

# **Managerial and Functional Influences on Perceived Environmental Uncertainty**

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## **ABSTRACT**

Perceived environmental uncertainty (PEU) is an important construct in behavioral research that has been widely studied. Critics argue that management should be used in the measurement of PEU, though many studies continue to ignore the distinction between management and non-management in the measurement of PEU. The distinctness of constructs and scales has important implications for the integrity of prior research. This paper examines the differences in PEU based on management versus non-management personnel, firm size, and functional areas. The research is based on a sample of 504 professionals in public accounting. The results indicate that management and non-management personnel have a significantly different level of PEU, thus confirming the criticism of studies that ignore the distinction between management and non-management measurement of PEU. Results also confirm the effects of firm size and functional areas on PEU. Future research using PEU in behavioral accounting research should consider the effect of management versus non-management, firm size, and functional areas in their research design.

Keywords: Environmental uncertainty, management, firm-size, functional areas, and public-accounting

## INTRODUCTION

It is widely accepted that the accounting profession operates in a fairly dynamic and uncertain environment (Ferris 1982; Gordon and Narayan 1986; Chenhall and Morris 1993). Several studies have examined the impact of environmental uncertainty within the accounting environment using perceived environmental uncertainty (PEU). PEU is a strategic level construct that measures upper management's perceptions of their external environment (Gul and Chia 1994). While the results of many of the studies that use PEU in behavioral research are significant, others have raised questions about the validities of some the findings because of the manner in which PEU was operationalize in the studies (Gregson, Wendell, and Aono 1994).

Gregson et al (1994) argue that it is important to measure PEU using management's perception of the external environment. In a critical review on the use of PEU in behavioral accounting research (BAR), Tymon, Stout, and Shaw (1998) provide evidence that several BAR studies ignore the distinction between management and non-management in their study of PEU. The failure to measure PEU accurately as theory specifies violates the construct validity criterion for the integrity of good research. Construct validity measure the degree to which a measure fit a theory about the construct (Nunnally and Bernstein 1994), and it is important to good research because it reflects the extent to which we can generalize from observable measures to higher order constructs (Shadish, Cook and Campbell 2001; Kerlinger 1986). As such, the distinction between management versus non-management measures of PEU has important implications for the integrity of prior research that use models whose results include PEU based on non-management perception (Rebele and Michaels 1990). The measurement of PEU has implications for future accounting research as well. This is because recent events within the last decade have once again highlighted the importance of environmental uncertainty within the accounting profession. These events include the demise of an international accounting firm (Arthur Andersen), several instances of high profile fraudulent or inappropriate financial reporting (Enron, Worldcom, Healthsouth, and Tyco), new legislation (the Sarbanes-Oxley Act), and the creation of a new regulatory agency for the accounting profession (Public Company Accounting Oversight Board)..

Given the continued importance of environmental uncertainty within the accounting profession, the correct measurement of this construct is important in behavioral accounting research. To date, no study has provided evidence on the existence of a significant difference between management and non-management personnel in their perception of environmental uncertainty. If there is no documented evidence of a significance difference in PEU between management and non-management, then the argument for using management in PEU studies is a mute one. However, there are reasons to believe that there is a difference in the perception of environmental uncertainty between these two groups. Management personnel are generally more knowledgeable about the business, and are more aware of the big picture than non-management personnel. By examining the difference between management and non-management in their perceptions of environmental uncertainty, the current study provides empirical evidence on the distinctiveness of the PEU construct as it applies to these groups. The study also extends future research by examining the effect of firm size, and functional areas (Audit, Tax, Consulting, and Others) on PEU.

The research is based on a sample of 504 professionals from national and local accounting firms. The results indicate that management and non-management personnel have a significantly different level of perceived environmental uncertainty, with management perceiving a higher level of environmental uncertainty than non-managers. Results also indicate a significant difference in PEU based on firm size and functional areas.

## BACKGROUND

Prior research suggest that PEU is an important explanatory variable for a number of different factors such as organizational structure (Gordon and Narayanan 1984), compensation contract design (Kren and Kerr 1993), employee motivation, performance, and job satisfaction (Gul and Chia 1994; Anderson and Kida 1985; Ferris 1977, 1982). While the results of the studies using PEU are promising, they should be interpreted with care because of the manner in which PEU was operationalized. The distinction between management versus non-management in the measurement of PEU has important implications regarding the integrity of prior research that use PEU to predict consequent variables (Anderson and Kida, 1985). Tymon et al. (1998) provide evidence that many studies in BAR did not measure or control for PEU as a strategic level construct based on management subjects in their research design.

