

Vol. 20 No. 2

J.B.M.

Journal of Business and Management

Editors

Amy E. Hurley-Hanson, Ph.D.
Cristina M. Giannantonio, Ph.D.

Published by Chapman University's Argyros School of Business and Economics
Sponsored by the Western Decision Sciences Institute





WESTERN DECISION SCIENCES INSTITUTE

The Western Decision Sciences Institute is a regional division of the Decision Sciences Institute. WDSI serves its interdisciplinary academic and business members primarily through the organization of an annual conference and the publication of the *Journal of Business and Management*. The conference and journal allow academicians and business professionals from all over the world to share information and research with respect to all aspects of education, business, and organizational decisions.

PRESIDENT

Debbie Gilliard

Metropolitan State College, Denver

PRESIDENT-ELECT

John Bell

University of Tennessee

PROGRAM CHAIR/VICE PRESIDENT FOR PROGRAMS/PROCEEDINGS EDITOR

Natasa Christodoulidou

California State University, Dominguez Hills

VICE PRESIDENT FOR PROGRAMS-ELECT

Albert Huang

University of the Pacific

VICE PRESIDENT FOR MEMBER SERVICES

Omer Benli

California State University, Long Beach

SECRETARY/TREASURER

Sheldon R. Smith

Utah Valley University

DIRECTOR OF INFORMATION SYSTEMS

Salem Boumediene

Montana State University-Billings

IMMEDIATE PAST-PRESIDENT

Hamdi Bilici

California State University, Long Beach

Journal of Business and Management

Volume 20, Number 2

2014

EDITORS

Amy E. Hurley-Hanson, *Chapman University*

Cristina M. Giannantonio, *Chapman University*

J.B.M.

Journal of Business and Management

EDITORS

Amy E. Hurley-Hanson, *Chapman University*
Cristina M. Giannantonio, *Chapman University*

EDITORIAL BOARD

Nancy Borkowski
University of Alabama at Birmingham

Krishna S. Dhir
University of Hawaii at Hilo

Sonia M. Goltz
Michigan Tech University

Richard L. Jenson
Utah State University

Terri A. Scandura
University of Miami

Jeffrey A. Sonnenfeld
Yale University

Victor H. Vroom
Yale University

PAST EDITORS

Burhan Yavas, *California State University Dominguez Hills 1993-1999*
Raymond Hogler, *Colorado State University 2000-2004*

EDITORIAL STAFF

Rosalinda Monroy, *Chapman University, Strategic Marketing and Communications*
Jaclyn Witt, *Editorial Assistant*

Contents

Do Non-Large Networks Engage in Portfolio Restructuring? A Signal Detection of Peak Period Capability Pressure.....	5
<i>Semiun Babatunde Adeyemi and Oladipupo Muhrtala Tijani</i>	
The Role of IT Investments in Fostering Firm Innovations: An Empirical Study	25
<i>Erastus Karanja and Ganesh D. Bhatt</i>	
The Relationship Between Dispositional Positive Affect and Team Performance: An Empirical Study	51
<i>Tianjiao Qiu and Vicki M. Scherwin</i>	
Employee Turnover: A Study on Information Technology Sector.....	71
<i>Sumana Guha and Subhendu Chakrabarti</i>	
Resources and Business Failure in SMEs: Does Size Matter?	89
<i>Densil A. Williams</i>	

Do Non-Large Networks Engage in Portfolio Restructuring? A Signal Detection of Peak Period Capability Pressure

Semiun Babatunde Adeyemi
The Institute of Chartered Accountants of Nigeria (ICAN)

Oladipupo Muhrtala Tijani
Al-Hikmah University

This study considers the local offices of medium-sized audit firms as a unit of analysis. Adapting measures validated in earlier studies, this paper develops a model and evaluates the model that directly describes all variables that affect portfolio structuring in an auditor-client environment during peak periods. Using a sample of 237 local office observations between 2007 and 2011 among medium-sized audit firms in Nigeria, evidence of a positive association between capability pressure and the likelihood of portfolio restructuring is reported. The results lend credibility to the implications of capability pressure characterized by the year-end effects of assurance providers. This position is consistent with earlier studies on portfolio management decisions of external auditors.

*“Fit no stereotypes. Don’t chase the latest fads of clients. The situation dictates which approach best accomplishes the team’s mission.” [Authors’ emphasis added] (Colin Powell – former United States Secretary of State). This quotation describes a managerial allocation of resources and the display of flexibility in managerial decision making. Auditors often experience capacity pressure as a result of the *peak period* syndrome. The best way to overcome this barrier in order to prevent underreported time and premature signoffs depends on the situation (for instance, capacity constraint) and expected results. A technique that works best under a particular peak period pressure may not necessarily work in all cases because of differences in the respective situations.*

Auditors must identify what technique will, in a particular accounting period, under particular circumstances and at a particular time, best achieve the containment of audit risk and improve audit quality.

A large number of companies in Nigeria list the end of their reporting period as December. This choice for a company's calendar year may differ from the country's actual fiscal year. In some jurisdictions, particularly those that permit tax consolidation, companies that are part of a group must use nearly the same fiscal year (up to three months difference are permitted in some countries such as the U.S. and Japan), with consolidating entries to adjust for inter-company transactions with different fiscal years. Nevertheless, the fiscal year is identical to the calendar year for most publicly traded companies in the U.S., the majority of large corporations in the U.K., and elsewhere (with notable exceptions like Australia, New Zealand, and Japan). Most choices of fiscal year end dates are the product of local laws, regulations, customs, business and trade practices. Similar to what is experienced in developing jurisdictions, the recurrent use of months like December creates the peak period effect. This frequently leads to capability pressure, a phenomenon attributed to the relative concentration of companies with identical fiscal year-end in an auditor client's portfolio (Lopez & Pitman, 2013).

This capability pressure could result in dysfunctional auditor behavior, including premature sign-off and underreported time (Lovelock, 1984; Parasuraman, Zeithamel, & Benry, 1985; Margheim & Pany, 1986; Kelly & Margheim, 1990; Sridharan, 1998; Houston, 1999; Landsman, Nelson, & Roundtree, 2009). A number of prior behavioral research and anecdotal evidence have demonstrated that for many service firms, deterioration in quality has often been a by-product of capacity constraints consequential to peak period demands, even though others suggest the contrary (Agoglia et al., 2010). Experiential studies that focus on the effects of workload compression on portfolio management decisions of auditors have been limited, except for a few (Shu, 2000; Lopez & Pitman, 2013) which concentrated on the Big-N firms. Furthermore, recent years have increased complexity and risk is standard fare on an independent auditor's plate as changing business and risk environments are continually shaped by technology and digitization, globalization, increased local and international regulations and enforcement, as well as expectations for greater transparency (KPMG, 2013). As the business landscape becomes more fast paced, there is movement towards leveraging advanced business analysis techniques to refine the focus on risk and derive deeper insights for new evidence about the current role of capability pressure on portfolio management decisions of auditors.

Given that the Non-Big-N firms are an increasingly important but poorly understood sector of the audit market even in developing jurisdictions, feature specificity in prior studies was considered for the Big-N firms and a model was developed and empirically assessed using a sample of 237 local office-year observations between 2007 and 2011 among medium-sized audit firms in Nigeria. The proxy for auditor capability pressure was the ratio of professional fees from client portfolios with a fiscal year end date of December to total fees. Auditor-client misalignment was also used as a control variable (Shu, 2000). As in Lopez and Pitman (2013), three dimensions of audit risk were measured: earnings manipulation risk, financial performance risk, and litigation risk. This study did not delineate between first-tier, second-tier, and other mid-size audit

firms within the population and the sample only included local offices in Lagos, the commercial nerve center in Nigeria. Hence, there may be induced substantial variation in the subjects' behavior within replications of market treatments which could limit the interpretation of the study's results. The study found evidence of a positive association between auditor capability pressure and the likelihood of portfolio restructuring of a local office during peak period. The result lends credibility to the hypothesis that the likelihood of peak period client portfolio reorganization is increasing with the concentration of companies with a December year-end date in the auditor's portfolio. The outcome of the study's logistic regression shows the existence of a positive link between auditor-client misalignment and the likelihood of peak period portfolio restructuring. The results for the auditor proxies are generally consistent with extant literature, which supports the view that an auditor portfolio and client turnover are largely determined by the presence of risk in their portfolios. This paper's conclusions substantially contribute to audit firm portfolio management literature by placing smaller firms in a developing economic setting under empirical evaluation. This study is useful in the portfolio restructuring strategies of mid-sized audit firms as the unit of analysis in relation to capability pressure during peak periods. It also provides evidence on the differential effects of audit market vicissitudes on Big-N versus Non-Big-N firms. It strengthens past studies involving audit risk dimensions and clients' portfolio management for assurance providers. As a supply side determinant of client portfolio management, it is a unique line of proof explorable by audit market niches.

Prior Studies and Background

This section will discuss evidence from past studies on auditors' workload compression during the busy season and implications for a client's portfolio management. A relevant hypotheses in each subsection will also be developed.

Size and Importance of Non-Large Networks

Concentration in the market for audit services exists in the literature. The existence of a two-tiered audit market has also been documented. The implicit assumption is that smaller audit firms are incapable of providing equivalent levels of audit services to large public company clients (Ferguson, Francis, & Stokes, 2003). While the four large networks have subsidiaries in the country, there are over 916 registered accountancy firms in Nigeria (Nairametrics, 2012). However, there are other large and medium-sized firms with market share for over 17,284,671 micro-small and medium enterprise (MSMEs) (National Bureau of Statistics, 2010) clients. This sector of the audit market contributes to MSME's tremendous role in reengineering the socio-economic landscape of the country. The market for auditing in Nigeria is self-regulated and there is no mandatory restriction to the "audit only" model, hence medium and small audit firms are not prohibited from offering non-audit services. Subsequently, these professional partnership firms contribute to MSME's social and political role in local employment creation, balanced resource utilization, income generation, utilization of local technology and raw materials, and in helping to promote change in a gradual and peaceful manner through the provision of non-audit services. These range of services

include but are not limited to consulting in areas of financial information systems, design and implementation, and tax-related services. This segment of external auditing in Nigeria constitutes more than 90% of the entire population (13 large/medium-sized and 903 small firms) (Nairametrics, 2012). Hence there is a need to understand the phenomenon of client portfolio structuring in this sector.

Audit Firm Portfolio Risk Management

Audit firms are increasingly recognizing that effective portfolio management assists with decisions that set them apart from their competitors in terms of organizational success. A significant portion have in their tactical strategies, vibrant portfolio management culture and frequently implement appropriate tools and practices. Effective client portfolio management supports audit firms' intent, direction, and progress towards achieving strategic objectives (Gramling et al., 1998; Bell et al., 2002). When making portfolio management decisions, auditors preferentially price their assurance services while being cognizant of risk differences amongst their clients. Anecdotal evidence has related the overall audit engagement risk primarily to that associated with litigation costs even though there is another dimension of audit risks. Thus, auditors consider this assessment as a vital component of client portfolio management (Huss, Jacobs, & Patterson, 1993; Johnstone, 2000). When managing clients' portfolios, auditors should note, but also not solely focus on, litigation risk (Asare, Hackenbrack, & Knechel, 1994; Asare & Knechel, 1995; Huss & Jacobs, 1991). When managing their portfolio, various strategies are adopted to control for risk, which may include, but are not limited to, close monitoring of personnel related policies, heightened financial reporting related risks, management integrity, internal controls and the performance of additional audit procedures (Boone, Khurana, & Raman, 2008; Manry, Mock, & Turner, 2008).

Research on clients' portfolio management is important given that incorrect decisions create potential liabilities that may affect audit quality and ultimately auditor's financial viability and reputation (Colbert, Leuhlfing, & Alderman, 1996), yet a limited amount of accounting studies do provide insights into the client portfolio management decisions of assurance providers from the supply side. In response to this limitation of data, in a two-party experimental setting, Gramling et al. (1998) demonstrated the impact of legal liability regimes and differential client risk on audit client acceptance, pricing, and audit effort decisions. This laboratory-market-based study provides researchers with direct evidence of the impact of perceived litigation risks of audit fees and efforts when selecting audit clients. This method has been developed and utilized in earlier studies (Schatzberg, 1990; Schatzberg & Sevcik, 1994; Dopuch, King, & Schatzberg, 1994). Using proprietary data on audit effort, billing rates and risk assessments in the portfolio of continuing clients of a major accounting firm, Johnstone and Bedard (2005) studied shifts in audit planning and pricing decisions within a three year period. They assert that consistent with accelerating litigation, environmental, regulatory scrutiny, and planned audit efforts, average client billing rates tend to increase. The result of the study also suggests that engagement teams demonstrate particular concern for clients with heightened risks related to financial reporting, management integrity, and internal controls. This implies that it is unlikely that increased fees resulting from opportunistic

pricing have positive implications for audit quality.

Driven by increasingly large awards, settlements and insurance costs, the second half of the 1980's was plagued by a considerable increase in litigation pressure on large audit firms (Arthur Anderson et al., 1992), leading to widespread concerns that major audit firms were "not going to be doing business with companies that [were] at risk...and the general well-being of the public [was] not going to be served because the better talent [was] not going to be out on the most difficult situations" (Chicago Tribune, 1987, C8). Subsequent mergers among large audit firms were suggested as a response to the increase in litigation liability pressure (Lys, 1993) having an adverse impact on the supply side of the audit market. In a twenty-two year partitioned period of study, Choi, Doogar, and Ganguly (2004) investigated whether the financial riskiness of large audit firms varied with changing audit liability litigation environment. The study, which was delineated into four distinct phases across different client types (e.g., incoming clients, continuing clients), and auditor types (Big-N, Non-Big N) observed that during the time when the Big 6 market shares grew appreciably, the proportion of litigations-industry clients grew at about the same rate as the proportion of such clients in the population. This also supported the view that the riskiness of the Big- N client portfolios reacted to changes in the audit litigation liability environment.

Local Bias and Auditor Client Portfolio

Empirical and anecdotal examinations recommend that research on auditing phenomena be conducted at city-level markets (Francis & Krishnan, 1999). Using city markets as a unit of analysis, Francis and Krishnan (1999) found that the national accounting firm market leader is not the city-specific market leader the majority of the time. Variation in market leadership at the city-level suggests that the reputations of individual accounting firms vary from city to city. Perhaps many of the final audit outcomes are local office auditor dependent (Krishnan, 2002; Choi, 2007; Choi et al., 2004; Charles, Su, & Wu, 2010; Timmermans, 2013; Asthana, 2013).

While some consider the effect of geographic proximity on audit quality insignificant (Timmermans, 2013), others affirm that the size of local audit offices are major determinants of both audit quality and fees (Choi et al., 2004) as local auditors offer higher quality jobs (Choi, 2007). More conservatively, Asthana (2013) asserted that geographic diversification has a detrimental effect on audit quality, probably due to strain on resources of audit office. Every so often, the local offices of the Big-N firms operate as decentralized, semi-autonomous structures (Bell et al., 2002). Timmerman (2013) found that geographic proximity did not affect the quality of audit. The position of this study is affirmed due to the smaller distances in the Netherlands auditor-clients neighborhood. Perhaps the Dutch audit market is one in which there is no distinction between local and non-local auditors, hence it may be concluded that the result be generalized with caution. Using over 19,000 observations for over 3,000 clients over a ten year period, Asthana (2013) detected that geographic diversification had adverse effects on audit quality while Gaver and Patterson (2007) discovered that the comparative prominence of a client to a local office attenuated auditor oversight over reporting decisions. Most importantly, the

role of local partners in client acceptance, retention, and dismissal decisions of a firm cannot be overemphasized (Lopez & Pitman, 2013). Since audit firms that are more financially integrated are associated with riskier client portfolios (Hay, Baskerville, & Qiu, 2007), the first hypothesis is offered:

H₁: Local auditor office structures positively influence the portfolio management decisions of local partners.

Capability Pressure and Portfolio Management

The public accounting workplace has long been acknowledged as a high stress environment (Gaertner & Ruhe, 1981; Weick, 1983). The relationship between stress and job related outcomes have similarly been well-recognized in behavioral and psychological studies on an individual and organizational performance basis (Sager, 1990; Spector, Dwyer, & Jex, 1988; Williams et al., 2001; Chen, Silverthorne, & Hung, 2006; Virtanen et al., 2009), in particular, absenteeism (Spector et al., 1988). Several accounting literatures also provide the link between job stress and a profession which includes underperformance, job dissatisfaction, job burnout, turnover (Choo, 1997; Fischer, 2001; Fogarty et al., 2000; Larson, 1991; Libby, 1983; Rebele & Micheals, 1990; Senatra, 1980; Smith, Davy, & Everly, 1995, 2007; Sweeney & Summers, 2002), and the inherent risks that could cause damage to public trust in the audit firm in particular and the accountancy profession in general (DeZoort & Lord, 1997). The pressure on time and meeting the budget may lead to a substandard quality of the audit and ultimately lead to premature sign-off, a superficial review of documents, and acceptance of insufficient client verbal evidence (Alderman & Dietrick, 1982; Kelley & Margheim, 1990).

Dalton, Hill, and Ramsay (1997) found that auditors worked more than 60 hours a week during busy season. These workloads did not often decrease during off-peak periods either as would have been expected (Sweeney & Summers, 2002; Ward & Albright, 2009). Noor (2011) stressed the positive relation with job stress. The busy season is a phase characterized by system performance constraints (Mukherjee & Chatterjee, 2006), and hence may influence portfolio restructuring decisions to reduce local office risk and expand the client set arrangement. Therefore,

H₂: Capability pressure will positively influence auditor peak period clients' portfolio restructuring.

Firm Capacity and Auditor Client Misalignment

Bills (2012) described auditor-client misalignment as a situation in which low quality auditors serve high quality clients which are to be served by higher quality auditors and vice versa. This auditor-clientele adjustment is often driven by changes in economic conditions and market competition (Johnson & Lyns, 1990; Shu, 2000). Large but risky companies switching auditors are able to engage other Big-N firms (Reynolds & Francis, 2000) as auditor resignations are influenced by misalignment. Further, clients are able to utilize their opportunity sets as auditors react to manage their portfolio (Lopez & Pitman, 2013). In the post Enron period, Landsman, Minutti-Meza, and Zhang (2009) recounted evidence of increased sensitivity to auditor-client

misalignment. With both parties having limitless opportunities for switching business relationships, the likelihood of increased probability for an auditor's receptiveness to change during their busy season client portfolios exists. Therefore,

H₃: Auditor-client misalignment will have the positive effect of changes to peak period portfolio changes.

Auditor Risk Factors and Portfolio Restructuring

Although there are a number of risk considerations in audit engagements, behavioral evidence suggests three major risks relating to auditor-client realignments (Cassell et al., 2010): earnings manipulation risk (EMR), financial performance risk (FPR), and litigation risk (LR). Evidence suggesting auditors screening of high-earnings risk management clients appears to be rather scanty. Financial reporting manipulations such as unusual levels of accruals are associated with litigation against auditors (Lyns & Watts, 1994; Heninger, 2010). Where an auditor is concerned about a client's inappropriate earnings management, the initial reaction is to avoid (in the case of a new assignment) or withdraw (in the case of existing client) his services (Asare et al., 1994; Knechel, 2001). Johnstone (2000) asserted that auditors adapt to risk differential effects by screening out high-risk clients, even though they are indifferent to such risks when it comes to audit planning and pricing. Auditors often experience a greater demand on audit resources for clients with income increasing accruals (Abbott, Parkers, & Peters, 2010). DeFond and Subramanyam (1998) emphasized that discretionary accruals were significantly income-decreasing in the year prior to a change, and generally insignificant in the post auditor shifting years. Thus,

H₄: Clients-sets earnings management risk will have a positive effect on peak period portfolio changes.

In a study investigating the effects of fraud and going-concern risk on an auditors' assessment of the risk of material misstatements and resulting audit procedures, Allen et al. (2007) analyzed the association between these risks and an auditors' assessment. They found that both fraud risk and going-concern risks were significantly related to the risk of material misstatement. This suggests that a client's financial condition can affect the audit risk evaluation of assurance professionals (Kreutzfeldt & Wallace, 1986; Palmrose, 1987). It also remains a key factor in portfolio structuring (Choi et al., 2004).

H₅: Increases in the level of clients' financial risk positively affect peak period portfolio restructuring.

One of the leading challenges in the audit profession is litigation risk (Lowe & Peckers, 2000). The contemporaneous increase in litigation and internal control risk amplifies the benefits associated with objectivity and defensibility, thus resulting in an interactive effect on decision aid reliance for the audit function. Auditors would often respond to litigation risk by increasing audit fees, planned hours, and evidence requirements (Simunic, 1980; Barron, Pratt, & Stice, 1994; Houston, 1999) particularly

in areas of subjective judgments such as accruals and accounting estimates (Lys & Watts, 1994). Auditors are particularly attuned to potential overstatements of financial performance when the risk of litigation risk is heightened (Barron, Pratt, & Stice, 2001; Hirst, 1994), hence operating environment litigation risks may affect audit reporting decisions (Lopez & Pitman, 2013).

H₆: Intensification of litigation risk will affect peak period client portfolio restructuring.

Research Method

Independent Variable

In order to measure the impact of workload compression, clients' misalignment and auditor risk on portfolio restructuring, the current study developed a model based on local offices of mid-sized audit firms. The decision to restructure the portfolio by audit firms was modeled as a function of all other variables of interest. The existence of incoming and outgoing clients during busy season representing portfolio restructuring was predicated with PPP_RST. The absence of portfolio constituent changes during this period equalled 0 and 1. Using a logistic regression model, local offices were defined without portfolio reshuffling during the busy season as a baseline condition as adapted from previous studies. Data cross-sections were defined according to auditors' sign-off date. This was used in place of the financial statement year in order to eliminate potential timing issues resulting from the gap between the audit completion date and a client's fiscal year-end. This will also afford the opportunity to eliminate the joint audit influence.

Dependent Variables

The independent variables of interest included December workload compression, auditor-client misalignment, earnings manipulation risk (EMR), financial performance risk (FPR), and litigation risk (LR) (all three were captured under *audit risk*). Controls for average client size, local office size, international affiliation, and the fixed effects of time were also included. Further, portfolio size (PRT_SIZE) was operationalized as the mean of the logs of audit fees from the list of clients captured from each local office, while the log of total audit fees from each local office was used for the size of local audit office (LCT_SIZE). As indicated in an earlier section, the concentration of companies in busy season in the auditors' portfolio was referred to as December capability pressure (DEC_CP). This was the proxy for the proportion of aggregate audit fees from peak period clients' total fees generated by the audit client in a particular year.

Auditor-client misalignment in the portfolio of local audit offices was classified with predicted probabilities above a predetermined cutoff point as misaligned. The paper developed an estimate of the probability that a company be paired with a medium-sized audit firm. In developing a proxy for misalignment, the ratio of audit fees from auditor-client pairs classified as misaligned to total audit fees obtained by a local office in an audit calendar year was adopted. Where higher values were obtained for this variable, it can be concluded that there was a greater concentration of misaligned clients within the portfolio. The existence of this feature suggested an expectation of auditor switching. The study adapted variable operationalization as adopted in Lopez

and Pitman (2013) and other literature as cited. The weight (audit fees) of absolute value of performance-adjusted discretionary accruals of all portfolio clients in each local office was used as a proxy for earnings manipulation risk (EMR). Since discretionary accruals quantified the magnitude of management reporting discretions, higher values (EMR) indicated higher levels of the presence of earnings management activity among the clients of a local office.

Financial performance risk (FPR) reflected the overall level of financial performance risk among companies in the auditor's portfolio. The weighted variable was calculated using audit fees. The proxy was the weighted average of the Altman Z-score of all companies in the portfolio of the local firms (Altman, 1968). In this case, higher values were associated with lower likelihood of financial risk or bankruptcy. Subsequently, the Altman score was multiplied by -1 prior to estimating the variance as higher values indicated higher overall levels of financial performance risk. The ratio of audit fees from clients whose industries were characterized by litigation, to total audit fees produced by a local office during the audit year was the proxy for litigation risk (LR). For the purpose of this study, it was projected that financial services, information and telecommunications technology, oil and gas, and service utilities had higher potential litigation risks or auditors. Consequently, higher overall levels of litigation risk in auditor client portfolio were indicated by higher LR values, which were expected to influence auditor switching decisions. For office size, the proxy was the log of total audit fees from each local office, while for client size, it was the mean of the logs of audit fees from all portfolio clients. FIRM_1, FIRM_2, FIRM_3, and FIRM_4 were proxies for the local offices of the firms included in the study sample.

Survey Design

Data for this study were collected through primary sources accessed from four local offices of selected medium-sized audit firms. These firms with local office locations supported this paper's research with enough information relevant to estimate the different components of the regression model. The paper limited the sample to Lagos offices and to maximize the number of company-year observations in the estimation, each regression model variable was separately operationalized. Beginning with an original sample of 836 local office-year observations between 2007 and 2011 from the firms which were considered accessible from privileged information, 599 observations were eliminated due to incomplete data. The final sample therefore consisted of 237 local-office year observations, representing 4 local offices of the firms being surveyed. The untabulated sample construction revealed that of this figure, local offices with expanding clients' portfolio restructuring represented 104 observations, while contracting clients' portfolio restructuring represented 133 observations. Lopez and Pitman (2013) described expanding client portfolio as a positive difference between audit fees emanating from incoming and outgoing December year-end clients, and contracting client portfolios.

Results of Analysis

Procedures

A preliminary analysis was performed by means of survey tabulation. The

objective was to gather results according to the topic of interest. Therefore, it allowed for making a comparative analysis and also to contrast the tendencies of different variables. A multivariate analysis was also conducted that focused on exploring the degree of dependency between the binary dependent variable that was the peak period client portfolio restructuring and the independent variables of interest. In order to achieve this, two steps were carried out. First, a factorial analysis was used to evaluate the influence of individual variables and their interactions in order to identify a reduced number of factors which could readily explain them. Second, a logistic regression was applied to analyze the influence of those factors on the dependent variable, making use of the stepwise procedure as a significant predictor in each of the regressions performed.

Descriptive Statistics

Subsequent to the partitioning of the sample into offices with and without portfolio restructuring during the busy season, the study arrived at 237 and 172 observations respectively. The results presented in Table 1 revealed that offices with active portfolio restructuring during the peak periods had a higher concentration of clients with December year-ends (0.893 vs. 0.864; p-value = 0.098). Further, there was also a higher concentration of financial risk in the portfolio of such offices with active restructuring as compared to those offices without changes (-1.462 vs. -1.788; p-value < 0.001). With regards to office size, the study found offices with active portfolio changes during the peak period significantly larger than others without client restructuring (18.802 vs. 16.421; p-value < 0.001). Other detail revealed that *Firm_2* had the largest proportion of local offices with changes (LOCL_FM2 = 0.318), while *Firm_3* was discovered to be the most sensitive without portfolio restructuring (LOCL_FM3 = 0.386).

Table 1: Descriptive Statistics

Variable	Local offices with peak- period portfolio restructuring (n = 237)			Local offices without peak-period portfolio restructuring (n = 599)			t-test p- value	Combined Observations (n=836)		
	Mean	Median	STD	Mean	Median	STD		Mean	Median	STD
DEC_CP	0.893	0.816	0.164	0.864	0.876	0.174	0.098	0.754	0.804	0.211
MISALIGNED	0.078	0.032	0.134	0.068	0.006	0.063	0.615	0.074	0.022	0.307
EMR	0.061	0.056	0.031	0.049	0.043	1.321	0.127	0.063	0.052	0.214
FPR	-1.462	-1.437	1.231	-1.788	-1.654	0.261	<0.001	-1.404	-1.486	0.386
LR	0.154	0.111	0.167	0.127	0.042	0.935	0.838	0.147	0.083	1.321
PRT_SIZE	13.784	13.945	0.675	13.796	13.842	1.117	0.186	13.674	13.751	0.435
LCT_SIZE	18.567	18.643	1.321	17.456	17.679	0.342	<0.001	18.302	18.319	0.326
LOCL_FIRM1	0.214	0.000	0.402	0.307	0.216	0.410	0.328	0.234	18.319	0.442
LOCL_FIRM2	0.318	0.000	0.452	0.214	0.214	0.342	0.006	0.243	18.319	0.434
LOCL_FIRM3	0.251	0.000	0.342	0.386	0.386	0.325	0.184	0.274	18.319	0.418
LOCL_FIRM4	0.223	0.000	0.502	0.242	0.244	0.421	0.539	0.241	18.319	0.403

In Table 2, the paper presented the product of the Pearson correlation coefficients. Inter-firm affiliation indicators were found to be high and statistically significant. The correlations between the three proxies of auditor risk and CLIENT MISALIGNED were positive and significant. These were revealed in the values indicated between 30.8% and 32.6%. It can be concluded from this that there was a positive relationship between auditor-client misalignment and auditor exposure to riskier clients. This indicated that Hypotheses 4, 5, and 6 are supported.

