

**Does Innovation Mediate Firm Performance?:
A Meta-Analysis of Determinants and
Consequences of Organizational Innovation**

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Abstract

This study uses emerging meta-analytic methods, in combination with structural equations methodology, to synthesize empirical studies that examine the correlates (antecedents and/or outcomes) of organizational innovation. Overall, this study draws upon a meta-analytic database of 134 independent samples from 83 studies from the period of 1980 through 2003. Specifically, the study examines the impact of 27 determinants and 3 performance outcomes of innovation with an overall sample size of 122,943. Organizational capabilities and structure account for the majority of unique variance explained in predicting innovation. Overall findings indicate that innovation is significantly and positively related to superior performance. Additionally, a multivariate generalized least squares (GLS) moderator analysis indicates that measurement factors and research design considerations in model specification significantly biases the observed effects within a given study. Using a dichotomous measure of innovation deflates observed effect sizes, while studying innovation cross-sectionally and within one industry sector inflates the observed effect. The findings also help address a number of conflicting results. Finally, this study tests an integrative model of product innovation and finds support for innovation as a partial mediator between environmental and organizational variables and financial performance. The study identifies surpluses and shortages in the empirical literature on organizational innovation.

Key Words: Organizational innovation; Product innovation; Literature review; Meta-analysis; Performance; Organizational capabilities; Organizational structure; Organizational demographics

1. Introduction

Numerous studies in economics, organizational theory, strategic management, and marketing have focused on studying innovation. Innovation is thought to provide organizations with a means of creating a sustainable competitive advantage that is imperative in today's turbulent environment. Innovation is positioned as a driver of economic growth. Different scholars have stated that innovation is a mechanism by which organizations can draw upon core competencies and transition these into performance outcomes critical for success (Reed and DeFillippi 1991; Barney 1991). While the importance of this domain has not gone unnoticed, there seems to be a lack of clarity on the drivers and performance implications of innovation. To further illustrate this point, scholars have pointed out that past research in this arena has primarily been inconclusive, inconsistent, and lacking explanatory power (Wolfe 1994). Perhaps the major culprit of this lack of consistency and power is that there is no one theory of innovation present within the literature. In fact, no one set of antecedent variables has emerged that can differentiate between organizations that are successful innovators from those that struggle with innovation. Therefore it is difficult to build a strong theoretical understanding of the nature of this phenomenon.

The lack of consistency within the innovation literature has not gone unnoticed by other scholars. Damanpour (1991) provided an early quantitative synthesis of organizational innovation, but since this time a substantial body of empirical innovation research has been conducted. Additionally, Damanpour's (1991) focus was limited to organization level variables and their impact on organizational innovation. His results suggest that the relationships between these antecedents and innovation remained relatively stable across multiple studies and contexts. Despite these findings, there still appear to be several discrepancies present in the literature with regards to the impact of organizational variables on innovation. For example, some scholars find that age is positively associated with innovation (Sorenson and Stuart 2000), while the opposite finding has also been demonstrated (Boeker 1997). Additionally, the role of centralization, diversification, resource level, and organizational size also face conflicting results and conclusions from past research.

A great deal of research within the past decade has moved beyond examining only the organizational antecedents of innovation. Innovation is conceptualized as being context-dependent and influenced by environmental, organizational, and individual level antecedents (Russell 1990; Wolfe 1994). In particular, the impact of the environment has been addressed by many scholars and innovation is viewed to be a means of creating a dynamic capability that is necessary to

manage the uncertainty present in the environment (Teece, Pisano and Shuen 1997; Eisenhardt and Martin 2000). Another emerging area that has received considerable attention is the role of individuals within an organization in the innovation process (Goes and Park 1997; Sivadas and Dwyer 2000; Keister 2002; Rao and Drazin 2002). Additionally, while the literature has continued to grow and shed new insights on the nature of innovation, there has been no systematic synthesis on the impact of these factors on the different performance metrics used to measure innovation success. Recent reviews have been limited in their focus, such as research on integrated product development (Gerwin and Barrowman 2002), new product development (Brown and Eisenhardt 1995; Krishnan and Ulrich 2001), and mathematical modeling concurrent engineering (Krishnan et al 1997; Loch and Terwiesch 1998). Because innovation is influenced by so many different variables, it is not possible to empirically examine all of them in one study. Therefore there is a need to reevaluate and integrate the innovation literature in order to account for these new developments. A clear synthesis of the impact of these different level variables is imperative in order to advance the current knowledge base of the literature.

Not only has the innovation literature itself grown and changed, so has the meta-analysis methodology. Meta-analysis is a useful approach for creating an overall summary of a research domain, and serves as a systematic way to understand how research design impacts the results obtained in the literature, and to empirically address conflicting findings within the literature. An emerging use of meta-analysis is for theory building and hypothesis testing (Viswesvaran and Ones 1995). In this role, meta-analysis allows the researcher to empirically test alternative theoretical models using a much larger dataset and a nomological net of constructs than a typical study can. Against this backdrop, the objectives of this article are: (1) to provide an up-to-date synthesis of the empirical literature on innovation including environmental, organizational, and individual level variables and (2) to aid in the development of a much needed theory of innovation by testing alternate models of innovation's antecedents and consequences.

2. Study 1: Meta-Analysis of Innovation

The primary objective of a meta-analysis examining correlations is to describe the relationship between independent and dependent variables, or in this case, between antecedents of and the construct of innovation itself. However, often there is a substantial amount of variation present in the actual correlations, suggesting a moderator variable (Hunter and Schmidt 2004). Then the goal of the meta-analysis is no longer simply to summarize the correlations, but rather becomes a hypothesis-testing tool to examine these moderators (Mathieu and Zajac 1990).

In this study, the procedures for conducting a meta-analysis by Hunter and Schmidt (2004) were followed. Study correlations are open to statistical artifacts, such as sampling error and measurement unreliability. Once these artifacts are controlled for, then a chi-square test should be conducted in order to determine if sufficient variance remains in the results and justifies a search for moderator variables. Without sufficient variance, one can conclude that inconsistent findings are in fact completely explained by statistical artifacts.

Sampling Frame

Only studies that actually measured innovation were included in the meta-analysis. In order to identify these studies, the following procedure based upon Capon, Farley and Hoenig (1990) and Gerwin and Barrowman (2002) was used: (1) search of online bibliographic databases (ABI Inform Complete, UMI Dissertation Database, and Business Source Premier) using key words that referred to innovation, (2) manual search of sixteen economic, management and marketing journals covering the period from January 1980 to December 2003 for studies on organizational innovation¹, (3) references used in the Damanpour (1991) meta-analysis of innovation as well as references in studies found in steps 1 and 2, and (4) authors that had studied innovation in the past were contacted for working papers on innovation.

Sample Characteristics

Overall, eighty-three empirical studies that measured organizational innovation were analyzed in this meta-analysis and one hundred and thirty-four independent samples were coded for the analysis.² The average sample size ranged from a high of 40,808 to a low of 16 with a mean of 917.49 and standard deviation of 3,895.75. The sample size for the meta-analysis across all studies was 122,943 observations. Sixty-five studies examined innovation in a manufacturing context and forty-three in service industries. Twenty-six studies aggregated innovation scores across multiple industries for the analysis. Ninety-five of the studies were cross sectional in nature while only thirty-nine utilized a longitudinal research design.

Several other study characteristics were also taken into account. Seventy-one studies used a frequency count of innovation as the measure for innovation. Thirty studies used a binary (1/0) adopt versus nonadopt measure of innovation.

¹ Economics (*American Economic Review, Journal of Technology Transfer, R&D Management, RAND Journal of Economics, Research Policy, Quarterly Journal of Economics*); Management (*Administrative Science Quarterly, Academy of Management Journal, Journal of Management, Management Science, Organization Science, Strategic Management Journal*); Marketing (*Journal of the Academy of Marketing Science, Journal of Marketing, Journal of Marketing Research, Journal of Product Innovation Management*)

² Having an independent investigator code 10% of the samples included in the database checked the quality of the coding. The intercoder reliability was 1.00.

Six studies used R&D intensity to represent organizational innovation, while eleven studies operationalized innovation as a series of steps taken by organizations to promote innovation. Finally, there were sixteen studies that used a scale of radicalness, or newness of the innovation, as the measure of organizational innovation. In addition, typology of innovation used was also coded as a potential moderator variable. There were seventy-six product innovation studies, twenty process innovation studies; thirty addressed radical innovations, while only twenty-one focused on incremental innovations. In addition, the dual core typology was also examined in several studies with seventeen examining administrative innovations and twelve studies focusing on technical innovations (Daft 1978).

Meta-Analysis Procedure

We followed the meta-analytical procedure as set forth by Hunter and Schmidt (2004). In addition, we also followed the procedure set forth by Huffcutt and Arthur (1995) for detecting outliers in a meta-analytic dataset. We first corrected each correlation for attenuation using the reliabilities reported for each measure, where reliability information is available³. After the correlations are corrected for attenuation, the estimated true correlation (r_t) between each independent variable and the innovation construct is calculated. In order to calculate the mean r_t , each corrected correlation for a given study is weighted by the sample size and averaged across respondents and studies. The next step is to calculate the estimated population standard deviation (s_p^2) and finally, a chi-square statistic that allows for the assessment of the heterogeneity across the studies after correcting for statistical artifacts (Hunter and Schmidt 2004). A significant chi-square indicates the presence of moderator variables. It is also necessary to compute the 95% confidence interval around the mean correlations corrected for measurement and sampling errors. Moreover, a fail-safe N is calculated for each variable studied in order to assess the possibility of publication bias or the “file-drawer” problem in the analysis. This information given in the last column of Table 1 indicates the number of other studies that would have to be included in the analyses in order to change the correlation to $r < 0.01$, yielding confidence in the results of the meta-analysis (Hunter and Schmidt 2004).

