

SUBMISSION TITLE: Innovation in Higher Education: The Influence of
Organizational Culture

TOPIC AREA OF THE SUBMISSION: Educational Administration, Higher Education

DATE: October 15, 2002; Submission for Proceedings

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Innovation in Higher Education: The Influence of Organizational Culture

According to Eckel (2002), American colleges and universities are facing a new playing field marked by different fiscal rules. Sources of funding appear to be decreasing, while higher education costs are increasing. Eckel (2002) continues by suggesting that higher education institutions face demands of an increasingly influential market to do new things. The idea of “doing new things” – organizational innovation – is marked with barriers for institutions of higher education. Hefferlin (1969) described colleges and universities as devices essentially for

the “perpetuation of culture” with a long tradition of custom and precedent. He continues suggesting that innovation is not especially compatible with such an organization. Levine (1980) reported that academic institutions are deliberately structured to resist precipitant change. Hefferlin (1969) best summarizes the relationship between academic institutions and innovation suggesting “academic institutions are basically conservative in educational purpose and in support structures for innovation programs”. (pp. 11)

Within the domain of education, the roots of empirical research on organizational innovation date back to the early 1920’s. The domain of education, particularly higher education institutions is a ripe area for empirical research on organizational innovation. West and Farr (1990) offer a definition that defines organizational innovation as:

The intentional introduction and application within a role, group, or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organization or wider society. (p. 9)

Several arguments support the need for understanding organizational innovation within higher education institutions. First, in an era of decreasing public funding, universities are scrambling to respond to challenges like globalization, commercialization, and the increasing availability and capacities of information technologies (Taylor, 1998). Taylor (1998) continues, suggesting that responses to such forces within institutions have been energized primarily by lone rangers – individual staff members who are energetic, early adopters of innovation. However, innovation at the individual level often results in conflict with broader institutional practices, processes, values and structure. The challenge is to move beyond innovation at the individual level and turn attention to change at the institutional level – the reinventing of culture (Taylor, 1998).

Second, institutions of higher education are potential users and producers of innovations. Colleges and universities function as suppliers of training, expertise, and personnel for industries, most of which have encountered the high-technology domain.

In addition, changes in student demographics, the presence of high technology, and changes in funding are signals create forces for innovation for colleges and universities. Fourth, Rogers (1995) suggested that educational institutions, in one way or another, are involved in the adoption of innovations. Given these perspectives, empirical investigation of organizational innovation in the setting of higher education is justified.

Industries, including higher education, that have faced pressure for innovation have also faced fundamental changes in philosophy, values and operations. Some organizations appear to have resources, structures, processes and values that foster adoption of innovations while others do not. Technological innovations continue to hold vast opportunities for conducting operations in more effective and efficient ways. However, these same innovations place pressure on organizational resources, structures, processes and values for change.

Assuming that technology and market changes will continue to produce pressures for innovation on higher education institutions, what then explains why some are successful at innovation adoption while others are not? Researchers of organizational innovation would suggest that factors related to the “formal” organization such as, organizational size, structure and resources influence the ability of an organization to adopt an innovation. Yet, the findings of researchers are mixed with little conclusive evidence regarding the role of these factors in organizational innovation.

Christensen (1997) suggests that an organization’s resources, processes and values - its organizational culture - contribute to its ability to adopt innovations. Kanter (1983) stresses the importance of a “pro-innovation” culture. Thus, the challenge facing researchers is to identify organizational-level features that can be considered as enabling organizational innovation.

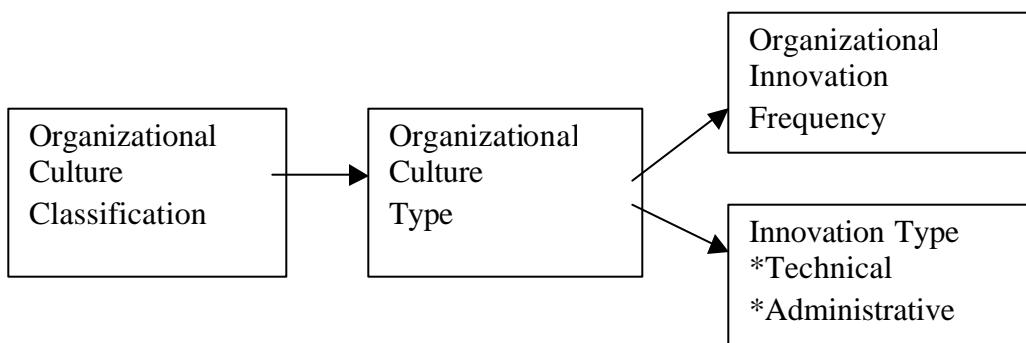
The primary focus of this study is to explore the influence of organizational culture, particularly culture types, on organizational innovation. Academic researchers suggest the presence of a relationship, however, few empirical studies exist to support these claims. Exploration of this relationship within the domain of higher education should yield useful insight for administrators of higher education institutions. Thus the objectives of this study are:

1. First, this study should advance understanding of organizational innovation within higher education institutions.
2. Second, this study should enhance understanding of organizational culture types within higher education institutions.
3. Third, and perhaps most important, this study should advance understanding of how organizational culture influences organizational innovation.
4. Fourth, from a theoretical perspective, this study should contribute to the ability of organizational innovation researchers to better understand the antecedents associated with organizational innovation.

Theoretical Framework and Literature Background

The theoretical framework guiding this study evolved from two fields of organizational inquiry - organizational innovation and organizational culture. The framework is illustrated in Figure 1. Innovation, at the level of the organization has been the main focus of a majority of theoretical and empirical studies of innovation (King, 1990). The adoption perspective, the focus of this study, usually centers on why some organizations adopt a given innovation (or set of innovations) more quickly than others.