Table 2: Correlations

	DEC_CP	MIS ALIGNED	EMR	FPR	LR	PRT_SIZE	LCT_SIZE	LOCL_FIRM1	LOCL_FIRM2	LOCL_FIRM3	LOCL_FIRM4
DEC_CP	1.000	-0.026	-0.048	0.064	-0.023	0.167	0.027	-0.021	-0.130	0.076	0.063
MISALIGNED	-0.034	1.000	0.224	0.223	0.352	-0.167	-0.104	-0.047	0.028	0.095	-0.086
EMR	0.220	<.0001	<.0001	<.0001	<.0001	<.0001	0.001	0.129	0.112	0.006	0.001
FPR	-0.048	0.221	1.000	0.124	0.201	-0.057	0.002	-0.067	0.043	-0.006	0.032
LR	0.046	<.0001	<.0001	<.0001	<.0001	0.029	0.812	0.014	0.150	0.794	0.219
PRT_SIZE	0.067	0.217	0.172	1.000	0.084	-0.064	0.032	0.011	-.001	0.062	-0.047
LCT_SIZE	0.016	<.0001	<.0001	0.018	0.092	0.438	0.865	0.860	0.185	0.083	0.021
LOCL_FIRM1	-0.023	0.246	0.307	0.804	1.000	-0.067	-0.021	-0.013	-0.006	0.112	0.021
LOCL_FIRM2	<.0001	<.0001	<.0001	0.011	0.016	0.423	<.0001	0.765	0.000	0.584	0.211
LOCL_FIRM3	0.179	-0.216	-0.026	-0.045	-0.086	1.000	0.202	-0.021	-0.074	-0.109	0.211
LOCL_FIRM4	<.0001	<.001	0.036	0.093	0.016	<.0001	0.674	0.003	0.000	0.000	<.0001
MISALIGNED	0.042	-0.121	0.003	0.031	-0.032	0.302	1.000	-0.001	-0.012	-0.087	0.185
EMR	0.241	0.001	0.816	0.432	0.483	<.0001	0.802	0.629	0.001	-.0001	0.001
FPR	-0.031	-0.043	-0.084	0.031	-0.142	-0.024	-0.004	1.000	-0.284	-0.421	-0.427
LR	0.451	0.126	0.014	0.731	<.0001	0.742	0.842	<.0001	<.0001	<.0001	<.0001
PRT_SIZE	-0.147	0.045	0.033	-0.001	-0.006	-0.076	-0.021	-0.361	1.000	-0.374	-0.318
LCT_SIZE	<.0001	0.121	0.146	0.845	0.890	0.004	0.629	<.0001	<.0001	<.0001	<.0001
LOCL_FIRM1	0.078	0.068	-0.004	0.034	0.112	-0.208	-0.087	-0.541	-0.276	1.000	-0.548
LOCL_FIRM2	0.006	0.003	0.875	0.156	0.000	0.000	0.001	<.0001	<.0001	<.0001	<.0001
LOCL_FIRM3	0.047	-0.079	0.023	-0.049	0.021	0.318	0.128	-0.304	-0.384	-0.432	1.000
LOCL_FIRM4	0.026	0.001	0.231	0.075	0.754	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Logistics Regression

In the final stage of the study, a logistics regression was performed to establish which of the factors had the greatest incidence on peak period portfolio restructuring amongst evaluated firms. In terms of the independent variables, the resulting values of the factorial analysis were gathered for each of the observations in the survey, according to the record of the statistical software (SPSS) during the study. A stepwise procedure was used to ensure the best selection of variables. Table 3 depicted the results of the probability of portfolio restructuring for each local office during the peak periods. Using the observations from the original sample (n = 836) in the estimation, the results indicated that the estimated regression coefficient for DEC_CP achieved a positive and significant status. This suggested that an increase in capability pressure led to the auditor-clients' portfolio restructuring during peak periods, supporting Hypothesis 2. The current study posited that this relationship may be the result of deficiency in quality monitoring of clients' interactions and marketing policies. Essentially, clients would switch between auditors where they perceived similar audit service quality could be obtained from other firms at reduced costs. The study also relayed this connection to the regulatory pronouncement of the Central Bank of Nigeria. According to the Bank's Prudential Guidelines for Deposit Money Banks, external auditor tenure shall be for

a maximum period of ten years from the date of the first appointment after which the firm shall not be reappointed in the bank until after another ten years. However, it was expected that the impact of this requirement on peak period portfolio restructuring would be insignificant, given that a larger proportion of banks in Nigeria are audited by the largest networks, which was not the focus of this study. However, the impact of accelerated filing requirement might be considerable. Hence the study augmented alternate clarifications to this finding in the robustness test.

Table 3: *Logistics Regression of the Probability of Portfolio Restructuring During the Peak Period in a Local Office*

<i>Variable</i>	<i>Predicted</i>	<i>Coefficient</i>	<i>P-value</i>
	<i>Sign</i>	<i>Estimate</i>	
Intercept	+	-4.167	<.0001
DEC_CP	+	0.894	0.004
MISALIGNED	+	0.682	0.079
EMR	+	2.304	0.089
FPR	+	0.168	0.007
LR	+	-0.021	0.896
PRT_SIZE	+	-1.212	<.0001
LCT_SIZE	+	1.324	<0001
LOCL_FIRM1	+	0.132	0.218
LOCL_FIRM2	+	0.208	0.173
LOCL_FIRM3	+	0.244	0.132
LOCL_FIRM4	+		0.103
YEAR	+		<i>(included)</i>

n = 237

*Pseudo r*² = 43.67%

*Chi*² = 231.74 (<.001)

P-values are based on robust standard errors obtained from the asymptotic covariance matrix.

Table 4: Logistic Regression of a Net Decrease in the Size of the Peak Period Client Portfolio of a Local Office – Reduced Sample

<i>Variable</i>	<i>Predicted Sign</i>	<i>Coefficient Estimate</i>	<i>P-value</i>
Intercept	+	-5.121	<.0001
DEC_CP	+	0.983	0.004
MISALIGNED	+	0.783	0.004
EMR	+	2.204	0.438
FPR	+	0.142	0.017
LR	+	-1.243	0.241
PRT_SIZE	+	-1.218	<.0001
LCT_SIZE	+	1.324	<.0001
LOCL_FIRM1	+	0.138	0.398
LOCL_FIRM2	+	0.241	0.217
LOCL_FIRM3	+	0.238	0.148
LOCL_FIRM4	+		0.145
YEAR	+		(included)

$n = 176$

$Pseudo\ r^2 = 46.37\%$

$Chi^2 = 197.31 (<.001)$

P-values are based on robust standard errors obtained from the asymptotic covariance matrix. One-tailed p-values when signs are reported.

The likelihood of portfolio restructuring was higher when there was a higher level of auditor-client misalignment, earnings management risk, and financial risk. This was indicated in the estimated coefficients for these variables. The result of the logistics regression showed positive and significant estimated coefficients for MISALIGNED, EMR, and FPR, supporting Hypothesis 3. A similar result was obtained for litigation risk (LR). This was a substantial deviation from the findings of Lopez and Pitman (2013) that asserted that the estimated coefficient for LR was not significant amongst local offices of the Big-N-Firms in relation to the likelihood of changes to the busy season client portfolio. For the control variables, none of the firm affiliation indicators were statistically significant. However, the likelihood of portfolio restructuring among the firms during peak periods was significantly higher among offices with larger clients (CLS_SIZE), and office size (OFF_SIZE), supporting Hypothesis 1.

Reduced Sample Regression

For the purpose of understanding the distinctive bearing of capability pressure on portfolio management decisions of auditors beyond immediate variables such as service quality and marketing policies as identified earlier, a monopolistic effect on local offices of contracting peak period client portfolio restructuring (PORTF_RST_

DEC) was explored. Hence, the study eliminated the sample from expanding peak period client portfolio restructuring. Subsequently, PORTF_RST_DEC was defined as the dependent variable in the reduced sample regression. A value of 1 was implied for the negative difference between audit fees for the incoming December year-end clients. Outgoing December year-end clients was negative and 0 if otherwise. As a baseline condition, audit offices without portfolio restructuring during the peak periods were used as baseline condition. The result of the reduced sample regression was presented in Table 4, from which two fundamental variances were discovered. First, the control for expanding peak period client portfolio restructuring in the reduced sample regression revealed greater estimated regression coefficient for MISALIGNED. Also, that of EMR was no longer significant. This suggested that for contracting peak period portfolio restructuring in local firms, auditor-client misalignment became a weightier dynamic for portfolio management and the existence of variances in risk priorities amongst surveyed firms.

Robustness Test

The effect of identifiable extraneous variables was captured with a robustness test. The study developed two alternative variations of the PORT_RST variable: the log of net changes in audit fees from restructured clients in the portfolio, and the log of net changes in the restructured portfolio. To ensure that the significance and interpretation of the regression results remained unchanged, insignificant clients' portfolio restructuring set at less than 10% was also eliminated. To account for client-motivated restructuring, an alternative to the original regression model was established using an alternate PORT_RST wherein 1 indicated a situation of portfolio restructuring resulting from client-motivated dismissals, and 0 if caused by other factors. The regression remained significant and in the expected direction. The study also recognized the possibility of significant changes in continuing clients' operations such as technology, merger/amalgamation, acquisitions and takeovers, and divestiture which could affect the workload compression of the auditor. This is an instance where the auditor made no portfolio restructuring. As such, the paper addressed this concern using the estimation of an OLS version of the regression model and percentage of portfolio restructuring as the dependent variable. The result of the robustness test conducted along this line remained positive and significant. The study reflected the probability of the influence of local offices with a peak period other than December creating a bias for the result. Therefore, the outcome added an indicator to the main regression model identifying local offices without December as the peak period and eliminated them from the sample in order to investigate whether the results were robust for this condition. The study found that none of the tests altered the interpretation of the estimated coefficients for the independent variables. After adjusting for January year-end companies in auditor portfolios, an additional robustness check was conducted and found that the result interpretations remain unchanged. However, the use of a reduced sample under the robustness test indicated that some of the estimated coefficients for the audit risk factors increased.

Conclusions

Large global accounting networks emerged in response to the demands of

multinational companies which required their auditors to have similar global reach and consistent audit expertise around the world. Over the years, these networks have invested substantially in harnessing the necessary tools and skills to meet the market demands for high quality audits. Subsequently, the large networks competed intensely with industry expertise, innovation, quality, and cost resulting in their dominance in most economies. A larger proportion of extant audit literature focused on markets that included and were dominated by Big-N audit firms providing audit services to the largest, most complex organizations, with significant neglect of the Non-Big-N audit firms. This study represented and attempted to provide a particularly interesting and rich empirical investigation in which the emergence of other groups of audit firms in an increasingly competitive market were examined. The study's model considered the local offices of medium-sized audit firms as the unit of analysis. Adapting measures validated in earlier studies, a model was developed that directly described all variables affecting portfolio structuring in an auditor-client environment during the peak periods. Using a sample of 237 local office-year observations between 2007 and 2011 among medium-sized audit firms in Nigeria, evidence of a positive association between capability pressure and the likelihood of portfolio restructuring in the local office of medium-size audit firms was found. The results lended credibility to the implication of capability pressure characterized by the December year-end effect of assurance providers. This position was consistent with earlier studies on portfolio management decisions of the external auditors (Lopez & Pitman, 2013) which studied the Big-N-firms using similar variables.

The effects of other extraneous variables were eliminated and a robustness test conducted which substantiated the interpretation of the estimated coefficients for the independent variables identified in the study. Evidence was found of a direct positive relationship between auditor-client misalignment and the possibility of portfolio restructuring. Furthermore, the probability of the influence of local offices with peak periods consisting of clients with year-end other than December created a bias for the result. Therefore an indicator was added to the main regression model identifying offices without December as their peak period and eliminated them from the sample in order to investigate whether the results were robust for this condition. The study found that none of the tests altered the interpretation of the estimated coefficients for the independent variables.

This study did not delineate between second-tier and other mid-sized audit firms within the population. The sample only included local offices in Lagos, the commercial nerve center in Nigeria. Hence, there may be induced substantial variation in the subjects' behavior within replications of market treatments which could limit the interpretation of the results. Additional research is encouraged that investigates the effect of workload compression on audit fees, as well as on audit quality in developing economies. In particular, empirical research on the impact of adjustment on the tenure of external auditors on deposit money banks in Nigeria on auditor switches will be significant at this stage, given the volatility of the financial services industry in Nigeria. Future research that considers sector and industry peculiarity, industry concentration of audit firms, and the effects of reliance on corporate reporting may benefit from the model developed herein.

References

- Abbott, L. J., Parker, S., & Peters, G. F. (2010). Earnings management, litigation risk, and asymmetric audit fee responses. *Auditing: A Journal of Practice and Theory*, 25(1), 85-98.
- Agoglia, C. P., Brazel, J. F., Hatfield, R. C., & Jackson, S. B. (2010, Fall). How do audit workpaper reviewers cope with the conflicting pressures misstatements and balancing client workloads?. *Auditing: A Journal of Practice and Theory*, 29, 27-43.
- Alderman, C. W., & Deitrick, J. W. (1982). Auditors' perceptions of time budget pressures and premature sign-offs: A replication and extension. *Auditing: A Journal of Practice and Theory*, 1(2), 54-68.
- Allen, A. P., Gillooly, J. F., & Brown, J. H. (2007). Assessing auditors concentration in special markets. *Journal of Accounting and Auditing*, 9(1), 11-28.
- Altman, E. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609.
- Anderson, A. W., Baird, R. H., & Davis, J. R. (1992). *The Big Audit Premium and the assurance contract*, 4(12), 12-25.
- Asare, S. K., & Knechel, W. R. (1995). Termination of information evaluation in auditing. *A Journal of Behavioral Decision Making*, 8(1), 21-31.
- Asare, S. K., Hackenbrack, K., & Knechel, W. R. (1994). Client acceptance and continuation decisions. Paper presented at Auditing Symposium XII: Proceedings of the 1994 Deloitte & Touche/University of Kansas Symposium on Auditing Problems, Lawrence, Kansas. Abstract retrieved from <http://clio.lib.olemiss.edu/cdm/ref/collection/deloitte/id/27328>.
- Asthana, S. (2013). Diversification by the same audit office and its impact on audit quality. San Antonio, Texas: College of Business Knowledge for a New World.
- Barron, O., Pratt, J., & Stice, J. (2001). Misstatement direction, litigation risk, and planned audit investment. *Journal of Accounting Research*, 39(3), 449-462.
- Bell, T. B., Bedard, J. C., Johnstone, K. M., & Smith, E. F. (2002). A computerized decision aid for client acceptance and continuance risk assessments. *Auditing: A Journal of Practice and Theory*, 21(2), 97-113.
- Bills, K. L. (2012, May). The effects of significant changes in auditor-clientele and auditor-client mismatches on audit quality. *Masters Thesis*. Oklahoma, United States.
- Boone, J. P., Khurana, I. K., & Raman, K. K. (2008). Audit firm tenure and the equity risk premium. *Journal of Accounting, Auditing and Finance*, 23(1), 115-140.
- Cassell, C. A., Giroux, G., Myers, L. A., & Omer, T. C. (2010). The relation between the strength of corporate governance and auditor-client realignments. Working Paper.
- Charles, J. P., Su, C. X., & Wu, X. (2010). Auditor changes following a Big 4 merger with a local Chinese firm: A case study. *Auditing: A Journal of Practice and Theory*, 29(1), 41-72.
- Chen, J. C., Silvesthorne, C., & Hund, J. Y. (2006). Organizational communication, job stress, organizational commitment, and job performance of accounting professionals in Taiwan and America. *Leadership & Organization Development Journal*, 27(4), 242-249.
- Chicago Tribune. (1987, August 16). *Accounting firms no longer ducking court fights*, C8. Chicago, United States.

- Choi, J. H. (2007). *Auditor locality, audit quality and audit pricing*. AAA Annual Meeting. Chicago: Research Collection School of Accountancy.
- Choi, J. H., Doogar, R. K., & Ganguly, A. R. (2004). The riskiness of large audit firm client portfolios and changes in audit liability regimes: Evidence from the U.S. audit market. *Contemporary Accounting Research*, 21(4), 747-785.
- Choo, F. (1997). A study of the relations among disagreement in budgetary performance evaluation style, job-related tension, job satisfaction and performance. *Behavioral Research in Accounting*, 9, 199-218.
- Colbert, J. L., Luehlfling, M. S., & Alderman, W. (1996, March). Engagement Risk. *The CPA Journal*, 54-56.
- Cook, J. M., Freedman, E. M., Groves, R. J., Madonna, J. C., O'Malley, S. F., & Weinbach, L.A. (1992). The liability crisis in the United States: Impact on the accounting profession. *Journal of Accountancy*, 174(5), 18-31.
- Dalton, D. R., Hill, J. W., & Ramsay, R. J. (1997). Women as managers and partners: Context specific predictors of turnover in international public accounting. *Auditing: Journal of Practice and Theory*, 16(1), 29-50.
- DeFond, M. L., & Subramanyam, K. R. (1998). Auditor changes and discretionary accruals. *Journal of Accounting and Economics*, 25(1), 35-67.
- Dezort, F. T., & Lord, A. T. (1997). A review and synthesis of pressure effects research in accounting. *Journal of Accounting Literature*, 16, 28-86.
- Dopuch, N., King, R. R., & Schatzberg, J. W. (1994). An experimental investigation of alternative damage-sharing liability regime with an auditing perspective. *Journal of Accounting Research*, 32(Supplement), 103-130.
- Fischer, R. T. (2001). Role stress, the Type A behavior pattern, and external auditor job satisfaction and performance. *Behavioral Research in Accounting*, 13, 143-170.
- Fogarty, T. J., Singh, J., Rhoads, G. K., & Moore, R. K. (2000). Antecedents and consequences of burnout in accounting: Beyond the role of stress model. *Behavioral Research in Accounting*, 12, 31-67.
- Francis, J. R., & Yu, M. D. (2009). The effect of the Big 4 office size and audit quality. *The Accounting Review*, 84(50), 1521-1552.
- Francis, J., & Krishnan, J. (1999, Spring). Accounting accruals and auditor reporting conservatism. *Contemporary Accounting Research*, 16, 135-165.
- Gaertner, J. F., & Ruhe, J. A. (1981, June). Job-related stress in public accounting: CPAs who are under the most stress and suggestions on how to cope. *Journal of Accountancy*, 151, 68-74.
- Gaver, J. J., & Patterson, J. S. (2007). The influence of large clients on office-level auditor oversight: Evidence from the property-causality insurance industry. *Journal of Accounting and Economics*, 43(2-3), 299-320.
- Gramling, A. A., Schartzberg, A. D., Bailey, A., & Zhang, H. (1998). The impact of legal liability regimes and differential client risk on client acceptance, audit pricing, and audit effort decisions. *Journal of Accounting, Auditing and Finance*, 13(4), 437-450.
- Hay, D. C., Baskerville, R. F., & Qiu, T. H. (2007). The association between partnership financial integration and risky audit client portfolios. *Auditing: A Journal of Practice and Theory*, 26(2), 57-68.
- Heninger, W. G. (2010). The association between auditor litigation and abnormal

- accruals. *The Accounting Review*, 76(1), 111-126.
- Hirst, D. (1994, Fall). Auditor sensitivity to earnings management. *Contemporary Accounting Research*, 11(1), 405-422.
- Houston, R. (1999). The effects of fee pressure and client risk on audit seniors' time budget decisions. *Auditing: A Journal of Practice and Theory*, 18(2), 70-86.
- Huss, H. F., & Jacobs, F. A. (1991, Fall). Risk containment exploring auditor decisions in the engagement process. *Auditing: A Journal of Practice and Theory*, 10, 16-32.
- Huss, H. F., Jacobs, F. A., & Patterson, D. M. (1993). Managing risk in public accounting firms. *Risk management*, 40(9), 51-60.
- Johnson, W. B., & Lys, T. (1990). The market for audit services: Evidence from voluntary auditor. *Journal of Accounting and Economics*, 12, 281-308.
- Johnstone, K. M. (2000). Client acceptance decisions: Simultaneous effects of clients' business risk, audit risk, auditor business risk, and risk adaptation. *Auditing: A Journal of Practice and Theory*, 19(1), 1-27.
- Johnstone, K. M., & Bedard, J. C. (2005). Longitudinal evidence on audit planning and pricing. *Auditing: A Journal of Practice and Theory*, 22(2), 13-26.
- Kelly, T., & Margheim, L. (1990). The impact of time budget pressure, personality, and leadership variables on dysfunctional auditor behavior. *Auditing: A Journal of Practice and Theory*, 21-42.
- Knechel, W. R. (2001). *Auditing: Assurance and risk*. Cincinnati, OH: South-Western College Publishing.
- KPMG (2013). Global Audit Committee Survey. Retrieved from www.kpmg.com/aci
- Kreuzfeldt, R. W., & Wallace, W. A. (1986). Error characteristics in audit populations: Their profile and relationship to environmental factors. *Auditing: A Journal of Practice and Theory*, 6(1), 20-43.
- Krishnan, G. P. (2002). Did Houston clients of Arthur Anderson recognize publicly available bad news in a timely fashion? *Journal of Accounting, Auditing and Finance*, 28(7), 602-614.
- Landsman, W. R., Minutti-Meza, M., & Zhang, P. (2009, January). Can Big 4 versus non-Big 4 differences in audit quality be attributable to characteristics? *The Accounting Review*, 86, 259-286.
- Landsman, W. R., Nelson, K. K., & Roundtree, B. R. (2011, March). Auditor switches in the pre-and-post-Enron eras: Risk or realignment. *The Accounting Review*, 84, 259-286.
- Larson, J. W. (1991). The view from the bottom of the ladder. *Journal of Accountancy*, 171(2), 30-34.
- Libby, R. (1983). Comments on Weick. *The Accounting Review*, 58(2), 370-374.
- Lopez, D. M., & Pitman, M. K. (2013, May). *Auditor workload compression and busy season portfolio changes - U.S. evidence*. Austin, Texas: University of Texas.
- Lovelock, C. H. (1984, November). Strategies for managing demand in capacity-strained service organizations. *The Services Industrial Journal*, 4, 12-30.
- Lowe, D., & Peckers, P. (2000). The use of foresight decision aids in auditor judgement. *Behavioral Research in Accounting*, 12, 97-118.
- Lys, T. (1993). Discussion: The evolution of lawsuits against auditors - determinants, consequences, and solutions. *Journal of Economics and Management Strategy*, 2(3), 427-433.

- Lys, T., & Watts, R. L. (1994, Winter). Lawsuits against auditors. *Journal of Accounting Research*, 32, 65-93.
- Manry, D. L., Mock, T. J., & Turner, J. L. (2008). Does increased audit partner tenure, reduce audit quality? *Journal of Accounting, Auditing and Finance*, 23(4), 553-572.
- Margheim, L., & Pany, K. (1986, Spring). Quality control, premature signoff, and underreporting of time: Some empirical findings. *Auditing: A Journal of Practice and Theory*, 5(1), 50-63.
- Messier, W. F., Eilifsen, A., & Austen, I. A. (2012). Auditor detected misstatements and the effect of information technology. *International Journal of Auditing*, 8(3), 223-235.
- Mukherjee, S., & Chatterjee, A. K. (2006). Unified concept of bottleneck. Working Paper. India: IIM. doi: <http://iimahd.ernet.in/publications/data/2006-05-01saralm.pdf>
- Nairametrics. (2012). Retrieved April 29, 2014, from Audit Firms in Nigers website, <http://nairametrics.com>
- National Bureau of Statistics. (2010). *Survey Report on Micro, Small and Medium Enterprises (MSMEs) in Nigeria (Preliminary Report)*. Retrieved from <http://www.nigerianstat.gov.ng>
- Noor, J. (2011). Auditor and work related variables: Some observations. *Community, Work and Family*, 3(1), 11-18.
- Palmrose, Z. V. (1987). Litigation and independent auditors: The role of business failures and management fraud. *Auditing: A Journal of Practice and Theory*, 6(2), 90-103.
- Parasuraman, A., Zeithaml, A., & Benry, L. L. (1985). A conceptual model of service quality. *The Journal of Marketing*, 49 (Autumn), 41-50.
- Powell, C. (n.d.). BrainyQuote.com. Retrieved March 9, 2015, from *BrainyQuote.com* website, <http://www.brainyquote.com/quotes/quotes/c/colinpowel393609.html>
- Prat, J., & Stice, J. (1994, October). The effects of client characteristics on auditor litigation risk judgements, required audit evidence, and recommended audit fees. *The Accounting Review*, 69(4), 639-674.
- Rebele, J. E., & Michaels, R. E. (1990). Independent auditors role stress: Antecedent, outcome, and moderating variables. *Behavioral Research in Accounting*, 2, 124-153.
- Reynolds, J. K., & Francis, J. R. (2000). Does size matter? The influence of large clients on office-level auditor reporting decisions. *Journal of Accounting and Economics*, 30(3), 375-400.
- Sager, J. K. (1990). Reducing sales manager job stress. *The Journal of Consumer Marketing*, 7(4), 5-14.
- Schatzberg, J. W. (1990, April). A laboratory market investigation of low balling in auditing pricing. *The Accounting Review*, 65, 337-362.
- Schatzberg, J. W., & Sevcik, G. (1994, Summer). A multi period model and experimental evidence of independence and low balling. *Contemporary Accounting Research*, 11, 137-174.
- Senatra, P. T. (1980). Role conflict, role ambiguity, and organizational climate in a public accounting firm. *Accounting Review*, 55(4), 594-603.
- Shu, S. Z. (2000). Auditor resignations: clientele effects and legal liability. *A Journal of Accounting and Economics*, 29(2), 173-205.
- Simunic, D. (1980, Spring). The pricing of audit services: Theory and evidence. *Journal of Accounting research*, 18, 161-190.
- Smith, J. K., Davy, J. A., & Everly, G. S. (1995). An examination of the antecedents of job

- satisfaction and turnover intentions among CPAs in public accounting. *Accounting Enquiries*, 5(1), 99-142.
- Spector, P. E., Dwyer, D. J., & Jex, S. M. (1988). Relation of job stressors to effective, health, and performance outcomes: A comparison of multiple data sources. *Journal of Applied Psychology*, 73(1), 11-19.
- Sridharan, S. V. (1998). Managing capacity in tightly strained systems. *International Journal of Production Economics*, 56(57), 601-610.
- Sweeney, J. T., & Summers, S. L. (2002). The effect of the busy season workload on public accountants job burnout. *Behavioral Research in Accounting*, 14, 223-245.
- Timmermans, M. (2013). *Local bias? The effect of auditor-client distance on audit quality*. Masters Thesis, Tilburg University, Tilburg.
- Virtanen, M., Feriè, A. S., Gimeno, J. E., & Elovainio, M. G. (2010, January). Long working hours and cognitive function. *American Journal of Epidemiology*, 6, 1-10.
- Ward, T. J., & Albright, M. T. (2009). An empirical study of the attributes impacting the decisions of accountants to accept a pay cut in exchange for reduced work hours. *Academy of Accounting and Financial Studies Journal*, 13(1), 53-67.
- Weick, K. E. (1983). Stress in accounting systems. *The Accounting Review*, 58(2), 350-369.
- Williams, E. S., Konrad, T. R., Scheckler, W. E., Pathman, D., & McMurray, M. (2001). Understanding physicians' intentions to withdraw from practice: the role of job satisfaction, job stress, mental and physical health. *Health Care Management Review*, 26(1), 7-19.

The Role of IT Investments in Fostering Firm Innovations: An Empirical Study

Erastus Karanja
North Carolina Central University

Ganesh D. Bhatt
Morgan State University

Information Systems scholars and practitioners continue to devote more resources in trying to unravel how Information Technology (IT) investments create business value. Although there is an emerging consensus on the positive role of IT investments in creating business value, there is still a need for research studies that empirically examine the mechanisms or intermediate processes through which these IT investments lead to business value. This study examines the relationship between IT investments and firm innovation - one of the understudied mechanisms or intermediate processes in the IT business value paradigm. An investigation of this link identifies an important underlying mechanism that may explain how IT investments indirectly create business value. Using IT investments and innovation (patents) data, the researchers test hypotheses grounded in the Knowledge-Based View (KBV) theory of the firm. After controlling for firm and industry factors, the empirical results provide support for the effect of IT investments on firm innovation.

In the past four decades, Information Systems (IS) scholars and business practitioners have carried out a number of studies aimed at unraveling how Information Technology (IT) investments create business value. These studies have made significant contributions in the understanding of the relationship between IT investments and firm and industry level competencies (Banker et al., 2011; Tallon, 2010; Im, Grover, & Teng, 2013). However, there is still a need for research studies that investigate the mechanisms through which IT investments create economic rents in the firm. This research is motivated by the call for research studies that investigate the effects of business processes and, specifically, innovation through which IT investments create

economic rents in the firms (Devaraj & Kohli, 2003; Melville, Kraemer, & Gurbaxani, 2004; Piccoli & Ives, 2005). Thus, the aim of this study is to empirically investigate the effects of IT resources on firm innovation, while taking the firm as the unit of analysis.

An investigation of the impact of IT investments on firm innovation is important because of the managerial implications that such results entail. For instance, various researchers have examined how IT interacts with other firm resources to spur performance differentials (Bhatt & Grover, 2005; Mithas et al., 2012; Tallon, 2010) and how IT returns are mediated by organizational processes such as customer satisfaction (Mithas, Krishnan, & Fornell 2005). The objectives of this study are closer to the aforementioned; although the scope goes beyond by incorporating firm innovation as the underlying mechanism through which firms earn above normal economic rents. Second, authors have called for “theoretical frameworks that explain how and why these [IT] investments” create business value (Sambamurthy, Bharadwaj, & Grover, 2003, p. 238).

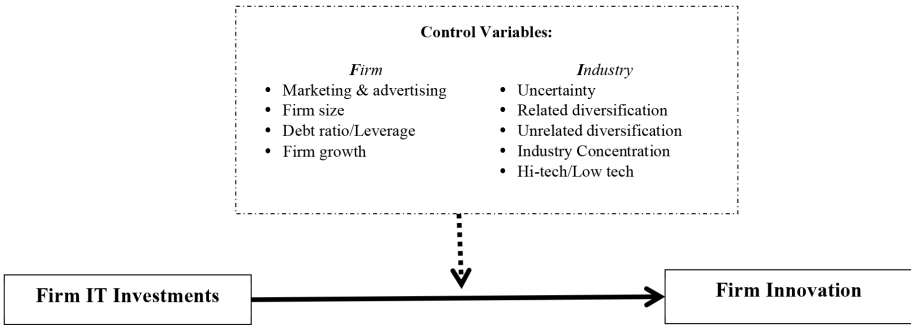
This study addresses the above call by developing a theoretical framework that ties IT investments to firm innovation and specifically aligns the attributes of the knowledge based view theory of the firm to IT investments and innovation mechanisms. Strategically, innovation ranks among the top and most dominant initiatives associated with the rising levels of firms’ IT investments (Ahuja, 2000; Teece, 2009). Many business managers have indicated that innovation is the engine of growth and the dominant driver of business value (Baya, Gruman, & Mathaisel, 2011). Innovation is the process through which new products, processes, business models, organizational frameworks, or services are thought out, developed, and brought to the market with the aim of generating economic rents, while satisfying customer needs (Katkalo, Pitelis, & Teece, 2010). For example, product innovations can lead to competitive advantages or expansion into new and emerging markets. Process innovations, through improvement in production efficiency, can create cost-effective production and marketing methods and services. Innovation has also been defined as the adoption of an idea, process, or behavior that is new to the adopting firm (Damanpour, 1996).

In spite of the importance of innovation in creating business rents, the extant research studies have not explicitly outlined which variables and business processes foster innovation leading to an inexplicable and confusing body of knowledge.

Thus, the goal of this research is to answer the following question:

What is the relationship between IT investments and firm innovation while controlling for specific firm factors such as growth, leverage, marketing and advertising intensity, and size, and industry-specific factors such as market share, diversification, role of IT in the industry, and environmental uncertainty?

To answer the aforementioned question, this study adopts IT investments data from *InformationWeek 500* and patents data, as a measure of innovation output, from the National Bureau of Economic Research (NBER). The values for the firm and industry control variables are generated from the Compustat dataset. In total, the panel dataset consisted of 483 global firms over a 7 year period (1991-1997). The research model is shown below in Figure 1.

