

# INTERNATIONAL JOURNAL OF THE ACADEMIC BUSINESS WORLD

## CONTENTS

<b>Accounting and Reporting Convergence</b> <i>Mary Fischer &amp; Treba Marsh</i> .....	1
<b>Performance Analysis between IPv6 and IPv4: Voice over IP Implementation in Campus Network</b> <i>Mohd Nazri Ismail</i> .....	11
<b>Civilization in the Balance: A Comparative Validation of Hofstede and GLOBE Cultural Dimensions Against the Toynbee-Huntington Civilization Model</b> <i>Richard Steven Voss</i> .....	21
<b>The Impact of Organizational Context on Turnover and Job Satisfaction: A Multi-Analysis Study of Bank Employees</b> <i>Monica J. Parzinger, Mary A. Lemons, &amp; Karen McDaniel</i> .....	39
<b>Cloud Computing: Differences in Public and Private Sector Concerns</b> <i>Bryan K. Hasty, Gregory M. Schechtman, &amp; Michael Killaly</i> .....	51
<b>Institutions and Momentum</b> <i>Xiuqing Susan Ji</i> .....	63
<b>Fractal Vertical Polarization: Definition and Nomological Elaboration of a Complexity-Based Theory of Organizational Power and Dissonance</b> <i>Roger Alan Voss &amp; Dennis W. Krumwiede</i> .....	69
<b>A Case Study in Marketing Communications: Traditional vs. E-media Advertising</b> <i>Rand Wergin &amp; Richard Muller</i> .....	85
<b>Deconstructing "Personal Privacy" in an Age of Social Media: Information Control and Reputation Management Dimensions</b> <i>Jo Ann Oravec</i> .....	95
<b>Studies on the International Diversification</b> <i>Hong Rim &amp; Robert Setaputra</i> .....	105



**INTERNATIONAL JOURNAL OF THE  
ACADEMIC BUSINESS WORLD**

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# ACCOUNTING AND REPORTING CONVERGENCE

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## ABSTRACT

*The Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have been working to eliminate differences between US accounting rules and international financial reporting standards (IFRS). The FASB has undertaken initiatives such as joint projects, short-term conversion projects, monitoring IASB projects, convergence research projects and others as initiatives to further convergence. The primary problems with convergence are the lack of requirements or guidance that currently exist between IFRS and generally accepted accounting principles (GAAP), the large number of differences such as definition, recognition, measurement, presentation and disclosure differences and the costs to eliminate these differences.*

*Even with convergence, a single set of global accounting standards will continue to be subject to change as the IASB has an ongoing history of revising or changing their pronouncements. Given this history, multinational accountants must be vigilant to stay current with IFRSs.*

## INTRODUCTION

Since 2002, FASB and the International Accounting Standards Board (IASB) have been working to eliminate differences between U.S. accounting rules and international financial reporting standards (IFRS). At a 2002 meeting in Norwalk, Connecticut, the FASB and IASB pledged to use their best efforts to (a) make their existing financial reporting standards fully compatible and (b) to coordinate their work programs to ensure that once compatibility was achieved, it would be maintained (FASB 2008). This memorandum of understanding (Norwalk Agreement) formalized the Boards commitment to converge US and international accounting standards. In September 2008, the Boards update their memorandum of understanding to affirm the plans and commitment to develop a common set of high quality standards that they believe would improve the quality, consistency and comparability of financial information for investors and capital markets around the world.

The FASB has undertaken six initiatives to further the convergence goal (FASB 2008).

1. *Joint Projects.* Joint projects with IASB involve sharing staff resources and working on a similar time schedule. Revenue recognition and business combinations are but two of the current issues addressed by joint projects
2. *Short-term convergence project.* This is an active agenda project conducted jointly with the IASB and FASB to remove a variety of existing differences. The project scope is limited to differences in which high-quality solutions appear likely to be achieved in a short-term.
3. *Liaison IASB member.* A full-time IASB member is in residence at the FASB offices. James Leisenring, a former FASB

Board member, is the IASB member currently serving the liaison role. Dr. Leisenring's presence at FASB facilitates information exchange and cooperation between the Boards.

4. *Monitoring IASB projects.* The IASB projects are monitored based on the FASB's level of interest in the project. Active project include business combinations, liability and revenue recognition, and reporting comprehensive income.
5. *Convergence research projects* The Board staffs are currently working on four major convergence projects including conceptual framework, business combinations and consolidations, financial statement presentation, and revenue recognition. Projects currently on the agenda that will ultimately result in new guidance being issued include leases, liabilities and equity distinctions, and derecognition. Projects that have resulted in SFAS guidance with IFRS guidance still under development include fair value measurement and postemployment benefits. In addition, the 500-page second edition of a comprehensive comparison of IFRS and FASB Generally Accepted Accounting Principle (subsequently referred to as GAAP) is available that compares both IASC standards and GAAP though 1998 (FASB 1999).
6. *Consideration of convergence potential in board agenda decisions.* All topics considered for addition to FASB's agenda are assessed for the potential cooperation with the ISAB.

Given these initiatives, significant convergence progress has been achieved. However, one of the more difficult projects is revenue recognition. Apparently more than 160 pieces of authoritative literature exists that relates to how and when companies record revenues (Johnson 2008). Other advances have been achieved on the ac-

counting and reporting of share based payment, leases, nonmonetary asset exchange, and fair value reporting of equity or liability instruments issued.

Many multinational executives are pressuring the SEC to keep the global-standards movement on the fast track. To that end, the SEC now allows foreign companies to submit their IFRS-prepared filings without reconciling them to GAAP. This eliminates the extra work and costs of adhering to GAAP as well as IFRS accounting rules. In August 2008, the SEC voted to publish for public comment a proposed roadmap that could lead to the voluntary or mandatory use of IFRS by all US issuers beginning in 2014. Under this plan, about 110 companies could start following international rules even earlier. The proposed plan sets out several milestones that, if achieved, could result in a common accounting language to give investors greater comparability and transparency of financial reports worldwide. Based on the comments and other outcome, the SEC intends to make a decision in 2011 regarding the adoption of IFRS in its totality (WSJ 2008).

#### **TYPES OF DIFFERENCES BETWEEN IFRS AND US GAAP**

A total of 41 international accounting standards (IAS) have been issued. Of that number, twelve have been superseded or withdrawn. The remaining 29 standards have been revised one or more times with 19 revised within the past eight years. In addition to the IAS pronouncements, eight International Financial Reporting Standards (IFRS) have been issued. These 37 standards comprise international accounting guidance and are subsequently referred to as IFRS. There are numerous types of differences between IFRS and GAAP that can be classified into the following areas.

1. *Definition differences* exist though out the guidance even though the IFRS and GAAP concepts are similar. These differences can lead to recognition or measurement differences.
2. *Recognition differences* arise from recognition criteria and/or guidance related

to whether an item is recognized or not, how it is recognized and when it is recognized which would result in a timing difference.

3. *Measurement differences* result from the amount recognized based on the different method/model used or difference in the guidance for applying a similar method. An example would be the one step versus two-step method for determining asset impairment.
4. *Alternatives* exist when the standard allows for a choice between two or more alternatives such as fair value determination (i.e., market, cost or income methods).
5. *Lack of requirements or guidance* will produce differences when either IFRS or GAAP does not address an issue that is covered by the other's guidance.
6. *Presentation differences* exist due to terminology required in the financial statements including classifications, sections and account types.
7. *Disclosure differences* are significant as IFRS and GAAP require a different set of notes to the financial statements. This is primarily related to whether a disclosure is required or not, and the format/manner of the information required to be disclosed.

### GUIDANCE COMPARISON

In general, IFRS standards are much less detailed (principle based) than GAAP/FASB standards (rule-based) as GAAP frequently sets forth prescribed and detailed guidance. US standard setters often develop and publish implementation guides whereas IFRS does not. Given that FASB and IASB have an ongoing convergence project, in time fewer differences will result between the two sets of accounting guidance. Meanwhile, the following is a discussion of specific recognition and reporting differences between current GAAP and IFRS.

## FINANCIAL STATEMENTS

### Balance Sheet

The balance sheet is a required statement by both GAAP and IFRS. IFRS does not require a specific format for the balance sheet. The presentation should classify each section as current and non-current unless the liquidity presentation is more appropriate. Specific items and entity components are required by IFRS in contrast to GAAP.

Minority interest presentation differences will be eliminated with SFAS 160 that requires minority interest to be presented in the equity section.

### Income Statement

IFRS does not have a prescribed format but there are six required elements – revenue, finance costs, profit and loss from associates and joint ventures, tax expense, discontinued operations and the bottom line (profit or loss). Expenses may be presented by natural classification or by function. If functional display is used, depreciation, amortization and employee benefit expenses must be displayed separately.

GAAP uses a single step or multi-step format and SEC requires public companies to present expenses by function.

IFRS prohibits items from being presented as extraordinary on the face of the statement or in the notes.

IFRS does not use the term 'other comprehensive income' but does include all changes to owner's equity that are not transactions with owners. However in 2009 as a convergence effort, a revised IFRS will require a company to present either a combined statement of profit and loss followed by components of other comprehensive income, or two separate statements.

IFRS reports 100% of the subsidiary's income on the face of the parent's income statement as contrasted to GAAP. SFAS 160 minimizes the difference with 100% of the subsidiary's income being reported in net income. Earnings related to the minority interest will be subtracted on the face of the statements.

## Statement of Cash Flows

Both GAAP and IFRS provide information about historical changes in cash and cash equivalents and classify cash flows according to operating, investing and financing. Both define cash and cash equivalents in a similar fashion except IFRS requires bank overdrafts to be reported as cash and cash equivalents where GAAP does not.

IFRS requires entities to separately disclose interest and dividends received and paid as well as separately disclose income taxes. Classification of interest and dividends either paid or received is prescribed by GAAP. Whereas IFRS allows them to be reported in either of two categories (operating vs investing or investing vs financing) providing the classification is consistent over time.

## SPECIFIC ACCOUNTS

### Cash and Cash Equivalents

Both IFRS and GAAP define cash and cash equivalents in a similar fashion. Both include cash on hand, demand deposits and short-term investments that mature within 90 days. GAAP further requires that the short-term investments have an original issue date of 90 days or less. The difference between the two is the classification of bank overdrafts. IFRS includes them in cash and equivalents while GAAP requires bank overdrafts to be reported as a liability.

### Receivables

Loans and receivables is one of four financial asset categories required by IFRS to be displayed on the face of the balance sheet. A similar category does not exist under GAAP. IFRS defines this category to include accounts/trade receivables, loans receivable and loans to other entities. IFRS requires that receivables be measured initially at fair value. Subsequently, the accounts are reported at amortized cost using the effective interest method. With the implementation of SFAS 157, GAAP reporting will require fair value reporting that will create another difference with IFRS.

GAAP and IFRS have similar requirements for recording uncollectible accounts receivable and

both require the use of the allowance method. The only difference between the two pertains to terminology such as *provision for* versus *allowance for* doubtful accounts.

Both IFRS and GAAP require the recognition of any impairment to receivables. IFRS allows for the reversal of recognized impairment whereas GAAP prohibits the reversal of impairment loss.

GAAP and IFRS have similar conceptual requirements for the sale of receivables. However, the derecognition model under IFRS tests for risks and rewards first followed by a control test whereas GAAP only tests for control before removing the receivable from the financial statement.

### Inventories

GAAP and IFRS define inventories in a similar manner and initially record the acquisition at cost. IFRS allows design cost to be recognized as a part of the cost while GAAP does not. Both GAAP and IFRS allow the FIFO and weighted average costing method while IFRS prohibits the use of the LIFO method. Additionally, both IFRS and GAAP allow the use of standard cost and retail methods as long as the results are comparable to actual cost.

According to GAAP and IFRS, the reported value of inventory should be reduced if the value declines below the original cost. IFRS requires the reduction to be measured at the *lower of cost and net realizable value* while GAAP requires the measure to be *lower of cost or market*. Unlike IFRS, GAAP prohibits the reversal of write downs if replacement cost subsequently increase. However with the implementation of SFAS 157 recognition that requires all assets and liabilities to be reported at fair value, if the fair value of the inventory has increased an adjustment will be recognized.

### Investments

IFRS definitions of financial instruments are consistent with GAAP. However, IFRS identifies four categories versus the GAAP three. The four categories include (1) financial assets at fair value, (2) held to maturity, (3) loans and receivable, and (4) available for sale. GAAP requires

loan and receivables to be classified separate from the investment category.

GAAP requires investments to be recognized and reported using fair value. IFRS requires fair value to be used to measure categories 1 and 4 while amortized costs are to be used to measure (2) held to maturity and (3) loans and receivables. IFRS prohibits transfers among the four categories while GAAP allows transfers to be made using fair value determination.

GAAP prohibits the reversal of impairment losses while IFRS reverses impairment losses when certain conditions have been met.

### Property, Plant and Equipment (PP&E)

Currently historical cost is the basis for recording property, plant and equipment under GAAP and IFRS. With the implementation of SFAS 157, GAAP will revalue PP&E using fair (exit basis) value. IFRS allows the use of historical cost or a revalued amount such as fair value at the date of revaluation less any impairment losses and subsequent depreciation. Different terminology is applied as IFRS uses the term *revaluation surplus* for reporting either the increase or decrease in fair value recognition. GAAP recognizes fair value *unrealized gains* and/or *losses* at the gross amount and does not allow the display of a net amount.

IFRS considers exchange rate differences from foreign currency to be borrowing costs. Under IFRS, these and other PP&E borrowing costs are capitalized but not allowed recognition by GAAP. The IFRS guidance is presently being revised to require capitalization of borrowing costs related not only to the acquisition but also to construction or production costs of a qualified asset. GAAP allows only the capitalization of interest costs incurred during construction.

Both GAAP and IFRS require the recognition and recording of depreciation on a systematic basis. IFRS requires the estimates of useful life, residual value and the method of depreciation be reviewed on an annual basis. GAAP only requires review when events or circumstances indicate that the current estimates and depreciations methods are not appropriate.

GAAP and IFRS have different policies regarding depreciation of asset components. IFRS requires component depreciation if components of an assets have differing patterns of benefits such as useful lives.

IFRS considers an asset to be impaired when its carrying value is greater than the higher of the asset's value determined by the discounted present value of the asset's expected future cash flow or the asset's fair value less selling costs. GAAP considers an asset to be impaired when its carrying value is greater than the undiscounted expected future cash flow. The amount of impairment loss recognized under GAAP is measured using a two-step discounted cash flow model. Any reversal of the impairment is prohibited by GAAP but required by IFRS.

### Intangible Assets

With the implementation of SFAS 157, GAAP and IFRS will report intangible assets with finite lives at their fair value less accumulated amortization and impairment. According to IFRS, intangible assets with indefinite lives are not amortized but carried at historical cost less any impairment. SFAS 157 amended the accounting for intangible assets with indefinite lives to be reviewed periodically and reported at their fair value with any recognized impairment or unrealized gain reported via the income stream.

A significant difference exists between GAAP and IFRS concerning the recognition of internally generated intangibles. GAAP requires that research and development costs be expensed as incurred. Separate rules apply for the development costs of computer software and websites. IFRS recognized the costs associated with the creation of intangible asset as associated with the development or research phase. The research phase costs are required to be expensed. The development phase costs are treated by IFRS in a comparable fashion to the GAAP recognition of computer software. That is, all costs related to the creation, production and preparing the asset are capitalized. Marketing, training and selling costs are expensed as incurred. Neither GAAP nor IFRS recognize internally generated goodwill, brands, customer list or similar items as intangible assets.

Both GAAP and IFRS test intangible assets for impairment on an annual basis. However, the IFRS uses the cash-generating unit level for impairment testing while GAAP utilizes the reporting unit level. The cash generating unit is the smallest identifiable group of assets that generate cash inflows and are independent from other assets or groups of assets. The reporting unit is an operating segment for which management regularly reviews financial information. In some situations, these units are quite different and produce significant recognition differences. The IFRS also uses a one-step process rather than the two-step recoverability test/impairment assessment required by GAAP.

### **Current Liabilities**

For the most part, GAAP and IFRS accounting for current liabilities are comparable. Refinanced short-term debt, amounts payable due to bond covenant violation and bank overdrafts are the exception. As discussed in the cash section, IFRS requires bank overdrafts to be classified as part of the cash and cash equivalents while GAAP requires that they be reported as current liabilities.

GAAP requires that refinanced short term debt be reported as long-term debt if a refinancing agreement has been completed before the financial statement date while IFRS requires the debt to be a part of current liabilities unless the refinancing process has been completed.

If debt become payable due to a debt covenant violation, GAAP requires the amount to be classified as a current liability unless a year long waiver is obtained from the lender before the financial statement date. FASB and ISAB are discussing this difference as part of the ongoing financial statement presentation project.

### **Contingent Liabilities**

Both GAAP and IFRS recognize a contingent liability when a loss is probably and can be measured. However, IFRS recognizes the liability at the mid-point of the estimates while GAAP uses the low end of the estimate. Thus, there is a significant threshold and measurement objective difference.

### **Pensions and Other Postemployment Benefits**

Thanks to the long effort toward convergence, few differences remain between IFRS and GAAP. Ongoing revisions are currently underway. Both GAAP and IFRS use the corridor approach to determine income/losses to be recognized in the income statement. However slight differences exist in where the amounts outside the corridor are reported – comprehensive income for GAAP and other income for IFRS.

### **Leases**

Lease recognition is similar between IFRS and GAAP. Both currently have four criteria that must be met to record a capital lease. IFRS has a fifth indicator for a finance lease that is not specified by GAAP, The IFRS fifth criteria states that leased assets are of a specialized nature and are only usable by the lessee unless substantial adjustments are made to the asset. In addition, IFRS has other criteria that could lead to the lessor recording a finance lease. The primary difference between IFRS and GAAP is the GAAP provides specific guideline where as the IFRS provides principle guidance.

Lease recognition is currently on both IFRS and FASB's agenda. As of summer 2008, they had agreed to incorporate the language that only when the risks and rewards to ownership are not transferred from the lessor to the lessee could an operating lease be recognized. This change is expected to reduce the number of off-balance sheet operating leases currently being recorded.

### **Income Tax**

IFRS and GAAP recognition has similar recognition guidance for deferred taxes created by timing differences between book and tax rules. The presentation can, however, be different. IFRS classified deferred income tax payable only as noncurrent liabilities. GAAP classifies the deferred tax asset or liability based on the classification of the related asset or liability. IFRS is expected to issue a revision to its guidance to conform to GAAP.

When noncurrent assets are revalued under IFRS, it often results in a temporary deferece

between the book and tax bases. The deferred tax resulting from the IFRS revaluation is recognized as a change in equity. With the implementation of SFAS 157, GAAP will be recognizing unrealized gain/losses resulting from the fair value determination of noncurrent assets as an income change.

### **Long-term Liabilities**

SFAS 150 specifies certain conditions that equity instruments must be classified as liabilities. These conditions include mandatory redemption, obligation to repurchase of obligations that require issuing equity shares. Conversely, IFRS focuses solely on the substance of the transaction. Although this guidance is somewhat complex, there is a selective difference. For financial instruments that are conditionally redeemable, IFRS classifies the amounts as liabilities while GAAP classifies the instruments as equity. If the redemption event occurs, the fair value of the instruments would be reclassified as a liability according to GAAP.

Convertible debt instruments also are an area of difference. IFRS requires split accounting between liabilities and equity whereas GAAP requires that they be recognized as liabilities.

IFRS does not permit curing of debt covenant violations after the fiscal year end.

### **Stockholder Equity**

The primary difference between IFRS and GAAP for the measurement and display of equity is terminology. That is, different terms are used for display. For example, GAAP's common stock is displayed as Share capital in IFRS. Additional paid in capital reported in GAAP statements is displayed as Share premium in IFRS presentations. IFRS used the term general reserve and other reserve accounts while GAAP.

## **OTHER ITEMS**

### **Revenue Recognition**

This is a significant area of differences between IFRS and GAAP. GAAP guidance is incorporated in standards, emerging topic guidance,

statements of position and other old guidance. To bring all of these into convergence with IFRS will be a major effort which is currently underway at the two Boards. It is anticipated that convergence may be possible by 2011 mean while revenue recognition differences will continue.

A specific area of difference between IFRS and GAAP is construction contracts. IFRS requires the percentage-of-completion method unless the outcome cannot be estimated. For GAAP, the percentage-of-completion is preferred but not required. GAAP allows the completed contract method while IFRS prohibits the use of the completed contract method.

Service revenue for IFRS is typically accounted for using the percentage-of-completion method. The straight-line method may be used if the services occur over a specified period of time. For GAAP, companies follow appropriate industry guidance for services revenue.

IFRS does not specifically address multiple-element arrangements therefore recognition is evaluated for each component part. For GAAP, a transaction must meet ETIF 00-21 criteria to be divided into separate elements for recognition. Software industry specific guidance also establishes criteria for multiple element recognition.

### **Accounting Changes**

With the issuance of SFAS 154, IFRS and GAAP guidance regarding the treatment of accounting changes and error corrections are converged. Both account retrospectively for prior period error when they are uncovered. Comparative information should be restated for the period in which the error existed or the beginning balance amended for the earliest period presented.

When new accounting guidance is adopted changes are made in accordance with the transitional directions in the guidance. Like error correction, both IFRS and GAAP account retrospectively for prior period error when they are uncovered. Comparative information should be restated for the period in which the error existed or the beginning balance amended for the earliest period presented.

Both IFRS and GAAP account for a change in estimate, such as depreciation for an existing asset, in a prospective fashion.

### **Segment Reporting**

With the issuance of IFRS 8, the significant differences between IFRS and GAAP have been eliminated. Two minor differences still exist. One, GAAP requires companies with a matrix form of organization to report segments based on products or services. IFRS allows these firms to use whichever criteria produces the most useful information for the financial statement user. Second, both IFRS and GAAP require disclosure of segment liabilities but GAAP requires the disclosure of liabilities only if that information is provided to the decision maker for evaluation purposes.

IFRS differs from GAAP regarding related party transaction by requiring disclosure of the compensation of key management personnel. SEC requires this information for publicly traded companies but GAAP does not require the information for either public or private companies.

### **Specialized Industries**

IFRS has few, if any, specific guidance for special industries. It does, however, provide general guidance for government grants, agriculture, bank reporting, extractive industries and insurance. GAAP does not address government grants or agriculture but there is specific guidance for certain industries such as oil and gas. Secondary guidance for specialized industries is provided by AICPA guides and SOPs.

### **Off-Balance Sheet Transactions**

IFRS is generally more difficult as the key consideration is whether the company exercises effective control. Synthetic leases and special purpose entities are primary examples of these differences as they are reported off-balance sheet by GAAP but on the financials per IFRS.

## **THE FUTURE**

The prospect of US compliance with IFRS raises significant pedagogical, research and implementation issues.

When considering the pedagogical issue, the question becomes how colleges and universities should integrate the study of international reporting standards into the accounting curriculum? Should it be integrated within all classes or would a stand-alone course be more appropriate? What are the advantages of breaking international reporting into disciplines as accounting curriculums are currently offered? Should IFRS be limited to the accounting discipline or should a working knowledge of IFRS be offered to the general student body in nonaccounting classes? For after all, managers will be required to read and analyze financial statements created using IFRS during their professional careers. A related topic that must be addressed is what to do about textbooks and teaching materials. Other than those textbooks specifically written for a single stand-alone international accounting class, few textbooks currently address IFRS. Until textbooks integrate international standards, accounting instructors will be forced to supplement their materials with handouts, discussion questions, quizzes, and problems.

The research implications of international standards are extensive. How will the multinational companies go about converting to the international guidance and at what cost? How will the markets and analysts use earnings numbers generated by the IFRS? For example, a small study of 2006 earnings found the IFRS standards produced greater earnings ranging from 9 to 530 percent (Johnson 2008). Another study of 137 companies found earnings under IFRS would increase 63 percent while 34 percent would report less than GAAP and only three percent would be unchanged (Henry 2008). What about the asymmetry that could be created when one party involved in a contracting arrangement uses IFRS and the other GAAP? What about the earnings management? If IFRS reporting is optional rather than mandated, what will result? All of these questions become valid research topics and ones that must be answered for a clear understanding of the consequences of the convergence. One can only imagine a plethora of dissertation findings



that will become available in the near-term that investigate these and a whole range of other related questions.

As to the implementation issues, those will become the burden of multinational organizations. How expensive will it be and how long will it take? The large accounting firms will not estimate the costs but do admit that it will not be inexpensive (Johnson 2008). By reviewing the cost and time consumed by their European counterparts, some executives are anticipating the costs to be five percent of their revenue in the first year of switching to IFRS. As for timing, they estimate that installing a new, IFRS-based accounting system will take from 18 to 24 months to complete and require extensive training in the new accounting language and relationship with outside groups including bondholders, banks and credit-rating agencies.

To date, a vast amount of material has been written about international financial reporting standards, their background, features and implementation issues. A Google.com search of IFRS produced 4,840,000 items. When the search was narrowed to IFRS vs GAAP, 1,170,000 items were listed. Appendix A is a short list of www addresses where additional information can be obtained and is not meant to be all inclusive as new material is being posted daily.

## CONCLUSION

It is widely acknowledged that IFRS use a principle-based approach rather than the GAAP rule-based approach. This principle-based guidance is derived from the IASB *Framework* that established recognition, measurement and reporting requirements. By using this approach, IFRS tend to limit guidance for applying the general principles to typical transactions and encourages professional judgment in applying general principles to transactions specific to the entity. In contrast, GAAP detailed guidance encourages a rule-based mentality that encourages professional to find ways around the guidance when it does not address a specific aspect of a given transaction. Even so, multinational organizations claim to be tired of using more than one accounting system for regulatory purposes as they must now maintain two sets of records. Another possible conver-

gence benefit is more often than not, a company's earnings are higher under the international standards (Johnson 2008).

The primary problem with convergence is the large number of differences that currently exist between IFRS and GAAP and the incredible costs to eliminate them. It is not clear that the cost outweigh the benefits. Opponents to convergence argue that it is unnecessary to require all worldwide companies to follow a common set of accounting recognition and reporting rules as some would be forced to comply with guidance that is not relevant. For after all, a well-developed capital market currently exists that evolved without uniform accounting guidance (Goeltz 1991). Others argue that because of different environmental influences, differences in accounting might be appropriate and in fact, necessary.

Given the pros and cons, the prospect of US adoption of IFRS did not occur overnight. During the past six years, FASB and the IASB have been working to eliminate the differences between US accounting rules with international financial reporting standards. The convergence is progressing to the delight of those who favor a single global accounting and reporting guidance. Many SEC observers expect the agency to eventually scrap GAAP and initiate a mandatory conversion to IFRS for publically traded organizations. For after all, a global set of accounting standards would improve consistency among regulators, capital markets and the investment community. However, such a convergence would create four authoritative sets of guidance in the US that accounting professional would be obligated to understand and apply: IFRS guidance for publically traded organizations, FASB GAAP for nonprofit and nonpublic organizations (i.e., partnerships and sole proprietorships), Governmental Accounting Standards Board (GASB) GAAP for state and local government organizations, and Federal Accounting Standards Advisory Board (FASAB) guidance for the federal government and its agencies.

Even with convergence, a single set of global accounting standards will continue to be subject to change. The IASB has an ongoing history of revising or changing their pronouncements. Given this history, multinational accountants must be alert to stay current with IFRSs.

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## APPENDIX A

- [www.ifrs.com](http://www.ifrs.com) (click on IFRS summaries)
- [www.aaahq.org](http://www.aaahq.org) (click on commons – requires AAA membership [www.kpmgifs-institute.com](http://www.kpmgifs-institute.com))
- [www.pwc.com](http://www.pwc.com) (search for their publications)
- [www.pwc.com/usifrs](http://www.pwc.com/usifrs)
- [www.ey.com](http://www.ey.com) (search for global)
- [www.grant\\_thornton.com](http://www.grant_thornton.com)
- [en.wikipedia.org/wiki.ifrs](http://en.wikipedia.org/wiki/ifrs)
- [www.fasb.org/intl/convergence](http://www.fasb.org/intl/convergence)
- [www.ifrsaccounting.com/ifrs-gaap](http://www.ifrsaccounting.com/ifrs-gaap)
- [www.Deloitte.com/us](http://www.Deloitte.com/us)
- AICPA ([www.ifrs.com](http://www.ifrs.com))

# PERFORMANCE ANALYSIS BETWEEN IPV6 AND IPV4: VOICE OVER IP IMPLEMENTATION IN CAMPUS NETWORK

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## ABSTRACT

*In this research, we propose an architectural solution to implement voice over IP services over IPv6 in campus environment network. IPv6 is considered to be the next-generation Internet protocol. Therefore, this study is to analyze the VoIP performance and measure Quality of Service (QoS) delivered by IPv6 and IPv4. This study focuses on quality of voice such as packet loss, delay time and jitter and CPU utilization over IPv4 and IPv6 through soft phone. VoIP experiment will involve two types of codecs such as G.711 and iLBC. In this study, network management system (NMS) is used to monitor and capture the performance of VoIP over IPv4 and IPv6 in campus environment. Based on the finding result, it shows that VoIP over IPv6 protocol is able to achieve a good performance similar to VoIP over IPv4.*

## INTRODUCTION

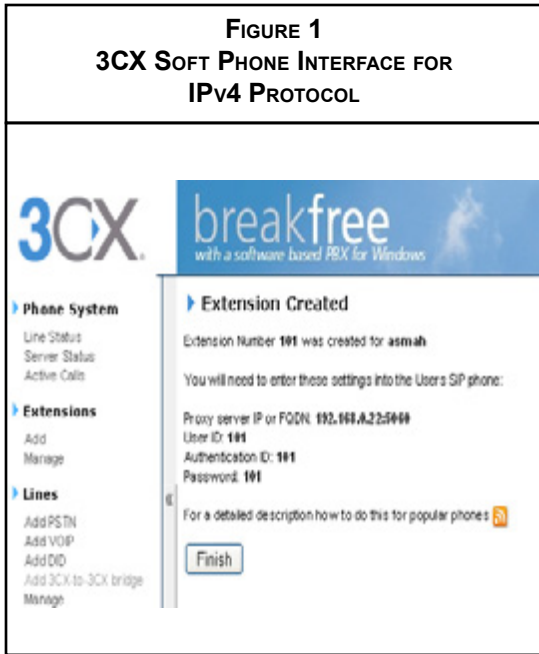
As with most new technologies, Voice over Internet Protocol (VoIP) brings new challenges along with the benefits. The main challenge is VoIP's extreme sensitivity to delay and packet loss compared with other network applications such as web and e-mail services. A basic understanding of VoIP traffic and of the quality metrics provided by VoIP monitoring tools will help to keep VoIP network running smoothly. IPv6 can improve the Internet or Intranet, with benefits such as:

- Expanded addressing capabilities;
- Server less auto configuration (plug-and-play) and reconfiguration;
- More efficient and robust mobility mechanisms;
- End-to-end security, with built-in, strong IP-layer encryption and authentication;
- Streamlined header format and flow identification;
- Enhanced support for multicast and QoS and,
- Extensibility: improved support for options/extensions.

The objective of this study is to analyze and compare the performance of the VoIP over IPv4 and IPv6 protocol. This study will identify the problematic areas of VoIP over IPv6 protocols compare to IPv4. There are several experiments will be conducted on this study as follow:-

1. To analyze the performance of VoIP over IPv4 and IPv6 protocol based on traffic utilization and CPU activities.
2. To analyze VoIP Quality of Service (QoS) over IPv4 and IPv6 protocol such as delay, jitter and packet loss issues.
3. To measure voice quality over IPv4 and IPv6 protocol by using Mean Opinion Score (MOS), R Factor and Voice Quality graph.

In addition, it is to develop additional VoIP service over IPv6 protocol in campus environment. When VoIP is implemented using the public Internet, users may experience quality degradations due to dynamic delays and losses in the LAN. Packets may be lost, either in isolation or in batches, and may experience sudden delay increases [2]. Figure 1 and Figure 2 show 3CX soft phone interface is used for IPv4 protocol and Kapanga soft phone is used for IPv6 protocol in campus network environment.



**RELATED WORKS**

Recently, VoIP (Voice over IP) [1] is rapidly growing and becoming a mainstream telecommunication services, it is also convergence technologies of data and voice communication. VoIP applications like Skype [2] have also achieved

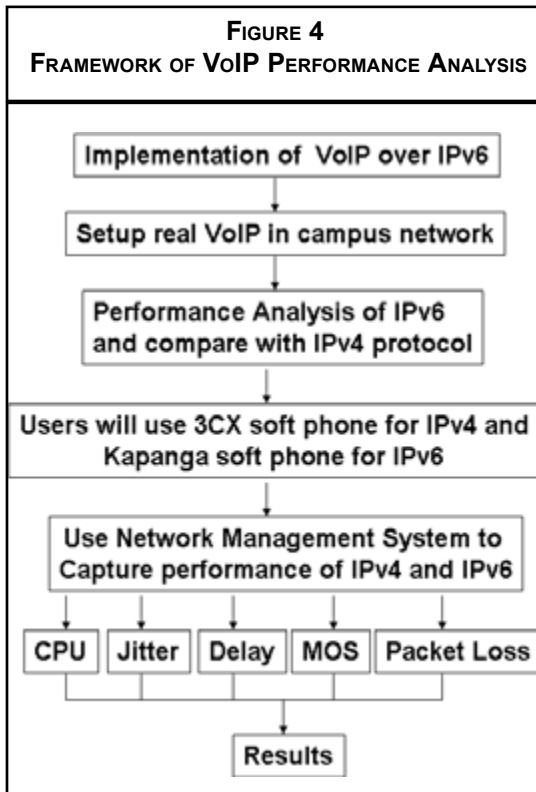
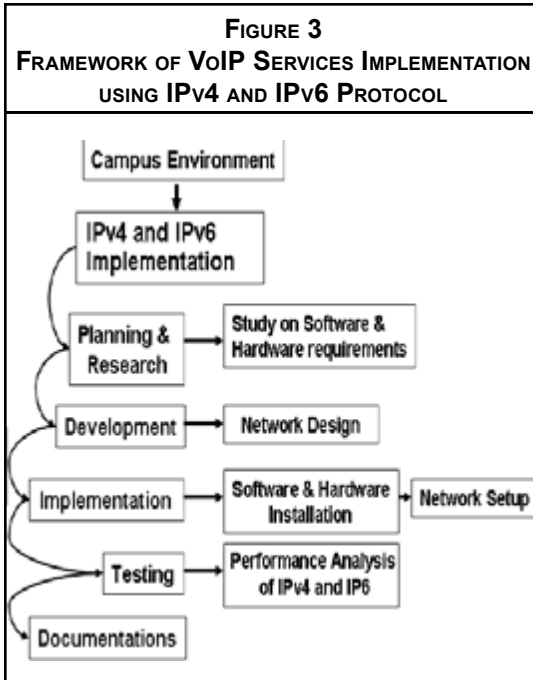
great success. However, due to the complexity of the Internet, it is unpractical to calculate VoIP performance metrics only through the mathematical modeling, as what was done in the telephone networks, so the performance evaluation of VoIP requires actual measurement activities. There have been numerous studies on VoIP measurement. A. Markopoulou [3] measured loss and delay characteristics of American backbone networks, and analyzed how these characteristics impact VoIP quality. For examples, most work focused on monitoring and analyzing performance of actual applications, like MSN and Skype [4], [5], [6].

To provide high quality service for future Internet applications, insight in IPv6 performance measurements is needed. IPv6 is still in its infancy and it is hardly ever used by real-life applications, there is a lack of knowledge about the network performance of end-to-end IPv6 communication [7]; [8]; [9]. For example, case study has been conducted on different types of operating system using IPv6 protocol. However, only a few works have been presented to evaluate the performance of IPv6 protocol [10]. For many applications, network performance is an issue and the selection of the operating systems for the computers may depend on this performance. Windows 2000 (Microsoft IPv6 Technology Preview for Windows 2000) and Solaris 8 connected two identical workstations using a point-to-point link and reported results such as throughput, round-trip time, CPU utilization, socket-creation time, TCP-connection time, and client-server interactions. The results (Windows XP, Solaris and Debian) show that IPv4 and IPv6 have similar performance, even though it shown IPv4 is better [11], [12], [13], [14].

**METHODOLOGY**

Figure 3 shows the overall framework of the VoIP services implementation in campus environment using IPv4 and IPv6 protocol. There are five phases development process such as: i) planning and research; ii) development; iii) implementation; iv) testing and v) documentations.

Figure 4 shows the overall framework of the VoIP performance analysis over IPv4 and IPv6 protocol. In the experiment, the performance

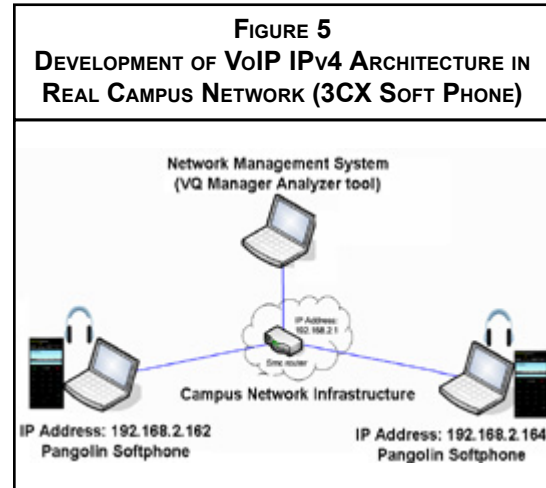


analysis will focus on jitter, delay, packet loss and CPU usage. Network management system such as VQ manager and Clear Sight are used to analyze VoIP service over IPv4 and IPv6 protocol.