Figure 1
Theoretical Framework:
Relationship of Organizational Culture to Organizational Innovation



The study specifically addresses the following research questions:

- 1) Can a sample of four-year, private (non-profit) and public colleges and universities be classified by organizational culture types?
- 2) Is organizational culture type related to the frequency of organizational innovation?
- 3) Is organizational culture type related to types (e.g., technical, administrative) of organizational innovation.

Organizational Innovation

Research conducted on organizational adoption of innovation acknowledges organizations as systems of relations and is grounded in the structural-functional theory (Parsons, 1956; Hage and Aiken, 1970). This view suggests that organizational innovation can be best explained through analysis of structure (King, 1990). Blau and Scott (1962) however, argue that this view is incomplete and that an organization's informal element – its culture – should be included in analyzing organizational innovation. Numerous organizational characteristics including variables such as organizational type, size, resources, structural variables and organizational climate have been the focus of innovation studies. Although most of these variables have been widely studied in organizational innovation studies, the concepts related to culture have not been empirically developed (King, 1990).

Most researchers return to the work of Burns and Stalker (1961) who noted the distinction between innovative and non-innovative organizations along the continuum of organic vs. mechanistic organizational forms. With a sole focus on organizational structure, Burns and Stalker (1961) reported that organizational structure should be related to the environment in which the organization operates. King and Anderson (1995) appear to be among the first to challenge the notion that organic structures are universally the optimum structural form for organizational innovation. To summarize King and Anderson's (1995) position they state "The message emerging now is that although organic structure may often facilitate innovation, it is not a panacea. There is much else to consider when looking for the antecedents of successful organizational innovation" (p. 101).

In response to these findings, researchers of organizational innovation in the business domain, have suggested exploration into the concept of organizational culture (Cherian and Deshpande, 1985; Deshpande and Webster, 1989; Deshpande, Farley and Webster, 1993). Cherian and Deshpande (1985) suggested that the cultural system of a firm interacts with the structural system affecting formal goals, policies, and processes. In turn, the structural system and the cultural system affect all organizational actions, including organizational adoption of innovations.

In summary, organizational culture influences organizational action. Organizational innovation researchers suggest the presence of a relationship between organizational culture and organizational structure and together, they influence organizational innovation. Despite the conceptual linkages between organizational culture and organizational innovation, there is a paucity of empirical research. In fact, organizational culture is an area of speculation rather than empirical investigation in the innovation literature (King, 1990).

Organizational Culture

Contemporary organizational culture researchers, such as Cameron and Quinn (1999), build on the views of Schein (1985) and Louis (1985) suggesting the following:

Organizational culture refers to the taken-for-granted values the underlying assumptions, expectations, collective memories, and definitions present in the organization. It represents how things are around here. It reflects the prevailing ideology that people carry inside their heads. It conveys a sense of identity, provides unspoken guidelines for how to get along and enhances the stability of the social system to which they belong. (p. 134)

Research on the application of culture has dealt with the relationship of organizational culture content with other variables in the field of organization science. As an interpretive paradigm, culture content is both a product and process, the shaper of human interaction and the outcome of it, continually created and recreated by people's ongoing interactions (Jelineck et al., 1983; Kuh and Whitt, 1988). The urgings of Kanter (1983) for organizations to develop a "pro-innovation" culture suggest that innovative organizations have cultures with distinct

characteristics that enable innovation. Perhaps the relationship between organizational culture and organizational innovation is best explored through analysis of culture content. Research on organizational culture content provides a tradition for profiling (e.g., typing) organizations along distinct value dimensions.

Organization theorists have used the Competing Values Framework (CVF) in defining distinctive culture types in studies relating organizational culture and organizational performance (Deshpande, Farley and Webster, 1993), organizational culture and institutional effectiveness of higher education institutions. (Cameron, 1983; Smart and St. John, 1996; and Zammuto et al., 2000) Therefore, the initial focus of this study is to identify the dominant organizational culture type of a sample of higher education institutions through the following hypothesis:

Hypothesis 1: There will be a difference in the mean scores assigned to the culture types of clan, hierarchy, adhocracy and market within a nationwide sample of accredited, four-year-plus, not for profit, private and public colleges and universities.

Organizational Culture and Organizational Innovation

Organizational culture is important as a vehicle for implementing organizational change (Yeung, Brockbank and Ulrich, 1991). Though not all organizational change involves innovation, all organizational innovation involves change (King, 1990). Though studies have acknowledged existence of a relationship between organizational culture and organizational innovation (Kotter and Heskett, 1992) empirical studies on the impact of organizational culture on organizational innovation are sparse.

Schein (1985) indicates that organizational culture plays a role in organizational processes as culture, by definition is a pattern of shared basic assumptions that an organization learns as it responds to problems. In the case where the external environment is characterized as ever-changing, conceptions of organizational innovation take center stage (Detert et al.).

Organizational culture is both product and process, the shaper of human interaction and the outcome of it (Jelinek, Smirich and Hirsch, 1983; Kuh and Whitt, 1988). Thus, culture could be viewed not only as process (e.g., patterns) to help solve organizational problems, but also as a product of the problem-solving process.

Organizational culture researchers argue that isolating organizational culture content is useful in understanding organizational action (Cameron and Quinn, 1999). Furthermore, organizational innovation, as an organizational action, might be better understood. Thus,

Hypothesis 2: There is a significant relationship between dominant organizational culture types and the frequency of organizational innovation within a nationwide sample of accredited, four-year-plus, not for profit, private and public colleges and universities.

It is also believed that innovations are likely adopted in a manner that maintains and reinforces an organization's existing culture (Zammuto, Gifford and Goodman, 2000). Thus,

Hypothesis 3: The dominant culture types of clan, hierarchy, adhocracy and market are related to a) technical innovation, and b) administrative innovation within a sample of accredited, four-year-plus, not for profit, private and public colleges and universities.

