perceptions of the usability of the tool and confounded the results. Furthermore, several changes in the 360-degree feedback system (e.g., improved communication tools, increased internet speed, the upgrading of internet browsers) plus greater familiarity with the tool by the 360-degree feedback champions all occurred during the time the data was collected again providing another source of non random variation. To better control for these issues, future research should either use a longitudinal design or control group type design to limit these sources of systematic variation.

A third problem with the present study was that the model did not control for the seniority of those using the 360-degree feedback system. Researchers have suggested that the longer employees work for a company, the greater is their resistance to changes in the status quo that implicitly alter the psychological contract (Kolb, Rubin, & McIntyre, 1984; Kossek, 1989). Thus, future research should control for the level of seniority of those using the 360-degree feedback system.

A fourth limitation of the present study was that it did not control for the work group/organizational unit within Company XYZ. Personnel programs are optimally administered to support the mission and goals of an organization (Walker, 1980). In a large organization, there are likely to be interunit differences in missions and goals, structure, employee demographic backgrounds, and local employee relations climate (Kossek, 1989). Moreover, organizational units often differ in the extent to which local units accept new practices. At Company XYZ, there were large differences in the degree of integration and willingness to be integrated into the dominant culture. Thus future research should examine effects of inter unit differences on innovation acceptance.

A fifth problem with the present study was that it did not control for users' previous positive experience with 360-degree feedback. While none of the business units within Company XYZ have had experience with the present internet based system, employees vary in their experience with 360-degree type feedback. Some departments in various locations have implemented forms of the 360-degree feedback system (that is peer appraisals, a paper-based version of the system and facilitated group discussions). As the attitudes toward performance appraisal literature suggests, users' experience with a system can affect their post-use behavior (e.g., Bass & Barrett, 1981; Berndt, 1992; Kavanagh, 1981). Specifically, this research has shown that users' past negative experience with a system will often thwart the subsequent use of the 360-degree feedback (or similar) systems.

A sixth problem with the present study is that it did not account for other important predictors to the consequence variables (i.e., feedback acceptance, goal setting, intentions to improve performance and increased communication). For example, there is a wealth of literature on the elements of effective feedback in the performance appraisal setting (see Cascio, 1991). For example, feedback is more likely to be accepted by the employee when it is timely, specific, behaviorally based and where the receiver is afforded the opportunity to discuss the rating with the performance feedback with his or her supervisor (Kugler & DeNisi, 1991). Likewise, research has shown that employee commitment to goals, self efficacy, and previous experience with goal setting are all important precursors to goal setting behaviors (Locke et al., 1981). Finally, concerning communication, research has shown that nonverbal immediacy, source credibility, interpersonal, attraction, and overall affect toward the sender affects communication dynamics (Richmond & McCroskey, 2000). Thus, future research might consider the study of these variables.

Finally, the present study looked at the implementation of a 360-degree feedback system that would be used only for developmental purposes. As discussed above, there is considerable debate about whether 360-degree feedback should also be used for administrative purposes (Arvey & Murphy, 1998; Bracken et al., 1997; Crystal, 1994; Dalton, 1996). Future research should examine whether the model for the implementation of an administrative 360-degree feedback system differs from the model for a developmental 360-degree feedback system.

CHAPTER IV

CONCLUSION

For researchers and practitioners concerned with 360-degree feedback, the findings from this study are limited. Results suggest that users who are satisfied with a new 360-degree feedback system and committed to its use are more likely to accept their feedback, set goals, and improve their performance. Thus, these results provide tentative support for the efficacy of 360-degree feedback as an HR innovation. Unfortunately, the present study does little to provide guidance to the practitioner on how to manage the implementation of the 360-degree feedback system to ensure that users are satisfied with the 360-degree feedback system and committed to its use. Further research is required to help provide a framework for the effective implementation of a 360-degree feedback system.

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APPENDICES

APPENDIX A

SCALE INFORMATION

Table A1

Scale Items for Survey 1

Scale	Items
Psychological Climate for Innovation	Items 1 to 5
Feedback Seeking Environment	Items 6 to 10
Innovation Characteristics – Compatibility	Items 11 to 17
Demographics	Items 18 to 20

Table A2

Scale Items for Survey 2

Scale	Items
Innovation Characteristics	
Complexity	Items 1 to 4
Relative Advantage	Item 5
Psychological Climate for 360-Degree Feedback Implementation	
Availability of Training	Items 6 to 9
User Support for 360-Degree Feedback	Items 10 and 11
Time to Experiment with 360-Degree Feedback	Items 12 to 14
Communication around 360-Degree Feedback	Items 15 to 17
Reward for Using 360-Degree Feedback	Items 18 and 19

Table A3

Scale Items for Survey 3

Scale	Items
User Attitudes Toward the Innovation	
Satisfaction with the Innovation	Items 1 to 4
Commitment to the Innovation	Items 5 to 7
Feedback Acceptance	Items 8 to 9
Goal Setting	Items 10 to 12
Intentions to Improve Performance	Items 13 to16
Increased Communication	Items 17 to 19
Increased Trust	Items 20 to 22

Table A4

Survey I

Company XYZ 360-Degree Feedback Evaluation Survey - Part I

Introduction

Thank you for selecting to use the Company XYZ 360-Degree Feedback System. We hope that this system will help you grow and develop here at Company XYZ.

As part of our efforts to provide the highest quality of services to our associates, we are currently evaluating the 360-Degree Feedback system. The purpose of this evaluation is to see how well the system works and to identify where improvements/additions should be made. Moreover, we are also interested in determining how receptive Company XYZ is to this new tool. This data will allow us to better design the system to meet your needs. As an initial user of the process, and a member of (Company XYZ), your assistance in this process is requested.

This is the first of three short surveys you will receive as you work through the process. Each survey is designed to collect your feedback at different stages throughout the feedback process. You will receive the second survey at the end of the feedback workshop. The final survey will be sent to you approximately 1 month after attending the Feedback Workshop. Completing all three surveys will take approximately 25 minutes of your time.

Please remember that all responses are strictly confidential. All reports to me will be based on aggregated data to protect your confidentiality. At no time will any of your responses be compared to your 360-degree feedback results and your responses will in no way affect your employment at Company XYZ.

Our evaluation requires us to measure your feedback at three times during the 360-process To allow us to do this (and maintain your anonymity), we ask that you put your mother's maiden name and first initial on each survey. Once your data has been entered, your mother's maiden name will be deleted from the database, and all surveys will be destroyed.

Please complete and return the survey before starting the 360-degree feedback process.

Thank you,

Paula Larson

VP-Organizational Effectiveness

Instructions

When providing your responses, remember that there are ***no right or wrong answers***. If the question/statement does not apply to you, or you have no idea how to answer it, ***please leave it blank***.

Mark your response by placing an X in the appropriate box.

For example, if you are satisfied with your job, you would respond as follows:

Please answer regarding how satisfied you are →	**Very Dissatisfied**	Dissatisfied	**Neutral**	Satisfied	**Very Satisfied**
Overall, how satisfied are you with your job?	☐	☐	☐	☐	☐

Once complete, make a photocopy for your records and mail it/fax it to Simon Bartle.

If you have any problems or questions, please call Simon Bartle 8*578-7140 or (804) 484-7140.

Please write your mother's maiden name and first initial here (Without this information, we will be unable to use your data)

The following questions refer to where you work. Please indicate your level of agreement with the following statements →	**Strongly Disagree**	Disagree	**Neutral**	Agree	**Strongly Agree**
1. In my job, new or unusual ways of doing the work are encouraged.	☐	☐	☐	☐	☐
2. Goals where I work tend to be daring or risky.	☐	☐	☐	☐	☐
3. At work, I am encouraged to try new ideas.	☐	☐	☐	☐	☐
4. In my job, I am expected to be open and responsive to change.	☐	☐	☐	☐	☐
5. Where I work, I find that creative efforts are usually ignored.	☐	☐	☐	☐	☐
6. The way things are set up where I work, it would take a lot of effort to get feedback from others.	☐	☐	☐	☐	☐

7.	I can get feedback from others with little effort whenever I want it.	☐	☐	☐	☐	☐
8.	I think that my boss would think worse of me if I asked him/her for feedback.	☐	☐	☐	☐	☐
9.	Where I work, it is not a good idea to ask your co-workers for feedback; they might think that you are incompetent.	☐	☐	☐	☐	☐
10.	Where I work, it is better to try to figure out what you are doing on your own rather than ask others for feedback.	☐	☐	☐	☐	☐
11.	It is important to me to receive feedback on my performance.	☐	☐	☐	☐	☐
12.	I would like to get more feedback on what behaviors will help me do better in performing my job.	☐	☐	☐	☐	☐
13.	I find feedback on my performance useful.	☐	☐	☐	☐	☐
14.	Performance feedback from my manager is very important to me.	☐	☐	☐	☐	☐
15.	Performance feedback from my peers is very important to me.	☐	☐	☐	☐	☐
16.	Performance feedback from my reports is very important to me.	☐	☐	☐	☐	☐
17.	Performance feedback from my customers is important to me.	☐	☐	☐	☐	☐

18. What business unit do you work in? (check one)

- A
- B
- C
- D
- E
- F
- G
- H
- I
- Other__________

19. How long have you been in your current position?

- Less than 1 year
- More than 1 year but less than 2 years
- More than 2 years but less than 5 years
- More than 5 years but less than 10 years
- More than 10 years

If you worked for a business that was acquired by COMPANY XYZ, how long did you work there before being acquired by COMPANY XYZ?