**PROPOSED  
VOIP OVER IPV6 PROTOCOL IN  
CAMPUS NETWORK ENVIRONMENT**

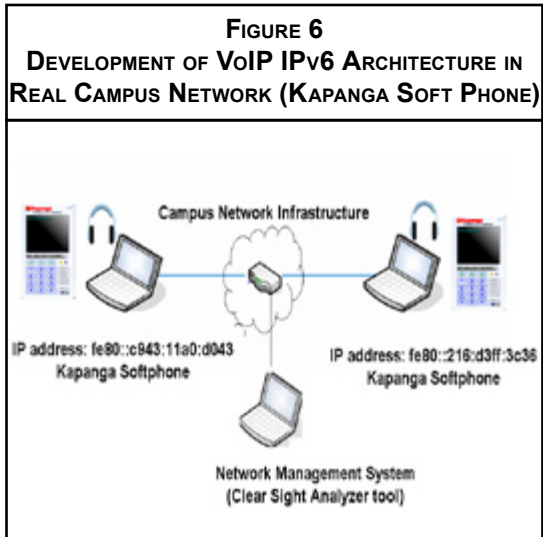
We have setup a real VoIP over IPv6 and IPv4 network environment at University of Kuala Lumpur. Before this VoIP service offer to students and staffs, we will conduct performance measurement test on VoIP IPv6 protocol. This study posits several research questions: i) what is the performance level of the VoIP IPv6 protocol compare IPv4 protocol over LAN; and ii) Is the analysis for evaluating and measuring VoIP IPv6 protocol performance effective?

Figure 5 shows the VoIP IPv4 architecture in real campus network environment. VoIP IPv4 quality can be monitored periodically through the measurement using VQnet (VoIP) management and clear sight management tools is used to capture quality on VoIP IPv6 protocol (see Figure 6).



**EXPERIMENTAL AND  
ANALYSIS RESULTS**

This section analyzes, measures and compares VoIP IPv6 and IPv4 performance in campus network environment. There are many types of softphones available but not many of them do support both IPv4 and IPv6 protocols. Some of the softphones have been studied are X-Lite, PhonerLite, SJPhone, AGEPhone, PortSIP Pangolin and Kapanga. Kapanga is suitable for supporting IPv4 and IPv6 protocol that can implement in campus network environment. While



IPv4 protocol, we decide to use 3CX soft phone. Table 1 shows list of codecs that support by 3CX and Kapanga soft phone. The experiment can be tested only on G.711 and iLBC codecs because both soft phones have provided the same codecs functionality.

**TABLE 1**  
**LIST OF CODECS SUPPORT BY 3CX AND KAPANGA SOFT PHONE**

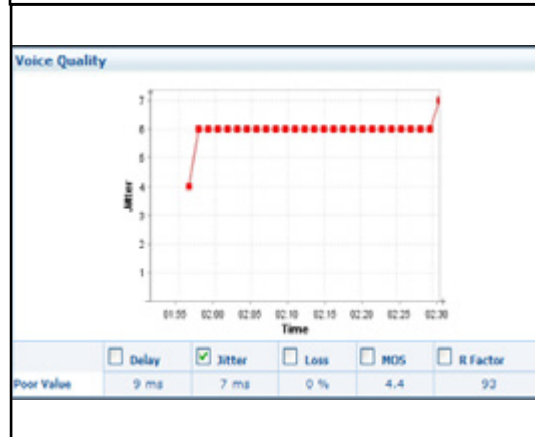
IPv4	Codecs Support by 3CX Soft Phone			
	G.711	iLBC	GSM	G.729
IPv6	Codecs Support by Kapanga soft Phone			
	G.711	iLBC	LPC	Speex

**Experiment on performance analysis: VoIP IPv4 using G.711 codec:** this section will discuss VoIP IPv4 performance analysis based on jitter, packet loss, delay, MOS and CPU utilization. Figure 7 and Figure 8 show the results of VoIP IPv4 for delay and jitter occur on G.711 codec. While, result in Figure 9 and Figure 10 show MOS (automated mean opinion score generate by VQ manager) and R factor results. It shows that G.711 generates high VoIP quality and less CPU usage (refer to Table 2).

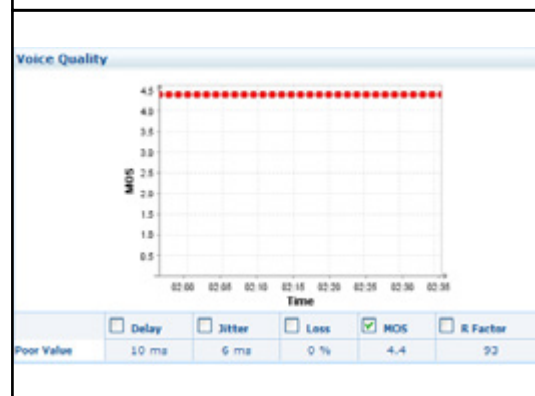
**FIGURE 7**  
**IPv4 - VoIP DELAY USING G.711CODEC**

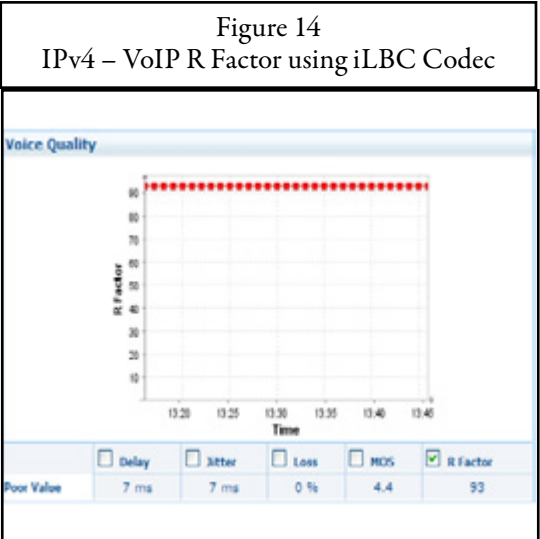
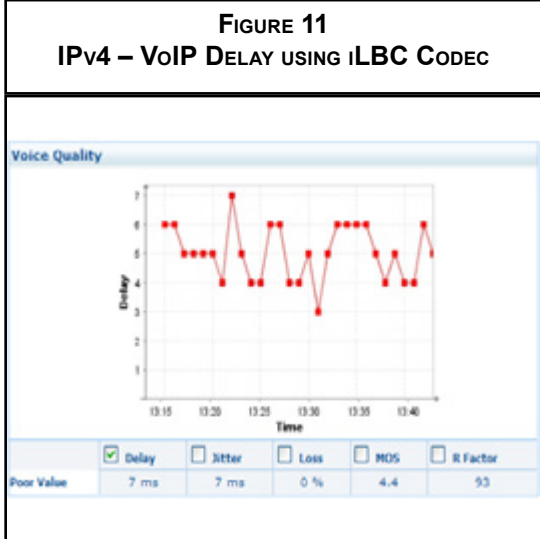
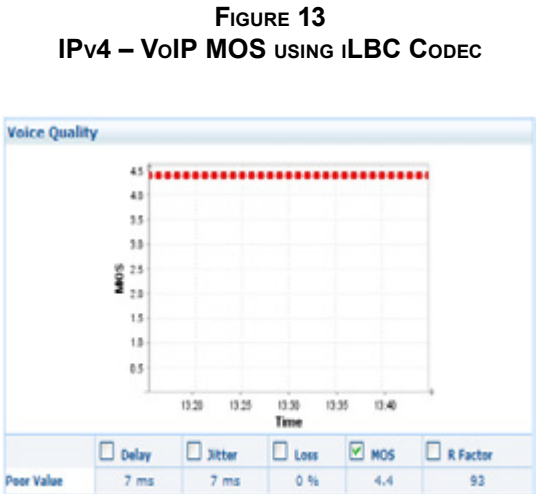
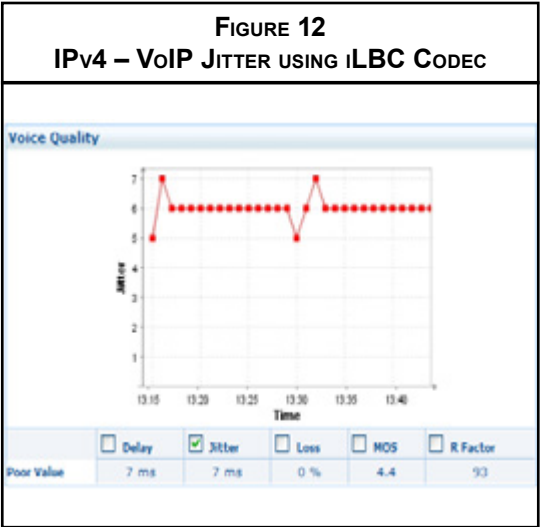
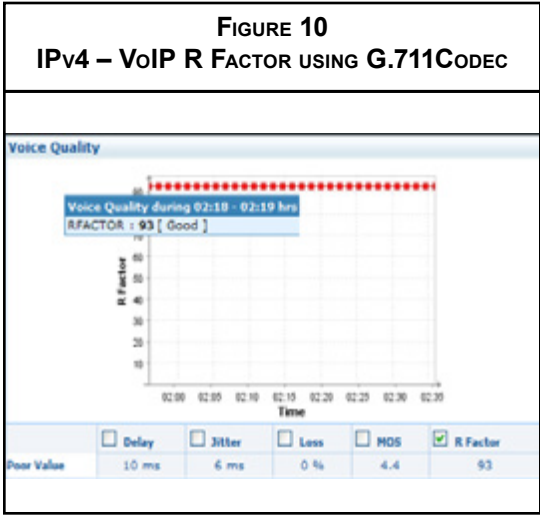


**Figure 8**  
**IPv4 – VoIP Jitter using G.711Codec**



**Figure 9**  
**IPv4 - VoIP MOS using G.711Codec**

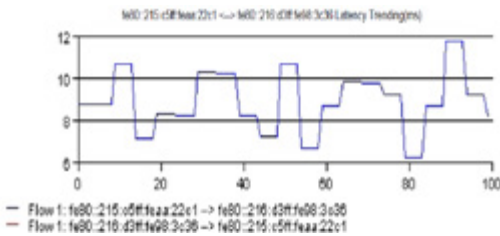




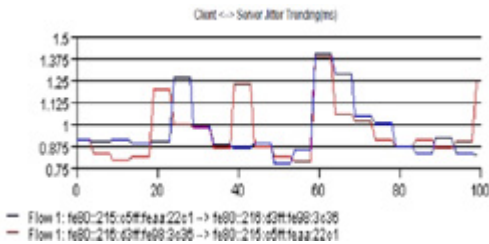
**Experiment on performance analysis: VoIP IPv4 using iLBC codec:** this section will discuss VoIP IPv4 performance analysis based on jitter, packet loss, delay, MOS and CPU utilization using iLBC codec. iLBC (internet Low Bitrate Codec) is a speech codec suitable for robust voice communication over IP. Figure 11 and Figure 12 show the results of VoIP IPv4 for delay and jitter occur on iLBC codec. The results show that G.711 and iLBC codecs generates approximately similar jitter and delay result While, result in Figure 13 and Figure 14 show MOS (automated mean opinion score generate by VQ manager) and R factor results. It shows that iLBC also generates high VoIP quality and a bit higher CPU usage compare to G.711 codec (refer to Table 2).

**Experiment on performance analysis: VoIP IPv6 using G.711 codec:** this section will discuss performance analysis on VoIP IPv6 based on jitter, packet loss, delay, and MOS using G.711 codec. Clear Sight network management tool is used to capture traffic on VoIP. VQ manager tool is unable to support VoIP IPv6 protocol. Figure 15 and Figure 16 show the results of VoIP IPv6 for delay and jitter occur on G.711 codec. While, result in Figure 17 and Figure 18 show MOS (automated mean opinion score generate by Clear Sight tool) and R factor score. It shows that G.711 generates high VoIP quality.

**FIGURE 15**  
**IPv6 – VoIP DELAY USING G.711 CODEC**



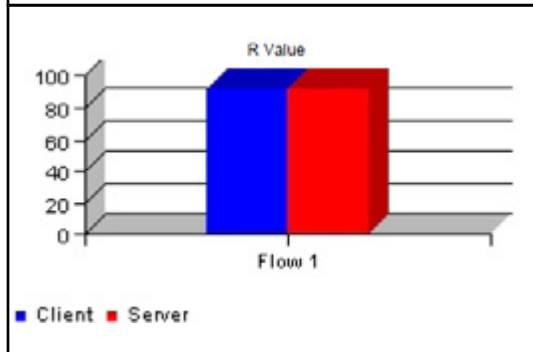
**FIGURE 16**  
**IPv6 – VoIP JITTER USING G.711 CODEC**



**FIGURE 17**  
**IPv6 – VoIP MOS USING G.711 CODEC**

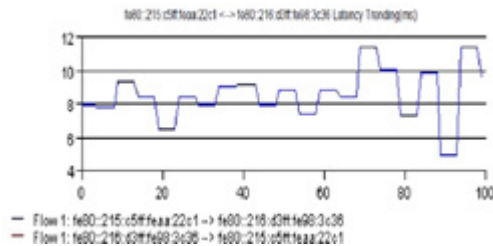


**FIGURE 18**  
**IPv6 – VoIP R FACTOR USING G.711 CODEC**

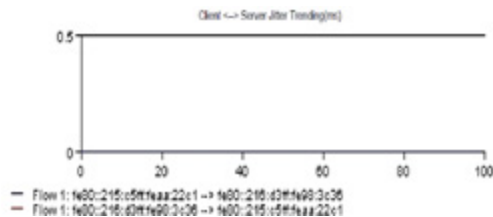


**Experiment on performance analysis: VoIP IPv6 using iLBC codec:** this section will discuss VoIP IPv6 performance analysis based on jitter, packet loss, delay, and MOS using iLBC codec. Figure 19 and Figure 20 show the results of VoIP IPv6 for delay and jitter occur on iLBC codec. The results show that G.711 and iLBC codecs generates approximately similar delay result. The iLBC codec shows a minimum jitter result compare to G.711 codec. While, result in Figure 21 and Figure 22 show MOS (automated mean opinion score generate by Clear Sight tool) and R factor for overall results. It shows that G.711codec generates higher VoIP quality compare to iLBC codec.

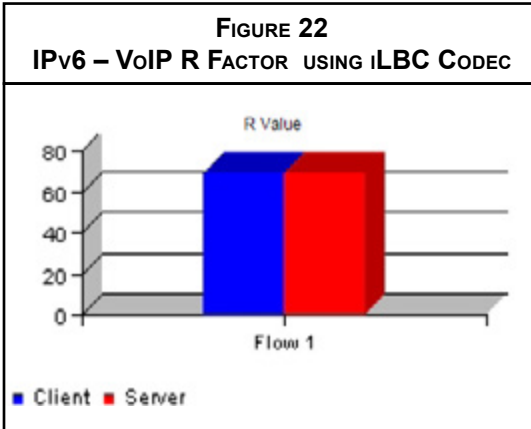
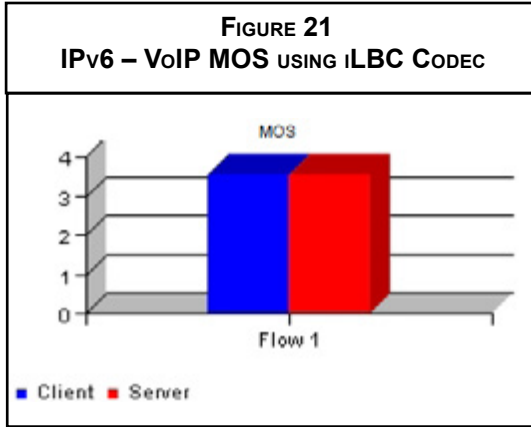
**FIGURE 19**  
**IPv6 – VoIP DELAY USING iLBC CODEC**



**FIGURE 20**  
**IPv6 – VoIP JITTER USING iLBC CODEC**

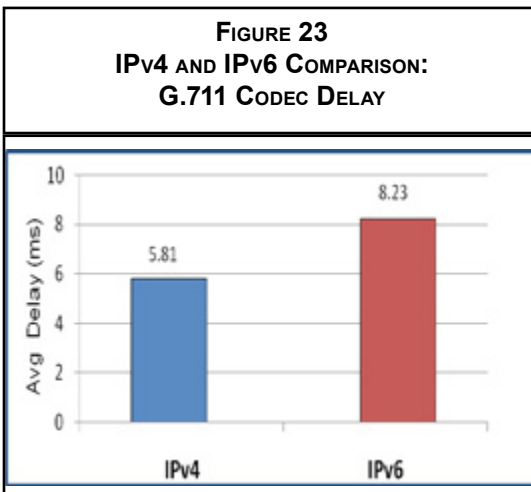
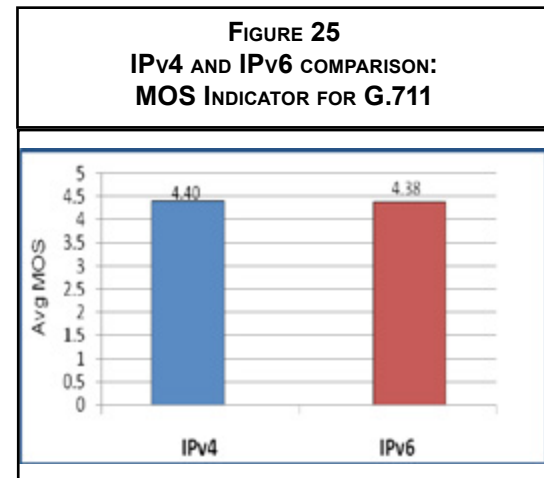
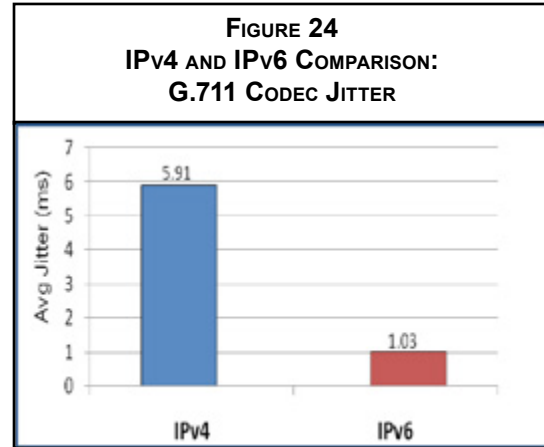




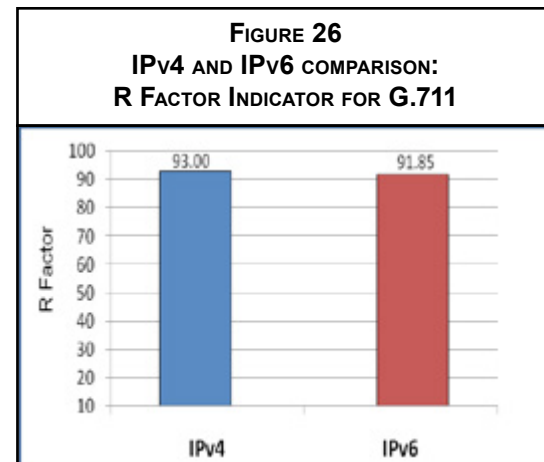


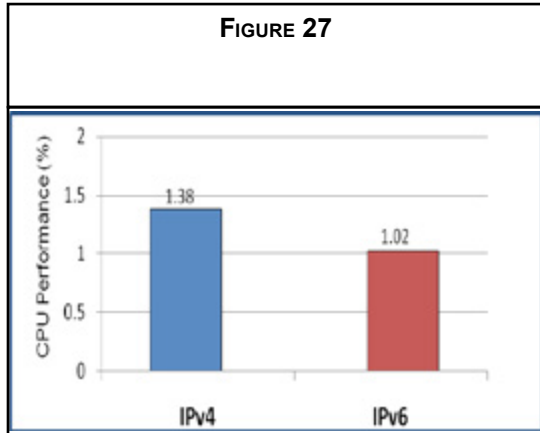
**Overall G.711 results comparison -VoIP IPv4 and IPv6:** As a result in Figure 23 and Figure 24 have confirmed and proven that VoIP IPv6 achieves higher delay compared to VoIP IPv4 and lower jitter occurs for VoIP IPv6. While, result in Figure 25 and Figure 26 show MOS and R factor results for VoIP IPv4 and IPv6. It shows that both protocols able to contribute similar

voice quality in campus network environment. Figure 26 shows that CPU usage for VoIP IPv4 slightly higher compare to VoIP IPv6.



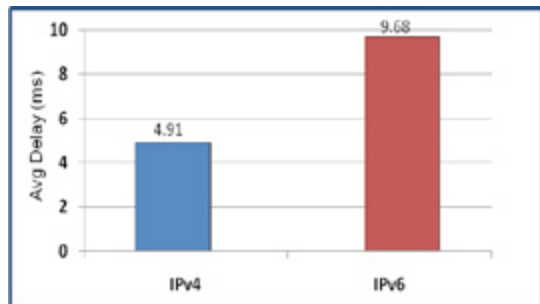
**Overall iLBC codec results comparison -VoIP IPv4 and IPv6:** Again, as a result in Figure 28





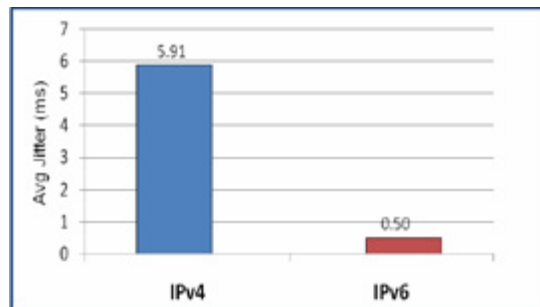
and Figure 29 have confirmed and proven that VoIP IPv6 achieves higher delay compared to VoIP IPv4 and lower jitter occurs for VoIP IPv6. Figure 30 and Figure 31 show MOS and R fac-

**FIGURE 28**  
**IPv4 AND IPv6 COMPARISON: iLBC CODEC DELAY**



tor results using iLBC codec generate low voice quality over IPv6 compare to IPv4. MOS and R

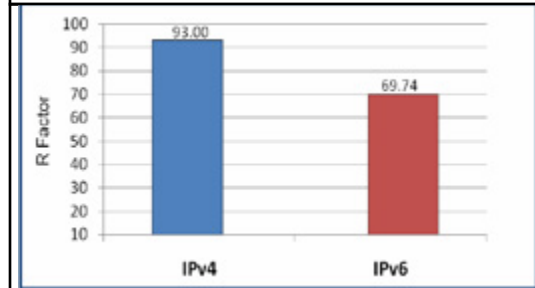
**FIGURE 29**  
**IPv4 AND IPv6 COMPARISON: iLBC CODEC JITTER**



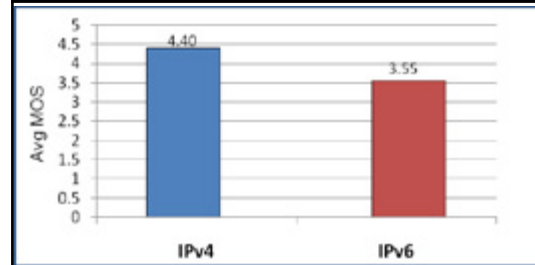
factor rate as a medium range voice quality. Fig-

ure 31 shows that CPU usage using iLBC codec generates slightly higher compare to G.711 codec but it still lower than VoIP IPv4.

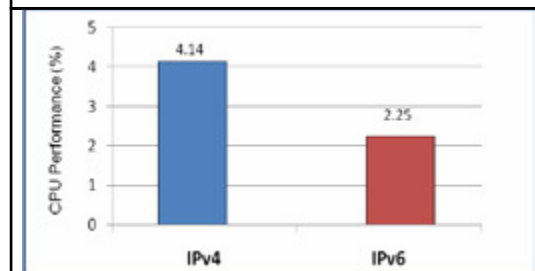
**FIGURE 30**  
**IPv4 AND IPv6 COMPARISON: MOS FOR iLBC**



**FIGURE 31**  
**IPv4 AND IPv6 COMPARISON: R FACTOR FOR iLBC**



**FIGURE 32**  
**IPv4 AND IPv6 COMPARISON: CPU PERFORMANCE FOR iLBC CODEC**



## CONCLUSION

This paper discussed the implementation of VoIP over IPv6 in campus network enviromnet. We conclude that base on our findings; VoIP over IPv6 has generated slightly higher delay for G.711 and iLBC codecs. In addition, VoIP over IPv6 has generated lower jitter for G.711 and iLBC codecs. From the analysis result, it shows

that CPU usage for VoIP IPv6 is lower than VoIP IPv4; however iLBC codec over IPv6 generates higher CPU usage compare to G.711 codec over IPv6. Overall results show that MOS and R factor indicate similar voice quality for IPv4 and IPv6 however iLBC codec for IPv6 generates lower voice quality. There are several techniques should be studied and analyzed that can be used to increase performance of VoIP over IPv6 in campus environment as follows: i) dejitter buffer; ii) Type of Service (ToS); iii) Weighted Fair Queuing (WFQ); and iv) Random Early Detection (RED).

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**CIVILIZATION IN THE BALANCE:  
A COMPARATIVE VALIDATION OF HOFSTEDEAN AND  
GLOBE CULTURAL DIMENSIONS AGAINST THE  
TOYNBEE-HUNTINGTON CIVILIZATION MODEL**

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**ABSTRACT**

*This study compares the relative validity of Hofstede's cultural dimensions and the GLOBE cultural dimensions against the Toynbee-Huntington civilization model. Despite the potential value of models of national culture for expatriate training, intercultural management, global marketing, and other transnational applications, progress in generating national-culture scores for the world's countries and regions has been slow. The GLOBE project stands to offer new impetus for this ongoing project, but the implicit challenge that it poses to the firmly established Hofstede model as an ostensible alternative, rather than possibly a new source of useful data, has created an impasse. Published cultural dimensions have yet to include many countries and regions, so resolving this impasse would be of considerable value. Accordingly, the present study seeks to establish an initial basis by which the Hofstede and GLOBE cultural dimensions may serve a common purpose. It first presents a Monte Carlo analysis to establish an appropriate set of expectations on questions of validation against the civilization model. It then presents validity comparisons. The results show that both Hofstede's cultural dimensions and the GLOBE Values faithfully predict civilizational affiliation, while the GLOBE Practices are weaker as a predictor, despite their also manifesting significant validity. The study concludes with recommendations for future research.*

**INTRODUCTION**

Since 1980, researchers in the area of global business have undertaken two major projects to quantify the dimensions of national culture. In these research agendas, national culture operates as a representation of drivers of human identity at the highest order of abstraction short of that of being human per se (Huntington, 1993). As defined by Hofstede (1980) and later researchers, national culture consists of variables present in all nations, despite such sources of uniqueness as religion, language, and historical experience. For example, through the lens of national culture, one sees a surprising resemblance between Islâmic and Latin American nations, despite obvious differences in attitudes and beliefs. In this example, given the reality of that segment of history during which Spain was an Islâmic state,

cultural dimensions demonstrate their power to reach a deep substrate of the sociopsychological drivers of human priorities. Thus, studies of national culture reveal the underlying similarities and differences among national groups that religion, politics, and other overlain features of culture may obscure.

The first comprehensive project in national culture (Hofstede, 1980) produced a model in four bipolar dimensions. The small range of dimensions is consistent with an important theoretical underpinning of national culture, namely, that they are few in number (*cf.* Hofstede, 2006). By comparison, a broader range of variables by which national identity might distinguish itself would capture more specificity, including specific religious and political idiosyncrasies, which would complicate the question of a common denominator of cultural drivers that applies equally

across nations. A later study (Hofstede & Bond, 1988) added a fifth cultural dimension to this same model, based on a replication of the original study in Southeast Asian nations. Recently, further studies (Hofstede, Hofstede, Minkov, & Vinken, 2008; Minkov, 2007; Neculăesei & Tătărușanu, 2008) have added a sixth and seventh dimension, for which few data exist so far.

The second comprehensive project dedicated specifically to national culture, at the appropriate level of abstraction, is the GLOBE study (*viz.*, Global Leadership and Organizational Behavior Effectiveness), which produced a list of nine practices and nine values and gathered nation-level data across 62 national samples (House, Hanges, Javidan, Dorfman, & Gupta, 2004). The noted distinction between practices and values is missing in Hofstede's model, whose scales include elements of both. As Earley (2006) has observed, culture consists of the common meaning that a society attributes to its central phenomena of interest, whether these are values or practices. The question of whether espoused values or espoused practices might provide a better reflection of culture therefore remained pertinent, so the GLOBE project helps in answering this question.

As explained below, other research projects that currently seek to compare attributes of interest across national boundaries focus on variables of a lower order than cultural dimensions. Only the Hofstede and GLOBE models are therefore available for assessing national culture at the correct level of abstraction. However, because researchers have yet to apply either model to the majority of countries or peoples, valid approaches to extending current databases would be valuable for both researchers and practitioners. Meanwhile, correlations between the analogous Hofstede and GLOBE dimensions fall short of permitting simple duplication, so if these models constitute equally valid measures of national culture, their theoretical underpinnings merit further scrutiny to help decipher how to translate a given nation's profile from one model to the other. As long as questions remain about the relative validity of the Hofstede and GLOBE models, doubts about their utility in practical business management will hamper progress in this field.

Comparing the Hofstede and GLOBE models against a neutral model from an independent line of research may serve to elucidate the optimal direction to take. Toynbee's (1946) model of historically rooted civilizations, supplemented by Huntington's (1993) adapted model of living civilizations, which fills some gaps left by Toynbee's historical model, presents just such an opportunity. Voss, Murphy, and Pederson (2010) have thus far shown that Hofstede's cultural dimensions predict civilizational boundaries well, especially insofar as the civilizational model conforms to Toynbee's original lines of demarcation.

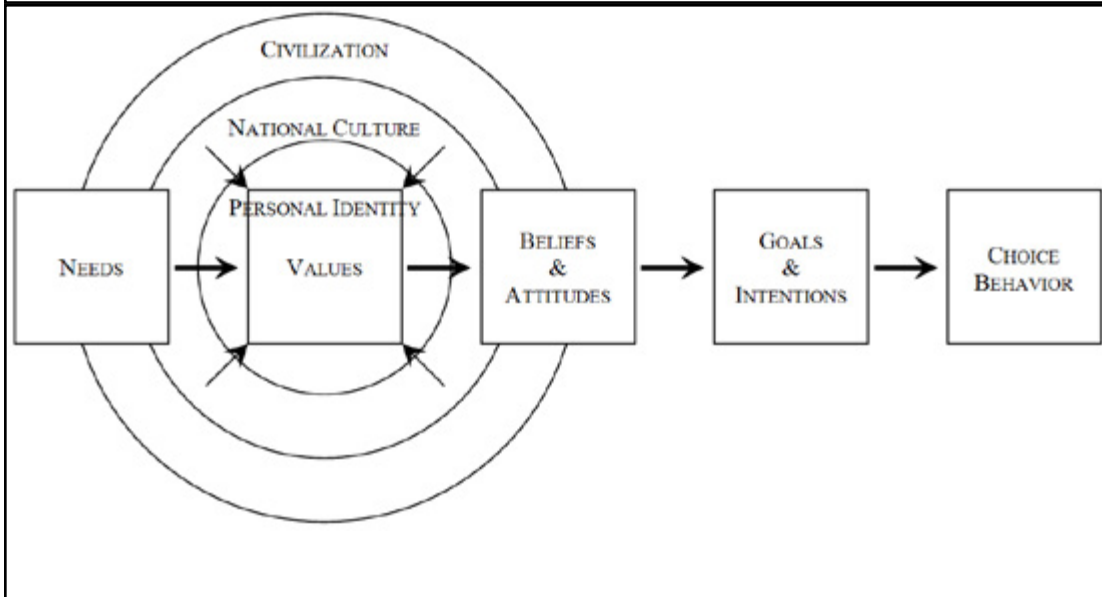
## Literature Review

For the sake of completeness, it is important to make the appropriate distinctions among cultural dimensions, human needs, universal human values, and political attitudes, as other writers (*e.g.*, Hofstede, 2006) have sometimes included a broader range of projects in the same category as those of Hofstede and GLOBE that seek to compare variables of any kind across nations. The simplest distinctions among such models lie in their relative levels of theoretical abstraction, as comprehensive models necessitate greater numbers of variables at lower levels of abstraction, as well as whether they are semantically bipolar or apolar. An adequate elucidation of the different levels of abstraction lies in Locke's (1991) motivation core, which consists of needs, values, and attitudes. In this context, Schwartz and Bilsky (1987) showed that values cluster into statistically stable motivational domains, which are interpretable as needs in the traditions of Maslow (1943), McClelland (1961), and other early theorists. Schwartz (1993) demonstrated that national culture is a construction of the same human values as those that define individual personality. Toynbee (1946), meanwhile, provided a way to interpret civilization, the basic unit of human identity, as the essential driver of national culture. Accordingly, Figure 1 presents a flow model combining civilization, national culture, and personal identity in the motivation core.

Moving horizontally along the motivation sequence model, needs are fewest in number, values are more numerous, and attitudes are most numerous within the motivation core. Schwartz

**FIGURE 1**  
**LOCKE'S MOTIVATION SEQUENCE MODEL**  
**WITH ENHANCEMENT**

This figure depicts Locke's (1991) motivation sequence model, with overlay of personal identity, national culture, and civilization in the motivation core. Because values cluster into motivation domains, which correspond to needs, an alternative depiction might position the concentric circles over the needs node. Nevertheless, the semantic content of universal human values bears a direct relationship with the dimensions of national culture, hence this choice.



and Bilsky (1987) identified 10 motivational domains, of similar content to the needs in Maslow's (1943) pentad or McClelland's (1961) triad. Opposing motivational domains approximate the content of opposing poles of each of Hofstede's cultural dimensions (*cf.* Figure 2). For example, high power distance reflects *power* motivational domain, high uncertainty avoidance *security*, and low individualism *conformity*. Opposite these, one finds *universalism*, *self-direction*, and *stimulation*, respectively. Universal human values, arranged on opposing poles, thus become semantically bipolar. Clustered into motivational domains, they relate to cultural dimensions; treated individually, they relate to contrasts in personality within a given culture. The distinction between apolar and bipolar variants of motivation variables occurs throughout the motivation sequence, which fact provides a basis for establishing relative quantities of each type. There should generally be fewer bipolar than apolar variables within a category, because only the

most pronounced semantic contrasts are likely to be psychologically measurable. Apolar variables occur in respondent material simply as strong or weak, rather than as competing arguments for action, while bipolar variables will serve the latter purpose. Because cultural dimensions are bipolar, they are likely to be fewer in number than motivational domains, before the model in question reaches saturation (*i.e.*, collinearity among variables).