Insert Table 1 Here

As seen in Table 1, of the eighteen behavioral accounting research studies examined by Tymon et al. (1998), eight correctly used management to measure PEU, six used non-management, and two used a mixed sample of management and non-management to measure perception of environmental uncertainty. The studies that did not operationalize and measure PEU as a strategic level construct based on management perception of environmental uncertainty violate the basic scientific norm of the correspondence concept (Sterling 1989, 1990). Tymon et al. (1998) recommend that PEU should be “conceived and operationalized as a strategic level construct”, and that the measurement of PEU should be based on upper management perception of the external environment. Studies subsequent to Tymon et al. (1998) measured PEU using upper management perception (Karimi, Somers and Gupta 2004; Budding 2004; Sawyer, McGee and Peterson 2003; Agle, Nagarajan, Sonnenfeld and Srinivasan 2006; Westerberg and Wincent 2008), while one did not make the distinction between management and non-management (Shmuel and Shpielberg 2003). Panel B of Table 1 below provides a list of these studies, which indicate that there is research that continues to ignore the distinction between management and non-management in the measurement of PEU. If management and non-management perceive environmental uncertainty differently, this distinction has implications for research design on PEU. Thus, the results of studies that ignore this distinction may be questionable.

Another important variable likely to influence the measurement of PEU in BAR is firm size. Given differences in the client characteristics of national versus non-national accounting firms documented in prior research (Kaplan, Menon, and Williams 1990), it is likely that there are differences in firms’ operating environments likely to influence PEU.

The national accounting firms, represented in this study by the former Big-5 firms, tend to have clients that are larger in size, with operations in multiple locations and industries. As such, their operating environment is more dynamic and more complex, which is likely to lead to more uncertainty in their environment.

Differences in the primary functional areas (audit, tax, and consulting) of accounting firms may also influence the perception of environmental uncertainty. Professionals in the three primary functional areas of accounting differ in terms of what they do and there are differences in how they interact with, and perceive the external environment. They work in different environment in terms of job context, client expectations, firm expectations, and number and variety of client contact occasions. As such, it is possible that their perception of environmental uncertainty may differ. None of the studies reviewed in this paper control for firm size or made a distinction between functional areas in the evaluation of PEU.

## **RESEARCH OBJECTIVE AND METHOD**

While prior research suggests that PEU is a strategic level construct that should be operationalized based on management perceptions only, several studies have not followed this suggestion. To date, no study has directly tested for the implied difference in PEU among professional accountants based on management and non-management, firm size (national versus non-national firms), and functional areas. The objective of this research is to determine if there is a difference in perceived environmental uncertainty based on management versus non-management, firm size, and functional areas. The three hypotheses used to examine these issues are as follows:

H<sub>1</sub>: There is a significant difference in perceived environmental uncertainty based on management compared to non-management personnel.

H<sub>2</sub>: There is a significant difference in the level of perceived environmental uncertainty based on firm size.

H<sub>3</sub>: There is a significant difference in the level of perceived environmental uncertainty based on functional areas.

### **Sample and Measures**

The sample was selected from the American Institute of Certified Public Accountants (AICPA) list of CPAs in public accounting in seven geographically diverse states. The list made available to us includes the following states: Pennsylvania, Montana, New York, California, Florida, Illinois, and Kansas. A survey instrument was mailed to 2,754 professionals of the former Big-5 accounting firms and some regional accounting firms in the seven states to collect data on the variables of interest. A follow up letter and another copy of the survey instrument was mailed to those who had not responded within four months. A self-addressed postage paid envelope was included to return the completed questionnaire directly to the researcher. Of the 2,754 surveys mailed, 504 completed surveys were returned for a response rate of 18%. To determine the existence of a non-response bias, we used analysis of variance to compare the means

between the respondents from the first and second surveys. The results indicate there is no significant difference between the means of the first and second surveys on perceived environmental uncertainty.