[Insert Table 1]

Results from Overall Analysis

A summary of the meta-analysis is presented in Table 1. The antecedents of innovation can be broadly grouped into Environmental, Organizational Capabilities, Organizational Demographics, and Organizational Structural variables

³ Corrected $r_x = \text{uncorrected } r_{xy} * \text{reliability } x * \text{reliability } y$. We corrected for measurement error using Hunter and Schmidt's (2004) artifactual distribution approach, since Cronbach alpha values were not available in every study.

(Russell 1990). Table 1 also provides a description of the effect size of the relationships between the antecedent variables and innovation in accordance with the guidelines set forth by Cohen and Cohen (1983), where correlations less than 0.10 are considered to be small, correlations ranging from 0.10 to 0.30 are medium, and correlations greater than 0.30 are large. The consequences, or outcomes of innovation, have been categorized into three distinct types: (1) financial performance, (2) efficiency gains, and (3) self-report subjective measures of innovation performance. Classifying variables as either antecedents or consequences provides a useful means for discussing the results (Mathieu and Zajac 1990) (See Table 2 for theoretical rationale underlying these antecedents and outcomes of innovation; Appendix 1 provides the definitions of the antecedent constructs). The overall meta-analysis results are summarized in Figure 1⁴.

[Insert Figure 1] and [Insert Table 2]

Environmental Factors. External factors are thought to lead to increased levels of innovation. A dynamic environment requires organizations to innovate in order to adapt to the changing environment (Meyer and Goes 1988; Nohria and Gulati 1996). Prospect Theory argues that in times of great uncertainty, organizations are more likely to be risk seeking and therefore more likely to innovate (Kahneman and Tversky 1979). However, competition and environmental turbulence have a relatively small impact on innovation. Additionally, a union influence is negatively related to innovation, while the urbanization surrounding a company promotes innovation.

Organizational Capabilities. The resource-based view of the firm argues that organizational capabilities provide the stimulus necessary to achieve a competitive advantage in the marketplace (Barney 1991). One potential mechanism through which superior performance can be obtained is innovation. Therefore, it is expected that organizational capabilities will be drivers of innovation. Overall results suggest that an organization's past innovation has the strongest relationship with innovation. In addition, an organization's communication, customer and competitor orientation, network ties, and resource levels are all positively related to innovation. Managerial openness to change is positively correlated with innovation, as well as the presence of an innovation champion and team communication. The positive effect of organizational capabilities on innovation provides empirical support for the resource-based view of the firm.

⁴ Outliers for this dataset were identified using the sample-adjusted meta-analytic deviancy (SAMD) statistic as proposed by Huffcutt and Arthur (1995). The identification of outliers eliminated 5 innovation correlations out of the sample of 531 innovation correlations coded from the samples.

Organizational Demographics. Organizational demographics are posited to influence the level of innovation present within organizations (Moch and Morse 1977). The results of the overall analysis suggest that both organizational age and size are positively related to innovation. In addition individual antecedents also impact organizational innovation. Management education level and professionalism are positively correlated with innovation. However, managers' tenure level, which is posited to negatively impact innovation throughout the literature, shows a correlation of zero (Kimberly and Evanisko 1981; Meyer and Goes 1988; Rao and Drazin 2002).

Organizational Structure. Past research has argued that organizational structure is the primary driver of innovation (Wolfe 1994). Structure provides the formal, internal context that is required in order for process of innovation to occur (Russell 1990). Overall results indicate that clan culture has the strongest relationship with innovation. Other organizational structure variables are also positively related to innovation including complexity, formalization, interfunctional coordination, and specialization providing support to the role of organizational structure in the facilitation of innovation. Surprisingly, while centralization has been the focus of a great deal of research, overall results indicate that it is not significantly related to innovation (Collins, Hage and Hull 1988; Dewar and Dutton 1986; Ettlie and Rubenstein 1987; Hage and Dewar 1978).

Outcomes. The link between innovation and performance is well established in the literature (Han, Kim and Srivastava 1998). The overall analysis supports this expectation. Results suggest that innovation is positively related to all of the performance outcomes in this analysis. Innovation has the strongest relationship with efficiency gains in an organization and the weakest relationship with financial performance.

In addition to the overall analysis, we were also interested in examining which set of predictor variables has the greatest amount of unique variance in explaining innovation. In order to conduct this analysis, a correlation matrix for the dataset was constructed and several regression models were hierarchically run. The unique variance attributable to each variable (Environmental, Capabilities, Structure, and Demographics) is equal to the difference in R^2 between the model with all 4 predictor variable sets included and the model with that particular variable set excluded. The difference between the full model (with all four predictor sets) and each of the 3 predictor set models shows the unique contribution of each (See bottom of Table 3). From the results of this analysis one can see that both organizational capabilities and demographics account for the majority of the variance in innovation. Organizational capabilities uniquely account for 44 percent of the variance in innovation, while organizational structure variables uniquely account for 30 percent of the variance.

Moderator Analysis

As a follow up to the overall meta-analysis, we conducted several tests to check for the presence of moderators in our data set. The first indicator of moderators is to examine whether or not statistical artifacts explain the variance in observed correlations (Hunter and Schmidt 2004). The chi-square test (shown in Table 1) indicates that between study variance was in fact due to statistical artifacts in 2 of the 30 variables examined. Both of the studies are based on five or fewer samples. However, the remaining 28 analyses indicate that there are potential moderators of the innovation-variable relationship.

In addition to the standard procedure as set forth by Hunter and Schmidt (2004), the test for moderators can also be performed using Structural Equations Modeling (Joreskog and Sorbom 2001). All of the correlations between the independent variables and dependent variables were computed (where information was available)⁵. Additionally a separate correlation matrix was constructed for each independent variable that eliminated outliers and resulted in a non-significant chi-square in the previous analysis (a correlation matrix without moderators present). After construction of the two correlation matrices, the variables were analyzed using a multi-group comparison in LISREL 8.51 (Joreskog and Sorbom 2001). The results indicate with certainty that there are in fact differences between the two correlation matrices providing further evidence of moderators within the data set ($\chi^2_{(78)} = 45,495.12$, RMSEA = 0.28).

To examine the impact of moderators on the innovation-variable relationship, a generalized least squares regression (GLS) approach was taken. GLS can overcome the assumption of independence that is necessary in other multivariate analysis techniques. The correlations in this analysis cannot be treated as independent because each sample in the meta-analysis provided more than one innovation pairwise correlation. Therefore it is necessary to model within-sample dependencies and in turn safeguard against samples that yielded more information biasing the results. In order to model these dependencies, it was necessary to calculate the block diagonal variance-covariance matrices for each sample and analyze them together in a single analysis (Raudenbush et al 1988). As pointed out by Raudenbush et al (1988, p.112):

“Perhaps most important, the method [GLS] provides a systematic framework for examining whether different outcomes respond similarly or differently to treatments and whether these treatment effects depend on features of study design, sampling, and implementation.”

For each sample the variances and covariances were calculated (Becker 1992; Becker and Schram 1994) as:

⁵ The correlation matrix is available upon request from the first author.

$$Var(r_{inn,x}) = (1 - \rho_{inn,x}^2)^2 / n, \quad [11]$$

$$Cov(r_{inn,x}, r_{inn,y}) = \left[\frac{1}{2} (2\rho_{x,y} - \rho_{inn,x}\rho_{inn,y}) * (1 - \rho_{inn,x}^2 - \rho_{inn,y}^2 - \rho_{x,y}^2) + \rho_{x,y}^3 \right] / n, \quad [12]$$

where $r_{inn,x}$ is the sample correlation between innovation and variable x, $\rho_{inn,x}$ is the corresponding population correlation, and n is the sample size. From these calculations, a matrix consisting of variance and covariance values for each sample was constructed (Σ_i), with the full covariance matrix for the meta-analysis denoted as Σ . In order to examine the impact of moderators, the following model was estimated

$$d = X\beta + e, \quad [13]$$

where d is the effect size of the innovation-antecedent variable relationship, and the parameter β is estimated through GLS estimation. In order to estimate β , the following equation was used

$$\beta^* = (X'\Sigma^{-1}X)^{-1}X'\Sigma^{-1}d, \quad [14]$$

with the variance-covariance matrix of β^* being:

$$V_{\beta^*} = (X'\Sigma^{-1}X)^{-1}, \quad [15]$$

Four broad categories of moderators have been identified as critical in meta-analytic studies: (1) measurement method, (2) research context, (3) estimation procedure, and (4) model specification (Assmus, Farley and Lehmann 1984; Capon, Farley and Hoenig 1990; Farley, Lehmann and Sawyer 1995). However, in this study, since the effect size under consideration is the Pearson product moment correlation, it is not affected by either model specification or the estimation procedure. Consequently, we consider three measurement factors: (1) innovation measure, (2) innovation typology, and (3) temporal nature of the data (cross-sectional versus longitudinal). In addition, we examine one research context moderator, namely, industry type (see Figure 2). The rationale behind the impact of these moderators is provided in Table 3.

[Insert Figure 2] and [Insert Table 3]

Moderator Results. The results from the generalized least squares regression are summarized in Table 4.⁶ Overall, the results provide support for our moderator hypotheses. A discussion of specific results follows.