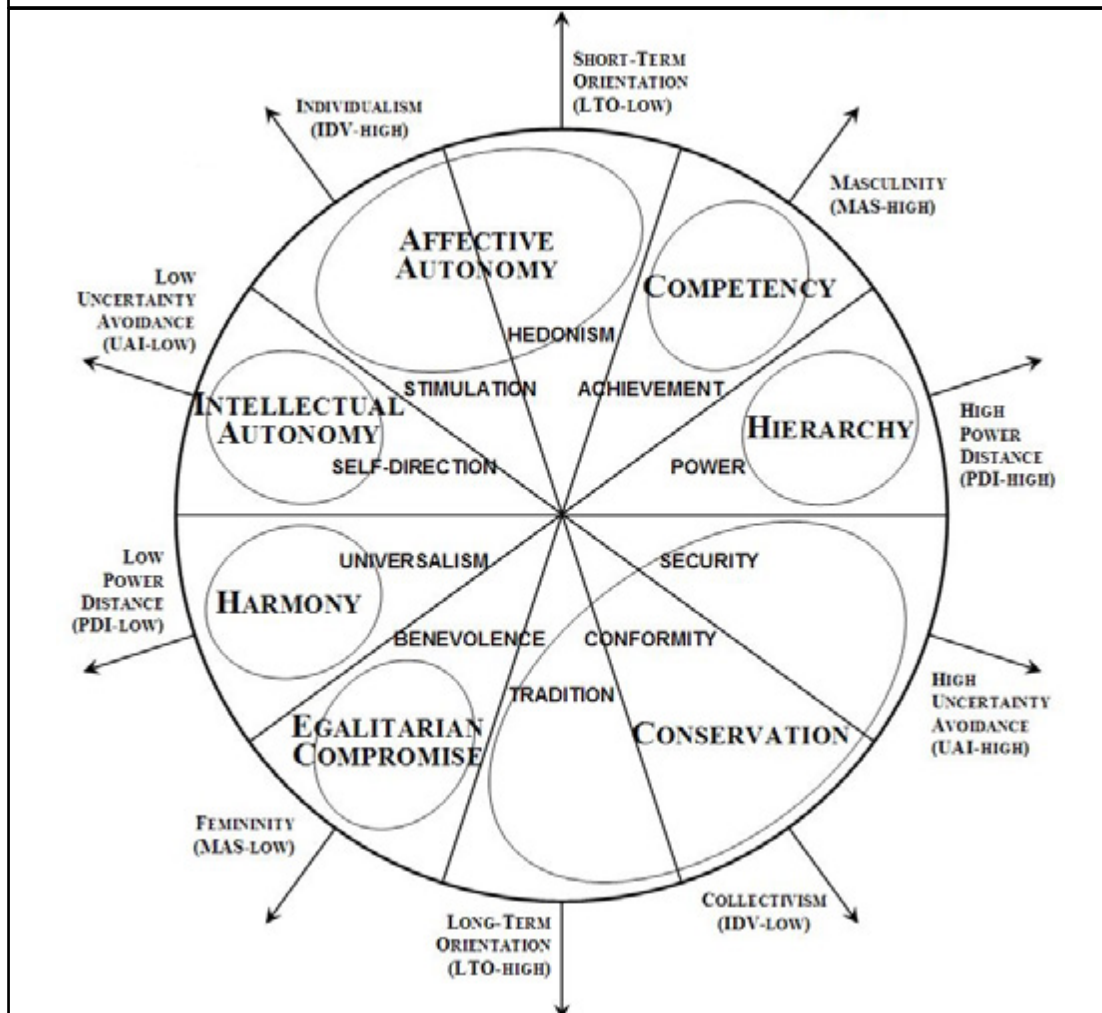
The only major project that compares universal human values across cultures is that begun by Schwartz and Bilsky (1987), which started as a cross-cultural extension of the Rokeach Value Survey (Rokeach, 1973). This work has found that universal human values differ systematically between countries with distinct religious traditions, linguistic affiliations, or histories. Clustered into their respective motivational domains, universal human values operate in a similar way

to national culture, except for their apolarity. For example, aside from masculinity-femininity and individualism-collectivism, which are explicitly bipolar, the low end of every cultural dimension suggests a facet of a desirable worldview, rather than simply a low priority. It is conceivable to treat the smallest-space (Euclidean) model of

motivational domains as a depiction of cultural dimensions, just by linking each motivational domain to its opposite in the spatial distribution. Figure 2 shows how similar Schwartz and Bilsky's (1987) smallest-space model is to Hofstede's 5-dimension model, as depicted in this way. (It is also possible to consider indirect oppositions,

**FIGURE 2**  
**SCHWARTZ MOTIVATIONAL DOMAINS AND**  
**HOFSTEDE'S CULTURAL DIMENSIONS**

This depicts Schwartz and Bilsky (1987) motivational domains (inside, small type), Schwartz's (1994) new categories (inside, large type), and Hofstede's cultural dimensions (outside). This illustrates the likely relationships among the models depicted. Closer inspection might suggest construing IDV as self-direction (rather than stimulation) versus conformity and UAI as security versus stimulation (rather than self-direction), while MON may amount to achievement versus universalism, and IVR to hedonism versus conformity. Above all, the distinction between apolar motivational domains and bipolar cultural dimensions is the central point of this illustration.





such as achievement *versus* universalism; however, the more subtle the semantic difference, the less psychologically perceptible will be the construal.) Human values also differ from cultural dimensions in their dual purpose, as they simultaneously serve to define individual personalities, while cultural dimensions are incapable of that level of personal detail (Hofstede, 1980).

Lastly, the World Values Survey project (WVS; *cf.* World Values Study Group, 1989) measures political attitudes (*e.g.*, support for democracy, impact of globalization, and tolerance of ethnic minorities) and has developed a large database reflective of national averages on these measures. This work may offer important insights for the study of national culture, due to the sheer volume of global data that it has collected so far. The WVS includes 250 items, potentially permutable in a variety of composite scales. Properly understood, the WVS is an array of attitudinal measures, even though some items may indirectly reflect universal human values or cultural dimensions. Importantly, however, cultural-dimension research tries to control for systematic differences in personality, typically by restricting comparisons to people in the same professional discipline. The WVS fails to do this, so differences in subpopulations may confound attempts to translate its data into cultural dimensions.

By this reckoning, cultural dimensions probably constitute the most parsimonious model within the motivation sequence. However, an even broader construal of these opposites is visible in the composite model, namely, that of Hall's (1959) high context *versus* low context. cursory review of high- and low-context countries from any source, by comparison against Hofstede's cultural dimensions as displayed in Figure 2, will show that these differ noticeably by virtue of generally high and low scores in the right and left halves of the circle, respectively. Hall's dimension of high and low context seems to capture a broader mode of social difference than that of cultural dimensions, one that seems to emphasize perception as a fundamental driver of motivation (*cf.* Postman, Bruner, & McGinnes, 1948; Ravlin & Meglino, 1987). By comparison, Schwartz and Bilsky (1987) interpreted the upper and lower halves of the circle as reflecting a broad construal

of individualism and collectivism, respectively, which appear to correspond to the Yang and Yin dimensions of Daoist metaphysics (while also accommodating masculinity and femininity).

## HOFSTEDE *VERSUS* GLOBE

As of Hofstede and Hofstede's (2005) publication, Hofstede's cultural dimensions consisted of power distance (PDI), individualism-collectivism (IDV), uncertainty avoidance (UAI), and long-term orientation (LTO). As discussed above, Hofstede *et al.*'s (2008) model has recently added two more dimensions, namely, monumentalism *versus* self-effacement (MON) and indulgence *versus* restraint (IVR), to the model. To date, few studies reflect MON or IVR, so most studies must exclude them. Published Hofstede data follow a scale of zero to 100, with an occasional score above 100. Of relevance to the GLOBE study, low IDV refers to ingroup (as opposed to institutional) collectivism, while high MAS includes assertiveness, and LTO fosters an outlook simultaneously toward the past and toward the future (*cf.* Earley, 2006).

The GLOBE study lists assertiveness, gender egalitarianism, and performance orientation (which are nominally related to MAS); institutional and ingroup collectivism (probably related to IDV, especially the latter); power distance and humane orientation (probably related to PDI); future orientation (probably related to LTO); and uncertainty avoidance, which is nominally identical to UAI (House *et al.*, 2004). The study reports one measure of each variable as relating to practices, and the other as relating to values, given the distinction that one may observe between espoused and practiced values. As is evident from the prior discussion, some of these variables may seem to constitute opposites of one another (*e.g.*, humane orientation *versus* performance orientation), while the bipolar nature of these variables is harder to detect than in the case of the Hofstede model. Thus, some GLOBE variables may actually be apolar and thus constitute motivational domains, as in Schwartz and Bilsky (1987). GLOBE data use a scale of one to seven.

Currently, cultural-dimension data are available to provide adequate knowledge of 86 nations or peoples using Hofstede's (1980, 1988) model (Hofstede & Hofstede, 2005), and 62 by way of the GLOBE model (House *et al.*, 2004), which adds 11 unique nations or peoples to the current Hofstede database. Although Hofstede (2006) scrutinized the GLOBE data for comparability, correlations between analogous variables are too weak to constitute simple substitutes, despite the strong statistical significance of the matches thus made. Still, success in translating one data set to the other would provide researchers with data covering only 97 nations or peoples (or 90 nations proper), which would leave at least 103 more nations to estimate in some way (reflecting the distinction between Sudan and South Sudan, as of 9 July 2011), in addition to 51 territories and possessions. Moreover, distinctions in cultural dimensions among states with geographically bounded ethnolinguistic cultural identities, such as in Belgium, China, Ethiopia, India, Indonesia, Iraq, Nigeria, Russia, South Africa, and Switzerland, will certainly merit further study.

### TOYNBEE VERSUS HUNTINGTON

Toynbee's (1946) theory of civilizations is the result of an extraordinarily deep study (published in 10 volumes, whereof the 1946 and 1957 publications are condensed distillations) to enumerate civilizations and identify the civilizational life cycle. From an historical perspective, civilizations began as major empires, becoming clusters of nation-states by modern times. Given his focus on historical processes, Toynbee left unidentified the civilizational affiliations of some present-day nations. Latin America is a case in point, as Toynbee only discussed pre-Columbian civilizations relevant to the Western Hemisphere, leaving readers to guess, for example, whether Guatemala is an eventual product of the Mayan civilization, Spain, or an admixture of both.

In his introduction, Toynbee (1946) at first summarized four civilizations in addition to "Western Christendom" (p. 8). These include Orthodox Christian (southeast Europe and Russia), Islam, a Hindu civilization in India, and a Far-Eastern civilization. Toynbee later refined his terminol-

ogy as Western, Orthodox, Islamic, Hindu, and Far Eastern. The Western civilization is divisible into Central European, approximately corresponding to the defunct Austro-Hungarian Empire, and a Western European core group, corresponding to the defunct Holy Roman Empire. At the outer boundaries of the Western civilization are distinct Nordic and Anglo-Britannic groups, resulting from Toynbee's observation that new civilizations emerge at the boundaries of declining entities. The Orthodox civilization may warrant a similar division into Orthodox-Russian and Orthodox-Byzantine components, while the Far Eastern is divisible into Chinese and "Korean-Japanese" components (p. 34). Of import to Huntington's later terminology, Toynbee described a "Sinic" civilization as an ancient forerunner of the "Far Eastern" one, which he thought to constitute a separate historical phase due to the transformation that occurred with the advent of Mahāyāna (Dàshèng) Buddhism in the first century CE (p. 22). In the Western Hemisphere, Toynbee listed the defunct Andean, Yucatec, Mexic, and Mayan civilizations, without naming any successors. Toynbee cited no African civilization either, aside from a defunct Egyptian.

Huntington (1993) set out to identify the systematic causes of international stresses and strains in the era following the Cold War's close. He relied on Toynbee (1946) to delimit his civilizations, while examining only those national clusters of the present era that seem to share a common self-identity. Thus, Latin America counts among Huntington's present-day civilizations. Huntington deviated from Toynbee in his judgment on certain groupings, such as by identifying Japan as its own civilization, rather than grouping it with Korea, as Toynbee suggested. He also emphasized religion more than history in some cases, wherein Toynbee would have emphasized the latter. For example, Huntington placed Western-Christian Slavic countries into a mammoth Western civilization, although historical forces would more likely place them in a Slavic-Orthodox group. Despite these deviations, Huntington's work offers important clarity to the study of civilizations, both on the status of Latin America as a civilization, rather than an extension of the West, and on noteworthy cases in which more than one civilization occur in a

single country (*e.g.*, the defunct Yugoslavia). Voss *et al.* (2010) have shown the combined insights of Toynbee and Huntington to be very accurate, by reference to Hofstede's cultural dimensions as a point of reference.

It is important to recognize Huntington's reliance on Toynbee, as critics of Huntington (notably the vociferous outcry that erupted in *Foreign Affairs* immediately following the seminal article) have treated Huntington's model as an atheoretical proposition, a contention contradicted by the fact of Toynbee's elaborate theorizing. Huntington's important deviations from Toynbee were: (1) to separate the Japanese civilization from "Far Eastern," relegating Korea to the Sinic realm; (2) to add Latin America as its own civilization; (3) to propose an emergent African civilization; and (4) to treat the Western civilization as a unitary entity or source of identity, despite its great scope and internal divisions. Common references to *the West* among Westerners, as opposed to any more specific source of identity, justify this from the perspective of self-identification, even if cultural differences would suggest alternative categories. For Huntington, a civilization comes into being as it acquires a coherent identity to motivate a consistent pattern of decisions (*e.g.*, a consistent pattern of contention) on a national level, along with sufficient international gravity to draw resources from other civilizations. Minor civilizations also exist (*e.g.*, the Buddhist cluster, along with an array of unitary states that seem to constitute their own civilizations) as a product of manifest identity, without a significant level of international importance.

### CIVILIZATIONS AND NATIONAL CULTURE

Neither Huntington (1993) nor Toynbee (1946) suggested that major civilizations must constitute homogeneous cultural units; rather, the available evidence suggests that national samples diverge culturally from a central benchmark that constitutes the civilizational norm. Huntington referred to core states (*e.g.*, Saudi Arabia in the Islâmic civilization or Russia in the Orthodox) as serving as the main drivers of civilizational identity and hence the cultural focal point. This

question was irrelevant to Toynbee, but one state's supplanting of another as a civilization's exemplar nation should indeed shift the cultural center of a civilization, consistent with Toynbee's observation of shifting civilizational centers. Toynbee discussed cultural similarities across the nations within a civilization, but cultural heterogeneity should emerge naturally due to differences in technology and resource availability across nations (*e.g.*, Athens *versus* Sparta). New civilizations, with their own cultural uniqueness, would emerge at the boundaries of declining ones. Given the common, higher-order identity that characterizes the members of a civilization, there must be more cultural similarity within civilizations than across them. This expectation is consistent with the findings of Voss *et al.* (2010) in comparing Hofstede's cultural dimensions to Toynbee's model.

Nations within a civilization that share related languages may be culturally similar, but linguistic affinities between nations across the civilizational divide may hide notable differences. Jamaican culture is by no means English or even Western (*cf.* Huntington, 1996, p. 131), but anglophone nations in the Western civilization are culturally very similar. Language is a powerful carrier of culture, but language conversely molds itself around major cultural transitions (*e.g.*, revolutions), injecting them with neologisms and semantic revisions, which in turn perpetuate the new cultural norms, such as across the linguistically varied Islâmic civilization. Linguistically divided nations may nevertheless be culturally similar (*e.g.*, Finland and Norway, which differ in root language family, despite their cultural similarities). Meanwhile, nominal religious kinship between nations across the civilizational boundary may be deceptive (*e.g.*, Western European and Latin American Christianity, which are both nominally Western in identity, although the latter civilization bears a much stronger resemblance to the Islâmic than it does to Western European core states). Finally, the Christian Orthodox traditions (*e.g.*, in Bulgaria, Georgia, Greece, Romania, and Russia) are distinct from those of Western Christianity mainly due to how their respective cultures actually perceive and apply those traditions, rather than due to differences in theology.

## HYPOTHESES

Models of national culture and of civilizations should unite clusters of countries into culturally similar groups, despite their disparate theoretical origins. Insofar as the theories underlying both types of models are valid, there will be a measurable degree of similarity in how the models of either type will do this. Consistent with this expectation, the Hofstede and GLOBE models of national culture should demonstrate significant validity against the criterion measures, namely, the Huntington and the Toynbee civilization models. Beyond this, should one model of national culture happen to show greater validity than is the case with the other, one may infer that that model captures a fuller range of drivers of civilizational differences.

Hofstede's cultural dimensions only number four or five in the widely available data, depending on the country in question, so the empirical process will test 4- and 5-factor models, respectively, to capture any relevant difference in the Hofstede data. For the purposes of the present study, this difference may possibly manifest itself in the form of validity degradation with the deletion of the LTO variable, if LTO is a necessary part of a complete model of national culture. Both the Huntington and Toynbee models will serve as the criteria in this study, to compare differences in civilizational model (*cf.* Measures, below):

- H1a. Hofstede's 4-factor model (PDI, IDV, MAS, and UAI) will demonstrate validity against the Huntington civilization model.
  - H1b. Hofstede's 5-factor model (PDI, IDV, MAS, UAI, and LTO) will demonstrate validity against the Huntington civilization model.
  - H2a. The GLOBE 4-factor model of practices (weighted average all possible 4-factor models) will demonstrate validity against the Huntington civilization model.
  - H2b. The GLOBE 5-factor model of practices (weighted average all possible 5-factor models) will demonstrate validity against the Huntington civilization model.
  - H3a. The GLOBE 4-factor model of values (weighted average all possible 4-factor models) will demonstrate validity against the Huntington civilization model.
  - H3b. The GLOBE 5-factor model of values (weighted average all possible 5-factor models) will demonstrate validity against the Huntington civilization model.
- There is no *a priori* way to predict which model, Hofstede or GLOBE, will demonstrate stronger validity, or whether there will be any statistically significant difference between them. Moreover, the result may change when the criterion is the Toynbee civilization model. Notwithstanding the outcome, the Voss *et al.* (2010) Toynbee-based corrections create a more accurate civilization model in terms of culture *per se*, even if Huntington's (1993) model is a more accurate gauge of political alignments and sources of international conflict. Accordingly, this part of the study will advance the following hypotheses:
- H4a. Hofstede's 4-factor model (PDI, IDV, MAS, and UAI) will demonstrate validity against the Toynbee civilization model.
  - H4b. Hofstede's 5-factor model (PDI, IDV, MAS, UAI, and LTO) will demonstrate validity against the Toynbee civilization model.
  - H5a. The GLOBE 4-factor model of practices (weighted average all possible 4-factor models) will demonstrate validity against the Toynbee civilization model.
  - H5b. The GLOBE 5-factor model of practices (weighted average all possible 5-factor models) will demonstrate validity against the Toynbee civilization model.
  - H6a. The GLOBE 4-factor model of values (weighted average all possible 4-factor models) will demonstrate validity against the Toynbee civilization model.
  - H6b. The GLOBE 5-factor model of values (weighted average all possible 5-factor models) will demonstrate validity against the Toynbee civilization model.

ity against the Toynbee civilization model.

### METHODOLOGY

Voss *et al.* (2010) introduced a composite scoring method to determine cultural fit between two nations or between a nation and the mean cultural dimensions of a given civilization. The noted method is a function of the simple correlation coefficient between each of the nations' cultural dimensions, the Spearman rank-order correlation coefficient, and a third measure designed to capture the residual difference in the comparative sets of cultural dimensions, beyond what the two types of correlation coefficients are able to detect. The rationale for this composite measure starts with the fact that the simple correlation coefficient between two sets of cultural dimensions may create an unreasonable impression of similarity or difference. For example, series A (50, 50, 50, 50, 60) correlates with series B (50, 50, 50, 50, 40) at  $r = -1$ , despite their manifest similarity. To help correct this, one of the three components is a function of the ratio between the countries on each cultural dimension. In this example, the ratio function produces a correlation of  $r = 0.96$  instead. Because both measures capture some valid information, the average is a better measure. The Spearman rank-order correlation then adds yet further information to the composite measure by emphasizing the relative priority of the array of cultural dimensions, given the fact that human values (hence cultural dimensions; *cf.* Schwartz, 1993) adjust themselves over time into a natural rank ordering, as they compete to provide arguments for action (Rokeach, 1973).

The present analysis's use of a composite criterion demands dyadic comparisons of all possible pairs of nations, with one score calculated for each pair. If that score exceeds a given threshold, the analysis assigns it a value of one, which means that the two countries are similar enough to be members of the same civilization. The limitation on this measure is that countries that fall into dissimilar civilizations by the prevalence of other criteria (*e.g.*, a combination of history, region, religion, and language) may nevertheless score above the critical threshold (*e.g.*, Korea and Peru, which show a similarity of 0.95 [Hofstede-4] but

quite logically fall into dissimilar civilizations). Thus, where scores fall below the threshold, one infers civilizational dissimilarity; otherwise, one must consider the other criteria before drawing the conclusion of civilizational similarity.

### MONTE CARLO ANALYSIS

The Monte Carlo analysis seeks to gauge what the expected validity coefficients should be. This analysis contrives 12 notional civilizations to correspond to the number of civilizations identified by Voss *et al.* (2010), in a world of  $N = 240$  nations. The first civilization includes four nations, followed by 5, 6, 7, 10, 12, 16, 20, 26, 34, 44, and 56. This civilization size progression mimics that of the civilizations identified by Voss *et al.* (2010) and follows a logarithmic progression in the form of  $y = 2.153e^{0.25235x}$  (where  $x$  = the ordinal number of the civilization). The analysis uses five notional cultural dimensions, after Hofstede's model, while fixing the standard deviation of all cultural dimensions to  $s = 15$  (scale of zero to 100). The analysis first sets civilizational means using the Microsoft Excel™ expression  $=(\text{RAND}()+(\text{RAND}()*0.49))/1.49*99$  (which produces a standard deviation of approximately  $s = 22.5$  by itself). Adding the result of this expression to an identical expression to simulate each notional nation's uniqueness produces a composite standard deviation of  $s = 15$  for each nation. The analysis thus distributes variance evenly between the 12 civilizational clusters and the 240 individual nations.

The Monte Carlo analysis involves three key steps. The first is to standardize the scores from the three fit-statistics (Pearson correlation, Spearman correlation, and ratio criterion), to harmonize their expected mean scores, given the observable relationship between mean scores and validity thresholds that happens to occur in the spreadsheet program. This step stabilizes validity results, which otherwise achieve maxima at disparate thresholds and thereby confuse interpretation, so it permits a direct comparison among the components of the composite validity coefficient. The second step involves comparing the optimal validity thresholds across the components of the composite fit-statistic, given that different levels

of mean validity occur at different thresholds. This will permit serve to confirm the stability of the validity criteria, to maximize the expected validity coefficient in the actual study. The third step involves optimizing the validity coefficient for the composite fit-statistic alone, without standardizing it. It will thus provide a mathematical basis for setting the validity threshold in the study of real data.

### Standardizing Scores

The mean score varies noticeably from sample to sample. It trends toward  $r^2 = 0.70$  for the ratio measure and  $r^2 = 0.52$  for both the Pearson and the Spearman measures, over 1,000 trials. As the simulation sample produces higher and lower means due to random chance, the validity optimum follows accordingly. It also differs substantially between the ratio and correlation measures. In accordance with the relationship between mean scores and validity thresholds noted above, the strongest threshold settings for the ratio measure are considerably higher than are those for the correlation criteria. To fix expected means to a consistent value (*viz.*,  $r^2 = 0.50$ , to move visible variance toward the center of the data plot for better scrutiny), the analysis first logs the natural means and then adjusts the fit-statistic using an exponential function applied to each type of fit-statistic. Table 1 displays descriptive statistics for the Monte Carlo analysis, before standardizing the scores. Based on the means generated in this step, the procedure will adjust the different fit-

statistics exponentially to produce an expected value of  $\text{Fit} = 0.5$  for the second step.

### Comparing Validity Thresholds

The validity threshold in this study refers to that score at which the analysis will consider a pair of nations similar, rather than different. The choice of threshold is that at which the Monte Carlo analysis demonstrates the strongest expected validity in the composite fit-statistic. In general, a score that exceeds the average score across all paired comparisons in the sample ( $N = 28,680$  dyads) indicates notable similarity, but the point of maximum validity is actually at a threshold of about  $r^2 = 0.6$ , rather than  $r^2 = 0.5$  (*cf.* Table 2).

Table 2 displays how the selection of different validity thresholds produces different mean levels of validity, using only the Pearson, Spearman, or ratio criterion individually. In order to identify the optimal validity threshold for use with the composite fit-statistic, the objective in this step is to seek the maximum expected validity, based on the score threshold (between 0 and 1) applied to the test. Importantly, the maximum validity occurs at the same threshold across all three of the components of the composite fit-statistic, namely at a threshold of 0.6 (*cf.* Table 2). In fact, this reflects the fact that the primary determinant of the optimal validity threshold is the proportional distance between the mean and a notional threshold of 1.0. This analysis also shows that there is only a negligible difference between

TABLE 1 INITIAL DESCRIPTIVE STATISTICS FROM THE MONTE CARLO ANALYSIS								
	Descriptive Statistics							
	Means		St. Deviations		Minima		Maxima	
	mean	st.dev.	mean	st.dev.	mean	st.dev.	mean	st.dev.
Pearson	0.5221	0.0143	0.1838	0.0054	0.0015	0.0011	0.9990	0.0007
Spearman	0.5198	0.0132	0.1855	0.0048	0.0000	0.0000	1.0000	0.0000
Ratio	0.7009	0.0159	0.0927	0.0058	0.3502	0.0397	0.9688	0.0073
Composite	0.5809	0.0110	0.1386	0.0045	0.1466	0.0153	0.9848	0.0045
	Pearson, Spearman, and Ratio refer to the three components of the composite fit-statistic, which this table represents as Composite. These results each represent the mean and standard deviation of the noted statistic, from 1,000 iterations.  To produce an expected mean of $\text{Fit} = 0.5$ , the analysis will apply exponents as follows in step two: $\text{PFit}_{\text{MOD}} = \text{PFit}^{1.066844}$ , $\text{SFit}_{\text{MOD}} = \text{SFit}^{1.059365}$ , $\text{RFit}_{\text{MOD}} = \text{RFit}^{1.950220}$ , and $\text{CFit}_{\text{MOD}} = \text{CFit}^{1.276336}$ .							

	Validity Threshold								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pearson	0.0516	0.0877	0.1253	0.1699	0.2748	0.2989	0.2700	0.2315	0.1515
Spearman	0.0647	0.0806	0.1315	0.1618	0.2456	0.2644	0.2319	0.2034	0.0935
Ratio	0.0020	0.0253	0.0854	0.1685	0.2311	0.2354	0.1710	0.0821	0.0180
Composite	0.0053	0.0541	0.1075	0.1717	0.2779	0.2973	0.2508	0.1868	0.0836
Pearson, Spearman, and Ratio refer to the three components of the fit-statistic explained above, while Composite refers to the composite fit-statistic. The quantities in the cells are $r^2$ -values. The study only uses $r^2$ -values for obtaining mean scores, because aggregating them would require the use of a weighted average, rather than a simple average.									

the validity of the Pearson criterion (which is the strongest of the three components) and the composite fit-statistic. Although the composite fit-statistic is conversely the strongest, at a threshold of 0.5, that difference is also negligible, and the goal of identifying the point of maximum validity remains appropriate for the next step.

### Optimizing the Validity Threshold

Table 3 displays the mean validities of the unstandardized composite fit-statistic across the same thresholds as give in the previous table. The optimum happens to occur at a threshold of 0.637. This correspond to  $z = 0.405$  standard deviations above the expected mean. Given that the true mean score changes from trial to trial, the  $z$ -criterion will serve to set the validity threshold in the analyses of the real data. This approach will automatically adjust for differences in mean scores that are likely to arise as the selections of variables change throughout the analysis.

### SAMPLE

The sample for the main validity analysis consists of between  $N = 780$  and  $N = 3,655$  pairs of nations or peoples, depending on the particular permutation of cultural dimensions that applies to a given test. Featured in these pairs are either 40 or 86 nations as represented by the Hofstede model (*cf.* Hofstede & Hofstede, 2005), with and without LTO, respectively, and 62 nations as represented by the GLOBE model (House *et al.*, 2004). The smallest possible sample for any given test ( $N = 780$ ) corresponds to Hofstede dimensions with LTO included; without LTO, the Hofstede sample features  $N = 3,655$  pairs. The GLOBE data, by comparison, will always feature  $N = 1,891$  pairs.

The sample reflects eight of Huntington's major civilizations, or 11 of the 12 civilizations or cultural groups identified by Voss *et al.* (2010) as reflected in Toynbee's (1946) model. For the latter, the missing civilization is the Anglo-Caribbean (identified by Huntington as a separate

	Validity Threshold								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
<b>Composite</b>	0.0001	0.0152	0.0620	0.1138	0.1841	0.2911	0.2829	0.2211	0.1143
Composite refers to the composite fit-statistic. The quantities in the cells are $r^2$ -values. This table shows that the unstandardized composite fit-statistic produces a maximum expected validity at a threshold between 0.6 and 0.7. Further analysis shows that the precise point of maximum validity is a threshold of 0.637, or a proportional distance from the expected mean of $z = 0.405$ .									

civilizational group), as the GLOBE data exclude the two countries at issue, namely, Jamaica and Trinidad and Tobago.

## MEASURES

Prior to the validity analyses, the procedure normed each cultural dimension in each of the three models (Hofstede, GLOBE practices, and GLOBE values), to a mean of 50 and a fixed standard deviation of 15. Prior to norming, the procedure first eliminated skew by using a logarithmic or an exponential transformation, depending on the direction of the skew. The purpose of this step was to remove artifactual differences, to ensure that all data behave similarly from a statistical perspective.

As noted previously, the composite fit-statistic consists of the average of the Pearson, Spearman, and ratio criteria. The prior discussion explains the rationale for the choice of the composite fit-statistic, so a description of the mathematics behind the ratio criterion is relevant here. First used in Voss *et al.* (2010), this involves gauging the total difference in magnitude between the two sets of scores. For example, if one country rates power distance as 80, while the other rates it as 60, power distance is 75% similar between them. This measure requires obtaining the product of the percentages of all four or five dimensions in the paired lists, and then restoring them to their original metric by obtaining the fourth or fifth root of the product, as appropriate. Thus, if one country reports PDI = 80, IDV = 80, MAS = 80, and LTO = 80, while the other reports a value of 60 in each position, the product (75% taken to the fourth power) is 31.6%. However, because the true difference is 75% throughout the comparison, it is clear that it will be necessary to restore 31.6% mathematically to the original 75%, so the solution is to obtain the fourth root in this case.

The analysis introduced by Voss *et al.* (2010) obtains a weighted average of these measures, by first setting them in the same metric. The ratio criterion has a minimum of zero and a maximum of one and is a percentage (*i.e.*, equivalent to an  $r^2$ -value), so the analyst must likewise transform

the Pearson and Spearman correlation coefficients into  $r^2$ -values, with a minimum of zero and a maximum of one. Because this transformation must preserve the value's negative quality, zero must reflect a correlation of negative one, while 0.5 represents a correlation of zero. After this, a simple average of the resulting  $r^2$ -values correctly renders the mean score. Analyses are easier without returning the score to the form of a correlation coefficient (*i.e.*, by reversing the process just noted), so that will be the practice here. However, when scoring dyads of nations, it may be clearer to return the score to its positive or negative square root.

Common-civilization scores come in two forms. The first comes in the form of a strict construal of Huntington's (1993) civilizational boundaries, ignoring disagreements with Toynbee (1946). The second corrects those civilizational boundaries according to the revised model presented by Voss *et al.* (2010), excepting inferences made in that study based solely on observed fit-statistics. Those exceptions include placing Israel in the Central European civilizational cluster, placing the Philippines in the Islamic civilization, placing Thailand in the Hindu-Buddhist civilization, and placing South African Whites in the Anglo-Britannic civilizational cluster. Huntington described Israel as most likely falling outside major civilizational boundaries, while Thailand belongs to a Buddhist group unaffiliated with either the Hindu or the Sinic civilizations. Huntington described South Africa as belonging to the African proto-civilization, so identifying South African Whites as belonging to the Anglo-Britannic cluster demands additional patience. The Philippines feature two civilizations at odds, including Mindanao Island in the south, which is Islamic and probably explains Voss *et al.*'s (2010) finding in that regard.

Against this backdrop, validity will consist of the simple correlation between binary tags that represent same or different civilizations, and binary tags that indicate a composite fit-statistic in excess of  $\text{CFit}_{\text{DYAD}} = \text{CFit}_{\text{MEAN}} + 0.405z$ . For example, if a given analysis produces a mean score across all dyads of  $\text{CFit}_{\text{MEAN}} = 0.4$ , with a standard deviation of  $z = 0.1$ , the analysis will code a dyad



TABLE 4  
CORRELATION MATRIX OF STANDARDIZED CULTURAL-DIMENSION VARIABLES

	1	2	3	4	5	6	7	8	9	10	11
1. PDI											
2. IDV	-0.58***										
3. MAS	0.16	0.08									
4. UAI	0.20	-0.16	-0.02								
5. LTO	0.18	-0.27	0.01	-0.12							
6. ASP	-0.18	0.20	0.23	0.19	-0.19						
7. ISP	-0.21	0.28*	-0.17	-0.50***	0.22	-0.33***					
8. IGP	0.71***	-0.63***	0.05	0.23	0.26	-0.08	-0.25				
9. FUP	-0.37***	0.33*	-0.09	-0.57***	-0.09	0.19	0.46***	-0.51***			
10. GEP	-0.17	0.33*	-0.15	0.10	-0.26	0.11	0.00	-0.26*	0.01		
11. HUP	0.11	-0.07	-0.12	-0.37***	0.00	-0.46***	0.37**	0.19	0.01	-0.13	
12. PEP	-0.27	0.23	0.08	-0.58***	0.16	0.12	0.44***	-0.23	0.61***	-0.28*	0.11
13. PDP	0.32*	-0.20	0.15	0.48***	-0.08	0.21	-0.40***	0.38**	-0.43***	-0.18	-0.28*
14. UAP	-0.47***	0.44**	-0.11	-0.63***	-0.13	0.05	0.44***	-0.61***	0.75***	-0.01	0.02
15. ASV	0.15	-0.04	0.13	-0.36*	0.17	-0.29*	0.26*	0.18	0.12	-0.07	0.34**
16. ISV	0.25	-0.37**	-0.01	0.40**	-0.14	0.16	-0.65***	0.23	-0.24	-0.19	-0.14
17. IGV	-0.13	0.10	-0.19	0.19	-0.58***	-0.26*	0.08	-0.07	-0.33**	0.24	0.06
18. FUV	0.44**	-0.29*	0.10	0.25	-0.18	0.00	-0.30*	0.42***	-0.48***	-0.23	0.10
19. GEV	-0.60***	0.52***	-0.09	0.02	-0.48**	0.26*	-0.11	-0.58***	0.33***	0.40**	-0.35**
20. HUV	-0.31*	0.45**	-0.06	-0.08	-0.19	0.39**	0.16	-0.29*	0.36**	0.20	-0.37**
21. PEV	-0.16	0.22	0.01	0.09	-0.65***	0.00	-0.29*	-0.25	-0.11	0.15	-0.19
22. PDV	-0.05	0.32*	0.11	-0.27	0.21	0.05	0.31*	-0.05	0.14	0.16	0.24
23. UAV	0.66***	-0.61***	0.03	0.34*	0.30	-0.05	-0.33**	0.71***	-0.60***	-0.11	0.15
12. PEP	12	13	14	15	16	17	18	19	20	21	22
13. PDP	-0.32*										
14. UAP	0.63***	-0.35**									
15. ASV	0.26*	-0.16	0.08								
16. ISV	-0.22	0.33**	-0.20	-0.33*							
17. IGV	-0.34**	0.29*	-0.24	-0.05	0.11						
18. FUV	-0.31*	0.57***	-0.47***	0.01	0.30*	0.38**					
19. GEV	-0.01	-0.05	0.27*	-0.26*	0.01	0.22	-0.42***				
20. HUV	0.12	0.29*	0.32*	-0.11	-0.16	0.01	-0.19	0.40**			
21. PEV	-0.22	0.34**	0.12	-0.04	0.24	0.52***	0.25*	0.33**	0.16		
22. PDV	0.32*	-0.33**	0.22	0.16	-0.27*	-0.19	-0.12	-0.28*	-0.15	-0.25	
23. UAV	-0.38**	0.36**	-0.60***	0.05	0.29*	0.02	0.55***	-0.65***	-0.34**	-0.14	0.10

\*p<.05,\*\*p<.01,\*\*\*p<.001. For PDI, IDV, MAS, and UAI, minN=39, maxN=85. For LTO, minN=32, maxN=61. For GLOBE variables (rows 6-23), minN=32, maxN=61.

as similar if its dyadic score is at or above  $C\text{Fit}_{\text{DYAD}} = 0.4405$ .

**Controls**

To keep extraneous methodological factors from affecting the comparison, the validity analysis uses weighted mean averages of the individual validity coefficients corresponding to all possible permutations of the four or five cultural dimensions in the GLOBE data, rather than attempting to select nominal equivalents between the Hofstede and GLOBE models. The other principle controls in this analysis consist of the previously discussed transformation of the original data to remove skew, standardize scores with fixed mean and standard deviation, and set the validity threshold to a function of each measured mean and standard deviation across all dyads.

**Results**

Table 4 presents bivariate correlations among all of the cultural-dimension variables, which are in standardized form (mean = 0 across all nations; standard deviation = 15), as explained under Controls, above. Immediately visible in this table is the fact that the analogous GLOBE Practices and Values correlate against one another in very uneven fashion. Occasionally, one may note a strong correlation in an expected direction, but the extent to which cultural dimensions seem to defy expectations is considerable.

Tables 5 and 6 present the results of the 4- and 5-factor validity studies, respectively, against the Huntington (1993) model and the Toynbee-based improved model by Voss *et al.* (2010). The results support all of the foregoing hypotheses, relating to validity in both the Hofstede and GLOBE models, consistently, based on the criterion of statistical significance. The Hofstede model, however, whether in the form of four or five variables, is clearly superior in terms of the strength of validity against the Toynbee civilizational model, while the Huntington civilizational model produces mixed results. Meanwhile, GLOBE Practices produced inferior results in all four tests.

The difference between Hofstede-4 and GLOBE Values-4 against the Huntington model falls short of significance ( $\Delta r^2 = .0009$ , Hofstede-4 over GLOBE Values-4, n.s.). In the 5-variable case, however, it is indeed significant, despite its small magnitude ( $\Delta r^2 = .01$ , GLOBE Values-5 over Hofstede-5,  $p < .0001$ ). Against the Toynbee model, by comparison, the Hofstede model, in both four and five variables, is clearly stronger ( $\Delta r^2 = .04$  in both cases,  $p < .0001$ ).