The final sample size of 504 professionals is made up of 45 from Arthur Andersen LLP, 81 from Deloitte and Touche LLP, 79 from Ernst and Young LLP, 48 from KPMG Peat Marwick LLP, 73 from PriceWaterhouseCoopers LLP, and 142 from non-big 5 firms. The remaining 36 respondents did not indicate their firm's identity. Seventy-six percent of the sample is made up of subjects that are managers or above (354) and twenty-four percent of the respondents are professional staffs (114). Functional areas represented in the sample are 237 (45%) from Audit, 182 (35%) from Tax, 67 (13%) from consulting, and 41 (8%) for a total of 527. Some of the respondents work in more than one functional area, which explains the difference for the total of 527 for the functional areas versus the 504 for the sample size. Some respondents did not indicate their functional areas. We classify these into Other Functional Areas.

Insert Tables 2 Here

Table 2 provides descriptive information on education, job tenure, and accounting career tenure. The average age for the respondents is 35 years, the youngest is 20 years old, and the oldest respondent is 74 years old. There are 185 females and 318 males in the sample. 348 respondents are married and 154 are single. The average year with the current employer is approximately 9 years, with a minimum of 1 year and a maximum of 39 years. The average year in the accounting profession for the respondents is 12, with a minimum of less than 1 year and a maximum of 40 years.

Perceived environmental uncertainty was measured using three questionnaire items based on studies by Sathe (1974) and Ferris (1982). By focusing on accounting professionals in public accounting only, the sample used for this study avoids the confounding effects of multi-industry variation in the perception of environmental uncertainty. The questionnaire items used to measure PEU are show in the Appendix. Factor analysis results indicate that the three observed variables (three questionnaire items) used to measure PEU all load on a single factor (Factor loadings of .854, .868, and .796, respectively).

## RESULTS

The data was analyzed using univariate analysis of variance (ANOVA) to determine if the sample means of the different groups (management vs. non-management; four different job categories) are from populations with equal means. Table 3 below shows the respective means statistic on PEU for the different groups and their respective sample size.

Insert Tables 3 Here

The purpose of the first ANOVA test is to determine if a statistical difference exist between management and non-management in their perception of environmental uncertainty. The hypothesis pertaining to this test is restated below:

H<sub>1</sub>: There is a significant difference in perceived environmental uncertainty based on management compared to non-management personnel.

The results from table 4 below indicate that a significant statistical difference exists between management and non-management's perception of environmental uncertainty (F statistic of 10.062, at a significance level of .002).

The second ANOVA test examines the difference in PEU based on firm size. The hypothesis pertaining to this test is restated below:

H<sub>2</sub>: There is a significant difference in the level of perceived environmental uncertainty based on firm size.

The results from table 4 below indicate that a significant statistical difference exists in PEU based on firm size (F statistic of 7.147, at a significance level of .008).

Insert Tables 4 Here

Next, we perform ANOVA test to determine if there are significant differences between the functions areas of audit, consulting, tax, and others in their perception of environment uncertainty. The hypothesis being tested is:

H<sub>3</sub>: There is a significant difference in the level of perceived environmental uncertainty based on functional area.

The results from table 5 (Panel A) below indicate a significant difference in groups' means on PEU (F statistic of 4.559, at a significance level of .004) based on the four functional areas used in the study. While the above results indicate the effect of functional areas on PEU, it does not tell us what particular functional area(s) is driving the results. To isolate the functional area(s) that is driving the results stated above, we conducted a post hoc pair wise comparison test between audit, tax, consulting, and other job functions. The results from table 5 (Panel B) indicate significant difference in PEU between Tax and Consulting; and between Tax and Other Functional Areas. It would appear that personnel in the functional area differ significantly in PEU compared to Consulting and Other Functional areas.

Insert Tables 5 Here

## **DISCUSSION AND CONCLUSIONS**

While previous literature suggests that PEU should be based on management perception only, a great deal of research on PEU does not make the distinction between management and non-management in the measurement of PEU. The current study provides empirical evidence on the merit of the argument that suggests that PEU measurement should be based on management perception only. The theory behind PEU