Figure 1: Research Model

The IT investments and innovation model being tested in this research are not claimed to be exhaustive. It should be viewed as a parsimonious subset of a larger model since the complexity of organizations suggests that no single study could test all the relevant variables and their relationships. A parsimonious model was deliberately suggested that consisted of some of the key variables that may explain the relationship between IT investments and firm innovations.

Theoretical Background and Hypotheses

This study draws from the Knowledge Based View (KBV) theory of the firm to set up a theoretical framework. The main aim is to investigate the effects of IT investments on firm innovation while controlling for several salient firm and industry level factors.

Knowledge Based View Theory of the Firm

Knowledge Based View theory of the firm addresses how firms attain sustainable competitive advantages by using knowledge to build capabilities from resources. According to the KBV theory, organizational capability entails the ability of a firm to search, explore, acquire, assimilate, and apply knowledge about organizational resources, capabilities, and market opportunities (Grant, 1996; Kraaijenbrink, Spender, & Groen, 2010). Organizational capabilities are embodied in organizational technologies, business processes, product improvements, executive decision making, as well as organizational adaptations and renewal. Certainly, the more information and knowledge a firm can acquire from external and internal sources and competently distribute it within the firm, the more efficient a firm becomes in renewing and reconfiguring its resources and capabilities.

In line with the KBV theory of the firm, a number of studies have paid considerable attention to the concept of organizational dynamic capabilities (Helfat & Winter, 2011; Sambamurthy et al., 2003; Trkman, 2010). This line of inquiry has been motivated by the desire to address the increasingly important question of how organizations gain and sustain competitive advantages in complex and dynamic environments (Teece,

Pisano, & Shuen, 1997). The mere existence of specific resources and capabilities is not sufficient to gain and sustain competitive advantage because changing environmental stimuli often demand new and innovative organizational responses.

As such, in order to gain and sustain a competitive advantage, an organization needs to reconfigure and recombine its resources and capabilities to meet the demands of a dynamic, uncertain, and fluid competitive environment. This particular process of reconfiguration and recombination has led to the concept of dynamic capabilities (Teece, 2009). According to Teece et al. (1997), dynamic capabilities refer to the processes through which organizations reconfigure and recombine their resources to gain the performance advantages. Dynamic capabilities are considered critical because they allow an organization to reconfigure and recombine its existing knowledge in such a way as to be able to respond to the challenges of complex dynamic environments (Katkalo et al., 2010) and can be captured through firm innovations.

IT Investments and Innovation

In many organizations, most of the business processes are either associated or fully embedded in sophisticated IT infrastructures. Thus, the strategic role of IT in the firm has led to an upsurge in IT investments (Mithas et al., 2012; Tallon, 2010). In the IT intensive firms, IT expenditures are almost 8% of total sales (Kobelsky et al., 2008) and almost 40% of the firm's total capital expenditures (Karanja & Patel, 2012; Ranganathan & Brown, 2006). Firms invest in IT because of the inherent ability of IT to provide important tools for knowledge management through the gathering, manipulating, and sharing of information and knowledge (Alavi & Leidner, 2001). These activities allow a firm to better understand the changes in the current environment and to reconfigure existing resources and capabilities for innovation and competitive performance in response to the changes in the internal and external competitive environments (Lopez-Nicolas & Merono-Cerdan, 2011).

In addition, IT resources enable a firm in augmenting its knowledge management capabilities (Joshi et al., 2010). IT resources not only facilitate the process of creating new knowledge through employees and stakeholders interactions, but also enable the process of knowledge reconfiguration and renewal. In addition, the sharing of knowledge within the firm creates synergies as IT can open several avenues to recombine and reconfigure knowledge from different perspectives that lead to innovation (Barbaroux, 2012; Joshi et al., 2010).

According to Zahra and George (2002), dynamic firm capabilities are closely related to the absorptive capacity of firms. Absorptive capacity, according to Cohen and Levinthal (1990), refers to the ability of a firm to acquire, assimilate, transform, and exploit knowledge. Acquisition and assimilation of knowledge are associated with the potential for absorptive capacity, while transformation and exploitation of knowledge represent realized absorptive capacity (Zahra & George, 2002). Since IT can be an important tool in supporting and enhancing a firm's knowledge acquisition capability by enhancing the speed, quantity, and quality of knowledge, it is likely that firms can get strategic benefits as a result of faster identification of useful knowledge that is important for the operations of the firm. For example, query-engines, expert systems, decision support systems, and many customized tools can capture and process

information rapidly and accurately (Alavi & Leidner, 2001; Joshi et al., 2010).

Conversely, IT resources can also support a firm's capability in assimilating useful knowledge as part of the organizational memory. The assimilation capability allows a firm to compare information and thus make more informed decisions. The informed decision making is conducive to a firm's ability to generate new ideas, products, and services and eventually bring them to market to satisfy customers' needs and concurrently generate economic rents. Finally, IT resources can facilitate the exploitation of existing knowledge as well as the exploration of new knowledge. IT-enabled absorptive capacity involves knowledge exploitation by synthesizing and refining existing knowledge (Joshi et al., 2010). Conversely, knowledge exploration involves the transformation of knowledge through the merging of different databases, categorization and classification of knowledge frames, as well as by creating visual maps. Thus, IT resources can be an important tool for knowledge exploration and exploitation that eventually yields products, services, or business process innovations.

IT investments also contribute to the dynamic capabilities of the firm by providing resources that enable the recombination and reconfiguration of different knowledge domains. For instance, in the biotechnology industry, cooperation among different firms' networks is associated with new medical products and processes (Shan, Walker, & Kogut, 1994). Thus, the innovative ability and the resulting innovative output of a firm are dependent on the size of the direct and indirect ties that exist between the firm and its partners (Ahuja, 2000). Thus, it is argued that investments in IT resources provide platforms that enable and facilitate the interactions and collaborations among different stakeholders both within and outside the firm boundaries. The resultant inter-group and intra-group interactions and collaborations within and between organizations entail exchanging views, information, and ideas that help in generating knowledge, codification of useful knowledge, and informing processes (Prasanna, Hitt, & Brynjolfsson, 2012). Therefore,

H₀: While controlling for salient firm and industry factors, IT Investments are positively related to higher levels of innovation in the firm

Sample and Variables Used

In the following section, the constructs that are used in this study to test the model depicted in Figure 1 are defined.

IT Investments

There are multiple studies that have sought to extricate the complex relationship between IT investments, productivity, and firm performance (Melville et al., 2004; Prasanna & Hitt, 2012). A significant number of these studies have used different definitions and conceptualizations of the IT investments variable. The definition and the conceptualization of IT investments has varied based on whether the research data are obtained from a survey (Preston, Chen, & Leidner, 2008; Sobol & Klein, 2009), interviews with firm executives (Enns, Huff, & Golden, 2003; Leidner, Beatty,

& Mackay, 2003), or are gleaned from archival sources (Bharadwaj, 2000; Banker et al., 2011). Broadly defined, IT investments include all the expenditures made by the firm toward computers and telecommunications resources such as hardware, software, and related human resources and services (Dedrick, Gurbaxani, & Kraemer, 2003). Table 1 provides a short synopsis of some of the prior IS key research studies that have used the IT investments variable as well as the findings of these studies.

Table 1: Key Constructs Used in a Subset of Prior IT Investment Studies

Author(s)	Constructs	Results
Mithas et al., 2012	IT investments, profitability, operating expenses, sales, R&D expenses	IT investments positively impact firm sales and profitability through IT enabled revenue growth
Banker et al., 2011	IT investments, CIO (reporting structure, tenure)	CIO reporting structure is based on firm's strategic positioning and they are associated with superior firm performance
Tallon, 2010	IT investments, customer intimacy, and operational excellence	Small firms strategically use IT for customer intimacy while large firms use IT mainly in operational strategies
Ravichandran, Liu, & Hasan, 2009	IT investments, diversification, performance	IT moderates the relationship between diversification and performance
Shin, 2006	IT intensity (IS budgets scaled by selling and general administrative expenses)	Interaction term of IT and strategic direction is positively associated with gross margin and IT is negatively associated with firm performance
Zhuang, 2005	E-business innovation (early adoption and creative use of electronic commerce technologies)	Significant differences exist between the performance of e-business innovative firms versus the performance averages for their respective industries)
Devaraj & Kohli, 2003	Costs associated with DSS (IT labor, capital, and support)	Support for the IT-Performance relationship after certain time lags
Brynjolfsson, Hitt, & Yang, 2002	IT spending (installed IT base, Total CPUs, # of PCs)	Financial markets put a higher value on firms with more installed computer capital (combination of computers and organizational structures creates more value)
Zhu & Kraemer, 2002	E-business use (the extent to which e-business is being used to conduct value chain activities)	Important antecedents of e-business use are technology competence, firm size, financial commitment, competitive pressure, and regulatory support
Bharadwaj, Bharadwaj, & Konsynski, 1999	IT spending (staff expenditures, hardware, software, and data communications)	For all five years, IT investments had a significantly positive association with Tobin's q value.
Franecalanci & Galal, 1998	IT expense (ratio of firm-level IT expenses to total premium income)	Increases in IT expenses are associated with productivity benefits when accompanied by changes in worker composition
Loveman, 1994	IT spending (investments in Hi -Tech capital resources like office, computing and accounting machinery)	IT capital had little, if any, marginal impact on output or labor productivity
Weill, 1992	IT Investment perceptually categorized by management objective (strategic, informational, and transactional)	Heavy use of transactional IT investment is significantly and consistently associated with strong firm performance over the six years studied. Heavy use of strategic IT is neutral in the long term and is associated only with relatively poor performing firms in the short term
Strassmann, 1990	IT spending (IT investment budgets, value of installed equipment, IT staff budget, # of PCs and terminals)	Relationship between expenses for computers and business profitability is not consistent
Cron & Sobol, 1983	Organizational Strategy and computerization	Computerization is related to overall performance

This study adopted the definition of IT investments that was used in the InformationWeek 500 industry magazine (Lou, 1997), in which IT investments included all those expenditures relating to a firm's IT infrastructures such as PCs, servers, mainframes, communication equipment, software, and other related hardware that are utilized in setting up local and wide area networks, as well as expenditures incurred toward hiring and training IT employees and providing related services. IT investments data from InformationWeek 500 firms has been used extensively in IS research in exploring the various dimensions of IT and firm variables (Banker et al., 2011; Ravichandran, Liu, & Hasan, 2009). Table 2 shows a sample industry breakdown of IT investments into 6 major categories, namely salaries and benefits, hardware, software, IT services, research and development, and others.

As Table 2 illustrates, the allocations of IT investments across the industries and specific firms in each industry do not vary greatly. The values listed are in percentages.

Table 2: 2008 Industry % Allocations of IT Investments

Industry Groupings	Salaries & Benefits	Hardware	Software (purchases, development & maintenance)	IT services	R&D	Everything else (includes system administration & maintenance)
Information Technology	29	19	19	13	3	17
Manufacturing	38	14	17	14	5	12
Banking/Financial Services	32	20	20	12	5	11
Automotive	28	18	23	21	3	7
Biotech./Pharmaceuticals	30	11	20	29	5	5
Chemicals	31	16	27	16	1	9
Construction/Engineering	37	20	18	11	4	10
Consulting/Business Firms	33	17	19	13	5	13
Consumer Goods	35	10	22	15	3	15
Insurance	44	14	15	14	3	10
Hospitality and Travel	34	16	16	17	3	14
Healthcare and Medical	34	17	20	9	4	16
Energy Utilities	32	15	23	14	2	14
Electronics	32	19	17	18	6	8
Distribution	36	13	16	17	4	14
Logistics/Transportation	30	15	22	17	3	13
Media and Entertainment	31	18	27	12	2	10
Metals/Natural Resources	38	14	17	12	1	18
Retail-General Merchandising	19	17	25	5	3	31
Retail-Specialty Merchandising	29	17	21	11	6	16
Telecommunications	33	14	18	18	4	13
<i>Average</i>	<i>32.62</i>	<i>15.90</i>	<i>20.10</i>	<i>14.67</i>	<i>3.57</i>	<i>13.14</i>

Note: (Date gleaned from IW500 Analytics Report, 2008)

The highest percentage of IT investments is allotted to IT employees' salaries and benefits followed by software, hardware, and IT services in descending order. The specific budgets allocated to Research and Development (R&D) is a mere 3% while systems maintenance and administration services take on an average close to 13% of the total IT investment budgets.

Firm Innovation

Innovation is an important firm strategy and innovative firms have been found to earn above normal profits (Lopez-Nicolas & Merono-Cerdan, 2011). For instance, in the 2009 annual study of the Global 1000 innovators, Booz & Company reported that even with the recession, most of the companies had maintained their innovation projects and that these firms were indeed boosting their innovation investment so as to be competitive in the upturn. According to Robert Lardon, Corporate Vice President for strategy and investor relations at Harman International Industries Inc. (Public, NYSE:HAR), “innovation is what drives our competitive position in all three of our markets - automotive, professional, and consumer and we cannot back off” (Jaruzelski & Dehof, 2009, p. 3). Elsewhere, in the 13th annual ranking of the best 50 firms by Business Week Magazine, *BusinessWeek50*, Foust (2009, p. 40) indicated that “innovation remains a powerful engine of success” for these firms.

Researchers have generally conceptualized innovation through the amount of money spent by firms in their R&D activities, the number of patents granted to the firm or applied for by the firm, the number of patent citations, new product announcements or introductions, etc. Raw patent counts have been extensively used to represent firm innovations, as they are considered to be a good indicator of the inventive performance of firms, reflecting new technologies, new processes, new services, and new products (Acs & Audretsch, 1989; Ahuja & Katila, 2004; Griliches, 1998; Maarten, Geert, & Jan, 2009; Shan et al., 1994).

For this study, a broad definition of innovation was adopted that included new and improved products, technological artifacts, processes, and services that were either physical in nature or were encapsulated in intangible forms such as key ideas (i.e., software) that have the potential to meet a user's needs and economic rents for the innovating firms and are represented by patents (Joshi et al., 2010). There is a plethora of research studies that have adopted patents as a measure of innovation (Griliches, 1998; Jaffee & Trajtenberg, 2002). A patent confers upon the inventor the sole right to make, use, and sell an invention for a specified period of time, usually 20 years. A patent details information about the specific innovation, the inventors, and the affiliations of the inventors. Thus, a patent clearly illustrates technological and scientific linkages that traverse generations of inventions as well as the knowledge flow across individuals, organizations, geographical regions, and countries (Jaffee & Trajtenberg, 2002).

Patent-based innovations are knowledge driven in that they involve applications and the generation of scientific, technical, and experiential knowledge. Patents are also unique in that they allow the investors/inventors to appropriate a larger portion of the profits accruing from innovations. Patents are the strongest form of legal protections against imitations by other firms (Teece, 1998).

In this research, the above researchers' conceptualization and measures of innovation were adopted resulting in the use of applied patents and granted patents (Freeman & Soete, 1997; Griliches, 1998). The innovation output of a firm is represented by a factor score that is generated (through factor analysis) after normalizing (log base 10) the raw count values of applied patents and granted patents. The factor score was created to eliminate the limitations of using one variable in the measurement of innovation output, namely the raw count values of either applied for or granted

patents. Applied patents refer to those patents that firms have invested in but have not yet been approved by the United States Patent and Trademark Office (USPTO) while the granted patents refer to the patents which have been approved by the USPTO (Jaffe & Trajtenberg, 2002). Although this factor score only dealt with those innovations that had been patented (output), it was found that the factor score was highly correlated (0.87) with R&D investments, which were considered an input into the innovation process, thus providing a good indication of a firm's innovative behavior.

Firm and Industry Control Variables

The ability of a firm to innovate is likely to be affected by the firm strategy, firm resources capacity, organizational motivation, organizational goals, as well as the interaction of the firm and the external environment. Also, investments in IT resources are not exogenous but are influenced by the internal firm factors as well as the external market and environmental forces (Xue, Ray, & Sambamurthy, 2012). For instance, the strategy of the organization can be reflected in the way the firm allocates its resources namely the amounts allocated to the R&D initiatives, IT investments, or expansion into new markets through mergers and acquisitions. Also, the debt level of the organization and its growth potential are a reflection of the organizational goals and strategies and have the potential to impact firm innovation.

With regard to the firm environmental factors, the market position of the firm in relation to the competitors, the risk inherent in the environment and the product diversification strategy employed by the firm also affect innovations. Since there are several factors that are likely to influence the relationship between IT investments and innovation, the study incorporates a number of firm and industrial control factors. The firm level control variables are Marketing and Advertising (M&A) intensity, firm size, debt ratio/leverage, and firm growth. The environmental control variables include environmental uncertainty, related and unrelated diversification, market concentration ratio, and the role of IT in the firm industry. These variables have been shown to have an impact on how firms allocate their IT investments (Banker et al., 2011; Kobelsky et al., 2008).

M&A intensity is an indicator of the firm's marketing capability and represents the efforts geared towards marketing and informing the market about the firm's new and innovative products, services, or processes. Firm size is controlled because of the varied arguments about the role that organizational size plays in fostering innovation. Debt ratio, also known as leverage, is the amount that the firm owes the creditors in the course of financing the obligations to the customers and stakeholders. Firms carrying a higher debt obligation are perceived to be risky and the risk factor affects the relationship between firm IT investments and commitment to innovation. Firm growth is controlled because growth is associated with increases in resources that lead to higher market share and ultimately higher profit margins that can be ploughed back into innovation focused endeavors.

Environmental uncertainty exemplifies the degree of perceived volatility and rate of change of the environment external to the firm (Matthews & Scott, 1995; Milliken, 1987). Higher levels of uncertainty require that a firm undertake initiatives that are geared towards offsetting the uncertainty. Diversification measures the extent of a

firm's operations in different industries within the same two digit Standard Industry Classification (SIC) codes (Chari, Devaraj, & David, 2008). Also, related diversification entails the exploitation of economies of scale through the sharing of both physical and human resources across related lines of business. Firms pursuing related diversification strategy will also be more effective in responding to the customer-based opportunities that spur more innovations.

Unrelated diversification measures the extent of a firm's operations in different two-digits SIC codes. Unrelated diversification is aimed at efficient allocation of capital and other resources in an internal market rather than in the inefficient public market exchanges (Dewan, Michael, & Min, 1998). Industry concentration ratio is an indicator of the relative size of the firm in relation to the industry with higher values being associated with market domination and monopolistic business structures. For instance, monopolists have been shown to innovate more rapidly in order to retain their market share and high profits in markets characterized by low or nonexistent barriers to entry. The industry in which a firm operates can be classified as either hi-tech or low-tech (Francis & Schipper, 1999). Hi-tech firms are thus expected to be savvier at using IT to plan, implement, control, and assess the performance of innovation strategies. Table 3 provides a summary of the research constructs used for the study, their operationalization, and sources of data.

Table 3: Definitions of Research Constructs

Construct	Definition	Data Source	References
IT investments	Annual firm IT investments scaled by sales	IW500	Kobelsky et al., 2008; Banker et al. 2011
Firm innovation	A factor score generated from applied and granted patents	NBER	Jaffe & Trajtenberg, 2002
Marketing & advertising intensity	Ratio of marketing and advertising costs scaled by sales	Compustat	Bharadwaj et al., 1999; Chari et al. 2008
Firm size	Size of the firm measured through market capitalization	Compustat	Fama & French 1993
Debt ratio/Leverage	Measure of what firm owes external stakeholders	Compustat	Kobelsky et al., 2008; Lang, Ofek, & Stulz, 1996
Firm growth	Realized growth of the firm based on sales	Compustat	Kobelsky et al., 2008
Environmental uncertainty	A measure of variability in the environment	Compustat	Kim, 2001; Kobelsky et al., 2008
Diversification (Related/Unrelated)	Extent to which a firm engages in more than one business venture or line of business	Compustat	Dewan, et al., 1998; Jacquemin & Berry, 1979; Palepu, 1985
Concentration ratio	A measure of firm power and industry competition based on the 4-digit SIC Codes	Compustat	Bharadwaj et al., 1999; Chari et al., 2008
Hi-Tech/Low-Tech	A value designating firms in high and low technology industries	Based on SIC Codes	Banker et al. 2011; Francis & Schipper, 1999; Kobelsky et al., 2008

Hi-tech firms have more sophisticated IT resources, which should offer these firms superior capabilities in gathering, analyzing, assimilating, and disseminating information and knowledge within and across firm boundaries leading to more innovative ideas, processes, and products.

Data Analysis and Results

The estimation of the research model used data from three sources: IT investments from *InformationWeek 500*, patents from the National Bureau of Economics Research (NBER), and control variables from Compustat as shown in Table 3. The data set was generated by merging IT investments, innovation, and control variables, which consisted of 69 global firms for a total of 483 observations for IT investments from 1991 to 1997 for innovation from 1991 to 1999, and for control variables from 1991 to 1997. Thus, it is a balanced panel data set.

Data Research Context

Following prior research (Banker et al., 2011; Ravichandran et al., 2009), IT investments data was gleaned from *InformationWeek 500* industry magazine from 1991-1997. The selected firms were those that had accounting/finance data in the Compustat database. The required accounting/finance data enabled the computation of the values for the control variables. Using the Compustat database, each firm was matched with its corresponding SIC code, and a unique identifier known as a Global Company Key (GVKEY, a unique six-digit key assigned to each company in the Compustat database) was generated. This GVKEY was used to match the firms in the NBER Patent Data Project to generate firms that had both IT investments data and patents data. The final sample data set was generated by merging these three disparate data sets and consisted of 69 global firms for a total of 483 observations for IT investments and control variables from 1991 to 1997, and innovations data from 1991 to 1999. Thus, the final sample is a balanced panel data set.

Data Cleaning

Following the recommendations of Hair et al. (2002) and Belsley, Kuh, and Welsch (1980), a number of tests were conducted that aimed at cleaning the data as well as examining the violations of assumptions of multivariate regression analysis. To start with, a number of data transformation techniques were applied and the values were 'winsorised' at 5% and 95% levels to eliminate the influence of outliers, which have been shown to be associated with Type I and Type II errors besides skewing the reliability of the estimates (Osborne, 2001). The outliers were eliminated after a careful examination of Cook's D distance statistics, 'studentized' residuals, and DFFITS as suggested by Neter, Wasserman, and Kutner (1990). Secondly, in testing the violations of normality, an examination of the distribution of the variables was done and the results ascertained that the variables were, on average, normally distributed (skewness range: -0.85 to 0.73; kurtosis range -0.49 to 0.65). Also, the Kolmogorov-Smirnov test for normality, which indicated no deviations from normality, and the White's test (White, 1980) for heteroscedasticity that supported the constant variance assumptions were done.

Thirdly, in testing the presence or absence of multicollinearity, an examination of the Variance Inflation Factors (VIFs) and tolerance values was done and both VIFs and tolerance values were found to be well below the threshold value of 10 (highest value was 1.28) and above the 0.10 (lowest value was 0.72) values, respectively

(Neter et al., 1990). Finally, the correlation coefficients of the variables used in the regression analysis were evaluated and found to be low enough to signify lack of multicollinearity ($rs < 0.70$), thus justifying simultaneous inclusion in the regression analysis equation models.

Summary Statistics

Table 4 provides the descriptive statistics for the study variables for the 483 firms in the sample with IT investments, innovation, and control variables over the 1991 to 1997 period.

Table 4: Descriptive Statistics

<i>Research Variables</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>SD</i>
Innovation	0.693	8.183	3.843	1.588
IT investments	0.001	0.075	0.024	0.013
M&A intensity	0.000	0.100	0.011	0.021
Firm size	6.524	12.392	9.184	1.196
Debt ratio	0.000	0.857	0.194	0.124
Firm growth	0.001	3.280	0.098	0.171
Environmental uncertainty	0.001	0.150	0.032	0.028
Related diversification	0.000	1.309	0.267	0.310
Unrelated diversification	0.000	1.824	0.498	0.452
Industry concentration	0.299	1.000	0.795	0.190
Hi-tech/Low-tech	0.000	1.000	0.450	0.498

N=483, All variables winsorized at 5% and 95%	
SD	= Standard deviation
Innovation	= A factor score based on applied and granted patents for firm <i>i</i> at time <i>t</i>
IT investments	= IT investments scaled by sales as reported by firm <i>i</i> in year <i>t</i>
M&A Intensity	= Marketing and Advertising expense scaled by sales
Firm size	= Size of the firm represented by log market capitalization
Debt ratio	= Debt ratio (data9/data6) at time <i>t</i> on Compustat database
Firm growth	= Average growth from sales computed as a ratio of <i>t-1</i> and <i>t</i>
Environmental Uncertainty (EU)	= Level of industry uncertainty (standard deviation of industry earnings before extraordinary item during the previous 5 years scaled by sales) at time <i>t</i>
Related Diversification (RD)	= related diversification based entropy measures (see appendix for computation) at time <i>t</i>
Unrelated Diversification (UD)	= Unrelated diversification based on entropy measurers (see appendix for computation) at time <i>t</i>
Industry Concentration (IC)	= Measure of industry concentration and competition
Hi-/Low-tech	= Binary value of 1 represents firms in high technology industries

These values are in line with similar studies that used analogous measures and data variables (Bharadwaj, Bharadwaj, & Konsynski, 1999; Chari et al., 2008; Kobelsky et al., 2008). The firms in this sample were weighted toward large firms with mean market capitalization of \$9.18 billion (1991-1997), and this value was shown in Table 4 as the log value with base 10 for the firm size variable. The values were comparable to the firms in the Standard and Poor's database of 500 firms. On average, the firms in the sample spent about 2.4% of their sales revenue on IT in the years 1991-1997.

Table 5 presents the correlation coefficients among the variables adopted for this study. The Spearman correlations were above the diagonal while the Pearson correlations were below the diagonal. As predicted, IT investment levels were positively and significantly related to innovation, while innovation was positively and significantly related to marketing and advertising intensity, firm size, firm growth, uncertainty, and related diversification.

Table 5: Correlations of the Research Variables

Correlations(Spearman's above the diagonal and Pearson's below the diagonal)												
	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	Innovation	1	0.36	0.18	0.40	-0.14	0.05	0.18	0.14	-0.21	0.01	0.15
(2)	IT Investments	0.30	1	0.02	0.28	-0.15	0.00	0.12	-0.13	-0.08	0.01	0.13
(3)	M&A Intensity	0.14	-0.06	1	0.34	-0.19	0.03	-0.16	-0.01	-0.16	-0.06	0.01
(4)	Firm size	0.40	0.25	0.33	1	-0.13	0.03	0.12	0.14	0.15	0.02	0.06
(5)	Debt ratio	-0.19	-0.13	-0.11	-0.18	1	-0.10	0.09	0.16	0.24	0.15	-0.02
(6)	Firm growth	0.07	0.12	0.04	0.04	-0.14	1	0.12	-0.13	-0.07	-0.11	0.05
(7)	EU	0.13	0.10	-0.12	0.15	0.04	0.02	1	-0.07	-0.04	-0.03	0.15
(8)	RD	0.14	-0.15	0.05	0.08	0.14	-0.11	-0.11	1	-0.11	0.233	0.01
(9)	UD	-0.24	-0.02	-0.07	0.11	0.20	-0.06	-0.02	0.01	1	0.16	-0.10
(10)	IC	-0.02	0.04	-0.06	0.08	0.20	-0.02	0.05	0.20	0.13	1	-0.03
(11)	Hi-tech	0.15	0.16	-0.11	0.06	0.001	0.07	0.15	0.08	-0.10	0.05	1

Values higher than 0.07 or lower than -0.07 are significant at the 0.1 level, values higher than 0.09 or lower than -0.09 are significant at the 0.05 level, values higher than 0.13 or lower than -0.13 are significant at the 0.01 level; (2-tailed), N=483

Moreover, firms in high technology (hi-tech) industries showed a propensity to innovate based on the correlation results in Table 5. Also, as predicted, innovation was negatively and significantly related to debt ratio and unrelated diversification.

Empirical Model

This research made use of a balanced panel data set to examine the relationship between IT investments and innovation. The study adopted the following cross sectional time series model, $y_{it} = \alpha + X'_{it}\beta + (\mu_i + \omega_{it})$ which estimated variance components for groups and error, while assuming the same intercept and slopes. In this model, $(\mu_i + \omega_{it})$ was the error component and was not correlated to the independent variables. Also, in line with the assumptions of Ordinary Least Square (OLS), the intercept, α , was constant and the error variances vary across groups and times (Baltagi, 2005). On substituting the variables from the data into the regression equation, Equation 1 is as shown below.

$$\begin{aligned} \text{Innov}_{i,t+n} = & \delta_0 + \delta_1 \text{ITBGT_Sls}_{i,t} + \delta_2 \text{M\&A Intensity}_{i,t} + \delta_3 \text{Firm_Size}_{i,t} + \delta_4 \text{Dbt_Rto}_{i,t} \\ & + \delta_5 \text{Gwth_Sls}_{i,t} + \delta_6 \text{IndUncty}_{i,t} + \delta_7 \text{RD}_{i,t} + \delta_8 \text{UD}_{i,t} + \delta_9 \text{Ind_Conc}_{i,t} + \delta_{10} \text{Hi_tech}_{i,t} \\ & + \varphi_{i,t} \end{aligned} \quad (1)$$

Equation 1 represents the relationship between innovation and IT investments while controlling for both specific firm and environmental uncertainty variables whereby:

- $Innov_{i,t+n}$ = Innovation score for firm i at year $t+n$ where $t=0,1,2$, and $n=1, 2, 3$
- $ITBGT_Sls_t$ = IT investments scaled by sales as reported by firm i in year t
- $M\&A_Intensity_t$ = Marketing and Advertising costs scaled by sales as reported by firm i in year t
- $Firm_Size_t$ = Size of firm measured by log market capitalization for firm i in year t
- Dbt_Rto_t = Debt ratio of firm i in year t
- $Gwth_Sls_t$ = Firm growth from sales for $t-1$ and t for firm i
- $IndUncty_t$ = Level of environmental uncertainty (standard deviation of industry earnings before extraordinary items for previous 5 years scaled by sales) for firm i in year t
- RD_t = Related diversification based on entropy measures (see appendix for computation) for firm i in year t
- UD_t = Unrelated diversification based on entropy measures (see appendix for computation) for firm i in year t
- Ind_Conc_t = Measure of industry concentration and competition for firm i in year t
- $Hi-tech_t$ = Binary value of 1 represents firms in high technology industries and 0 otherwise in year t
- φ_{it} = Independent and identically distributed error term with zero means

Results

The results from the cross sectional regression analysis are presented in Table 6 on the next page.