**Discussion**

This paper set out to compare the validity of Hofstede’s cultural dimensions and the GLOBE project’s lists of culturally informed practices and values, respectively. The results show all three models (differentiating GLOBE Practices from GLOBE Values) are significant predictors

**TABLE 5**  
**FOUR-VARIABLE VALIDITY COMPARISON AGAINST CIVILIZATION MODELS**

	Criterion								
	Hofstede <sup>a</sup>			GLOBE Practices <sup>b</sup>			GLOBE Values <sup>c</sup>		
	r	t	p	r	t	p	r	t	p
Huntington Model	.2359	14.50	< .001	.1215	5.23	< .001	.2340	10.29	< .001
<b>Toynbee Model<sup>d</sup></b>	.2669	16.54	< .001	.1535	6.64	< .001	.1825	7.94	< .001
<sup>a</sup> Hofstede: PDI, IDV, MAS, and UAI only ( $N = 3,570$ ). <sup>b</sup> GLOBE Practices: Weighted mean of validity coefficients for 126 permutations of four variables ( $N = 1,830$ ). <sup>c</sup> GLOBE Values: Same as GLOBE Practices. <sup>d</sup> The Toynbee model used herein includes the African, Ibero-American, and Korean-Japanese civilizations. The Slavic-Orthodox civilization featured in this analysis includes all Christian Orthodox nations, including Greece. In all other ways, the Toynbee model follows the details covered in the foregoing discussion.									

**TABLE 6**  
**FIVE-VARIABLE VALIDITY COMPARISON AGAINST CIVILIZATION MODELS**

	Criterion								
	Hofstede <sup>a</sup>			GLOBE Practices <sup>b</sup>			GLOBE Values <sup>c</sup>		
	r	t	p	r	t	p	r	t	p
Huntington Model	.2352	14.46	< .001	.1344	5.80	< .001	.2611	11.57	< .001
<b>Toynbee Model<sup>d</sup></b>	.2854	17.79	< .001	.1712	7.43	< .001	.2051	8.96	< .001
	<sup>a</sup> Hofstede: PDI, IDV, MAS, UAI, and LTO ( $N = 3,570$ ). The analysis computes fit-statistics for all available cultural dimensions in each comparison dyad, but only 780 dyads include LTO for both nations. <sup>b</sup> GLOBE Practices: Weighted mean of validity coefficients for five-variable permutations ( <i>i.e.</i> , 126) five-variable permutations ( $N = 1,830$ ). <sup>c</sup> GLOBE Values: Same details as GLOBE Practices. <sup>d</sup> The Toynbee model for this purpose includes the African, Ibero-American, and Korean-Japanese civilizations, while including all Christian Orthodox nations in a Slavic-Orthodox civilization, in addition to the other entities previously discussed.								

of the civilization models, but the Hofstede and GLOBE Values models are strongest overall, when one includes both civilization models as criteria of comparison. Limiting the analysis to the more accurate Toynbee-Huntington model (*i.e.*, Toynbee's model with the addition of Huntington's recognition of Latin America [*qua* Ibero-America] and Africa as additional civilizations), only the Hofstede model demonstrates consistently strong predictability.

Although Hofstede (2006) proposed an empirical mode of equivalence between the Hofstede and GLOBE models, assessment of precisely how such a proposal might influence the question of civilization-based validity lay outside the parameters of the present study. Nevertheless, it is clear that simple substitutions of nominally analogous cultural dimensions from one data set to the other is impractical, given the uneven pattern of correlations between them. In addition, the question of an optimal number of cultural dimensions, as suggested by Hofstede (2006), remains worth pursuing. Specifically, in view of the larger number of variables present in the GLOBE data set, compared to the published Hofstede data, the possibility that some of them might constitute motivational domains rather than cultural dimensions (*i.e.*, behave apolarly rather than bipolarly from the perspective of semantics) is pertinent. Future studies should consider whether significant relationships between selected GLOBE and Hofstede data

emerge from composite constructions under this assumption, as well as whether such relationships suggest a distinction between motivational domains and *bona fide* cultural dimensions. Future research should also continue to work carefully with the Hofstede and GLOBE models to confirm their points of intersection and produce some synergy on the matter of scoring dyads of nations. This paper has already shown that scoring countries on their cultural similarity is eminently feasible using either the Hofstede or the GLOBE Values model. Given that the GLOBE model clearly contains a valid core, further work should attempt to determine how exactly to construe it.

Additional work should furthermore try to determine whether any data from the World Values Survey might be construable in some combination as one or more cultural dimensions. Such an insight could be useful for extending one or the other model to a larger number of countries, and it would be worthwhile even if the contribution only consisted of a single observation for several more countries (indeed, the world is in need of supplements to compensate for missing LTO data in most countries). Nevertheless, it is important to exercise caution against drawing too much information from indirectly related data. That is always a prominent challenge in the present line of research. Cultural dimensions are delicate reflections of collective human motivation.

It is easy to misconstrue them when confronted by attractive databases.

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# THE IMPACT OF ORGANIZATIONAL CONTEXT ON TURNOVER AND JOB SATISFACTION: A MULTI-ANALYSIS STUDY OF BANK EMPLOYEES

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## ABSTRACT

*With the recent turmoil of the financial industry, banks have more challenges today than ever. Some of these challenges, such as government involvement and restriction, are out of the control of financial organizations. One problem that may be predicted and controlled by institutional leaders, however, involves the satisfaction and retention of their own employees. Because research indicates that organizational culture and climate affect employee career decisions (Van Vianen, 2000; Young & Hurlich, 2007), the purpose of this research is to specifically identify the cultural elements that have the strongest impact on job satisfaction and intentions to leave. As organizational climate is often examined in conjunction with organizational culture, we will also identify those characteristics of climate that influence job satisfaction and intentions to leave. Further analysis explores the relationships with leadership style and our dependent variables. We collected data from a medium-sized regional bank located in the Southeastern section of the United States. Results of our analysis indicate that employee welfare was the most important variable in determining both job satisfaction and intent to leave.*

## INTRODUCTION

With the recent turmoil in the financial industry, caused partly by a poor economy involving budget cuts, foreclosures, and stock market volatility, banks have more challenges today than ever. Some of these challenges, such as government involvement and restriction, are out of the control of financial organizations. One problem that may be predicted and controlled by institutional leaders, however, involves the satisfaction and retention of their own employees. Research suggests that organizational culture and climate affect employee career decisions (Van Vianen, 2000; Young & Hurlich, 2007). Thus, employees who fit happily into the culture and/or climate

of their organizations are less likely to search outside their own company for employment. Additionally, the culture and the climate, or context, of an organization is greatly affected by the leader of that company, division, or department. The ability of leaders to identify contextual elements most important to job satisfaction and turnover can reduce many problems and save money. When employees are disgruntled or unhappy with their jobs, they may exhibit negative behaviors like sabotage, theft, or violence. They may also leave the company, costing much in lost productivity and human resource expense. In this study, we identify characteristics of climate,

culture, and leadership which influence job satisfaction and intentions to leave.

### LEADERSHIP

Two forms of leadership often discussed in the literature are transformational and transactional. The transformational leader possesses charisma and is able to simply be supportive rather than directive when the situation allows (Hersey and Blanchard 1969; Hersey and Blanchard 1977; Hersey and Blanchard 1984). There is a religious-like motivation that the leader is able to instill in the employees, whereas, the transactional leader appeals to employees' self-interest rather than raise the levels of morality and motivation (Burns 1978). Transformational leadership processes may align followers' work-oriented values with those of the greater group or organization (Bass et al. 1987a; Burns 1978; Conger & Kanungo, 1988).

Leadership studies often focus on a top ranking corporate officer. However, Yammarino (1994) notes that one will find transformational leaders in all areas and positions. They may be formal leaders, such as those appointed by the organization. But they can also be found in informal settings, such as friendship or interest groups. Leadership qualities can trickle down through layers of the hierarchy. In fact, the relationship between the leadership style of the person in charge and the operating employees may be irrelevant. It may be the immediate supervisor's leadership behavior that influences success rather than the person in charge of the project or organization (Bass and Avolio, 1994).

### ORGANIZATIONAL CULTURE AND CLIMATE

The anecdotal evidence of organizational context leads to basic research questions. What are the prevalent aspects of organizational culture? What are the drivers of culture? While aspects of culture are often referred to when describing the work environment and explaining behavior, there frequently lacks a clear distinction between organizational culture and climate. For some, there is no distinction and the terms are used interchangeably. One explanation proposed by Svyantek and Bott (2002) defines organizational

culture as a set of shared values and norms held by employees. These values and norms guide interactions with peers, management, and clients. Organizational climate, on the other hand, represents employees' perceptions of organizational policies, practices and procedures that support creativity, innovation, safety or service (Patterson, Warr & West, 2004). Climate might be considered a manifestation of culture (Schein, 1985, Schneider, 1990). The atmosphere created by the established norms and perceptions of policies and procedures can impact an individual's level of job satisfaction and intentions to leave the organization (Hatton, et. al., 1999; Reigle, 2001).

The importance of culture in an organizational setting is recognized in all lines of business (Preston, 2002). While there is not agreement either on the level of analysis or interpretations of quantitative measurement of culture, organizational behavior is often explained by the examination of the organizational context (O'Reilly, Chatman, & Caldwell, 1991). Therefore, research focuses on the values and assumptions that form culture. As O'Reilly et al. (1991) explain, "If there is strong and widespread agreement about the salience and importance of specific values, a central value system or unit culture may exist (p. 493)." Thus we turn toward the degree of fit between the employee and their organization.

Researchers have provided us with empirical evidence of the importance of "fit" between an employee and the organizational culture (Person-Organization fit, P-O, or Person-Person fit, P-P). For example, the fit between an individual's preference for a particular culture and the culture of the organization joined is related to commitment, satisfaction, and turnover (O'Reilly, et al., 1991). Van Vianen (2000) looked at both the organizational preferences between a newcomer and the organizational values (P-O) and the fit between the newcomer and others in the organization (P-P). One finding of this study suggests that a newly hired employee's concern for people (P-P) fit with the supervisor was related to organizational commitment and turnover intentions.

Researchers have also explored specific professions and their organizational culture. For example, Ross (2000) describes the relationship between organizational culture and the high rate



of turnover for many people in software development and test positions. She notes that many people in these stations change jobs or companies almost annually. One reason is the practice of rewarding individual behavior rather than teamwork, which fosters unhealthy competition. Another reason for the frequent job change as identified by Ross is the placement of immature or insecure persons in management roles. Persons that lack relevant experience and/or compassion can have an adverse impact on culture (Ross, 2000).

Thus, support for a fit between organizational culture and employees exists. But, do identical cultures impact males and females the same way? Young and Hurlic (2007) developed a model of person-organizational fit based on gender theories, gender enactment, person-group fit and person-organization fit. They suggest that deviations from accepted gender-related behaviors can lead to stress and lower levels of self-efficacy, while also influencing career decision-making.

Van Vianen and Fischer (2002) examined the relationships among gender, organizational culture preferences and ambition. In this research a feminine dimension of organizational culture was operationalized with three scales: positive feedback, peer cohesion, and participation. Masculine dimensions of organizational culture were operationalized also with three scales: work pressure, effort, and competition. Gender differences in culture preferences were found for lower level employees, but not for employees at management levels. In general they found that, even in more feminine-oriented organizational cultures, managers have relatively high masculine culture preferences compared with other employees in the same organization.

There is as much controversy over the definition of organizational climate as there is with organizational culture. Climate is typically thought of as shared perceptions of organizational policies, practices, and procedures, both formal and informal. It may reflect the organization's goals and the means to reach those goals (Siu, 2002). It is a descriptive concept referring to facts about the organizational environment (Patterson, et al., 2004).

Organizational climate has been found to impact job satisfaction, absenteeism (Siu, 2002), and productivity (Patterson, et al., 2004). Payne, Fineman, and Wall (1976) found that perceptions of an organization's emphasis on achievement, affiliation, autonomy, and understanding highly correlated with satisfaction of those aspects of climate. Perceived organizational climate and person-organization fit have also been linked with employee behaviors and performance at the organizational level (Patterson, et al., 2004). Research in equal opportunity climate (EOC) within organizations also suggests higher organizational commitment in employees perceiving an equitable climate (Landis & Dansby, 1990). The links between organizational climate and behaviors are numerous. Job Satisfaction (James & Jones, 1980; James & Tetrick, 1986; Mathieu, Hoffman, & Farr, 1993) and turnover intentions (Rentsch, 1990; Rousseau, 1988) are just two outcomes that are impacted by climate.

## METHOD

### Data Collection

The focus of this study is on a single, medium-sized financial institution with branches within one state. Top management of the institution strongly supports research of organizational behavior issues and was instrumental in communicating the desire for cooperation with the educational communities involved. Thus we were able to distribute the online survey link to 225 employees and within one week, receive 194 responses, resulting in a response rate of 86%.

The sample consisted of 81% female respondents. The age range was from 20 to 70, with 55% between the ages of 40 and 60, and another 15% in the age range of 31 to 40. The sample was also mostly White (non-Hispanic) at 95%. Over 46% of the respondents had been with the company 10 years or longer.

### Leadership

To measure the dominating leadership, Bass and colleagues' (1987) instrument was adapted. Their research resulted in five dimensions or factors of leadership. Charisma, individualized consider-

ation, and intellectual consideration are three active dimensions of the transformational leader. Contingent reward is one active dimension of the transactional leader and management by exception one passive dimension of the transactional leader. From each of these five dimensions, two items with the highest loadings as previously used in leadership research (Parzinger, Nath & Lemons, 2001) were chosen and included in the survey instrument.

Data was acquired by requesting the respondent to judge how frequently the respondent's current immediate supervisor had displayed behavior indicative of transactional and transformational styles of leadership. The respondent's manager was assigned to the leadership style with the higher mean. If the two means were identical, no style was assigned. Each item is rated on a 5-point scale (1 = Not at All, 2 = Once in a While, 3 = Sometimes, 4 = Fairly Often, 5 = Frequently, If Not Always). While a leader may have some characteristics of either style, a dominating mode usually surfaces. The mean of the 6 items indicative of Transformational leadership style was

compared with the mean of the 4 items describing transactional leadership style (see Appendix for Survey items). Table 1 presents the descriptive statistics of all variables of this study.

### Culture

Though there are several organizational culture scales in the literature, the items devised by Van Vianen and Fischer (2002) were incorporated into this survey. These researchers selected "these culture preference scales based on two dimensions of Quinn's (1988) Competing Value Framework: the human relations culture and the rational goal culture. The human relations culture reflects a concern for people, by emphasizing cohesion, participation, and cooperation, which is stereotypically associated with a feminine orientation. The rational goal culture focuses on achievement, rewards, and compensation, and thus reflects a concern for goal accomplishment, which is stereotypically characterized as a masculine orientation (319)." In a prior study by Van Vianen (2000), these

**TABLE 1  
DESCRIPTIVES**

	Mean	Std Dev	Minimum	Maximum
Positive Feedback	4.43	.74	1.50	5.00
Integration	3.53	.56	2.20	4.80
Pressure	4.00	.61	1.75	5.00
Participation	4.05	.83	1.50	5.00
Effort	3.61	.65	1.50	5.00
Competition	3.97	.72	1.00	5.00
Reward	4.07	.78	1.00	5.00
Autonomy	3.16	.51	1.6	4.60
Collegiality	4.39	.66	2.00	5.00
Welfare	3.82	.52	1.50	4.33
Training	3.68	.57	1.75	4.50
Performance Feedback	3.70	.56	1.80	4.60
Formalization	3.89	.50	2.00	4.75
Traditional	2.28	.70	1.00	5.00
Satisfaction	4.44	.78	1.00	5.00
Transformational	3.78	.79	1.33	5.00
Transactional	3.53	.71	1.75	5.00
Intent	1.57	.73	1.00	5.00

dimensions were found to be basic dimensions of both organizational culture and culture preferences (see Appendix for Survey items).

### **Climate**

There are various measures of organizational climate in the literature. The Organizational Climate Questionnaire (OCQ) by Litwin and Stringer (1968) may be the best known general measure, however, there is some evidence that it lacks validity and is not a consistent measurement device (Rogers, Miles, and Biggs, 1980). As an alternative, a number of culture questionnaires have been published, but they can also be seen as measures of climate when using the definition of climate provided by Schein (2000).

Patterson and colleagues (2004) have developed and validated an organizational climate measure which is to be used in this study. It is a comprehensive scale and notes that researchers are unlikely to apply all 17 dimensions of the instrument. However, the instrument has been developed in such a fashion that it can be used in a more refined way by selecting scales most applicable to the research questions being posed.

The Organizational Climate Measure (OCM), which was based upon Quinn and Rohrbaugh's Competing Values model, was used to sample 6,869 employees, across 55 manufacturing organizations. The 17 scales contained within the measure had acceptable levels of reliability and were factorially distinct. Concurrent validity was measured by correlating employees' ratings with managers' and interviewers' descriptions of managerial practices and organizational characteristics. Predictive validity was established using measures of productivity and innovation. The OCM also discriminated effectively between organizations, demonstrating good discriminant validity. The results gave almost identical fit indices for the 17 factor model across all job types (Patterson, et. al., 2004) (see Appendix for Survey items).

### **Intent to Leave**

Intentions to leave an organization were measured with two 5-point Likert-type questions as used in the O'Reilly et al. (1991) assessment of

person-organization cultural fit. Our estimate of reliability using Cronbach's alpha was .63 (see Appendix for Survey items).

### **Job Satisfaction**

Two items were constructed for the measurement of Job Satisfaction. This approach has been used in a study by Siu (2002) when examining organizational climate as a predictor of job satisfaction in samples of Hong Kong nurses. (Organization has replaced the word hospital in the second item for our research.) Our reliability estimate using Cronbach's alpha was .89.

Items are rated by a 5-point scale from very satisfied (5) to very dissatisfied (1). The first item was found to be correlated highly with the five items measuring satisfaction with the job itself devised by Cooper and William (1996), and the second item was found to be correlated highly with the six items measuring satisfaction with the organization devised by Cooper and Williams (1996). The mean of these two items measures job satisfaction (see Appendix for Survey items).

## **ANALYSIS AND RESULTS**

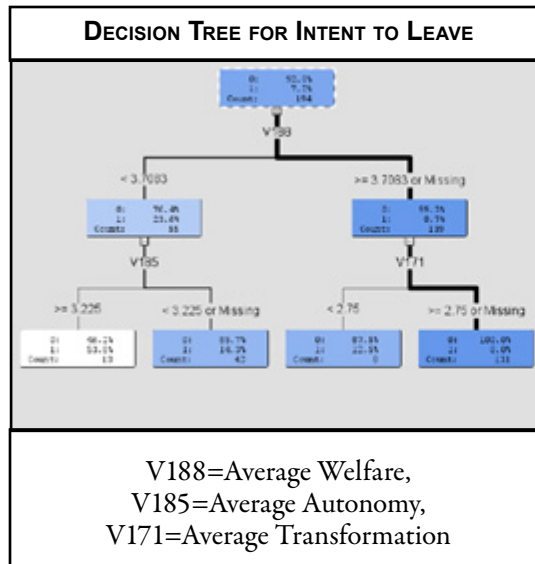
The analysis of the data focused on two aspects that may reflect contentment with the current working conditions: 1) the level of job satisfaction experienced by each employee and 2) the level of each employee's intent to leave the employer. In order to determine if culture, climate, or leadership style attributed to either of these, various methods of evaluating the data were employed. Using both a Decision Tree and a Regression equation, variables influencing our measures were identified. In addition, these means of discovery can be used as models to predict contentment of future employees. A third model, Neural Networks was also used to determine if it might improve predictability for employees not in the data analysis. However, this approach is often considered a black box and does not assist in explaining the impact of culture, climate of leadership style.

The original survey data was collected on a Likert scale from 1 to 7 or 1 to 5, with 3 being a midpoint. However, in order to build and compare decision trees, logistic regression models, and

neural networks, both independent variables, Job Satisfaction and Intent to Leave the Organization, were converted to binary measures. If the average Job Satisfaction measure was less than 3 for a respondent, it was converted to a measure of dissatisfaction. If Intent to Leave was greater than or equal to 3, the respondent was considered to have intentions of leaving the organization. The conversion was performed in this manner so that the focus of the analysis would be on the negative end of employee responses. The rationale being that if the models can identify those aspects of culture, climate, and leadership which impact an employee's job dissatisfaction and high intentions to leave, management would have the opportunity to adjust the environment and retain the employee.

The data analysis was performed using SAS Enterprise Miner software. The 3 models were constructed by first partitioning the responses into training and validation data sets. The training data set was used to build the models while the data in the validation partition was used to measure the adequacy of the models. The validation data set acts as a representation of the general population under examination and helps avoid the development of a model that is over-fitted to the training data set or too generalizable to be a good predictor. In order to capitalize on all the data available, means were substituted for missing interval data when building the regression and neural network models. The software tool provided several options for building the models. For example, Decision Trees were constructed using input variables only once in the analysis and limiting the number of branches to 2.

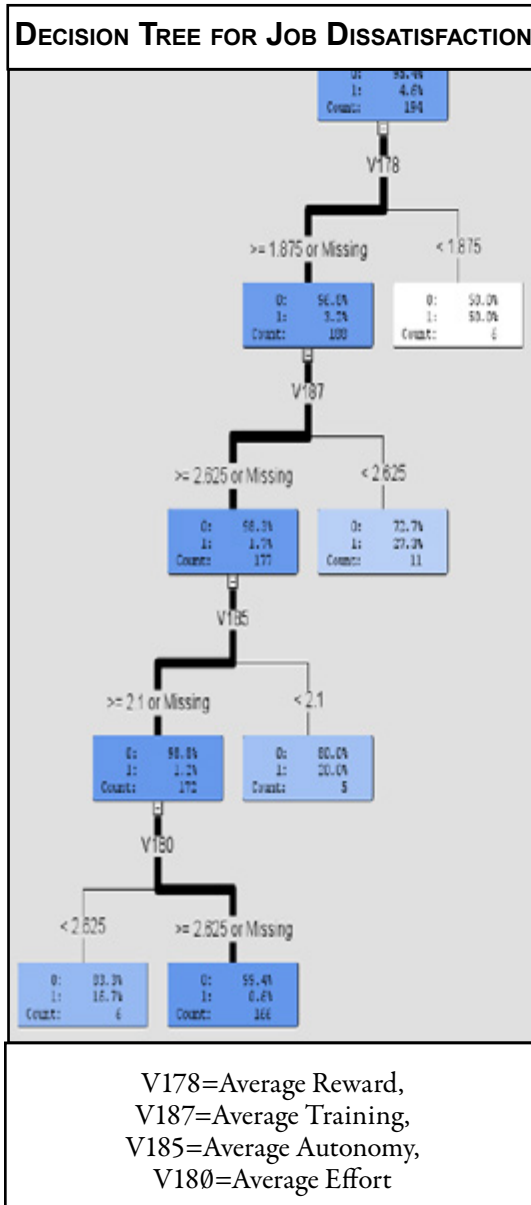
The Decision Tree used to predict an employee's intent to leave the organization is below along with the legend for the branches. It can be used to predict the likelihood that a particular employee will leave the organization. It begins with Average Welfare. An individual most likely to leave the organization will have an Average Welfare measure less than 3.71 (on a 5-point scale) and Average Autonomy will be greater than or equal to 3.23 (on a 5-point scale). The individual least likely to leave the organization will have an Average Welfare score greater than or equal to 3.71 and a Transformational measure of their supervisor of 2.75 or above.



A similar Decision Tree model was built to identify important factors in an employee's job dissatisfaction. The Tree and variable codes are presented below. A review of the results suggests that the likelihood of an individual being dissatisfied with their job begins with Average Reward and is the primary predictor. If the Average Reward measure of an employee is less than 1.88, then there is a 50% chance that that person is dissatisfied. An individual least likely to be dissatisfied with their job will have an Average Reward measure greater than 1.88, Average Training will be greater than or equal to 2.63, Average Autonomy will be greater than or equal to 2.1, and Average Effort will be greater than or equal to 2.63, all on a 5-point scale.

The second technique used to identify important culture, climate or leadership styles was regression analysis. Logistic regression produces a model which highlights the importance of employee Welfare in predicting an employee's intention of leaving the organization. In fact, this is the only culture, climate or leadership variable which significantly predicts an employee's intention of leaving the organization ( $p < .0001$ ).

The same form of statistical analysis was used for job dissatisfaction. Logistic regression produces a model which again highlights the importance of employee Welfare. However, utilizing this technique identifies both Average Welfare and Average Traditional aspects of culture and cli-



mate as significantly impacting an employee’s level of job dissatisfaction ( $p=.05$ ).

In order to determine which method, Decision Tree or Logistic Regression, produces the best predictive model, the Average Squared Error was chosen as a fit statistic. The model producing the lowest error score for the validation dataset represents the better of the two methods for predicting future cases or employees’ Intent to Leave or Job Dissatisfaction. A third method of analysis, Neural Networks, was utilized as well in order to determine if it might produce a model with an even lower Average Squared Error. The fit sta-

istics are presented below. As can be seen, Logistic Regression produced results with the least amount of error.

	Job Dissatisfaction	Intent to Leave
Decision Tree	.049	.064
Logistic Regression	.041*	.055*
Neural Network	.100	.197

\*- Indicates logistic regression is the best of the three models constructed.

**DISCUSSION**

Several limitations merit discussion. First, since this was a case study of a single organization it is impossible to generalize these results. Further research could be conducted on entire industries to determine any properties that might surface. Second, the organization surveyed had an unusual demographic make-up. Even though this study was of a financial institution, which is traditionally male-dominated and full of transactional leaders, the majority of employees surveyed were female and 65% of the managers were identified as transformational by their employees.

Having such a high number of transformational leaders may be one reason this specific organization has recently been recognized as being one of the best places in the southeastern region to be employed. Therefore, the data was skewed in that most employees were satisfied and intended to remain with the company. Finally, with current economic conditions, the intent to remain with an organization may have more to do with high unemployment and financial instability than with leadership style, climate, or culture. In critical times such as this, unless directly approached by another company, people tend to stay where they are currently employed.

A result of the research herein suggests that of the models used, the logistic regression model gave the best fit of the data we analyzed. Using this model, we were able to determine the importance of employee Welfare in predicting an employee’s intention of leaving the organization. (Refer to Section III, Questions number 3, 10, 17, and 24 in the Appendix for items measuring Welfare.) This was the only culture, climate or leadership variable which significantly ( $p<.001$ ) predicted

an employee's intention of leaving the organization where we collected data. Additionally, we identified the importance of employee Welfare in job satisfaction. However, logistic regression identifies both Average Welfare and Average Traditional aspects of culture and climate as significantly impacting an employee's level of job dissatisfaction ( $p=.05$ ). (Refer to Section III Questions number 7, 14, 21, and 28 in the Appendix for items measuring Tradition.) Again, the uncertainty of our economy may well prove to be an important factor, as employees today are more concerned with the future of employee benefits (i.e., health care) and financial ruin than how satisfied they are with contextual aspects of the organization.

### CONCLUSION

The purpose of this research was to specifically identify the contextual elements that have the strongest impact on job satisfaction and intentions to leave in a specific organization. We take a multi-analyses approach in our study by testing the data using multiple regression, decision trees and neural networks. There are many aspects of leadership, organizational culture and climate. Those that are important to an individual's job satisfaction and intent to leave the organization are highlighted in this research without regard to generalizability. On the other hand, our demonstration is one way of predicting job satisfaction and employee turnover, as well as the many areas of culture or climate which will have the greatest impact on both variables. Future research may also find that the dimensions vary amongst industry, professions, and individual traits.

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## APPENDIX: SURVEY ITEMS

### Section I: Leadership

1. Makes everyone around him/her enthusiastic about assignments.
2. Tells me what to do if I want to be rewarded for my efforts.
3. I have complete faith in him/her.
4. There is a close agreement between what I am expected to put into the group effort and what I can get out of it.
5. Enables me to think about old problems in new ways.

6. Gives personal attention to members who seem neglected.
7. As long as the old ways work, he/she is satisfied with my performance.
8. Finds out what I want and tries to help me get it.
9. He/She is content to let me continue doing my job in the same way as always.
10. His/Her ideas have forced me to rethink some of my own ideas, which I had never questioned before.

### Section II: Culture

1. Thoroughly discussing decisions with employees.
2. Presence of pressure for an individual to achieve.
3. Encouragement between personnel.
4. Emphasizing that work is more important than free time.
5. Making it clear how much an individual has achieved.
6. Encouraging individuals who want to be the "best."
7. Telling personnel they have done a good job.
8. Material rewards for achievements.
9. Emphasizing that one should "want to excel."
10. Atmosphere of loyalty.
11. Asking for more effort than is really necessary.
12. Employee input in decisions that are being made.
13. Striving for a competitive atmosphere.
14. Telling personnel that a good performance is valued.



15. Direct association between achievements and awards.
16. Encouraging mutual interest.
17. Management is demanding.
18. Encouraging employees to contemplate decisions.
19. Regarding extra work as normal.
20. Management showing their appreciation for good work.
21. Stimulating personnel to be better than others.
22. Introduction of new employees.
23. The person who achieves the most also earns the most.
24. Mutual communications between management and subordinates.
25. Asking a lot from your personnel.
26. The fact that personnel does work in their leisure time.
27. Challenging personnel to compete with others.
28. Rewarding the exceptional achievements.
7. Changes in the way things are done here happen very slowly.
8. Management trusts people to take work-related decisions without getting permission first.
9. People in different departments are prepared to share information.
10. This company tries to look after its employees.
11. People receive enough training when it comes to using new equipment.
12. People don't have any idea of how well they are doing their job.
13. People can ignore formal procedures and rules if it helps get the job done.
14. Senior management likes to keep to established, traditional ways of doing things.
15. People at the top tightly control the work of those below them.
16. There is very little conflict between departments here.
17. This company cares about its employees.
18. People are strongly encouraged to develop their skills.

### **Section III: Climate**

1. Management lets people make their own decisions much of the time.
2. People are suspicious of other departments.
3. This company pays little attention to the interests of employees.
4. People are not properly trained when there is a new machine or piece of equipment.
5. People usually receive feedback on the quality of work they have done.
6. It is considered extremely important here to follow the rules.
19. In general, it is hard for someone to measure the quality of their performance.
20. Everything has to be done by the book.
21. The way this organization does things has never changed very much.
22. Management keeps too tight a reign on the way things are done around here.
23. Collaboration between departments is very effective.
24. This company tries to be fair in its actions towards employees.

25. The company only gives people the minimum amount of training they need to do their job.
26. People's performance is measured on a regular basis.
27. It's not necessary to follow procedure to the letter around here.
28. Management is not interested in trying out new ideas.
29. It's important to check things with the boss before making a decision.
30. There is very little respect between some of the departments here.
31. The way people do their job is rarely assessed.
32. Nobody gets too upset if people break the rules around here.

#### **Section IV: Job Satisfaction**

1. All in all, how satisfied are you with your job?
2. All in all, how satisfied are you with the organization you work at?

#### **Section V: Intent to Remain with Organization**

1. To what extent would you prefer another job to the one you work in now?
2. To what extent have you thought seriously about changing organizations since beginning to work here?
3. If you have your own way, will you be working for this organization three years from now?

# CLLOUD COMPUTING: DIFFERENCES IN PUBLIC AND PRIVATE SECTOR CONCERNS

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## ABSTRACT

*This paper addresses the research question: Do sector-level cultural differences influence the importance placed on concerns about the potential adoption of cloud computing? To answer this question, a survey based on previous efforts that measured private sector IT professionals' perceptions of an emerging technology (cloud computing) was replicated using a public sector sample of military and civil service IT professionals. Results indicate that there are significant differences between how members of private and public sector organizations rate the concerns surrounding the potential adoption of new technologies. Specifically, the public sector members were more concerned with availability and performance issues, and less concerned with on-demand costs or ability to bring the IT capabilities back in-house.*

## INTRODUCTION

In August, 2008, CIO Research surveyed 173 Information Technology (IT) and business leaders to get first-hand feedback on what enterprises really think about cloud computing, and how, when and why they planned to deploy it in their organizations. The respondents included 93 heads of IT at their company or business unit level. The survey found that 58 percent said that cloud computing would cause a radical shift in IT and 47 percent said they were already using it or actively researching it (McLaughlin, 2008). Supporting this finding, a recent report by **International Data Corporation (IDC)** shows worldwide revenue from IT cloud services exceeded \$16 billion in 2009 and is forecast to reach \$55.5 billion in 2014. This trend represents a compound annual growth rate of 27.4%, which is over five times the projected growth rate for

traditional IT products. The recent economic downturn has accelerated the adoption of cloud services adoption due to the great potential for cost-cutting that has become the mantra of most organizations (IDC, 2011).

Many reports can be found on the success stories of the benefits gained from adopting cloud computing in one form or another, with claims of estimated savings reaching 40% (Del Nibletto, 2011). But, that doesn't mean there have not been investigations into the concerns surrounding its adoption into the organization. All of these reports, though, have all been in the context of private commercial organizations. Although the benefits of adopting cloud computing should translate into the public sector as well, adoption in this sector seems to be lagging.

One potential reason for this discrepancy lies in the cultural differences between public and private sector organizations. This paper reports on an early exploratory effort to examine the differences in ratings of IT professionals in public and private sector organizations concerning the issues surrounding promising emerging new technologies, such as cloud computing. Specifically, this effort addresses the question: Do sector-level cultural differences influence the importance placed on concerns about the potential adoption of cloud computing?

## BACKGROUND

When examining the determinants of innovation adoption, past research suggests that it is necessary to look at different contexts (Thong, 1999). In response, technological innovation research has determined several variables for studying organizational adoption in addition to innovation characteristics. For example, Tornatzky and Fleischer (1990) proposed that technological context, organizational context, and environmental context influence the process by which innovations are adopted. Damanpour (1991) argued that organizational innovations are affected by individual, organizational and environmental factors. Grover (1993) proposed that organizational factors, policy factors, environmental factors, support factors, and system-related factors determine the adoption of interorganizational information systems. Thong (1999) identified four elements of context that affects the adoption of technological innovations by organizations: characteristics of the organizational decision makers; characteristics of the technological innovation; characteristics of the organization; and characteristics of the environment in which the organization operates.

Although all of these studies were done in a private sector context, similar lenses have been used to investigate the adoption of computer technologies in public sector organizations. For example, Bingham (1976) identified four categories of factors that affect adoption of computer technologies: organizational characteristics; demand for computing; community environment; and organizational environment. Perry and Kramer (1999) investigated the effects of extra-organizational characteristics, intra-organizational

characteristics, and innovation attributes as the key determinants of the adoption of computer technologies by local government agencies. Thus, when examining the potential differences in the perceptions of IT professionals, the type of organizational context, whether private sector or public sector, will potentially have a significant impact.

## Private versus Public Sector

The distinct differences between private and public organizations are the core of public administration theory and have been the topic of on-going research. The main conventional distinction between public and private organizations is their ownership (Rainey, Backoff, & Levine, 1976). Private firms are owned by entrepreneurs or shareholders. Public agencies are owned collectively by members of political communities. The literature on the differences between public and private organizations is summarized by Rainey, et al. (1976). Stated in terms of the public sector's characteristics relative to those of the private sector, these differences include:

1. **Environmental Factors:** Public sector organizations have less market exposure (and therefore more reliance on appropriations) resulting in less incentive for productivity and effectiveness, and lower cost efficiencies; more legal and formal constraints; and higher political influences, including impacts of interest groups and need for support of constituencies.
2. **Organization/Environment Transactions:** Public sector organizations have more mandatory actions due to the unique sanctions and coercive powers of government; wider scope of concern and significance of actions in the "public interest"; higher level of scrutiny of public officials; and greater expectation that public officials act fairly, responsively, accountably, and honestly.
3. **Internal Structure and Processes:** Public sector organizations have more complex

criteria (e.g., multiple, conflicting, and intangible); managers with less decision making autonomy, less authority over subordinates, greater reluctance to delegate, and a more political role for top managers; more frequent turnover of top managers due to elections and political appointments; difficulties in devising incentives for individual performance; and lower work satisfaction and organizational commitment.

Taking all of this into account, it is clear that market-based IT practices that work well in the private sector may not automatically or easily transfer to the public sector. This is attributable to the differences between the public and private sector discussed above, as well as more specific differences in the nature of the IT management environment in the private versus the public sector. Bretschneider (1990) empirically tested the argument that IT management in public organizations differs from that of the private sector. Using a sample of 1,005 public and private sector organizations, his study concluded that the two environments are indeed different. He found that the critical difference was that the public sector features greater interdependencies across organizational boundaries, which in turn, contribute to increased accountability and coordination problems. Additionally, public sector IT managers are confronted with greater external review and control by third parties, as well as being subject to a host of regulatory, legislative, and political influences.

Using these general and specific IT management differences between public and private sector enterprises, and some propositions on public information systems (Bozeman & Bretschneider, 1986), the expected differences in perceptions of the concerns surrounding the adoption of new technology innovations are presented.