The Competing Values Framework and Culture Type

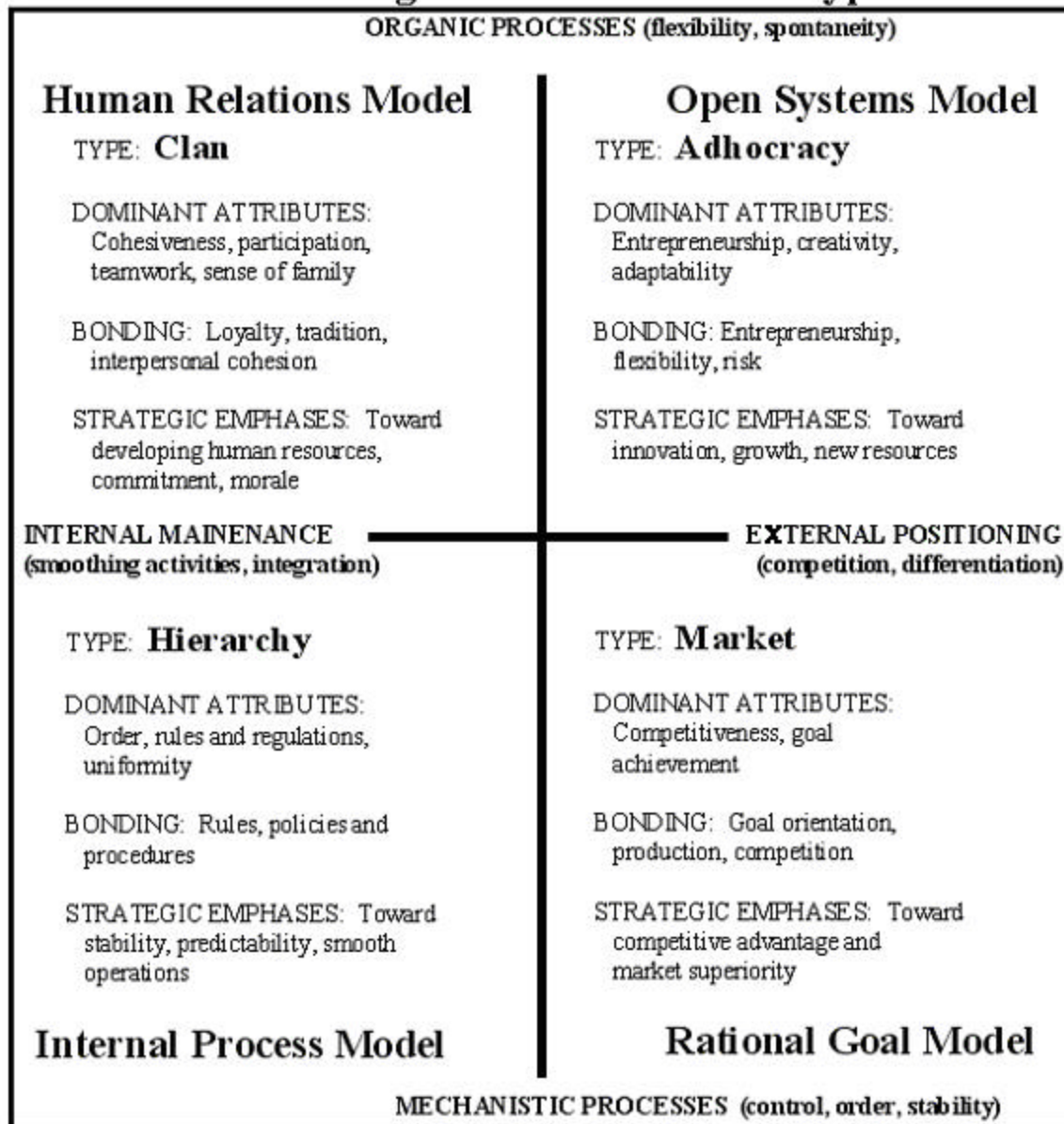
Quinn and Rohrbaugh (1983) developed the Competing Values Framework (CVF), which has been used to examine the relationship between organizational culture and organizational phenomena including organizational effectiveness in colleges and universities (Cameron, 1988; Zammuto and Krakower, 1991; Smart and St. John, 1996) and business performance of Japanese firms (Deshpande, Farley and Webster, 1993).

The culture of an organization is difficult to assess objectively because it is grounded in shared assumptions of individuals in the organization (Schein, 1985; Cameron and Freeman, 1991) Archetype theory (Mitroff, 1983) asserts that "axes of bias" or psychological archetypes organize individuals' interpretations of reality into a limited number of categories. These categories identify the different frames used by individuals to organize underlying values,

assumptions and interpretations. Consequently, these categories can also be used to identify certain types of cultures because cultures are based on, and defined by, these values, assumptions and interpretations (Mitroff, 1983; Cameron and Freeman, 1991).

The quadrants of the CVF reflect two value dimensions that are foundational to organization science. One of the problems facing organization theorists includes external adaptation (Schein, 1985), which is illustrated on the horizontal axis as the value for internal focus vs. external focus. The vertical axis of the CVF reflects the value dimension for issues of internal integration, another problem facing organization theorists (Schein, 1985) and reflects values for flexibility vs. control. The cross-hairs of this model result in four quadrants that precisely match the main organizational forms that have developed in organizational science (Cameron and Quinn, 1999). These forms include: the open systems model, the human relations model, the internal process model and the rational goal model. Using the terminology of Williamson (1975), Cameron and Quinn (1999) assigned culture types of adhocracy, clan, hierarchy and market, respectively, to the quadrants. Figure 2 illustrates the model of Organizational Culture Types presented by Deshpande, Farley and Webster (1993) and adapted from Cameron and Freeman (1991) and Quinn and Rohrbaugh (1983).