Measure of Innovation. Despite the prevalence of innovation studies, no standard measure of innovation has been used (Downs and Mohr 1976). The five primary methods of innovation measurement used are: (1) frequency count measure that is the summation of all innovations adopted within an organization, (2) a dichotomous adoption or nonadoption, (3) R&D intensity as a surrogate for innovation, (4) a scale of implementation (steps that organizations take to introduce/implement an innovation), and (5) a scale of product radicalness or newness to the organization and/or customer base. With so many

⁶ The GLS regression only examined the impact of variables with a sample size of 15 or greater.

different ways of measuring innovation, it is difficult to synthesize and interpret the findings of prior research on innovation without knowing the exact nature of their measure of the central construct, innovation. It is hypothesized that the measure of innovation employed will significantly impact the correlations observed between innovation and other constructs. In particular, Hypothesis 1 predicts that a dichotomous measure of innovation will exhibit lower effect sizes than samples using other measures of innovation. The parameter estimate for Measure 2 is negative ($\beta=-0.422$, $p<0.001$) thus supporting Hypothesis 1. Therefore we can conclude that dichotomous measures of innovation negatively bias the observed effect size of innovation relationships. Additionally, the results indicate that the other measures of innovation also bias the observed effect sizes of innovation relationships. Because these results have such a strong implication for future innovation research, it is worthwhile to examine the impact of measurement as a moderator further.

[Insert Table 4]

A univariate analysis was conducted in order to examine the impact of measurement on these innovation relationships. In general, measuring innovation by R&D intensity yields the highest correlations between innovation and environmental antecedents. However, when examining the relationship between innovation and organization level variables, a frequency count measure of innovation exhibits a larger effect of organizational variables on innovation. Interestingly is the fact that when innovation is measured according to its degree of radicalness, the impact of management on innovation is maximized. Finally, a frequency count of innovation yields the highest correlation between innovation and financial performance while innovations that are measured according to their degree of radicalness yield the highest correlations with perceptual measures of organizational performance. Therefore, measurement does impact which organizational antecedents play a significant role in the innovation and additionally the innovation-performance relationship.

*Typology of Innovation*⁷. Despite the prevalence of these different typologies in innovation studies, the focus of this moderator analysis is the impact of categorizing innovation as being either product or process in innovation relationships. As pointed out by Downs and Mohr (1976), it is imperative to base an innovation typology on a primary attribute, or one that is capable of classifying the innovation without reference to the specific organization under study. This primary classification typology would lead to consistency between studies and an increased ability to generalize from a given study of innovation. When secondary attributes are used to classify innovation, it is possible that the same innovation may be classified in different categories for different organizations (i.e. radical versus incremental). Therefore, we believe that using the product/process typology would provide our analysis with a consistent means of classifying innovations that is independent of the context in which the study was conducted. In order to conduct the moderator analysis, all samples were coded as a product innovation, a process innovation, or some combination of both. Of the 134 samples, eighty-six examined product innovations, thirty-four samples were based on process innovations, and fourteen samples examined both product and process innovations together. The results of the moderator analysis finds support for Hypothesis 2 and indicate that studying product, process, or a combination of the two types of innovations does bias the results obtained. Studying product innovations and process innovation in isolation tends to inflate the effect size of innovation relationships as compared to examining these same relationships with some combination of the two types of innovation ($\beta=0.294$, $\beta=0.548$, $p<0.001$, respectively). This finding provides support for Downs and Mohr's (1976) need to categorize innovation in order to gain a true understanding of the nature of innovation.

Temporal Design. Hypothesis 3 predicts that examining innovation either with a cross-sectional research design or longitudinally will bias the effect sizes observed. We find support for Hypothesis 3 ($\beta=0.368$, $p<0.001$) and results suggest that studying innovation at one point in time will inflate the true effect size of these innovation relationships as compared to

⁷ Past scholars have often found it necessary to categorize and distinguish innovations in order to understand the true nature of the construct (Downs and Mohr 1976). From this, several different typologies have been developed: (1) administrative versus technical, (2) product versus process, and (3) radical versus incremental. Administrative innovations are defined as those that occur in the social system, or the relationships among people who interact to accomplish a particular goal, of an organization (Cummings and Srivastava 1977). On the other hand, a technical innovation is defined as an innovation that occurs in the technical system of an organization and is directly related to the primary work activity of the organization (Damanpour and Evan 1984). Product innovations involve the introduction of a new product to the marketplace while process innovations are new elements that are brought into an organization's production or service operations (Knight 1967; Utterback and Abernathy 1975). Radical innovations fundamentally change the activities of an organization and represent clear departures from the previous way of conducting business. Innovations that do not cause significant departure from the status quo are considered incremental in nature (Damanpour 1991). These different typologies were developed in order to bring some clarity to the study of innovation. The analysis is on the product/process typology because it has been the focus of most empirical efforts regarding innovation.

examining the impact of innovation over time. This finding indicates a need for researchers to be cognizant of the differences in studying innovation at one point in time versus longitudinally.

Again, we followed up the multivariate moderator analysis with univariate t-test comparisons. Overall, studies that are cross-sectional tend to find that environmental variables have a much stronger effect on innovation than studies that are carried out over time. However, longitudinal studies tend to show a much stronger effect between organizational variables and innovation than cross-sectional samples. The nature of the study also impacts the innovation-performance relationship. For example, studies that investigate innovation and financial performance at one point in time find a much stronger effect size than studies that are conducted over time ($r=0.14$ and $r=0.02$, respectively). However, the opposite finding is observed with regards to efficiency outcomes. Studies that were longitudinal found a significantly greater impact of innovation on efficiency than samples that measured innovation and efficiency at the same time. This finding suggests that efficiency outcomes take longer to come about while market measures of performance occur right away.

Industry Characteristics. Innovation has been examined in several different contexts. The objective of Hypothesis 4 is to investigate the impact of studying innovation in manufacturing and service industries. Specifically, it addresses the question: whether industry characteristics result in meaningful differences between the effect sizes found between antecedents and consequences of innovation. We find support for Hypothesis 4 and results suggest that studying innovation in either a manufacturing ($\beta=1.182$, $p<0.001$) or service setting ($\beta=0.739$, $p<0.001$) inflates the effect size of innovation relationships as compared with studying innovation with a pooled sample from both settings. Therefore studying innovations using pooled samples from multiple contexts will lead to weaker results than simply conducting the study within one context.

Univariate analyses revealed several interesting differences between innovation relationships between manufacturing and service industry sectors. Environmental turbulence has a strong positive correlation with innovation in manufacturing settings, while in service settings turbulence is negatively related to innovation. Additionally, the resource level and size of an organization have a large positive correlation with innovation in manufacturing settings but are not as significantly related to innovation within a service context. While antecedent relationships of innovation may differ across the two settings, the relationship between innovation and performance is stable across the two industry sectors. Therefore different antecedents may stimulate innovation asymmetrically across industries but the performance outcomes of innovation are fairly homogeneous.

3. Study 2 – Is Innovation a Mediator between Organizational and Environmental Antecedents and Firm Performance?

Past research has demonstrated that there is a direct, robust relationship between organizational innovation and performance. However, there is a lack of understanding surrounding the relationship between the antecedents of innovation, innovation itself, and organizational performance outcomes. Additionally these relationships have yet to be empirically investigated with one sample (Wolfe 1994). Innovation is hypothesized as one possible mechanism by which organizations can gain a competitive advantage in the marketplace through unique organizational resources (Barney 1991). Product innovation can be the source of competitive advantage to the innovator and at the same time can lead to a sustainable increase in firm profits (Geroski, Machin and VanReenen 1993; Chandy and Tellis 1998). Past research supports the argument that innovation serves as a key mediator between antecedents of innovation and performance (Conner 1991; Damanpour and Evan 1984; Han et al 1998). In particular, innovation mediates the relationship between environmental uncertainty and performance. Firms faced with intense competition and turbulent environments often rely upon innovation as the primary driver of organizational performance (Gronhaug and Kaufman 1988). Innovation provides organizations with a means of adapting to the changing environment and often is critical for firm survival. Additionally, the relationship between organization level variables and performance are also mediated by innovation. Organization structure provides the internal configuration, including communication and resource flows, necessary for innovation to occur (Russell 1990). Organizational capabilities provide organizations with the inputs required for innovation that in turn can provide the organization with superior performance (Eisenhardt and Martin 2000).

Despite the theoretical rationale underlying innovation's role as a mediator in the relationship between environmental and organizational antecedents and performance, it can also be the case that innovation does not act in this capacity. These environmental and organizational drivers of innovation are unique resources capable of creating a competitive advantage within their own right through a direct linkage with financial performance. Threat rigidity theory would postulate that during times of turmoil, organizations are less likely to rely on innovation but rather will focus on the core competencies of the business and efficiency considerations (Palmer, Danforth and Clark 1995). In addition, innovation is a very risky undertaking for organizations and requires the dedication of resources towards the innovation and away from other work activities within the business. Given these competing perspectives, the primary objective of the second study is

to examine the role of innovation in performance, and to empirically test whether or not it serves as a mediator between environmental and organizational variables and financial performance.

Testing for Mediation

In addition to providing a quantitative integration of past research within a domain of study, meta-analysis is emerging as a means of testing alternative models within a research stream. By combining the principles of traditional meta-analysis and those of structural equations modeling, it is possible to test integrated models involving several constructs in order to advance theory development within the domain (Viswesvaran and Ones 1995). The combination of these two methodologies allows for the optimal testing of integrated models. Correcting artifacts present within a meta-analytical sample and using this data in a SEM analysis achieve accurate assessment of causal models and linkages between constructs of interest.

The first step in testing an overall model of innovation is the construction a complete correlation matrix. Results from the first part of this study indicate that a pooling of correlations across innovation types will lead to significant confounding of the results. Therefore, in order to decrease the amount of variation in the dataset due to moderators, the correlation matrix was constructed for samples addressing only product innovations. Due to an incomplete correlation matrix, several variables had to be excluded from the analysis. Therefore the model was tested using seven antecedents to product innovation (competition, turbulence, age, centralization, diversification, resource level, and size) and 1 outcome (financial performance) using LISREL 8.51 with maximum likelihood estimation. The harmonic mean of the sample size is used in the analysis so as to not give undue influence to studies with larger sample sizes.