### **Concerns with Adopting New Technologies**

The survey concerning cloud computing conducted by CIO Research in 2008, elicited responses in thirteen categories. These categories included: security, integration with existing systems, loss

of control over data, availability, performance issues, IT governance issues, regulatory/compliance concerns, dissatisfaction with vendor offerings/pricing, ability to bring back in-house, lack of customization opportunities, measuring ROI, not sure, and other (McLaughlin, 2008). In 2009, a similar survey by International Data Corporation (IDC) of its commercial enterprise panel examined the top challenges and issues of cloud computing. Their results tapped the top seven challenges and issues ascribed to the cloud computing, which included seven of the previous categories from the CIO Research study including: availability, performance, security, integration with in-house IT, ability to customize, on-demand costs, and bringing back in-house (Gens, Mahowald, Villars, Bradshaw, & Morris, 2010). Using these seven recurring issues, the expected differences in perceptions of IT professionals in the public sector are derived.

### **Expected Differences in IT Professionals' Concerns**

#### **Availability**

Availability is the state of being able to ensure users can use any information resource when ever and whenever it is needed. Availability depends on the accessibility of the data, the system, the applications and the infrastructure used to access that data. The loss of availability is critical if there is a serious incident, network failure, or natural disaster. For the public sector IT personnel, the availability of the data and services could be critical to the completion of missions such as a military unit in a combat zone. Public organizations are "open systems" that are easily influenced by external events. Indeed, it is the responsibility of public managers to protect and promote this permeability of organizational boundaries to ensure that services are responsive to public needs (Boyne, 2002). A wide variety of public agencies, such as emergency services, are also bound to provide services constantly, with little regard for the notion of "typical business hours". In the case of the military, such services have to be available 24 hours a day, every day, for even the most routine of operations. Add to this the global nature of their operations, and the environment described is one where the availability

of IT services is paramount. By contrast, where loss of availability would impact the commercial organization in terms of time and profit, private sector entities may ignore most constituents' demands, at least in the short term (Ring & Perry, 1985). Thus:

Public sector IT professionals are expected to rank concerns about the availability of cloud computing services as higher in importance than their private sector counterparts.

### Performance

Cloud computing performance can either be cloud-oriented or client-oriented (Linthicum, 2010). Cloud-oriented performance is where the processing occurs in the "cloud" and is compared to the performance of completing the processing on-premise. Cloud-oriented performance is generally seen as an advantage. Performing large amounts of processor intensive calculations or queries can take many hours on the local network, but the scalable nature of the cloud allows additional processors to be quickly added resulting in calculation or queries taking minutes instead of hours to complete. Client-oriented performance is where users constantly interact with the cloud provider where there is latency with the constant back-end machine-to-machine communications that occurs between the Software-as-a-Service (SaaS) provider and the browser. Client-oriented performance issues may not be as noticeable in terms of latency until network saturation is reached (Linthicum, 2010). The latency on bandwidth constricted networks severely hampers the ability to communicate and accomplish the mission and is generally deemed not acceptable for such entities. To overcome this limitation, many public sector agencies, such as emergency services, have dedicated bandwidth channels for their communications due to the saturation of normal communication channels that occurs during emergencies (Hwang, 2005). Thus:

Public sector IT professionals are expected to rank concerns about the performance of cloud computing services as higher in importance than their private sector counterparts.

### Security

Public sector organizations are particularly concerned about the security on the information entrusted to their care, and are especially wary of making the information collected by them being available to outsiders. One concern is that public agencies want to have full control over the information collected and perceive that storing off-site might reduce control over the information (Dawes, 1996). Agencies are also concerned about the security of information shared online and apprehensive about unauthorized access and privacy rights (Rochleau, 1997). Information collected by public sector entities is often highly sensitive or even classified. Sharing this information might result in problems related to privacy rights of individuals (Dawes 1996, Landsbergen and Wolken 2001, Rocheleau 1997) or detriment to national interests. The adopting of cloud computing services can exacerbate these concerns, as it presents its own set of security risks, which require comprehensive safeguards. If the connections are not secured, such implementations can easily invite unauthorized access and misuse of information. Thus:

Public sector IT professionals are expected to rank concerns about the security of cloud computing services as higher in importance than their private sector counterparts.

### Integration with in-house IT

Organizations want to maximize the control of their business core systems, which can be in-house legacy systems, and integrate these systems across externally sourced cloud services (Gens, 2008). In the commercial industry, an organization's proprietary management systems are implemented and leveraged to provide them with a competitive advantage (Mata, Fuerst, & Barney, 1995). Compared to public organizations, private organizations are much more likely to have to act quickly and invest substantial amounts of money in expensive and potentially risky technology ventures if they believe these could lead to a competitive advantage and, ultimately, profits. But, despite these risks, prior research has shown that private sector organizations rankings of integra-

tion issues have been declining over the years, ranking third in 1984, seventh in 1985, and tenth in 1986 (Caudle, Gorr, & Newcomer, 1991). This seems to indicate that the private sector has been getting this issue under control. The public sector, however, is still hamstrung by red tape and procurement rules leading to long delays and divergent mixes of equipment (Bozeman, Reed, & Scott, 1992). Additionally, whereas private sector organizations often have to act quickly, public sector IS errors can affect a much larger body of people in negative ways (e.g., cutting off of Social Security or welfare benefits); thus, public-sector information systems need more deliberate development and more extensive testing (Rochleau & Wu, 2002). Thus:

Public sector IT professionals are expected to rank concerns about the ability to integrate cloud computing services with in-house IT as higher in importance than their private sector counterparts.

#### Ability to customize

The public sector features greater interdependencies across organizational boundaries (Beyah & Gallivan, 2001). Also, public sector organizations often are expected to collaborate with other organizations offering similar services (Nutt and Backoff 1993). A consequence of this interdependence is a reliance on standardized processes and procedures to insure interoperability among the various public agencies. These characteristics of public agencies reflect the lack of rewards or incentives for successful innovations and the penalties for violation of established procedures (Fottler, 1981). In this context, the limits placed on managers' autonomy to change processes or their delivery mechanisms discussed above are deemed necessary for successful operations. Overall, the environment is best described as one that is highly structured and intolerant of deviations or customization. Additionally, the public sector model of sharing information amongst each other about key systems has important advantages (Rochleau & Wu, 2002). For example, public organizations involved in implementing new technologies can benefit from each other's experiences, whereas private sector organizations

are likely to keep secret any information they feel gives them competitive advantage. Consequently, the public sector is likely to be better able to take advantage of other organizations' experiences, thereby avoiding many problems (Rochleau & Wu, 2002). Thus:

Public sector IT professionals are expected to rank concerns about the ability to customize cloud computing services as lower in importance than their private sector counterparts.

#### On-demand costs

Unlike the private sector, cost minimization has not been a priority in the public sector until relatively recently (Jensen & Stonecash, 2005). As stated above under environmental factors, public sector organizations have less exposure to market forces, leading to lower cost efficiencies. That is, because public agencies typically have few rivals for the provision of their services, there are no built in market incentives to lower costs to gain a greater portion of the market (Boyne, 2002). Additionally, the lack of cost consciousness can also be attributed to the fact that cost allocation techniques are difficult to apply in the public sector because many outputs are joint products. This has changed in recent times with the introduction of activity-based-costing, but the underlying problem is still pervasive. Thus:

Public sector IT professionals are expected to rank cost concerns about cloud computing as lower in importance than their private sector counterparts.

#### Bringing back in-house

The use of an external entity to assume IT responsibilities can negatively impact the downstream consequences of IT projects by altering whether and how in-house employees learn and retain important knowledge (both tacit and explicit), leading to an atrophy of internal knowledge assets (Beyah & Gallivan, 2001). Furthermore, once the organization limits or ceases investing in its own competencies in an area, it may be difficult to renew a specific competence. The in-house IT organization thus leaves itself unprepared to re-

integrate former services back in-house without significant investments in training and technological upgrades. Such concerns are less pervasive for public sector organizations.

Organizations in the public sector are more risk-averse than their private sector counterparts (Bozeman & Kingsley, 1998). To minimize risk, public sector organizations often undertake a costly dual operating capability wherein both the old and new technologies are kept available until the new technology has been proven to be able to take over (Rochleau & Wu, 2002). Thus:

*Public sector IT professionals are expected to rank concerns about cloud computing services having to be brought back in-house as lower in importance than their private sector counterparts.*

## Methodology and Sample

To test the seven propositions above, a web-based survey based on the prior efforts of CIO Research and IDC was developed. For an accurate comparison of private and public entities, the survey scales and questions were maintained from the IDC survey. In the IDC survey of its commercial enterprise panel in 2009 on the top challenges and issues of cloud computing, two-hundred sixty-three IT executives/CIOs and their line-of-business colleagues completed the survey about their companies' use of, and views about, IT Cloud Services.

When selecting from the vast array of public sector entities to sample for the survey, careful consideration must be given to select a representative public organization. A public organization may, depending on usage, be a government organization, an organization charged with operating in the public interest, or one with goods and services having public goods characteristics (to name just a few of the possibilities). The degree to which an organization operates for the public interest is termed its "publicness" which is more formally defined as a characteristic of an organization which reflects the extent the organization is influenced by political authority (Bozeman & Bretschneider, 1994). Bozeman (1984, 1987) presents a dimensional model of "publicness" that based on organization resource processes and other fundamental organizational activities such as goal setting, structuring and design, and

organizational maintenance. According to this dimensional model, few, if any, complex organizations are purely public or purely private. Instead, some mix of public and private authority influences the behavior of most organizations. As a consequence of this model, some public sector or governmental organizations can be deemed "more public" than others, while some private sector business organizations are "more private" than others, creating a continuum. To minimize any overlap in samples and to maximize the potential impacts of the cultural differences between the public and private sectors, an entity high on the "publicness" scale, the Department of Defense, was selected.

The respondents for this effort included eighty-three DoD IT professionals including both Civil Service and uniformed members. Like the previous effort, the respondents completed the survey about their companies' use of, and views about, IT Cloud Services. The survey respondents were asked to rate the seven challenges/issues ascribed to the cloud computing model using a 5-point Likert-type scale ranging from 1 (Not Significant) to 5 (Extremely Significant). The selected sample were senior IT professionals currently employed by the Department of Defense. Following the IDC's method, the results were tabulated from the respondents that selected 3, 4, or 5 for a challenge/issue and reported in percentages.

To determine if the percentages were significantly different, a series of Z-tests were conducted. A Z-test compares the sample and population means to determine if there is a significant difference between the samples when the samples are large ( $n > 30$ ), each sample represents a random sample of the relevant population, and that each group to be tested is independent of the other, as in the case of the collected and archived data. The critical Z-value for the 99% confidence interval for a one-tailed test is 2.33. If the sample returns a test statistic of less than 2.33, then there is insufficient evidence to reject the null hypothesis that there is no significant difference between the two samples. If the test statistic is more than or equal to 2.33, then there is sufficient support to reject the null hypothesis and state that the difference in ratings between the public and private sector respondents are statistically significant at



the 99% confidence level. The data analysis and results are presented in the next section.

**DATA ANALYSIS AND RESULTS**

As shown in Figure 1, the top three issues for the private sector were security, availability, and performance. These issues were also rated as the most significant in the 2008 survey by CIO Research, indicating a consistent trend for concerns for emerging technologies in these areas. As shown in Figure 2, the top three issues for the public sector were performance, availability, and security, matching the private sector concerns, although in a different order. A side-by-side comparison using the public sector respondent's top concerns is shown in Figure 3.

The following presents the results of the Z-tests for the seven issues surveyed.

**Availability**

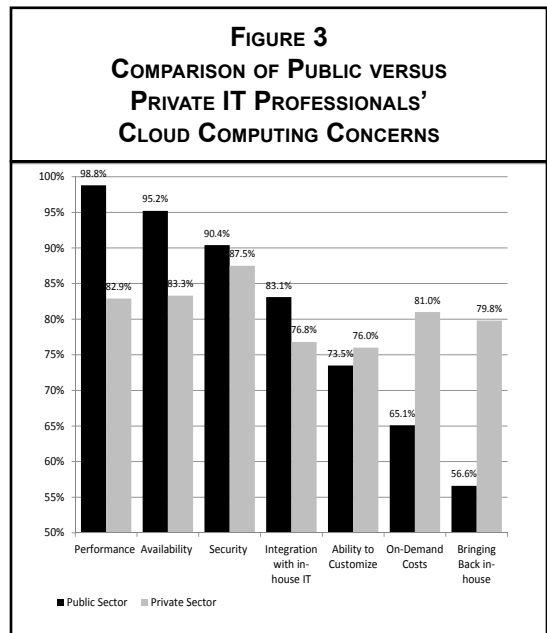
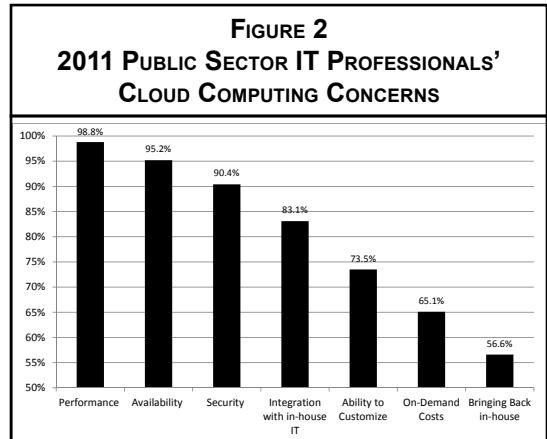
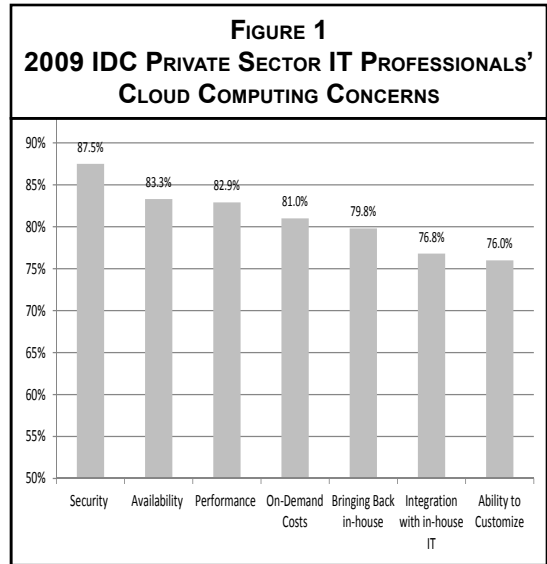
As proposed, there was a significant difference ( $Z = 3.537, p < .01$ ) between the percentage of DoD IT personnel (98.8%) that rated availability as a significant issue compared to the percentage of IDC Enterprise personnel (82.9%). That is, public sector IT professionals ranked concerns about the availability of cloud computing services higher in importance than their private sector counterparts.

**Performance**

As proposed, there was a significant difference ( $Z = 2.555, p < .01$ ) between the percentage of DoD IT personnel (95.2%) that rated Performance as a significant issue compared to the percentage of IDC Enterprise personnel (83.3%). That is, public sector IT professionals ranked concerns about the performance of cloud computing services as higher in importance than their private sector counterparts.

**Security**

Contrary to expectations, there was not a statistically significant difference ( $Z = 0.52, n.s.$ ) between the percentage of DoD IT personnel (90.4%) that rated Security as a significant issue compared to the percentage of IDC Enterprise



personnel (87.5%). That is, public sector IT professionals did not rank concerns about the security of cloud computing services as higher in importance than their private sector counterparts.

### **Integration with in-house IT**

Contrary to expectations, there was not a statistically significant difference ( $Z = 1.066$ , n.s.) between the percentage of DoD IT personnel (83.1%) that rated the ability to integrate with in-house IT as a significant issue compared to the percentage of IDC Enterprise personnel (76.8%). That is, public sector IT professionals did not rank concerns about the ability to integrate cloud computing services with in-house IT as higher in importance than their private sector counterparts.

### **Ability to customize**

Contrary to expectations, there was not a statistically significant difference ( $Z = 0.326$ , n.s.) between the percentage of DoD IT personnel (73.5%) that rated the ability to customize cloud computing services as a significant issue compared to the percentage of IDC Enterprise personnel (76.0%). That is, public sector IT professionals did not rank concerns about the ability to customize cloud computing services as lower in importance than their private sector counterparts.

### **On-demand costs**

As proposed, there was a significant difference ( $Z = 2.864$ ,  $p < .01$ ) between the percentage of DoD IT personnel (65.1%) that rated On-demand costs as a significant issue compared to the percentage of IDC Enterprise personnel (81.0%). That is, public sector IT professionals ranked cost concerns about cloud computing as lower in importance than their private sector counterparts.

### **Bringing back in-house**

As proposed, there was a significant difference ( $Z = 4.075$ ,  $p < .01$ ) between the percentage of DoD IT personnel (56.6%) that rated bringing IT services back in-house as a significant issue compared to the percentage of IDC Enterprise

personnel (79.8%). That is, public sector IT professionals ranked concerns about cloud computing services having to be brought back in-house as lower in importance than their private sector counterparts.

The comparative analysis of the IDC Enterprise panel 2009 IT Cloud Services Survey and the 2010-2011 DoD IT personnel cloud computing in the military survey shows that the majority of the a priori expectations were confirmed. As expected, more DoD IT personnel cited availability, performance, and in-house integration with cloud computing services as significant issues than did personnel on the IDC Enterprise panel, with the first two concerns being statistically significant. There were also statistically significant differences between the number of IDC Enterprise panel personnel citing on-demand costs and bringing the IT services back in-house as important concerns than the number of personnel in the DoD IT survey. Contrary to expectations, concerns over the security of cloud computing and ability to customize cloud computing services were virtually identical between the two sectors. These results are discussed in the next section.

## **CONCLUSIONS**

This study examined the differences in the perceptions of public and private sector IT professionals towards an emerging new technology, cloud computing. Testable propositions based on prior research were presented and tested. In general, the results were in line with a priori expectations, with four of the seven propositions supported by the empirical analysis. Specifically, the results of the statistical analysis indicate that public sector IT professionals are more concerned with the availability and performance of cloud computing implementations than their private sector counterparts. And, the public sector respondents were less concerned with cost issues or the difficulties of bringing IT services back in house if a cloud computing project failed to bring the desired results.

In keeping with expectations, but not statistically significant, were the expectations that the public sector members would rate concerns surrounding the security of cloud computing and

the integration of cloud services with in-house IT higher than their private sector colleagues, as well as the non-supported expectations that the public sector would consider cloud computing service customizing abilities as lower in importance than the private sector entities would. In sum, the results indicate that there are significant differences between how members of private and public sector organizations rate the concerns surrounding the potential adoption of new technologies. Specifically, the public sector members were more concerned with availability and performance issues, and less concerned with on-demand costs or ability to bring the IT capabilities back in-house. The three non significant results and some potential reasons that results were not in keeping with expectations are discussed in more detail next.

### Security

Contrary to expectations, there was virtually no difference between the percentage of public and private respondents to issues regarding the security of cloud computing services. Even though a slightly higher percentage of public sector respondents ranked security as important, the difference was not statistically significant. This is especially surprising due to the purposeful selection of Department of Defense, a known security-conscious culture, from which to draw sample respondents. Potential reasons for this result are the current trends of increases in identity thefts through unauthorized access to corporate records of customers (Kabay, 2010), and the rise in corporate espionage (Power, 2010). With all of the media attention on these issues, there is an increased emphasis being placed on security of information systems in the private sector, including calls from IT professionals to require mandatory reporting of intrusions (iClass, 2011). This increased emphasis may account for the closing of the gap in security concerns between public and private organizations.

It has been reported that the number of identity fraud cases rose by 12 percent in the U.S. last year, to 11.1 million, while the amount of these frauds grew by 12.5 percent, to \$54 billion (Ingram, 2010). Part of the rising figures is the fact that state laws have been passed all over the United States to force holders of personally identifiable

information to inform data subjects when their records are compromised by accident, employee malfeasance, or outside criminal activity (Kabay, 2010). When a customer is a victim of identity theft or data loss, the business suffers along with the victim. Monetary losses of goods and services are often compounded by chargebacks. Then there is the loss of customer trust, and in turn, loss of customers. According to CIO magazine, after a breach, 20 percent of customers sever all ties with the company, 40 percent say they consider doing the same, and another 5 percent will be hiring lawyers (Tynan, 2008). This increased visibility by consumers can be one more potential source of increased emphasis on IT security amongst the private sector respondents.

On the corporate espionage issue, the recent wikileaks incident is but one of a string of incidents in the past year that have brought to light the increasing ease of stealing corporate data in the digital age. Major corporations such as GM, Motorola, and Ford all had high profile cases in 2010 (Abatan, 2010). In light of these cases, private industries have started to put data security measures in place to avoid the potential huge financial losses which could jeopardize jobs and the very future of the business (Burgess & Power, 2008). These measures are disruptive to the IT professionals and adds a great deal of new responsibilities in areas such as endpoint security tools like enterprise information rights management, data loss prevention, email encryption and many other tools that can specifically lock data down (Abatan, 2010). The increased responsibilities and security implementations are potential explanations for the closeness in ratings between the already security conscious public sector IT professionals and the private sector entities surveyed.

### Integration with in-house IT

Even though, as proposed, a higher percentage of public sector respondents ranked concerns with integrating cloud computing services with in-house IT as important, the difference was not statistically significant. This result may partially be due to the public sector's desire to improve the efficiency of their IT/IS services by copying the practices of the private sector, leading to approaches to purchasing and planning for com-

puting systems narrowing between the two sectors during the past few years (Rochleau & Wu, 2002). As Federal, State, and local government agencies seek to improve efficiency, they increasingly turn to IT consultants (Bureau\_of\_Labor\_Statistics, 2010-11 Edition). These outside IT experts bring with them vast amounts of knowledge gained from their private sector experience. Thus, the public sector may be enjoying the same decline in concerns over integrating new technologies as has been reported in the private sector (Caudle, et al., 1991), leading to a closer set of ratings among the private and public sector respondents.

### Ability to customize

Even though the expected lower percentage of public sector respondents ranked concerns with the ability to customize cloud computing services as important, the difference was not statistically significant. This result may partially be due to the DoD's relatively recent efforts at standardizing computing services at most locations by consolidating much of their IT services into centralized processing centers (Robb, 2007). Add to this the U.S. Chief Information Officer's initiative announced in late 2010 to reduce number of Federal data centers by at least 800 by 2015 (Kundra, 2010), and the distance between DoD end user needs for customization and the implementing organization increases significantly, potentially leading to higher concerns than expected among the DoD respondents.

### LIMITATIONS

As with any research, this study has its limitations. One possible limitation of the studies' findings, is the use of the DoD from which to draw the sample respondents. The DoD is not fully representative of the public end of the "publicness" continuum of the public sector, but rather an extreme case. Additionally, the sample size, although sufficient for Z-tests, was somewhat small for that organization. A larger sample size would have increased the ability to detect small effects, such as those that potentially exist but were not significant in this study, especially the integration concern which approached significance at  $p < .10$ . Simply put, although the DoD

was purposefully selected to minimize any overlap in samples and to maximize the potential impacts of the cultural differences between the public and private sectors, that very selection was the source of a limitation that should be addressed in future research.

### Future Research

This study expanded the understanding of the differences in perceptions among IT professionals in the public and private sectors. To expand on these findings, future research efforts should examine other portions of the "publicness" continuum of both the public and private sector. Additionally, future researchers in this area should endeavor to acquire larger numbers of respondents from both sectors to increase the point where small effects could be discerned, possibly between members of the same sample. For example, a larger sample of DoD IT professionals would allow comparisons of the responses from the civil service members to those of the uniformed members and those of the IT leadership to their line of business colleagues. Additionally, future research efforts could expand the target technology beyond cloud computing to encompass other emerging technologies such as computational knowledge engines, semantic web, and social networking, to determine if perceptions differ by technology characteristics.

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# INSTITUTIONS AND MOMENTUM

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## ABSTRACT

*Momentum has been an intriguing phenomenon that has attracted much attention from both industry and academia. Whether institutional investors drive momentum is explored in this paper. The results show that institution's holdings are not related to momentum in 21 countries around the world. This finding is robust to an alternative measure of institution's holdings and sub-period analysis.*

## INTRODUCTION

Jegadeesh and Titman (1993) establish the momentum anomaly: selling losers and buying winners determined from the past 3 to 12 months and holding these positions for the following 3 to 12 months produces a 1% return per month. The profitability of this simple zero-cost strategy has spawned numerous studies intending to further explore, understand, and explain the strategy.

On the existence of momentum, Jegadeesh and Titman (2001) demonstrate the persistence of momentum profitability in the 1990s. Rowenhorst (1998) discovers significant stock momentum in twelve European countries. Griffin, Ji, and Martin (2003) investigate Africa, the Americas, Asia, and Europe and uncover that stock momentum indeed exists around the globe. Ji (2010) provides further evidence from the pre-CRSP period, 1815-1925.

It is in debate whether momentum profitability is the reward for risk. Conrad and Kaul (1998) attribute momentum to unconditionally high expected returns. Chordia and Shivakumar (2002) argue that macro-economic risk is the fundamental reason for momentum. In the meantime, Jegadeesh and Titman (1993) find that the CAPM does not account for momentum. Fama and French (1996) conclude that their own three-factor model can explain many anomalies but momentum. Grundy and Martin (2001) further show that conditional Fama-French factors generate even stronger momentum. Griffin, Ji,

and Martin (2003) present findings that macro-economic risk fails to explain momentum globally.

Three leading behavioral models are constructed to accommodate numerous existing anomalies, including momentum. These models are by Barberis, Shleifer, and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), and Hong and Stein (1999). Supporting evidence for the models includes Daniel and Titman (1999), Hong, Lim, and Stein (2000), and Durham, Hertz, and Martin (2005). While all relying on imperfect revision and processing of information, three models have different working mechanisms: under- or over-reaction. Ji (2008) distinguish between the latter two models and find support for Daniel, Hirshleifer, and Subrahmanyam.

In the presence of the importance and prevalence of institutional investors, this paper examines if such investors are driving momentum. Using a dataset covering 21 countries for stock returns and institution's holdings, the empirical analyses show that, while stock momentum is significantly positive around the world, it is not related to institution's holdings. In addition, the finding is robust to an alternative measure of institution's holdings and sub-period examination.

The rest of the paper consists of the following: I describe the data in Section 2 and conduct empirical analyses in Section 3. A summary is in Section 4.

## DATA

Following the common practice of the momentum literature, I only use common stocks, thus ADRs, REITs, primes, closed-end funds, and foreign companies are excluded from the sample. For the United States, the database of the Center for Research in Security Prices (CRSP) is the source for stock returns from 1975 to 2000; for 20 international countries, stock returns are from Datastream International. A minimum of 50 stocks are required in each country so that diversification benefit can be achieved.

Ince and Porter (2006) raise the possibility of data errors in Datastream. To address those concerns, I clean up the data in the following manner. I include both listed and delisted firms to reduce delisting bias. In order to measure returns as precisely as possible, when a stock has return index repeated four times or more consecutively, I use the earliest value and treat repeated values as missing. If a monthly return is above 1000%, I treat it as data error and consider the return missing.

Another data source is the Organization for Economic Co-operation and Development (OECD). OECD provides the financial assets of institutional investors as percentage of gross domestic product (GDP) and that is my measure of institution's holdings.

## EMPIRICAL ANALYSES

### Momentum Portfolios

I examine the typical six-by-six momentum strategy and form the portfolios using the method of Jegadeesh and Titman (1993). At the beginning of every month  $t$ , rank stocks based on their performance in the past six months:  $t-7$ ,  $t-6$ , ...,  $t-2$ , and sort them into quintiles. Buy the best performing quintile and sell the worst performing quintile. These positions last for the coming six months,  $t$ ,  $t+1$ , ...,  $t+5$ . Equal-weighted returns are computed for each portfolio in every month. There are six momentum strategies in effect for a particular month, and momentum profit is the difference between winner and loser portfolios.

Table 1 presents the summary statistics of the data. Denominated in local currency, monthly

**TABLE 1**  
**VARIABLE DESCRIPTIONS**

In each month  $t$ , stocks within each country are sorted into quintiles based on their returns in the previous 6 months:  $t-7$ , ...,  $t-2$ . The momentum strategy sells the loser quintile and buys the winner quintile. These positions are held for the following 6 months. Momentum profits for each country, MomRet, are measured as the equal-weighted returns from the winner quintile minus the counterpart from the loser quintiles. Reported in the Table below are the average momentum profits in percentage for each of the twenty one countries in the sample from 1975 to 2000. Also reported are the financial assets of institutional investors scaled by the country's gross domestic product (GDP).

Country	MomRet (%)	Institution's Holdings/GDP
<b>Emerging Markets</b>		
Greece	1.77	0.16
Mexico	1.21	0.07
Portugal	-0.46	0.34
Turkey	-1.50	0.02
<b>Developed Markets</b>		
Australia	0.43	0.89
Austria	0.70	0.41
Belgium	1.12	0.67
Canada	0.52	0.88
Denmark	0.92	0.75
Finland	0.50	0.58
France	0.79	0.85
Germany	0.69	0.51
Italy	0.86	0.47
Japan	0.02	0.86
Netherlands	1.16	1.63
Norway	1.11	0.43
Spain	0.32	0.53
Sweden	-0.01	1.16
Switzerland	0.95	1.25
UK	1.03	1.66
US	0.59	1.57

momentum profits range from -1.50% in Turkey to 1.77% in Greece for the group of emerg-



ing markets; developed markets demonstrated a much smaller variability: from -0.01% in Sweden to 1.16% in Netherlands. The average is larger in developed than in emerging countries: 0.69% vs. 0.25%. In the meantime, institution's holdings show a similar pattern: the average is 0.89 for developed and 0.15 for emerging, respectively, which may suggest a positive relation between momentum and institution's holdings. However, the variability of the variables are now the opposite: institution's holdings have a much wider range in developed countries, from 0.89 to 1.66, than in emerging: from 0.02 to 0.34. So the real relation between momentum and institution remains an empirical question.

**Relation between institutions and momentum**

To examine if institutions influence momentum, I use the following model:

$$MomRet_i = \alpha + \beta*(Institution's Holdings/GDP)_i + \epsilon_i \tag{1}$$

where  $MomRet_i$  is the momentum return from each country,  $Institution's Holdings/GDP_i$  is the measure for institutional investors in each country. If institutions drive momentum, then the coefficient  $\beta$  should be significant.

Table 2 displays the results. As evident from the Table, the coefficient for institution's holdings is both small in magnitude, 0.003, and statistically insignificant with a  $t$ -statistics of 0.89. This clearly indicates that, without using any other variables, institutions is not the cause for momentum.

**Robustness**

An alternative measure for institutional investor is to purge the influence of market capitalization from the original institution's holdings. To do so, I run the following regression:

$$(Institution's Holdings/GDP)_i = \alpha + \beta*(Market Cap/GDP)_i + \epsilon_i \tag{2}$$

where  $(Market Cap/GDP)_i$  is one country's market capitalization scaled by its GDP and the data

is taken from OECD. The regression residual is the residual institution's holdings.

**TABLE 2**  
**INSTITUTIONS AND MOMENTUM**

Momentum returns and institution's holdings/GDP are averaged for each country for the period of 1975-2000. All the countries in the sample are used in the following model:  
 $MomRet_i = a + b*(Institution's Holdings/GDP)_i + \epsilon_i$

This table shows the regression results and associated t-statistics are in parentheses.

	Coeff.	t
<b>Intercept</b>	0.004	(1.39)
<b>Institution's Holdings/GDP</b>	0.003	(0.89)
<b>N</b>	21	
<b>Adj. R2</b>	-0.010	

**TABLE 3**  
**INSTITUTIONS AND MOMENTUM:**  
**USING RESIDUAL INSTITUTION'S HOLDINGS**

Momentum returns and institution's holdings/GDP are averaged for each country for the period of 1975-2000. Res. institution's holdings/GDP is the residual from regressing institution's holdings/GDP on market cap/GDP:  
 $(Institution's Holdings/GDP)_i = \alpha + \beta*(Market Cap/GDP)_i + \epsilon_i$

Reported below are the results from using all the countries in the sample on the following model:  
 $MomRet_i = \alpha + \beta*(Res. Institution's Holdings/GDP)_i + \epsilon_i$

T-statistics are in parentheses.

	Coeff.	t
<b>Intercept</b>	0.006	(4.01)
<b>Res. Institution's Holdings/GDP</b>	0.006	(0.90)
<b>N</b>	21	
<b>Adj. R2</b>	-0.009	

$$\text{MomRet}_i = \alpha + \beta^*(\text{Res. Institution's Holdings/GDP})_i + \varepsilon_i \quad (3)$$

each firm. The difference is the residual analyst coverage used in subsequent analyses.

**TABLE 4**  
**INSTITUTIONS AND MOMENTUM:**  
**SUB-PERIOD ANALYSIS**

Momentum returns and institution's holdings/GDP are averaged for each country for the sub-period of 1990-2000. Res. institution's holdings/GDP is the residual from regressing institution's holdings/GDP on market cap/GDP:

$$(\text{Institution's Holdings/GDP})_i = \alpha + \beta^*(\text{Market Cap/GDP})_i + \varepsilon_i$$

Reported below are the results from using all the countries in the sample on the following models:

$$\text{MomRet}_i = \alpha + \beta^*(\text{Institution's Holdings/GDP})_i + \varepsilon_i$$

$$\text{MomRet}_i = \alpha + \beta^*(\text{Res. Institution's Holdings/GDP})_i + \varepsilon_i$$

T-statistics are in parentheses.

	Coeff.	t
<b>Intercept</b>	0.001	(0.43)
<b>Institution's Holdings/GDP</b>	0.005	(1.57)
<b>N</b>	21	
<b>Adj. R<sup>2</sup></b>	0.068	
<b>Intercept</b>	0.005	(3.14)
<b>Res. Institution's Holdings/GDP</b>	0.006	(0.82)
<b>N</b>	21	
<b>Adj. R<sup>2</sup></b>	-0.016	

Residual analyst coverage is constructed as follows. The number of analysts covering each firm is obtained from the Institutional Brokerage Estimate System (I/B/E/S) and the high correlation between size and the number of analyst is purged out in the way of Griffin and Lemmon (2002). In each country, form size quintiles. Within each quintile group, the median of the number of analyst is subtracted from the number of analyst of

## SUMMARY

To further investigate momentum strategy, this paper uses a dataset that is systematically constructed but has not been touched for momentum study. The main results confirm the existence of momentum profitability in the pre-CRSP period of 1815-1925; the seasonality of momentum strategy earning negative returns in January is consistent with the momentum literature. Collectively, the results show that data mining is not the reason for momentum profitability; future research can concentrate on the remaining two possibilities: risk or behavioral argument.

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**FRACTAL VERTICAL POLARIZATION:  
DEFINITION AND NOMOLOGICAL ELABORATION OF A  
COMPLEXITY-BASED THEORY OF  
ORGANIZATIONAL POWER AND DISSONANCE**

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**ABSTRACT**

*This paper lays out the complete model of fractal vertical polarization (FVP), as it currently exists in conceptual form, a theory constructed entirely within the framework of the paradigm of self-organizing complexity. It includes both external and internal nomological models to facilitate scale development and empirical testing. The fact of FVP's foundation in the paradigm of systems, complexity, and chaos theory presents similar empirical challenges to those encountered in the development of the constructs of LMX (Graen & Cashman, 1975) and TMX (Seers, 1989), which similarly emerge from the autopoietic paradigm. Accordingly, the present study summarizes the contributing paradigmatic vernaculars, relevant theories and rationales, and prior conceptual discussion on this topic fielded by the authors before learned audiences since 2008, with the goal of introducing FVP as a theory of organizational dissonance in its own right.*

**INTRODUCTION**

Fractal vertical polarization (FVP) is a dysfunction wherein the upper and lower nodes of a self-organized entity experience dissonance in communication, which may threaten the entire system. The model proposes that power disequilibria in unit-level vertical dyads create dissonance, which in turn results in an erosion of trust and a variety of other dysfunctional outcomes. Antecedents may include excessive exertions of power from the upper node or asymmetries of organizational culture between the nodes (Voss & Krumwiede, 2009). The model is a derivative of the paradigm of self-organizing complexity, namely, open, complex, or chaordic systems (*cf.* Hock, 1995). Its fractal property, a central aspect of chaordic systems (*cf.* Fitzgerald & van Eijntaten, 2002), is a key to understanding it. This feature of the model, which informs FVP with the unique feature of replication across multiple levels of scale (Chatterjee & Yilmaz, 1992), renders

it quite distinct from other models of organizational dynamics.

The literature has investigated questions of organizational dissonance as a significant topic of study, but most research promotes the construction of models under assumptions of determinism and reductionism, a mode of thinking often cited as the mechanistic paradigm, rather than that of self-organizing complexity (*cf.* Emery, 1969). Among those theories in the traditional literature that may inform concepts of dissonance along vertical power linkages are communication theory and interpersonal-power theory. Communication theory studies the interplay between the source of a communication and its target, while highlighting disturbances in the encoding, decoding, and transmission of information (Phelps, 1942; Pollack, 1953). Theories of interpersonal power study distinct sources or concentrations of power in organizations and people's reactions to them (French & Raven, 1959; Raven & French, 1958; Tedeschi, 1968).