Figure 2
A Model of Organizational Culture Types



SOURCE: Adapted from Cameron and Freeman (1991); Quinn and Rohrbaugh (1983); Deshpande, Farley and Webster (1993); Denison and Spreitzer (1991).

By juxtaposing the four quadrants along its two dimensions, the CVF makes it clear that each quadrant emphasizes different aspects of the organizing process - people, adaptation, stability and task accomplishment - issues that are important for every organization. Opposing quadrants high-light inherent dilemmas in the organizing process. (Zammuto and Krakower,

1991; Cameron and Freeman, 1991, Denison and Spreitzer, 1991; Yeung, Brockbank and Ulrich, 1991; Zammuto, Gifford and Goodman, 2000) Zammuto et al. (2000) suggest that the balance among the four quadrants within an organization has a major impact on how its members view an innovation, its intended outcomes and how it is implemented.

In summary, we believe organizational culture influences organizational innovation in higher education institutions. However, few if any studies address this relationship. This study endeavors to close that gap by investigating the relationship between organizational culture type and innovation in higher education institutions. The next section of this paper introduces the methodology used, including the sample, data collection, measures and data analyses employed.

Research Method

Sample

Data were collected for this study through the use of a cross-sectional mail survey of academic administrators of four-year-plus, not-for-profit private and public institutions in the United States and the District of Columbia. The sampling frame consisted of four-year, private (non-profit) and public institutions and was drawn from taken from the 2001 Higher Education Directory. In comparison to their for-profit counterparts, the institutions in this sampling frame face high degrees of external control (e.g., state, local, religious, etc.) and increased pressures for external adaptation. A manual review of each institution resulted in the identification of respondents, respondent addresses and number of students.

The sample included such key informants as chief academic officers and directors of institutional research. The rationale for using these respondents was that they represent major constituencies in colleges and universities. That is, they are formal position holders who

influence institutional policy, direction and performance. Reliance on the use of such key informants in assessing organizational culture in the higher education domain is common (Cameron, 1985; Zammuto and Krackower, 1991; Smart and St. John, 1996).

The survey was sent to 1912 institutions in the sampling frame. This number represents 95% of the sampling frame population. (Note: The remaining 5% (n=100) of the sample were included in the pre-test phase and were not resurveyed.) Two written questionnaires were mailed to each institution resulting in a total number of 3864 questionnaires distributed.

The mail survey process utilized was a modified version of the tailored design method espoused by Dillman (2000). This method contains five elements: (1) a respondent-friendly questionnaire, (2) multiple contacts with the questionnaire recipient, (3) inclusion of stamped return envelopes, (4) personalized correspondence and (5) a non-financial, token incentive sent with the survey request. Dillman (2000) suggests that material incentives improve response rates as well. Thus, it seemed reasonable to provide an incentive that was appropriate to the domain of study and level of analysis. Each survey recipient received a one-page bibliography of the core literature related to this study and a bookmark. Both incentives were intended to promote goodwill and foster interest in the survey content. In accordance with the tailored design method (Dillman, 2000), survey recipients received a packet including a personalized cover letter, a two-page written survey, a self-addressed/postage paid envelope and the incentives.

Of the 3,864 surveys mailed, 28 were undeliverable for reasons such as “not at this address”, “deceased please remove”, and “forwarding order expired”. One thousand two hundred and twenty-six (1226) individual responses were returned over the survey period of 3 and ½ weeks. After thorough review of all 1226 surveys, 73 were found to be unuseable due to incomplete data, thus yielding 1053 useable surveys. Since the unit of analysis for this study was

the organizational level, multiple individual responses from a single institution were aggregated. Upon completion of aggregation, 922 organizational responses were retained and recorded. This represents 48.2% of the study population ($n = 1912$). Based on the response rate, no follow-up mailing was conducted.

Sample Characteristics

The institutions in the sample were diverse in terms of institutional type – private independent/no affiliation, private religious-affiliated and state/local affiliated. The majority were private independent ($n=334$, 36.2%). Three-hundred-three ($n=303$, 32.9%), however, were private religious-affiliated and two hundred sixty-five ($n=265$, 30.9%) were state/local (e.g., public) affiliated. In terms of size, number of full-time students and number of employees (e.g., sum of faculty, staff and administration) were measured. Regarding the number of full-time students, the largest had 78,500 full-time students, while the smallest had 0. Regarding full-time employees, the largest had 14,607, while the smallest had 7. In summary, an assessment of demographic characteristics indicated that the sample of institutions were quite diverse in terms of type and size.

Variables

Organizational culture type was treated as the primary independent variables.

Organizational innovation, the dependent variable was measured as total frequency of technical and administrative innovation.

Organizational Culture Type

Twelve items were presented on the questionnaire to assess organizational culture type. These twelve items were adopted from Yeung, Brockbank and Ulrich (1991). Exact scale items are noted in Table 2. For these twelve items measuring organizational culture type, respondents

were asked to indicate on a 5-point scale the degree to which each statement describes their institution. Possible responses ranged from 1 = low to 5 = high. A score of 1 indicated a “low” degree of descriptiveness, while a score of 5 indicated a “high” degree of descriptiveness. Multiple individual responses received from an organization were aggregated for each question to yield an organizational-level response. For the three items corresponding to each particular culture type, a mean score was calculated, yielding a numerical score for each culture type for each institution. The type with the highest numerical score was assigned the dominant organizational culture type for the institution. Rationale for this approach was supported by Yeung, Brockbank and Ulrich (1991).