Alternate Models and Model Testing

Three models of innovation were analyzed and are reported below. The first model posits innovation as a key mediator between antecedents and financial performance. The second model estimated allows innovation to serve as a partial mediator between these relationships. Finally, a third model was estimated in which innovation was included as an antecedent to innovation along with the other environmental and organizational variables. The results of this model testing are in Table 5.

[Insert Table 5]

Model 1 positions innovation as a key mediator, or mechanism by which environmental and organizational antecedents allow organizations to realize increased financial performance. The model yielded a poor fit ($\chi^2_{(23)}$ of 288.82, CFI = 0.68, RMSEA = 0.12). Competition, turbulence, age, diversification, resource level, and size are all significantly related to innovation (see bottom of Table 5 for path coefficients). Centralization was not significant predictors of product innovation. The model did indicate that product innovation is positively associated with financial performance, thus shedding some light on the nature of the relationship between innovation and performance. Therefore it appears that innovation is not a key mediator for all environmental and organizational antecedents included in the model, but does play a significant role in financial performance.

The second model positions innovation as a partial mediator between the antecedents and financial performance. The resulting fit is good ($\chi^2_{(20)}$ of 90.29, CFI = 0.91, RMSEA = 0.064). Again, innovation is found to be a positive, significant predictor of performance. The results indicate that in times of high environmental turbulence, innovation the mechanism by which firms can achieve superior financial performance. Additionally, organizational structure variables do impact performance via innovation, with the exception of centralization. Product innovation also plays a role as a partial mediator for the competition-performance relationship, age-performance relationship and in the relationship between the resource level of the organization and financial performance. It appears that competition, age, and resource level have both a direct and indirect (through innovation) relationship with performance.

Because Model 1 (innovation as a mediator) and 2 (innovation as a partial mediator) are nested, it is possible to conduct a χ^2 difference test to compare the models. The test indicates that the partial mediation model results in significantly better fit than the key mediation model (Comparison of Model 1 and Model 2: $\chi^2_{\text{diff}} = 198.53$, d.f.=3, $p < 0.001$). Therefore, we find support for innovation as a partial mediator but cannot conclude that product innovation is the only mechanism through which superior financial performance is achieved.

Much of the power associated with Structural Equations Modeling is the ability to test alternate models. The final model tested did not include product innovation as a mediator, but rather tests the direct linkages between the antecedents of interest, including innovation, and financial performance. This model yielded a fairly poor fit ($\chi^2_{(23)}$ of 186.91, CFI = 0.79, RMSEA = 0.092). Results indicate that competition, age, centralization, and resource level are all significantly related to financial performance. However, turbulence, diversification, and size do not have a significant impact on performance.

Interestingly, age has a negative impact on performance. A comparison of Model 2 and Model 3 indicates that innovation does serve as a partial mediator between antecedents and financial performance (Comparison of Model 2 and Model 3: $\chi^2_{diff} = 96.62$, d.f.=3, $p < 0.001$).

In addition to overall model testing for mediation, we also conducted more formal statistical tests of mediation (Barron and Kenny 1986; MacKinnon, Warsi and Dwyer 1995). These tests show the extent to which innovation mediates the relationship between environmental and organizational antecedents with financial performance. The formula used to conduct the mediation test follows (MacKinnon, Warsi and Dwyer 1995):

$$z = \frac{ab}{\sqrt{b^2 s_a^2 + a^2 s_b^2 + s_a^2 s_b^2}}, \quad [6]$$

where the path from the independent variable to the mediator is a and its standard error is s_a^2 , and the path from the mediator to the dependent variable is b and its standard error is s_b^2 . Results show strong support for the role of innovation as a mediator for turbulence, age, diversification and size with that of performance. Marginal support is found for the role of innovation as a mediator in the competition-performance and resource-performance relationships (See Table 5). Therefore, one can conclude that innovation does in fact play a role in organizational performance and serves as a link between certain antecedents and financial performance, thereby supporting the partial mediation model and the resource-based view of the firm. Innovation created by the combination of organizational resources provides organizations with a unique resource that can be capitalized upon in the marketplace (Conner 1991).

Results and Discussion

In addition to using SEM to test model structures, the model testing analysis can also shed some light on the true relationship between innovation and other core constructs (as highlighted in Table 5). This section of the paper empirically addresses several of the inconsistent findings present within the innovation literature.

Environmental Variables. Much of the focus of recent research regarding innovation has been on the role of the environment in the innovation process. Past research has shown that the environment has a positive impact on innovation and that innovation is influenced by environmental pressures (Baldrige and Burnham 1975; Kimberly and Evanisko 1981; Dosi 1988; Nohria and Gulati 1996). Hypothesis 1 predicts that the level of competition present within the environment will

be positively related to innovation. The results from our model testing support this position, and find competition not only positively influences product innovation ($\gamma=0.12$, $p<0.01$), but at the same time has a negative impact on financial performance ($\gamma=-0.49$, $p<0.01$). This finding indicates that it may be possible for firms to try and overcome the negative impact of competition on performance through innovation. This supports the notion that competition encourages organizations to engage environmental scanning and in turn innovation provides organizations with a means of survival.

Similarly, Hypothesis 2 posits that there is a positive relationship between environmental turbulence and innovation. Strong support is found for Hypothesis 2 ($\gamma=0.19$, $p<0.01$) suggesting that innovation provides organizations with a mechanism for dealing with the uncertainty present within the environment. In times of high turbulence, the uncertainty present in the environment may drive innovation because organizations are constantly scanning their environment for new opportunities (Henderson and Clark 1990; Damanpour and Gopalakrishnan 1998). While environmental turbulence is a driver of innovation, it is not significantly related to financial performance.

Organizational Variables. While the theoretical rationale and proposed relationship behind each of the environmental antecedents are the same, the role of organizational level variables on innovation all have conflicting hypotheses. The impact of age on innovation has been studied quite extensively in the literature with mixed results (see Table 6). On the one hand, older organizations are thought to be better at innovation because they have established resources and procedures for survival (Chandy and Tellis 2000; Kimberly and Evanisko 1981). Yet other scholars have demonstrated that with age organizations become rigid and are less open to change (Rao and Drazin 2000). The results find support for Hypothesis 3b ($\gamma=-0.10$, $p<0.01$) indicating that age has a negative relationship with product innovation. Perhaps even more surprising is that age is negatively related to financial performance. This finding is somewhat unexpected because past research has found that older firms demonstrate a high potential for survival and are thought to have the capabilities necessary to achieve superior financial performance (Kimberly and Evanisko 1981).

Both the overall meta-analysis and the model testing of product innovation find that the relationship between centralization and innovation is not significant. Therefore we cannot support either Hypothesis 4a or Hypothesis 4b. While centralization is not related to innovation, it does have a positive impact on financial performance in this model ($\gamma=0.07$, $p<0.05$). The take-away from this finding is that a concentration of power within an organization may not impact innovative output but can promote financial performance.

Diversification has also been subject to conflicting predictions as to its association with innovation. The model testing finds that diversification is positively related to product innovation, thereby supporting Hypothesis 5a ($\gamma=0.19$, $p<0.01$). However, diversification is not significantly related to financial performance. It appears that firms that are highly diversified can take advantage of this greater knowledge base and increase their level of product innovation (Hitt et al 1996). However, diversification by itself does not promote or hurt financial performance.

Hypothesis 6a and Hypothesis 6b are competing hypotheses with regards to the impact of resources on innovation. The results of the model testing demonstrate with certainty that resources are a necessary input to both product innovation and financial performance (Goes and Park 1997), thus supporting Hypothesis 6a and the notion that the greater the resource levels of a firm the greater their flexibility to pursue new product innovations ($\gamma=0.29$, $p<0.01$).

As a follow-up to the resource level argument, organizational size is thought to promote innovation through resource availability and knowledge diversity arguments and the model supports this notion and Hypothesis 7a ($\gamma=0.15$, $p<0.01$). However, size was not found to significantly impact financial performance. Therefore, these results suggest that organizational size does in fact promote innovation through the communication of diverse ideas within the organization and increased access to resources (Baldrige and Burnham 1975; Chandy and Tellis 1998).

Finally, this analysis was able to empirically examine the impact of product innovation on financial performance. Innovation provides organizations with a means of creating a competitive advantage in the marketplace that in turn will provide organizations with superior financial performance (Ahuja 2000; Han et al 1998). However, often scholars have posited that while innovation has the potential to create the opportunity for increased performance, the act of innovation can be very costly and risky and has the potential to decrease financial performance (Markham and Griffin 1998). We find support for Hypothesis 8a suggesting that product innovation does increase financial performance ($\gamma=0.10$, $p<0.01$). This result suggests that innovation is a mechanism through which organizations can achieve a competitive advantage in the marketplace.

4. Summary, Directions for Future Research, and Conclusion

The key objective of this study is to synthesize 23 years of innovation research findings from economic, strategy, and marketing literatures and extend the current theoretical knowledge base in these domains through meta-analysis. In general, we provide empirical evidence of the nature of the relationship between innovation and its antecedents and

consequences, while at the same time providing answers to conflicting conclusions within this field. The conclusions reached in Study 1 provide a more comprehensive understanding of the drivers of innovation as well as the implications associated with the phenomena. In addition, Study 2 seeks to aid in building a strong theoretical foundation relating to the nature of the relationship of innovation with key antecedents and outcomes. We are able to demonstrate that innovation serves as a partial mediator of the relationships between organizational and environmental antecedents and firm performance.

What do we know about innovation? Innovation is influenced by environmental, organizational and individual level variables (Russell 1990). This study demonstrates that the role of environmental, organizational capabilities, organizational demographics, and organizational structure variables must be acknowledged when conducting research on innovation. In particular, organizational capabilities and structure account for the greatest level of unique variance on innovation. Additionally, overall results support the notion that innovation is a significant driver of different types of organizational performance.