Table 6: Results of a Cross Sectional Regression Analysis

Innov	Predicted Sign	Model 1	Model 2
Intercept		-1.03 (-1.70*)	-1.40 (2.13**)
M&A Intensity	+	0.10 (0.03)	2.25 (0.72)
Firm Size	+	0.53 (8.94***)	0.44 (7.39***)
Dbt Rto	-	-1.23 (-2.28**)	-1.05 (-1.97**)
Gwth Sls	+	0.31 (0.82)	0.18 (0.50)
IndUncty	+	4.39 (1.90*)	4.43 (1.96**)
RD	+	0.47 (2.26**)	0.69 (3.21***)
UD	-	-0.87 (-5.88***)	-0.82 (-5.66***)
Ind Conc	+	0.37 (1.06)	0.15 (0.44)
Hi-tech	+	0.27 (2.11**)	0.18 (1.44)
ITBGT Sls	+		24.29 (4.84***)
Adj. R-squared		0.26	0.30
Δ Adj. R-squared			0.04***
F Value		19.98***	23.40***

Unstandardized regression coefficients are reported and t-values are in parentheses ***. Significant at the 0.01 level, **. significant at the 0.05 level, *.significant at the 0.1 level (2-tailed), N=483	
Innov	= Innovation score firm i at year t+n where t=0,1,2, and n=1, 2, 3
ITBGT Sls	= IT investments scaled by sales as reported by firm i in year t
M&A Intensity	= Marketing and advertising intensity scaled by sales
Firm Size	= Size of the firm represented by log market capitalization as a ratio of t-1 and t
Dbt Rto	= Debt ratio at time t
Gwth Sls	= Average growth from sales
IndUncty	= Level of industry uncertainty (standard deviation of industry earnings before extraordinary items for previous 5 years scaled by sales) at time t
RD	= Related diversification based on entropy measures (see text for computation) at time t
UD	= Unrelated diversification based on entropy measurers (see text for computation) at time t.
Ind Conc	= Measure of industry concentration and competition
Hi-tech	= Binary value representing high technology firms in year t, 1 for firms in hi-tech industries.

Findings and Discussions

A time-series cross sectional regression analysis was carried out to test the effect of IT investments on firm innovation while controlling for both firm and industry factors. As shown in Table 6, the variables statistically significantly predicted firm innovation, ($F(10,472)=23.40, p<0.005$). Specifically, IT investments were positively and significantly ($\beta=24.29, p<0.001$) related to innovations with a change in adjusted R^2 equal to 4%. Thus, one unit of IT investments input led to 4 units in innovation outputs. For the control variables, firm size ($\beta=0.44, p<0.001$), uncertainty ($\beta=4.43, p<0.05$), and related diversification ($\beta=0.69, p<0.01$) were positively and significantly related to innovation while debt ratio ($\beta=-1.05, p<0.05$) and unrelated diversification ($\beta=-0.82, p<0.001$) were negatively and significantly related to innovation. On the other hand, marketing and advertising intensity ($\beta=2.25, ns$), firm growth ($\beta=0.18.50, ns$), industry concentration ratio ($\beta=0.15, ns$), and hi-tech ($\beta=0.18, ns$) were positive, as predicted, but not statistically significant.

The support for the research hypothesis suggests that IT investments enable the firms to acquire the capability to test new ideas at faster speeds and at lower prices/costs. This is especially true currently, where firms utilize the internet and other web 2.0 technologies to communicate with their customers and stakeholders in soliciting ideas and inputs on new products or processes. These exchanges, communications, and interactions are accomplished within short time periods, possibly within hours, reducing the cost and time of innovative initiatives. On the other hand, these IT-enabled capabilities make innovations, “the lifeblood of growth, more efficient and cheaper” (Brynjolfsson & Schrage, 2009, p.1). By soliciting customers’ inputs and feedback during the innovation processes, firms generate innovative products and services that are tailored to the needs of the customers, guaranteeing wider acceptance during the diffusion stages and thus, higher economic rents.

IT investments are also used in facilitating and organizing the know-how about a firm’s past projects, expertise, and routines. In addition, investments in IT resources can help in the coordination of knowledge among different people in the firm, as well as between R&D groups in a firm adopting related diversification strategy by offering collaborative capability. IT investments in the form of communication tools such as networks, email, virtual meetings, blogs, and the more recent relation-oriented tools such as wikis, blogs, and social networking resources can also facilitate collaboration and teamwork by reorganizing and recombining the organizational knowledge.

For the control variables, the relationship between M&A intensity and innovation was positive as predicted, but not statistically significant. Also, the relationship between firm size and innovation was found to be positive, although not statistically significant. Large firms tend to be associated with the advantages of superior resources and capabilities that these firms have acquired over time. Also, large firms are more innovative because they tend to have more financial slack, superior marketing skills, and R&D capabilities, as well as product and service development experience (Nord & Tucker, 1987; Zhu & Kraemer, 2005). Hence, large firms can cushion against potential losses associated with unsuccessful innovation project ventures. Some of the IT investments are utilized in acquiring and training IT human resources. Thus, the hiring of IT professionals and skilled workforce with superior technical and business knowledge places large firms at the vanguard of technological development (Ettlie, Bridges, & O’Keefe, 1984; Popadiuk & Choo, 2006).

The negative association between innovation and debt ratio may be explained by the perceived risk associated with innovation that affects the relationship between firm IT investments and commitment to innovation. Innovation involves a number of stages that include ideation, project selection, development, and commercialization and lower firm debt levels are important at each of these stages. Lower debt levels or lower values for leverage (more free cash flows) ensure uninterrupted IT investments in initial innovation initiatives as well as availability of funds during the product testing, launching, and the ultimate commercialization. Also, lower debt levels offer free cash flows that firms can use to expand their knowledge bases, through the hiring of savvy IT professionals, or acquiring IT tech venture firms (O’Brien, 2003). A firm that has a higher debt ratio may not have the required funds to sustain the necessary IT investment levels associated with innovation.

Though indicative results of the relationship between firm growth and innovation were obtained, the lack of significant statistical support might be explained by the fact that not all growth comes from innovation. For instance, top executives seeking prestige and immediate job rewards may grow their firms through mergers and acquisitions (Matsusaka, 1993). Also, firms can grow their sales through competitive attacks such as steep price reductions or other aggressive sales campaigns. Although controlled growth brings with it economies of scale that are conducive to innovation, rapid growth can lead to rapid asset acquisitions, which result in tying-up resources that could be used for other ventures such as IT driven innovations.

The positive and significant relationship between uncertainty and innovation alludes to the fact that higher levels of uncertainty demand greater efforts in coordination and control at the firm level. As such, firms will resort to innovative endeavors – in products, processes or services – which lower the uncertainty levels. For instance, uncertainty requires more complex IT-enabled information processing systems and marketplace volatility is associated with the building of an extensive IT infrastructure (Broadbent et al., 1996). An extensive IT infrastructure such as Enterprise Resource Planning (ERP) or Supply Chain Management (SCM) links the various facets of the organization while also establishing and facilitating timely information gathering and sharing. Thus, firms operating in uncertain environments tend to be more innovative so as to overcome the inherent risks while also staying competitive.

A diversified firm seeks to limit market and operational risks based on the premise that not all products or service offerings move up or down the market simultaneously, allowing for a more consistent performance under various organizational and economic conditions. A firm engaged in related diversification, characterized by similar lines of business, is capable of exploiting economies of scope by sharing physical and human resources. As a result, a consistent revenue stream may be reinvested toward innovation initiatives. Moreover, a firm operating in a number of related business segments may exploit its core capabilities, resulting in economies of scale and scope, efficiency in allocating resources, as well as management synergy through the transfer of technical and management skills across the product or service lines (Rumelt, 1982). The core capabilities resulting from resource sharing and efficient allocation of resources may possibly lead to the positive relationship between related diversification and innovation.

Contrary to expectations, a significant relationship between the concentration ratio and innovation was not found. This was surprising as it was expected that firms in more concentrated industries would be more competitive and hence more innovative to mitigate the effects of market competition. The reason for the lack of significant relationship could be the heterogeneity of the sample space, which was comprised of firms from multiple industries, making it difficult to discern the effect of individual industries. Also, contrary to expectations, a significant relationship between hi-tech firms and innovation was not found. This could be because hi-tech firms are not very adept at using IT for innovation. Hi-tech firms use IT for streamlining and coordinating their business processes.

There is limited empirical research that examines the link between IT investments and innovation. Thus, this research contributed to this line of research by offering results that shed more light on the importance of IT investments in fostering firm

innovations. This paper argued that IT investments enable a firm to reconfigure and recombine knowledge from various diverse sources to promote innovation and also facilitate the organizing of know-how about past projects, expertise, and routines.

Robustness of the Results

As alluded to earlier, the innovation score was computed based on the number of patents applied for and granted to the firm through factor analysis. Assuming that the effects of IT investments take, on average, 3 years to assimilate and yield noticeable business process improvements (Dewan et al., 1998), IT investments were related in year t to applied patents in year $t+n$ ($t=1,2,3$, $n=0,1,2,3,4$), such that IT investments in 1991 were related to patents applied for in 1993. Also, since it takes around 3 years for patents to be approved by the USPTO, the patents applied for in 1993 were typically granted in 1995. Thus, the innovation score associated with IT investments in 1991 was generated from patents that were applied for in 1993 and granted in 1996, based on a 3-year sliding window. To examine the robustness of the results, a 1-year, a 2-year, and a 4-year sliding window were also used, and with the exception of the 1-year sliding window, the results of the cross sectional regression based on the model in Equation 1 were not significantly different. The only results presented were based on the 3-year sliding window to conform with the theory and also for space limitations. Alternative measures and specifications for other variables were also utilized. For instance, the study tested the model in Equation 1 using IT investments scaled by employees rather than sales. The results were not statistically different.

Research Contributions

This study contributes to the literature on the role of IT investments in creating business value through firm innovations in a number of ways. First, researchers have long been motivated by the economic significance of IT investments in studies examining IT business value (Loveman, 1994; Tallon, 2010), but the mechanisms or business processes that yield this value have been understudied. This study brings a closer understanding of this phenomenon by investigating the effects of IT investments on firm innovation, which can lead to business value. This study developed a theoretical framework for IT investment payoff in the context of innovation by specifically aligning the attributes of the KBV theory to the innovation life cycle. The adopted research framework drew from the literature on coordination and control in order to explain payoffs from IT investment in innovation. In this study, the question of whether an IT investment pays-off in the context of innovation was considered to be very significant from an economical perspective. Moreover, the motivation to consider the relationship between IT investments and innovation provides researchers with a firm basis that IT indirectly may yield business value through the commercialization of innovations.

Economists and management scholars agree on the role of innovations in generating economic rents at the firm, industry, or economy level. Firms that are persistent innovators have been demonstrated to appropriate superior economics rents compared to their competitors (Anthony, Johnson, & Sinfield, 2008). In this respect, IT investments played a key role by spurring innovation in the firms that ultimately lead to business advantages. Also, by systematically investigating the relationship

between IT investments and innovation, this research was differentiated from prior research studies, which focused on the direct link between IT investments and business performance. As such, this research offered an explanation for the seemingly conflicting findings about the impact of IT on business performance in the extant literature. The results of a positive relationship between IT investments and innovation added credence to the notion that the impact of IT investments should be carried out at the business process level, where its first order effects are more often realized. This study narrowed that gap by linking IT investments to innovation, which is a key driver of superior business performance.

Limitations

The IT investments data adopted for this study were not based on the actual IT resources specifically allocated to the innovation processes, but were an aggregate value of all the IT investments utilized by the firm. Future studies should try and address this shortcoming. A fine-grained analysis of actual IT investments data dedicated to the firm innovation processes might provide a better understanding of the roles of IT investments in fostering the firm innovation. Also, the sample frame was not randomly selected and was based on a data set comprising firms that appeared in the *InformationWeek 500* and for the most part these firms self-reported their IT investments data. As such, the generalizability of these results to other firms is open to scrutiny.

Another limitation of this study was the use of *InformationWeek 500* dataset. Although the dataset had been used extensively in previous studies (Kobelsky et al., 2008; Banker et al., 2011; Im et al., 2013), it may be considered dated. However, studies that used duration are better suited to “old” data due to their longitudinal nature that require a couple of years between the investments and the results (Dehning & Stratopoulos, 2003). Future studies should use more recent data to replicate and confirm that the findings still hold after a decade of rapid and widespread use of IT.

The use of patents as a measure of innovation may pose some limitations too. Nevertheless, there is a longstanding debate on the use of raw-patent counts as a measure of innovation output at the firm, industry or economy level (Griliches, 1998). Some critics have argued that patents should be differentiated by value. That is, weights should be assigned based on the economic value of the patent. However, researchers in management and economics have generally accepted raw-patent counts as one indicator of the innovative performance of firms as depicted by new processes, new technologies, and new products. Future studies should seek to use survey data to gather more data on new products and services introduced by firms and the portion of IT investments allocated to each innovation process.

Conclusions

IT has permeated many facets of organizations and is being utilized, for instance, to internally coordinate, control, and facilitate organizational processes and management decision-making processes. Externally, firms have made IT investments that enable and facilitate interactions with customers, suppliers, and other stakeholders as demonstrated in the use of CRM, SCM, or ERP systems respectively. These are organizational day-to-day business oriented processes, which result from IT investments and in one way or

another have a direct or indirect impact on firm innovation. For example, an effective and efficient IT-enabled value chain is an indispensable firm asset that facilitates the generation and capture of ideas on new products, or processes designs, improvements on existing products, and processes as well as retirement of non-rent generating products, services, or business processes. Capturing and understanding valuable knowledge is a firm capability, because these ideas will ultimately be converted into innovative products or services. These ideas also offer a firm several opportunities to identify its strengths and weaknesses. The benefits accruing from innovations are amplified when a firm integrates and aligns its business strategy with IT investment initiatives.

Resources attributed to IT investments have transformed the processes through which firms engage in innovative endeavors (Brynjolfsson & Schrage, 2009). For instance, firms rely on employees, customers, suppliers, and other stakeholders for breakthrough ideas on products, processes, or service innovations. New ideas are generated, shared, and developed through collaborative trial-and-error initiatives by different entities that supersede the Schumpeterian model of lone entrepreneurs (Schumpeter, 1987). Thus, by investing in IT resources, firms can make use of industry value chains that connect the firm with customers, suppliers and other trading partners encapsulating diverse pools of knowledge across the firm, which is an indispensable resource for innovation.

References

- Acs, Z. J., & Audretsch, D. B. (1989). Patents as a measure of innovative activity. *Kyklos*, 4, 171–180.
- Ahuja, G. (2000). Collaboration networks, structural holes and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- Ahuja, G., & Katila, R. (2004). Where do resources come from? The role of idiosyncratic situations. *Strategic Management Journal*, 25(8-9), 887-907.
- Alavi, M., & Leidner, D. E. (2001, March). Review: Knowledge management and knowledge management systems. *MIS Quarterly*, 25(1), 107-136.
- Anthony, S. D., Johnson, M. W., & Sinfield, J. V. (2008). Institutionalizing innovation. *MIT Sloan Management Review*, 49(2), 45-53.
- Baltagi, B. H. (2005). *Econometric analysis of panel data*. London: John Wiley & Sons, Ltd.
- Banker, R., Hu, N., Pavlou, P. A., & Luftman, J. (2011). CIO reporting structure, strategic positioning, and stock performance. *MIS Quarterly*, 35(2), 487-504.
- Baya, V., Gruman, G., & Mathaisel, B. (2011). The Strategic CIO's new role in innovation: Innovation is the next frontier for all CIOs, and now is the time for the CIO to prepare and take action. *PwC's Technology Forecast: A Quarterly Journal*, 2, 44-53.
- Belsley, D. A., Kuh, E., & Welsch, R. E. (1980). *Regression diagnostics*. New York: John Wiley & Sons.
- Bharadwaj, A. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*, 24, 169-196.
- Bharadwaj, A., Bharadwaj, S., & Konsynski, B. (1999). Information technology

- effects on firm performance as measured by Tobin's q. *Management Science*, 45(7), 1008-1024.
- Bhatt, G. D., & Grover, V. (2005). Types of information technology capabilities and their role in competitive advantage: An empirical study. *Journal of Management Information Systems*, 22(2), 253-277.
- Barbaroux, P., (2012). Identifying collaborative innovation capabilities within knowledge-intensive environments: Insights from the ARPANET project. *European Journal of Innovation Management*, 15, 232 - 258.
- Broadbent, M., Weill, P., O'Brien, T., & Neo, B. S. (1996). Firm context and patterns of IT infrastructure capability. In J. I. DeGross., S. Jarvenpaa, & A. Srinivasan (Eds.), *Proceedings of the Seventeenth International Conference on Information Systems*, Cleveland, Ohio, 13, 174-194.
- Brynjolfsson, E., Hitt, L. M., & Yang, S. (2002). Intangible assets: Computers and organizational capital. *Brookings Papers on Economic Activity*, 1, 137-198.
- Brynjolfsson, E., & Schrage, M. (2009, August). The new, faster face of innovation: Thanks to technology, change has never been so easy-or so cheap. *Wall Street Journal and Sloan Management Review*.
- Chari, M. D. R, Devaraj S., & David P. (2008). The impact of information technology investments and diversification strategies on firm performance. *Management Science*, 54(1), 224-234.
- Cohen W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective of learning and innovation. *Administrative Science Quarterly*, 35, 128-152.
- Cron, W., & Sobol, M. (1983), The relationship between computerization and performance: A strategy for maximizing economic benefits of computerization. *Information and Management*, 6, 171-181.
- Damanpour, F (1996). Organizational complexity and innovation: Developing and testing multiple contingency models. *Management Science*, 42(5), 693-716.
- Dedrick, J., Gurbaxani, V., & Kraemer, K. L. (2003). Information technology and economic performance: A critical review of empirical evidence. *ACM Computing Surveys*, 35(1), 1-28.
- Dehning, B., & Stratopoulos, T. (2003). Determinants of a sustainable competitive advantage due to an IT-enabled strategy. *The Journal of Strategic Information Systems*, 12(1), 7-28.
- Devaraj S., & Kohli, R. (2003). Performance impacts of information technology: Is actual usage the missing link? *Management Science*, 49(3): 273-289.
- Dewan, S., Michael, S. C., & Min, C. (1998). Firm characteristics and investments in information technology: Scale and scope effects. *Information Systems Research*, 9(3), 219-232.
- Enns, H., Huff, S., & Golden, B. (2003). CIO influence behaviors: The impact of technical background. *Information and Management*, 40, 467-485.
- Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. (1984). Organization strategy and structural differences for radical versus incremental innovation. *Management Science*, 30(6).
- Fama, E., & French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Finance*, 33(1), 3-56.
- Foust, D. (2009). The best performers, Business Week 50. *Business Week*, 40-63.

- Francalanci, C., & Galal, H. (1998). Information technology and worker composition: Determinants of productivity in the life insurance industry. *MIS Quarterly*, 22(2), 27–241.
- Francis, J., & Schipper, K. (1999). Have financial statements lost their relevance? *Journal of Accounting Research*, 37(2), 319–352.
- Freeman, C., & Soete, L. (1997). The economics of industrial innovation. London: Pinter.
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(Winter Special Issue), 109-122.
- Griliches, Z. (1998). *R&D and productivity: The econometric evidence*. Chicago: The University of Chicago Press.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2002). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice Hall.
- Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capabilities: Strategy for the never-changing world. *Strategic Management Journal*, 32, 1243–1250.
- Jacquemin, A. P., & Berry, C. H. (1979). Entropy measure of diversification and corporate growth. *Journal of Industrial Economics*, 27, 359-369.
- Jaffe, A. B., & Trajtenberg, M. (2002). *Patents, citations, and innovations: A window on the knowledge economy*. Cambridge, MA: MIT Press.
- Jaruzelski, B., & Dehoff, K. (2009). Profits down, spending steady: The global innovation 1000. *Strategy Business*, 57 (Winter).
- Joshi, K., Chi, L., Datta, A., & Han, S. (2010). Changing the competitive landscape: Continuous innovation through IT-enabled knowledge capabilities. *Information Systems Research*, 21(3), 472-495.
- Karanja, E., & Patel, S. (2012). A review of research trends in strategic information-systems planning. *International Journal of Business Information Systems*, 10(2), 151-177.
- Katkalo, V. S., Pitelis, C. N., & Teece, D. J. (2010). Introduction: On the nature and scope of dynamic capabilities. *Industrial and Corporate Change*, 19(4), 1175-1186.
- Kim, C. (2001). Firm diversification and earnings volatility: An empirical analysis of U.S.-based MNCs. *American Business Review*, 19(1): 26-38.
- Kobelsky, K., Richardson, V. J., Smith, R. E., & Zmud, R. W. (2008). Determinants and consequences of firm information technology budgets. *The Accounting Review*, 83(4), 957-995.
- Kraaijenbrink, J., Spender, J. C., & Groen, A. J. (2010). The resource-based view: A review and assessment of its critiques. *Journal of Management*, 36, 349-372.
- Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of Financial Economics*, 40, 3-29.
- Leidner, D. E., Beatty, R. C., & Mackay, J. M. (2003). How CIOs manage IT during economic decline: Surviving and thriving amid uncertainty. *MIS Quarterly Executives*, 2, 1-14.
- Im, K. S., Grover, V., & Teng, J. T. (2013). Research note-do large firms become smaller by using Information Technology? *Information Systems Research*, 24(2), 470-491.
- Lopez-Nicolas, C., & Merono-Cerdan, A. L. (2011) Strategic knowledge management, innovation and performance. *International Journal of Information Management*, 31, 502-509.

- Lou, B. (1997). Calculating the IW 500, *InformationWeek 500*. Retrieved from <http://www.informationweek.com/649/500calc.htm>
- Loveman, G. W. (1994). An assessment of the productivity impact of information technologies. In Allen, T. J., & Scott Morton, M. S. (Eds.), *Information technology and the corporation of the 1990s: Research Studies*. Cambridge: Oxford University Press.
- van Gils, M., Vissers, G., & de Wit, J. (2009). Selecting the right channel for knowledge transfer between industry and science: Consider the R&D-activity. *European Journal of Innovation Management*, 12, 492 - 511
- Matusaka, J. G. (1993). Takeover motives during the conglomerate merger wave. *RAND Journal of Economics*, 24, 357-379.
- Matthews, C. H., & Scott, S. G. (1995). Uncertainty and planning in small and entrepreneurial firms: An empirical assessment. *Journal of Small Business Management*, 33, 34-52.
- Melville, N., Kraemer, K. L., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly*, 28, 283-322.
- Milliken, F. J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management Review*, 12, 133-143.
- Mithas, S., Tafti, A. R., Bardhan, I. R., & Goh, J. M. (2012). Information technology and firm profitability: Mechanisms and empirical evidence. *MIS Quarterly*, 36, 205-224.
- Mithas, S., Krishnan, M. S., & Fornell, C. (2005). Why do customer relationship management applications affect customer satisfaction? *Journal of Marketing*, 69, 201-209.
- Neter, J., Wasserman, W., & Kutner, M. H. (1990). *Applied linear statistical models*. Homewood, IL: McGraw-Hill Irwin.
- Nord, W. R., & Tucker, S. (1987). *Implementing routine and radical innovations*. San Francisco: New Lexington Press.
- O'Brien, J. P. (2003). The capital structure implications of pursuing a strategy of innovation. *Strategic Management Journal*, 24, 415-431.
- Osborne, J. W. (2001). *A new look at outliers and fringeliers: Their effects on statistic accuracy and Type I and Type II error rates* (Unpublished manuscript, Department of Educational Research and Leadership and Counselor Education, North Carolina State University).
- Palepu, K. (1985). Diversification strategy, profit performance and the entropy measures. *Strategic Management Journal*, 6, 239-255.
- Piccoli, G., & Ives, B. (2005). Review: IT-dependent strategic initiatives and sustained competitive advantage. *MIS Quarterly*, 29, 747-776.
- Popadiuk, S., & Choo, C. W. (2006). Innovation and knowledge creation: How are these concepts related? *International Journal of Information Management*, 26, 302-312.
- Prasanna, T., & Hitt, L. M. (2012). The productivity of Information Technology investments: New evidence from IT labor data. *Information Systems Research*, 23(3), 599-617.
- Prasanna, T., Hitt, L. M., & Brynjolfsson, E. (2012). The extroverted firm: How external information practices affect innovation and productivity. *Management Science*, 58(5), 843-859.

- Preston, D. S., Chen, D., & Leidner, D. E. (2008). Examining the antecedents and consequences of CIO strategic decision-making authority: An empirical study. *Decision Sciences*, 39, 605-642.
- Ranganathan, C., & Brown, C. V. (2006). ERP Investments and the market value of firms: Toward an understanding of influential ERP project variables. *Information Systems Research*, 17(2), 145-161.
- Ravichandran, T., Liu, Y., & Hasan, I. (2009). Diversification and firm performance: Exploring the moderating effects of information technology spending. *Journal of Management Information Systems*, 25, 205-240.
- Rumelt, R. P. (1982). Diversification strategy and profitability. *Strategic Management Journal*, 3, 359-369.
- Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly*, 27, 237-263.
- Schumpeter, J. A. (1987). *Capitalism, socialism and democracy*. London: Unwin.
- Scott, D. A., Mark, W. J., & Joseph, V. S. (2008). Institutionalizing innovation. *MIT Sloan Management Review*, 49, 1-10.
- Shan, W., Walker, G., & Kogut, B. (1994, June). Interfirm cooperation and startup innovation in the biotechnology industry. *Strategic Management Journal*, 15(5), 387-394.
- Shin, N. (2006). The Impact of information technology on the financial performance of diversified firms. *Decision Support Systems*, 41, 698-707.
- Sobol, M. G., & Klein, G. (2009). Relation of CIO background, it infrastructure, and economic performance. *Information and Management*, 46, 271-278.
- Strassman, P.A. (1990). *The business of value of computers*. New Canaan, CT: Information Economics Press.
- Tallon, P.P. (2010). A service science perspective on strategic choice, it, and performance in US banking. *Journal of Management Information System*, 26, 219-252.
- Teece, D. J. (1998). Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California Management Review*, 40, 55-79.
- Teece, D. J. (2009). *Dynamic capabilities and strategic management: Organizing for innovation and growth*. Oxford: Oxford University Press.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18, 509-533.
- Trkman, P. (2010). The critical success factors of business process management. *International Journal of Information Management*, 30, 125-134.
- Weill, P. (1992). The relationship between investment in information technology and firm performance: A study of the valve manufacturing sector. *Information Systems Research*, 3, 307-333.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817-38.
- Xue, L., Ray, G., & Sambamurthy, V. (2012). Efficiency or innovation: How do industry environments moderate the effects of firms' it asset portfolios? *MIS Quarterly*, 36(2), 509-528.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization

- and extension. *Academy of Management Review*, 27, 185-203.
- Zhu, K., & Kraemer, L. K. (2005). Post-Adoption variations in usage and value of E-business by organizations: Cross-country evidence from the retail industry. *Information Systems Research*, 16, 61-84.
- Zhuang, Y. (2005). Does electronic business create value for firms? An organizational innovation perspective. *Journal of Electronic Commerce Research*, 6(2), 146-159.

Appendix

Diversification

In measuring business diversification, this study utilized information from Compustat database business segments (Rule 14 of the FASB mandates public firms to disclose information on significant business segments, and a significant business segment is one that accounts for more than 10% of the total firm assets, sales, or profits). The two dimensions of diversification namely, related and unrelated diversifications were computed as shown in the equation below following Jacquemin and Berry (1979), and Palepu (1985).

Figure 2: Equations for Computing Related and Unrelated Diversification Values

$\text{Related Diversification} = \sum_{j=1}^M \sum_{l=1}^{N_j} S_l^j \ln \frac{S_l^j}{S_j^j}$	$\text{Unrelated Diversification} = \sum_{j=1}^M S_j^j \ln \frac{1}{S_j^j}$
--	---

N is the number 4 – digit SIC industries a firm is active in, indexed by i , which in turn aggregate into M2 – digit industry groups, indexed by j , ($M \leq N$),
 N_j is the number of different industries in group j ,
 S_i is the share of industry i in total firm sales,
 S_j^j is the share of group j in total firm sales,
 S_i^j is the share of firm sales in industry i of firm sales in industry group j

Table 6: Diversification Values as Computed from Total Sales for Selected Firms with IT Budgets in 1996

Company Name	GVKEY	Total Sales	Group 1		Group 2		Group 3	Group 4	UD	TD	RD	# of SEGs
			SEG 1	SEG 2	SEG 1	SEG 2	SEG 1	SEG 1				
Baxter Int. Inc	2086	5438	5438						0.000	0.000	0.000	1
Bemis Co. Inc.	2154	1655	1180	474					0.000	0.599	0.599	2
Chevron Corp.	2991	37580	3422		33832				0.313	0.313	0.000	2
Crane Co.	3580	1865	207		363		246	734	1.197	1.197	0.000	4
Intl Paper Co.	6104	21400	2665	3475	5640	494500	4675		0.707	1.577	0.870	5

SEG = business segment

The Relationship Between Dispositional Positive Affect and Team Performance: An Empirical Study

Tianjiao Qiu

California State University, Long Beach

Vicki M. Scherwin

California State University, Long Beach

Research has established the impact of affectivity on a range of organizational outcomes. However, empirical works on how dispositional affect—the tendency to experience positive emotions—influences team outcomes are lacking. The purpose of this study is to empirically investigate how dispositional positive affect impacts team performance and how individual team member's task performance and team interactions including team learning and interpersonal citizenship behaviors, mediate the relationship. Results from new product student teams demonstrate that dispositional positive affect promotes both individual team member's task performance and team interactions, yet only team interactions contribute to overall team performance.

Understanding what contributes to the performance of small groups and teams has garnered the attention of scholars and researchers from a variety of disciplines, including psychology, organizational behavior, marketing, and economics (e.g., Grawitch, Block, & Ratner, 2005; Riolli & Sommer, 2010). Among various kinds of teams, new product development (NPD) teams have been widely adopted in organizations to generate product innovation (Edmondson & Nembhard, 2009; McDonough, 2000). Due to the popularity of NPD teams, a significant amount of research has investigated what contributes to NPD team processes and success (e.g., Troy, Hirunyawipada, & Paswan, 2008; Sethi, Smith, & Park, 2001). The majority of NPD team research focuses on examining how the functional composition of the team—the differing expertise within a team—impacts NPD team performance (e.g., Sethi et al., 2001). This line of research

has shown that integration through better team communication, team coordination, and team learning is necessary before NPD teams can shorten product development cycles, produce more innovative new product ideas, and generate better product design and quality (e.g., De Luca & Atuahene-Gima, 2007; Troy et al., 2008). Another line of research examines how leadership roles in the NPD process, including team leaders, managers, and champions, enable NPD team success (e.g., Qiu et al., 2009; Sarin & McDermott, 2003). For example, Sarin and McDermott (2003) demonstrated that leadership characteristics in NPD teams significantly impacted team learning, knowledge application, and subsequently, NPD performance. Qiu et al. (2009) found that project managers' interactional fairness promoted both individual team member's task performance and team performance as a whole.