Organizational Innovation

Based on the conceptualization of Perry (1993) and Shin (1996), the dependent variable of total innovation was operationalized with seven items, which was comprised of two subscales – technical innovation and administrative innovation. Technical innovation” as defined by Damanpour (1987) includes new products, services and new elements in the processes of production. Administrative innovation was measured with the following two items: the creation of new organizational structures for the management of people (and the building of new inter-organizational relationships. Illustrations of each type of innovation, using a case of higher education, were provided to help respondents better understand the questions. Exact scale items are illustrated in Table 2.

The frequency of each type of innovation was measured through questions, which asked respondents to indicate the number of times each type of innovation was implemented. Support for this approach was found in Shin (1996) who studied organizational innovation in human service organizations. For each innovation item, a continuous, metric scale ranging from 1-10

was provided for respondents to indicate frequency. The frequency of innovation was accepted as the number of times respondents respond positively to the innovation indicator. The study limited frequency to innovations that have occurred in the past three years (Shin, 1996).

Reliability Analysis

Cronbach's alpha was the coefficient used to estimate the reliability of the measurement scales Table 1.

Table 1

Cronbach's Alpha on Culture Types and Innovation Types

Scale	#items	Alpha	Sample item
Culture/Clan	3	.73	My institution is a very personal place. It is like an extended family.
Culture/hierarchy	3	.71	My institution is a very formal and structured place. People pay attention to procedures to get things done.
Culture/ad hoc	3	.82	My institution is a very dynamic place and entrepreneurial place. People are willing to stick their necks out and take risks.
Culture/market	3	.79	My institution is a very production oriented place.
Innovation/tech	5	.83	Create wholly new programs/services for students.
Innovation/Admin	2	.65	Create new organizational structure for the management of people.

All except Innovation/admin are above 0.70 which researchers generally deem to be adequate (Aiken 2000). However, Aiken (2000) reports that a test used to determine whether the

“mean scores of two groups of people are significantly different, a reliability coefficient of .60 to .70 may be satisfactory”.

Validity Analysis

Content factor validity was performed on the data using principal components analysis. In sum, principal components analysis of all subscales in the organizational culture scale and the organizational innovation scale confirmed the presence of six (6) subscales including: clan type, hierarchy type, adhocracy type, market type, technical innovation and administrative innovation. In other words, each subscale was uni-dimensional.

Table 2

Factor Loadings for Independent Variables (Subscales of Clan, Hierarchy, Adhocracy and Market) and Dependent Variable of Total Innovation (including subscales of Technical and Administrative Innovation)

Item	Factor Loading
Factor 1: Clan Type	
1. My institution is a very personal place. It is like an extended family.	.82
5. The glue that holds my institution together is loyalty and tradition.	.80
9. My institution emphasizes human resources. Morale is important.	.79
Factor 2: Adhocracy Type	
2. My institution is a very dynamic place and entrepreneurial place. People are willing to stick their necks out and take risks.	.85
6. The glue that holds my institution together is commitment to innovation and development.	.86
10. My institution emphasizes growth through developing new ideas. Generating new programs or services is important.	.87
Factor 3: Hierarchy Type	
3. My institution is a very formal and structured place. People pay attention to	.86

procedures to get things done.	
7. The glue that holds my institution together is formal rules and policies. Following rules is important.	.86
11. My institution emphasizes permanence and stability. Efficiency is important.	.63
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Factor 4: Market Type	
4. My institution is a very production oriented place.	.82
8. The glue that holds my organization together is an emphasis on tasks and goal accomplishment.	.85
12. My institution emphasizes outcomes and achievement. Accomplishing goals is important.	.84
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Factor 5: Technical Innovation	
1. Create wholly new programs/services for students.	.77
2. Convert existing programs/services into a recognizably different format.	.79
3. Extend programs/services to new groups of students previously not served by the institution.	.73
4. Incorporate new techniques/inputs in producing programs/services.	.79
5. Develop new practice, knowledge/theory in producing programs/services within a given technique and different mixes of the same input.	.78
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Factor 2: Administrative Innovation	
6. Create new organizational structure for the management of people.	.86
7. Build new inter-organizational relationships with other organizations.	.86

Note: $N = 922$

Results and Findings

Descriptive statistical analyses were conducted on the primary variables: dominant culture type, and organizational innovation. Table 3 reports the descriptive statistical analyses for culture type. Regarding Organizational Culture Type, the mean scores for the culture types ranged from 2.9169 to 3.8273 suggesting that the respondents, as a group, believe each culture type to be at least moderately descriptive of their institution. Among the four culture types, the mean score for the Clan type (mean = 3.8273) was the largest followed by Market (mean 3.4509), adhocracy (mean = 3.072) and hierarchy (mean = 2.9169).

In this study, primary emphasis was placed on classifying institutions by dominant culture type (e.g., clan, hierarchy, adhocracy, and market). Institutions reporting identical scores

on two or more dominant culture types were assigned the designation of “no dominant”. Thus, five (5) classifications of dominant culture type, not four (4) were identified and reported.

Four hundred sixty-four (464) institutions reflected a dominant culture type of Clan. Surprisingly, the next most frequently occurring culture type was “no dominant (n=199). Of the remaining major culture types, one-hundred twenty-six institutions (126) reflected a dominant culture type of market. Sixty-eight (68) institutions reflected a dominant culture type of adhocracy. The lowest frequency was the hierarchy type with sixty-five (65) institutions reflecting this type. As noted earlier, the institutions represented in the sample were diverse in terms of size.