specifies that it should be measured using management personnel. The results from this study indicate that there is a distinct and significant difference in PEU between management and non-management (2.19 versus 2.39 from Table 3). If the results in this study are generalized to other research, the effect of PEU in studies that use non-management or a mix of management and non-management is distorted. Consequently, different results might have been obtained in some of those studies, which compromise the statistical conclusion validity of studies that did not use management to measure PEU. Statistical conclusion is the degree by which an independent and dependent variable covary (Shadish et al. 2001). Ignoring the distinction between management and non-management will be particularly problematic for studies whose theoretical justification is dependent on PEU conceptualization as a strategic level construct, for the effect of PEU will be understated in these studies. Given the relevance of PEU to various measures in prior research, the findings of research that did not distinguish management from non-management in the measure of PEU ought to be interpreted with caution, given the findings of the current study. While the results of many of these studies are important, critics argued that these results should be interpreted with caution because of the manner in which PEU was measured. It is important that future research consider the theoretical role of PEU in their research context and design.

The reasons for the difference between management and non-management may be due to numerous factors, including the fact that management is more knowledgeable about the business, the competition, the industry, and the institutional framework under which the firm operates. In addition, management personnel may tend to be older, have longer tenure, and higher levels of education. Management interacts with the critical constituents of the firm's environment and has a better understanding of the big picture under which the firm operates. As such, it is understandable why management perception of environmental uncertainty would differ from that of non-management. Future research should take this distinction into consideration in the research design of studies involving environmental uncertainty.

The results of the study also confirm the existence of a significant difference in PEU based on firm size, and functional areas among management personnel. Difference in PEU based on firm size is not surprising, given the difference in the client portfolios, operating environment, and characteristics of national versus non-national accounting firms. Few, if any of the studies using PEU control for firm size in their research design. The difference in PEU between Tax management personnel and consulting management personnel is an interesting discovery. While the difference in PEU between these two functional areas may be attributable to differences in their duties and operating environment, one would expect these differences to be mitigated by better awareness of firm-wide issues and problems by management personnel. Future research is needed to determine the underlying reasons for this and other findings from this research. In addition to future research that is warranted to further explore the areas addressed here, other factors that could be examined to assess how they impact PEU includes the maturity of the firm (Gilley, McGee, and Rasheed, 2004), cultural factors (Teoh, Foo, and Liang, 1997; Weber and Hsee, 1998) and personality traits of management (Weber and Milliman (1997).

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**TABLE 1**

Studies Using PEU in Behavioral Research

<u>Author(s) Year</u>	<u>Management</u>	<u>Mix</u>
<u>Panel A*</u>		
Ferris (1977)	N	
Ferris (1978)	N	
Ferris (1982a)	Y	
Ferris (1982b)	N	
Anderson and Kida (1985)		X
Chenhall & Morris (1986)		X
Rebele and Michaels (1990)	N	
Umanath et al. (1983)	N	
Gregson et al. (1994)	N	
Khandwalla (1972)	Y	
Gordon and Narayana (1984)	Y	
Govindarajan (1984)	Y	
Gul (1991)	Y	
Chenhall and Morris (1993)	Y	
Kren and Kerr (1993)	Y	
Gul and Chia (1994)	Y	
<u>Panel B: Recent PEU Studies</u>		
Sawyer, McGee and Peterson (2003)	Y	
Ellis and Shpielberg (2003)		X
Karimi, Sommers and Gupta (2004)	Y	
Budding (2004)	Y	
Agle, Nagarajan, Sonnenfeld and Srinivasan (2006)	Y	
Westerberg and Wincent (2008)	Y	

Summary:

Number of studies that used Management	13
Number of studies that used Non-management	6
Number of studies with Management and Non-management	3

\* Adapted from Tymon, Stout and Shaw (1998).

**TABLE 2**  
Descriptive Statistics

## Panel A: Occupational Levels

Firms	Management	Prof. Staff	Total
Arthur Andersen	32	13	45
Deloitte & Touche	57	24	81
Ernst & Young	60	19	79
KPMG Peatmarwick	43	5	48
PriceWaterhouseCoopers	51	22	73
Non Big-5 Firms	111	31	142
Total	354	114	468
Percent	76%	24%	100%

## Panel B: FPirms by Job Categories

Firms	Audit	Tax	Consulting	Other	Total
Arthur Andersen	17	18	10	4	49
Deloitte & Touche	44	33	5	3	85
Ernst & Young	43	23	12	6	84
KPMG Peatmarwick	27	16	8	3	54
PriceWaterhouseCoopers	38	24	7	7	76
Non Big-5 Firms	68	68	25	18	179
Total	237	182	67	41	527
Percent	45%	35%	13%	8%	100%