Despite these fruitful findings on NPD teams from the functional composition and leadership perspectives, little empirical research has investigated the individual differences of the members within the team and how these individual differences impact the interactions between the team members. McNally et al. (2009) proposed that a manager's dispositional traits, such as analytic cognitive style, ambiguity tolerance, and leadership style, would be related to his or her decision processes in new product portfolio management. One central dispositional trait, dispositional affect (positive or negative affect), has received little attention in NPD teams. Dispositional affect encompasses a wide range of personality traits (Barsade et al., 2000) and is therefore likely to influence NPD team interactions and ultimately NPD team performance. In this study, how the dispositional affect impacts NPD team performance through individual team member's task performance and interactions with other team members will be empirically examined.

Theoretical Background

Affectivity is generally classified as either positive or negative. Positive affectivity (PA) is described as the experience of engaging pleurably with ones' environment, feeling cheerful, enthusiastic, energetic, confident, and alert (Watson, Clark, & Tellegen, 1988; Wright, Larwood, & Denney, 2002). Conversely, negative affectivity (NA) is the experience of anger, guilt, fear, nervousness, and subjective stress (e.g., Watson & Clark, 1984). The tendency to experience positive or negative feelings consistently across time and a range of situations is defined as dispositional affect—dispositional PA and dispositional NA, respectively. Similar to personality traits, dispositional PA and dispositional NA represent consistent individual differences (Watson & Clark, 1984). They are not opposite ends of a one-dimensional construct. In fact, dispositional PA and dispositional NA operate largely independently and relate to different types of predictor and outcome variables (e.g., Watson et al., 1988).

Given the independence of dispositional PA and dispositional NA, studies have commonly focused on either dispositional PA or dispositional NA in predicting employees' attitudes and behaviors. The meta-analysis of Thoresen et al. (2003) reported that compared to dispositional NA, dispositional PA received disproportionately less attention in organizational research. The existing limited dispositional PA research

primarily focused on organizational outcomes, such as job satisfaction, organizational commitment, and turnover intentions (Thoresen et al., 2003). However, little is known about how individual dispositional PA impacts NPD team outcomes. In this research, the goal is to investigate how individual dispositional PA impacts NPD team performance through individual team member's task performance and team interactions including team learning and interpersonal citizenship behaviors (ICBs).

The research model used integrated insights from motivation research (Elliot, 1999; Elliot & Thrash, 2002; Gable, Reis, & Elliot, 2003), which suggested that motivation consisted of two dimensions: *approach* and *avoidance*. Approach motivation can be described as a tendency toward certain actions (Carver, Sutton, & Scheier, 2000). Action tendencies are "deeply embedded in the nature of human personality" (Carver, 2006, p.109). Approach tendencies prod people to act and trigger behaviors that facilitate their pursuits, whereas avoidance tendencies stimulate inhibition and elicit withdrawal in the face of new opportunities (Gray, 1994).

Scholars from a variety of empirical traditions proposed that these two dimensions served as the foundation for a range of individual differences (Gray 1990, 1994; Elliot & Thrash, 2002; Carver, 2006) including dispositional affect, where positive affect and negative affect were manifestations of approach and avoidance temperaments, respectively. Approach motivated individuals were defined as "highly engaged in the pursuit of whatever incentives arise" (Carver et al., 2000, p. 747). For example, approach motivated individuals could be expected to look forward to an upcoming social event, thrill-seek, act spontaneously, or be excited about an unexpected opportunity (Gray, 1994). More generally, approach motivated individuals enacted behaviors that actively approached their environments, such as fulfilling their responsibilities, intentionally interacting with others, and seeking new experiences and opportunities (e.g., Gable, 2006). Relevant to this research, given that high dispositional PA individuals were likely to be approach motivated (Elliot & Thrash, 2002), they had the tendency to initiate behaviors which supported the task performance, team learning, and interpersonal citizenship behaviors investigated in this study.

Data were collected from teams engaged in the task of designing a new product and corresponding plan as part of an undergraduate product development course. This interactive task (McGrath & Kravitz, 1982), which involved multiple interactions across various product development stages, required the participation of all team members. Because of the level of interdependence inherent in the interactive task (Van der Vegt, Emans, & Van De Vliert, 1999), it was meaningful to examine team members' behaviors and to explore how these behaviors influenced the relationship between dispositional PA and NPD team performance. Specifically, the study intended to answer the following research questions about teams working on interactive tasks: (1) How did dispositional PA impact individual team member's task performance, team learning, and interpersonal citizenship behaviors? and (2) How did these behaviors contribute to overall team performance?

Literature Review and Hypotheses

Although there is an increasing interest in the relationship between personality traits

and individuals' attitudes and behaviors in the work place (see Ng & Sorensen, 2009 for a review), research on how dispositional affect (both positive and negative) impacts NPD team performance has received little attention in the interdisciplinary literature. Research findings have centered on general working teams in the organization. For example, two recent meta-analyses illustrated the range of outcome variables that dispositional affect can influence including: personal accomplishment, organizational commitment, job satisfaction, emotional exhaustion, depersonalization, turnover intentions (Thoresen et al., 2003), global satisfaction, social integration, organizational treatment, job stress, in-role and extra-role performance, and absenteeism (Ng & Sorensen, 2009), among others. Overall findings indicated that dispositional PA and NA were related to many important organizational variables and that dispositional PA had a strong effect on variables related to the job and organizational context (Ng & Sorensen, 2009). Additional research explored affect at the group level which entailed aggregating individual-level dispositional affect (George, 1990) and moods (Bartel & Saavedra, 2000) to investigate, for example, emotional contagion (Hatfield, Cacioppa, & Rapson, 1994) and the effects of affective diversity within a team (e.g. Barsade et al., 2000).

Despite these rich findings, there is a lack of empirical work on the relationship between dispositional PA and NPD team performance. The performance of a NPD team is based on the success of the product(s) that the NPD team develops (Kleinschmidt & Cooper, 1991). Thus, the performance of a NPD team can be assessed in a variety of ways, including external measures, such as product speed to market or timeliness of product introduction (Bstieler & Hemmert, 2010), product quality, and the product's market performance (Lynn, Skov, & Abel, 1999) or internal measures such as team members' self-assessments of performance and team member satisfaction (Brockman et al., 2010) along with innovativeness and improvement of the NPD process (Ettlie, Elsenback, & Jorg, 2007).

Regardless of which measure is adopted, NPD performance depends on how well the team members interact and collaborate (Hoegl & Gemeunden, 2001) or in other words, the quality of teamwork (Hoegl & Gemeunden, 2001). Scholars have called for more research into caring and cooperative behaviors and suggest that these behaviors are representative of the quality of team member interactions (Hoegl, Ernst, & Proserpio, 2007) and should be investigated as mechanisms that contribute to NPD team success and efficiency (Bstieler & Hemmert, 2010). Therefore, the question investigated in this study—how specific behaviors mediate the relationship between dispositional PA and NPD team performance—have the potential to yield insights beneficial for both emotion aspects and for NPD team researchers.

Dispositional PA and Task Performance

Task performance refers to individuals enacting role responsibilities (Qiu et al., 2009; Settoon & Mossholder, 2002). Given that individuals with higher dispositional PA are approach motivated (i.e., driven to pursue their goals) and enact approach related behaviors (e.g., actively engage with their environment), they will be more likely to fulfill their responsibilities, perform expected tasks, and complete their duties than those individuals lower in dispositional PA in NPD teams. Howell and Shea (2001) connected approach motivation and task performance by showing that

when individuals were approach motivated, they were likely to be more committed, involved and persistent in working on a product innovation task. Although task focus has never been directly linked to dispositional PA, a recent meta-analysis found that dispositional PA was positively correlated with in-role performance (Ng & Sorensen, 2009). Additionally, research on short-term affect, which demonstrated that individuals in positive moods were found to display task focus (Grawich et al., 2003) and initiative (Den, Hartog, & Belschak, 2007), was relevant in this case because individuals higher in dispositional PA were likely to be experiencing frequent short-term positive feelings. Finally, individuals who experienced more frequent positive emotions across a variety of situations were more likely to have confidence in their performance and were perceived to be more effective in their workplaces than those who experienced positive emotions less frequently (Staw & Barsade, 1993). Therefore, the following is suggested:

Hypothesis 1: Team members higher in dispositional PA will demonstrate a higher level of task performance than team members lower in dispositional PA.

Dispositional PA and Team Learning

Team learning is one of the most critical drivers of innovation in NPD teams (Clark & Cardy, 2002; Edmondson & Nembhard, 2009). It is defined as “activities by which team members seek to acquire, share, refine, or combine task-relevant knowledge through interaction with one another” (Van der Vegt & Bunderson, 2005, p. 534). This is a key team behavior because teams are unlikely to be able to succeed in new product development if the members do not combine their knowledge. Edmondson and Nembhard (2009) indicated that there was a set of processes that aided in team learning such as seeking feedback and help, experimenting with new approaches, and asking questions. Since approach motivated individuals seek out new opportunities, actively engage with others, and are driven to act in ways that support their goals, these interpersonal learning processes may also be expected from high dispositional PA individuals.

Although no previous research has studied the relationship between dispositional PA and team learning in NPD teams, research on associated behaviors has supported the expectation that team members higher in dispositional PA would engage in team-level processes that contributed to team learning more than those lower in dispositional PA (e.g., D’Zurilla, 2011). For example, individuals with greater dispositional PA performed better on the cognitive processes that were the antecedents to good decision making and constructive problem solving (D’Zurilla, 2011; Staw & Barsade, 1993). Additionally, Levin et al. (2010) found that individuals with a positive affect had a more successful transfer of knowledge than individuals with a negative affect. Individuals’ with high dispositional PA approach motivation, decision making skills, and increased knowledge incorporation all indicated that individuals higher in dispositional PA would benefit from team learning. Thus the following is suggested:

Hypothesis 2: Individual team member’s dispositional PA will be positively associated with team learning behaviors.

Dispositional PA and Person-focused Interpersonal Citizenship Behaviors (ICB)

Person-focused ICB refers to a type of extra-role behavior in which an individual extends voluntary efforts that go beyond his or her immediate role requirements in order to support fellow team members, enhancing the fabric of social relations in the workplace (Qiu et al., 2009; Settoon & Mossholer, 2002). Person-focused ICB can be exhibited in various forms, such as interpersonal sharing, helping, and facilitation (Bowler & Brass, 2006). Qiu et al. (2009) found that team members' commitment to NPD teams positively impacts team members' person-focused ICB.

Approach motivated individuals also have a more positive attitude toward social relationships (Gable, 2006). They experience an increase in relationship quality compared to non-approach motivated individuals (Impett et al., 2010). Therefore, it is expected that individuals higher in dispositional PA will be more willing to contribute beyond their required role responsibilities and enact ICB behaviors, compared to those individuals lower in dispositional PA in NPD teams.

Although no research has specifically addressed the relationship between dispositional PA and person-focused ICB in NPD teams, some research has shown that short-term PA encourages the display of helping others and prosocial behaviors (Isen & Baron, 1991; George, 1991). Dispositional PA can also lead to participation in more social activities (Watson, 1992) and better social judgments (Staw & Barsade, 1993). High dispositional PA members are also better at perceiving the social interaction patterns in groups (Casciaro, Carley, & Krackhardt, 1999) and have the tendency to pay more attention to others' behavior, consequently allowing them to make more accurate judgments about others than judgments made by individuals with lower dispositional PA (Staw & Barsade, 1993). Accurate judgments and frequent social interactions with team members are necessary precursors of ICB behaviors. Thus it is suggested:

Hypothesis 3: Team members higher in dispositional PA will demonstrate higher levels of person-focused ICB than team members lower in dispositional PA.

Task Performance, Team Learning, and Person-focused ICB as Mediators

This research explored the relationship between dispositional PA and the team behaviors described above with the ultimate goal of understanding how dispositional PA influenced NPD team performance. Team members were engaged both in their "taskwork" and "teamwork" (Ortiz, Johnson, & Johnson, 1994). Thus, team performance depended on individual task performance, as well as how well the team members learned, interacted and collaborated in NPD process.

Although NPD teams consisted of multiple individuals working toward a common goal, each individual was responsible for exerting effort in order to accomplish his or her assigned tasks. There is general consensus among team researchers that the quality performance of each group member contributes to the overall NPD team performance (Qiu et al., 2009). Specifically, individual task efforts have been found to have a significant positive influence on team performance (Weingart & Weldon, 1991). Previous conceptual arguments stated that task performance may impact team performance in a number of different ways depending on the task type. Task types may have determined whether team performance was affected by interdependent group

efforts or by the efforts of specific individuals within the team (Zaccaro & McCoy, 1988). For example, if performance in a specific task was only based on one team member's solution, then one might argue that the other team members' emotional dispositions would be irrelevant. However, that was not the case for the interactive task assigned to the product teams in this study. Therefore, the expected result was that the greater each team member's task performance, the greater the team performance would be.

Hypothesis 4a: Task performance will mediate the relationship between individual dispositional PA and team performance.

In addition to “taskwork”, in order to reap the benefits of working in a team, team members need to behave in ways that enhanced team learning. Teams are “key learning units in organizations” (Senge, 1990, p. 236) and they contribute to organizational effectiveness. A significant success factor in NPD teams is whether knowledge shared with the team becomes a part of the team (e.g., Edmondson, 1999; Edmondson & Nembhard, 2009). When team members learn by effectively sharing their information or developing new knowledge, the effectiveness of the NPD team is enhanced (Edmondson, 1999; Edmondson & Nembhard, 2009), in turn leading to improved NPD team performance (Sarin & McDermott, 2003). Knowledge acquisition, implementation, and dissemination, (among other learning sub-concepts) contributes to new product success (Akgün, Lynn, & Yilmaz, 2006). More specifically, since innovation is a consequence of the learning process (Sarin & McDermott, 2003), the more a team learned, the more likely the NPD team would be to perform well. Therefore, it is hypothesized:

Hypothesis 4b: Team learning will mediate the relationship between individual dispositional PA and team performance.

A harmonious work environment in which team members voluntarily enact supportive and caring behavior is also important in order for teams to achieve a common goal. When constructive and cooperative behaviors occur within NPD teams, the quality and acceptance of the solutions that the teams propose are enhanced (De Dreu & West, 2001; Qiu et al., 2009). Additionally, scholars hypothesize that when team members are in a caring environment they can concentrate more on their tasks, as opposed to having to struggle to be accepted and appreciated, yielding a positive impact for the team (De Dreu & Weingart, 2003). Therefore, this paper suggests that voluntary interpersonal caring behaviors, such as listening, showing concern and helping—investigated in this study as person-focused citizenship behaviors—will mediate the relationship between dispositional PA and team performance.

Hypothesis 4c: Person-focused ICB will mediate the relationship between individual dispositional PA and team performance.

Method

Sample and Data Collection Procedure

Data were collected from 26 new product development teams consisting of a total of 98 undergraduate senior business majors from two large public universities. 15 new product development teams (56 students) were from a large public university in the Midwestern United States and 11 new product development teams (42 students) were from a large public university in the Southern United States. Approximately 32% of the participants were male and 68% were female. Participants' ethnicities were as follows: White (85), Hispanic (6), Asian (5), Black (1), and Native American (1). The participants' ages ranged from 18 to 45 years old, with 88% of the participants having full or part-time work experience.

Given that organizations are increasingly relying on new product development (NPD) teams to leverage employees' combined expertise and knowledge (McDonough, 2000), NPD teams provide an opportune context in which to empirically investigate the relationships studied in this paper. The study participants were enrolled in NPD courses that required product teams to develop detailed and actionable new product solutions to project ideas provided by corporate sponsors from both manufacturing and service industries. During the first week of the semester, participants were randomly assigned to teams of three or four members to work on this task. Then, following the schedule as outlined in the course syllabus, the student teams engaged in the following new product development activities: 1) identifying market needs, 2) generating new product ideas, 3) evaluating the potential market, 4) conducting cost analysis, and 5) outlining a market launch plan. Team members interacted with each other both in the class work-sessions and during team meetings outside of the class. The course faculty advisors and corporate sponsor representatives guided the teams' NPD efforts from idea screening to product testing. At the end of the semester, the teams presented their new product solutions and submitted a written report. The faculty advisors and the corporate sponsor representatives then evaluated each team's new product solution following the Product Development and Management Association's project success guidelines (Griffin & Page, 1996). Specifically, the faculty advisors and the corporate sponsor representatives evaluated the product solutions along five dimensions: product innovativeness, development cost, how the product met quality specifications, how the product fit with the business strategy, and how the product led to future opportunities.

After all teams submitted their reports (but before the evaluation of their projects), the data for the study were collected via a written survey. Collection occurred before the final project evaluation to avoid retrospective biases in which team members adjusted their responses based on the evaluation results from the faculty advisors. The survey contained measures of each team member's dispositional PA, task performance, team learning behavior, person-focused ICB, and self-report team performance.

Measures of Key Constructs

The measures employed in the study were adapted from previous scales. The item loadings of all variables were significant at $p < .05$. Cronbach's reliability statistics showed that all measures had satisfactory convergent reliability. Discriminant validity

between the measures using two approaches was tested. First, a confirmatory factor analysis (CFA) was employed to test the validity of the measures (Anderson & Gerbing, 1988). The model statistics were satisfactory (RMSEA= 0.08; GFI= 0.89; RMR= 0.08; AGFI= 0.85; CFI= 0.90; NFI= 0.86). Second, following the guidelines set by Segars (1997), discriminant validity with a chi-square difference test was tested. Specifically, the study compared the pair-wise chi-square statistics among each possible pair of scales using unconstrained (the correlation between the two constructs is set free) and constrained (the correlation between the two constructs is constrained to one) models. All chi-square statistics in the unconstrained model were significantly lower than the chi-square statistics in the constrained model ($p < .01$), verifying the discriminant validity of the scales.

The study measured dispositional PA by adopting Watson et al.'s (1988) 10-item scale. The instructions asked the respondents to indicate to what extent he/she felt that each of the items was generally descriptive of oneself, not just descriptive of oneself while he/she was working on the team project. The measure used a 5-point Likert scale, with response options ranging from 1 = "not at all", to 5 = "extremely". The final measure contained all 10 items, with a reliability level (alpha) of 0.79 in the current study. The following were three sample items: interested, proud, and inspired. Williams and Anderson's (1991) in-role behavior scale to measure individual team member's task performance was adapted. This self-report scale contained five items that examined how well the team member completed his/her assigned team duties. The following were two sample items: "I adequately completed my assigned team duties" and "I fulfilled my responsibilities as specified." The scale had a reliability level of 0.88. Edmondson's (1999) team learning scale was adapted to measure team learning processes. This scale measured learning as an ongoing process at the group level that enabled team members to acquire, share, and combine knowledge through group interactions. One item in this scale had a loading of less than [.50] and was eliminated (Hair et al., 1998). The final scale contained 6 items, with response options ranging from 1 = "strongly disagree", to 5 = "strong agree." The reliability level was 0.73. The following were two sample items: "Our team frequently sought new information that led us to make important changes" and "We regularly took time to figure out ways to improve our team's work processes." Settoon and Mossholder's (2002) scale was used to measure person-focused ICB. This scale measured team members' social and emotional support of other team members. The scale contained 6 items and had a reliability level of 0.90. The following were two sample items: "I made an extra effort to understand the problems faced by teammates" and "I took the time to listen to teammates' problems and worries."

Team performance was measured in two ways: (1) respondents' self-report rating of their teams' performance, and (2) faculty advisor's evaluation of the team performance. For the first measure, existing published research using student samples was followed (e.g., Sarin & McDermott, 2003) and team performance was assessed with self-report ratings of NPD team performance, which included team performance from 5 perspectives: the morale of the team, the efficiency of the team's operations, the attainment of the goals set for the team, the team's reputation for work excellence, and the quality of the project (Sethi et al., 2001). This scale used a 5-point Likert scale, ranging from 1 = "far below expectations", to 5 = "far above expectations". The

reliability level was 0.91. The limitation of assessing team performance through self-report survey items was recognized, thus the study attempted to address this limitation by including a second, external team performance measure that reflected a combined team evaluation score from the faculty advisors and corporate sponsors. The advisors and corporate sponsors met to discuss and assign a score to each team's project based on the five-stage development process. Since the student teams worked on mock products and no true product performance data were available, these evaluations captured the qualitative aspect of the project and were project-specific centering around the key criteria of “the degree to which the product provides a competitive advantage” as advocated by Griffin and Page (1996). Specifically, five dimensions of the product solutions: product innovativeness, development cost, how the product met quality specifications, how the product fit the business strategy, and how the product led to future opportunities, were emphasized in the qualitative evaluation.

Finally, the study controlled for three variables: (1) team members' gender, (2) team members' ethnicity, and (3) team size, when testing the models due to the possible influence these variables might have had on team interactions and project success.

Tests of Hypotheses

Table 1: *Descriptive Statistics and Correlations among Variables^a*

	Mean	Correlation						
		1	2	3	4	5	6	7
1. Dispositional positive affect	3.79							
2. Task performance	4.54	.47 ^b						
3. Team learning behavior	3.7	.30 ^b	.35 ^b					
4. Person-focused ICB	4.20	.37 ^b	.56 ^b	.61 ^b				
5. Team performance (self report)	3.82	.48 ^b	.48 ^b	.65 ^b	.67 ^b			
6. Gender	N.A	.04	.02	.27 ^b	.23 ^c	.22 ^c		
7. Ethnicity	N.A.	-.04	-.18	-.02	-.18	-.13	.05	
8. Team Size	3.89	.08	-.08	-.17	-.02	-.06	-.03	-.11

^a Ninety eight senior undergraduate students participated in the study. The items corresponding to each construct/dimension were summed and averaged in order to obtain a summated index. The summary statistics are reported for this index.

^b correlations have $p < .01$

^c correlations have $p < .05$

Before testing the model, an assessment was conducted of the between-group variance in team performance using a null model. The null model is an intercept-only model in which no predictors are specified. The between-group variance (τ^2) in team performance was calculated to be .27, while the variance between members in the same team (δ^2) was .35. In this case, the interclass correlation coefficient was .44, indicating that 44% of variance in team performance resided between groups. This

result indicated that the team level had an important impact on team performance and justified the use of hierarchical linear modeling technique.

The 5 linear mixed equations that were tested in the study are presented in Table 2. Equations 1 to 5 tested the mediating effects of individual task performance, person-focused ICB and team learning on the relationship between dispositional PA and NPD team performance (Krull & MacKinnon, 1999). Analytical procedures recommended by Baron and Kenny (1986) were adopted to test the presence of mediating effects in the model. Equations 1, 2 and 3 examined the direct effects of dispositional PA on the mediating variables: individual task performance, team learning, and person-focused ICB. Equation 4 examined the direct effect of dispositional PA on the dependent variable of the model: NPD team performance. All variables were entered simultaneously in Equation 5 to examine individual task performance, team learning, and person-focused ICBs as mediators of the relationship between dispositional PA and NPD team performance. The hypothesized mediating effects were supported if three criteria were met: (1) if dispositional PA significantly affected individual task performance, team learning, and person-focused ICB in equations 1, 2 and 3, (2) if dispositional PA significantly affected NPD team performance in the fourth equation, and (3) if individual task performance, team learning, and person-focused ICB significantly affected NPD team performance while controlling individual dispositional PA.

Table 2: *The Effect of Dispositional Positive Affect (DPA) on Team Performance*

	Fixed Effects		Random effects				Fit statistics	
	γ 's	(SE)	δ	(SE)	$\hat{\delta}^2$	(SE)	-2 loglike	AIC
1. Task performance (TP):	Int	3.24** (.45)	.00	.02	.26	.04	135.1	147.1
	DPA	.43** (.08)						
Level 1: $(TP)_i = \beta_{0i} + \beta_{1i}(DPA)_i + \beta_{2i}(CV)_i + \varepsilon_i$	Size	-.05 (.05)						
Level 2: $\beta_{0i} = \gamma_{00} + U_{0i}$	Ethnicity	-.12 (.06)						
	Gender	.00 (.14)						
2. Team learning (TL):	Int	2.38** (.62)	.11	.07	.39	.07	187.5	201.5
	DPA	.25* (.11)						
Level 1: $(TL)_i = \beta_{0i} + \beta_{1i}(DPA)_i + \beta_{2i}(CV)_i + \varepsilon_i$	Size	-.05 (.08)						
Level 2: $\beta_{0i} = \gamma_{00} + U_{0i}$	Ethnicity	-.14 (.08)						
	Gender	.40* (.18)						
3. Person-focused ICB (ICB):	Int	2.42** (.52)	.02	.04	.36	.06	161.8	173.8
	DPA	.39** (.10)						
Level 1: $(ICB)_i = \beta_{0i} + \beta_{1i}(DPA)_i + \beta_{2i}(CV)_i + \varepsilon_i$	Size	-.13* (.06)						
Level 2: $\beta_{0i} = \gamma_{00} + U_{0i}$	Ethnicity	-.03 (.07)						
	Gender	.44** (.16)						
4. Team performance (TAP)	Int	1.70** (.60)	.16	.08	.31	.06	176.6	190.6
	DPA	.48** (.10)						
Level 1: $(NPD)_i = \beta_{0i} + \beta_{1i}(DPA)_i + \beta_{2i}(CV)_i + \varepsilon_i$	Size	.09 (.09)						
Level 2: $\beta_{0i} = \gamma_{00} + U_{0i}$	Ethnicity	-.07 (.08)						
	Gender	.39* (.17)						
5. Team performance (TAP):	Int	-.58 (.56)	.01	.03	.23	.04	129.9	149.9
Level 1:	DPA	.29** (.09)						
$(NPD)_i = \beta_{0i} + \beta_{1i}(DPA)_i + \beta_{2i}(TL)_i + \beta_{3i}(ICB)_i + \beta_{4i}(CV)_i + \varepsilon_i$	TP	.10 (.12)						
Level 2: $\beta_{0i} = \gamma_{00} + U_{0i}$	TL	.41** (.09)						
	ICB	.29* (.12)						
	Size	-.02 (.06)						
	Ethnicity	-.03 (.06)						
	Gender	.12 (.14)						

* $p < .05$; ** $p < .01$

Equation 1 showed a significant effect of dispositional PA ($\gamma = .43, p < .01$) on individual team member's task performance, supporting Hypothesis 1. Equation 2 examined the effect of dispositional PA on team learning. The parameter estimate of dispositional PA ($\gamma = .25, p < .05$) was significant. These results demonstrated that

dispositional PA significantly impacted team learning, which supported Hypothesis 2. Equation 3 examined the effect of dispositional PA on team members' person-focused ICB. Dispositional PA demonstrated a strong significant effect on person-focused ICB ($\gamma = .39, p < .01$), which supported Hypothesis 3. Equation 4 examined the direct effect of dispositional PA on NPD team performance. Dispositional PA was found to significantly impact NPD team performance ($\gamma = .48, p < .01$).

In Equation 5, dispositional PA ($\gamma = .29, p < .01$), team learning ($\gamma = .41, p < .01$), and person-focused ICB ($\gamma = .29, p < .01$) were found to significantly impact NPD performance. Individual task performance did not show a significant effect on team performance. Taken together, the hypothesized mediating effects of team learning and person-focused ICB were supported. However, although dispositional PA significantly impacted team members' task performance, team members' task performance had no direct impact on NPD team performance.

Further, since dispositional PA still significantly impacted NPD performance in Equation 5, this was an indication of a partial mediation. Team learning and person-focused ICB did not fully mediate the relationship between dispositional PA and NPD performance. Using Sobel's (1982) method, the study further tested the partial mediating roles of team learning and person-focused ICB. The Sobel z-statistics were 2.11 for team learning ($p = .04$) and 3.36 for team members' person-focused ICB ($p < .001$). These statistics confirmed a partial mediating role of team learning and person-focused ICB on the relationship between dispositional PA and NPD team performance, supporting Hypotheses 4b and 4c.

To address the issue of possible common method bias, the faculty advisors' aggregated performance evaluation scores were used as an alternative measure of NPD team performance (Podsakoff et al., 2003). Since HLM required that the dependent variables be measured at the lowest level to capture both variance within the lower-level and the variance between the higher-level groups, the faculty advisors' evaluation scores took into account the advisors' evaluation not only of each team's new product solutions, but also of the individual student team member's contribution to the solution. Consistent with the above findings, dispositional PA significantly impacted NPD team performance ($\gamma = .70, p < .01$). At the same time, both team learning ($\gamma = .33, p < .05$) and person-focused ICB ($\gamma = .54, p < .01$) demonstrated highly significant relationships with NPD performance while controlling for dispositional PA. Thus, the faculty advisor scores provided a version of an external measure of performance to complement the internal measure (Brockman et al., 2010) and through triangulation, supported the validity of the study's findings (Jick, 1979).

In terms of controls, the findings showed that ethnicity had no significant impact on team learning, individual task performance, and person-focused ICB. Gender had no relationship to task performance either. However, it was found that gender significantly impacted both team learning and person-focused ICB. Female team members demonstrated significantly higher levels of person-focused ICB and promoted team learning better than male team members. Team size demonstrated a significant negative effect on team members' person-focused ICB. The findings illustrated that smaller team size enhanced interactions and facilitated team members' interpersonal behaviors.

Discussion

Due to the increased popularity of teams in executing various tasks, such as new product development and sales campaigns in organizations, there is great interest from academics and practitioners alike in the antecedents of team performance. This study contributed to an understanding of the relationship between dispositional PA and NPD team performance and promoted an understanding of both an antecedent to and the mechanisms of team success. Although functional diversity, especially cross-functional diversity in NPD teams, has received wide attention, it has been shown here that the dispositional diversity of team members also has important implications for team interactions. The study highlighted the relationship between dispositional PA and key behaviors integral for NPD team performance. It was also shown that dispositional PA had a direct positive effect on NPD team performance along with having important implications for team learning and ICBs which also contributed to NPD team performance. These results underscored the role of dispositional PA as a critical team stage setting element at the outset of a team project that promoted active learning and influenced project success.