- Less than 1 year
- More than 1 year but less than 2 years
- More than 2 years but less than 5 years
- More than 5 years but less than 10 years
- More than 10 years
- Does not apply

Thank you for your help and participation. Please make sure you have put your mother's maiden name on the survey.

Table A5

Survey 2

Company XYZ 360-Degree Feedback Implementation Survey - Part II

Introduction

Thank you for your continued help in evaluating the effectiveness of the 360-Degree Feedback system. Now that you have used the 360 system and have completed the 360-Degree Feedback Workshop, we would like to get your feedback on the workshop and the 360 system itself.

Please remember that all responses are strictly confidential. All reports to me will be based on aggregated data to protect your confidentiality. At no time will any of your responses be compared to your 360-degree feedback results and your responses will in no way affect your employment at COMPANY XYZ.

Our evaluation requires us to measure your feedback at three times during the 360-process To allow us to do this (and maintain your confidentiality), we ask that you put your mother's maiden name and first initial on each survey. Once the data is entered into the database, all names will be deleted from the database and all original surveys will be destroyed.

Approximately one month from today, you will receive the final short evaluation survey.

Thank you,

Paula Larson
VP-Organizational Effectiveness

Instructions

When providing your responses, remember that there are no right or wrong answers. If the question/statement does not apply to you, or you have no idea how to answer it, please leave it blank.

Mark your response by placing an X in the appropriate box. For example, if you are satisfied with your job, you would respond as follows:

Please answer regarding how satisfied you are →	**Very Dissatisfied**	Dissatisfied	**Neutral**	Satisfied	**Very Satisfied**
Overall, how satisfied are you with your job?	☐	☐	☐	☐	☐

Once completed, please place your completed survey in the attached envelope and give it to your 360-degree feedback instructor. If you prefer you can mail it/fax it to **Simon Bartle**.

If you have any problems or questions, please call Simon Bartle 8*578-7140 or (804) 484-7140.

Please write your mother's maiden name and first initial here (Without this information, we will be unable to use your data)

The following questions refer to your experience using the 360-degree feedback system→	**Strongly Disagree**	Disagree	**Neutral**	Agree	**Strongly Agree**
1. The 360-Degree Feedback system is fast and responsive to commands.	☐	☐	☐	☐	☐
2. The 360-Degree Feedback system has a lot of "bugs."	☐	☐	☐	☐	☐
3. In general, 360-Degree Feedback system is easy to use.	☐	☐	☐	☐	☐
4. The 360-Degree Feedback system is "user-friendly."	☐	☐	☐	☐	☐
5. The 360-Degree Feedback system is much better system for collecting performance feedback data than what we have used before.	☐	☐	☐	☐	☐

The following questions relate specifically to the training you received on the use of the system→

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. The training I have received has taught me what I need to know to use the 360-degree feedback system effectively.	☐	☐	☐	☐	☐
7. I learned a lot in the 360-Degree Feedback Workshop.	☐	☐	☐	☐	☐
8. The training I received on how to interpret my feedback was inadequate.	☐	☐	☐	☐	☐
9. The quality of the 360-Degree Feedback Workshop was very good.	☐	☐	☐	☐	☐

Please indicate your level of agreement with the following statements →

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. If I have a problem using the 360-Degree Feedback system, I can easily find someone to help me.	☐	☐	☐	☐	☐
11. It takes a long time to get questions about the 360-Degree Feedback system answered.	☐	☐	☐	☐	☐
12. Overall, I have had enough time to use the 360-Degree Feedback system **and** to perform my regular job tasks.	☐	☐	☐	☐	☐
13. Over the next few weeks, I expect to have enough time to fully review and understand my 360-degree feedback data.	☐	☐	☐	☐	☐
14. Over the next few weeks, I expect to have enough time to develop my detailed action plan.	☐	☐	☐	☐	☐
15. The people in charge of the 360-Degree Feedback system have provided me with enough information about the 360-degree feedback system.	☐	☐	☐	☐	☐
16. I am well informed about the 360-degree feedback process.	☐	☐	☐	☐	☐
17. I understand why the 360-degree feedback system is being implemented.	☐	☐	☐	☐	☐
18. My manager has encouraged me to use the 360-Degree Feedback system.	☐	☐	☐	☐	☐
19. In my opinion, the more you use the 360-degree feedback system, the better are your chances of being promoted.	☐	☐	☐	☐	☐

Thank you for your help and participation. Please make sure you have put your mother's maiden name on the survey.

Table A6

Survey 3

Company XYZ 360-Degree Feedback Implementation Survey - Part III

Introduction
Thank you for your help in evaluating the effectiveness of the 360-Degree Feedback system. Your feedback will help us improve the 360-Degree Feedback system for all COMPANY XYZ employees.

Now that you have been through the entire 360 process, we would like to get your feedback on the entire 360 process.

Please remember that all responses are strictly confidential. All reports to me will be based on aggregated data to protect your confidentiality. At no time will any of your responses be compared to your 360-degree feedback results and your responses will in no way affect your employment at COMPANY XYZ.

Our evaluation requires us to measure your feedback at three times during the 360-process To allow us to do this (and maintain your confidentiality), we ask that you put your mother's maiden name and first initial on each survey. Once the data is entered into the database, all names will be deleted and all original surveys will be destroyed.

Thank you,

Paula Larson

VP-Organizational Effectiveness

Instructions

When providing your responses, remember that there are no right or wrong answers. If the question/statement does not apply to you, or you have no idea how to answer it, please leave it blank.

Mark your response by placing an X in the appropriate box. For example, if you are satisfied with your job, you would respond as follows:

Please answer regarding how satisfied you are →	**Very Dissatisfied**	Dissatisfied	**Neutral**	Satisfied	**Very Satisfied**
Overall, how satisfied are you with your job?	☐	☐	☐	☐	☐

Once complete, make a photocopy for your records and mail it/fax it to **Simon Bartle**.

If you have any problems or questions, please call **Simon Bartle 8*578-7140 or (804) 484-7140.**

Please write your mother's maiden name and her first initial here (without this information, we will be unable to use your data).

Please indicate your level of agreement with the following statements →	**Strongly Disagree**	Disagree	**Neutral**	Agree	**Strongly Agree**
1. I think that the 360-Degree Feedback process is a waste of time and money.	☐	☐	☐	☐	☐
2. I think my business made a good decision in investing in the 360-Degree Feedback system.	☐	☐	☐	☐	☐
3. I am very satisfied with my 360-degree feedback experience.	☐	☐	☐	☐	☐
4. I believe the 360-Degree Feedback process is well run.	☐	☐	☐	☐	☐
5. I am willing to put a great deal of effort, beyond that normally expected, to help the 360-Degree feedback Process be successful.	☐	☐	☐	☐	☐
6. I describe the 360-Degree Feedback process to my coworkers as something they should participate in.	☐	☐	☐	☐	☐
7. Participating in the 360-Degree Feedback process was definitely a mistake on my part.	☐	☐	☐	☐	☐

The following questions relate specifically to your 360-degree feedback →

	Excellent	Above Average	Average	Below Average	Poor
8. Evaluate the quality of the performance feedback you received from the 360-Degree Feedback process.	☐	☐	☐	☐	☐

	Very Accurate	Accurate	Neutral	Inaccurate	Very Inaccurate
9. How accurate was your 360-degree feedback?	☐	☐	☐	☐	☐