Other theories fit some aspects of self-organizing complexity and may be useful in understanding organizational dissonance as well. Role theory, for example, seeks to rationalize what cognitive processes emerge to convert a barrage of role-sendings into that focal person's response patterns in the meaning-laden context of the role set (Merton, 1945; Roethlisberger & Dickson, 1939). The role theory model fits the autopoietic paradigm in its emphasis on the local mechanisms (*cf.* Chua, 2005) that translate into higher-order emergent properties in organizations (*cf.* Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Leader-member exchange (LMX) theory, an explicit derivative of observations of open-systems dynamics, seeks to understand the mechanisms and effects of vertical differentiation at the level of the group (Graen & Cashman, 1975). Lastly, while team-member exchange (TMX) theory (Seers, 1989) addresses horizontal, rather than vertical information exchange dynamics, it too is a derivative of open-systems observations and is likewise relevant to the elaboration of FVP within the same general paradigm.

In similar fashion to LMX and TMX, the FVP model seeks to include theory from the traditional literature wherever possible, while interpreting it within the autopoietic paradigm. This approach to the construction of theory entails first exploring the common characteristics of self-organizing systems (Katz & Kahn, 1966). One may thus illustrate what ought to constitute normal dynamics in an organization as seen in the form of a natural, self-organizing structure, which obeys the typical flow characteristics that the prior literature has enumerated. One can thence refine the developing model by way of concepts taken from those traditional models that subsequently fit within the autopoietic structure without undermining its integrity as a self-organizing system.

As key concepts that together make up the FVP model, fractality, vertical differentiation, and a system's natural self-equilibrating features are typical of the three vernaculars of the autopoietic paradigm (namely, systems theory, complexity theory, and chaos theory). These three vernaculars explore the same dynamics of self-organizing processes, albeit with distinct points of emphasis, given the historical distinctions in their respec-

tive core subject matter. Generally, the differences among the three vernaculars arise from assumptions about the relative diffuseness and bounded nature of the self-organizing structures under study. Thus, open systems *per se* reveal the lowest degree of diffuseness and highest degree of boundedness, chaotic systems reveal the opposite, and complex systems occupy a point in between (Anderson, 1999). A biological system naturally merits a discussion of systems theory, in the terms advanced by Ludwig von Bertalanffy (1937), while chemical reactions are more readily comprehensible by reference to the complexity theory terminology of Ilya Prigogine (1947). Meanwhile, weather patterns are so diffuse that references to the terminology of chaos theory is virtually compulsory (Lorenz, 1972). Human organizations may accommodate discussion within any of these vernaculars, as different kinds of analysis may demand different assumptions of diffuseness and boundedness.

## REVIEW OF THE LITERATURE

Aside from such significant contributions as those of Holland (1962), Katz and Kahn (1966), Emery (1969), and Dooley and Van de Ven (1999), efforts to apply the autopoietic paradigm to organizations have too often amounted to artful commentary to combat faulty thought patterns arising from linear, mechanistic, causal, or entropic thinking (*e.g.*, Gordon, 1999; Koch, 2001; Wheatley, 1994). In these works, the common theme is to challenge assumptions of determinism and reductionism and resist confounding conventional notions of analysis (*versus* synthesis) with the objective nature of the attributes that one is studying. There is, to be sure, a notable body of mathematically oriented literature in the realm of chaos theory, of which an occasionally brilliant effort at applying mathematical insights to qualitative observations useful to practicing managers emerges (*e.g.*, Dooley & Van de Ven, 1999). Nevertheless, with the significant exceptions of LMX and TMX, the development of organizational models constructed explicitly within the autopoietic sciences has been very slow.

Meanwhile, several works have arisen in the practitioner-oriented business press, receiving

broad attention by addressing intuitive tactics for confronting complex business challenges, but without actually drawing from the autopoietic paradigm. Peters and Waterman (1982), for example, first detailed what they described as the rational model of managing that had ostensibly governed business school thinking through modern times. The authors then proceeded to enumerate a series of managerial principles that defy that brand of rationality, while happening to agree in some ways with autopoietic assumptions. This is particularly true in the authors' first principle, namely, the management of "ambiguity and paradox" (Peters & Waterman, 1982, p. 89). This chapter of the work proceeds to explore the pertinence of "gestalt" or "open system" approaches to managerial thinking (p. 91). Meanwhile, other authors, including Senge (1990), have produced similar arguments. Senge's (1990) citing systems thinking, in fact, originates with Emery's (1969) treatise on the subject. Significantly, Emery's idea of systems thinking consists of a set of conceptual biases that one consciously adopts in opposition to the natural tendency to think mechanistically about phenomena that actually obey the common characteristics of autopoietic systems, rather than of machines.

### The Autopoietic Vernaculars

The founding conceptualization of the autopoietic paradigm is systems theory (Bertalanffy, 1937, 1949), which enumerates instances of homology in organisms and thence across both species and social systems (Bertalanffy, 1950). Open systems all reveal the common characteristics of growth (as negative entropy), trans-boundary resource exchange, internal differentiation (the emergence of subsystems), and equilibrium-seeking internal processes (notably equifinality, equipotentiality, dynamic morphology, and dynamic homeostasis). As systems grow, mechanistic attributes form at the outermost levels of analysis. Cybernetic structures emerge as superstructures or secondary systems characteristics, atop the process (primary) characteristics just listed (Bertalanffy, 1937, 1949, 1950). These emergent structures include the familiar features of input, throughput, output, feedback, and coding (Katz & Kahn, 1966). Bertalanffy (1937) addressed anabolic and catabolic processes as well, which

constitute the central dynamic that makes open systems possible.

The complexity and chaos paradigms emerged in 20th-century thinking as independent developments, but their object of analysis is of the same order of phenomenon. Aside from the fact of increasing diffuseness and decreasing boundedness in their typical objects of analysis (Voss & Krumwiede, 2009), the three vernaculars all similarly address the curiosity of autopoietic complexity. There is thus more in common across these vernaculars than their distinct *foci* of typical research interest. More specifically, the central feature of distinction between systems theory and complexity theory is that the latter heavily emphasizes nonlinear dynamics (Prigogine, 1947, 1955; Holland, 1962, 1975). Moreover, as applied to the present paper, inferences about vertical polarization first emerged in observations of organizations from the perspective of the complexity vernacular.

Meanwhile, among these distinct vernaculars, chaos theory will most likely feature the simultaneous pursuit of mathematical and qualitative models in their own research streams, independent of one another, with little consideration for either synergy or comprehensibility between them (excepting Dooley & Van de Ven, 1999). Lastly, of course, the butterfly effect reference (Lorenz, 1972) has become an axiomatic facet of chaos theory in modern parlance, while fractality (Mandelbrot, 1967, 1977) remains a key to exploring the natural emergence of chaordic structures in nature.

### Fractality in Chaordic Systems

Mathematically, fractality is a type of dimensionality (Mandelbrot, 1977). Conventional thinking presumes one-, two-, and three-dimensional objects, but chaos theory uses fractional dimensions. A given object may thus manifest 1.5 dimensions, or 2.12345 dimensions, or even  $\pi$  dimensions. This construal of natural formations contributes information that a reference to whole dimensions obscures (Zeide, 1993). Thus, while two dimensions represent the holistic spatial dimensionality necessary for containing a line plus a separate point in space, fractal dimensionality captures the true extent of the rep-

resentation mathematically as minutely greater than one. Superficially, this mathematical property seems impractical for business practitioners, but Dooley and Van de Ven (1999) have shown it to be feasible to draw qualitative interpretations from chaos theory's purely mathematical properties without resorting to mere metaphor. Specifically, their study categorized four types of organizational processes based on their fractal dimensionality alone.

Fractality represents another property visible in organizations, by reference to precisely the same mathematical concept as just described. Specifically, a fractal property refers to any feature that repeats itself across levels of scale at a constant relative proportion (Mandelbrot, 1977). Such a feature manifests qualitatively similar "spatial characteristics" at various levels of "contraction or magnification" (Chatterjee & Yilmaz, 1992, p. 53). Geometry now uses the concept of fractality to find greater predictability in both natural and social structures (*cf.* Frankhauser, 1998). Benoît Mandelbrot (1967) originally referred to this mathematical property as fractional, only to update his terminology later with the neologism fractal (1977). From his perspective, identifiable spatial forms recur in a given system in relatively stable fractional proportions. An underappreciated example is the relative positioning of the eight known planets in the visible solar system following a fractional (or fractal) progression. It so happens that each semi-major axis is approximately 80% farther from the central star than the next one. The formation of the solar system is thus a clear example of a wholly fractal structure in nature.

In mathematical models of purely chaotic systems, fractality often exhibits itself in the form of perfect self-similarity between levels of analysis. By comparison, in naturally occurring chaotic systems, this cross-level self-similarity takes on systematic mutations as scale increases, along with the random mutations that always occur throughout (Morel & Ramanujam, 1999). This is by no means any indication of imperfections in the actual incidence of fractality in nature, but rather it obeys the rule of emergence as a naturally occurring property of all such systems (Lichtenstein, 2001). Specifically, each superordinate level of analysis in turn reveals novel char-

acteristics, which fail to manifest themselves at lower levels of analysis. In biological systems, for example, motility is an emergent feature of an organism, being impossible at the subordinate level of a mere organ, while nevertheless depending on the organ's particular construction for its own realization. In purposive social organizations, a perpetual cycle of productivity followed by consequent inputs from the task environment occurs only at the level of analysis that corresponds to the whole business unit.

### LMX and TMX

As previously noted, LMX (Graen & Cashman, 1975) and TMX (Seers, 1989) emerge explicitly from systems theory. Accordingly, of all theories, these most closely inform FVP in both its application and its theoretical assumptions. Of these, LMX is central to FVP, because it addresses similar dynamics of the vertical information flow. In its scrutiny of vertical relationships (*i.e.*, vertical dyads, or those that link individual-level *foci* of position power), LMX theory seeks to promote the enrichment of communication quality along vertical lines between leaders and group members. LMX quality thus reflects the richness of communication that characterizes a typical exchange. In this sense, richness refers that aspect of communication theory that studies the multiple, simultaneous modes of message transmission, wherein face-to-face modes are rich by virtue of the interaction among syntax, body language, tone of voice, and other contributors to the message that serve to transmit a broad range of information with relative efficiency (Daft & Lengel, 1986). At the leanest extreme is signal communication, which transmits only one level of information and thus represents efficiency in terms of the total expenditure of informational resources on a relatively sparse or parsimonious message. In this sense, LMX theory unites communication theory with motivation theory.

### Traditional Theories

Of the traditional theories, communication theory (Phelps, 1942; Pollack, 1953) is quite relevant to the FVP model. Key observations from this theory include uncertainty in the transmission of information, effects of the use of lan-



guage, and sources of message interference from the environment (Cherry, 1966). Supplementing the communication literature is that part of the voluminous work of Miller (1978) that presents a helpful distinction among three forms of coding, namely, the alpha, beta, and gamma varieties, which represent spatial patterns (alpha, the simplest), process variations (beta, a higher order), and the use of symbols (gamma, the most complex of the three), respectively. Communication theory applied to human organizations places emphasis on the informational apparatus within which one formulates one's message (viewed as a discrete unit for purposes of analysis), the channel through which the message travels, and finally the medium within which the receiving party decodes it.

Although role theory most often receives causal interpretations, it is similarly relevant to FVP. In its earliest form (Roethlisberger & Dickson, 1939), the model illustrates a focal person (a generic, central actor of interest), to whom organizational actors send role-expectations (*i.e.*, they effect role-sendings), to which the focal person reacts in predictable ways. As a science, role theory seeks to codify apt predictions. An important area of lateral interest in role theory looks at the *gestalt* form of the received information in the focal person's experience (Merton, 1945, 1957), which can confound the focal person's logical need to differentiate among the respective sources of role-sendings when rationally perceptible conflict occurs among them. The natural result is some kind of confusion, which can serve to obstruct the focal person's efforts to operate effectively within the relevant organizational unit (Kahn *et al.*, 1964).

The popular model of the five types of power is probably the aptest representation of organizational power in terms of the present study (French & Raven, 1959). The noted model first depicts position power and person power, as two higher-order categories. The former includes the legitimate, coercive, and reward subtypes, while the latter includes the referent and expert subtypes. Of theoretical relevance to FVP is the fact that the two superordinate categories happen to correspond generally to horizontal (*i.e.*, lacking institutional differences in power) and vertical (*i.e.*, relying on institutional differences in pow-

er) modes of interpersonal influence, respectively. Therefore, power asymmetries in a group or organization will typically implicate hierarchical differences (*i.e.*, one position's level of responsibility *vis-à-vis* others). In turn, this perpendicular distinction fits one of two axes of differentiation on which any organizational structure relies, namely, vertical *versus* horizontal differentiation (Voss & Krumwiede, 2009).

## RACTAL VERTICAL POLARIZATION

The crux of fractal vertical polarization is simply the fact of vertical polarization itself. This is a frequent topic of study in both political science and economics (*cf.* Esteban & Ray, 1994), in which fields the concept closely matches the model presented herein, with the exception of the subject level of analysis (because FVP addresses the organization, while the more common treatments of polarization examine whole societies). Despite the difference in level of analysis, the exploration into the phenomenon of polarization in such research streams also features strong theoretical definition, which is relevant to the present exploration.

For simplicity, it is apt to note that there are two extreme conditions of vertical polarization in an organization, which straddle an optimum. These are weak (insufficient) and constrictive, while an appropriate level of vertical differentiation occurs midway between these points. Weak vertical differentiation represents a weak structure of command and control. Theoretically, sufficient social control could render this weakness irrelevant, so the question of sufficiency must legitimately consider the capacity of the workforce to operate free of vertical dysfunction, rather than treating command structure deprivation as inherently problematic. At the opposite extreme, constrictive vertical differentiation features a burdensome command structure, which smothers lower-level decision-making.

An organization with a weak command structure is adaptable to environmental fluctuations, but it lacks efficiency if also deprived of the compensatory mechanism of sufficient social control. Skilled professionals in one's workforce require relatively weak vertical differentiation in their delivery of custom solutions or other complex

services, because their professional education and orientation afford the requisite social control, while overly directive command structures would frustrate their efforts to make the creative decisions for which their professional background has prepared them. Thus, weak vertical differentiation becomes more fitting as the typical level of complexity in knowledge, skills, and abilities at lower hierarchical levels of an organization increases. By contrast, if vertical differentiation is weak, while at the line levels the workforce requires hierarchical guidance, the result is inefficiency.

If there is no manifest need for complex decision-making capacities at the lower levels (hence there is no call for hiring people who have deep decision-making experience), strong levels of vertical differentiation may provide efficiency in an organization. Such a structure shows little adaptability to environmental fluctuations though, so it only makes sense in an environment of heavy production. In this sense, Hersey and Blanchard's (1969) model of situational leadership suggests that a more directive style of leadership, which fits stronger vertical differentiation, is necessary in units with lower structural capacities for self-monitoring. A constrictive level of vertical differentiation occurs when strong vertical differentiation meets employees with the professional or experiential abilities to apply judgment in the course of their work. Whether the organizational structure at the lower hierarchical levels demands creativity, or whether the people employed there possess strong decision-making competencies, strong vertical differentiation will thus conflict with the innate properties of the organization and result in dysfunctions.

At the dyadic level, FVP moderates the productivity of the supervisor-subordinate relationship in a manner similar to LMX, but the focus is on dissatisfaction, rather than on the potential for extraordinary motivation, in the sense of Herzberg's motivator-hygiene theory (Herzberg, Mausner, & Snyderman, 1959). On the matter of polarization *per se*, an example may involve subordinates' bifurcating themselves affectively into opposing subgroups, in which one adheres to the formal unit leader, while the other experiences alienation. This is similar to the natural division between ingroup and outgroup mem-

bers (originally called cadre and hired hands, respectively) observed in LMX theory (Graen & Cashman, 1975), but the implication of FVP is that these poles may suffer from mutual antipathy, rather than merely distinguishable levels of group commitment. Of relevance to FVP is also the fact, demonstrated in several studies, of the relationship between LMX quality (measurable as the proportion of group members that perceive themselves as closely adhering to the group leader) and trust (*cf.* Gómez & Rosen, 2001).

### External Nomology

According to Voss and Krumwiede (2010), the conditions that will most likely lead to distortions in vertical communication patterns fall into three main categories. First, incompatible media for encoding and decoding at the opposite ends of unit-level vertical dyads may be relevant. Second, sources of information flow obstructions in the vertical lines themselves may be a cause. Finally, the prevalence of leadership styles appropriate to more directive contexts than those that fit the organization at issue may be relevant. The primary outcome is an erosion of trust, while others include inferences of managerial incompetence or subordinate irrationality, misattribution of performance (*e.g.*, attributing successes to a group boss rather than to key employees within the group), circumvention of formal channels as a coping tactic, bottlenecking or funneling of work roles, withholding effort, and organizational attrition. Voss, Krumwiede, and Duncan (2010) also noted the leader's abandonment of the company mission as both an antecedent and an outcome of FVP. Figure 1 depicts the expected external nomological net for the FVP construct.

Meanwhile, Voss *et al.* (2010) discussed three important categories of FVP effects. The first is erosion in the trust condition as it pertains to the vertical axis. Second is erosion in the procedural and distributive justice conditions. Finally, FVP may cause growth in the prevalence of informal power (*i.e.*, expert and referent power). This may in turn result in the emergence of mavericks or reliability nodes, which seek to restore the equilibrium lost under the FVP condition, alongside ingroup sycophants, which is a reversal of the theoretical LMX condition.

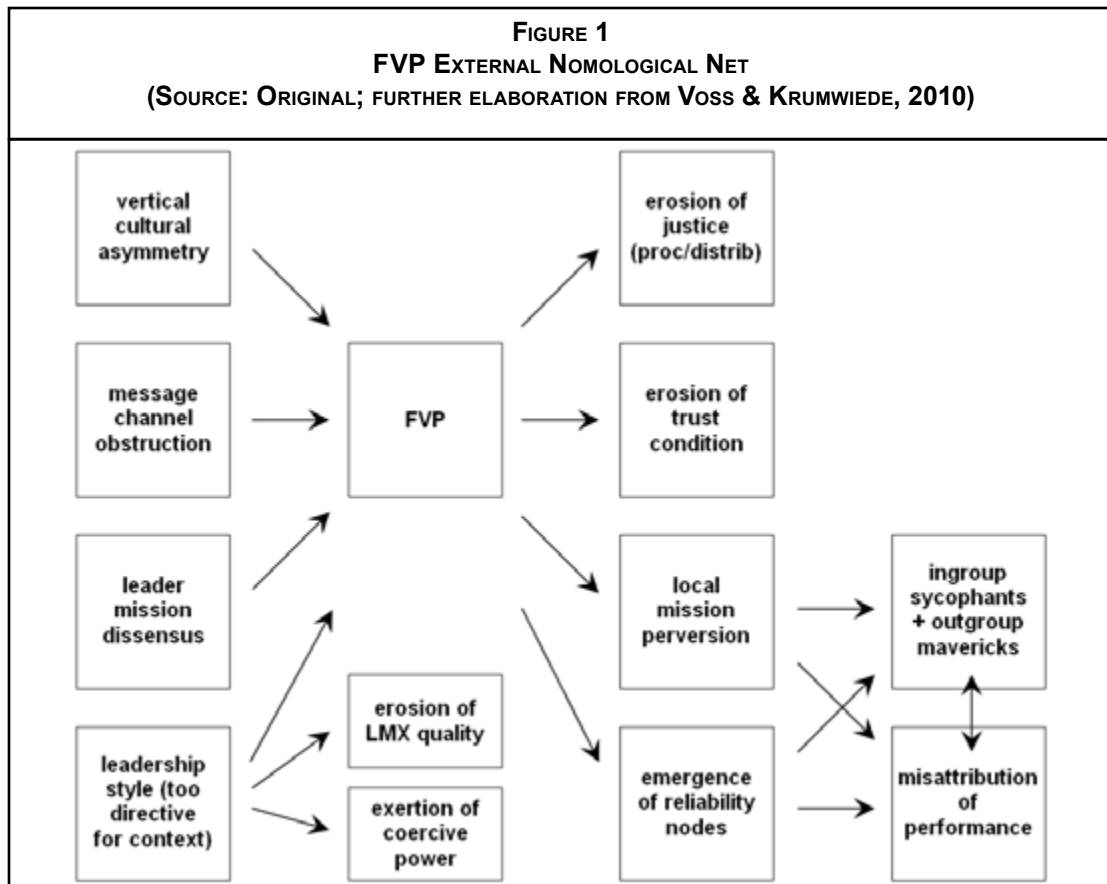
**Antecedents**

Vertical-culture asymmetries will predict differences both in encoding and in decoding messages through vertical conduits. Reliability in communication is a condition of vertical symmetry in this respect (Brannan, 2004). In essence, when the central administrative structure abruptly begins to treat its peripheral units as direct subordinates, such as in the advent of a major acquisition, those peripheral units may suddenly see a barrage of directives from the central organization that conflict with their preexisting competencies in the areas addressed thereby. Thus, the assumptions governing the encoding of these directives are distinct from those governing decoding. The effect is confusion in the periphery, or newly acquired units.

Message channel obstruction refers to distortions in transmission (Sperber & Wilson, 1986). Here, the upper and lower nodes in a unit-level vertical dyad may apply incompatible norms to their use of message channels. For example, one unit

may habitually use asynchronous methods, while the other insists on synchronous methods such as telephone or face-to-face media. Such a disparity implies distinctions in implicit protocols for encoding and decoding (Daft, Lengel, & Treviño, 1987). This is similar to the problem of disparate encoding and decoding contexts under the condition of distinct organizational subcultures, but in this case, the dynamic involves transmission processes rather than encoding and decoding processes. When this occurs between entire units, there is no self-evident mechanism to correct it, so the problem can persist indefinitely and lead to FVP. Otherwise, a more ordinary form of this phenomenon, unlikely as common today as in days typified by the use of whole units to route messages, involves the mediation of a central unit dedicated to communication coordination that breaks down due to bottlenecking or inadequacy in routing protocols.

Constrictive leadership styles may cause FVP, as a unit leader enacts an excessively directive leader-



ship style for the unit in question (Voss & Krumwiede, 2009). An interesting example of this is Tran's (2007) study, which features evidence of erosion in vertical communication among military students in project groups when leaders used mainly coercive power. In the context of that study, leaders and followers had similar levels of leadership ability, so the context demanded more participative leadership styles in those cases.

Leader mission dissensus, or the leader's *a priori* disengagement from the mission of the organization, is another issue pointed out by Voss *et al.* (2010). Specifically, under certain conditions, leaders may fail to realize that they are acting discordantly from true organizational priorities. Subordinates may encounter difficulties in trying to interpret managerial decisions, or they may be unable to perceive how the decisions that they see actually fit within the vision or strategic imperatives of the organization. Directives issued without clear regard for the organizational mission may lead logically to subordinates' undertaking actions whose long-range implications are at odds with the perceived good of the organization. Consequently, subordinates may try to make sense of such directives as somehow supporting the organizational strategy for as long as they can, until the disparity between directives and mission becomes too great to rationalize. Leader mission dissensus can theoretically occur at the organization level of analysis itself, in which case a CEO may lose sight of the strategic priorities of the company and proceed to operate instead on internal criteria, such as by drawing from prior experience at other companies. If the strategic imperatives at those prior companies are different from those of the current company, the result is ineffectiveness due to strategic misalignment.

## Outcomes

On the outcome side of external nomology, prior conceptual work expects negative effects on perceptions of procedural and distributive justice, organizational trust (specifically, mutual trust between lower and upper nodes), and adhesion to the organizational mission. By comparison, there is an expectation of positive effects on the tendency for displacement in unit loyalties, such

as the emergence of ingroup sycophants, and a strengthening of *foci* of informal power, such as outgroup mavericks (Voss *et al.*, 2010). In addition, a conceptual exploration into the likely effects of an FVP condition on supply chain relationships has concluded that high-FVP organizations may experience a mutation of vendors' contact-seeking behavior in the form of their transitioning away from formal contact nodes to informal options residing closer to the center of operations in the buying firm (Voss & Krumwiede, 2009). Meanwhile, it may be possible for the FVP condition to infect a vendor if the buyer has significant economic power over it (Voss & Krumwiede, 2009).

Procedural justice refers to the application of decision-making rules that affect similarly situated parties similarly, rather than capriciously or alternatively according to personal preference (Thibault & Walker, 1975). Procedural justice therefore requires the availability of the same procedural information at the upper and lower nodes of each hierarchical relationship, as well as willingness on the part of decision-makers to attend to the organization's interests rather than react to any personal set of guidelines that might operate outside the organizational context. FVP can erode procedural justice in two primary ways. First, an obstruction in vertical lines will obscure the information necessary to maintaining procedural justice, which may deprive decision makers of procedural knowledge and thence result in random fluctuations in its application. Insofar as it also deprives affected parties of the information necessary for accessing appeals processes or otherwise knowing their procedural rights, it will create further fluctuations in the apparent willingness to appeal adverse decisions. In turn, given that the latter condition results in a buildup of implicitly unsatisfied grievances, it undermines the trust condition (discussed further below). Second, a decision maker's disconnection from the company mission (discussed below) will shift effective guidelines for rendering justice from those established by the organization to those that exist in the decision maker's own mind. Insofar as the decision maker has strong internal standards of procedural justice, this effect may be invisible. However, decision makers who lack such internal standards will begin to act on their personal preferences in hiring, firing,

promotion, and recognition. In turn, this effect will further undermine the trust condition.

Distributive justice refers to the similar allocation of organizational rewards to similarly situated people, after adjusting for observations of performance (Homans, 1961). There are arguably two primary ways in which distributive justice suffers erosion. First, an obstruction in vertical lines will lead to random fluctuations in decision making, due to a greater incidence of uncertainty. For example, a supervisor may overpromise a new hire regarding certain details of direct pay by overestimating the true limits of supervisory latitude in effecting such decisions. Insofar as there is a lack of clarity in this regard, new supervisors will furthermore infer from the decision-making criteria of current supervisors to determine how to make their own distributive decisions. Second, erosion in distributive justice may result from decision makers' disconnection from the company mission. As in the case of procedural justice, decision makers will shift from external (organizational) to internal (personal) criteria for allocating rewards.

Organizational trust in the context of FVP refers to subordinates' trust in management and conversely management's trust in the subordinates. The erosion of organizational trust is theoretically the first visible and most obvious of the symptoms that indicate an FVP condition. Manifestations of this phenomenon include commentary from lower-order units that imply that the leadership is oblivious to the reality of line workers or simply intent on making their lives miserable. Conversely, higher-order leaders may perceive the workers to be disloyal or obstructionist. These inferences influence real communication dynamics and end up creating self-fulfilling prophecies. Organizational trust is primarily a reciprocal phenomenon. Insofar as subordinates feel that management gives them the decision-making latitude that corresponds to their actual level of competence, the trust condition remains strong. Conversely, insofar as management perceives that subordinates are acting in the organization's best interests, the same is true at the upper levels of the hierarchy. If indeed both management and subordinates are trying to function in the best interests of the company, obstructed vertical lines will nevertheless obscure mutual perceptions of

this fact and begin to erode the trust condition. Once the organization suffers from dissonance in vertical lines, whatever the reason (*cf.* the internal causes of FVP, above), the trust condition erodes, and the other symptoms of FVP begin to manifest themselves. For example, this effect may come from sudden changes in managerial patterns, such as frequent memoranda that seem aimed at exerting greater control over subordinate decision-making latitude. At the local level within an organization, perceived incongruities between managerial decisions and the company mission will create the effect. By comparison, in a low-FVP organization, advance warning and careful explanation are likely to precede the otherwise inexplicable shifts in managerial behavior, which serves to mitigate this effect.

Local mission perversion refers to subordinate-unit decision makers' acting at odds with the company mission. In these cases, the manager's decision-making guidelines have shifted from those of the company to an internal (*i.e.*, personal) agenda that is out of concordance with them. At the local level, for example, a supervisor who experiences alienation from his superiors may start to enunciate directives that obey personal idiosyncrasies instead of company interests. This can result in severe polarization of local units and a reversal of the relative positions of ingroup and outgroup members (*cf.* the discussions of reliability nodes, sycophants, and mavericks, below). Mission perversion appears similar to leader mission dissensus, but the latter is construable as a cause of FVP, while mission perversion is an expected outcome. It is therefore naturally possible that this particular variable represents a vicious cycle.

Reliability nodes refer to organizational members, especially subordinates, who take on increasing levels of responsibility informally in response to the exploring behavior of others within and without the organization that seek stable responsiveness across unit or organizational boundaries. In an abstract sense, the communication lines that would otherwise follow formal paths reconfigure around those nodes that emit stable signals, and away from those that emit sporadic signals. While bottlenecking may simply result from poorly planned work sequences, it often occurs instead due to the FVP condition.

Thus, an informal structure emerges to restore equilibrium to an otherwise dysfunctional formal system. When this is a consequence of mission perversion at local levels, reliability nodes occur in outgroups rather than ingroups, which is a complete reversal of the normal LMX process. The result is performance misattribution, as local unit leaders continue to benefit from the performance of their reliability nodes, while dissonance in vertical lines obscures the true source of that performance.

Sycophants emerge in ingroups under the condition of mission perversion, in opposition to the LMX expectation of higher performers in that pole. This is a consequence of the unit leader's idiosyncratic decision-making criteria. That is, the personal interests of the unit leader, rather than those of the company, are paramount, so those unit members who gravitate toward the leader are manifesting responsiveness to those personal interests, rather than to the interests of the company as defined in its mission or strategic priorities. In practical terms, there is a sense of mutual protection between the unit leader and ingroup members. Outgroup members, meanwhile, may conversely adhere closely to the company mission, which may result in informal behavior to seek out reliability nodes outside the local unit.

Outgroup mavericks may emerge in these situations, as long as there is some source of informal power in the outgroup pole. The maverick's characteristic trait is overachievement, along with frustration with the ingroup. The emergence of an outgroup maverick may often precede the maverick's departure from the organization itself, depending on the target of the maverick's intensive efforts toward achievement. As an interesting example of a maverick in history, Martin Luther first expended considerable effort arguing against local mismanagement (specifically, abuses in the allocation of indulgences, or a misaligned system of distributive justice), while believing that his actions were consonant with his organizational mission (*i.e.*, the Papacy). Of course, he eventually left his organization on an entrepreneurial venture to start a better one. The risk that mavericks take is self-evident, given that performance misattribution must follow in an FVP structure, which in turn nullifies the recognition of their actual achievements within their

respective organizations. In the midst of often extremely heavy workloads, which leave little room to ponder the propriety of their stubborn adherence to the company mission, mavericks may go on in this way for long periods of time before abruptly leaving.

Performance misattribution refers to distorted information about the true sources of achievement in an organization. FVP may invite the inadvertent recruitment of incompetent managers, who may exploit (unknowingly perhaps) the vertical dissonance to obscure the true source of their effectiveness (Voss *et al.*, 2010). When the vertical lines of communication suffer distortion, the information that reaches the upper hierarchy is cloudy. Subordinate unit leaders can easily exploit this cloudiness by taking credit for their subordinates' achievement. There is often little need, in fact, for unit leaders to try very hard to do this, as the default assumption about unit-level performance is that the unit leader has somehow been responsible for it, even where there is outright enmity between a unit leader and a strongly performing outgroup maverick. Moreover, this cloudiness, as it affects performance attribution, may infect recruitment decisions themselves. That is, hiring managers' efforts to recognize signs of valid past performance among applicants to managerial positions may suffer from the same distortion. While internal applicants may already benefit from performance misattribution, given the possible contributions of ingroup mavericks in their respective units, even external applicants may benefit from similar effects at other FVP organizations, while decision makers in the hiring organization credit such applicants by analogy with their perceptions of unit leaders in their own organization.

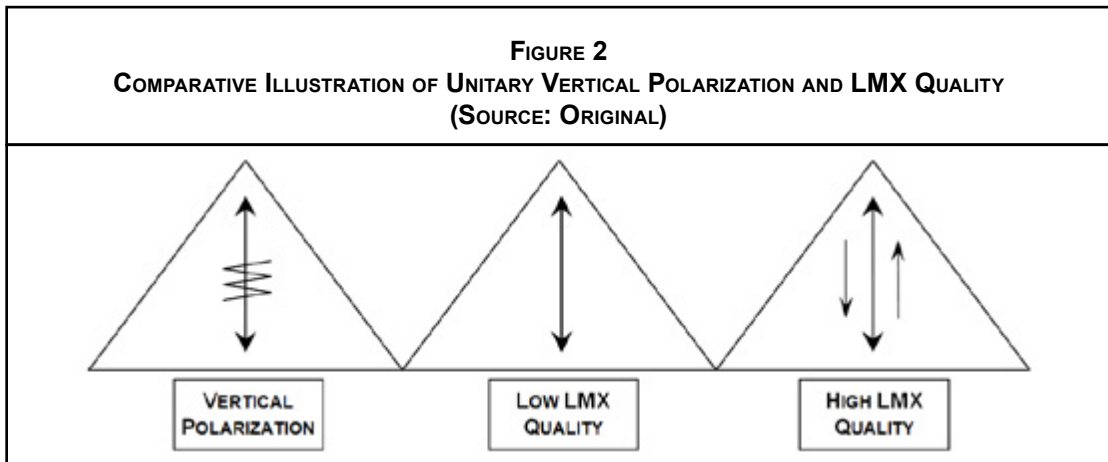
### Internal Nomology

The internal nomology of a construct conceptualized within the autopoietic paradigm manifests the nature of a flow of resources and information, rather than causal expectations. To be sure, the concept of internal nomology is curious, as Cronbach and Meehl (1955) only discussed external nomologies as a way to link proposed constructs to other constructs and thus more readily establish their validity. In the field of philosophy, an

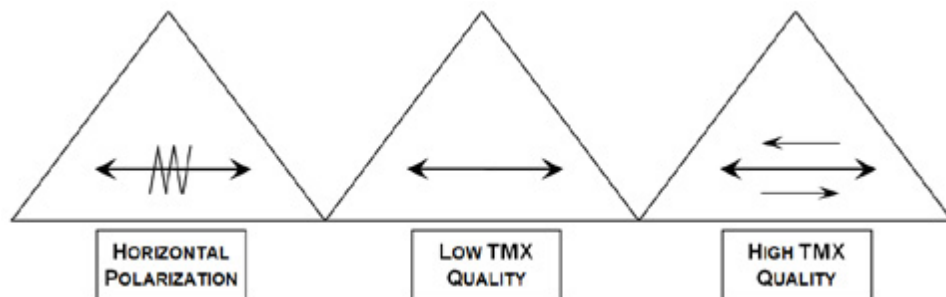
internal nomology refers to that set of explanatory laws that rationalizes the internal properties and thus productive potential of a science or art (*cf.* Schaeffer, 1992), hence likewise of a theoretical phenomenon on a smaller scale. Inevitably, the internal nomology of a chaordic construct explains what occurs internally and therefore addresses flow characteristics, rather than causality. Figures 2 and 3, in which the zigzag mark suggests channel dissonance, illustrate vertical and horizontal polarization alongside LMX and TMX, respectively. Figures 4 and 5 then illustrate fractal differentiation (as an ordinary and indeed necessary property of chaordic systems) and fractal polarization (with the attendant dissonance), respectively.

The most peculiar property of FVP, informed entirely by chaos theory, is the theoretical process by which it spreads from a focal point in the organization to all lower-order units that fall within its formal jurisdiction. In all affected units, commu-

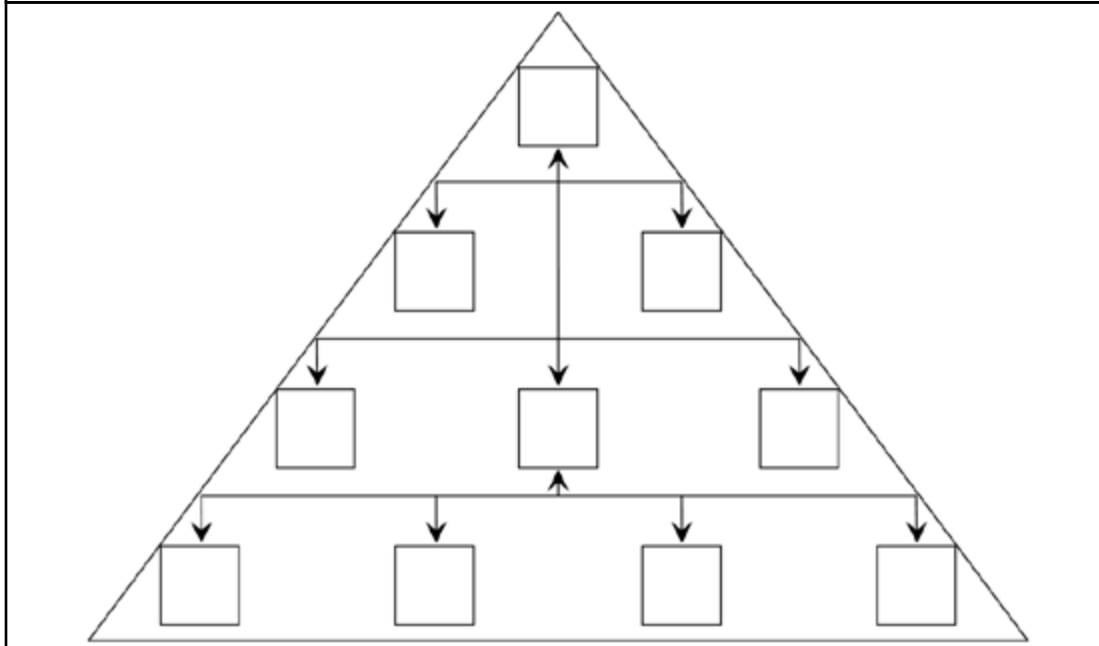
nication asymmetries emerge between the upper and lower poles. Thus, consistent with the nature of fractality, the pattern of vertical communication replicates across levels of organizational scale (Chatterjee & Yilmaz, 1992). A comparison in nature might involve the fractal structure of a tree, by which a dysfunction that affects cellular interaction (*i.e.*, its elemental structure) tends to spread upward, rather than downward, consistent with the directive flow (roots to leaves, rather than leaves to roots) that is apt for a tree. By comparison, a human organization manifests an elemental structure that features resource transfer among organizational agents, guided from above (metaphorically speaking), while enacted from below. Consistent with this observation, basic organizational processes constitute information transfer among organizational nodes, whether symbolically or in the form of physical or energetic resources.