This study illustrated that team members with high levels of dispositional PA acted in ways that corresponded with their approach motive tendencies (e.g., intentionally interacting with others and seeking new experiences and opportunities); namely, they were more willing to fulfill their task responsibilities and go beyond their task specifications to engage in team learning and spontaneous assistance behaviors. These findings were consistent with previous research on dispositional PA that emphasized the positive relationships between dispositional PA and a range of work performance outcomes, such as decision making, interpersonal performance, and managerial potential (Staw & Barsade, 1993; for a review, see Thoresen et al., 2003). Furthermore, the findings demonstrated that dispositional affect may be considered an individual-level team stage setting element. McDonough (2000) described this as an element in place at the outset of the project that influenced project success. Thus, the study illustrated that dispositional affect is an important variable to address because it not only can have a direct impact on individual task performance, it also indirectly influences two mechanisms—interpersonal behavior and team learning—known to drive NPD performance.

The study suggested that the success of NPD teams depended upon how effectively team members were interacting and communicating with each other. Team activities such as communication with other members and showing concern towards others contributed to the performance of NPD teams as a whole, which supported previous research emphasizing the importance of teamwork quality (Hoegl et al., 2007) and internal team factors such as social cohesion (Nakata & Im, 2010) on NPD team success. It was also found that the extent to which team members acquired, shared, and combined knowledge impacted NPD team performance, thereby supporting previous findings (Lynn et al., 1999; Akgün, Lynn, & Yilmaz, 2005) and theorizing (Edmondson & Nembhard, 2009) in regards to the relationship between team learning and NPD team performance.

This study also revealed that dispositional PA and short-term PA had different

consequences. For example, previous research on short-term PA has shown that it had an inhibiting role in individual cognition and the search for information because individuals in positive moods use heuristics and perform less systematic analyses of the information they receive than individuals in negative moods (see Forgas, 2008 for a review). In contrast, it was found that team members high in dispositional PA did not appear to fall prey to this type of limited information search. It seemed that they continued to initiate behaviors that facilitated their pursuits, as their task performance and team learning behaviors were consistently stronger than low dispositional PA team members.

Although dispositional PA had a positive influence on individual team members' task performance, counter to expectations, individual team members' task performance did not have a significant effect on team performance. This implies that fragmented individual effort cannot lead to the success of the team as a whole for an interactive task. Instead, success on an interactive task depended on the concerted efforts of all team members through their behaviors that promote team interactions and team synergy.

This study had important implications for practitioners managing NPD teams. The results suggested that it is critical for managers to seek out high dispositional PA individuals in the interest of success of the whole team. Dispositional PA was consistent across situations (Diener & Larsen, 1984) and team members carried their affective history with them when they interacted as a group (Kelly & Barsade, 2001). Thus, dispositional PA, at any time, exerted strong effects on the behaviors of individuals. However, it is also important to note that although team members with high dispositional PA were likely to fulfill their individual task obligations, high dispositional PA individuals' fragmented efforts could not guarantee the success of the team. Instead, the success of the team relied on the concerted efforts of dispositional PA team members to actively contribute their share of knowledge to the development of the project while at the same time supporting other team members. Taking into account that dispositional PA operates like a personality trait, management may have difficulty changing the team dynamic by adapting individuals' dispositional affect. Instead, management may want to consider individuals' dispositional affect when assigning employees to teams. To summarize, this study contributed to a better overall understanding of the relationship between dispositional PA and NPD team performance. This relationship cannot simply be summed up so as to say "positive people create positive outcomes," but instead that individuals who are more dispositionally positive enhance team effectiveness due to enacting behaviors that support team learning and ICBs.

Limitations and Future Research

This research provided important evidence of the positive effects of dispositional PA on NPD team outcomes, including team learning behavior, ICBs, and overall team performance. Several limitations to the research are worthy of note and efforts that address these limitations may introduce interesting avenues for future study. First, PA from a dispositional perspective was studied while ignoring the possible influences of short-term PA and group-level PA on team outcomes. Future research should try to incorporate individual short-term PA and group-level PA with dispositional PA in order

to enable a better understanding of the effects of various types of PA on team outcomes. For example, do frequent short-term low PA experiences for high dispositional PA individuals negate the benefits of dispositional PA on team performance? Also, what is the impact of different configurations of dispositional PA on how team behaviors are enacted when some team members are high in dispositional PA and other team members are not? Assessing PA as a state and a trait, individually and in different configurations, will likely introduce many other important mechanisms that can influence team performance.

Second, as noted above, the study investigated the mediating roles of task performance, team learning, and ICBs in the relationship between PA and team outcomes. However, previous research has indicated that a wide variety of variables may have moderating/mediating roles such as job type and tenure (Ng & Sorensen, 2009). Future research could expand on the behaviors investigated here to include other team based variables that dispositional PA would be likely to influence, such as group identity, risk taking, conflict resolution, and innovation.

Lastly, the restricted student sample that was used placed a limitation on the study's external validity. The study could be enhanced by collecting data from work teams in a range of real business settings and using a variety of performance indicators. The faculty advisors' performance evaluations, although incorporating corporate sponsors' feedback, were still based on only one rater. Thus, the study could be improved by having corporate sponsors be more involved in the student projects and integrating multiple evaluators' objective evaluations as the index of the final team performance scores. Instead of developing mock products, long-term or permanent teams in organizations engaging in the development of real-world products or promoting a product should be investigated, along with various external performance indicators, such as speed to market, customer satisfaction, and sales volume. Continued research in this area may not only shed new light on the influence of affect on NPD team processes, but also provide practitioners with useful guidelines for boosting NPD team performance.

References

- Akgün, A. E., Lynn, G. S., & Yilmaz, C. (2006). Learning process in new product development teams and effects on product success: A socio-cognitive perspective. *Industrial Marketing Management*, 35(2), 210-224.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- Bacharach, S. B., Bamberger, P. A., & Doveh, E. (2008). Firefighters, critical incidents, and drinking to cope: The adequacy of unit-level performance resources as a source of vulnerability and protection. *Journal of Applied Psychology*, 93(1), 155-169.
- Baron, R. M., & Kenny, D.A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Barsade, S. G., Ward, A. J., Turner, J. D. R., & Sonnenfeld, J. A. (2000). To your heart's content: A model of affective diversity in top management teams. *Administrative Science Quarterly*, 45(4), 802-836.

- Bartel, C. A., & Saavedra, R. (2000). The collective construction of work group moods. *Administrative Science Quarterly*, 45(2), 197-231.
- Bowler, W., & Brass, D. (2006). Relational correlates of interpersonal citizenship behavior: A social network perspective. *Journal of Applied Psychology*, 91(1), 70-82.
- Brockman, B.K., Rawlston, M.E., Jones, M.A., & Halstead, D. (2010). An exploratory model of interpersonal cohesiveness in new product development teams. *Journal of Product Innovation Management*, 27(3), 201-219.
- Bstieler, L., & Hemmert, M. (2010). Increasing learning and time efficiency in interorganizational new product development teams. *Journal of Product Innovation Management*, 27(7), 485-499.
- Carver, C. S. (2006). Approach, avoidance, and the self-regulation of affect and action. *Motivation and Emotion*, 30(2), 105-110.
- Carver, C. S., Sutton, S. K., & Scheier, M. F. (2000). Action, emotion, and personality: Emerging conceptual integration. *Personality and Social Psychology Bulletin*, 26(6), 741-751.
- Casciaro, T., Carley, K. M., & Krackhardt, D. (1999). Positive affectivity and accuracy in social network perception. *Motivation and Emotion*, 23(4), 285-306.
- Clark, M. A., Amundson, S. D., & Cardy, R. L. (2002). Cross-functional team decision-making and learning outcomes: A qualitative illustration. *Journal of Business and Management*, 8(3), 217-236.
- De Dreu, C. K., & Weingart, L. R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology*, 88(4), 741-749.
- De Dreu, C. K. W., & West, M. A. (2001). Minority dissent and team innovation: The importance of participation in decision making. *Journal of Applied Psychology*, 86, 1191-1201.
- De Luca, L. M., & Atuahene-Gima, K. (2007). Market knowledge dimensions and cross-functional collaboration: Examining the different routes to product innovation performance. *Journal of Marketing*, 71(1), 95-112.
- Den Hartog, D. N., & Belschak, F. D. (2007). Personal initiative, commitment and affect at work. *Journal of Occupational & Organizational Psychology*, 80(4), 601-622.
- Diener, E., & Larsen, R. J. (1984). Temporal stability and cross-situational consistency of affective, behavioral, and cognitive responses. *Journal of Personality and Social Psychology*, 47(4), 871-883.
- D'Zurilla, T. (2011). Predicting social problem solving using personality traits. *Personality and Individual Differences*, 50(2), 142-147.
- Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2), 350-383.
- Edmondson, A. C., & Nembhard, I. M. (2009). Product development and learning in project teams: The challenges are the benefits. *Journal of Product Innovation Management*, 26(2), 123-138.
- Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology*, 82, 804-818.
- Erdogan, B., & Bauer, T. N. (2009). Perceived overqualification and its outcomes: The

- moderating role of empowerment, *Journal of Applied Psychology*, 94(3), 557-565.
- Ettlie, J., Elsenbach, E., & Jorg, M. (2007). Modified Stage-Gate® regimes in new product development. *Journal of Product Innovation Management*, 24(1), 20-33.
- Forgas, J. P. (2008). Affect and cognition. *Perspectives on Psychological Science*, 3(2), 94-101.
- Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality*, 74(1), 175-222.
- George, J. M. (1990). Personality, affect, and behavior in groups. *Journal of Applied Psychology*, 75(2), 107-116.
- George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology*, 76(2), 299-307.
- Grawitch, M. J., Block, E. E., & Ratner, J. F. (2005). How are evaluations of positive and negative experiences related to the intensity of affect in workgroups? *Group Dynamics: Theory, Research, and Practice*, 9(4), 261-274.
- Grawitch, M. J., Munz, D. C., Elliott, E. K., & Mathis, A. (2003). Promoting creativity in temporary problem-solving groups: The effects of positive mood and autonomy in problem definition on idea-generating performance. *Group Dynamics: Theory, Research, and Practice*, 7(3), 200-213.
- Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition and Emotion*, 4, 269-288.
- Gray, J. A. (1994). Three fundamental emotion systems. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 243-247). New York: Oxford University Press.
- Griffin, A., & Page, A.L. (1996). PDMA success measurement project: Recommended measures for product development success and failure. *Journal of Product Innovation Management*, 13(6), 478-496.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall.
- Hatfield, E., Cacioppa, J., & Rapson, R. L. (1994). *Emotional contagion*. New York: Cambridge University Press.
- Hoegl, M., Ernst, H., & Proserpio, L. (2007). How teamwork matters more as team member dispersion increases. *Journal of Product Innovation Management*, 24(2), 156-165.
- Hoegl, M., & Gemeunden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization Science*, 12, 435-449.
- Howell, J. M., & Shea, C. M. (2001). Individual differences, environmental scanning, innovation framing, and champion behavior: Key predictors of project performance. *Journal of Product Innovation Management*, 18(1), 15-27.
- Impett, E. A., Gordon, A. M., Kogan, A., Oveis, C., Gable, S. L., & Keltner, D. (2010). Moving toward more perfect unions: Daily and long-term consequences of approach and avoidance goals in romantic relationships. *Journal of Personality and Social Psychology*, 99(6), 948-963.
- Isen, A. M., & Baron, R. A. (1991). Positive affect as a factor in organizational behavior. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (pp.

- 1–53). Greenwich, CT: JAI Press.
- Jick, T. D. (1979). Qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24, 602-11.
- Kelly, J. R., & Barsade, S. G. (2001). Mood and emotions in small groups and work teams. *Organizational Behavior and Human Decision Processes*, 86(1), 99-130.
- Kleinschmidt, E. J., & Cooper, R. G. (1991). The impact of product innovativeness on performance. *Journal of Product Innovation Management*, 8(4), 240-251 .
- Krull, J. L., & MacKinnon, D. P. (1999). Multilevel mediation modeling in group-based intervention studies. *Evaluation Review*, 23(4), 418–444.
- Levin, D. Z., Kurtzberg, T. R., Phillips, K. W., & Lount, R. B. (2010). The role of affect in knowledge transfer. *Group Dynamics: Research Theory and Practice*, 14(2), 123-142.
- Lynn, G. S., Skov, R. B., & Abel, K. D. (1999). Practices that support team learning and their impact on speed to market and new product success. *Journal of Product Innovation Management*, 16(5), 439-454.
- McGrath, J. E., & Kravitz, D. A. (1982). Group Research. *Annual Review of Psychology*, 33(1), 195-230.
- McDonough III, E. F. (2000). An investigation of factors contributing to the success of cross-functional teams. *Journal of Product Innovation Management*, 17(5), 221-235.
- McNally, R. C., Durmusoglu, S. S., Calantone, R. J., & Harmancioglu, N. (2009). Exploring new product portfolio management decisions: The role of managers' dispositional traits. *Industrial Marketing Management*, 38(1), 127-143.
- Nakata, C., & Im, S. (2010). Spurring cross-functional integration for higher new product performance: A group effectiveness perspective. *Journal of Product Innovation Management*, 27(7), 554-571.
- Ng, T. W. H., & Sorensen, K. L. (2009). Dispositional affectivity and work-related outcomes: A meta-analysis. *Journal of Applied Social Psychology*, 39(6), 1255-1287.
- Podsakoff, P., MacKenzie, S., Lee, J., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- Ortiz, A. E., Johnson, D. W., & Johnson, R. T. (1994). The effect of positive goal and resource interdependence on individual performance. *Journal of Social Psychology*, 136(2), 243-249.
- Qiu, T., Qualls, W., Bohlmann, J., & Rupp, D. E. (2009). The effect of interactional fairness on the performance of cross-functional product development teams: A multilevel mediated model. *Journal of Product Innovation Management*, 26(2), 173-187.
- Riulli, L., & Sommer, S. M. (2010). Group attributional style: A predictor of individual turnover behavior in a manufacturing setting. *Journal of Business and Management*, 16(1), 51-73.
- Sarin, S., & McDermott, C. (2003). The effect of team leader characteristics on learning, knowledge application, and performance of cross functional new product development teams. *Decision Sciences*, 34(4), 707-739.
- Segars, A. H. (1997). Assessing the unidimensionality of measurement: A paradigm and illustration within the context of information systems research, *Omega*, 25(1), 107-121.
- Senge, P. M. (1990). *The fifth discipline: Art and practice of the learning organization*. New York: Doubleday.

- Sethi, R., Smith, D. C., & Park, C. W. (2001). Cross-functional product development teams, creativity, and the innovativeness of new consumer products. *Journal of Marketing Research*, 38(2), 73-85.
- Settoon, R. P., & Mossholer, K. W. (2002). Relationship quality and relationship context as antecedents of person- and task-focused interpersonal citizenship behavior. *Journal of Applied Psychology*, 87, 255-267.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equations models. In W. Leinhardt, (Ed.), *Sociological methodology*, (pp. 290-312). San Francisco: Jossey-Bass, Inc.
- Staw, B. M., & Barsade, S. G. (1993). Affect and managerial performance: A test of the sadder-but-wiser vs. happier-and-smarter hypotheses. *Administrative Science Quarterly*, 38(2), 304-331.
- Thoresen, C. J., Kaplan, S. A., Barsky, A. P., Warren, C. R., & de Chermont, K. (2003). The affective underpinnings of job perceptions and attitudes: A meta-analytic review and integration. *Psychological Bulletin*, 129, 914-945.
- Troy, L. C., Hirunyawipada, T., & Paswan, A. K. (2008). Cross-functional integration and new product success: An empirical investigation of the findings. *Journal of Marketing*, 72(6), 132-146.
- Van Der Veegt, G., Emans, B., & Van De Vliert, E. (1999). Effects of interdependencies in project teams. *Journal of Social Psychology*, 139(2), 202-214.
- Van Der Veegt, G. S. V. D., & Bunderson, J. S. (2005). Learning and performance in multidisciplinary teams: The importance of collective team identification. *The Academy of Management Journal*, 48(3), 532-547.
- Watson, D., & Clark, L.A. (1984). Negative affectivity: The disposition to experience negative aversive emotional states. *Psychological Bulletin*, 96, 465-490
- Watson, D., Clark, L. A., McIntyre, C. W., & Hamaker, S. (1992). Affect, personality, and social activity. *Journal of Personality and Social Psychology*, 63(6), 1011-1025.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
- Weingart, L. R., & Weldon, E. (1991). Processes that mediate the relationship between a group goal and group member performance. *Human Performance*, 4(1), 33.
- Williams, J., & Anderson, E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, 17, 601-617.
- Wright, T. A., & Hobfoll, S. E. (2004). Commitment, psychological well-being and job performance: An examination of conservation of resources (COR) theory and job burnout. *Journal of Business and Management*, 9(4), 389-406.
- Wright, T. A., Larwood, L., & Denney, P. J. (2002). The different 'faces' of happiness - unhappiness in organizational research: Emotional exhaustion, positive affectivity, negative affectivity, and psychological. *Journal of Business and Management*, 8(2), 109-126.
- Zaccaro, S. J., & McCoy, M. C. (1988). The effects of task and interpersonal cohesiveness on performance of a disjunctive group task. *Journal of Applied Social Psychology*, 18, 837-851.

Employee Turnover: A Study on Information Technology Sector

Sumana Guha
St. Xavier's College

Subhendu Chakrabarti
Indian Statistical Institute

Under the globalized market, a firm's success depends on its innovativeness, adaptability and speed. These all are derived from its own human resources, but employee turnover can jeopardize a firm's efforts. This study, based on a primary survey, tries to explore the underlying reasons behind the voluntary turnover of Information Technology (IT) professionals. Among the six plausible considered push and pull factors – 'higher-salary', 'higher-portfolio', 'higher-company-brand-name' – these three pull factors chronologically appear to be responsible for IT professional turnover, regardless of age and gender. From an empirical and turnover model, it appears that an employee's attitude towards life and work is a key parameter affecting employee turnover.

The key players behind the spectacular technological changes in the 21st century are human beings. Human resources are sometimes referred to as human capital by different schools of thought and is considered as intangible intellectual capital with distinctive functional capabilities that control and augment both physical capital and other resources. Consequently, intellectual property has become the obvious concern of the present century, which in turn, has diffused in order to develop hypercompetitive market rivalries in world markets. Pfeffer (1994) argued that success in the present dynamic, hypercompetitive markets depends more on innovation, speed, and adaptability which are largely derived from a firm's own employees and the way in which they are managed. With similar arguments, various scholars (Wernerfelt, 1984; Levine, 1995; Lawler, 1996; Grant, 1996; O'Reilly & Pfeffer, 2000) advocated that for the competitive advantage, a firm should adopt a set of management practices with high involvement from human resources (HR). These arguments are the genesis for the development of today's system of Strategic Human Resource Management (SHRM).

Highly skilled and talented employees are indispensable for achieving or maintaining competitive advantages and are considered as assets to an organization. Therefore, any loss of this resource undoubtedly would be at great cost to the organization. In the present globalized competitive market, firms generally set up their respective HR divisions to promote, protect, and utilize their employee resources. The major problem faced by the firms though, is the departure of these resources, especially skilled ones. The employee turnover cost becomes even greater when efficient and skilled employees leave the firm. On the other hand, most employees will try to optimize their professional career, which is subject to their capability and functional domain. An employee's career scale is always judged in terms of income, professional position, and the reputation of the organization where the employee works. Therefore, human resources management often confronts two types of problems: recruiting and retaining high-value employees.

The Information Technology (IT) sector is one of the most important sectors of the world, especially in India where the voluntary employee turnover is the highest compared to other sectors. It is therefore pertinent to identify the reasons behind voluntary employee turnover in this changing market environment. This study, based on a primary survey, will endeavor to find the reasons behind the voluntary turnover of IT professionals.

Literature Review

Job Satisfaction, Employees' Future Expectations and Employee Turnover

Researchers have tried to unveil the impellent factors behind an employee leaving or choosing to stay with the firm. In this regard, Hom and Griffeth (1991) argued that an employee's job satisfaction or dissatisfaction is what motivates them to stay with or leave the firm. But these work attitudes play a relatively small role (Hom & Griffeth, 1995; Griffeth, Hom, & Gaertner, 2000) in overall employee retention. Instead, various other factors like organizational commitment, the opportunity for job alternatives, etc. are more important in explaining employee turnover. Mobley et al. (1979) observed that there are two factors responsible for employee turnover: one is the employee's evaluation of the firm's future expected value with respect to their own work aspirations, and the other is the tension associated with the employee's present work conditions. Researchers like Becker (1975), Kraut (1975), Stevens et al. (1978) and many others argued that employees make an implicit comparison between expected job benefits and alternative job opportunities. If the offered benefits of the present job are greater than or equal to alternative offers, then they will be less likely to leave the firm. An employees' personal commitment is a completely different aspect which indicates the intention of the employee to continue working in the firm in lieu of accepting an alternative job that may offer potentially better socio-economic benefits.

Workload, Role Ambiguity and Employee Turnover

Numerous studies have reported evidence like workload, role ambiguity, and role conflict in determining turnover decisions (Bostrom, 1981; Goldstein & Rockart, 1984; Ivancevich, Napier, & Wetherbe, 1983; Li & Shani, 1991; Sethi, Barrier, & King, 1999;

Weiss, 1983). It has been suggested that IT professionals in many firms are continually asked to take on impossible workloads and deadlines (Bartol & Martin, 1982; Ivancevich et al., 1983). The primary component of job burnout and exhaustion is the depletion of mental resources (Schaufeli, Leiter, & Kalimo, 1995). Consequences of exhaustion include job dissatisfaction (Burke & Greenglass, 1995; Maslach & Jackson, 1984; Pines, Aronson, & Kafry, 1981; Wolpin, Burke, & Greenglass, 1991), reduced organizational commitment (Jackson, Turner, & Brief, 1987; Leiter, 1991; Sethi et al., 1999; Thomas & Williams, 1995), and enhanced turnover intention (Jackson, Schwab, & Schuler, 1986; Jackson et al., 1987; Pines et al., 1981).

Gender Differentiated Employee Turnover

Marta M. Elvira (2001) observed that women were less likely to leave when there were other women employed at high levels within the firm. On the other hand, men's turnover was not significantly affected by the proportion of men in their own hierarchical level or immediately above their level, but decreased when more men were employed in executive levels. Again, social structure affects individuals differently, and different aspects of that same social structure have differing effects. Hence, it can be said that women are less likely to leave when they work with more women at their job level (Tolbert et al., 1995). Tsui, Egan, and O'Reilly (1992) observed that men's psychological attachment diminished with an increasing proportion of women. This evidence suggests that men are less likely to exit when more men work at their job level.

Employee Turnover in the IT Sector

Voluntary employee turnover of Information Technology (IT) professionals has become one of the persistent challenges faced by technology-based firms, and one of the major problems lies in employee retention. Adams, Clark, and Goldman (2006) argued that IT turnover remains a chronic problem. Despite a significant number of studies on IT turnover that have been conducted in the last two decades; there is no symmetric review of this topic for the collective understanding of accumulated knowledge on the IT turnover phenomenon. Most of the literature on IT professionals' turnover has focused on turnover intentions and very few have examined actual IT turnover behavior. Some IT firm level turnover studies emphasized contextual factors related to IT (Ang & Slaughter, 2000; Cappelli & Sherer, 1991) and focused on the internal labor market (Ang & Slaughter, 2004) and human resource practices' (Ferratt, Agarwal, & Brown, 2005) influence on IT turnover rates. Bacharach (1989) tried to specify interrelationships among the existing antecedents to explain why IT professionals develop turnover intentions. Thus, the crux of the problem therefore lies in the organizational internal environment, external labor market conditions as well as an employee's perception and attitude towards life and work.

Conceptual Framework

Employee Turnover: Refers to the percentage of employees who have left the organization during a specific period (usually one year) to the average monthly employee strength of the organization.

$$\text{Employee turnover} = \frac{Y}{\bar{x}} * 100 ; \text{ where } \bar{x} = \frac{\sum_{i=1}^{12} x_i}{12} ;$$

y=Number of employees left in a year

Employee turnover can primarily be classified as voluntary or involuntary. In the case of voluntary, the employee’s decision to leave a company is solely that employee’s decision. The voluntary turnover occurs, because of various factors like an employee’s job dissatisfaction, workload, familial reasons and/or when the employee is attracted by lucrative offers from other similar organizations. In the case of involuntary turnover, the employee’s job termination decision is made by the organizational authority. Employee retirement, layoff, etc. are examples of involuntary turnover.

It is apparent that the employee’s decision to leave or not to leave an organization is influenced by either endogenous factors, exogenous factors, or both. Keeping this in mind and for the sake of better understanding, this study classified the underlying reasons of employee turnover into push and pull factors.

Push Factors: Push factors are those factors which compel the employee to quit a job (e.g., employee’s job dissatisfaction, breach of commitment, familial compulsion and other like factors).

Pull Factors: Pull factors motivate employees to change organizations voluntarily in order to achieve a better and higher position in the professional-hierarchical scale. Pull factors include attractive offers from similar competitive firms, like ‘higher salary’, ‘higher portfolio’, ‘higher company-brand-name’, which are the means of upgrading an employee’s social and economic status.

Theoretical Framework

The employee turnover phenomenon is the consequence of various impulsive factors. These factors are classified into exogenous pull factors (e.g., attraction of a higher salary, higher portfolio, more prestigious company or better brand name) and endogenous push factors (e.g., job dissatisfaction, breach of commitment, familial compulsion, retirement, etc.) which compel an employee to leave an organization voluntarily. For the sake of simplicity, it was assumed that the goal of an employee was to optimize professional achievement and that he/she would always accept any available better offer in order to upgrade their professional career. It was also assumed that alternative job opportunities were available in the market.

Q_t implies an employee’s voluntary decision to leave an organization at time t, and P_t^l and P_t^h are the respective impulsive pull and push factors at time t. Then,

$$Q_t = Q (P_t^l, P_t^h); \frac{dQ_t}{dP_t^l} > 0, \frac{dQ_t}{dP_t^h} > 0 \quad \dots (1)$$

Now,

$$P_t^l = f (S_t^*, P_t^* C_t^*); \frac{dP_t^l}{dS_t^*} > 0, \frac{dP_t^l}{dP_t^*} > 0, \frac{dP_t^l}{dC_t^*} > 0 \quad \dots (2)$$

Where, S_t^* , P_t^* and C_t^* are the attractions of 'Higher Salary', 'Higher Portfolio' and 'Higher Company-Brand-Name' respectively offered by other organizations at time, t .

If S_t , P_t and C_t are the 'Salary', 'Portfolio' and 'Company-Brand-Name' enjoyed by employees in the organization where they are working at time, t .

Then, $(S_t^* - S_t) = s_t \Rightarrow$ Higher Salary impulsion at time t ,
 $(P_t^* - P_t) = p_t \Rightarrow$ Higher Portfolio impulsion at time t , and
 $(C_t^* - C_t) = c_t \Rightarrow$ Higher Company-Brand-Name impulsion at time t .

Then function (2) becomes,

$$P_t^l = f(s_t, p_t, c_t); \frac{dP_t^l}{ds_t} > 0, \frac{dP_t^l}{dp_t} > 0, \frac{dP_t^l}{dc_t} > 0 \quad \dots (3)$$

On the other hand,

$$P_t^h = f(B_t, O_t); \frac{dP_t^h}{dB_t} > 0, \frac{dP_t^h}{dO_t} > 0 \quad \dots (4)$$

Where, B_t and O_t are the 'Breach of Commitment' and 'Others' factors respectively at time t .

Considering \hat{B}_t and B_t as the commitments made and the commitments fulfilled in practice at time t respectively and \hat{O}_t and O_t as the 'Other' Expected Employees' own constraints, and the actual constraints faced by the employee at time t then,

$$(\hat{B}_t - B_t) = b_t \Rightarrow \text{Breach of Commitment impulsion at time } t, \text{ and} \\
(\hat{O}_t - O_t) = o_t \Rightarrow \text{Other self-constraints impulsion at time } t.$$

Then function (4) becomes,

$$P_t^h = f(b_t, o_t); \frac{dP_t^h}{db_t} > 0, \frac{dP_t^h}{do_t} < 0 \quad \dots (5)$$

Replacing functions (4) and (5) into function (1), then there is,

$$Q_t = Q(s_t, p_t, c_t, b_t, o_t), \quad \dots (6)$$

$$\text{where } \frac{dQ_t}{ds_t} > 0, \frac{dQ_t}{dp_t} > 0, \frac{dQ_t}{dc_t} > 0, \frac{dQ_t}{db_t} > 0, \text{ and } \frac{dQ_t}{do_t} < 0$$

Hence, it can be said that the voluntary decision of employees to quit (Q_t) an organization depends on a number of factors and the impact of these varies from employee to employee. If a linear relationship is assumed between Q_t and its predictor variables, then the required equation:

$$Q_t = \alpha + \beta_1 s_t + \beta_2 p_t + \beta_3 c_t + \beta_4 b_t - \beta_5 o_t + e_t \quad \dots (7)$$

But, the outcome of Q_t is reflected only when the decision of the employee has been measured, (i.e., either the employee quits or stays in the organization). Then the dependent variable Q_t becomes dichotomous. If values 0 and 1 are assigned to employee's staying or leaving the organization respectively, then the coefficient of each independent predictor will show their respective contribution to the variation of Q_t . From the knowledge of relevant independent predictors and coefficients, the objective becomes not to find a numerical value of Q_t as in linear regression, but the probability (θ) that it is 1 rather than 0. Then outcome will not be a prediction of a Q_t value but a probability value which can be any value between 0 and 1. A log transformation was needed to normalize the distribution and this log transformation of the θ values to a log distribution enabled the study to formulate a normal regression equation. The log distribution (or logistic transformation of θ is the log (to base e) of the odds ratio that the dependent variable was 1 and was defined as,

$$\log \left[\frac{\theta}{1-\theta} \right] = \ln \left(\frac{\theta}{1-\theta} \right), \text{ where } \theta \text{ ranges between 0 and 1}$$

Hence, the required equation becomes,

$$\ln \left[\frac{\theta}{1-\theta} \right] = \alpha + \beta_1 s_t + \beta_2 p_t + \beta_3 c_t + \beta_4 b_t - \beta_5 o_t + e_t \quad \dots (8)$$

$$\text{where } P(Q_t = 1) = \theta \text{ and } P(Q_t = 0) = (1 - \theta)$$

Methodology

Primary information regarding causal factors behind employee turnover in the IT sector was collected through a questionnaire given to 460 IT employees working presently in 17 different IT firms in Kolkata, West Bengal. The snowball method was used for sample selection. The questionnaire contained multidimensional questions to capture the behavioral patterns of IT employees under the influence of different push and pull factors. In this study, 420 respondents (out of a total of 460 respondents) had left companies at least once before joining their current company at the time of the survey. The number of companies covered by the survey, including the companies the respondents had left, was approximately 90.