## Panel C: Demographic Information

Average Age – Mean	35
Average Age – Median	34
Average Years With Firm – Mean	9
Average Years With Firm – Median	6
Average Years in Accounting – Mean	12
Average Years in Accounting – Median	10
Single	154
Married	348
Male	318
Female	185
Masters Degree	164
Juris Doctor Degree	24

**TABLE 3**  
Means Score

<b>Variables</b>	<b>Mean level of PEU</b>	<b>n</b>
Managers	2.19	367
Non-managers	2.39	121
National Firms	2.28	355
Local Firms	2.12	143
Audit	2.25	209
Consulting	2.07	67
Tax	2.32	176
Other Job Functions	2.03	42
CPAs	2.25	419
Non-CPAs	2.15	72
Females	2.22	184
Males	2.24	313

**TABLE 4**  
Oneway ANOVA Results

<b>Comparison</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Managers vs Non-managers*	1	3.655	10.062	.002
National vs. Non-National Firms*	1	2.610	7.147	.008

\*: Significant at p value  $\leq .05$

**TABLE 5**

(Panel A)  
Oneway ANOVA Results – Functional Areas

**PEU on Control Variables**

Between Groups Comparison	df	Mean Square	F	Sig.
Functional Areas*	3	1.632	4.559	.004

\*: Significant at p value ≤ .05

(Panel B)  
Turkey Multiple Comparisons Test

**Multiple Comparisons**

Dependent Variable: Environmental Uncertainty

Tukey HSD

(I) jobcat	(J) jobcat	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-.07346	.06122	.627	-.2313	.0844
	3.00	.17577	.08401	.157	-.0408	.3923
	4.00	.21865	.10119	.136	-.0422	.4795
2.00	1.00	.07346	.06122	.627	-.0844	.2313
	3.00	.24924*	.08590	.020	.0278	.4707
	4.00	.29212*	.10276	.024	.0272	.5570
3.00	1.00	-.17577	.08401	.157	-.3923	.0408
	2.00	-.24924*	.08590	.020	-.4707	-.0278
	4.00	.04288	.11777	.983	-.2607	.3465
4.00	1.00	-.21865	.10119	.136	-.4795	.0422
	2.00	-.29212*	.10276	.024	-.5570	-.0272
	3.00	-.04288	.11777	.983	-.3465	.2607

\*. The mean difference is significant at the .05 level.

T

- 1 = Audit
- 2 = Tax
- 3 = Consulting
- 4 = Other Functional Areas

**APPENDIX**

Questionnaire

Perceived Environmental Uncertainty

Please answer all questions as they relate to your job in your organization. Circle the appropriate choice for each question.

<u>Never</u>	<u>Seldom</u>	<u>Sometimes</u>	<u>Often</u>	<u>Always</u>
1	2	3	4	5

1. How often are you certain about what the actions or expectations of the group (supervisors and clients) are that you have to try to meet as part of your job?.....1 2 3 4 5
2. How often are you certain about how to respond to the group's actions or expectations?..... 1 2 3 4 5
3. How often can you determine whether your response to meet the actions or expectations of the group was effective?..... 1 2 3 4 5

General Information

Please fill in the blanks below or place a check (o) the appropriate space next to the items that apply to you.

General

Age: \_\_\_\_  
 Marital Status: Single \_\_\_\_ or Married \_\_\_\_  
 Sex: Male \_\_\_\_ or Female \_\_\_\_

Education

\_\_\_\_ I Have a Bachelor's Degree in \_\_\_\_\_  
 \_\_\_\_ I Have a Master's Degree in \_\_\_\_\_  
 \_\_\_\_ I Have a Juris Doctor Degree  
 \_\_\_\_ I Have a CPA Certificate  
 \_\_\_\_ Other (please describe) \_\_\_\_\_

Employment

1. My years of professional experience with this firm are \_\_\_\_\_
2. My total years of professional experience in accounting are \_\_\_\_\_
3. Job Title \_\_\_\_\_
4. My Occupational Area is (choose one)
  - \_\_\_\_ Auditing
  - \_\_\_\_ Tax
  - \_\_\_\_ Consulting
  - \_\_\_\_ Other. Please Specify \_\_\_\_\_