Please indicate your agreement with the following items →

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10 My 360-degree feedback has helped me more clearly understand the most important areas that I need to focus on to improve my job performance.	☐	☐	☐	☐	☐
11 The 360-Degree Feedback process has helped me understand how I can improve my job performance.	☐	☐	☐	☐	☐
12 Based on my 360-degree feedback results, I have developed a detailed action plan to address some of my developmental needs.	☐	☐	☐	☐	☐
13 I intend to use my 360-degree feedback for personal development.	☐	☐	☐	☐	☐
14 I intend to start implementing my action plan as soon as possible.	☐	☐	☐	☐	☐
15 I feel that my 360-degree feedback will help me improve my job performance.	☐	☐	☐	☐	☐
16 I intend to follow-up with my manager in a couple of months to see how well I am addressing my developmental needs.	☐	☐	☐	☐	☐
17 I feel that the 360-Degree Feedback process has helped to improve my communication with my manager(s).	☐	☐	☐	☐	☐

18	I feel that the 360-Degree Feedback process has helped to improve my communication with my **peers.**	☐ ☐ ☐ ☐ ☐
19	I feel that the 360-Degree Feedback process has helped to improve my communication with my direct/indirect **reports.**	☐ ☐ ☐ ☐ ☐
20	The 360-Degree Feedback process has shown me that my **manager(s)** can give me a fair and honest assessment of my performance.	☐ ☐ ☐ ☐ ☐
21	The 360-Degree Feedback process has shown me that my **peers** can give me a fair and honest assessment of my performance.	☐ ☐ ☐ ☐ ☐
22	The 360-Degree Feedback process has shown me that my **direct/indirect** reports can give me a fair and honest assessment of my performance.	☐ ☐ ☐ ☐ ☐

Please make sure you have put your mother's maiden name on the survey.

APPENDIX B

SAMPLE CHARACTERISTICS

Table B1

Table of Participating Locations

Location	Frequency	%
A	23	8.52%
B	25	9.26%
C	13	4.81%
D	11	4.07%
E	21	7.78%
F	29	10.74%
G	4	1.48%
H	2	.74%
I	6	2.22%
Missing	136	50.37%

Table B2

Tenure in Position

Time	Frequency	%
Less Then 1 Year	71	26.30%
More than 1 year but less than 2 years	77	28.52%
More than 2 years but less than 5	46	17.04%
More than 5 years but less than 10 years	18	6.67%
More than 10 years	38	14.07%
Missing	20	7.41%

APPENDIX C

ITEM MEAN, STANDARD DEVIATIONS AND CORRELATIONS

Table C1

Table of Pearson Product Moment Correlations, Means and Standard Deviations

Item	Mean	SD	1	2	3	4	5	6	7
1. I-1	4.04	.73	1.00						
2. I-2	3.19	.97	.04	1.00					
3. I-3	4.04	.73	.66*	.07	1.00				
4. I-4	4.58	.58	.29*	.11	.28*	1.00			
5. I-5R	3.58	.91	.40*	.00	.49*	.26*	1.00		
6. I-6R	3.36	.97	.35*	.01	.31*	.23*	.37*	1.00	
7. I-7	3.33	1.00	.38*	.02	.40*	.18*	.28*	.65*	1.00
8. I-8R	4.27	.83	.29*	.01	.35*	.30*	.34*	.30*	.26*
9. I-9R	2.00	.89	.11*	.14*	.23*	.18*	.39*	.21*	.22*
10. I-10	3.80	.90	.14*	.03	.25*	.28*	.26*	.28*	.21*
11. I-11R	4.50	.76	.10	.07	.08	.23*	.14	.03	-.11
12. I-12	4.45	.66	-.02	.15	-.00	.12*	.05	-.20*	-.26*
13. I-13	4.43	.63	-.03	.11	.07	.10	.14*	-.09	-.15*
14. I-14	4.62	.61	.13*	.02	.02	.12	.09	-.10	-.13*
15. I-15	4.37	.71	.07	.07	.10	.14*	.14	-.05	-.02
16. I-16	4.39	.78	.04	.01	.11	.06	-.00	.03	-.13*
17. I-17	4.49	.64	.05	.03	.09	.05	.07	-.13	-.06
18. II-1R	2.32	.78	-.09	.15*	.02	.05	-.01	-.06	-.10
19. II-2	2.34	.84	.06	.02	.02	-.04	-.02	-.01	-.00
20. II-3R	2.06	.60	.01	-.02	.01	.01	.03	.04	-.01
21. II-4R	2.08	.64	.10	.07	.11	-.12	.00	.04	-.00
22. II-5	3.93	.76	-.04	-.17*	-.07	-.11	-.13*	-.13*	-.00
23. II-6	4.15	.56	.03	-.06	.06	.06	-.05	.12	.14*
24. II-7	3.90	.68	.05	-.03	-03	-.06	-.11	.05	.06
25. II-8R	3.82	.96	.03	.08	.07	-.00	.04	.18*	.11*
26. II-9	3.87	.68	-.06	.09	.02	-.13*	.13*	.14*	-.01
27. II-10	3.91	.73	-.09	.02	-.16*	.08	-.17*	-.04	-.04

Table C1

Continued

Item	Mean	SD	1	2	3	4	5	6	7
28. II-11R	3.70	.78	.15*	.09	.05	-.00	-.00	.09	-.10
29. II-12	3.44	.91	-.17*	-.02	-.11	.04	-.05	-.02	.00
30. II-13	3.64	.93	-.09	-.12*	-.02	-.00	-.01	.01	.03
31. II-14	3.50	.90	-.05	-.09	-.03	-.06	-.04	.00	.08
32. II-15	4.05	.65	.02	-.16	.09	.02	.07	.07	.06
33. II-16	3.89	.70	-.14*	-.11	-.02	.05	-.12*	-.05	.07
34. II-17	4.11	.58	-.14*	-.03	-.05	.08	-.12*	-.01	-.02
35. II-18	3.70	.94	.02	-.03	.04	.03	.12*	-.08	-.04
36. II-19	3.35	.81	.09	.00	.06	-.06	.04	.13*	.08
37. III-1R	4.46	.62	-.01	.00	-.00	-.01	.02	.10	-.01
38. III-2	3.97	.77	-.06	.07	-.06	-.05	-.05	.10	.06
39. III-3	3.33	.84	.06	.09	.04	-.00	.06	.07	.03
40. III-4	3.73	.53	-.14*	.09	-.15*	-.02	-.09	-.03	-.03
41. III-5	3.58	.69	-.07	-.04	-.09	-.12	-.10	.06	.06
42. III-6	3.98	.78	.08	.03	.04	-.04	.10	.04	.00
43. III-7R	4.47	.53	-.12*	-.01	-.06	-.09	-.06	.06	.02
44. III-8	3.66	.89	.09	.02	.05	-.03	.10	.13*	.10
45. III-9	3.58	.79	.02	.10	.01	.01	.07	.11	.04
46. III-10	3.78	.94	-.07	.08	-.04	-.02	-.09	.07	.05
47. III-11	3.67	.86	.02	-.04	.04	-.00	.08	-.05	-.06
48. III-12	3.51	.90	.00	.09	.01	-.00	-.03	.08	.08
49. III-13	4.13	.62	.01	-.02	.06	-.03	.17	.11	-.00
50. III-14	3.84	.63	.02	.05	.08	.05	.00	.10	.05
51. III-15	3.71	.92	.00	.06	-.01	-.01	.02	.00	-.00
52. III-16	3.79	.65	-.04	-.00	.01	-.01	.03	.00	.04
53. III-17	3.41	.84	.05	-.02	.08	.07	-.05	.03	.01
54. III-18	3.56	.87	-.02	.01	-.05	-.06	-.04	.02	.01
55. III-19	3.78	.8	.02	-.15	.07	.02	.08	.04	-.03
56. III-20	3.78	.62	.07	.13*	.06	.04	.08	.04	.03
57. III-21	3.85	.79	.00	-.03	-.03	-.01	.00	.00	-.06
58. III-22	3.33	1.00	.03	.09	.02	.06	-.09	.00	.03