Results from Study 2 empirically support innovation's role as a mediator. It serves a key mediator for environmental turbulence, age, diversification, and organizational size. In addition, competition, age, and organizational resources have both a direct and indirect (through innovation) relationship with financial performance. We find that age does detract from innovation, while diversification, resources, and size are positively related to innovation. In addition, we find that product innovation does promote financial performance. This suggests that organizational resources by themselves are simply not enough to achieve superior performance. Furthermore, innovation is a means by which organizations can address the dynamism present within their environments and still thrive.

We are able to empirically test relationships with conflicting theoretical rationale. In alignment with past research, the focus of this study remains on innovation main effects. Although we were unable to do so in this study, we recognize the possibility for nonlinear relationships between organizational antecedents and innovation. This remains an area for future research.

How should we study innovation? In addition, considerable support is also found for the presence of moderators in the innovation literature. The measure of innovation used can significantly alter the conclusions garnered from a particular study. Overall, a dichotomous measure of innovation negatively biases the observed correlations. Future research should

seek to utilize the measure of innovation best suited for the particular research question being addressed. Studies focused on the adoption or implementation of innovation would do well to use a frequency count of innovations. However, studies focused on the development or beginning phases of innovation, would be better suited to use a measure like R&D intensity or scale of organizational steps used to promote innovation over a frequency count measure which only taps into the implementation side of the innovation process.

The type of innovation also significantly impacts observed relationships. The results from this study strongly suggest that innovations be examined in isolation of other classifications so as to gain a complete understanding of their nature. Process and product innovations have different relationships with the same set of predictors and consequences. It is imperative that these differential relationships are taken into consideration when designing future research studies. Along a similar line, innovation is a context-dependent phenomenon (Wolfe 1994). Research that seeks to generalize across multiple industries and sectors can result in misleading and incorrect conclusions. Finally, our results indicate a significant difference in the conclusions reached from studies that are cross-sectional in nature with those that are longitudinal. The majority of the empirical studies included in our sample were cross-sectional and this tends to inflate the observed effect size. The impact of environmental level variables on innovation are greater for studies that were cross-sectional in nature, while longitudinal studies found the correlation between organizational variables and innovation to be higher. Additionally, the performance implications associated with innovation were significantly different based on the temporal nature of the research design. Cross-sectional studies found a stronger effect size between innovation and financial performance, while longitudinal studies were better able to capture the relationship with efficiency gains. These results indicate the necessity of taking both research design and measurement considerations into account when conducting future studies on innovation.

Surpluses and shortages in empirical research. Meta-analysis also provides a systematic means of pointing out the current gaps and surpluses in a particular domain. As evidenced by this study, the role of organizational demographics and structure on innovation is well documented. For example, centralization has been studied a great deal, and yet the overall correlation between this variable and innovation is zero. Additionally, while organizational demographics are studied time and time again, they contribute very little explanatory power. While certain organization capability variables are widely studied and well understood (such as resources, network and diversification), there are other variables that are in need of attention. There are only a handful of studies that attempt to understand the role of culture and strategic orientation on

innovation and performance. Additionally, the current literature on innovation primarily focuses on only 2 environmental variables (competition and turbulence) and their relationship with innovation. Future research should explore this area further. Finally, there are very few studies that link innovation to both antecedents and consequences of innovation. The literature could benefit a great deal by extending the analysis to examine both the inputs and outcomes to innovation in the same study.

In addition to theoretical gaps, there are also substantial gaps in the methodology utilized to conduct innovation research. The majority of the research in this domain focuses on product innovation in a manufacturing context utilizing cross-sectional survey data (Brown and Eisenhardt 1995). Future research would benefit from focusing on process innovations and the performance implications associated with innovating in both product and process domains. The focus of the vast majority of prior empirical research has been on large and established organizational contexts. The emergence of university and other research incubators calls for research on how innovations happen in these contexts as well. Because innovation is context-dependent, future research should seek to explore the boundary conditions associated with each context and should be aimed at understanding the universal empirical generalizations that explain both drivers and outcomes associated with innovation.

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Table 1: Meta-Analysis Results of Antecedents and Consequences of Innovation

	α	n_α	k	N	r	r_t	sd _t	95% CI		ES	χ^2	N_{fs}
ENVIRONMENT												
Competition	0.57	9	23	4226	0.11	0.09	0.03	0.031	0.149	S	130.16*	752.27
Turbulence	0.79	10	19	3637	0.12	0.09	0.06	-0.028	0.208	S	224.192*	622.74
Union			3	519	-0.09	-0.09	0.00	-0.092	-0.088	S	0.37	55.22
Urbanization			12	1805	0.15	0.13	0.02	0.091	0.169	M	37.72*	307.84
ORGANIZATION												
Age			18	4735	0.09	0.09	0.01	0.07	0.11	S	48.06*	767.35
Centralization	0.80	9	21	3831	0.03	0.00	0.01	-0.019	0.021	S	38.39*	17.90
Clan Culture	0.85	1	3	470	0.33	0.51	0.17	0.177	0.843	L	97.31*	348.70
Communication Generation	0.73	2	6	1037	0.21	0.16	0.03	0.121	0.199	M	30.09*	333.24
Communication Responsiveness	0.80	4	17	3467	0.19	0.15	0.01	0.125	0.175	M	48.51*	486.59
Competitor Orientation	0.76	3	8	1533	0.07	0.16	0.06	0.042	0.278	M	94.84*	470.90
Complexity	0.88	1	18	2802	0.25	0.15	0.04	0.072	0.228	M	128.18*	795.38
Customer Orientation	0.76	3	8	1533	0.18	0.24	0.04	0.162	0.318	M	65.86*	748.48
Diversification	0.77	2	24	6992	0.15	0.15	0.02	0.101	0.179	M	146.31*	1845.38
Formalization	0.73	13	16	2572	0.09	0.11	0.02	0.071	0.149	M	52.28*	347.72
Past Innovation			4	905	0.39	0.49	0.01	0.47	0.51	L	16.62*	446.29
Interfunctional Coordination	0.76	3	3	582	0.11	0.10	0.04	0.022	0.178	S	23.38*	54.68
Public Ownership			5	939	0.16	0.15	0.00	0.15	0.15	M	3.07	147.23
Network	0.88	3	27	6397	0.24	0.16	0.04	0.092	0.248	M	288.94*	2011.16
Resources	0.81	3	66	10404	0.22	0.15	0.03	0.091	0.209	M	345.57*	2998.57
Size	0.95	2	73	16266	0.21	0.16	0.04	0.082	0.238	M	709.89*	4991.65
Specialization			13	2047	0.27	0.23	0.07	0.093	0.367	M	154.97*	968.00
MANAGEMENT												
Education			17	2339	0.18	0.13	0.02	0.091	0.169	M	43.92*	607.12
Openness to Change	0.73	6	17	1405	0.19	0.16	0.04	0.101	0.219	M	60.11*	440.62
Professionalism			18	1831	0.20	0.20	0.02	0.161	0.239	M	40.00*	699.33
Tenure			11	1874	-0.01	0.01	0.02	-0.029	0.049	S	37.48*	2.27
PROJECT/TEAM												
Team	0.75	6	10	1966	0.21	0.13	0.03	0.071	0.189	M	62.30*	491.07
Champion	0.83	1	18	2508	0.23	0.20	0.04	0.132	0.288	M	120.46*	1026.58
OUTCOMES												
Financial Performance			30	22015	0.08	0.07	0.02	0.031	0.109	S	446.475*	2961.93
Efficiency			17	1479	0.43	0.34	0.02	0.301	0.379	L	55.02*	1220.48
Subjective Performance			8	1561	0.20	0.09	0.01	0.07	0.11	S	22.58*	271.19

α = average reliability measure of the variables; n_α = Number of samples reporting alpha; k = the number of samples in each analysis; N = the total number of respondents in the k samples; r = the mean uncorrected correlation; r_t = the mean weighted corrected correlation; sd_t = the estimated population standard deviation; ES = effect size, where L is large, M is medium, and S is small (Cohen and Cohen 1983); χ^2 = a chi-square test for variance unaccounted for across the samples; N_{fs} = fail-safe N for each variable.

* p<.01.

