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Value Chain Orchestration in the Global Biotechnology and Other Industries – Empirical Findings of Antecedents and Consequences

Andreas Hinterhuber

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Section I

Abstracts
Leaping The Abyss: The Challenges on Medical Practitioners’ Adoption of mHealth Initiatives in Global Healthcare

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ABSTRACT

Interest in mobile healthcare, also known as mHealth, has been increasing over the past several years. Despite the promising advantages of mobile technology for use in a global healthcare environment there is an observed gap existing between the intended use of mHealth applications and the actual usage of the system. The goal of this research is to discuss challenges and obstacles facing healthcare professionals when adopting mHealth applications in global healthcare. This paper seeks to develop a conceptual model to gain a greater understanding of the factors that contribute to mHealth adoption. Some key factors that are of significance for use in general technology acceptance models (TAM) are adopted in the research framework. These factors include: job relevance, result demonstrability, self-efficacy, subjective norm, image, and facilitating conditions. In addition, several intervention factors are included in the theoretical framework as significant determinants of perceived usefulness and perceived ease of use. Based on TAM3, three intervention factors—information-related design characteristic, system-design characteristic, and organizational support—are identified. Hypotheses were developed for empirical testing. Several future research directions are outlined.
Technology-Driven Remedial Education For Liberia, West Africa: A Pilot Study with Global Applications

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ABSTRACT

Beginning in 1989, Liberia lost one out of every 17 people during 14 years of civil conflict that ended in 2003. Liberia’s infrastructure was decimated: 80% of schools were destroyed; the ranks of primary and secondary school teachers were reduced to 26,000, 65% of whom have not completed high school and lack national certification; 59% of girls do not complete high school; illiteracy is 80%, unemployment is 90% and Grade 1 students are aged 8-20 versus the norm of 6-7 years; and by some accounts, 90% if college students are unprepared to succeed at the tertiary level.

This study focuses on the results of tests conducted in 2008, in Monrovia Liberia among a sample of teachers and girls, to obtain primary research information on literacy in Liberia and identify education levels among a specific sample population of teachers and girls. Additionally, this study proposes a 1-year, pilot program in technology-driven remedial education. Technology-driven Remedial Education for Liberia (TREL) proposes the following pilot study: 1) Provide Training of Trainers (TOT) sessions teachers to deliver remedial education (Mathematics, Literacy and Science) using digital curricula in computer labs; 2) Enroll college freshmen in the remedial program to foster tertiary-level success; 3) Use the year-1 data to derive a model for tech-driven remedial education at the college level that may be applied elsewhere in Liberia and in other parts of the world where illiteracy affects 50-75% of the populations.

TREL’s objectives align with Liberia’s Poverty Reduction Strategy (PRS) the United Nations Millennium Goals and the United States Agency for International Development (USAID’s) Country Assistance Strategy (CAS) for Liberia. (See appendix for alignment table).
ABSTRACT

The meltdown of the banking industry in 2007 and 2008 caused 11 of the largest financial institutions in the United States to alter their manner of conducting business. While some of these companies declared bankruptcy or merged with more successful institutions, others changed from investment banks to bank holding companies. The surviving companies received bailout loans from the government and quickly reversed their financial situations. SFAS 157 was blamed for much of this financial crisis. As a result, Congress put pressure on the Financial Accounting Standards Board to change or suspend this financial standard. This paper describes the background of the banking crisis and examines the role of SFAS 157 in the subsequent meltdown. The paper concludes with a critique of FSP FAS 157-3.
The Academic Exception to the Incumbent’s Curse

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ABSTRACT

Numerous scholars have suggested that business research is hindered by the incremental nature of academic scholarship. To trace who is the most culpable for retarding radical research, I apply the framework of the incumbent’s curse to academia. The incumbent’s curse states that new entrants are more likely than established firms to produce radical innovation. Mixed support for the theory implies that there may be an important dimension being overlooked in this relationship and we may benefit from exploring a novel industry setting. By distinguishing between radically innovative and incremental journal articles (N=975), I trace the origin of the most innovative research papers to determine that incumbents have a strong advantage in academia. I conclude that the curse may not apply in academia and that radically new ideas may be the result of many formative years first conducting incremental research.
Fairness Perceptions in the Context of Smoking Policy Changes: 
An Integration of Social Comparison and Identity Theories

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ABSTRACT

The practice of changing organizational policies can hold major implications for how employees react to the reallocation of organizational resources. In recent years smoking policy changes have become increasingly prevalent and restrictive in the workplace. As with most workplace resource reallocation circumstances, comparison of what one receives to what someone else receives could lead individuals to consider the fairness or justice of such changes. Therefore, a model that integrates relative deprivation theory (RDT) and accessible identity model (AIM) is developed and a framework for understanding individuals’ variable reactions to smoking policy changes in the workplace is proposed. Both theoretical and practical implications are discussed.
E-Learning Security

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ABSTRACT

E-learning security is becoming vital in every institution as colleges all over the world embrace computer based training. Successful e-learning in any institution needs the sustenance of a well established network system. The purpose of this paper is to figure out how to minimize the security challenges that come with implementing e-learning. The aims of this document are to investigate the network security challenges involved in e-learning, and to highlight the measures required in preventing such security challenges. The theoretical framework analyses the strategies employed by learning institutions in implementing e-learning security and the obstacles in achieving full e-learning security. The significance of the study points out the changing faces of training modes in relation to globalization. Learning institutions are involved in computer based training without grasping the full concept that lack of e-learning security is detrimental to an institution’s data.
Value Chain Orchestration in the Global Biotechnology and other Industries:
Empirical Findings of Antecedents and Consequences