Table C1

Continued

Item	Mean	SD	8	9	10	11	12	13	14
8. I-8R	4.27	.83	1.00						
9. I-9R	2.00	.89	.35*	1.00					
10. I-10	3.80	.90	.30*	.48*	1.00				
11. I-11R	4.50	.76	.16*	.12*	.18*	1.00			
12. I-!2	4.45	.66	.02	.09	.05	.55*	1.00		
13. I-13	4.43	.63	.09	.16*	.04	.60*	.69*	1.00	
14. I-14	4.62	.61	.14	.14*	.08	.66*	.62*	.63*	1.00
15. I-15	4.37	.71	.10	.13*	.10	.51*	.51*	.55*	.63*
16. I-16	4.39	.78	-.08	.13*	-.02	.33*	.38*	.35*	.53*
17. I-17	4.49	.64	-.09	.11	-.02	.45*	.45*	.50*	.57*
18. II-1R	2.32	.78	.01	.00	.02	.08	.17*	.06	.09
19. II-2	2.34	.84	.01	-.11*	.12	.04	.11	.12*	.07
20. II-3R	2.06	.60	.11	.09	.01	.03	.05	.04	.05
21. II-4R	2.08	.64	.10	.07	.11	-.12	.00	.04	-.00
22. II-5	3.93	.76	-.04	-.17*	-.07	-.11	-.13*	-.13*	-.00
23. II-6	4.15	.56	.03	-.06	.06	.06	-.05	.12	.14*
24. II-7	3.90	.68	.05	-.03	-03	-.06	-.11	.05	.06
25. II-8R	3.82	.96	.03	.08	.07	-.00	.04	.18*	.11*
26. II-9	3.87	.68	-.06	.09	.02	-.13*	.13*	.14*	-.01
27. II-10	3.91	.73	-.09	.02	-.16*	.08	-.17*	-.04	-.04
28. II-11R	3.70	.78	.15*	.09	.05	-.00	-.00	.09	-.10
29. II-12	3.44	.91	-.17*	-.02	-.11	.04	-.05	-.02	.00
30. II-13	3.64	.93	-.09	-.12*	-.02	-.00	-.01	.01	.03
31. II-14	3.50	.90	-.05	.10	-.08	-.13	-.15*	-.14*	-.20
32. II-15	4.05	.65	.01	.10	-.04	-.05	-.09	-.12*	-.09
33. II-16	3.89	.70	-.07	.06	-.04	-.14*	-.07	-.16*	-.12*
34. II-17	4.11	.58	-.07	.04	-.07	-.08	-.06	-.13*	-.13*
35. II-18	3.70	.94	.10	-.13	-.05	-.11	.02	.11	-.01
36. II-19	3.35	.8!	.08	-.11	-.03	.02	-.01	.00	.09

Table C1

Continued

Item	Mean	SD	8	9	10	11	12	13	14
37. III-1R	4.46	.62	-.02	-.01	.06	.13	.00	-.02	.10
38. III-2	3.97	.77	-.05	.00	.13	.11	.03	.04	.12
39. III-3	3.33	.84	-.04	-.08	.11	.17*	.10	.08	.18*
40. III-4	3.73	.53	-.17*	.00	.03	-.09	-.01	-.02	-.05
41. III-5	3.58	.69	-.14*	-.01	-.00	.02	-.08	-.09	.02
42. III-6	3.98	.78	-.02	-.10	.05	.19*	.09	.06	.18*
43. III-7R	4.47	.53	.01	-.05	.17*	.14	.06	.06	.11
44. III-8	3.66	.89	.04	-.00	.00	.12	-.02	.01	.02
45. III-9	3.58	.79	.07	-.07	.12	.19*	.08	.09	.17*
46. III-10	3.78	.94	.00	-.02	.09	.02	.02	.00	.04
47. III-11	3.67	.86	-.01	-.13	.10	.17*	.17*	.14*	.16*
48. III-12	3.51	.90	.11	-.07	.09	.10	.08	.04	.14*
49. III-13	4.13	.62	.09	-.07	.06	.18*	.11	.10	.14*
50. III-14	3.84	.63	.12	.05	.10	.04	.05	.03	.07
51. III-15	3.71	.92	-.04	-.07	.08	.14*	.13*	.10	.22*
52. III-16	3.79	.65	.00	-08	.13	.05	.14*	.08	.15*
53. III-17	3.41	.84	.09	.11	.01	-.00	-.02	.03	-.01
54. III-18	3.56	.87	-.02	-.02	.01	-.07	.00	.05	-.03
55. III-19	3.78	.8	.10	-.05	.11	.02	.00	.00	.05
56. III-20	3.78	.62	.05	.03	.01	.04	-.03	.04	.00
57. III-21	3.85	.79	-.03	.01	-.05	-.04	.01	.07	-.04
58. III-22	3.33	1.00	.02	-.08	.01	.05	.07	.06	.12*

Table C1

Continued

Item	Mean	SD	15	16	17	18	19	20	21
15. I-15	4.37	.71	1.00						
16. I-16	4.39	.78	.56*	1.00					
17. I-17	4.49	.64	.65*	.75*	1.00				
18. II-1R	2.32	.78	.15*	.01	.01	1.00			
19. II-2	2.34	.84	.14*	-.04	.02	.42*	1.00		
20. II-3R	2.06	.60	.10	.16*	.05*	.22*	.35*	1.00	
21. II-4R	2.08	.64	.09	.16*	.03	.22*	.27*	.57*	1.00
22. II-5	3.93	.76	-.06	.07	.01	-.17*	-.14*	-.21*	-.17
23. II-6	4.15	.56	-.14	-.11	-.13	-.10	-.12*	-.21*	-.36*
24. II-7	3.90	.68	-.04	-.09	-.08	-.24*	-.12*	-.37*	-.17*
25. II-8R	3.82	.96	.01	.03	.01	.03	.23*	-.10	.03
26. II-9	3.87	.68	-.08	-.03	.03	-.17*	-.05	-.12*	-.14*
27. II-10	3.91	.73	-.00	-.08	-.05	-.17*	-.23*	-.37*	-.27*
28. II-11R	3.70	.78	.05	-.04	-.00	-.21*	.20*	-.32*	-.02
29. II-12	3.44	.91	-.12	-.20*	-.21*	.00	-.25*	-.14*	-.18*
30. II-13	3.64	.93	-.09	-.16*	-.23*	-.06	-.20*	-.05	-.12*
31. II-14	3.50	.90	-.11	-.18*	-.24*	-.00	-.14*	-.03	-.13*
32. II-15	4.05	.65	-.05	-.07	-.10	-.02	-.12	-.25*	-.36*
33. II-16	3.89	.70	-.11	-.18*	-.12	-.04	-.03	-.25*	-.31*
34. II-17	4.11	.58	-.10	-.18*	-.12	.02	-.18*	-.32*	-.33*
35. II-18	3.70	.94	.08	-.02	-.01	-.04	-.09	-.05	.01
36. II-19	3.35	.81	.02	.12	.06	-.02	-.09	.09	.12*
37. III-1R	4.46	.62	.01	.06	.00	-.06	-.07	-.06	-.07
38. III-2	3.97	.77	.14*	.07	.12	-.06	.06	-.11	.01
39. III-3	3.33	.84	.21*	.22*	.28*	-.04	.01	-.02	-.04
40. III-4	3.73	.53	.00	.06	.06	-.12	-.10	-.14*	-.15*
41. III-5	3.58	.69	.02	.11	.12*	-.08	.01	.01	.06
42. III-6	3.98	.78	.19*	.19*	.20*	-.03	.10	.07	.00
43. III-7R	4.47	.53	.11	.06	.11	.00	.06	-.08	.02
44. III-8	3.66	.89	.06	.03	.08	-.06	-.01	-.07	.02
45. III-9	3.58	.79	.19*	.06	.10	.02	.04	-.11	-.01

Table C1

Continued

Item	Mean	SD	15	16	17	18	19	20	21
46. III-10	3.78	.94	.05	.06	.05	-.01	-.03	-.09	-.02
47. III-11	3.67	.86	.15*	.16*	.17*	.08	.08	.08	.04
48. III-12	3.51	.90	.10	.02	.01	.12*	.10	.01	.07
49. III-13	4.13	.62	.12	.09	.14*	.01	.10	.06	.04
50. III-14	3.84	.63	.03	.01	-.01	.09	-.05	-.03	.04
51. III-15	3.71	.92	.20*	.19*	.23*	-.04	.07	-.03	-.04
52. III-16	3.79	.65	.13*	.10	.11	.05	.01	-.03	-.07
53. III-17	3.41	.84	-.02	-.01	.02	.01	-.04	-.04	-.02
54. III-18	3.56	.87	.02	.05	.14*	-.07	-.02	-.19*	-.08
55. III-19	3.78	.80	.00	-.02	-.04	.07	-.09	-.04	.05
56. III-20	3.78	.62	.08	.05	.09	-.01	-.06	-.03	-.11
57. III-21	3.85	.79	.04	.09	.14*	-.15*	-.06	-.04	-.12
58. III-22	3.33	1.00	.14*	.15*	.19*	-.05	.07	-.03	-.09