Table 3

Descriptive Statistics for Institutions in the Sample

	<u>Mean</u>	<u>Range</u>	<u>SD*</u>
Characteristics			
<hr/>			
Culture Scores			
Clan	3.8273	1.0-5.0	.751
Hierarchy	2.9169	1.0-5.0	.725
Adhocracy	3.0720	1.0-5.0	.708
Market	3.4509	1.0-5.0	.502
	<u># of Institutions</u>		<u>%</u>
Dominant Culture Type			
Clan	464		50.3%
Hierarchy	65		7.0%
Adhocracy	68		7.4%
Market	126		13.7%
No Dominant	199		21.6%

*SD = Standard Deviation

** Number of Employees = SUM of Faculty, Staff and Administration

In addition, descriptive analyses were conducted for the primary variable, organizational innovation. As earlier noted, this study employed a conceptualization of organizational innovation similar to Perri 6 (1993) and identical to Shin (1996) that details types of organizational innovation: technical innovation and administrative innovation. Table 4 provides the descriptive analyses conducted on the both subscales.

Regarding technical innovation, of the five technical innovation subtypes “creating wholly new programs/services for students” had the highest frequency. In contrast, “extending programs and services to new groups of students previously not served by your institution” had the lowest frequency. Specific frequencies for each sub-type are summarized in Table 4.

Likewise, administrative innovation included two sub-types, “creating organizational structures...” and “building new interorganizational relationships”. As shown in Table 4, “creation of new organizational structures” was implemented 3.362 times by the institutions in the sample during the past three years.

As illustrated in Table 4, the combined frequency for the five subtypes of technical innovation was higher at 20.739 (mean = 4.18) than the combined frequency for the subtypes of administrative innovation at 6.993 (mean= 3.49). The subtype of “creating totally new services and programs” had the highest frequency rate while the subtype of “extending programs/services to new groups of students” had the lowest frequency.

Table 4

Frequencies and Distributions of the Two Types of Organizational Innovation for the Last Three-Year Period

Innovation Types	Number of times Implemented Mean (Range)
Technical Innovation	
Creating totally new services and programs.	5.024 (0-10)
Converting existing programs into new forms	4.315 (1-10)
Extending services/programs to new groups of students.	3.240 (0-10)
Incorporating new techniques/ inputs in producing programs.	4.849 (0-10)
Developing new practice knowledge theory in producing programs and services.	3.311 (1-10)
<u>Tot. Frequency* - Tech. Innovation (Mean)= 20.739 (4.18)</u>	
Administrative Innovation	
Creating new organizational structures	3.362 (0-10)
Building new inter-organizational relationships.	3.631 (0-10)
<u>Tot. Frequency* - Admin. Innovation (Mean) = 6.993 (3.49)</u>	

*Total frequency was calculated by adding the number of times each innovation was implemented.

As a major single dependent variable, the number of times that the seven subtypes of innovation were implemented was calculated to indicate the total frequency of organizational innovation for the three-year period. This assessment indicated that the mean frequency of total organizational innovation was 27.742 times. The highest frequency for an institution was seventy (70) times, while the lowest frequency was five (5) times. The descriptive statistics for this assessment are reported in Table 5.

Table 5

Descriptive Statistics for Total Frequency of Organizational Innovation

Descriptive Statistics	Total Frequency-Organizational Innovation
Mean	27.74
SD	12.33
Median	26.00
Range	65 (5-70)

Hypothesis Testing

This section reports the results of the hypothesis testing, which was conducted through a series of one-way analyses of variance (ANOVA). Three hypotheses were presented – one dedicated to the classification of dominant culture type and the others dedicated to the relationship between dominant culture type and organizational innovation. In summary, each of the hypotheses were supported (e.g., the null hypothesis was rejected).

Hypothesis 1 posited that there will be a difference in the mean scores assigned to the culture types of clan, hierarchy, adhocracy and market within a nationwide sample of accredited, four-year-plus, not-for-profit, private and public colleges and universities. A one-way analysis of variance (ANOVA) of these data produced an $F(3,3684) = 263.05, p = 0.000$, which is statistically significant at the .05 level.

The average scores for the different culture types of clan, hierarchy, adhocracy and market were not the same. Therefore, the null hypothesis was rejected. This finding supports the findings of similar studies (Cameron, 1986; Zammuto and Krackower, 1991; Smart and St. John,

1996 and Cameron and Quinn, 1999) that higher education institutions can be classified by dominant operating values.

In addition, a post-hoc analysis using Tukey's Honestly Significant Difference (HSD) reported a statistically significant difference between all pair-wise combinations.

Regarding Hypotheses 2 and 3, it was posited that a relationship existed between dominant organizational culture type and organizational innovation. Hypothesis 2 examined the influence of dominant organizational culture type on total innovation frequency, while hypothesis 3 examined the influence of dominant culture type on the frequency of two types of innovation – technical and administrative. As noted, support for both hypotheses was found (e.g., the null hypothesis for each as rejected), and results for each are presented in Table 6.

Table 6

One-Way ANOVA for Dominant Culture Types of Clan, Hierarchy, Adhocracy and Market on Total Innovation, Technical Innovation and Administrative Innovation

Innovation	Sum of Squares	df	Mean Square	F	p
Total Innovation					
Between Groups	8953.994	4	2238.499	15.656	.000
Within Groups	131112.600	917	142.980		
Technical Innovation					
Between Groups	5126.376	4	1281.594	15.273	.000
Within Groups	76945.717	917	83.910		
Administrative Innovation					
Between Groups	584.147	4	146.037	9.821	.000
Within Groups	13635.849	917	14.870		

The average scores for total innovation, technical innovation and administrative innovation were not the same for the 5 dominant culture types (e.g., clan, hierarchy, market, adhocracy and no dominant). Therefore, the null hypothesis for each was rejected. Since ANOVA does not indicate where statistically significant differences exist, a post-hoc, pairwise comparison using Tukey's Honestly Significant Difference (HSD) procedure was conducted. Results of the Tukey HSD analysis are illustrated in Table 7.