This study was concerned with six plausible factors: 1) 'higher salary', 2) 'higher portfolio', 3) 'scope of foreign assignment', 4) 'higher company-brand-name', 5) 'breach of commitment', and 6) 'others' (which includes employee's job dissatisfaction, familial obligations, and other factors) which were hypothesized to be influential in causing Indian IT professionals to leave their jobs voluntarily and examine relative factors of dominance across gender and age groups. The respondents were asked to rank these factors according to their reasons for leaving their last company. Thus, respondents' given ranks expressed their respective motivation behind leaving the last company they worked for.

One of the implicit assumptions made in the study was that an employee's decisions were strongly affected by their attitudes towards life and work. Research in psychology and organizational behavior, especially the content theories, focused on the needs, wants

and desires of people which were the main impetus for motivational behaviors. The study also incorporated a self-appraisal of the IT employees' attitudes towards life and work and examined its effect on their turnover intent as well as the actual turnover. It appeared that the reasons behind turnover of the two groups of employees [ones who give 'Highest Priority to Work Life' (HPWL) and others who give 'Highest Priority to Social Life' (HPSL) in accordance with employees' self-assessment] were distinctively different. Respondents were classified by gender and age. Frequency and percentage distributions will be presented in tabular form. A correlation matrix and linear regression analysis were done. In addition, this paper developed a theoretical framework for employee turnover and based on that, a turnover model was created. The characteristics of sample respondents are presented below in the form of descriptive statistics.

Table 1: Descriptive Statistics of Sample Respondents

Characteristics of Sample Respondents	Age Group									Total		
	Less than 30			30-40			Above 40					
	No.	\bar{x}	σ	No.	\bar{x}	σ	No.	\bar{x}	σ	No.	\bar{x}	σ
A. Gender												
Male	119	27.0	1.6	188	34.1	3.3	21	43.8	2.5	328	32.2	5.3
Female	69	27.4	1.7	60	33.4	3.2	3	42.0	1.0	132	30.5	4.2
Total	188	27.1	1.6	248	33.9	3.3	24	43.6	2.4	460	31.6	5.7
B. Experience in IT (in yrs):												
Less than 1yr.	5	0.4	0.2	0	0.0	0.0	0	0	0	5	0.4	0.2
1-5 years	144	2.8	1.4	32	4.7	1.0	0	0	0	176	3.1	1.5
6-10 years	38	6.7	1.0	124	7.7	1.4	1	10	0	163	7.5	1.4
10 yrs.+	1	29.0	0.0	92	12.8	1.9	23	18.2	2.9	116	14.0	3.3
Total	188	3.7	2.1	248	9.2	2.7	24	17.9	3.3	460	7.4	4.4
C. # of company changes:												
0 change	27	-	-	10	-	-	3	-	-	40	0	0
1 change	38	-	-	43	-	-	6	-	-	87	0	0
2 changes	41	-	-	73	-	-	5	-	-	119	0	0
3+ changes	82	3.4	1.0	122	3.5	1.0	10	3.6	1.1	214	3.5	1
Total	188	3.4	1.0	248	3.5	1.0	24	3.6	1.1	460	3.5	21.4

Note: \bar{x} = mean; σ = Standard deviation and No. = Number of respondents

Empirical Observations

The empirical analysis was based on the information collected through a survey of 460 IT professionals in West Bengal. In order to judge the intrinsic factors behind an employee's propensity to leave a company, some endogenous factors [e.g., scope of revealing skill (SRS), professional attitude (PA), locational advantage (LA), experience

in IT (EIT), ‘higher degree of independence leads to greater attachment’ (HIGA)] were obtained from the 460 respondents (40 of which did not change companies at the time of survey), to reveal their plausible response. First, a correlation matrix was computed to see the relationship between these factors and the number of company changes (NCC) made by each respondent. Then a linear regression was estimated by assigning the ‘number of changes’ as the dependent variable (Y). The results of the correlation matrix and the regression analysis are presented below.

Figure 1: Pearson Correlations Matrix (n=460)

Variables	NCC	SRS	PA	LA	ExIT	HIGA
NCC	1					
SRS	-.098*	1				
PA	-.326*	.076	1			
LA	.131**	.061	-.005	1		
EIT	.128**	.028	.012	-.055	1	
HIGA	.127**	.014	-.067	.008	.040	1

** . Significant at the 0.01 level (2-tailed). * . Significant at the 0.05 level (2-tailed).

The correlation matrix among the endogenous factors explored the relationship of these factors with the ‘number of company changes’ (NCC) made by each respondent and also the inter-correlation between factors. Most of these endogenous factors appeared to be significantly correlated with ‘number of company changes’, but inter-factor correlations were found to be very insignificant.

Linear Regression Equation:

$$\text{NCC} = 1.853 - 0.123 (\text{SRS}) - 0.393 (\text{PA}) + 0.408 (\text{LA}) + 0.038 (\text{EIT}) + 0.279 (\text{HIGA})$$

(5.155*) (-2.033) (-7.258*) (3.285*) (3.198*) (2.321*)

(Figures in the parenthesis indicate t value and *, indicates significant at the 0.01 level)

The correlation matrix showed that all the variables were highly correlated with the ‘number of company changes’ (NCC) and from the regression it appeared as expected, that all the predictor variables were significantly related to the predicted variable. The employee’s propensity to change companies was negatively related with SRS and PA. This implies that an employee’s highly professional attitude combined with the greater scope of revealing skill would reduce their propensity for leaving the company. On the other hand, highly experienced (EIT) employees revealed their preference to locational advantage (LA) and greater freedom of work (HIGA) and if these preferences were not satisfied at their existing company, it increased their propensity to change companies. The reason behind this may as an employee ages, they may be more likely to look for work in a better location in order to avoid non-professional problems as well as have greater freedom to demonstrate their work efficiency and commitment.

Respondents (n = 420) who changed at least one company ranked the given 6 plausible causal factors according to their own rationale of leaving their last company. Respondents’ given ranks were arranged in accordance with age groups (‘below 30’,

'30-40' and 'above 40') and gender. It was apparent that most of the respondents (47.5% male and 49.6% female; overall 48%), irrespective of age and gender, gave rank-1 to 'higher salary'. This implied that the attraction of a higher salary was the most important factor for IT professionals for joining a new company. After 'higher salary', about 32% (27.2% male and 43.7% female) of the respondents ranked 'higher portfolio', and over 32% (34.6% male and 40.3% female) ranked 'higher company-brand-name' third. It is evident that the three impulsive pull factors, irrespective of age and gender, were mostly responsible for IT employees' leaving a company. 'Breach of commitment', 'others', and 'scope of foreign assignment' respectively ranked 4th, 5th and 6th. However, it appeared that the top three priority causal factors differed between male and female IT professionals. Male employees' first concern was 'higher salary' followed by 'higher company-brand-name' and 'portfolio'. On the other hand, female employees' main concern was also 'higher salary' but the second concern was 'portfolio', followed by 'higher company-brand-name'. Females appeared to be more concerned about professional hierarchy than their male counterparts.

In order to single out the most important reason among different age groups of IT employees for leaving their last company, the distribution of which of the 6 factors was ranked first was observed. Fifty-one percent of the 'below 30' age group of respondents ranked 'higher salary' first. The corresponding figures for the '30-40' and 'above 40' age groups respectively were around 48% and 33%. After 'higher salary', the second highest frequency of factors ranked was to 'higher company-brand-name' by the 'below 30' group (27%), age '30-40' (22%) and 'above 40' (24%) age group of respondents respectively (see Table 2). The third highest frequency of factors ranked was given to 'higher portfolio' by 10%, 13.8%, and around 10% of respondents 'below 30', '30-40', and 'above 40' respectively (see Table 1). One distinctive feature was that the propensity to change companies was much higher among younger IT employees which reflected their zeal to reach the top of the professional-ladder within a short period of time.

Table 2: Distribution of Highest Rank Given by the Respondents by Age Group

Age Group	Most important reason (Rank-1) for changing company						Total
	Higher Salary	Higher Portfolio	Scope of Foreign Assignment	Higher Company-Brand-Name	Breach of Commitment	Others	
Below 30	82 (51.0)	16 (9.9)	7 (4.4)	44 (27.3)	6 (3.7)	6 (3.7)	161 (100)
30-40	113 (47.5)	33 (13.8)	8 (3.4)	53 (22.3)	14 (5.9)	17 (7.1)	238 (100)
Above 40	7 (33.4)	2 (9.5)	2 (9.5)	5 (23.8)	1 (4.8)	4 (19.0)	21 (100)
Total	202 (48.1)	51 (12.1)	17 (4.0)	102 (24.3)	21 (5.0)	27 (6.5)	420 (100)

Note: Figures in the parenthesis are the % of total respondents.

In order to judge attitudinal affect on employee turnover intention, the 460 employees were divided into two groups: 1) 'Highest Priority to Work-Life' (HPWL) and 2) 'Highest Priority to Social-Life' (HPSL) according to the respondents' self-evaluation

of their attitudes towards life and work. Each group was then divided into three sub groups: 1) 'no change of jobs', 2) '1 or 2 changes of jobs', and 3) '3 or more changes of jobs' (see Table 3). Out of a total of 460 respondents, 8.6% did not change companies ($n = 40$) at the time of the survey, of which 75% belonged to the HPSL category and the remaining 25% belonged to the HPWL category. Around 206 respondents had already made '1 or 2 changes of job' of which 55% belonged to the HPSL category. However, it is interesting to note that out of those who had already changed 3 or more jobs, only 29% of them fell into the HPSL category and the remaining 71% were from the HPWL category. It was observed that for IT employees 'higher salary', 'higher portfolio' and 'higher company-brand-name' were the three primary reasons for them leaving a company. Therefore, it is evident that for the HPWL categories of employees, financial gain, professional position, and professional glamour with a more prestigious company brand name were the most important factors.

Table 3: Distribution of Respondents in Accordance with Their Highest Priorities between 'Work Life' and 'Social Life' by Age Group

Age Group	Respondents' Self-Evaluation of Attitudes Towards Their Work and Life								Total
	Highest Priority to Work-Life (HPWL)				Highest Priority to Social-Life (HPSL)				
	No Change	1 or 2 Changes	3 or more Changes	Total	No Change	1 or 2 Changes	3 or more Changes	Total	
Below 30	9 (4.8)	34 (18.1)	62 (33.0)	105 (55.9)	18 (9.6)	45 (23.9)	20 (10.6)	83 (44.1)	188 (100.0)
30-40	1 (0.4)	53 (21.4)	86 (34.7)	140 (56.5)	9 (3.6)	63 (25.4)	36 (14.5)	108 (43.5)	248 (100.0)
Above 40	0 (0.0)	5 (20.8)	5 (20.8)	10 (41.6)	3 (12.5)	6 (25.0)	5 (20.8)	14 (58.4)	24 (100.0)
Total	10 (2.1)	92 (20.0)	153 (33.3)	255 (55.4)	30 (6.5)	114 (24.8)	61 (13.3)	205 (44.6)	460 (100.0)

Note: Figures in the parenthesis are percentage of corresponding totals.

Again, when the respective attitudinal category of respondents was classified according to age group, it became apparent that in the HPWL category, employees of relatively lower age groups frequently changed jobs (59% of 'below 30' and 61% of '30-40' age groups of respondents changed '3 or more companies'). On the other hand, among the HPSL category of employees, only 24% of 'below 30' and 33% and of '30-40' age groups made '3 or more changes of jobs'. Respondents who made '3 or more changes of jobs' among the 'above 40' group were equally distributed between HPWL and HPSL categories (see Table 3). It was also revealed that 91% of 'below 30', 99% of '30-40', and 100% of 'above 40' age groups in the HPWL category of respondents changed at least one company. The corresponding figures for the HPSL category of respondents were 78%, 92% and 79% of the 'below 30', '30-40' and 'above 40' age groups respectively. Thus, it appeared that HPWL category of employees irrespective of their age group generally changed jobs more frequently than those in the HPSL category. Hence, the role of an employee's attitude on their turnover decision appeared to be very much pertinent.

Employee Turnover Model

Dependent Variable (Y)

An employee's propensity to change companies was the dependent variable of the model. An employee's propensity to change companies is defined as follows:

$$\text{Employee's propensity to change company} = \frac{\text{Employee's IT experience (in years)}}{\text{Employee's number of company changes}}$$

This ratio is the average time that an employee remained in one job. In other words, this ratio is an employee's average propensity to change a company. A higher value of the above ratio indicates lower propensity to change and vice versa. The respondents were classified into two groups: a high-propensity group and a low-propensity group. The median value of the employee's propensity was taken as a cut-off value. Employees having a median value of propensity to change or less than median value were assigned 1 (high-propensity group). Values above the median value were assigned 0 (low-propensity group). Therefore, the dependent variable was a dichotomous one by putting 0 for those employees who had a low-propensity to change companies and 1 for those who had a high-propensity to change companies.

The dependent variable (Y) became a dichotomous variable: $Y = \ln\left(\frac{\hat{p}}{1-\hat{p}}\right)$

A linear logistic regression model was fit in the following form:

$$\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 - \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Here, \hat{p} = Probability (Y = 1) implied the probability of an employee to quit the company, and $(1 - \hat{p})$ = Probability (Y = 0) implied the probability of an employee to stay in the company.

Explanatory Variables (X_i)

X₁ = Higher Salary (HS); X₂ = Higher Portfolio (HP); X₃ = Higher company-brand-name (HCBN); X₄ = Others (OTH); X₅ = Breach of Commitment (BoC); X₆ = Age (AG); X₇ = Educational Qualification (Edu_Q); X₈ = Attitude

Respondents were asked to reveal the reasons for their leaving their last company by assigning ranks (1 for the highest rank and 6 for the lowest) for the 6 possible job change factors: 'higher salary', 'higher portfolio', 'company's brand name', 'scope of foreign assignment', 'breach of commitment', and 'others'. The overall rank of 'scope of foreign assignment' appeared as insignificant and therefore this plausible factor was not included in the models. Here, the numerical value of each of the X₁ to X₅ explanatory variables varied from 1 to 6. The value of the variable X₆ was a continuous variable and X₇ and X₈ were binary variables.

Output of the Logistic Regression

Table 4: Classification Table^{a,b}

Observed		Predicted		
		Bi_prop change		Percentage Correct
		0	1	
Step 0	Bi_prop change 0	194	0	100.0
	Bi_prop change 1	181	0	.0
Overall Percentage				51.7

a. Constant is included in the model. b. The cut value is .500

Table 5: Variables in the Equation

	B	S.E.	Wald	Df	Sig.	Exp(B)
Step 0 Constant	-.069	.103	.450	1	.502	.933

Table 6: Omnibus Tests of Model Coefficients

	Chi-square	Df	Sig.
Step	407.779	8	.000
Step 1 Block	407.779	8	.000
Model	407.779	8	.000

Table 7: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	111.630 ^a	.663	.884

Note: Estimation terminated at iteration number 9 because parameter estimates changed by less than .001

Table 8: Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	1.505	8	.993

Table 9: Classification Table^a

Observed		Predicted		
		Bi_prop change		Percentage Correct
		0	1	
Step 1	Bi_prop change 0	179	15	92.3
	Bi_prop change 1	12	169	93.4
Overall Percentage				92.8

a. The cut value is .500

Table 10: Variables in the Equation

	B	S.E.	Wald	Df	Sig.	Exp(B)
HCBN	1.316	.337	15.211	1	.000	3.729
BoC	1.201	.316	14.474	1	.000	3.324
OTH	.829	.268	9.605	1	.002	2.292
Age	-1.906	.286	44.551	1	.000	.149
Step 1 ^a Attitude	-2.018	.701	8.291	1	.004	.133
Edu_Q	3.831	.776	24.362	1	.000	46.130
HS	-2.005	.701	8.188	1	.004	.135
HP	.454	.264	2.959	1	.085	1.575
Constant	38.953	6.735	33.446	1	.000	8.257E16

a. Variable(s) entered on step 1: HCBN, BoC, OTH, Age, Attitude, Edu_Q, HS, HP.

Model Discussion

The output of the logistic regression was derived by using the IBM SPSS Statistics version 20 software package. Out of 420 respondents, after the exclusion of the outliers, the number of samples became 375. The aim was to predict an employee's intention to change organizations for 375 IT respondents using 'higher salary' (HS), 'higher portfolio' (HP), 'higher company's brand name' (HCBN), 'breach of commitment' (BoC), 'others' (OTH), employee's 'attitude' (Attitude), 'age' (Age) and the educational qualification (Ed_Q) of the respondents as predictors. A test of the full model against a constant-only model appeared to be statistically significant, indicating that the predictors as a set reliably distinguished between the 'high-propensity group' and the 'low-propensity group' (chi square = 407.779, $p < .000$ with $df = 8$).

Nagelkerke's R^2 of .884 indicated a strong relationship between prediction and grouping. Prediction success overall was 92.8% (92.3% for the 'low-propensity group' and 93.4% for the 'higher-propensity group'). The Wald criteria demonstrated that all the predictors made significant contributions to the prediction ($p = .000, .000, .002, .000, .004, .000, .004, .085$ for HCBN, BoC, OTH, Age, Attitude, Edu_Q, HS, and HP, respectively). It appeared from the outcome of the model results that the model itself could make a correct prediction 51.7% of the time without any predictor variable. By adding the predictors in the model, the study was able to predict 92.8% with accuracy. The Hosmer and Lemeshow (H-L) goodness of fit test had a significance of 0.992 which meant that it was not statistically significant and therefore, the model was quite a good fit. However, it was observed that some of the coefficients [higher portfolio (HP), higher company-brand-name (HCBN), other (TH)] were opposite of those that would be expected. What is perplexing is that, except HP, all were significantly positive. One possible explanation for these results is that if the existing company failed to fulfill their expected portfolio and company's brand name, and if there were scopes of fulfilling their desired expectation to other companies, then an employee's probability to leave the present company would be much higher. It appeared from Exp (B) of the study's predictors that one unit higher offered in terms 'higher portfolio' (HP) or 'higher company's brand name' (HCBN) or 'other' (OTH) would enhance the probability of an employee changing companies by two or three times.

Concluding Remarks

The attraction of a 'higher salary' was the top ranked reason for an employee to leave a company for almost all the IT employees, regardless of gender and age. This reason was followed by 'higher portfolio', and 'higher company-brand-name'. All of these were in the array of pull factors. But, between 'higher portfolio' and 'higher company-brand-name', the female employees gave more priority to 'higher portfolio'. IT employees' attitudes towards life and work which is genetically inherited and determined by the influence of childhood socio-cultural and economic environments was an important parameter for judging the employee turnover phenomenon. Young employees were found to frequently change jobs which may be due to their desire to reach the top of the professional-ladder within a short period of time.

It appeared that lucrative offers from other competitive companies enhanced an employee's propensity to change from their existing company. Therefore, it is imperative to examine the magnitudes of attraction of different pull factors at which an employee finally quit his or her organization. This exercise was not done in the present study and is a limitation of the study. However, this issue could be considered as one for future studies.

Employee turnover models were actually meant for finding ways and means on how to retain skilled and high valued employees. The results in this study also have some policy implications for managers and administrators towards retaining talented employees. It was revealed that employees were very much concerned with their career development. Therefore, the organization should offer them a career path and career development plan. By doing so, an organization will show its commitment to developing its talent which benefits both the organization and the employee. Organizations should try to make employees realize that they are trying to enhance and support their employees' skills and experience. Again, the compensation structure for employees should be designed by giving salary and perquisites by means of a weighted composite function of qualification, talent, skill, performance and experience, as well as offering a slightly higher salary than the existing industry rates to highly valued employees. In reality, when it is followed, it will go much deeper into the human consciousness and the actions and attitudes that make employees feel successful, secure and appreciated. That in turn will help address the four key elements of a sound retention strategy: performance, communication, loyalty, and competitive advantage.

Above all, for a positive outcome with any retention strategy, it is necessary to mentor relationships with colleagues in order to increase emotional ties to the organization. Such familial relationships among the employees of the organization where each employee feels proud to be associated with the organization and his or her colleagues creates commitment to the organization.

References

- Adams, C., Clark, L. M., Goldman, M., Jester, R., Lee, M., Noseworthy, D., Soejarto, A., Cantara, M., & Thompson, E. (2006). *Skills shortages are emerging in the CSI service market*. Stamford, CT: Gartner Inc.
- Ang, S., & Slaughter, S. A. (2000). The missing context of information technology personnel: A review and future directions for research. In R.W. Zmud (Ed.), *Framing the domains of IT management: Projecting the future through the past* (pp. 305-327). Cincinnati, OH: Pinnaflex,
- Ang, S., & Slaughter, S. A. (2004). Turnover of IT professionals: The effects of internal labor market strategies. *The DATA BASE for Advances in Information Systems*, 35(3), 11-27.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4), 496-515.
- Bartol, K., & Martin, D. (1982). A review of the literature and managerial implications. *MIS Quarterly*, 6, 49-70.
- Becker, G. (1975). *Human capital* (2nd ed.). Chicago: University of Chicago Press.
- Bostrom, R. P. (1981). *Role conflict and ambiguity: Critical variables in the user designer relationship*. Paper presented at proceedings of the Seventeenth Annual Computer Personnel Research Conference, New York, NY.
- Burke, R. J., & Greenglass, E. (1995). A longitudinal study of psychological burnout in teachers. *Human Relations*, 48(2), 187-202.
- Cappelli, P., & Sherer, P. D. (1991). The missing role of context in OB: The need for a meso-level approach. In B. Staw & L. Cummings (Eds.), *Research in organizational behavior* (pp. 55-110). Greenwich, CT: JAI Press.
- Ferratt, T. W., Agarwal, R., Brown, C., & Moore, J. E. (2005). IT human resource management configurations and IT turnover: Theoretical synthesis and empirical analysis. *Information Systems Research*, 16(3), 237-255.
- Goldstein, D. K., & Rockart, J. F. (1984). An examination of work-related correlates of job satisfaction in programmer/analysts. *MIS Quarterly*, 8, 103-115.
- Grant, R. M. (1996). Towards a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109-122.
- Griffeth, R., Hom, P., & Gaertner (2000). A meta analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management*, 26(3), 463- 488.
- Hom, P., & Griffeth, R. (1991). A structural equations modeling test of a turnover theory: Cross-sectional and longitudinal analysis. *Journal of Applied Psychology*, 76, 350-366.
- Hom, P., & Griffeth, R. (1995). *Employee turnover*. Cincinnati, OH: Southwestern.
- Ivancevich, J. M., Napier, A. H., & Wetherbe, J. C. (1983). Occupational stress, attitudes, and health problems in the information systems professional. *Communications of the ACM*, 26(10), 800-806.
- Jackson, S. E., Schwab, R. L., & Schuler, R. S. (1986). Toward an understanding of the burnout phenomenon. *Journal of Applied Psychology*, 71, 30-640.

- Jackson, S. E., Turner, J. A., & Brief, A. P. (1987). Correlates of burnout among public service lawyers. *Journal of Occupational Behavior*, 8, 339-349.
- Kraut, A. I. (1975). Predicting turnover of employees from measured job attitudes. *Organizational Behaviour and Human Performance*, 13, 233-243.
- Lawler, E. (1996). *From the ground up: Six principles for building the new logic corporation*. San Francisco, CA: Jossey-Bass.
- Leiter, M. P. (1991). Coping patterns as predictors of burnout: The function of control and escapist coping. *Journal of Occupational Behaviour*, 1(2), 123-144.
- Levine, D. (1995). *Reinventing the workplace: How business and employers can both win*. Washington, DC.: Brooking Institution.
- Li, E. Y., & Shani, A. B. (1991). Stress dynamics of information systems managers: A contingency model. *Journal of Management Information Systems*, 7(4), 107-130.
- Marta, M. E. (2001). Location matters: A cross-level analysis of the effects of organizational sex composition on turnover. *Academy of Management Journal*, 44(3), 591-605.
- Maslach, C., & Jackson, S. E. (1984). *Burnout in organizational settings, in applied social psychology annual: Applications in organizational settings* (5th ed.). Beverly Hills, CA: Sage Publications.
- Mobley, W., & Adam, H. (1978). An evaluation of the precursors of hospital employee turnover. *Journal of Applied Psychology*, 63(4), 237- 240.
- Mobley, W. H., Griffeth, R. W., Hand, H. H., & Meglino, B. M. (1979). Review and conceptual analysis of the employee turnover process. *Psychological Bulletin*, 86, 493-522.
- O'Reilly, C. A., & Pfeffer, J. (2000). *Hidden value: How great companies achieve extraordinary results with ordinary people*. Boston: Harvard Business School Press.
- Pfeffer, J. (1994). *Competitive advantage through people*. Boston: Harvard Business School Press.
- Pines, A., Aronson, E., & Kafry, D. (1981). *Burnout: From tedium to personal growth*. New York: The Free Press.
- Schaufeli, W. B., Leiter, M. P., & Kalimo, R. (1995). The general burnout inventory: A self-report questionnaire to assess burnout at the workplace. Paper presented at Work, Stress and Health '95: Creating Healthier Workplaces, Washington, D.C.
- Sethi, V., Barrier, T., & King, R. C. (1999). An examination of the correlates of burnout in information systems professionals. *Information Resources Management Journal*, 12(3), 5-13.
- Stevens, J. M., Beyer, J. M., & Trice, H. M. (1978). Assessing personal, role and organizational predictors of managerial commitment. *Academy of Management Journal*, 21, 380-396.
- Thomas, K. M., & Williams, K. L. (1995). The role of burnout on organizational Attachment and career mobility. Paper presented at Work, Stress and Health '95: Creating Healthier Workplaces, Washington, D.C.
- Tolbert, P. S., Simons T., Andrews, A., & Rhee, J. (1995). The effects of gender composition in academic departments on faculty turnover. *Industrial and Labor Relations Review*, 48, 562-579.

- Tsui, A. S., Egan, T. D., & O'Reilly, C. A. (1992). Being different: Relational demography and organizational Attachment. *Administrative Science Quarterly*, 37, 549-579.
- Weiss, M. (1983). Effects of work stress and social support on information systems managers. *MIS Quarterly*, 7, 29-43.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171- 180.
- Wolpin, J., Burke R. J., & Greenglass, E. R. (1991). Is job satisfaction an antecedent or a consequence of psychological burnout? *Human Relations*, 44, 193-209.

Resources and Business Failure in SMEs: Does Size Matter?

Densil A. Williams
UWI, Mona

Almost all analyses that use small and medium-sized enterprises (SMEs) as their unit of analysis treat this group of firms as a homogenous group. However, the literature indicates that the small business sector is more heterogeneous than originally thought. To test this assumption, this study investigates business failure among SMEs controlling for size of the firm. Using data from over 60,000 SMEs in the UK, the study utilizes logistic regression to model business failure with a number of surrogate measures for resources. The analysis is compartmentalized into small and medium-sized firms. The results reveal that the resources that impact business failure do in fact vary based on firm size. The implications of the findings are addressed in the paper.

It is generally argued that firms fail because they lack resources (Ahmad & Seet, 2009; Campbell et al., 2012). However, it is not always clear whether or not these resource deficits are confined to firms of a particular size. The extant literature asserts that larger firms will have more resources, and, as such, should be able to survive while smaller firms with their limited resource stock should fail (Watson, 2007). However, empirical evidence suggests that failure is not confined to small firms but firms of all sizes. It is this observation that has motivated the work presented in this paper. The paper will try to understand whether or not the predictors of business failure, which are generally seen as surrogate for firm resources (Watson, 2007), vary based on the size of the firm. This analysis will be useful in guiding public policymakers to the best way to support firms of different sizes in order to prevent or alleviate failure rates among these enterprises. Similarly, managers in small and medium-sized firms can use the results from this analysis to help them determine the types of resources they should cultivate in the firm in order to minimize the risk of failure.

Resources and Business Failure

The organization ecology (OE) scholars who study business failure, generally argue that firms fail not because of factors external to them, but results directly from poor internal management decisions having to deal with shocks presented in the

external environment (Hannan & Freeman, 1988; Hannan, 1997). In essence, what this school of thought suggests is that failure is an internally driven activity. Contrary to this belief, industrial organizations (IO) scholars believe that firms fail because the environment in which they operate becomes too turbulent and therefore exert pressure on the firm which leads to its failure (Scott, 1992; Zou & Stan, 1998). For example, taking the Schumpeterian thesis of creative destruction as its starting point, industrial organization scholars argue that shifts in the environment caused by things such as technological change, economic or geographic shifts, regulatory changes, etc., are factors which the managers of a firm have no control over and these put pressure on the firm's strategy, which will lead to it failing. Thus, both schools of thought are at odds in explaining business failure among firms. The IO school blames external factors while the OE school blames internal factors vis-à-vis, management decision making. To reconcile both, this work will look at the resource-based view as the theoretical lens through which to analyze business failure.

The resource-based view of the firm argues that once a firm possesses resources that are scarce, difficult to copy, and measurable, this will lead to a competitive advantage that will ensure the survival of the firm (Amit & Schoemaker, 1993; Barney, 1991). From a reading of this literature, it appears that most scholars writing on the resource-based view of the firm generally infer that resources are only internal to the firm; thus, conflate the resource-based view and the organizational ecology view in explaining firm failure. Resources however, are not only tied to the internal operations of a firm. Resources can be external as well as internal to the firm. In fact, Amit and Schoemaker, (1993) defined resources as a set of factors that are owned or controlled by the firm. Indeed, controlled means that the resources do not have to be directly inside the organization but may be within the wider industry sector. As such, once resources are not conceptualized as only internal to the firm, the resource-based view of the firm will reconcile both the industrial organization view and the organization ecology view of business failure. Therefore, using the resource-based view lens; a number of factors that are generally referred to as surrogates for resources can be analyzed in order to determine their impacts on business failure.

Size

Firm size has been a long standing variable that is used to proxy firm resources (e.g., Bloodgood, Sapienza, & Almeida, 1996; Williams, 2009, 2011). The general argument is that the larger the firm, the more resources it will have, hence, the greater the likelihood of it surviving (Watson, 2007). This logic seems to suggest that with more employees, the firm tends to have a larger stock of resources and, as such, can generate economies of scale and reduce the cost of doing business, thus ensuring its long-term survival (Mittelstaedt, Harben, & Ward, 2003). An even more compelling argument for the importance of size in the survival/failure discourse is that size provides a buffer for the firm to absorb the fixed cost of doing business. Firms of larger size and presumably more resources are better able to absorb certain fixed costs of operations. Small firms do not have this latitude because absorbing large fixed costs can lead to a firm having to exit an industry (Hall & Tu, 2004). As such, overcoming the liability of smallness is important in the future survival of the firm.