Table C1

Continued

Item	Mean	SD	22	23	24	25	26	27	28
22. II-5	3.93	.76	1.00						
23. II-6	4.15	.56	.13	1.00					
24. II-7	3.90	.68	.23*	.44*	1.00				
25. II-8R	3.82	.96	.12*	.21*	.24*	1.00			
26. II-9	3.87	.68	.23*	.35*	.40*	.12*	1.00		
27. II-10	3.91	.73	.23*	.22*	.40*	.15*	.25*	1.00	
28. II-11R	3.7	.78	.01	.16*	.36*	.29*	.12*	.35*	1.00
29. II-12	3.44	.91	.04	.15*	.16*	-.02	.11	.06	-.01
30. II-13	3.64	.93	.08	.20*	.15*	.13*	.08	.03	.00
31. II-14	3.50	.90	.05	.23*	.14*	.05	.09	.02	.06
32. II-15	4.05	.65	.21*	.58*	.30*	.16*	.28*	.14*	.12*
33. II-16	3.89	.70	.19*	.40*	.12	.01	.44*	.17*	.02
34. II-17	4.11	.58	.22*	.39*	.25*	.16*	.23*	.24*	.06
35. II-18	3.70	.94	.08	-.04	-.08	-.18*	-.06	-.08	.01
36. II-19	3.35	.81	.10	.09	.18*	.21*	.04	.02	.08
37. III-1R	4.46	.62	-.04	.12*	.14*	.09	-.05	.02	.09
38. III-2	3.97	.77	-.07	.05	.21*	.05	.08	.02	.17*
39. III-3	3.33	.84	.00	.05	.17*	.06	.08	.00	.07
40. III-4	3.73	.53	.07	-.04	.01	.02	.03	.09	.07
41. III-5	3.58	.69	-.02	.03	.09	.04	.07	-.03	.09
42. III-6	3.98	.78	-.09	.03	.11	-.03	.06	-.01	.06
43. III-7R	4.47	.53	.03	.09	.20*	.14*	.10	.08	.02
44. III-8	3.66	.89	.07	.14*	.26*	.69	.16*	.05	.05
45. III-9	3.58	.79	-.07	.01	.19*	.02	.00	.03	.06
46. III-10	3.78	.94	-.02	-.01	.04	.03	-.05	-.02	.09
47. III-11	3.67	.86	-.02	.03	.02	-.04	.07	-.03	-.05
48. III-12	3.51	.90	-.05	-.08	-.02	-.04	-.08	-.07	.08
49. III-13	4.13	.62	-.10	.00	.05	-.02	.03	-.04	-.04
50. III-14	3.84	.63	.02	.03	.03	.02	-.11	-.02	.04
51. III-15	3.71	.92	-.05	-.01	.10	-.04	-.02	.00	.07

Table C1

Continued

Item	Mean	SD	22	23	24	25	26	27	28
52. III-16	3.79	.65	.03	.01	.05	.05	-.07	.05	.08
53. III-17	3.41	.84	.02	-.03	-.01	.00	.01	.10	.00
54. III-18	3.56	.87	.08	.00	.09	.04	.11	.12*	.08
55. III-19	3.78	.80	-.05	-.06	-.10	.08	-.08	-.03	-.02
56. III-20	3.78	.62	.01	.06	.06	.01	.13*	.10	.05
57. III-21	3.85	.79	.08	-.02	.02	-.01	.07	.09	.01
58. III-22	3.33	1.00	-.04	-.05	.04	-.06	-.02	.00	.03

Table C1

Continued

Item	Mean	SD	29	30	31	32	33	34	35
29. II-12	3.44	.91	1.00						
30. II-13	3.64	.93	.70*	1.00					
31. II-14	3.50	.90	.59*	.84*	1.00				
32. II-15	4.05	.65	.09	.20*	.18*	1.00			
33. II-16	3.89	.70	.31*	.21*	.19*	.45*	1.00		
34. II-17	4.11	.58	.21*	.23*	.24*	.42*	.57*	1.00	
35. II-18	3.70	.94	.07	.06	.03	.09	.08	.11	1.00
36. II-19	3.35	.81	-.10	-.05	-.02	.20*	.03	.16*	.14*
37. III-1R	4.46	.62	.08	.06	.04	.01	.00	.02	-.03
38. III-2	3.97	.77	.00	-.05	-.08	-.05	.04	-.02	-.04
39. III-3	3.33	.84	-.08	-.02	-.05	-.01	-.06	.02	-.04
40. III-4	3.73	.53	.00	.00	.01	.00	.09	.12	.03
41. III-5	3.58	.69	-.12*	-.05	-.01	-.03	.05	.05	-.07
42. III-6	3.98	.78	.00	.00	.03	.01	-.02	-.04	-.04
43. III-7R	4.47	.53	-.10	-.05	-.06	-.03	.02	.04	-.20*
44. III-8	3.66	.89	.04	.06	.04	.03	-.01	.12*	-.05
45. III-9	3.58	.79	-.02	-.06	-.12*	-.07	-.08	.03	.03
46. III-10	3.78	.94	.04	.02	.02	-.10	.05	.06	.02
47. III-11	3.67	.86	-.08	-.02	.03	.00	-.03	-.06	-.04
48. III-12	3.51	.90	-.03	-.10	-.14*	-.12*	.00	-.05	.02
49. III-13	4.13	.62	-.01	.02	.02	-.05	-.02	-.03	-.14*
50. III-14	3.84	.63	.07	.07	-.01	-.05	.00	.05	.08
51. III-15	3.71	.92	-.01	-.03	-.05	-.10	-.07	-.05	.01
52. III-16	3.79	.65	.01	.02	.00	.00	-.01	-.04	-.01
53. III-17	3.41	.84	-.02	-.03	-.10	-.06	-.01	.02	.01
54. III-18	3.56	.87	-.03	-.03	-.02	-.08	.06	.11	-.06
55. III-19	3.78	.80	-.03	-.02	-.09	-.02	-.04	-.10	-.11
56. III-20	3.78	.62	-.04	-.07	-.08	.06	-.05	.09	.03
57. III-21	3.85	.79	-.04	.05	.10	.02	-.01	.07	-.03
58. III-22	3.33	1.00	-.08	-.12*	-.14*	-.12	-.02	-.01	.06

Table C1

Continued

Item	Mean	SD	36	37	38	39	40	41	42
36. II-19	3.35	.81	1.00						
37. III-1R	4.46	.62	.06	1.00					
38. III-2	3.97	.77	-.02	.10	1.00				
39. III-3	3.33	.84	-.08	.11	.46*	1.00			
40. III-4	3.73	.53	-.01	.14*	.43*	.28*	1.00		
41. III-5	3.58	.69	-.08	.31*	.43*	.54*	.10	1.00	
42. III-6	3.98	.78	-.04	.27*	.45*	.71*	.11	.46*	1.00
43. III-7R	4.47	.53	-.03	.31*	.55*	.48*	.14*	.43*	.28*
44. III-8	3.66	.89	.09	.40*	.38*	.47*	-.06	.35*	.32*
45. III-9	3.58	.79	.01	.62*	.57*	.58*	.16*	.33*	.35*
46. III-10	3.78	.94	-.04	.39*	.54*	.29*	.41*	.24*	.19*
47. III-11	3.67	.86	-.18*	-.04	.19*	.51*	-.02	.25*	.65*
48. III-12	3.51	.90	-.08	.26*	.49*	.34*	.13*	.25*	.21*
49. III-13	4.13	.62	-.02	.25*	.27*	.53*	-.03	.33*	.56*
50. III-14	3.84	.63	-.02	.09	.29*	.12*	.12*	-.03	-.08
51. III-15	3.71	.92	-.12	.34*	.53*	.79*	.21*	.36*	.71*
52. III-16	3.79	.65	-.05	.13*	.34*	.40*	.29*	.11	.33*
53. III-17	3.41	.84	.05	-.11	.01	-.08	.09	-.30*	-.31*
54. III-18	3.56	.87	.05	.17*	.21*	.32*	.48*	.12	.09
55. III-19	3.78	.80	.08	.11	-.13*	-.14*	-.15*	-.20*	-.28*
56. III-20	3.78	.62	.07	-.10	-.04	.18*	.25*	-.21*	.07
57. III-21	3.85	.79	.01	-.15*	-.15*	.11	.53*	-.09	.17*
58. III-22	3.33	1.00	-.12*	.23*	.38*	.60*	.39*	.38*	.41*