Table 7

Post Hoc Scores on Technical Innovation as a Function of Dominant Culture Type

Innovation **	<u>Participant Group*</u>									
	<u>CL</u>		<u>HI</u>		<u>AD</u>		<u>MK</u>		<u>ND</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
TO. INN	25.34 a,e,g	11.18	24.85 b,f,h	9.99	35.21 a,b,c,d	13.49	30.13 c,e,f	13.31	30.23 d,g,h	12.82
TE. INN	18.91 a,e,g	8.78	18.96 b,f,h	8.20	26.47 a,b,c,d	10.57	22.25 c,e,f	9.57	22.78 d,g,h	9.53
AD.INN	6.43 b,c,e	3.34	5.99 a,d	3.32	8.74 a,b	4.19	7.96 c	4.73	7.46 d,e	4.37

Note: Means in a row sharing subscripts are significantly different. For all measures, higher means indicate higher scores for technical innovation.

* Participant Group: CL = Clan; HI = Hierarchy; AD = Adhocracy; MK = Market; ND = No Dominant

**Innovation Type: TO. INN = Total Innovation; TE INN = Technical Innovation; AD INN = Administrative Innovation.

The mean frequency of total innovation, technical innovation and administrative innovation for institutions reporting adhocracy as the dominant culture type is significantly different from those reporting dominant culture types of clan, hierarchy, market and no dominant.

This finding supports the logic provided by the Competing Values Framework, which suggests that the adhocracy culture type emphasizes operating values for innovation (Cameron and Quinn, 1999). Second, the mean frequency of total innovation, technical innovation and administrative innovation for institutions reporting market as the dominant culture type is significantly different from the mean frequencies for those reporting dominant culture types of hierarchy and clan. The literature on organizational culture type supports this finding suggesting that the adhocracy and market culture types share similar operating values. So, it would be expected that the market culture type might be associated with higher innovation. However, this finding was not expected with regard to administrative innovation. Zammuto, Gifford and Goodman (2000) posited that innovations are likely adopted in a manner that maintains and reinforces existing culture. Since the scale items for administrative innovation represent internally oriented ventures for the institution, it was expected that the clan and hierarchy cultures (e.g., internally focused cultures) might report higher mean scores on administrative innovation.

Third, the mean frequency of total innovation, technical innovation and administrative innovation for institutions reporting “no-dominant” as the dominant culture type is significantly different from those reporting dominant culture types of hierarchy and clan. Since the clan and hierarchy culture types share the operating value for internal focus, it was not surprising that these cultures had lower mean scores on innovation than the other culture types. In addition, Cameron and Quinn (1999) suggest that some organizations require a balanced culture where similar emphasis is required on each of the four culture types. Thus, these findings suggested that specific culture types as well as a balanced culture (e.g., no-dominant) might facilitate innovation.

Discussion

It should be noted that the findings of this study were a result of a large sample size. Hair, Anderson, Tatham and Black (1998) provided a note of caution when dealing with large sample sizes. Specifically, “large sample sizes reduce the sampling error component to such a

small level that any small difference is regarded as statistically significant” (p. 352). Thus, caution is advised in interpreting the results of this study.

The results of this study support Blau and Scott’s (1961) contention that the informal organization (e.g., its culture) and the formal organization (e.g., size, type, etc.) are important elements in organizational operation. Regarding the informal organization, this study suggested that institutions of higher education, on average, describe themselves as having operating values of the clan culture. Related operating values include decentralized coordination and control, a primary focus on human resources and morale and operating values for flexibility. Thus, an analysis of dominant culture type concluded that most institutions report a dominant culture of Clan. This finding is consistent with previous findings of Cameron (1985) and Smart and St. John (1996) who also found that institutions of higher education most frequently report a dominant culture type of clan. However, regarding innovation, the operating values and process of the clan culture are only partly compatible with those associated with higher levels of innovation. The clan culture shares processes for flexibility and spontaneity with the adhocracy culture – the most innovative. However, the clan culture demonstrates internal values such as cohesiveness and loyalty and emphasizes morale and human resources. In trade, a natural de-emphasis of external concerns (e.g., competition) occurs as the focus of the clan culture is on the internal organization. The very nature of innovation assumes a focus on such external concerns, and thus, clan cultures encounter conflict in the adoption and implementation of innovations. On one hand, this finding does not bode well for institutions of higher education as it suggests that many do not have the operating values and processes compatible with innovation. However, administrators of “clan” institutions who also desire higher levels of innovation may use the findings of this study to encourage operating values and implement processes that are compatible with innovation (e.g., the adhocracy culture).

Although the clan score, on average, was highest for most institutions, results indicated that institutions of higher education balance competing values from each of the remaining quadrants – hierarchy, adhocracy and market. However, many institutions reported no

dominant culture type. It was concluded that many institutions in the sample emphasize multiple and sometimes competing culture types. Regarding organizational innovation, this finding may not bode well for institutions of higher education. In instances where operating values in competing quadrants are dominant (e.g., institutions with dominant scores on “clan” and “market”, or dominant scores on “hierarchy” and “adhocracy”) internal conflict is likely. The presence of such conflict likely diminishes the capacity of an institution to identify common needs and reach agreement on responding to them. Cameron (1985) suggested that administrators should be sensitive to the variety of cultures that exist in their organizations. Thus, the opportunity for administrators of higher education is in gaining clarity about the organizational cultures within their institutions and managing the contradictions and incongruencies within them.

Regarding organizational innovation, it was concluded that institutions of higher education implement technical innovations more frequently than administrative innovations. In particular, “creating wholly new programs and services”, an externally oriented venture occurred with the greatest frequency. It was concluded that institutions of higher education are responding to pressures for innovation by implementing technical innovations, in particular, the creation of new programs and services.