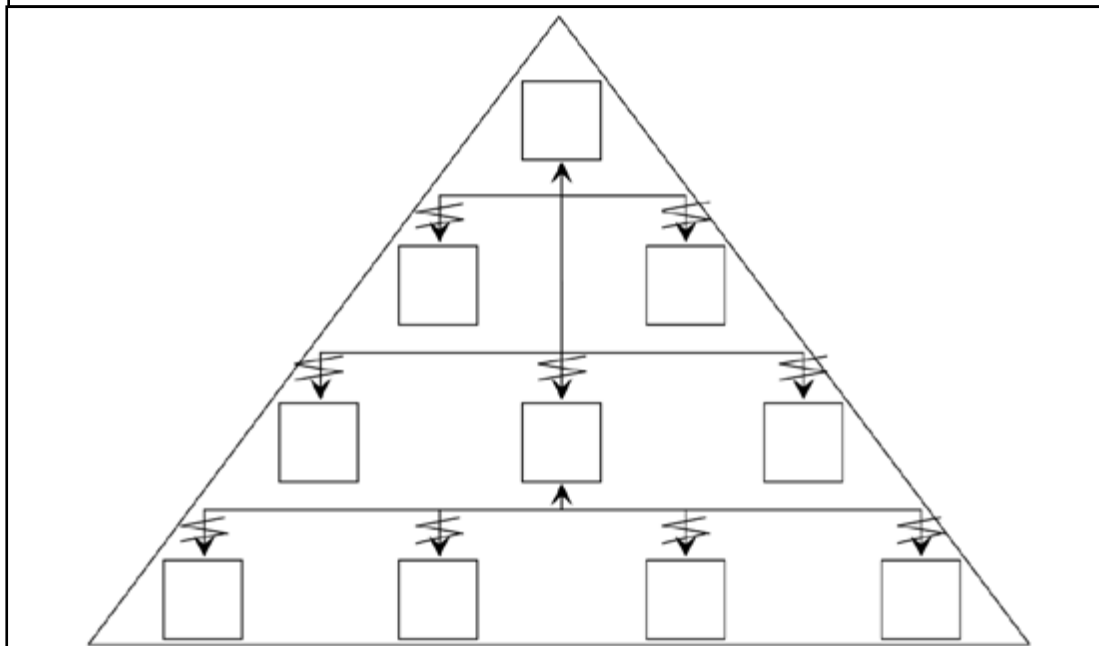
**FIGURE 3**  
**COMPARATIVE ILLUSTRATION OF UNITARY HORIZONTAL POLARIZATION AND TMX QUALITY**  
(SOURCE: ORIGINAL)



**FIGURE 4**  
**FRACTAL VERTICAL DIFFERENTIATION (COMMON CHARACTERISTIC OF CHAORDIC SYSTEMS)**  
**(SOURCE: ADAPTED FROM VOSS & KRUMWIEDE, 2009)**



**FIGURE 5**  
**FRACTAL VERTICAL POLARIZATION (DYSFUNCTIONAL CHARACTERISTIC OF CHAORDIC SYSTEMS)**  
**(SOURCE: ADAPTED FROM VOSS & KRUMWIEDE, 2009)**





As noted previously, dysfunctional extremes of differentiation depend on product complexity, as greater complexity levels demand greater complexity in abilities among subordinates. In turn, efficiency considerations suggest that subordinates receive a greater decision-making role, meaning empowerment, in these environments (Gómez & Rosen, 2001). Directive leadership is, by comparison, appropriate only in the opposite type of environment, wherein the suitable degree of vertical differentiation is higher (Muczyk & Reimann, 1987). Accordingly, the functional degree of vertical differentiation that would apply to a unit of sophisticated engineers is low, while the same degree of vertical differentiation applied to a labor-intensive manufacturing plant would suffer from a lack of direction if no social-control structure emerges to compensate. Thus, as subordinate skill complexity rises, hierarchy naturally falls. This may explain the flatter company structures that have come to predominate in modern industrial nations (*cf.* Peters, 1987, *pp.* 355 *ff.*). Indeed, the phenomenon of an inverse relationship between the skill complexity of subordinates and the extent of the organizational hierarchy is a consequence of equipotentiality, a known systems attribute (Katz & Kahn, 1966, 1978). Thus, any recommendation to increase the flexibility of an organization calls for a greater degree of equipotentiality, which may come in the form of hiring employees with more complex skill sets or by undertaking cross-training. Reflecting the flatter organizational structures that were emerging at the time of his writing, Peters (1987) thus wisely exhorted his readers to invest as much in “human capital” as in “hardware” (p. 322).

A natural propensity exists for organizational actors to respond differently to weak and strong information *foci*. This is a role theory observation, as is readily visible in the careful treatment of Kahn *et al.* (1964). Role-senders of greater importance than normal follow the lines of demarcation drawn by French and Raven (1959) in their explication of the five primary types of power. Specifically, all holders of power, whether formal or informal, are able to induce compliance by appealing either to formal modes of univalent dependence (coercive, reward, or legitimate power), or to informal modes of persuasive effect (expert or referent power). In the case of the emergence of the reliability node in an FVP organization,

informal sources of power draw habitual lines of communication away from formal centers of power, while other patterns of information exchange in the organization develop around the reliability node and reinforce it.

## PROPOSITIONS

In light of the foregoing discussion, the present study advances the following propositions. Versions of some of these first appeared in Voss *et al.* (2010) and Voss and Krumwiede (2010). The first set of propositions reflects the antecedents noted in the external nomology.

- P1. Vertical asymmetries in organizational culture (*e.g.*, in cases of corporate acquisition) will produce FVP conditions.
- P2. Obstructions in message channels (*e.g.*, the prevalence of asymmetric norms of message channel usage) will produce FVP conditions.
- P3. Leader mission dissensus (*i.e.*, leaders’ distancing themselves from the company mission) will produce FVP conditions.
- P4. Leadership styles that are more directive than merited by the level of skill complexity of the unit will produce FVP conditions.

The next set of propositions lists the direct outcomes of FVP. This enumeration excludes the indirect outcomes for simplicity.

- P5. FVP will undermine procedural justice, distributive justice, and organizational trust.
- P6. FVP will cause local-unit leaders to dissociate themselves from the company mission.
- P7. FVP will increase the incidence of process bottlenecks and reliability nodes.

Lastly, on the matter of internal nomology, a comparison against LMX and the observation of fractality would figure among the most telling candidates for confirmation of the chaordic nature of the proposed model. Accordingly, the following expectations emerge from the foregoing discussion.

- P8. FVP will correlate negatively and very strongly with LMX quality.
- P9. FVP will typically recur across several business units, rather than remaining isolated within a single unit.

## DISCUSSION

This paper has set out to present the complete model of fractal vertical polarization (FVP) as it currently exists in conceptual form, to support scale development and empirical analysis. As the foregoing discussion suggests, FVP is a dysfunctional phenomenon with properties that obey the common characteristics of chaordic systems. As such, it is analyzable within a chaordic empirical framework and thus in some sense manageable, for leaders who can recognize it and understand its causes and symptoms.

Those theories from the traditional literature that may offer means for detecting FVP or shedding light on its causes seem to include communication theory, role theory, situational leadership theory, procedural-justice theory, distributive-justice theory, and theories of organizational trust. Meanwhile, LMX and TMX constitute analogous models that likewise emerged from the autopoietic paradigm and thus may provide deeper insights into empirical questions.

The unique feature of FVP is its fractal structure, which suggests replicability of the phenomenon across organizational units. Specifically, the expectation is that this replication will occur downward from a starting point within the organizational hierarchy, rather than causing any upward influence. Should this feature prove valid, it would pose deep implications for LMX and TMX as well, which accordingly should likewise obey some measure of fractality in their own theoretical configurations.

Future research should proceed with scale development to enable empirical analysis. As in the case of LMX, measurable systems attributes that may provide insights into the phenomenon conceivably exist at different levels of analysis, but it may be sufficient, as LMX and TMX have both proven, to develop a single self-report measure for use in capturing subordinate impressions of the phenomenon. If so, then the complications that suggestions of empirical measurement of chaordic dynamics often imply need never actually emerge.

Meanwhile, the authors of the present paper would speculate that there is strong conceptual material in the FVP model already, which may prove useful for reconsidering many of the dysfunctional phenomena that observers often see in the workplace. It is their belief that the FVP model renders much of the chaos (in the traditional sense) of the workplace comprehensible and possibly manageable for any leader who has striven to visualize the workplace from the spectacles provided by this model. If so, then explorations into the chaordic paradigm merit continued effort, and the era of chaos theory is still young.

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## **A CASE STUDY IN MARKETING COMMUNICATIONS: TRADITIONAL VS. E-MEDIA ADVERTISING.**

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### **ABSTRACT**

*The intent of this research is to investigate the merits of online advertising media versus traditional print newspaper advertising. As such, this research simultaneously compares the effects of four advertising media: (1) newspaper print display advertising, (2) newspaper website advertising, (3) store website advertising, and (4) store email advertising. A four week experimental investigation was set up where store coupons were offered via the four advertising media, including a brief survey for those customers who redeemed the coupons. The results of the investigation support the current industry paradigm that traditional newspaper is declining in effectiveness, yet this research suggests that newspaper print advertising still has a place in a firm's media portfolio. The findings of this research reveal that the lowest cost of advertising per coupon redeemed occurred with the store email advertising and store website advertising, yet traditional newspaper print and website advertising provided a greater reach.*

*As a result, this paper offers four managerial recommendations. First, newspaper print advertising continues to be effective as tool for building brand awareness and the firm ought to continue using it as the primary component of its media efforts. Second, with newspaper website advertising is an effective brand awareness builder; however it was less effective as a media for delivering coupons. Third, store website advertising is currently underutilized and deserves attention for future expansion and long-term benefit. Finally, the firm should continue the development of the client database to be used in focused email advertising efforts.*

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### **INTRODUCTION**

One of the trends in advertising and media today is the movement of advertising budgets from traditional media toward various forms of online advertising (Forrester Research Inc., 2005). In fact, traditional media has been accused of being on its deathbed (Rust & Oliver, 1994; Rust &

Varki, 1996), while the internet is being lauded as a better communication tool due to its versatility and superiority at targeting customers (Mohammed, Fisher, Jaworski, & Paddison, 2002). This research is an investigation into this trend, using a small furniture store in the upper Midwest as the focus.

Freed's Fine Furnishings (FFF) is a family-owned business in Rapid City, SD, founded in 1922 as MidWest Furniture. It was purchased by Henry Freed in 1951, and adopted its current name in 1970. The firm currently operates under articles of incorporation, with members of the Freed family having majority ownership. While the owners and managers of FFF have built a successful business in western South Dakota, they were not convinced that their promotional budget was garnering optimal results. The managers recognized two problems with their promotional efforts using television, newspaper display, and radio advertising. First, they did not have a mechanism in place to evaluate the effectiveness of their efforts, and second, they were not sure that their current media resources were reaching their desired target market. The goal of this research is to provide the firm's management information regarding these two issues. Moreover, the leadership at FFF is interested in evaluating the merits of online and electronic promotional methods. Thus, the objective of this research is to compare four promotional methods for FFF: traditional print display advertising, website advertising using on the daily newspaper's homepage, direct email messaging from FFF's customer list, and advertising on FFF's own homepage.

## COMPANY OVERVIEW

### Internal Environment

FFF offers products and services for both home and commercial customers. The store carries over fifty brands of fine furnishings which include all types of furniture, mattresses, lamps, window treatments, pictures, paintings, upholstery, flooring, and accessories. In addition, the design department is staffed with certified Interior Designers who are able to assist customers with all elements of interior design; including furniture, window treatments, bed spreads, light fixtures, room layouts, and flooring. The firm also has specialists trained in flooring and furniture repair.

FFF's products and services are "big-purchase" items, which are often bought seasonally. The slowest months for sales are generally January through March, while the second quarter is the

busiest time period of the year. The second quarter offers several family and entertainment occasions, which prompt home furnishing upgrades or furniture gifts for graduations and weddings. July and August generally experience a decrease in sales as people focus on family vacations and various outdoor activities, typically making August the slowest summer month. However, an increase in sales occurs from September through November as people prepare for the holidays and an influx of family and guests within their homes. Surprisingly, December does not experience an increase in sales, perhaps due to the fact that people do not generally buy furniture as gifts.

### Customer Environment

FFF customers come from an expansive geographic region, reaching approximately 150 miles around Rapid City including the communities of Pierre and Faith, South Dakota, Gillette, Wyoming, and Chadron, Nebraska. The typical FFF customer is female, aged 35-64, married with children, and has an above average income (Alberts, 2011). The sales force at FFF attempts to build positive, lasting relationships with customers. They often service the same clients for many years, and know their customers and the customer's families on a personal level. This long-term customer orientation is a strength for FFF. In addition, FFF has a robust commercial clientele, and has served customers such as the Wall, South Dakota public schools, the South Dakota National Guard, and many casinos and resorts in the Black Hills and neighboring Wyoming.

### CURRENT ADVERTISING METHODS

FFF uses traditional channels for their advertising; newspaper print, direct mail, television, and radio are the dominant media used. Miscellaneous channels of communication include the store's website, the local newspaper's website, local magazines and brochures distributed to the community, and event sponsorships. (Christianson, 2011). The firm's advertising budget is supported with coop advertising funds through FFF's suppliers and manufacturers including Serta, Karastan Carpet, Stainmaster Carpet, and Hunter Douglas (Alberts, 2011).

Newspaper print advertising is the most used, and has the highest budget of the media sources from FFF, which is about \$130,000. The firm advertises in the community's largest local daily paper, the *Rapid City Journal*, an average of two promotions per month with three to five full page advertisements (Christianson, 2011). The second media outlet used by FFF is television with a budget of about \$60,000. FFF uses the two cable television companies in the community for their television advertising needs. The firm's commercials run sporadically throughout the year on mass media outlets ABC, NBC, and FOX, and targeted networks such as HGTV, TLC, Discovery, The History Channel, and Bravo. The third most important media for FFF is direct mail. The firm's budget for mail promotions is about \$20,000, which the firm uses once per quarter where mailings are sent to a list of over 10,000 current customers. The mailings are usually a promotion for current customers only, inviting them to a special or "private sale." The fourth media used by FFF is radio, where the firm has a small budget of less than \$8,000. FFF uses this medium sporadically. FFF supplements advertising and promotion through a number of smaller, miscellaneous methods which include local magazines, spots in local content brochures, their website, community contributions, and donations to entities which increase their public image and satisfy their desire for corporate responsibility.

The Internet represents one of two new advertising venues for FFF. First, the firm's website provides basic information about the store's hours of operation, contact information, and basic information about the furniture brands at FFF. In addition, the website is hosted by an internet/graphics development company that is responsible for maintenance and implementing updates. The second new media used by FFF is advertising via the newspaper's website using online banners and scrolling "PAW" advertisements. PAW advertisements are individually purchased banners on the newspaper's homepage that expand once scrolled over, and can be clicked through to reveal more information or an FFF's website. Interestingly, FFF has not pursued an email campaign with its current customers. While the direct mail database includes over 10,000 clients,

the firm has approximately 600 email addresses. This study will include email as a media source.

## RESEARCH METHOD

The leadership at FFF wanted to know if their advertising efforts were effective, and further, if the newer electronic forms of advertising would be more effective than the methods the firm has traditionally used. A test was developed to determine the effectiveness of four media, (1) newspaper print advertising, (2) newspaper website advertising, (3) advertising via the firm's website, and (4) direct email advertising using the firm's client list. The campaign was relatively simple. Each media introduced a coupon offering a 50% discount for the purchases of any one retail item. See Figure 1 for an example of the coupon. Each coupon had a different code placed in the bottom right corner in order to track the media source. The coupon codes are (1) NP for those coupons from the print newspaper, (2) NW for coupons from newspaper's website, (3) FWS for coupons from FFF's website, and (4) FEM for coupons from FFF's email list. Please see Figure 2 for an example of a coupon.



The case study followed a strict four week media schedule. To test the merits of newspaper print, the coupon was placed in Sunday print edition on the third Sunday of the schedule. Sunday is the periodical's highest read news day; it distributes 33,000 papers each Sunday and reaches roughly 70,000 readers (Conway, 2011). A full page advertisement featuring the coupon ran in the main section of the newspaper on the back page. This is the only time the promotion was

communicated through a traditional medium of advertising. To test the merits of the newspaper's website, a scrolling newspaper print advertisement was placed on the newspaper's homepage every Monday and Friday of the four week test. Third, the coupon was available on the firm's website starting February 27, 2011 and continued for four weeks, and finally, each Sunday of the four week test, an email explaining the promotion with the attached coupon, was sent to a customer database of around 600 recipients. A final email blast was sent the last Thursday of the test. The last day to redeem the coupons was the fourth Saturday of the four week test. Please see Figure 3 for the promotion and media schedule.

Each customer who redeemed a coupon was asked by the sales representative to complete a survey at the point of purchase. The survey was divided into two parts, the first part asked demographic questions, and the second asked questions about the client's media use and preferences in media interaction with FFF. Clients placed the surveys into sealed envelopes and then put the envelopes into a collection basket.

### Survey Results

The four week campaign brought in 69 coupons, and the FFF sales staff collected 55 surveys. Each of the surveys was inspected to insure comple-

tion and suitability for analysis; all were deemed suitable and included in this study. The six missing surveys occurred early in the study when the sales staff failed give the customers the survey. Once the staff learned how the study could benefit them and the firm, they were proactive and encouraged customers to participate. Of the 69 coupons redeemed, 39 came from newspaper print edition, 8 from newspaper's website, 13 from FFF's website, and 9 from FFF's email.

The survey results confirm the management's perception that the FFF client is generally an older married female with above average income; only seven coupons were redeemed by males. In addition, 80 % of the surveys were from clients between the ages of 35 and 64, and specifically, 38% were between the ages of 55 and 64. Further, 38% of the respondents earned more than \$95,000 per year, while 29% have been customers less than three years and 33% have been customers for sixteen years or more. See Table 1 for the demographic profile of clients submitting surveys.

Two items on the survey asked where clients generally learn about FFF promotions, and where they would prefer to learn about FFF promotions. Newspaper print media was the dominant source of learning current promotions, 71% responded that they typically learn about current

**FIGURE 2**  
**PROMOTION SCHEDULE**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27-Feb FWS FEM	28-Feb FWS NW	1-Mar FWS	2-Mar FWS	3-Mar FWS	4-Mar FWS NW	5-Mar FWS
6-Mar FWS FEM	7-Mar FWS NW	8-Mar FWS	9-Mar FWS	10-Mar FWS	11-Mar FWS NW	12-Mar FWS
13-Mar NP FWS FEM	14-Mar FWS NW	15-Mar FWS	16-Mar FWS	17-Mar FWS	18-Mar FWS NW	19-Mar FWS
20-Mar FWS FEM	21-Mar FWS NW	22-Mar FWS	23-Mar FWS	24-Mar FWS FEM	25-Mar FWS NW	26-Mar FWS Last day to redeem.



**TABLE 2**  
**PREFERENCES FOR PROMOTIONAL DELIVERY**

GENDER		AGE (in years)							
Coupon Source	Male	Female	<24	25-34	35-44	45-54	55-64	65-75	75+
NP	3	27	0	1	5	5	13	4	2
NW	0	4	0	0	2	0	1	1	0
FWS	1	10	0	1	1	3	5	1	0
FEM	3	7	0	0	2	5	2	1	0
total	7	48	0	2	10	13	21	7	2

INCOME (in thousands)*									
Coupon Source	\$0-24	\$25-34	\$35-44	\$45-54	\$55-64	\$65-74	\$75-84	\$85-94	\$95+
NP	0	1	2	1	3	7	1	2	11
NW	0	1	0	0	2	0	0	0	1
FWS	0	0	1	3	2	0	0	0	4
FEM	1	0	2	1	0	0	1	0	5
total	1	2	5	5	7	7	2	2	21

\*Frequency for income totals 52; 3 responses were left unanswered.

Coupon Source	Marital Status						Number of years customer has been shopping at FFF				
	Single	Married	Divorced	Widowed	Never married	Living with a partner	0-3	4-7	8-11	12-15	16+
NP	5	21	3	0	0	1	4	5	6	3	12
NW	0	3	1	0	0	0	2	0	1	0	1
FWS	1	8	2	0	0	0	5	1	0	2	3
FEM	2	5	2	1	0	0	5	2	0	1	2
total	8	37	8	1	0	1	16	8	7	6	18

promotions through the local newspaper print edition. However, 52% indicated that they prefer to learn about promotions via newspaper print advertising, while 34% they prefer direct mail promotions, and 32% prefer email delivery of promotional messages. Percentage totals are greater than 100% due customers selecting more than one preference. The analysis revealed that newspaper print was the only medium to experience a decline in actual versus preferred sources for promotion. See Table 2 for details regarding preferences for promotional delivery.

**New Customer Preferences**

Table 1 reveals that the top two redeemers of the coupon were new customers that have been shopping at FFF for three years or less and long

term customers who have been shopping at FFF for sixteen or more years. Analysis illustrated in Figure 3 reveals that compared to long-term customers, new customers are more likely to prefer the delivery of promotions in media other than newspaper print. Interestingly, the survey shows that the preferences of new customers are evenly divided over most of the media channels FFF uses.

**COUPON CAMPAIGN RESULTS**

Table 3 illustrates the scope, costs and results of the four media utilized in this experiment. First, the results from the data collected show that the newspaper print campaign had the most circulation, and also brought in the most coupons. This finding correlates with the survey data which

**TABLE 2**  
**PREFERENCES FOR PROMOTIONAL DELIVERY**

Typically learn current promotions							
Coupon Source	NP	NW	TV	Mail	Radio	FWS	FEM
NP	28	1	5	7	3	1	na*
NW	1	2	1	1	0	1	na
FWS	6	1	1	2	1	4	na
FEM	<u>4</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>3</u>	na
	<b>39</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>4</b>	<b>9</b>	

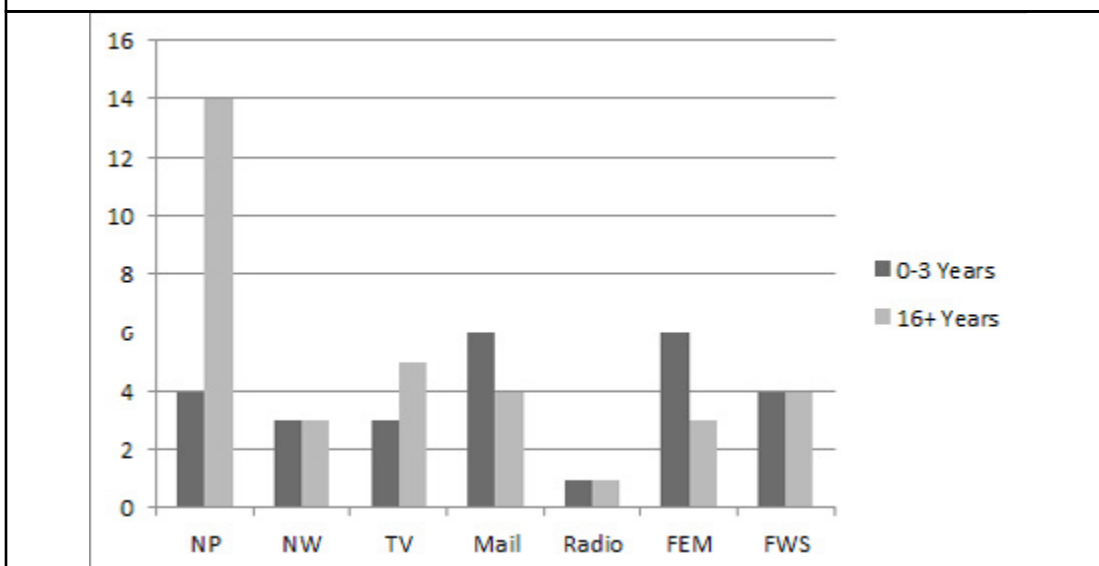
\*Frequency for email is not applicable, for the firm did not use email prior to this study.

Prefer to learn current promotions							
Coupon Source	NP	NW	TV	Mail	Radio	FWS	FEM
NP	21	3	7	9	4	6	9
NW	1	3	2	3	0	2	1
FWS	4	2	2	5	1	4	2
FEM	<u>3</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>6</u>
total	<b>29</b>	<b>8</b>	<b>11</b>	<b>19</b>	<b>5</b>	<b>12</b>	<b>18</b>

revealed that newspaper print was also the most frequent choice for customers wanting to learn of store promotions. Analysis also shows that the cost per coupon redeemed was the second highest of the four mediums tested, and the number of

coupons redeemed per circulation was very low. Second, the newspaper's website ads brought in the least number of coupons: eight. In addition, the newspaper's website was the most expensive of the four mediums in cost per redemption at

**FIGURE 3**  
**PREFERENCES FOR PROMOTIONAL DELIVERY BASED UPON CUSTOMER TENURE.**



\$500.00 per coupon. Third, thirteen coupons were redeemed from FFF’s website, which also brought in the lowest cost per coupon redeemed. One of the difficulties with collecting data for this portion of the analysis was the inability to secure circulation numbers from FFF’s web host. FFF hires an outside contractor to maintain the store’s website presence, and the individuals in charge of that portion of the business did not provide the data requested. Finally, FFF’s email list brought in nine coupons, which provided a low \$8.67 cost per coupon redeemed, the second lowest in this experiment.

**Traffic Counts**

Each day, the numbers of customers visiting the store are tallied. Compared to February 2011, traffic counts in March 2011 were higher. Remarkably, daily traffic counts peaked at 116 customers on Saturday, March 19, which was the

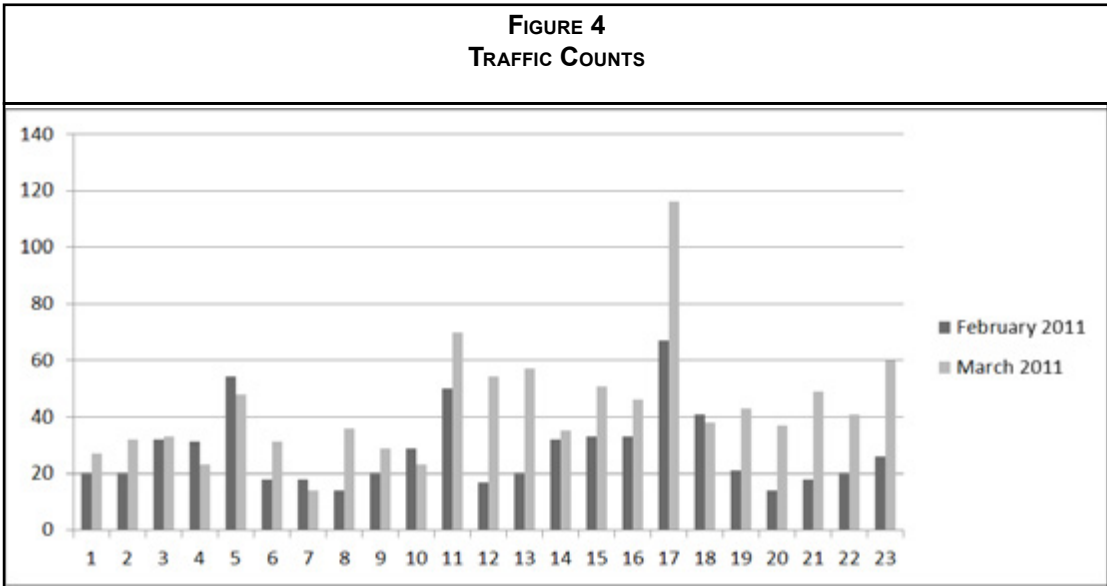
first Saturday after the newspaper print promotion was run. That was the highest traffic day FFF has ever recorded. In addition, the traffic counts for the third and fourth week of the experiment were higher than the final two weeks of the previous months.

**Monthly Sales**

Along with the higher traffic counts, the campaign also brought increased sales. March was the third slowest month for revenue in calendar year 2010, and the first week of sales was similar in March 2011. The second week of sales in March 2011 was higher than sales levels in the same time period of 2010. The third week’s sales were much higher than the previous year, which could be attributed to the full page newspaper print advertisement. However, the sales in the last week of the month were lower. An analysis of the subsequent month was taken to see if the

**TABLE 3  
COUPON CAMPAIGN RESULTS**

Coupon Source	Circulation	Cost of promotion	Cost per impression	Coupons Redeemed	Cost per Redemption	Coupons per circulation
NP	~75,000	\$2,210	\$0.03	39	\$56.67	~0
NW	~40,000	\$4,000	\$0.01	8	\$500.00	~0
FWS	unknown	\$6.50	unknown	13	\$0.50	unknown
FEM	3000	\$78	\$0.03	9	\$8.67	0.003



campaign was merely stealing sales from April. However, total sales in the following month were also higher than the previous April, suggesting that some of the increase in sales was new sales.

**Newspaper Web Results**

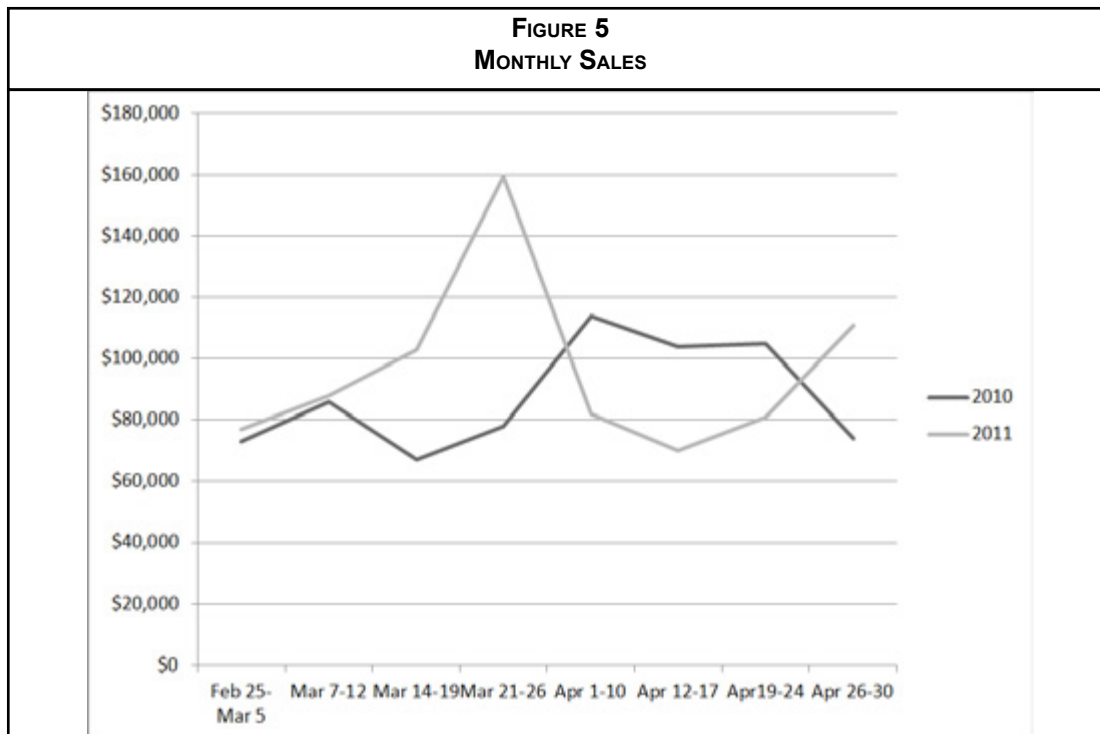
The newspaper web coupons were run eight times during the test period, every Monday and Friday for four weeks. The cost for the promotion was \$500 per day, for a total cost of \$4000. The first day of the promotion, a Monday, experienced over 70,000 impressions, and the second day, a Friday had over 90,000 impressions. However, the following eight runs experienced decreasing levels of impressions until finally only 48,000 impressions were tallied on the last day. The click through rate followed a similar pattern, where the first two days saw an increase in attention, and then declined each of the following days. Thus, the cost per impressions was lower for the first two days, and then rose thereafter. See Table 4 for more details.

**Managerial Recommendations**

The following recommendations are based strictly on analysis of the specific mediums utilized in

this experiment. An opportunity exists to refine weaknesses identified during the promotion in a subsequent re-launch.

1. Company should continue to lead with newspaper/print media for the time being as the primary component of their media efforts.
2. Company should continue with newspaper web as a brand awareness builder, with less emphasis on coupon program.
3. Company should continue development of company website for future expansion and long-term benefit.
4. Company should continue implementation and development of email and internal database as the secondary component of their media efforts.
5. Company should consider conducting a similar multi-media coupon campaign with appropriate timing and refinements.



**TABLE 4**  
**NEWSPAPER WEB RESULTS**

	Monday 28-Feb	Friday 4-Mar	Monday 7-Mar	Friday 11-Mar	Monday 14-Mar	Friday 18-Mar	Monday 31-Mar	Friday 25-Mar
Impressions	71,572	91,490	61,296	54,793	53,027	53,850	54,428	48,196
Click Through	223	331	206	163	131	113	113	85
Click Thrg Rate	0.31%	0.36%	0.34%	0.30%	0.25%	0.21%	0.21%	0.18%
Cost Per Click	\$2.24	\$1.51	\$2.43	\$3.07	\$3.82	\$4.42	\$4.42	\$5.88

### Print

Newspaper print was the most popular media in this study. First, it brought in the highest number of redeemed coupons in this study. Second, the survey showed that more customers learned about store promotions through newspaper print, and third, preferred to learn about store promotions through newspaper print. Also, newspaper print circulation is simple to track, and it had the highest circulation of the four media. This robust level of circulation assists brand awareness; and therefore, print should continue to serve as the most utilized medium for FFF in the short term. It is important to note, however, print was also the only medium to experience a decline in actual versus preferred sources of mediums for promotion. Actual advertising source versus preferred source sunk from 39 preferences to 29 preferences, a decrease of 34%. The trend is expected to continue as newspapers keep experiencing declines in circulation. Advertising methods will have to change to cater to the preferences of the current target market as readers shift their sources for obtaining news.

### Newspaper Web

NW advertisements should be the least utilized media of the mediums tested for promotions at FFF. The number of coupons redeemed via NW was the lowest of all four mediums, and the cost of running eight NW advertisements was much higher than the others. As a result, cost per redeemed coupon was significantly higher than the other three media. From a cost perspective, NW advertisements do not deliver the benefit offered by the other three media. However, NW advertisements do have a robust circulation, and assist in building awareness and brand recogni-

tion for FFF. There were a total of 406,302 impressions for the eight days the NW advertisements ran, but it must be assumed that many of these were repeat impressions. Additionally, the click through rate (CTR), which measures how many persons are actually clicking through the advertisement, was higher than the national average. The average CTR for the four weeks of this promotion was .27%, whereas the national average is .09% (Report, 2009). This contributes to the credibility of NW advertisements for brand awareness; however, NW advertisements do not appear to have much effect on actual sales.

### FFF Website

Thirteen customers redeemed coupons from the FFF website, which was the second most utilized medium, and one of the most cost effective. Labor for uploading the promotions onto the server is the primary source of costs for this medium, which resulted in the lowest cost per redemption. Further, 11% of surveyed customers prefer to learn of promotion from the FFF website. Finally, the FFF website (in addition to email) outscored both television and radio as a preference for communication. This preference, in conjunction with the low cost of redemption, makes the website a favorable opportunity for FFF in the long-run. An upgrade to the website to improve its usability, message, and theme, should result in more traffic from customers.

### Email

Email should serve as the second most utilized medium of communication exchange for FFF. Even though the coupon redemption rate was much lower than newspaper print, the results are positive for two reasons. First, this was the first

email promotion run by FFF, and second, the email list had only 600 customers. Thus, email showed itself to be a cost-efficient form of communication when compared to the other forms of media tested. Since the email server is a fixed cost, the only costs which arise from campaign are the labor costs of compiling the list of contacts and the time required to create the messages for promotions. As a result, the cost per redemption rate was much lower than newspaper print. In addition, the survey showed that 17.6% of customers prefer to learn of store promotions through email while 18.6% prefer to learn of promotions through direct mail. Moving forward, email should begin to supplement and/or eventually replace direct mail promotions, resulting in substantial cost savings for FFF. The most pertinent course of immediate action will be to build and maintain a robust customer database that includes email addresses.