Table C1

Continued

Item	Mean	SD	43	44	45	46	47	48	49
43. III-7R	4.47	.53	1.00						
44. III-8	3.66	.89	.38*	1.00					
45. III-9	3.58	.79	.45*	.65*	1.00				
46. III-10	3.78	.94	.44*	.16*	.40*	1.00			
47. III-11	3.67	.86	.20*	.06	.08	.00	1.00		
48. III-12	3.51	.90	.33*	.03	.42*	.68*	.08	1.00	
49. III-13	4.13	.62	.42*	.36*	.36*	.26*	.44*	.23*	1.00
50. III-14	3.84	.63	.16*	.04	.21*	.47*	-.23*	.51*	.00
51. III-15	3.71	.92	.40*	.17*	.44*	.35*	.56*	.44*	.51*
52. III-16	3.79	.65	.35*	-.20*	.10	.38*	.25*	.47*	.25*
53. III-17	3.41	.84	-.05	.04	.08	.15	-.30*	.20*	-.12*
54. III-18	3.56	.87	.42*	.31*	.31*	.41*	.08	.11	.33*
55. III-19	3.78	.80	.00	-.05	.05	-.12	-.11	-.00	.12*
56. III-20	3.78	.62	-.02	.23*	.19*	.01	-.08	.04	-.03
57. III-21	3.85	.79	.02	-.02	-.16*	.08	.19*	-.25*	.23*
58. III-22	3.33	1.00	.26*	.03	.41*	.48*	.29*	.56*	.23*

Table C1

Continued

Item	Mean	SD	50	51	53	53	54	55	56
50. III-14	3.84	.63	1.00						
51. III-15	3.71	.92	.10	1.00					
52. III-16	3.79	.65	.43*	.60*	1.00				
53. III-17	3.41	.84	.47*	-.21*	.01	1.00			
54. III-18	3.56	.87	.03	.31*	.20*	.20*	1.00		
55. III-19	3.78	.80	-.10	-.13*	-.02	.26*	.19*	1.00	
56. III-20	3.78	.62	.33*	.03	.09	.52*	.15*	-.11	1.00
57. III-21	3.85	.79	-.04	.09	.15*	.08	.46*	-.19*	.34*
58. III-22	3.33	1.00	.10	.63*	.43*	.11	.35*	-.16*	.10

Table C1

Continued

Item	Mean	SD	57	58
57. III-21	3.85	.79	1.00	
58. III-22	3.33	1.00	.15	1.00

Note. $p < .05$. I-XX refers to items on Survey 1. II-XX refers to items on Survey 2. III-XX refers to items on Survey 3.

APPENDIX D

CONFIRMATORY FACTOR ANALYSIS – GENERALIZED LEAST SQUARES

Table D1a

Psychological Climate for Innovation: Initial Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

	Factor Loadings			
Item	GLS	MEV	R^2	Included in Final Scale
I-1	.83	.31	.69	Yes
I-2	.08*	.90	.01	No
I-3	.93	.13	.87	Yes
I-4	.51	.68	.27	Yes
I-5R	.64	.55	.43	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS $\geq$ 0.40. Item I-2 was dropped from the scale. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square ($df = 5, p < .05$) = 18.29; Non-Normed Fit Index = .99 Comparative Fit Index = .99.

Table D1b

Psychological Climate for Innovation: Final Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

	Factor Loadings			
Item	GLS	MEV	R^2	Included in Final Scale
I-1	.83	.31	.69	Yes
I-3	.93	.14	.86	Yes
I-4	.50	.73	.25	Yes
I-5R	.64	.58	.42	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Final scale estimates Chi-Square ($df = 2, p > .05$) = 4.18; Non-Normed Fit Index = .99 Comparative Fit Index = .99. Composite reliability = .63. Scale Mean = 4.06. Scale Standard Deviation = .56.

Table D2

Feedback Seeking Environment: Generalized Least Squares Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
I-6R	.87	.20	.79	Yes
I-7	.79	.32	.66	Yes
I-8R	.50	.69	.27	Yes
I-9	.53	.40	.42	Yes
I-10R	.51	.46	.36	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS $\geq$ 0.40. R indicates that the item(s) were reversed scored. Final scale estimates: Chi-Square (df = 5, $p < .05$) = 66.16; Non-Normed Fit Index = .92 Comparative Fit Index = .96. Composite reliability = .61. Scale Mean = 3.69. Scale Standard Deviation = .66.

Table D3

Innovation Characteristics - Compatibility: Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
I-11	.76	.19	.76	Yes
I-12	.72	.29	.64	Yes
I-13	.75	.21	.72	Yes
I-14	.90	.09	.90	Yes
I-15	.84	.25	.74	Yes
I-16	.82	.12	.85	Yes
I-17	.86	.09	.90	Yes

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS $\geq$ 0.40. All items were retained in the scale. Final scale estimates Chi-Square (df = 14, $p < .05$) = 31.07; Non-Normed Fit Index = .99 Comparative Fit Index = .99. Composite reliability = .82. Scale Mean = 4.47. Scale Standard Deviation = .54.

Table D4a

Innovation Characteristics: Complexity – Initial Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
II-1R	.39	.35	.31	No
II-2	.64	.45	.47	Yes
II-3R	.84	.27	.73	Yes
II-4R	.76	.38	.60	Yes

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item II-1R was dropped from the scale. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square (df = 2, $p < .05$) = 10.91; Non-Normed Fit Index = .88. Comparative Fit Index = .96.

Table D4b

Innovation Characteristics: Complexity – Final Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
II-2	.52	.73	.20	Yes
II-3R	.92	.16	.84	Yes
II-4R	.74	.45	.55	Yes

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. R indicates that the item(s) were reversed scored. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .67. Scale Mean = 2.24. Scale Standard Deviation = .56.

Table D5b

Psychological Climate for 360-Degree Feedback Implementation: Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
II-6	.31	.07	NA	Yes
II-7	.08	.04	NA	Yes
II-8	1.16	-.46	NA	No
II-9	.20	.26	NA	Yes
II-10	-.05	.40	NA	No
II-11	.12	.10	NA	No
II-12	-.12	.18	NA	No
II-13	.02	.00	NA	No
II-14	.04	.00	NA	No
II-15	.08	.07	NA	Yes
II-16	.05	.02	NA	Yes
II-17	.13	.04	NA	Yes
II-18	-.34	.72	NA	No
II-19	.16	.59	NA	No

Note. n= 255. Model was not positive definite. R^2 could not be calculated by LISREL.

Table D5

Psychological Climate for 360-Degree Feedback Implementation: Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
II-6	.81	.18	.79	Yes
II-7	.43	.31	.48	Yes
II-9	.57	.40	.45	Yes
II-15	.73	.28	.67	Yes
II-16	.92	.08*	.91	Yes
II-17	.82	.24	.74	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant (p < .05) and greater than 2.0 unless indicated by *. Item retention criteria: GLS $\geq$ 0.40. R indicates that the item(s) were reversed scored. Final scale estimates Chi-Square (df = 9, p < .05) = 163.19; Non-Normed Fit Index = .98 Comparative Fit Index = .96 Composite reliability = .74. Scale Mean = 4.00. Scale Standard Deviation = .45.

Table D6a

User Attitudes Toward the Innovation. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

			Factor Loadings	
Item	GLS	MEV	R^2	Included in Final Scale
III-1R	.55	.48	.81	Yes
III-2	.80	.20	.30	Yes
III-3	.94	.08*	.73	Yes
III-4	.30	.74	.28	No
III-5	.78	.28	.34	Yes
III-6	.80	.31	.48	Yes
III-7R	.71	.34	.53	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS ≥ 0.40. Item III-4 was dropped from the scale. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square (df = 14 $p < .05$) = 119.37; Non-Normed Fit Index = .98 Comparative Fit Index = .98.

Table D6b

User Attitudes Toward the Innovation. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2)

			Factor Loadings	
Item	GLS	MEV	R^2	Included in Final Scale
III-1R	.53	.60	.32	Yes
III-2	.81	.20	.76	Yes
III-3	.94	.09*	.91	Yes
III-5	.77	.30	.67	Yes
III-6	.80	.31	.68	Yes
III-7R	.71	.35	.59	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS ≥ 0.40. Item III-4 was dropped from the scale. R indicates that the item(s) were reversed scored. Final scale estimates Chi-Square (df = 9 $p < .05$) = 91.26; Non-Normed Fit Index = .98 Comparative Fit Index = .99. Composite reliability = .73. Scale Mean = 3.97. Scale Standard Deviation = .52.