Table 2: Theoretical Rationale of Innovation Relationships

Variable	Rationale	Relevant Literature
DETERMINANTS		
Competition (+)	It is a generally held view that competition fosters innovation (Utterback 1974; Kimberly and Evanisko 1981). Competition can influence innovation by providing companies with exposure to new ideas. Additionally, a highly competitive environment pressures managers to scan their environment to search for superior alternatives to their current methods as well as making the environment such that innovation is necessary for survival.	Bidault, Despres and Butler (1998); Boeker (1997); Fuentelsaz, Gomez and Polo (2003); Goes and Park (1997); Greve and Taylor (2000); Kelm, Narayanan and Pinches (1995); Kimberly and Evanisko (1981); Majumdar and Venkataraman (1998); Pelham and Wilson (1996); Powell, Koput and Smith-Doerr (1996); Soultaris (2002); Tsai (2001); Zajac, Golden and Shortell (1991)
Turbulence (+/-)	Environmental turbulence creates an environment characterized by uncertainty and provides a stimulus for organizations to innovate in order to guard against uncertainty. Turbulence forces organization to search for and process information from the environment and search for potential opportunities.	Ettlie (1983); Geiger and Cashen (2002); Kahn and Manopichetwattana (1989); Li and Atuahene-Gima (2002); Meyer and Goes (1988); Moorman (1995); Moorman and Miner (1997); Nohria and Gulati (1996); Pelham and Wilson (1996); Sethi, Smith and Park (2001); Souder, Sherman and Davies-Cooper (1998); Soultaris (2002) Fennell (1984)
Union (-)	Organizations are under pressure to conform to union demands and pressured by this influence to act in accordance with prespecified procedures, rather than new processes.	
Urbanization (+)	Urban environments provide organizations with increased diversity, larger resource base, and greater accessibility to information that enable innovation.	Baldrige and Burnham (1975); Fennell (1984); Goes and Park (1997); Majumdar and Venkataraman (1998); Meyer and Goes (1988); Wong-Martinez (1995)
Age (+/-)	Older organizations have established formal and informal relationships both internal and external to the organization and are a creature of norms and habits. Older organizations have been found to be more rigid and less open to change (Rao and Drazin 2000). On the other hand, some scholars posit that younger firms are less willing to make changes that might disrupt their current means of conducting business. In addition, past research has found support for a positive relationship between age and innovation. Older organizations have a well-defined resource base and have demonstrated high potential for survival, which allows organizations the ability to pursue innovation (Kimberly and Evanisko 1981).	Baker and Cullen (1993); Boeker (1997); Day (1994); Frost (2001); Galende and de la Fuente (2003); Graves and Langowicz (1993); Ibarra (1993); Kahn and Manopichetwattana (1989); Keister (2002); Kimberly and Evanisko (1981); Li and Atuahene-Gima (2002); Powell, Koput and Smith-Doerr (1996); Sherer and Lee (2002); Sorenson and Stuart (2000)
Centralization (+/-)	Centralization is thought to discourage innovation by decreasing employee's awareness, commitment and involvement. Centralization does not allow for lower level individuals to participate in decision-making and therefore they do not feel involved with the innovation or the outcomes associated with the innovation. Centralization does not foster information transfer within the organization/free exchange of ideas that fosters innovation (Khan and Manopichetwattana 1989). On the other hand, other scholars have found the opposite relationship to be true. The concentration of power within the organization is often necessary to overcome organizational opposition to change (Dewar and Dutton 1986).	Blau and McKinley (1979); Cardinal (2001); Collins, Hage and Hull (1998); Dewar and Dutton (1986); Ettlie and Rubenstein (1987); Hage and Dewar (1973); Kahn and Manopichetwattana (1989); Kimberly and Evanisko (1981); Nohria and Gulati (1996); Pelham and Wilson (1996); Powell, Koput and Smith-Doerr (1996); Shan, Walker and Kogut (1994); Sivadas and Dwyer (2000)
Clan Culture (+)	A clan culture stresses employee participation, teamwork and cohesiveness. Clan cultures are open to change and provide an environment that fosters innovation.	Moorman (1995); Sivadas and Dwyer (2000)
Communication Generation (+)	Promotes environmental scanning and the gathering of market relevant information, which promotes new ideas within an organization.	Kahn and Manopichetwattana (1989); Lukas and Ferrell (2000); Moorman (1995); Soultaris (2002)
Communication Responsiveness (+)	Communication responsiveness facilitates the dissemination of information throughout the organization, which in turn increases information exchange as well as the diversity of ideas generated within an organization (Utterback 1971). Past research has shown that communication is extremely important in both innovation creation and implementation (Becker and Whisler 1967).	Ahuja (2000); Ancona and Caldwell (1992); Ettlie and Rubenstein (1987); Hurley and Hult (1998); Ibarra (1993); Kahn and Manopichetwattana (1989); Lukas and Ferrell (2000); Moorman (1995); Sethi, Smith and Park (2001); Sivadas and Dwyer (2000); Srinivasan, Lilien and Rangaswamy (2002); Tjosvold and McNeely (1988)
Competitor Orientation (+/-)	Organizations that are focused on their competitors are less likely to come up with radical ideas but are likely to innovate in "me-too" products.	Lukas and Ferrell (2000); Romijn and Albaladejo (2002); Saez, Marco and Arribas (2002); Soultaris (2002)
Complexity (+)	Complexity increases an organization's awareness of a need for change, improves the dissemination of diverse ideas, and encourages debate among organizational members.	Baldrige and Burnham (1975); Bidault, Despres and Butler (1998); Blau and McKinley (1979); Collins, Hage and Hull (1988); Dewar and Dutton (1986); Ettlie and Rubenstein (1987); Fennell (1984); Galende and de la Fuente (2003); Geiger and Cashen (2002); Hage and Dewar (1973); Meyer and Goes (1988); Tjosvold and McNeely (1988); Zmud (1984)
Customer Orientation (+)	Organizations that are customer oriented are more likely to gain ideas and information from consumers that can stimulate innovation.	Lukas and Ferrell (2000); Romijn and Albaladejo (2002); Saez, Marco and Arribas (2002); Soultaris (2002)

Diversification (+/-)	Organizations that have very diversified product offerings have to split their R&D resources among several different product lines that can have a detrimental impact on innovation. On the other hand, diversification creates a greater knowledge base within the firm to build upon as well as promoting the dissemination of diverse ideas.	Ahuja (2000); Ahuja and Lampert (2001); Ancona and Caldwell (1992); Bidault, Despres and Butler (1998); Boeker (1997); Cardinal (2001); Day (1994); Galende and de la Fuente (2003); Geiger and Cashen (2002); Hitt, Hoskisson, Johnson and Moesel (1996); Hoskisson, Hitt, Johnson and Grossman (2002); Kahn and Manopichetwattana (1989); Nohria and Gulati (1996); Pelham and Wilson (1996); Powell, Koput and Smith-Doerr (1996); Shan, Walker and Kogut (1994); Thomas (1990); Wong-Martinez (1995)
Formalization (-)	Formalization limits organizational flexibility and stifles the creativity of employees because of the focus on rules and procedures within the organization. Formalization results in standardized behavior from employees (Robbins 1990), thereby inhibiting innovation.	Blau and McKinley (1979); Cardinal (2001); Collins, Hage and Dewar (1973); Hage and Hull (1988); Kahn and Manopichetwattana (1989); Moorman and Miner (1997); Nohria and Gulati (1996); Pelham and Wilson (1996); Sivasdas and Dwyer (2000); Wong-Martinez (1995); Zajac, Golden and Shortell (1991)
Past Innovation (+)	Organizations that have been successful at innovation in the past are more likely to innovate in the future.	Ahuja and Lampert (2001); Chandy and Tellis (1998); Tsai (2000)
Interfunctional Coordination (+)	Promotes the diversity of information and the cross-fertilization of ideas within the organization that can stimulate innovation.	Lukas and Ferrell (2000)
Public Ownership (+)	Public organizations may be more open to change than private organizations. Public firms have greater access to resources that are necessary for innovation to occur, as well as market pressures to engage in innovation.	Baker and Cullen (1993); Boeker (1997); Goes and Park (1997); Powell, Koput and Smith-Doerr (1996); Shan, Walker and Kogut (1994)
Network (+)	Networks provide organizations access to knowledge and information about trends present in the environment. An organization's network increases boundary-spanning activities within an organization as well the potential for providing resources required in order for organizations to innovate.	Ahuja (2000); Faber and Hesen (2004); Goes and Park (1997); Kimberly and Evanisko (1981); Li and Atuahene-Gima (2002); Love and Roper (2001); Nagarajan and Mitchell (1998); Powell, Koput and Smith-Doerr (1996); Rao and Drazin (2002); Romijn and Albaladejo (2002); Saez, Marco and Arribas (2002); Shan, Walker and Kogut (1994); Sivasdas and Dwyer (2000); Srinivasan, Lilien and Rangaswamy (2002); Soultaris (2002); Stuart (2000); Tsai (2001)
Resources (+/-)	Resources provide organizations with the flexibility to pursue new products (Meyer 1982). Not only do available resources provide the necessary inputs to innovation, but also reduce barriers and risks to the organization when implementing new innovations by enabling an organization to absorb the cost of the innovation and the possibility of failure (Rosner 1968; Burns 1989). On the other hand, too many resources may be an indication of management incompetence and organizational waste, which can detract from innovation.	Ahuja (2000); Ahuja and Lampert (2001); Baldrige and Burnham (1975); Boeker (1997); Campbell (1993); Chandy and Tellis (1998); Collins, Hage and Hull (1988); Damanpour (1987); Day (1994); Dewar and Dutton (1986); Ettlie (1983); Ettlie and Rubenstein (1987); Faber and Hesen (2004); Fuentelsaz, Gomez and Polo (2003); Geiger and Cashen (2002); Goes and Park (1997); Graves and Langowitz (1993); Ibarra (1993); Kahn and Manopichetwattana (1989); Keister (2002); Kelm, Narayanan and Pinches (1995); Li and Atuahene-Gima (2002); Lim (2004); Love and Roper (2001); Majumdar and Venkataraman (1998); Meyer and Goes (1988); Nagarajan and Mitchell (1998); Nohria and Gulati (1996); Powell, Koput and Smith-Doerr (1996); Romijn and Albaladejo (2002); Scott and Bruce (1994); Sherer and Lee (2002); Sorenson and Stuart (2000); Souder, Sherman and Davies-Cooper (1998); Souder and Jenssen (1999); Soultaris (2002); Srinivasan, Lilien and Rangaswamy (2002); Tsai (2001); Wong-Martinez (1995); Zajac, Golden and Shortell (1991)
Size (+/-)	Large organizations tend to have more resources available to them than smaller organizations. There is also more diversity in the organization, which can lead to a greater number of innovative ideas. However, size can also be associated with organizational inertia and a failure to adapt to changing resource conditions. Organizations that are large are also very complex and may have more difficulty processing information.	Ahuja (2000); Ahuja and Lampert (2001); Ancona and Caldwell (1992); Baker and Cullen (1993); Baldrige and Burnham (1975); Blau and McKinley (1979); Boeker (1997); Campbell (1993); Cardinal (2001); Chandy and Tellis (1998); Chandy and Tellis (2000); Collins, Hage and Hull (1988); Damanpour (1987); Day (1994); Dewar and Dutton (1986); Ettlie (1983); Ettlie and Rubenstein (1987); Fennell (1984); Fuentelsaz, Gomez and Polo (2003); Galende and de la Fuente (2003); Geiger and Cashen (2002); Goes and Park (1997); Graves and Langowitz (1993); Greve and Taylor (2000); Hitt, Hoskisson, Johnson and Moesel (1996); Hoskisson, Hitt, Johnson and Grossman (2002); Ibarra (1993); Kahn and Manopichetwattana (1989); Kaufmann and Todtling (2001); Keister (2002); Kelm, Narayanan and Pinches (1995); Kimberly and Evanisko (1981); Kotabe (1990); Li and Atuahene-Gima (2002); Love and Roper (2001); Majumdar and Venkataraman (1998); Malerba and Orsenigo (1999); Meyer and Goes (1988); Nagarajan and Mitchell (1998); Nohria and Gulati (1996); Pelham and Wilson (1996); Powell, Koput and Smith-Doerr (1996); Rao and Drazin (2002); Saez, Marco and Arribas (2002); Scott and Bruce (1994); Shan, Walker and Kogut (1994); Sherer and Lee (2002); Sorenson and Stuart (2000); Souder, Sherman and Davies-Cooper (1998); Souder and Jenssen (1999); Srinivasan, Lilien and Rangaswamy (2002); Thomas (1990); Tsai (2001); Wong-Martinez (1995); Zajac, Golden and Shortell (1991); Zmud (1984)