In the extensive literature, a number of studies noted a positive relationship between size and firm performance as measured by growth, profitability, survival, or internationalization. For example, Watson (2007) and Calof (1994) noted that large firms are more likely to survive than small ones. This positive relationship between size and performance of the firm seems overwhelming. The general consensus strongly suggests a positive relationship between firm size and firm performance. Indeed, viewing failure through the resource-based view lens, it is expected that larger firms will have a higher stock of resources. Among other things, these resources can be used as a buffer to absorb fixed costs, which generally helps to drive failure and helps the firm to overcome turbulent times in the market.

Governance

The organizational structure of the firm is a critical proxy for the access to resources, which can impact the performance of that firm. For example, whether or not the firm is publicly or privately owned can impact the amount of resources it has at its disposal.

Firms that are publicly owned and listed on stock markets are more likely to have access to cheaper sources of finance than firms that are privately owned and depend solely on the small networks of the owner and family members (Brush, 2002; Watson, 2007). Based on this observation, it is logical to expect that firms that are publicly owned and listed, will have a larger stock of resources than those that are privately owned. Following this logic and using the resource-based view lens to analyze business failure, it is expected that publicly-listed firms are more likely to survive than private firms given that the former will likely have more avenues to gather additional resources than the latter.

Firm Age

Age is seen as a good proxy for the stock of resources that a firm possesses (Williams, 2009). Researchers have used the age of the firm as a proxy for experience (Autio, Sapienza, & Almeida, 2000). In fact, from a resource-based perspective of the firm, older firms will have considerably more resources than younger firms. This logic is based on the assumption that firms acquire resources over time (Autio, 2005). Because older firms will have a larger stock of resources than younger firms, the resource-based view explains that these firms will stand a better chance of survival than those with a lower stock of resources. This is because the higher stock of resources will provide a stronger buffer for the firms to absorb shocks and unanticipated costs, which can generally lead to business failure. This line of reasoning converges with the expectations of some researchers that older firms are less likely to fail than younger firms. Watson (2007) even found evidence among established firms that the older firms had a greater chance of survival than the younger ones.

Industry Sector

The sector in which the firm operates may impact its ability to amass resources. Indeed, researchers who are trying to understand firm performance as measured by success or failure have argued that the industry sectors impact on performance success

(Campbell et al., 2012; Watson, 2007). The argument is that access to resources may differ across industry sectors, and, as such, the performance of the firm may differ across sectors as well (Barney, 1991; Watson, 2007). The level of competition in the industry, the number of firms, and the structure of the industry are all factors that will determine whether or not a firm exits or remains in the sector (Porter, 2008). This observation about industry sectors makes the analysis of sectors important in the performance of business failure. Sectors that are predisposed to a greater stock of resources (maybe due to the make-up of the industries that reside there), will more than likely be better able to support its firms, and, as such, more firms in these sectors will be able to survive compared to those sectors that are informal and resources are hard to come by.

Financial Resources

Financial resources are generally seen as the most important resource that the firm possesses because they are easily observable and most persons can identify with them (Barney, 1991). These resources, while not the most important for a company to succeed, are an essential part of the resource pool that a company can possess in order to improve its competitive advantage and increase its chances of success. In this study, a number of these measures were used to capture the resource stock of the firms. These include net income, revenue, and return on assets.

Researchers have argued that higher capitalization normally suggests a greater belief in the viability of the business (Caves, 1998). Further, others have suggested that lower capitalization implies that the owner might want to learn from the business instead of wanting to grow the business, thus, embracing the idea that thinly capitalized business is a greater candidate for closure (Bates, 2005). However, this view is challenged by Gimeno et al. (1997). They argued that organizational survival is not exclusively a function of economic profitability but also depends on the firms' 'threshold for performance'. Indeed, it is suggested that internal characteristics such as firm size as well as other human capital attributes, like the owner's interests, are variables which help to define this threshold. It means then that the threshold performance varies across the different types of firms (Gimeno et al., 1997). They argued that the dynamism in the relationship with firm performance is not only dependent on the interest of the owner but also on the influence of outside stakeholders such as shareholders, employees, customers, community members, and the government (Gimeno et al., 1997). The strength of the influence of the external stakeholders tends to vary based on the size of the firm, with the owners of smaller firms having more control over decision-making, bearing in mind that their financial and non-financial resources normally outweigh those of other stakeholders.

Location

Agglomeration theory is a tool that can be used to better understand the impact of location on the performance of the firm. It hypothesizes that a relationship exists between the geographical location of firms and their competitive positions (Folta, Cooper, & Baik, 2006). It is argued that the performance of geographically clustered firms improve with cluster size (ibid). The theory argues that the 'economies of

agglomeration' enhance the firm's ability to innovate through patenting, attracting alliances, partners, and private equity partners. This suggests that these geographical links, such as those which exist in places like Silicon Valley, benefit small firms by improving the access to and use of information whether it relates to process, company strategy, and knowledge, as well as the ability to attract additional financial resources (Folta et al., 2006, p. 222). McCann and Folta (2011) further argued that firms do not benefit equally from clustering or networks. Before entering the network, it is important to consider the knowledge stocks of the firms as a key determinant of possible clustering.

Location is also a source of human capital resources for the firm. Areas that are more densely populated (e.g., urban areas) generally have more human resources than those that are less populated. For small firms, the recruitment of skilled workers and access to capital are important resources that can determine their survival or failure. If a location possesses these resources in abundance, it may be easier for the firms there to access them. In a recent study analyzing the longevity of small firms in Jamaica, the results showed that firms, which were located in rural areas had a higher chance of survival than those in urban centers (Williams & Jones, 2010). Despite having larger amounts of resources - especially human capital resources, firms in urban centers face a greater level of competition for markets, and so, those firms that do not start with a high stock of resources will eventually exit the market place. Indeed, this increased chance of survival in a rural area appears to stem from the lower levels of competition for market-share which these small firms face despite their small stock of resources. In essence, the location in a rural area provides a competitive advantage for these small firms. The remoteness of some rural locations in Jamaica makes it difficult for a large number of SMEs to operate in those geographic areas, so those that have a first mover advantage are more likely to face less competition for market-share. This lessening of competition thus provides a sort of monopoly status to these SMEs in the rural locations and therefore, increases their chance of survival.

Critically, while it is expected that urban centers will have a greater stock of resources which small firms can access, the cost of accessing these resources may inhibit resource-poor SMEs from actually taking advantage of these resources. With the inability to gain access to these resources, it may result in these firms being unable to compete in a highly competitive market environment. Urban centers that are densely populated with excess demand for labor may not be ideal locations for SMEs because of the high premium they will have to pay to attract human capital resources. Indeed, the locational advantage derived from being rural appears to be context-specific. As such, one can conclude using the lens of agglomeration theory that the impact of the location on the performance of the firm is still uncertain. Merely being located in a geographical area does not automatically lead to strong performance but it is the quality of the resources and levels of competition among the firms in the area that matter.

Method

This section describes the method that is used to achieve the aims of the paper.

The Analytical Framework

To motivate this study, a model which captured the relationship between the dichotomous dependent variable and the independent variables had to be derived. To this end, a model from the qualitative genre was used given the dichotomous nature of the dependent variable. The logit model was used because it had the possibility of producing outcomes that were not dependent on the normality assumptions of the population from which the data was drawn (Gujarati, 2003). In its theoretical form, this model is depicted as follows:

$$\text{Logit}(Y) = \ln(P/1-P) \quad (1)$$

However, the operational model becomes:

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \epsilon_j \quad (2)$$

Where:

\hat{Y} represents the unbiased estimator of the dependent variable, business failure, which is dichotomous and measured by whether or not the firm is active in the industry; that is, it keeps open or if it's inactive, meaning it closes its doors.

X_1 represents size

X_2 represents governance structure

X_3 represents age

X_4 represents industry sector

X_5 represents net income

X_6 represents revenue

X_7 represents return on asset

X_8 represents location

ϵ_j represents the error term

The model in Equation 2 above was estimated to provide insights into which factors are most important in predicting the likelihood of failure among small firms.

Research Data and Operational Measures for Variables

The data for this study were collected from the Financial Analysis Made Easy (FAME) database, a database with a significant amount of financial and company information on UK firms. The search for firms was narrowed down to those that were active or inactive in all industry sectors in the economy of the United Kingdom (UK) over the period from 1999-2008. This period was chosen because it represented a halcyon period in the contemporary UK economy in terms of economic growth and stability since the early 1990s. The average gross domestic product (GDP) growth over this period was 2.74%; the average inflation rate was 1.75% and interest rate at 4.79%. Also, the exchange rate variation was -0.82. The relative robustness of the economy, it is assumed, would be more amenable to business survival than failure.

Since this study focused on SMEs, a maximum upper bound on the number of employees in the firm was placed at 250. This upper bound of 250 employees

represented the definition for SMEs in the UK (Storey, 1994). As such, the search led to over 63,103 firms that were deemed appropriate for the analysis. The number of inactive firms accounted for 32.8 % of the sample while the number of active firms accounted for 67.2%. Similarly, 8 variables that had full information and were used in previous studies as surrogate for resources were collected from the database for analysis. These variables along with their operational measures are listed in the table below.

Table 1: Variable Measurements

Variable	Measurement	Variable Code	Previous Research
Dependent variable (Output) Business Failure	Dichotomous variable with the following labels Inactive = 1 Active = 0	CS	Mellahi and Wilkinson (2004)
Independent Variables			
Firm Size	Latest number of employees	Size	Tang and Murphy (2012) Williams (2011)
Firm Age	Number of years since incorporation	Age	Semrau and Werner (2012) Autio et al. (2000)
Location	1 = Urban centres, 0 = Rural areas	LC	Williams and Jones (2010)
Governance Structure	1 = Private limited liability 2 = Public listed company	GS	
Industry Sector	Ordinal 1 = Services 2 = Wholesale and retail 3 = Food 4 = Manufacturing	IDS	Williams and Jones (2010)
Net Income	Revenue minus cost	NETI	Bates (2005)
Revenue	Sales figures	Rev	Bates (2005)
Return on Asset	Total Asset divided by Profit	ROA	Bates (2005)

Results

This study aimed to understand whether or not size mattered in relation to the impact of resources on business failure. To do this, it modelled the resources, which impacted business failure among different size categories of the firm. The results below reflect the findings from this analysis.

Table 2: Results from All Firms

Logistic Regression- All Firms (N=63103)				
<i>Independent variables</i>	β	<i>Wald</i>	<i>Sig.</i>	Exp(β)
Constant	-.237	24.335	.000	.789
Size	.009	1011.847	.000*	1.009
Governance Structure	1.754	3127.543	.000*	5.777
Firm Age	-.196	3073.00	.000*	.822
IDS	.033	17.603	.000*	1.034
ROA	.000	24.004	.000*	1.000
Rev	.000	67.481	.000*	1.000
NETI	.000	78.699	.000*	1.000
Location	-.210	86.938	.000*	.811
-2LL (Initial Model)	63683.435			
-2LL (Final Model)	54260.290			
χ^2 (df) (Final Model)	9423.145 (8)			
χ^2 (df) Hosmer-Lemeshow test	240.136 (8)**			
Nagelkerke R ²	.24			
R ² _L	.15			
% Correct Prediction	74.6			

Dependent variable is business failure, that is, whether or not the firm is active.

** Variables are significant at the 0.05 level of significance*

*** Statistic is significant at the 0.05 level of significance*

R²_L = 1- (Final model -2LL/ Initial model -2LL).

When the model was analyzed using all 63,103 firms in the data set without controlling for size, the results reflected that all 8 variables which were proxies for resources had a significant impact on failure in small and medium-sized firms. For example, the results suggested that as firms get older, the likelihood of failure is reduced. This is in keeping with the mentality of the resource-based view of the firm which argued that older firms have more resources than younger firms, and, as such, the likelihood of failure is lower among the former. Further, a look at the model diagnostic statistics also suggested that the results were indeed robust. The model had a predictive accuracy of 74.6%, a high predictive accuracy in this line of research (Watson, 2007). Also, the model had a lower -2log likelihood value when the initial model without the variables was compared with the final model with all variables. This suggested that the model fitted was a better predictor of failure than the previous model. Similarly, the model chi-square value was also significant, which suggested that the fitted model was a better predictor than the model fitted only with the constant. In an ideal world, the Hosmer-Lemeshow test would be expected to be insignificant, which suggested that

the chosen model fit the data well. In this case, the test showed a significant statistic. This meant that the model and the data did not fit well. This is not of major concern since all the other diagnostics show a good fitted model.

Medium Sized Firms

The table below shows the results when the data were restricted based on the size of the firm. In this case, firms with employees ranging from 51-250 were classified as medium firms. These results show that the pattern of significant variables does change. Not all variables that were found to be significant in the full model are found to be significant here.

Table 3: Results from Medium-sized Firms

Logistic Regression- Medium- Sized Firms (N=21377)				
<i>Independent variables</i>	β	<i>Wald</i>	<i>Sig.</i>	$\text{Exp}(\beta)$
Constant	2.558	335.491	.000	12.912
Size	-.001	6.04	.014*	.999
Governance Structure	.353	19.361	.000*	1.424
Firm Age	-.151	277.716	.000*	.860
IDS	.003	.029	.864	1.003
ROA	.006	79.403	.000*	1.006
Rev	.000	3.303	.069	1.000
NETI	.000	22.13	.000*	1.000
Location	-.820	220.615	.000*	.440
-2LL (Initial Model)	9856.072			
-2LL (Final Model)	9106.685			
χ^2 (df) (Final Model)	749.387 (8)			
χ^2 (df) Hosmer-Lemeshow test	43.114 (8)**			
Nagelkerke R ²	.11			
R _L ²	.08			
% Correct Prediction	68.3			

Dependent variable is business failure, that is, whether or not the firm is active.

** Variables are significant at the 0.05 level of significance*

***Statistic is significant at the 0.05 level of significance*

R_L² = 1 - (Final model -2LL/Initial model -2LL).

Indeed, when compared to the model with all firms present, the model with medium-sized firms only showed that industry sector and revenue were not significant predictors of business failure. The interpretation here is that for medium-sized firms, failure can happen despite their revenue stock and also the industry sector in which they operate.

Small Firms

Small firms were operationalized as those firms with 50 or less employees. The table below shows the results from the model that was analyzed to determine whether or not the resources that were found to be predictors of business failure in medium-sized firms remain consistent across small firms.

Table 4: Results from Small Firms

Logistic Regression- Small Firms (N=41726)				
<i>Independent variables</i>	β	<i>Wald</i>	<i>Sig.</i>	Exp(β)
Constant	-.576	121.815	.000*	.562
Size	.034	860.397	.000*	1.034
Governance Structure	1.972	3303.867	.000*	7.184
Firm Age	-.216	2998.424	.000*	.806
IDS	.004	.179	.672	1.004
RoA	.001	35.784	.000*	1.001
Rev	.000	58.701	.000*	1.000
NETI	.000	30.549	.000*	1.000
Location	-.096	14.762	.000*	.908
-2LL (Initial Model)	52988.990			
-2LL (Final Model)	43662.030			
χ^2 (df) (Final Model)	9326.960 (8)			
χ^2 (df) Hosmer-Lemeshow test	193.865 (8)**			
Nagelkerke R ²	.279			
R ² _L	.18			
% Correct Prediction	74.6			

Dependent variable is business failure, that is, whether or not the firm is active.

**Variables are significant at the 0.05 level of significance*

***Statistic is significant at the 0.05 level of significance*

R²_L = 1 - (Final model -2LL/ Initial model -2LL).

The results from the model suggested that similar to medium-sized firms, industry sector was not a significant predictor of failure among small firms. However, unlike medium-sized firms, the revenue stock of the small firm was found to be a significant factor in the prediction of failure among small firms. These results were interesting and, in general, suggested that resources as a predictor of failure were contingent on the size of the firm in most respects. The discussion below will shed further light on these findings.

Overall, a look at the model diagnostics for all the models that were analyzed suggested that the results were robust. In all cases, both the model R^2 and the Nagelkerke R^2 were in line with results from previous works. Similar to a linear regression, both sets of R^2 provided a gauge of the significance of the model. The values varied between 0 which meant the model was useless in predicting outcomes to 1 which meant it predicted the outcome perfectly. Further, the Hosmer-Lemeshow test looked at the observed model with the predicted model. A result that was not significant (i.e., $p > 0.05$) suggested that the model predicted real world data fairly well.

The wald statistics, which is similar to the t statistic in linear regression, helped to determine the significance of the variable under investigation. A simple rule of thumb was that when the wald was greater than 2, the variable had a significant impact on the model. This rule was followed in reporting on variables that impacted business failure/success.

In addition, the expected beta value, which reflected the percentage change in the odds score (i.e., if the beta value of the independent variable, which measured the size of the impact of the variable on the outcomes changed by 1, the expected beta value revealed the odds with which the case could be predicted), showed that the results were indeed robust. Similarly, the model chi-square showed that the results were indeed robust, as in all cases the final model chi-square was significant.

Also, the log likelihood score (-2LL), which showed how much unexplained information was in the model after it had been fitted suggested that the models were all valid as the -2LL for the initial model was less than the -2LL for the final model, which included all the variables.

Discussion of Results

The research embodied in this paper was geared towards a better understanding of the factors that impacted business failure among SMEs, using the resource-based view lens as the theoretical underpinning for the analysis of variables and data. Importantly, there was a common assumption in the literature that the same stock of resources would have an equal impact on a firm irrespective of the size of the firm. Most of the works that looked at impact of resources on firm performance had not controlled for firm size as an important variable (Campbell et al., 2012; Watson, 2007). An important contribution that this research has made to the literature was to model the same resources that impact business failure across different sizes of firms, that is, small and medium enterprises, in order to determine whether or not the statistical significance of the resources remained the same. The results from the analysis suggested some interesting findings.

When the data was modeled on all firms pooled together, that is, both small and medium-sized firms, the results suggested that all eight (8) proxies that were used as surrogates for resources were found to be significant in predicting business failure among small firms. Similar to previous works (e.g., Ahmad & Seet, 2009; Campbell et al., 2012; Watson, 2007) the results were in concert with the postulates of the resource-based view theory of the firm. In essence, it took the very general view that firms which had a larger stock of resources would no doubt have a stronger proclivity to survive.

Conversely, the greater the stock of resources, the lower the likelihood of failure among small firms. However, this general view hid the fact that the impact of different types of resources may vary based on the size of the business. One type of resource may have a different impact on failure in smaller firms versus medium-sized firm. This is an observation that the general literature missed. This study advanced this argument by testing the various resources across two categories of firms – small and medium-sized – to determine whether or not the impact of the resources on failure remains the same across the size category.

For firms categorized as medium-sized, the analysis suggested that not all variables that served as surrogates for resources significantly impacted business failure among this category of firms compared to the results for the pooled sample.

In the case of the medium-sized firms, the variables that were not found to be significant predictors of business failure among this group of firms were industry sector and revenue stock. This is to say, despite the amount of money that the firm had and irrespective of the industry sector in which it operated, it was not immune to failure. This is an important observation. Taking the lens of the resource-based view of the firm uncritically, it suggested that firms with large stocks of resources such as revenue found it more difficult to fail. The results here suggested otherwise. When firms reached a certain level of maturity, it required more than a large stock of resources to ensure survival. The continued existence of these firms was heavily dependent on managerial astuteness and leadership. It was how management created effective strategies to use these resources in the most efficient and optimum way that determined which firm survived and which ones would fail.

Similarly, for firms that were designated as small, the results from the analysis found that industry sector and not revenue stock had an insignificant impact on the likelihood of failure among these firms. Again, this result deviated from the findings in the pooled data, which suggested that industry sector was indeed a significant factor that impacted business failure among SMEs. It can be reasoned that the industry sector was found to be insignificant among small firms because all firms, despite their size, must compete in the industry in which they are located in order to survive. This argument was true for manufacturing as well as the services industry. In other words, all firms had to find coping strategies in order to remain open despite the industry sector in which they operated. However, the fact that revenue was significant in the case of the medium-sized firms and not in the category of small firms, suggested that size did impact the types of resources that were required to ensure business survival among the SMEs. For smaller firms that had not reached a mature stage in their life cycle, cash generated from revenue was critical to help them acquire additional physical and human resources that were needed to grow the business and ensure survival. Therefore, those small firms that had less revenue resources tended to find it more difficult to survive than those with a large stock of revenue resources.

Concluding Thoughts

The aim of the study was to understand whether size mattered in determining which resources were more critical in diagnosing business failure among SMEs. The

results revealed that indeed, SMEs should not be treated as a homogenous group when trying to understand the impact of resources on their survival or failure. Industry sector was found to not significantly impact business failure among firms that were categorized as small. Similarly, for firms categorized as medium-sized; industry sector and revenue stock were not found to have a significant impact on business failure at that level. Policymakers at the firm level and at the country level should recognize this important finding that small firms are not homogenous, and therefore, policies aimed at reversing the mortality rate among these firms need to be properly contextualized. The study also has implications for future research. Future researchers need to use other surrogates of resources to model whether or not the impact of various types of resources on business failure does vary across firm size. Likewise, future researchers can also use different measures of failure such as bankruptcy or other established measures in the extant literature (Mellahi & Wilkinson, 2004) to test whether or not this result holds.

References

- Ahmad, N., & Seet, P. (2009). Dissecting behaviors associated with business failure: A qualitative study of SME owners in Malaysia and Australia. *Asian Social Sciences*, 5(9), 98–104.
- Amit, R., & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14, 33–46.
- Autio, E. (2005). Creative tension: the significance of Ben Oviatt's and Patricia McDougall's article "toward a theory of international new ventures." *Journal of International Business Studies*, 36(1), 9–20.
- Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of age at entry, knowledge intensity, and imitability on international growth. *Academy of Management Journal*, 43(5), 909–924.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Bates, T. (2005). Analysis of young, small firms that have closed: Delineating successful from unsuccessful closures. *Journal of Business Venturing*, 20(3), 343–358.
- Bloodgood, J. M., Sapienza, H. J., & Almeida, J. G. (1996). The internationalization of new high-potential U.S. ventures: Antecedents and outcomes. *Entrepreneurship: Theory and Practice*, 20(4), 61–76.
- Brush, C. G. (2002). Venture capital access in the new economy: Is gender an issue? In D. Hart (Ed.), *The emergence of entrepreneurship policy: Governance, start-ups and growth in the knowledge economy*. London: Cambridge University Press.
- Calof, J. L. (1994). The relationship between firm size and export behavior revisited. *Journal of International Business Studies*, 25(2), 367–387.
- Campbell, N. D., Heriot, K. C., Jauregui, A., & Mitchell, D. T. (2012). Which state policies lead to US firm exits? Analysis with the Economic Freedom Index. *Journal of Small Business Management*, 50(1), 87–104.
- Caves, R. E. (1998). Industrial organization and new findings on the turnover and mobility of firms. *Journal of Economic Literature*, 36(4), 1947–1982.

- Folta, T. B., Cooper, A. C., & Baik, Y. S. (2006). Geographic cluster size and firm performance. *Journal of Business Venturing*, 21(2), 217–242.
- Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, 42(4), 740–783.
- Gujarati, D. N. (2003). *Basic Econometrics* (4th ed.). New York: McGraw Hill.
- Hall, G. C., & Tu, C. (2004). Internationalization and the size, age and profitability in the United Kingdom. In L. Dana (Ed.), *Handbook of research on international entrepreneurship* (pp. 596–613). Cheltenham: Edward Edgar Publishing, Inc.
- Hannan, M. T. (1997). Inertia, density and the structure of organizational populations: Entries in European automobile industries, 1886-1981. *Organization Studies*, 18(2), 193-228.
- Hannan, M. T., & Freeman, J. (1988). The ecology of organizational mortality: American labor unions, 1836-1985. *American Journal of Sociology*, 94, 25-52.
- McCann, B. T., & Folta, T. B. (2011). Performance differentials within geographic clusters. *Journal of Business Venturing*, 26(1), 104–123.
- Mellahi, K., & Wilkinson, A. (2004). Organizational failure: A critique of recent research and a proposed integrative framework. *International Journal of Management Reviews*, 5, 21-41.
- Mittelstaedt, J. D., Harben, G. N., & Ward, W. a. (2003). How small is too small? Firm Size as a barrier to exporting from the United States. *Journal of Small Business Management*, 41(1), 68–84.
- Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, 86(January), 78–93.
- Scott, W. R. (1992). *Organizations: Rational, natural and open systems*. Englewood Cliffs, New Jersey: Prentice Hall.
- Semrau, T., & Werner, A. (2012). The two sides of the story- network investments and new venture creation. *Journal of Small Business Management*, 50 (1), 159-180.
- Storey, D. J. (1994). *Understanding the small business sector*. London: Routledge
- Tang, J., & Murphy, P.J. (2012). Prior knowledge and new product and service introductions by entrepreneurial firms: the mediating role of technological innovation. *Journal of Small Business Management*, 50 (1), 41-62
- Watson, J. (2007). Modeling the relationship between networking and firm performance. *Journal of Business Venturing*, 22(6), 852–874.
- Williams, D. A. (2009). *Understanding exporting in the small and micro enterprise*. New York: Nova Science Publishing.
- Williams, D. A. (2011). Impact of firm size and age on the export behaviour of small, locally-owned firms: Fresh insights. *Journal of International Entrepreneurship*, 9(2), 152–174.
- Williams, D. A., & Jones, O. (2010). Factors associated with longevity of small, family-owned firms. *International Journal of Entrepreneurship*, 14, 37–58.
- Zou, S., & Stan, S. (1998). The determinants of export performance: a review of the empirical literature between 1987 and 1997. *International Marketing Review*, 15(5) 333-356.



Edward Elgar
PUBLISHING

**NEW IN
PAPERBACK**

EXTREME LEADERSHIP

Leaders, Teams and Situations Outside the Norm

Edited by **Cristina M. Giannantonio** and
Amy E. Hurley-Hanson, Chapman University, US

Much has been written about how leaders and teams function in traditional business settings, but there is comparatively scant literature on the behaviors of leaders and teams facing extreme situations: that is, situations that fall outside the scope of daily experience. This book presents cases drawn from a diverse set of non-traditional and extreme leadership scenarios, offering a fresh perspective on both leadership research and management practice.

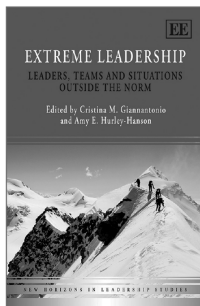
This groundbreaking volume features expert contributions from across the globe by both management scholars and business leaders. Divided into three main parts – Extreme Expedition Leaders, Extreme Work Teams and Extreme Individual Leaders – the book explores both specific instances of non-traditional leadership and their theoretical and practical implications. Examples discussed include polar and mountaineering expeditions such as Shackleton's *Endurance* expedition, survival and rescue efforts such as the Chilean mine cave-in, security and police crises such as the shootings at Sandy Hook Elementary School, and groundbreaking media and entertainment leaders such as Francis Ford Coppola and Glenn Miller.

This unique volume will appeal to students and professors of leadership and management studies, as well as managers, executives and other corporate business leaders.

Contributors: S.E. Anderson, M.D. Bowman, J.G. Clawson, B.S. Coffey, O. Epitropaki, C.S. Fuller, C.M. Giannantonio, Y. Giordano, G.B. Graen, M. Hällgren, R.O. Harris, A. Hornett, A.E. Hurley-Hanson, R. Jordán, M. Koljatic, P. Daniels Lee, P. Lievre, M. Lindahl, I.W. Lovegrove, C. Mainemelis, L. Mann, G. Musca, M. Perez, J.G. Perkins, A. Rehn, G. Rix-Lièvre, L. Rouleau, T.A. Scandura, M.M. Sharif, T.A. Sprinkle, M.J. Urick, M. Useem

264 pp Hardback 978 1 78100 211 7
2013 £78.00 (UK/RoW) • 2014 \$124.00 (N/S America)
Paperback 978 1 78347 199 7
2015 £27.50 (UK/RoW) • July 2015 \$42.50 (N/S America)
Elgaronline 978 1 78100 212 4

New Horizons in Leadership Studies series



TO PLACE AN ORDER
Go to: www.e-elgar.com
UP TO 20% ONLINE DISCOUNT!



UK/ROW ORDERS
Email: sales@e-elgar.co.uk

N/S AMERICA ORDERS
Email: elgarsales@e-elgar.com

**FOR MORE INFORMATION,
OR A FREE COPY OF OUR
LATEST CATALOGUE**

UK/ROW
Email: info@e-elgar.co.uk

N/S AMERICA
Email: elgarinfo@e-elgar.com



FOLLOW US!
For our latest news
and offers, follow us!
[@Elgar_Business](https://twitter.com/Elgar_Business)



Edward Elgar
PUBLISHING

Elgaronline

The digital content platform for libraries
from Edward Elgar Publishing

Consisting of scholarly monographs, Research Handbooks, companions and dictionaries as well as journals.
Please email sales@e-elgar.co.uk (UK & RoW) or elgarsales@e-elgar.com (N/S America) for more information.

Our eBooks are available for individuals through Google ebookstore and eBooks.com.

Ask your librarian to request a free trial.

www.elgaronline.com



EXTREME LEADERSHIP

ISSN: 1535-668X
Editorial Offices: Journal of Business and Management
Argyros School of Business and Economics
Chapman University
One University Drive
Orange, CA 92866

Fax: (714) 532-6081

E-mail: jbm@chapman.edu

Submission information is available on our website: www.chapman.edu/jbm

The *Journal of Business and Management* is published by Chapman University's Argyros School of Business and Economics with the sponsorship of the Western Decision Sciences Institute. The primary editorial objective of the *Journal of Business and Management* is to provide a forum for the dissemination of theory and research in all areas of business, management, and organizational decisions which would be of interest to academics and practitioners.

The views expressed in published articles are those of the authors and not necessarily those of the editors, editorial board, WDSI or Chapman University.

Copyright © 2014 Argyros School of Business and Economics, Chapman University.



THE GEORGE L. ARGYROS
SCHOOL OF BUSINESS AND ECONOMICS
ONE UNIVERSITY DRIVE
ORANGE, CALIFORNIA 92866

VOL. 20, NO. 2, 2014

JOURNAL of BUSINESS and MANAGEMENT

CHAPMAN UNIVERSITY