In general, the results of this study suggest that organizational culture type is related to organizational innovation. In particular, the dominant culture type of adhocracy is affiliated with higher total organizational innovation, higher technical innovation and higher administrative innovation more than the culture designations of market, hierarchy, clan and “no-dominant”. Higher education institutions that have operating values for growth and innovation, and processes that promote flexibility and spontaneity appear to implement innovations more frequently than others. However, only 7.4% of the sample reported having a culture – the adhocracy - with these operating values. This finding is consistent with other empirical studies by Cameron (1985) and Smart and St. John (1996) who also found limited presence of such operating values in institutions of higher education. This finding clearly establishes a link for administrators of

higher education institutions who are interested in diagnosing and managing their institution's culture toward innovation.

Implications

Despite some limitations, this study provides implications for higher education administrators. First, organizational culture was conceptualized as “how things are done around here” which enabled extraction of operating values and process and eventually the classification of organizational culture type. Classification of organizational culture type found that the clan culture remains the most frequently identified culture. However, the market culture type has replaced the adhocracy as the second most frequently occurring dominant culture type, which implies that more institutions are operating with dominant values toward competition and goal achievement. Many institutions in the sample were assigned to a category where more than one dominant culture type was identified. In these instances, many institutions are balancing critical and often competing values for human resources, rules, entrepreneurship and goal achievement. Cameron and Quinn (1999) suggested that effective organizations are able to behave in flexible and sometimes contradictory ways. In general, higher education administrators should respond by emphasizing operating values and promoting an organizational culture that is compatible with the operating environment.

Scholars in higher education have expressed concern for survival in the midst of an ever-changing and turbulent operating environment. This environment, characterized by increasing competition, regulatory barriers, and decreasing enrollments faces pressure for innovation. Based on the findings of this study, institutions of higher education are responding to such pressure by adopting innovations. In particular, institutions implement more technical innovations than administrative innovations.

For administrators seeking to understand the role of organizational culture in their organization, this study provides a reasonable basis for connecting culture to organizational phenomena such as innovation. This study suggests that culture types of adhocracy, market and

“balanced” (e.g., no-dominant) are associated with innovation implementation. Since educational institutions are both a source of supply and demand for innovations, higher education institutions will likely face ongoing pressure for innovation. The results of this study suggest that certain culture characteristics (e.g., operating values and processes) are associated with innovation implementation. An awareness of these cultural characteristics might enhance organizational efforts toward innovation implementation.

Limitations of the Study

The findings and results of this study need to be reviewed critically in light of several limitations. Several primary limitations exist regarding the large sample size, the nature of the questionnaire design, the subjective nature of the data, selection of respondents, and reliability.

The primary limitation in this study is the large sample effect. It should be noted that the findings of this study were a result of a large sample size. Hair, Anderson, Tatham and Black (1998) provided a note of caution when dealing with large sample sizes. Specifically, “large sample sizes reduce the sampling error component to such a small level that any small difference is regarded as statistically significant” (p. 352). Thus, caution is advised in interpreting the results of this study.

In addition, this study involves the cross-sectional, self-administered questionnaire design, which was used for collecting the data. The shortcoming of this method is that these estimations are retrospective and subjective. In addition, this study compared dominant culture type and the frequency of organizational innovation at one point in time. This approach is limited in its ability to detect causal relationships (King and Anderson, 1995).

Lastly, one additional limitation of this study was the reliability of the measurement for administrative innovation. This measurement, adopted from Shin (1996) yielded an internal consistency coefficient of .6520. Having only two (2) items in the scale, this internal consistency could be acceptable in some sense. In other words, deletion of either item did not increase the internal consistency coefficient.

Recommendations for Future Research

Beyond the limitations and scope of this research, several opportunities for research exist. One opportunity for future research exists with examination of the variables noted in this study. One purpose of this study was to perform a very basic exploration of innovation in the higher education domain. Data were collected on organizational size, organizational type and organizational culture. However, this study did not include investigation into the relationships of organizational size and type. Since no attempt was made to investigate these variables and the interaction among them with regard to innovation, future research should include such.

In addition, future studies examining organizational culture in higher education should include multiple participants representative of the critical factions in higher education. Inclusion of department heads, presidents, various vice presidents, student government representatives and trustees will enhance efforts to obtain a meaningful assessment of organizational culture. In addition, the domain of higher education is an area ripe for examination of organizational sub-cultures. Inclusion of other participants in higher education studies would provide a meaning contribution to the literature on the operation of institutions of higher education.

In general, this study sought to introduce organizational culture into studies on organizational innovation. This study established that frequency of organizational innovation could be attributed to organizational culture type. It would be helpful to identify the culture characteristics that predict frequency of organizational innovation. Since culture should match the demands of the competitive operating environment, it seems reasonable to understand what culture characteristics match the demands of and facilitate an innovative environment. Many sectors in the economy face pressures for innovation, and yet little is understood about the role culture has in fostering organizational innovation.

Next, research opportunities exist for understanding organizations that reveal a balanced (e.g., no-dominant) organizational culture type. The literature supports this designation and further notes that successful organizations often have no particular dominant culture type (Cameron and Quinn, 1999). Institutions were assigned the designation of “no-dominant” where

similar emphasis was given to two or more culture types. Since multiple and competing culture types were frequent in this study, it could be the case that significant internal conflict is present in many institutions of higher education. Since internal conflict has been long regarded as a hindrance to innovation, it could be beneficial to innovation research to understand the role of competing cultures and their influence on innovative behavior.

Lastly, opportunities exist for understanding the strength of culture type. In this study, no distinction was made between strength within a particular culture type. For example, strong cultures are associated with homogeneity of effort, clear focus and higher performance (Cameron and Quinn, 1999). It seems reasonable and prudent to understand the role that culture strength has in meeting the demands of an innovative environment.

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