Specialization (+)	Provides a focused knowledge base for the generation of ideas within an organization. It provides the organization with higher levels of technical knowledge that can be incorporated into innovations.	Baldrige and Burnham (1975); Blau and McKinley (1979); Damanpour (1987); Kahn and Manopichetwattana (1989); Kimberly and Evanisko (1981); Nohria and Gulati (1996); Scott and Bruce (1994); Sethi, Smith and Park (2001); Sherer and Lee (2002)
Education (+)	Individuals with higher education levels tend to be more open minded about organizational change. Education level is also thought to aid in the understanding and interpretation of diverse information, that in turn enables innovation.	Blind and Grupp (1999); Campbell (1993); Faber and Hesen (2004); Ibarra (1993); Kahn and Manopichetwattana (1989); Keister (2002); Kimberly and Evanisko (1981); Meyer and Goes (1988); Romijn and Albaladejo (2002); Scott and Bruce (1994); Soultaris (2002); Zajac, Golden and Shortell (1991)
Openness to Change (+)	A favorable attitude towards change provides organizations with a culture open to innovation. Managerial support of innovation also leads to increased resources provided for innovation. Upper management can provide a very powerful force within an organization, especially if decision-making is concentrated at the top of the organization.	Campbell (1993); Chandy and Tellis (1998); Day (1994); Ettlie (1983); Hage and Dewar (1973); Dewar and Dutton (1986); Kahn and Manopichetwattana (1989); Kotabe (1990); Meyer and Goes (1988); Soultaris (2002); Zmud (1984)
Professionalism (+)	Managers are involved in organizations that increase their boundary-spanning activities and serve as a means for gathering information. These activities provide managers with a diverse set of ideas to carry into their own organizations. Damanpour (1991) found that professionalism of management accounted for 40 percent of the variance in innovation.	Campbell (1993); Cardinal (2001); Damanpour (1987); Dewar and Dutton (1986); Goes and Park (1997); Hage and Dewar (1973); Ibarra (1993); Kahn and Manopichetwattana (1989); Kimberly and Evanisko (1981); Wong-Martinez (1995); Zmud (1984)
Tenure (+/-)	Managers with longer tenure provide legitimacy and knowledge of how to accomplish goals, manage office politics, and ultimately reach organizational goals. On the other hand, managers with higher levels of tenure are less likely to be open to new ideas or radical changes for fear that it may disrupt the status quo.	Ancona and Caldwell (1992); Boeker (1997); Campbell (1993); Ibarra (1993); Kahn and Manopichetwattana (1989); Kimberly and Evanisko (1981); Meyer and Goes (1988); Rao and Drazin (2002); Scott and Bruce (1994)
Team Communication (+)	Communication within the team, which increases the diversity of ideas as well as the knowledge base of the team. It also allows for the cross-fertilization of ideas within an organization.	Ancona and Caldwell (1992); Golden and Shortell (1991); Hurler and Hult (1998); Sethi, Smith and Park (2001); Soultaris (2002); Tjosvold and McNeely (1988); Zajac, Pelham and Wilson (1996)
Champion (+)	Champions use power and influence to gain the necessary resources and support in order for the innovation to occur. Champions help nurture the innovation from conceptualization to implementation and therefore foster innovation within an organization.	Chandy and Tellis (1998); Day (1994); Ibarra (1993); Kahn and Manopichetwattana (1989); Kimberly and Evanisko (1981); Markham and Griffin (1998); Meyer and Goes (1988); Sivasdas and Dwyer (2000); Souder and Jenssen (1999); Soultaris (2002); Stevens, Burley and Divine (1999)
CONSEQUENCES		
Financial Performance (+/-)	Innovation provides organizations with a new method of conducting business ahead of competition. This gives organizations an edge in the marketplace. On the other hand, innovation takes up substantial resources and the organization can lose money on the innovation.	Ahuja (2000); Basile (2001); Boeker (1997); Ettlie and Rubenstein (1987); Faber and Hesen (2004); Geroski, Machin and VanReenen (1993); Kotabe (1990); Li and Atuahene-Gima (2002); Markham and Griffin (1998); Meeus and Oerlemaus (2000); Moorman (1995); Moorman and Miner (1997); Pelham and Wilson (1996); Robinson (1990); Sivasdas and Dwyer (2000); Souder, Sherman and Davies-Cooper (1998); Tsai (2001); Stuart (2000)
Efficiency (+/-)	Innovation is often linked with organizational efficiency, especially process innovation. Companies are able to develop more efficient means of conducting business through innovation. However, innovations often require substantial startup costs and investment by the organization that can lead to inefficiency.	Ali, Krapfel and LaBahn (1995); Damanpour and Evan (1984); Majumdar and Venkataraman (1998); Markham and Griffin (1998); Moorman (1995); Rosner (1968); Souder, Sherman and Davies-Cooper (1998); Souder and Jenssen (1999); Tjosvold and McNeely (1988)
Subjective Performance (+)	Most organizations perceive that innovation is directly linked to an organization's performance. Therefore firms that are successful in innovation will rate their performance higher than firms that have failed at innovation.	Bougrain and Haudeville (2002); Damanpour and Evan (1984); Markham and Griffin (1998); Pelham and Wilson (1996); Souder, Sherman and Davies-Cooper (1998); Tjosvold and McNeely (1988)

All references used in the meta-analysis are available upon request from the first author.

Table 3: Theoretical Rationale for Proposed Moderators of Innovation Research

Potential Moderator Variables	Rationale
Measurement Factors	
Innovation Measure	<p>There have been five primary means of measuring innovation in the literature: (1) frequency count measure that is the summation of all innovations adopted within an organization, (2) a dichotomous adoption or nonadoption, (3) R&D intensity, (4) implementation scales (steps that organizations take to introduce/implement an innovation), and (5) scale of innovation radicalness. Prior research indicates that scales with larger range and number are more reliable. Consequently more attenuation should result from measurement error in a dichotomous scale, and therefore lower the effect size observed (Houston, Peter and Sawyer 1983). Therefore we hypothesize that:</p> <p><i>H1: Samples using a dichotomous measure of innovation will exhibit smaller effect sizes than samples using continuous measures of innovation.</i></p>
Innovation Typology	<p>Past research has reported that the impact of organizational variables on innovation can be different for product and process innovations (Damanpour 1991). Additionally, the objectives associated with product and process innovations are different. Product innovations are designed to meet an organization's external needs while the emphasis for process innovations is to incorporate new elements into the operations of an organization (Knight 1967; Utterback and Abernathy 1975). Therefore, it is expected that the typology of innovation will bias the effect sizes observed for the antecedents and outcomes of innovation, however the direction of this bias is not known a priori.</p> <p><i>H2: There will be a significant difference in effect sizes between samples studying product innovations, process innovations, and a combination of both product and process innovations.</i></p>
Temporal Design	<p>In meta-analytical investigations, scholars often code for the temporal nature of studies investigating causal relationships (e.g. Hom et al 1992). It is probable that studies investigating innovation at one point in time versus over a period of time are likely to yield different correlations between innovation and its antecedents and outcomes. Therefore we predict that the temporal design of the samples will bias the effect sizes observed with regards to innovation. However, the direction of this distortion is unknown a priori.</p> <p><i>H3: There will be a significant difference in effect sizes between samples investigating innovation with a cross-sectional design and samples investigating innovation with a longitudinal design.</i></p>
Research Context	
Industry Characteristics	<p>Past research has demonstrated that manufacturing and service organizations differ with respect to innovation (Damanpour 1991). Due to the differences inherent between service providers and manufacturers, the impact of antecedents on innovation could be markedly different. Studies with pooled samples from both sectors face greater heterogeneity than studies focusing on only one sector. Therefore, studies that focus on only one industry will be better able to tease out the true impact of antecedents on innovation and the relationship between innovation and performance as compared with studies that examine innovation in both industries. Therefore it is hypothesized that:</p> <p><i>H4: Samples investigating innovation within either a manufacturing or service context will yield different effect sizes than samples investigating innovation across both industries.</i></p>

Table 4: GLS Moderator Results

Moderator	Beta	Variance	z-value
MEASURE OF INNOVATION			
Measure 1 (Frequency Count)	1.231	0.0001	141.29***
Measure 2 (Dichotomous)	-0.422	0.0002	-34.27***
Measure 3 (R&D Intensity)	0.659	0.0004	29.90***
Measure 4 (Organizational Steps)	0.957	0.0001	81.94***
TYPOLOGY OF INNOVATION			
Product	0.294	0.0001	31.28***
Process	0.548	0.0001	47.18***
RESEARCH DESIGN			
Cross-Sectional vs. Longitudinal	0.368	0.00004	53.45***
INDUSTRY CHARACTERISTICS			
Manufacturing	1.182	0.0001	131.70***
Service	0.739	0.0001	76.03***
ENVIRONMENT			
Competition	0.012	0.0001	1.41
Turbulence	-0.640	0.0001	-87.24***
ORGANIZATION			
Age	-0.101	0.0001	-11.76***
Central	-0.108	0.0002	-7.94***
Response	-0.922	0.0002	-70.14***
Complex	0.522	0.0002	41.44***
Diversification	-0.747	0.0001	-69.47***
Formal	-0.173	0.0001	-14.71***
Network	-1.062	0.0001	-101.58***
Resource	0.388	0.0002	26.85***
Size	0.500	0.0001	70.72***
MANAGEMENT			
Change	0.308	0.0002	19.63***
Professionalism	0.501	0.0001	45.30***
PROJECT/TEAM			
Champion	-0.661	0.0002	-46.11***
OUTCOMES			
Financial	-0.586	0.0001	-59.32***
Efficiency	-1.073	0.0004	-52.58***

* p<.05. ** p<.01. *** p<.001.