Table D7

Goal Setting. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) -- Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
III-10	.93	.13*	.87	Yes
III-11	.13	.98	.02	No
III-12	.78	.40	.60	Yes

Note. n= 255. * p.<05. Item retention criteria: GLS $\geq$ 0.40. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .81. Scale Mean = 3.64. Scale Standard Deviation = .85.

Table D8

Intention to Improve Performance. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
III-13	.58	.66	.33	Yes
III-14	-.04*	.43	.05	No
III-15	1.10	-.26	1.05	No
III-16	.47	.42	.41	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant (p < .05) and greater than 2.0 unless indicated by *. Item III-14 & III-15 were dropped from the scale. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .49. Scale Mean = 3.88. Scale Standard Deviation = .59.

Table D9

Improved Communications. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
III-17	.58	.66	.34	Yes
III-18	.41	.83	.17	Yes
III-19	.55	.70	.30	Yes

Note. n= 255. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .41. Scale Mean = 3.59. Scale Standard Deviation = .58.

Table D10

Increased Trust. Generalized Least Squares Factor Loadings (GLS), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	GLS	MEV	R^2	Included in Final Scale
III-20	.14	.98	.02	No
III-21	2.07	-3.28	.12	No
III-22	.14	.98	.08	No

Note n= 255. Model did not converge after 5000 iterations.

APPENDIX E

CONFIRMATORY FACTOR ANALYSIS – MAXIMUM LIKELIHOOD

Table E1a

Psychological Climate for Innovation: Initial Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

			Factor Loadings	
Item	ML	MEV	R^2	Included in Final Scale
I-1	.83	.32	.68	Yes
I-2	.08*	.99	.06	No
I-3	.93	.14	.86	Yes
I-4	.50	.75	.25	Yes
I-5R	.64	.59	.41	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: ML $\geq$ 0.40. Item I-2 was dropped from the scale. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square ($df = 5, p < .05$) = 15.76; Non-Normed Fit Index = .96 Comparative Fit Index = .95.

Table E1b

Psychological Climate for Innovation: Final Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

			Factor Loadings	
Item	ML	MEV	R^2	Included in Final Scale
I-1	.83	.31	.32	Yes
I-3	.93	.14	.14	Yes
I-4	.50	.73	.75	Yes
I-5R	.64	.59	.59	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Final scale estimates Chi-Square ($df = 2, p > .05$) = 3.89; Non-Normed Fit Index = .99 Comparative Fit Index = 1.00. Composite reliability = .62. Scale Mean = 4.06. Scale Standard Deviation = .56.

Table E2

Feedback Seeking Environment: Maximum Likelihood Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
I-6R	.88	.22	.78	Yes
I-7	.81	.34	.66	Yes
I-8R	.47	.78	.22	Yes
I-9R	.43	.81	.19	Yes
I-10R	.42	.82	.18	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: ML $\geq$ 0.40. R indicates that the item(s) were reversed scored. Final scale estimates: Chi-Square ($df = 5, p < .05$) = 115.45; Non-Normed Fit Index = .48 Comparative Fit Index = .74. Composite reliability = .50. Scale Mean = 3.69. Scale Standard Deviation = .66.

Table E3

Innovation Characteristics - Compatibility: Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
I-11	.82	.32	.68	Yes
I-12	.79	.38	.62	Yes
I-13	.80	.36	.64	Yes
I-14	.93	.13	.87	Yes
I-15	.80	.35	.65	Yes
I-16	.68	.54	.46	Yes
I-17	.73	.47	.53	Yes

Note. $n = 255$ due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: ML $\geq$ 0.40. All items were retained in the scale. Final scale estimates Chi-Square ($df = 14, p < .05$) = 396.05; Non-Normed Fit Index = .64 Comparative Fit Index = .76. Composite reliability = .68. Scale Mean = 4.47. Scale Standard Deviation = .54.

Table E4a

Innovation Characteristics: Complexity – Initial Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
II-1R	.44	.80	.20	No
II-2	.57	.67	.33	Yes
II-3R	.85	.28	.72	Yes
II-4R	.78	.40	.60	Yes

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item II-1R was dropped. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square ($df = 2, p < .05$) = 51.71; Non-Normed Fit Index = .52. Comparative Fit Index = .84.

Table E4b

Innovation Characteristics: Complexity – Final Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
II-2	.52	.73	.20	Yes
II-3R	.92	.16	.84	Yes
II-4R	.74	.45	.55	Yes

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. R indicates that the item(s) were reversed scored. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .61. Scale Mean = 2.24. Scale Standard Deviation = .56.

Table E5a

Psychological Climate for 360-Degree Feedback Implementation: Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Initial Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
II-6	.85	.28	.72	Yes
II-7	.55	.70	.30	Yes
II-8	.33	.89	.11	No
II-9	.56	.69	.31	Yes
II-10	.39	.83	.17	No
II-11	.23	.95	.05	No
II-12	.39	.85	.15	No
II-13	.39	.85	.15	No
II-14	.39	.81	.19	No
II-15	.78	.39	.61	Yes
II-16	.77	.41	.59	Yes
II-17	.78	.40	.60	Yes
II-18	.04	1.00	.00	No
II-19	.16	.98	.02	No

Note. n= 255 due to pairwise deletion. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square (df= 77, $p < .05$) = 17204.07; Non-Normed Fit Index = .22 Comparative Fit Index = .34. Composite reliability = .82.

Table E5b

Psychological Climate for 360-Degree Feedback Implementation: Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
II-6	.87	.24	.76	Yes
II-7	.51	.74	.26	Yes
II-9	.55	.70	.30	Yes
II-15	.80	.36	.64	Yes
II-16	.78	.39	.61	Yes
II-17	.77	.41	.59	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: GLS $\geq$ 0.40. R indicates that the item(s) were reversed scored. Final scale estimates Chi-Square (df= 9, $p < .05$) = 218.84; Non-Normed Fit Index = .60 Comparative Fit Index = .76 Composite reliability = .56. Scale Mean = 4.00. Scale Standard Deviation = .45.

Table E6a

User Attitudes Toward the Innovation. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-1R	.55	.48	.38	Yes
III-2	.80	.20	.76	Yes
III-3	.94	.08	.92	Yes
III-4	.30	.74	.11	No
III-5	.78	.28	.68	Yes
III-6	.80	.31	.68	Yes
III-7R	.71	.34	.59	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: ML $\geq$ 0.40. Item III-4 was dropped from the scale. R indicates that the item(s) were reversed scored. Initial scale estimates Chi-Square ($df = 14$ $p < .05$) = 119.37; Non-Normed Fit Index = .81 Comparative Fit Index = .89.

Table E6b

User Attitudes Toward the Innovation. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2)

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-1R	.53	.60	.32	Yes
III-2	.81	.20	.76	Yes
III-3	.94	.09	.91	Yes
III-5	.77	.30	.67	Yes
III-6	.80	.31	.68	Yes
III-7R	.71	.35	.59	Yes

Note. $n = 255$. All T-values for factor loadings and measurement error variances are significant ($p < .05$) and greater than 2.0 unless indicated by *. Item retention criteria: ML $\geq$ 0.40. All items were retained for the scale. R indicates that the item(s) were reversed scored. Final scale estimates Chi-Square ($df = 9$ $p < .05$) = 103.31; Non-Normed Fit Index = .81 Comparative Fit Index = .89. Composite reliability = .71. Scale Mean = 3.97. Scale Standard Deviation = .52.

Table E7

Goal Setting. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-10	.93	.13*	.87	Yes
III-11	.13*	.98	.02	No
III-12	.78	.40	.60	Yes

Note. n= 255. * p.<05. Item retention criteria: ML $\geq$ 0.40. Item II-11 was dropped. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .81.

Table E8

Intention to Improve Performance. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-13	.42	.82	.33	Yes
III-14	-.09*	.99	.05	No
III-15	1.44	-1.03	1.05	No
III-16	.47	.77	.41	Yes

Note. n= 255. All T-values for factor loadings and measurement error variances are significant (p < .05) and greater than 2.0 unless indicated by *. Items III-14 & III-15 were dropped from the scale. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .49. Scale Mean = 3.88. Scale Standard Deviation = .59.