#### FURTHER RESEARCH AND CONCLUSIONS

A number of challenges were encountered when conducting this study. First, it was not possible to keep the coupon and the message entirely consistent throughout the media campaign. Sending the exact same message each time is inconsistent with FFF's current method of promotion since the company strives to be personable and relatable to each customer. Fortunately, the changes were minor, as the theme of the coupon changed and not the details. For example a St. Patrick's Day theme was used one week, and a spring flowers theme was used for the remaining weeks. Second, the sales staff was mostly uncooperative at the beginning of this study, yet their involvement and enthusiasm increased as they saw the benefits of the research. The sales staff at FFF now recognize the benefit of both surveying customers, and also recording their transactions and contact information into a database. Moreover, this research did not track the individual purchases to the redeemed coupons or the survey. This research was not able to determine if one of the media brought in more sales dollars than another, or link the purchases to demographic data. Thus, an expanded and updated email list and database should contribute to the success of the firm. Finally, managers at FFF recognize the

weaknesses in their current website delivery, and the opportunities available from a well-managed and supported website presence. Thus, the inability of collecting website traffic data from the web hosting firm ought not continue.

The results of this study illustrate the relative effectiveness of four promotional mediums: newspaper print, newspaper web, website, and email. Coupons were offered through each of the four media, and results were tallied to assess each medium's effectiveness in drawing customers, creating interest, and driving sales. The most cost effective of the mediums were email and store website, while the mediums with the greatest reach were newspaper print and newspaper web. Further research should be conducted to assess the development of the customer database, as well as testing other forms of targeted promotions such as local magazine advertisements, and community sponsorships.

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# DECONSTRUCTING “PERSONAL PRIVACY” IN AN AGE OF SOCIAL MEDIA: INFORMATION CONTROL AND REPUTATION MANAGEMENT DIMENSIONS

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## ABSTRACT

*This article analyzes the current spectrum of approaches toward the maintenance of personal privacy and reputation in social media venues. It outlines a number of the harms associated with reputational injury and describes kinds of “reputation work” that can empower organizations and individuals effectively to confront these issues. These online reputational issues are critical for organizations along with the professionals and administrators who work in them, especially in an era in which a great deal of knowledge work is conducted in social media. In order to maintain high levels of participation in social media, organizations will need to provide assurances that personal privacy and reputational problems are handled in serious and effective ways. The article analyzes the emerging industry of reputation management services that attempt to assist individuals and organizations in these complex matters*

## INTRODUCTION

Issues of online professional and social reputation are becoming more complex for both individuals and organizations, although organizations generally have greater resources at their disposal to deal with these matters along with a legacy of “reputation management” efforts (Deephouse, 2002). The very notions of “privacy” and “reputation” are being deconstructed in social and political discourse as more information about individuals is recorded, processed, and disseminated through social media and mobile Internet applications, as well as through everyday Internet searches (Ford, 2011; Semitsu, 2011; Oravec, 2003). The article addresses the emergence of an industry in which the means for the protection of personal privacy and reputation are commodified; new varieties of businesses are offering approaches to the solution of privacy and reputation problems. Innovative online utilities to assist with do-it-yourself reputation management (such as Google’s “Me on the Web”) are being released as well. Some concerned individuals are even attempting to opt-out of or erase traces of their personal identities from certain social media venues, often unsuccessfully.

The article also examines rhetorical dimensions of personal privacy and reputation, and projects the future of these issues in the context of the advent of social media.

Social media venues include weblogs as well as Facebook, Twitter, Foursquare, LinkedIn, Yelp, Flickr, Wikipedia, and Youtube (Kaplan & Haenlein, 2010; Lorenzetti, 2010; Markiewicz, 2011). These media provide means for individuals to contribute multimodal materials (such as images and text) and interact with other participants online. Reputation management issues in the context of these media provide difficult issues concerning privacy and reputation in part because of the willful release of a great deal of personal information by participants. However, privacy and reputation matters are relevant even if the surveillance involved is not covert and individuals voluntarily and openly engage in the activities in question. Consider college students who were photographed in a social group activity a year ago. They may no longer want to be associated with the group, perhaps because the group has changed leadership and subsequently espoused unsettling positions. The fact that the students were once associated with this group

may certainly haunt them in the future. The photograph can be relabeled or misconstrued by others as a recent photo or otherwise taken out of context; the photo and accompanying narrative can subsequently be widely disseminated online through social media (Rusted, 2007, provides comparable examples). Incidents such as the one just described could have transpired without the assistance of social media, with the photos being disseminated via a school newspaper or other outlet. However, in the advent of Facebook and Twitter, such scenarios have become much more common, leading to added anxiety for individuals already facing uncertain job and social prospects. Such online traces of personal identity can have legal ramifications as well: Strutlin (2011) describes how legal professionals seeking evidence “have already added online profiles, instant messaging, and videos to the list of information sources about their clients, their opponents, and their potential witnesses” (p. 228).

#### **PRIVACY INTERESTS RELATING TO PERSONAL AND PROFESSIONAL REPUTATION**

Some ethicists and legal theorists have declared that “privacy” cannot be well defined (Solove, 2002). However, efforts to map some of the damages and human costs related to privacy invasion would be of assistance in understanding reputational issues. As individuals build social and professional reputations over time, they invest considerable effort in building associations with particular educational institutions, social causes, religious institutions, and other societal operations as well as with certain individuals. Objective privacy and reputational harms include potential loss of employment, economic losses, and unjustifiable social stigma that may occur if these reputations are negatively affected in unwarranted ways. Harms associated with privacy and reputation also have subjective dimensions, including the “perception of unwanted observation... unwelcome mental states-anxiety, embarrassment, fear-that stem from the belief that one is being watched or monitored (Calo, 2011, p. 1133). Attacking an individual’s reputation can inflict deep psychological pain, sometimes resulting in overcompensation as the individual seeks

to regain lost opportunities and status (Baker, 2008).

Privacy and reputation problems in social media can occur in an assortment of simple and fairly recognizable ways: for example, distortions and misrepresentations of the material individuals reveal via social media can be problematic, such as the manipulation of digital images and subsequent dissemination via Facebook or other social media platform (Rusted, 2007). Even relatively simple cases of mistaken identity in social media spheres can spiral into larger issues as various parties do not use due diligence in associating identifying information with the correct individual. For example, a 43-year-old male Pennsylvania resident with the name “Casey Anthony” received hundreds of Facebook comments decrying his supposed participation in activities described in the trial of a much younger woman also named “Casey Anthony” (Alvarez, 2011). As described in this article, professionals are facing added risks as they integrate social media into their professional practices: for example, physicians who become “friends” of patients via Facebook could face personal difficulties as well as bring liabilities to their organizations if casual comments made online are distorted (Charet, 2010).

It may indeed seem odd to be addressing privacy issues in the realm of social media applications in which many individuals intentionally reveal detailed aspects of their personal lives. For instance, Cassidy (2009) describes how some hospitals have had to deal with the growing problem of the recording and online dissemination of childbirth videos and related text messages by families. Many individuals willingly share intimate details through social media (such as Facebook) and various political affiliations and economic interactions are easily determined online; young people are reportedly even more comfortable than older individuals with these online revelations (Palfrey, 2010). Why then do people share information so willingly online? Such factors include lack of knowledge of what is transpiring (there is little incentive to educate the public on these matters), difficulty of using mechanisms to prevent or mitigate privacy losses, as well as widespread confusion about erasure and opt-out mechanisms.



## SOCIAL MEDIA AND REPUTATION MANAGEMENT

Consider a professional or businessperson who was once tangentially associated with a major crime, either as an eyewitness or bystander. For example, a professor's station wagon was once used in a famous bombing incident in a Midwestern state in the 1970s. When the incident is referenced on the Internet, his name often emerges although his association with the bombing was proven to be entirely innocent. Prior to the emergence of Wikipedia, Google searches, and other online media, the association of the professor with the crime would have been seldom mentioned; however, his coupling with the bombing has become much tighter because of the Internet. The number of Google search results for his name that emerge that mention the bombing are comparable to those that link to his publications and other activities.

Whether or not the larger issues concerning privacy and reputation are resolved in the years to come, businesspeople, professionals, and educators are being faced with immediate concerns involving personal and professional reputation in social media venues. Businesses that attempt to assist with these matters are emerging (Adee, 2011), signaling increased awareness and concern by individuals of potential reputational harms:

Wyer runs a firm called Reputation Advocate -- and he's got plenty of company. There's Reputation Armor, Reputation Friendly, and **Reputation.com**. And while there's no official tally of the number of firms like this, one reporter who recently attempted to count them all gave up at 74. Clearly, online reputation management is an idea whose time has come. "In the last two or three years, we've seen a proliferation of these companies," observes Andy Beal, CEO of social media tracking company Trackur...

Klara, 2011, p. 37

The companies listed "scout websites that post erroneous or damaging private information, correct or delete that info, or petition Web proprietors to take it down" (Timpane, 2011, p. D01). The companies specifically work by performing

such functions as "... removing information from databases, blocking cookies that collect information, and blocking junk mail that comes to people's houses, among other services" (Claburn, 2011). One of the organizations, KwikChex, reportedly works to move search results that mention "bad" or stigmatized information lower in rankings in popular search engines by "burying" these results in neutral or positive links.

Examples of the kinds of reputational problems encountered by these companies include "college students trying to delete drunken party photos before corporate recruiters find them, a corporate lawyer who wanted to remove non-work-related photos of himself from the Web as he tried to become a partner within his law firm, and a real estate agent in Miami whose listings were obscured by blog posts that chronicled an arrest for driving under the influence" (Bilton, 2011).

Other kinds of online reputation work involve the maintenance of personal ratings in "reputation systems" such as Epinions.com, Amazon.com, and Reviewcentre.com that provide consumer advice on particular products or services (Oravec, 2004; Utz, 2009). Contributors to the systems receive reputational rankings when others find their advice of value. The online reputation monitor "Klout" attempts to measure the online influence of individuals, producing a reputation score using various metrics associated with Facebook, Twitter, and other social media results (Dumenco, 2011). The efforts involved in maintaining high rankings on these systems can be extensive, much like maintaining a high credit score. The reputational indices indeed provide some level of quality control for those searching for consumer assistance or attempting to find influential sources of opinion on certain topics; however, the ratings can also be manipulated by individuals who are attempting to receive high rankings for their own opportunistic purposes.

Narratives describing the steps needed to maintain control over online reputations are increasing in business and trade publications:

This being America, I don't have to wait for the government to give me an opt-out option; I can pay for one right now. Michael Fertik, the CEO and founder of **Reputation.com**, who nabbed my

Social Security number, will do it for me for just \$8.25 a month. His company will also, for a lot more money, make Google searches of your name come up with more flattering results--because when everyone is famous, everyone needs a public relations department. Fertik... believes that if data mining isn't regulated, everyone will soon be assigned scores for attractiveness and a social-prowess index and a complainer index, so companies can avoid serving you...

Stein & Harrell (2011), p. 45

Managing professional reputations provides additional concerns beyond those of more basic social reputation management. For example, health professionals face an assortment of particularly challenging problems in reputation management since they are often called to present a friendly, comforting face along with dispensing professional services. Moubarak *et al.* (2011) describe the dilemmas faced by medical staff who are given requests for friendship and online interaction by their patients and peers. Lombardi (2011) details related concerns for dentists and advises them to encourage satisfied patients to contribute positive reviews of their practices to consumer-review sites such as Yelp. Charet (2010) describes how hospital administrators need to reinforce the importance of maintaining the privacy of health records while facilitating open communication between patient and staff in social media venues. Since health professions face many restrictions concerning the use of personally-identifiable information (Myers *et al.*, 2008), concerns about social media are particularly relevant.

University faculty members who use social media to establish personal relationships with students may encounter ethical perils in establishing social media exchanges with students, some of which could have sexual or political content (Parker, 2009). Educators, scientists, and many other professionals face matters of reputation and character involving their production of knowledge (Thérèse & Martin, 2010), so online reputational issues can be of special importance as more research is disseminated via social media. Websites such as Ratemyprofessor.com provide students with the capacity to provide commen-

tary on faculty members (Stuber *et al.*, 2011). The legal profession is encountering related online reputation concerns. Bayers (2010) posed the following question to US lawyers: "Should you friend the judge?" Befriending judges in a social situation and using Facebook to become familiar with them differ widely in their implications, the latter producing tangible evidence of what transpired. Strategies for handling these reputational management concerns are just emerging: Barnett (2010), along with Blakeman and Brown (2010), describe reputational issues in terms of managing personal online "brands" (akin to marketing efforts), recommending that brand management strategies be employed to ensure their success.

Discourse on privacy issues is becoming more technical in character, and potential solutions less available to those who are not technologically sophisticated. For example, a growing assortment of social media "apps" has provided increasing uncertainty about personally-identifiable information. Developers of the apps may not have privacy policies that provide individuals with tools to correct misinformation or otherwise resolve reputational issues; deciphering all of the detailed privacy policies that do exist may not provide specific answers. Such apps may include programs that monitor travel ticket prices or other commodities online. Acohido (2011) describes new consumer tools provided by Unsubscribe.com and Reputation.com that may assist in monitoring social media apps: "Each assigns safety rankings to apps. And each guides users to regularly deactivate apps that aren't in use" (p. 01b). Locational information is often collected through such apps, detailing an individual's specific whereabouts and activities. This information could be coupled with other personally-identifiable information to commit crimes against individuals. US Senate hearings about the privacy of such sensitive mobile and locational information were conducted in 2011 (Gelles, 2011). Legal protections for the personal reputations of everyday citizens are still relatively hard to obtain, with courts demanding detailed evidence about the value of the reputations, how they were affected, and the intent of the parties involved (Cooper, 2010).

Reputation management consumes a great deal of time and energy for individuals; it also involves speculation about what might be considered as a stigma into the future. Pannacker (2007) "relates stories of students who are uncertain about participating in online discussions, for fear that comments on controversial issues might hurt them later in life" (p. B11). Such timidity about intellectual interaction could inhibit exploration of important political and social concerns. This cautious approach to reputational concerns could result in a chilling effect upon educational institutions as well as they attempt to engage students in intellectual discovery and debate.

### ORGANIZATIONS AND REPUTATION MANAGEMENT

Deephouse (2002) outlines a wide range of meanings of organizational "reputation management" efforts. The importance of these efforts is underscored by Robinson (2011): "a reputation risk is the risk of reputation failure, which results in people losing their emotional connection with the company. Reputation risks permeate all aspects of a company's operations..." (p. 40). In past decades, these reputation problems have included leaked memos, unfair coverage by the press, and negative or malicious gossip and rumors (Doorley *et al.* 2011); today's emphasis on social media usage has created new concerns as well. Dun & Bradstreet established a corporation focused on reputational issues to assist in these pursuits: "Credibility Corp.'s first new offering will collect comments and reviews from sites such as Twitter, the Better Business Bureau, Yelp, and Citysearch" (Tozzi, 2011, p. 49). The "Reputation Institute" has also employed social media in its efforts to map the reputations of organizations for purposes of the analysis of economic and social entrepreneurship (Robinson, 2010).

The usefulness of social media in establishing and maintaining contact with clients and customers has been widely demonstrated (Blakeman & Brown, 2010). Social media are playing growing roles in political campaigning (Cogburn & Espinoza-Vasquez, 2011), in which reputational factors can make the difference between success and failure. Walsh (2011) describes how some

corporations, including Pepsico, are fostering use of social media among employees as ways of extending their organizational reach in social media venues. Gardner (2011) describes a specific clause in social media policy established by the Commonwealth Bank of Australia (CBA) "which obliges CBA employees to report any material posted online that could affect the bank's reputation" (p. 10).

The kinds of reputational problems for professionals described in the previous sections are having cascading effects upon organizations themselves. Many organizations are developing social media policies designed to protect their reputations as social media problems emerge (Cain, 2011). Insurance coverages designed to provide resources in instances of reputational damage (including online mishaps) are available (Flett, 2011). IBM managers, for example, reportedly consider the social media interactions of employees to be an enterprise-level threat, and have worked to educate employees as to corporate policy in this regard (Cunningham & Hunt, 2010). Simonson (2009) advises businesses to monitor the social media usage of employees in order to forestall some difficulties, although this strategy is less effective in an age in which individuals carry their own mobile phones equipped with powerful social media apps. A number of corporate leaders have become concerned about what employees are writing, filming, and photographing in social media venues (Strother, Fazal, & Millsap, 2009). In order to assist in the efforts to track employee conduct, Social Intelligence Corporation provides services that use "a combination of search software and manual content reviews to monitor workers to see if they've badmouthed their company or uploaded inappropriate photos of themselves" (Frauenheim, 2011, p. 28). In an uncertain economy, these reputational issues are perceived as particularly salient for both individuals and organizations (Anders, 2008).

## ERASURE AND OPTING OUT AS REPUTATION MANAGEMENT STRATEGIES

It may seem simple at first to cease participation in and remove personally-identifiable information from various social media venues as a strategy for resolving reputational issues. Once privacy and reputational problems emerge, the belief that mitigating privacy problems and rectifying privacy harms will be straightforward may forestall individuals from taking decisive steps to resolve the situation. For example, identity theft, one form of online reputational problem, can consume months if not years of time to resolve (Mediati, 2010). Many privacy and reputational issues can indeed be very difficult to handle, requiring the cooperation of bureaucracies and the investment of personal time and resources.

Faced with reputational issues, some individuals are attempting to erase traces of their identities from specific social media venues such as Facebook. These efforts can be futile because copies of many online materials are kept in archives or stored on the pages of other social media participants. Legal concerns may also come into play since some social media venues assert a level of copyright privileges on participant contributions. Claburn (2011) describes the efforts of Reputation.com to design and market “uproct,” a browser plug-in “that allows users to encrypt posts on social networks like Facebook and to have posts expire after a certain period” (p. 24). Such erasure strategies could provide social media with yet another source of problems as individuals erase commitments to others or otherwise attempt to elude obligations.

Opportunities to “opt into” social media-- to choose to contribute certain materials, opinions, and images online-- are becoming more widespread. However, ways of “opting out” of these venues (or of circumventing them entirely) are becoming more complex and less straightforward. For example, if individuals purchase a certain social media “app” that uses locational information they may want to have the app disengaged during certain time periods. Individuals have been advised to handle such opting out with caution; for example, there may be a surprising time limitation on opting out or the petition to

opt out may be made invalid if a new service or product is purchased (Semitsu, 2011).

## SOME CONCLUSIONS AND REFLECTIONS

Privacy issues have pervasive cultural, political and societal influence; they are especially consequential for reputational concerns as individuals and organizations build identities over time. Author Virginia Woolf wrote of a private life as being “the dearest of our possessions” (1992, p. 60); maintaining such privacy and engaging in “reputation work” are becoming more complex and time consuming. The erosion of privacy provides troubling prospects, including the wearing down of the notion of “consent” as ineffective means are provided to opt-out of or to remove incorrect information in certain social media venues. Without privacy, individuals are denied physical and symbolic spaces for moral reflection as well as the resources needed to build and maintain their reputations (Ford, 2011; Oravec, 1996).

The increasing time and effort needed to defend professional and social reputations in online realms should be a major concern for both individuals and organizations. For example, education will suffer a “chilling effect” if young people decide that they cannot afford to engage in certain kinds of intellectual or political pursuits because of potential career damage in later life. Businesses such as KwikChex and Reputation.com can be of some assistance in reputational concerns, but more important will be lifelong awareness and vigilance on the part of individuals. Organizations should be aware of the potential for a social media “backlash” and work to prevent the exploitation of individuals who do not have the time or resources to manage their online reputations. Magnuson (2011) calls for increased educational efforts in the basics of privacy for young professionals who will be dealing for many years with these challenging concerns.

Businesses and other organizations of all sorts need information to find clients and to serve them more effectively. Social media and other new information technology advances have opened up new modes of information collection and analysis (Blakeman & Brown, 2010). The privacy harms that participants in these systems

may encounter are being more specifically determined in court challenges, governmental agency proceedings, and other venues (Calo, 2011; Semitsu, 2011). However, larger issues about the public's potential counterattacks against these privacy and reputational attacks are emerging; scenarios are becoming more plausible in which individuals begin to tire of the constant social exposure linked with social media and form a "backlash" against those who wish to invade their private lives. Social media venues can be damaged through various forms of sabotage, such as series of fabricated and malicious product or service reviews in consumer-advice websites (Utz, 2009). Participant dissatisfaction with social media can result in disaster for the venues; the former social media giant Myspace faced problems as many participants moved to Facebook and their Myspace pages were orphaned (Gillette, 2011). Businesses should consider that the treasure trove of personal information delivered by Facebook, Twitter, and other social media venues may not be as readily available at some point.

Designing and implementing fair systems in which there are real options for privacy and reputation protection (such as "opting out" of some applications) will have payoffs in the near future. The fostering of a "privacy/reputation divide," in which some individuals are harmed because of their lack of time, resources, or technological ability, would have serious repercussions for organizations in the near future as individuals avoid or sabotage various social media venues. Given the intense personal and professional ramifications of such privacy invasions and reputational concerns, these issues should be relevant for years to come.

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## STUDIES ON THE INTERNATIONAL DIVERSIFICATION

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### ABSTRACT

*This study is to examine the benefits of international diversification, using Lambda, during June 2005-April 2010. Some notable findings are: 1) Asian markets became less integrated with the US market during this period; 2) investors could have gained more diversification benefits in Asian markets; 3) diversification benefits persist; and 4) diversification benefit became bigger during the US crisis. The results suggest that there still exist much diversification benefits across financial markets in Asia and the US.*

### INTRODUCTION

In recent years, many countries began reforming (i.e., liberalizing or deregulating) financial markets to develop domestic capital markets and to increase capitalization and market activities. Coupled with new technologies and increased cross-border investments, financial markets around the world became more integrated, resulting in more efficiency. The benefits of financial integration lie in efficient way of allocating assets and sharing investment risks. Thus, it has long been debated how market integration affects the benefits of international diversification. As markets became more integrated, questions have been raised regarding the rationale for international diversification. It has been more so because the US investors could invest in foreign markets through various financial instruments such as ADR and WEBS without investing abroad directly (Errunza, Hogan, and Hung 1999). Then there had been no significant gains to be obtained by directly investing in foreign markets. Fatemi (1984) also noted that investing in MNCs provide the same return, conditioned on risk.

Investors increasingly design various strategies to obtain higher returns from foreign investments (due to expanded opportunity sets) with lower risk. In measuring the benefits of international diversification, most studies used many pairwise correlations between financial markets by ignoring the effects of exchange rates or by treating the exchange rate risk as a risk to be hedged away. To overcome these shortcomings, this study employs Lambda in examining benefits of international diversification. Lambda does not require correlations (changing over time) to be estimated and separates the effect of exchange-rate changes from that of equity returns measured in local currencies. Lambda is defined as the ratio of the standard deviation (STD) of return of an equally weighted international portfolio to the average STDs of all markets included in the portfolio (Fooladi and Rumsey 2006).

Lambda can be easily applied to various market indices in measuring the benefits of international diversification. All the indices are scaled to have the same value,  $I_0$ , in the initial year. In this study, we take the perspective of a US investor in calculating Lambda in the same fashion for a portfolio of equity returns measured in the investor's cur-

rency or the local currency. Lambda is calculated as follow. First, we form an equally weighted portfolio with 10 (the US and 9 Asian) market indices in local currencies. Lambda ( $\lambda$ ) is the ratio of STD of an equally weighted international portfolio (EWIP hereafter) to the average of the sample STDs of the 10 market indexes as follow (Eq. (2), p. 228, Fooladi and Rumsey (2006)):

$$\lambda_{SD,T} = S^2_{p,t} / \hat{S}_T \tag{1}$$

where  $S^2_{p,t}$  is the sample variance for the portfolio, and  $\hat{S}_T$  is the average of the STDs of the m markets for the period T to T+n. An unbiased estimate of the variance for market i for the set of observations between T and T+n is:

$$S^2_{i,t} = [1 / (n-1)] \sum_{i=T}^{T+n} d^2_{i,t} \tag{2}$$

where  $d_{i,t}$  (deviation from its sample mean) =  $r_{p,t} - \bar{r}_{p,t}$ , and

$$\bar{r}_{p,t} = [1/m] \sum_{i=1}^m r_{i,t} \text{ for all } t. \tag{3}$$

The average of the SDs for the m markets between T to T+n is:

$$\hat{S}_T = (1/n) \sum_{i=T}^{T+n} S_{i,T} \tag{4}$$

Then the sample variance for the portfolio is written as:

$$S^2_{p,t} = [1/(n-1)] \sum_{i=T}^{T+n} d^2_{p,t} \tag{5}$$

As financial markets become more integrated,  $\lambda$  should increase over time. If all the markets are perfectly correlated, Lambda equals to one because the EWIP STD becomes the average STDs of all these markets. If these markets are less than perfectly correlated, Lambda decreases to less than one. That is, the diversification benefit is considered as the extent to which  $\lambda$  is smaller than one. The values of Lambda (ranging

between 0 and 1) are inversely related to the international diversification benefits.

The next step is to examine the trend of international diversification benefits by analyzing the behavior of  $\lambda$  over time for portfolios, using the value of equity indices in the local currency. There are some advantages of using Lambda. First, it is easier by using one ratio,  $\lambda$ , rather than calculating many (i.e.,  $N(N-1)/2$ ) correlations. Second, it is easier to follow its trend over time rather than to follow the trends of many correlations.

### LITERATURE REVIEW

The benefits of international diversification have been studied for different time periods. These studies show that the average pairwise correlation among securities in domestic portfolio is higher than average correlation between various stock indices around the world. The results suggest that it is possible to reduce portfolio's systematic risk by adding securities from foreign markets. Heston and Rouwenhorst (1995) found that portfolio managers should "pay more attention" to the geographical than to the industrial composition" of their portfolio. Their results suggest that geographical diversification is more effective in lowering risk than is industrial diversification (Fooladi and Rumsey 2006). Most studies thus far suggest that the differences among these results could be the artifact of the time period and need not apply to other times. Eun and Resnick (1984) show that, during 1973-1982, the average correlation of stock returns in each country is typically around 0.63 whereas the average correlations of returns between the countries' stock markets is generally below 0.30. Elton and Gruber (1995) reported that the average pairwise correlations among stock indexes of 18 countries (measured in US dollars) to be 0.4. Longin and Solnik (1995) find that international correlation has risen over time for a period of 1960-1990. Solnik (1988) found that the average correlation of stock returns between countries is 0.35 during 1971-1986. Kaplanis and Schaefer (1991) report an average correlation of 0.32 for the period of 1978-1987. Another group of studies found that correlations among various stock markets

increase when world market volatilities are high (Solnik, Boucelle, and Fun (1996), and Chesnay and Jondeau (2001)). Interestingly, Longin and Solnik (2001) found that “correlation is not related to market volatility per se but to the market trend: Correlation increases in bear markets but not in bull market. Santis and Gerald (1997) note that, despite the increase in correlation between financial markets during the US market decline, US investors may expect to gain 2.1% per annum from international diversification, and this gain had not been significantly affected by more integrated international markets.

Most studies thus far indirectly measure the benefits of international diversification by making a general inference from the correlation structure of equity markets. In general, correlation is only one element in determining risk of an international portfolio. If a foreign market index is added to the well diversified domestic portfolio, the resulting mix might have a risk that depends not only on the correlation between domestic and foreign portfolios but also on the total risk (STD) of foreign portfolio. However, these studies had not separated the impact of exchange rate movements from the movements in various equity market returns

measured in local currencies. This study is to address these issues by 1) introducing a more direct measure of benefit from international diversification and 2) separating the effect of movement in exchange rate by that of equity market returns measure in local currencies.

## EMPIRICAL RESULTS

This study uses daily returns of MSCI (Morgan Stanley Capital International; DataStream) Market Indexes during June 2005-April 2010. This study uses 10 market indexes, including the US, 5 ASEAN (i.e., Indonesia, Malaysia, the Philippines, Singapore, Thailand), and other 4 Asian (i.e., Hong Kong, Japan, Korea, Taiwan) indexes. To better account for its impacts, this period is divided into 2 sub-periods: Before the crisis (2005.6~2008.6; Period-1) and During the crisis (2008.7~2010.4; Period-2).

In this study, we take the perspective of a US investor in calculating Lambda. The descriptive statistics of daily returns are presented in Table 1. Before the U.S. crisis, the average return (R) for ASEAN is 19.9%, slightly higher than 17.9% for other Asian markets and 7.2% for the US. The average standard deviation (STD) for ASEAN is

		US	HK	JAP	KOR	TAI	SIN	MAL	IND	PHI	THA
Before the crisis	Mean	0.072	0.241	0.115	0.251	0.110	0.161	0.119	0.385	0.154	0.176
	Std. Dev.	0.165	0.273	0.235	0.234	0.226	0.199	0.165	0.268	0.254	0.353
	CV	2.292	1.133	2.044	0.932	2.045	1.236	1.387	0.695	1.649	2.006
During the crisis	Mean	0.019	0.083	-0.068	0.134	0.109	0.064	0.199	0.202	0.270	0.165
	Std. Dev.	0.412	0.474	0.416	0.379	0.336	0.349	0.393	0.370	0.313	0.776
	CV	21.684	5.711	-6.118	2.828	3.083	5.453	1.975	1.833	1.160	4.703
Notes:											
CV = Coefficient of Variation (STD / Return).											
ASEAN markets: SIN: Singapore; MAL: Malaysia; IND: Indonesia; PHI: Philippines; THA: Thailand.											
Other Asian markets: HK: Hong Kong; JAP: Japan; KOR: S. Korea; TAI: Taiwan;											
Before the U.S. crisis (Period-1): June 2005 – June 2008;											
During the U.S. crisis (Period-2): July 2008 – April 2010.											

24.7%, higher than 24.2% for other Asian markets. The average coefficient of variation (CV), as a relative measurement of risk, is 1.395 for ASEAN, lower than 1.540 for other Asian markets. As a whole, ASEAN markets carried smaller risk for a unit of return.

During the crisis, the average return for ASEAN is 18%, much higher than 6.44% for other Asian markets. The STD for ASEAN is 44%, higher than 40.1% for other Asian markets. The CV for ASEAN is 3.025, much lower than 4.435 for other Asian markets. These results show that 1) other Asian markets carried much more risk during the U.S. crisis, 2) the average return for ASEAN markets decreased by 9.5% (19.9% to 18%) during the crisis; and 3) the average return for other Asian markets significantly decreased as much as 61% (17.9% to 6.44% during the crisis).

For ASEAN markets, before the crisis, IND posted the highest return of 38.5% whereas MAL had the lowest return of 11.9%. During the crisis, PHL posted the highest return of 27% while SIN had the lowest return of 6.4%. For other Asian markets, before the crisis, KOR posted the highest return of 25.1% whereas TAI had the lowest return of 11%. During the crisis, KOR posted the highest return of 13.4% while JAP had the lowest return of -6.8%. For ASEAN markets, the average returns slightly decreased by 10% (from 19.9% to 18%). The STD significantly increased as much as 77.4% (24.8% in Period 1 to 44% in Period 2). For other Asian markets, the average return significantly decreased around 63.7% (17.92% to 6.5%) while the STD significantly increased around 65.7% (24.2% in Period 1 to 40.1% in Period 2). The results suggest that the U.S. crisis had significant negative impacts on ASEAN markets than other Asian markets, and the risk (STD) increased in all Asian markets.

Table 2 provides correlations between the US and Asian stock markets. As a whole, the correlations decreased in 23 cases but increased in 22 cases. The results do not show any increasing or decreasing integration between the U.S. and Asian markets. The correlations between the US and ASEAN markets decreased as much as 38% with an exception for THA

(47.8% increase). During the crisis, the correlation between US and KOR became negative (-0.042), suggesting the existence of diversification benefits in Korean market. The correlations between the U.S. and other Asian markets decreased as much as 29%.

The correlations between THA and Asian markets increased, suggesting more integration, except for KOR. The correlations between JAP and TAI increased as much as 124%. The other cases of increasing correlations are for HK-JAP, HK-MAL, SIN-IND, and IND-PHL. The overall results do not suggest whether Asian markets became more or less integrated each other.

Table 3 provides the empirical results for Lambda. Lambda is calculated in three different ways. **Scenario 1** is to invest in all 10 markets; **Scenario 2** in the US and ASEAN-5 markets; and **Scenario 3** in the US and other Asian markets (i.e., JAP, HK, KOR, and SIN). The averages of Lambda are 0.643 (0.578 to 0.761) in Period 1 and 0.487 (0.406 to 0.515) in Period 2. The results suggest that investors could have enjoyed more diversification benefits from investing across Asian markets during this period. It is also interesting to note that the values of lambda are lower during the crisis. The lambdas decreased as much as 29% (0.578 to 0.410) in **Scenario 1**, by 11.4% (0.591 to 0.532) in **Scenario 2**, and by 34.1% (0.761 to 0.501) in **Scenario 3**. This suggests that the diversification benefits could be more effectively exploited during the crisis through less integrated financial markets. Thus, it is suggested that investors need to diversify more their investments across Asian markets.

Interestingly, the lambdas in Scenario 2 are lower than those in Scenario 3. This result suggests that the lambdas for more developed financial markets tend to be higher than the lambdas for developing markets. This result is consistent with the hypothesis that developed financial markets are more integrated. In addition, trend analyses revealed that the lambda significantly decreased in Scenarios 1 and 3, and the decrease in Scenario 2 is less pronounced.

	US	HKN	JAP	KOR	TAI	SIN	MAL	IND	PHL	THA
US	1.000									
HK	0.807	1.000								
JAP	0.674	0.251	1.000							
KOR	0.843	0.929	0.425	1.000						
TAI	0.883	0.902	0.407	0.930	1.000					
SIN	0.963	0.891	0.532	0.900	0.939	1.000				
MAL	0.864	0.916	0.321	0.881	0.900	0.945	1.000			
IND	0.794	0.967	0.232	0.919	0.903	0.883	0.945	1.000		
PHL	0.951	0.875	0.538	0.865	0.907	0.972	0.942	0.881	1.000	
THA	0.486	0.790	0.015	0.794	0.670	0.594	0.658	0.777	0.555	1.000

	US	HKN	JAP	KOR	TAI	SIN	MAL	IND	PHL	THA
US	1.000									
HK	0.265	1.000								
JAP	0.476	0.891	1.000							
KOR	-0.041	0.882	0.790	1.000						
TAI	0.669	0.815	0.913	0.642	1.000					
SIN	0.701	0.756	0.886	0.575	0.963	1.000				
MAL	0.497	0.919	0.977	0.819	0.920	0.889	1.000			
IND	0.768	0.773	0.902	0.559	0.951	0.949	0.917	1.000		
PHL	0.769	0.747	0.877	0.549	0.958	0.967	0.895	0.971	1.000	
THA	0.719	0.792	0.916	0.612	0.920	0.903	0.933	0.960	0.927	1.000

Lambda for Scenario #	Mean	Std. Dev.	Range
<b>Before the crisis</b>			
1	0.5778	0.1188	0.4928
2	0.5905	0.1002	0.4200
3	0.7611	0.1272	0.5662
<b>During the crisis</b>			
1	0.4102	0.0701	0.2872
2	0.5231	0.0932	0.3245
3	0.5012	0.0689	0.2574

## SUMMARY AND CONCLUSION

This study examined the benefits of international diversification, using Lambda. This study used daily returns of MSCI market indexes during June 2005-April 2010. The correlations between the US and Asian markets significantly decreased. Other notable findings are: 1) Asian markets became less integrated with the US market during this period; 2) investors could enjoy more benefits from investing across Asian markets during this period; 3) lower lambdas for developing markets suggest for investors to diversify their investments across developing Asian markets; 4) the benefits of international diver-

sification persist; and 5) diversification benefits increased during the US crisis because financial markets became less integrated. The results from Lambda suggest that there still exist much diversification benefits across financial markets in Asia and the US.

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We encourage the submission of manuscripts, presentation outlines, and abstracts in either of the following areas:

### **Learning**

We encourage the submission of manuscripts pertaining to pedagogical topics. We believe that much of the learning process is not discipline specific and that we can all benefit from looking at research and practices outside our own discipline. The ideal submission would take a general focus on learning rather than a discipline-specific perspective. For example, instead of focusing on "Motivating Students in Group Projects in Marketing Management", you might broaden the perspective to "Motivating Students in Group Projects in Upper Division Courses" or simply "Motivating Students in Group Projects" The objective here is to share your work with the larger audience.

### **Academic Administration**

We encourage the submission of manuscripts pertaining to the administration of academic units in colleges and universities. We believe that many of the challenges facing academic departments are not discipline specific and that learning how different departments address these challenges will be beneficial. The ideal paper would provide information that many administrators would find useful, regardless of their own disciplines

### **Conferences**

Prior to this year, Learning and Administration was a primary track of the annual Academic Business World International Conference. Because of increased interest, we have promoted Learning and Administration from a Track to Conference in its own right. For the full call for papers and more information go to <http://ICLAHE.org> and <http://ABWIC.org>.