Decomposition of Variance

Variable	Unique Variance	Percent of Variance Explained ⁸
Environmental	0.0012	1%
Capabilities	0.0483	44%
Structure	0.0007	1%
Demographics	0.0332	30%
Total	0.1114	100%

⁸ The remaining variation was explained by pairs of predictor set variables.

Table 5: Overview of Model Testing Theoretical Relationships

Variables	Theoretical Relationship with Innovation
Competition	<p>It is a generally held view that competition is a driver of innovation (Utterback 1974; Kimberly and Evanisko 1981). Competition exposes organizations to new ideas. Additionally, a highly competitive environment pressures managers to engage in environmental scanning in order to search for superior alternatives to their current methods. Additionally, a highly competitive environment makes it such that innovation is necessary condition for survival. Based on this logic, the following is hypothesized:</p> <p><i>H1: There is a positive association between competition and innovation.</i></p>
Turbulence	<p>Environmental turbulence creates an environment that can be characterized by uncertainty. Turbulence provides a stimulus for organizations to innovate in order to safeguard against this uncertainty. Organizations are forced to search for environmental information and opportunities and capitalize upon these opportunities through innovation. Therefore we hypothesize that:</p> <p><i>H2: There is a positive association between environmental turbulence and innovation.</i></p>
Age	<p>Older organizations are often thought of as being a creature of norms and habits. Older organizations have established formal and informal relationships both internal and external to the organization. They have been found to be more rigid and less open to change (Rao and Drazin 2000). On the other hand, some scholars posit that younger firms are less willing to make changes that might disrupt their current means of conducting business. In addition, past research has found support for a positive relationship between age and innovation (Chandy and Tellis 2000). Older organizations have a well-defined resource base and have demonstrated high potential for survival, which allows organizations the flexibility to pursue innovation (Kimberly and Evanisko 1981). Therefore the following competing hypotheses are proposed:</p> <p><i>H3a: There is a positive association between age and innovation.</i> <i>H3b: There is a negative association between age and innovation.</i></p>
Centralization	<p>Centralization is thought to discourage innovation by decreasing employee's awareness, commitment and involvement. Centralization does not allow for lower level individuals to participate in decision-making and therefore they do not feel involved with the process of innovation or the outcomes associated with the innovation. Centralization does not foster information transfer within the organization and past research has argued that it is this free exchange of ideas that fosters innovation (Khan and Manopichetwattana 1989). On the other hand, other scholars have found the opposite relationship to be true. The concentration of power within the organization is often necessary to overcome organizational opposition to change and in fact increases the likelihood of innovation success (Dewar and Dutton 1986).</p> <p><i>H4a: There is a positive association between centralization and innovation.</i> <i>H4b: There is a negative association between centralization and innovation.</i></p>
Diversification	<p>Organizations that have very diversified product offerings have to split their R&D resources among several different product lines. It is this scarcity of resources that can have a detrimental impact on innovation (Boeker 1997; Hoskisson et al 2002). On the other hand, because the organization offers so many different product lines, diversification creates a greater knowledge base within the firm to build upon. In addition, the promoting the dissemination of diverse ideas across the organization is likely to promote innovation (Day 1994; Hitt et al 1996).</p> <p><i>H5a: There is a positive association between diversification and innovation.</i> <i>H5b: There is a negative association between diversification and innovation.</i></p>
Resources	<p>Resources provide organizations with the flexibility to pursue innovation (Meyer 1982). Not only do available resources provide the necessary inputs to innovation, but also reduce barriers and risks to the organization when implementing the innovation. Resources enable an organization to absorb the cost of the innovation and the possibility of failure (Rosner 1968; Burns 1989). On the other hand, too many resources may be an</p>

indication of management incompetence and organizational waste, which can detract from innovation (Bolton 1993; Boeker 1997). Therefore it is hypothesized that:

H6a: There is a positive association between resource level and innovation.

H6b: There is a negative association between resource level and innovation.

Size

Large organizations often have more a larger resource base to pull from than smaller organizations (Baldrige and Burham 1975; Chandy and Tellis 1998). Size also leads to greater levels of diversity within the organization, which can lead to a greater number of innovative ideas being developed. However, size can also be associated with organizational inertia and a failure to adapt to changing resource conditions (Bolton 1993; Boeker 1997). The greater the organization's size, the higher the level complexity present within the organization, which can lead to difficulty in processing information. This leads us to hypothesize:

H7a: There is a positive association between size and innovation.

H7b: There is a negative association between size and innovation.

Performance

Innovation provides organizations with a new method of conducting business ahead of competition and the potential to gain a competitive edge in the marketplace (Stephens et al 1999; Ahuja 2000). In addition, innovation provides organizations with a new means of meeting customer needs and this can lead to increased financial performance. On the other hand, innovation takes up substantial resources and can be very risky for the organization. If the innovation fails in the marketplace it is likely to decrease financial performance (Markham and Griffin 1998).

H8a: There is a positive association between innovation and performance.

H8b: There is a negative association between innovation and performance.

SEM Model Testing Results

Variable	Path to Innovation			Path to Performance			Mediation Test	
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 1	Model 2	Model 3	Sobel	Goodman I
Competition	0.09	0.12***			-0.49***	-0.48***	1.87*	1.84*
Turbulence	0.19***	0.19***				0.05	3.17***	3.12***
Age	-0.09***	-0.10***			-0.06	-0.06*	-1.99**	-1.95*
Centralization	-0.01				0.07**	0.08**	-0.50	-0.48
Diversification	0.18***	0.19***				-0.04	3.36***	3.32***
Resources	0.31***	0.29***			0.44***	0.45***	1.70*	1.69*
Size	0.14***	0.15***				0.01	2.76***	2.72***
Innovation				0.20***	0.10***	0.10***		

Model Fit	Model 1	Model 2	Model 3
<i>Absolute Fit Indices</i>			
χ^2	288.82	90.29	186.91
d.f.	23	20	23
$\chi^2/d.f.$	12.56	4.51	8.13
RMSEA	0.12	0.064	0.092
SRMR	0.085	0.051	0.071
<i>Incremental Fit Indices</i>			
NNFI	0.50	0.85	0.67
CFI	0.68	0.91	0.79
GFI	0.93	0.98	0.95

^a – where innovation is modeled as a key mediator between antecedents and performance; ^b – where innovation is modeled as a partial mediator; ^c – where innovation is an antecedent to performance

* p<0.10. **p<0.05. ***p<.01.

Figure 1: Summary of Meta-Analysis Results

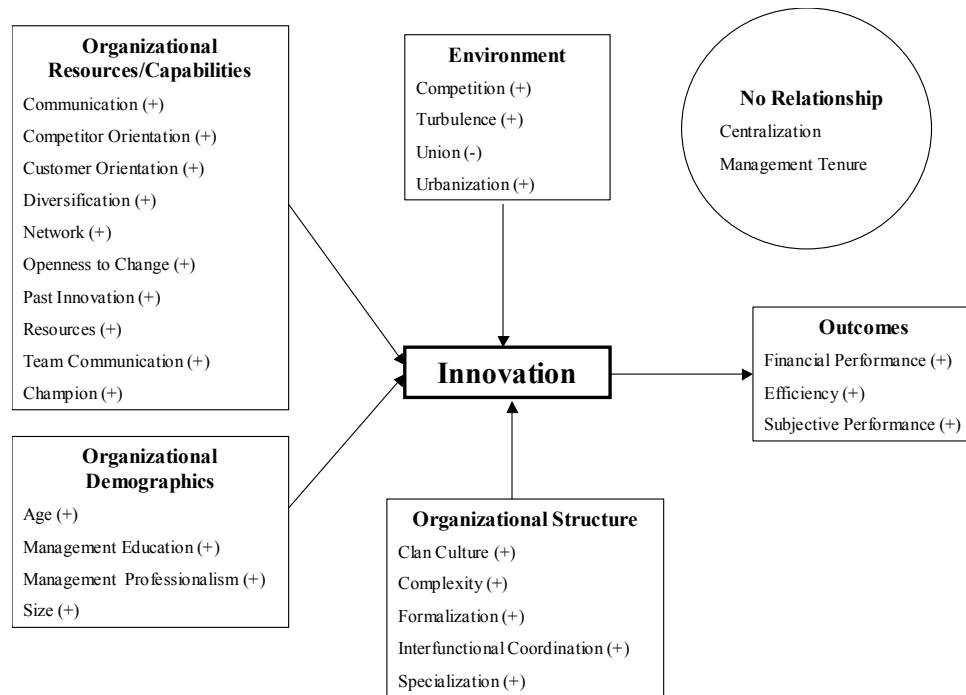


Figure 2: Conceptual Framework for Moderator Analysis