Table E9

Improved Communications. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-17	.58	.66	.34	Yes
III-18	.41	.83	.17	Yes
III-19	.55	.70	.30	Yes

Note. n= 255. As the model was fully saturated, goodness of fit indices could not be calculated. Composite reliability = .41. Scale Mean = 3.59. Scale Standard Deviation = .58.

Table E10

Increased Trust. Maximum Likelihood Factor Loadings (ML), Measurement Error Variances (MEV), And Item Reliability (R^2) – Final Scale Items

		Factor Loadings		
Item	ML	MEV	R^2	Included in Final Scale
III-20	.14	.98	.02	No
III-21	2.07	-3.28	.12	No
III-22	.14	.98	.08	No

Note n= 255. Model did not converge after 5000 iterations.

APPENDIX F

STRUCTURAL MODEL ANALYSES OF THE INDEPENDENT, PROCESS AND DEPENDENT LATENT VARIABLES – GENERALIZED LEAST SQUARES

Table F1

Structural Model Analysis of the Antecedent, Process and Consequence Latent Variables

Lambda Y Matrix

	PCI	FSE	CP	CL	RA	PC 360I	UAI	FA	GSB	IIP	COM	MEV	R^2
PCI-M	.46	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11	.65
FSE-M	.00	.60	.00	.00	.00	.00	.00	.00	.00	.00	.00	.08	.82
CP-M	.00	.00	.83	.00	.00	.00	.00	.00	.00	.00	.00	.05	.93
CL-M	.00	.00	.00	.77	.00	.00	.00	.00	.00	.00	.00	.09	.87
RA-M	.00	.00	.00	.00	.73	.00	.00	.00	.00	.00	.00	.23	.70
PC360I-M	.00	.00	.00	.00	.00	.74	.00	.00	.00	.00	.00	.08	.87
UAI-M	.00	.00	.00	.00	.00	.00	.95	.00	.00	.00	.00	.07	.93
FA-M	.00	.00	.00	.00	.00	.00	.00	.74	.00	.00	.00	.12	.82
GSB-M	.00	.00	.00	.00	.00	.00	.00	.00	.78	.00	.00	.13	.82
IIP-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.74	.00	.15	.78
COM-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.62	.18	.68

Beta Matrix

	PCI	FSE	CP	CL	RA	PC 360I	UAI	FA	GSB	IIP	COM
PCI	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
FSE	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CP	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RA	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PCI 360I	.01*	.04*	.00	.00	.00	.00	.00	.00	.00	.00	.00
UAI	.00	.00	.31	.04*	-.15*	.13*	.00	.00	.00	.00	.00
FA	.00	.00	.00	.00	.00	.00	.92	.00	.00	.00	.00
GSB	.00	.00	.00	.00	.00	.00	.67	.00	.00	.00	.00
IIP	.00	.00	.00	.00	.00	.00	.97	.00	.00	.00	.00
COM	.00	.00	.00	.00	.00	.00	.02*	.00	.00	.00	.00

Table FI

Continued

PSI Matrix

	PCI	FSE	CP	CL	RA	PC 360I	UAI	FA	GSB	IIP	COM
PCI	1.00										
FSE		1.00									
CP			1.00								
CL				1.00							
RA					1.00						
PCI 360						1.00					
UAI							.86				
FA								.16			
GSB									.55		
IIP										.06	
COM											1.00

Note. n= 255. Abbreviations used: MEV = Measurement Error Variance; R^2 = Item Reliability. PCI = Psychological Climate for Innovation. FSE = Feedback Seeking Environment. CP = Innovation Characteristics – Compatibility; CL = Innovation Characteristics – Complexity; RA = Innovation Characteristics – Relative Advantage; PC360I = Psychological Climate for 360-Degree Feedback Implementation. UAI = User Attitude Toward The Innovation; FA = Feedback Acceptance; GSB = Goals Setting Behaviors; IIP = Intentions to Improve Performance. COM = Improved Communications. All T-values for structural coefficients are significant ($p < .05$) and greater than 2.0 unless indicated by *. Estimates of goodness-of-fit are: Chi-Square (df = 45, $p < .05$) = 319.78; Non-Normed Fit Index = .95; Comparative Fit Index = .96; Root Mean Square Error of Approximation = .16.

APPENDIX G

STRUCTURAL MODEL ANALYSES OF THE INDEPENDENT, PROCESS AND DEPENDENT LATENT VARIABLES – MAXIMUM LIKELIHOOD

Table GI

Structural Model Analysis of the Antecedent, Process and Consequence Latent Variables

Beta Matrix

	PCI	FSE	CP	CL	RA	PC 3601	UAI	FA	GSB	IIP	COM
PCI-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
FSE-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CP-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CL-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RA-M	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PC3601-M	-.14*	.11*	.00	.00	.00	.00	.00	.00	.00	.00	.00
UAI-M	.00	.00	.20	.02*	-.13*	.18*	.00	.00	.00	.00	.00
FA-M	.00	.00	.00	.00	.00	.00	.71	.00	.00	.00	.00
GSB-M	.00	.00	.00	.00	.00	.00	.53	.00	.00	.00	.00
IIP-M	.00	.00	.00	.00	.00	.00	.72	.00	.00	.00	.00
COM-M	.00	.00	.00	.00	.00	.00	.02*	.00	.00	.00	.00

Table GI

Continued

PSI Matrix

	PCI	FSE	CP	CL	RA	PC 360I	UAI	FA	GSB	IIP	COM
PCI	1.00										
FSE		1.00									
CP			1.00								
CL				1.00							
RA					1.00						
PCI 360						.97					
UAI							.91				
FA								.49			
GSB									.72		
IIP										.15	
COM											.18

Note. *n*= 255. Abbreviations used: MEV = Measurement Error Variance; R^2 = Item Reliability. PCI = Psychological Climate for Innovation. FSE = Feedback Seeking Environment. CP = Innovation Characteristics – Compatibility; CL = Innovation Characteristics – Complexity; RA = Innovation Characteristics – Relative Advantage; PC360I = Psychological Climate for 360-Degree Feedback Implementation. UAI = User Attitude Toward The Innovation; FA = Feedback Acceptance; GSB = Goals Setting Behaviors; IIP = Intentions to Improve Performance. COM = Improved Communications. All T-values for structural coefficients are significant ($p < .05$) and greater than 2.0 unless indicated by *. Estimates of goodness-of-fit are: Chi-Square ($df = 45$, $p < .05$) = 411.36; Non-Normed Fit Index = .37; Comparative Fit Index = .48; Root Mean Square Error of Approximation = .18.

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University of Baltimore, Baltimore, Maryland. M.S., (1995). Industrial/Organizational Psychology.

University of Toronto. B.S., (1992). Psychology/Criminology.

Sample Publications

Bartle, S., Fink, A., & Hayes, B. (2000). Psychology of the Scientist: LXXX. Attitudes regarding authorship issues in psychological publications. Psychological Reports, 86, 771-788.

Hayes, B., Bartle, S., & Major, D. (2001). A conceptual model of equal opportunity climate in the workplace. Human Resources Management Review. In press.

Sample of Presentations

Bartle, S. & Davis, D. (1998). The effects of organizational structure on satisfaction, commitment and performance: A meta-analysis. Poster presented at the 13th Annual Conference for the Society for Industrial and Organizational Psychology. Dallas, Texas.

Bartle, S. & Hayes, B. (1999). Organizational justice and work outcomes: A meta-analysis. Poster presented at the 14th Annual Conference for the Society for Industrial and Organizational Psychology. Atlanta, Georgia.

Bartle, S., & Mitchell, T. (1996). The effects of frustration on the levels of cooperation: An examination with locus of control. Paper presented at the 42nd Annual Meeting of the Southeastern Psychological Association. Norfolk, Virginia.

Flynn, J., Stephens, J., & Bartle, S. (1994) . Determinants of employee attitudes and reactions toward performance appraisal systems: A multi-organizational study. Paper presented at the 1994 National Conference of the American Psychological Association. Los Angles, California.

Hamil, D., & Bartle., S. (1997). Applicant reactions to selection procedures and future job seeking behaviors. Poster presented at the 13th Annual Conference for the Society for Industrial and Organizational Psychology. Dallas, Texas.

Hayes, B., Bartle, S., & Major, D. (1997). A conceptual model of equal opportunity climate in the workplace. Paper presented at the Academy of Management Annual Conference, Boston, Massachusetts.