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ABSTRACT
This paper examines how firms expand international and cross industry boundaries through the orchestration of external value chains. Value chain orchestration is intended as way to create and capture value by structuring, coordinating, and integrating activities of previously unrelated markets and by effectively relating these activities to in-house operations with the aim of developing a network of activities that link previously unrelated industries and that create fundamentally new markets. The research is based on an in-depth analysis of the agrochemical and biotech industry and is illustrated by two case studies. Based on the preliminary results of these case studies, the paper concludes that the orchestration of external value chains expands international firm boundaries and leads to superior financial results.
ABSTRACT

This paper estimates the coefficients of the Heston-Nandi GARCH(1,1) model of the distribution of log-returns, for each country with an MSCI index as of 1996. These parameters are compared across developing and developed nations. I also test whether these parameters are affected by the level of governance in each country. I find that total risk, adjusted for kurtosis, is a significant predictor of whether the country is developed or developing. Further, I find that relative total volatility, between developed and developing nations, varies over time. Further, there is no constant relationship between governance indicators and the skewness or kurtosis of log-returns in the country indices. These results imply that financial analyses which rely on the distribution of returns, particularly derivative pricing and value-at-risk, may be implemented in the same fashion across developed and developing markets so long as the analyses account for differing first and second moments.
The Influence of Sarbanes-Oxley on the Foreign Corrupt Practices Act

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ABSTRACT

When passed in 1977 the Foreign Corrupt Practices Act (FCPA) was ground breaking legislation in the fight against corruption. The act contributed toward raising international awareness that corruption is a serious problem in international business transactions. The FCPA had several weaknesses, among them the accounting provisions and the self reporting aspects. The recognition of the weakness in the accounting provisions led to the strong accounting provisions of the Sarbanes-Oxley Act (SOX). SOX requires accurate accounting and reporting systems and most importantly reporting on an organization’s internal accounting controls. The SOX contains a requirement that Chief Financial Officer (CFO) and Chief Executive Officer (CEO) certify the adequacy of the internal controls, and they have personal liability. This has resulted in an increase in the companies reporting internal control weakness and violations of various types, including violations of the FCPA. Along with increased reporting has come an increase in the amount of the penalties. During 2009 two companies received penalties in excess of $500 million. The increased transparency required by SOX and the size of the penalties forces companies to be more concerned about violating the FCPA.
Li & Fung: Exploring Innovation and Change

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ABSTRACT

This paper examines the processes and theories necessary to motivate employees at Li & Fung to accept organizational innovation and change. Attention is given to the background and history of the organization and the type of leadership that is needed to create and foster innovation. The general characteristics of innovation are explored and examples provided on how the organization uses innovation to successfully meet the needs of their customers. A SWOT analysis is conducted on two systems of innovation and consideration is given to the role of ethics and corporate responsibility in implementing innovation and change. The paper identifies the obstacles and hindrances to innovation and concludes by providing a model that organizations can use to successfully implement innovation.
Alliance Learning Process and Knowledge Integration

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ABSTRACT

This study employs knowledge-based view to study how to use knowledge integration mechanisms to establish the internal valuable, rare and imperfectly imitable resources for alliance. Based on knowledge based theory, this study, from the alliance learning perspective, built a framework in addition to a sample set of 158 cases to explain how to enable alliance to reach its success. Additionally, by means of structural equation model (SEM), we test this model. This study not only considers the IT system, but also argues the importance of alliance learning mechanism and other knowledge integration mechanisms. First, the relational capability provides the foundations of the learning capability in alliance. Through the learning capability, the company can directly carry out the operational integration and promote the social integration mechanism, all which form the normative integration mechanisms that facilitate to increase the alliance performance.
Informing the CMS Adoption Process by Examining Historical Usage Patterns

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ABSTRACT

For universities involved in web-enhanced, blended, and fully online education, the cost of a course management system (CMS) represents a significant expense. The decision to renew a contract with a CMS vendor or change to another product is usually informed by a survey of faculty perceived needs, input about the local information technology infrastructure, and input about budgetary constraints. This study examines historical usage patterns at a small public liberal arts university to discern actual needs rather than perceived or theoretical needs. Differences in usage patterns between undergraduate and graduate students and between high, medium, or low activity courses are contrasted. This study would be easily replicated and applicable to other institutions making a CMS decision.
Relationship Between Learning Styles and eLearning Performance: An Empirical Study

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ABSTRACT

The impact of learning styles has been studied in various classroom environments including colleges and universities. However, there are very few studies attempting to study the influence of learning styles in eLearning environment despite the growth of eLearning modes of delivery at all levels of education. This study explores the relationship between Learning Styles and eLearning Performance in a US university. Four learning styles - activist, reflector, theorist and pragmatist were measured based on Honey and Mumford’s model. Researcher developed a classification of learning styles using cluster analysis based on empirical work in Blackboard environment. The results demonstrate a relationship between clusters and eLearning performance as indicated by grade point average, and provides insights about developing strategies that useful for the eLearners and the educators.
The Impact of Quality Management in Earned Value Management: A Theoretical Framework

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ABSTRACT

The current project management literature on Earned Value Management (EVM) centers on the schedule, planning, cost, and risk control that EVM provides on projects. EVM can keep a project on track assuming that the proper planning has been built into it. The literature has not, however, discussed in detail how EVM can combine aspects of Total Quality Management (TQM) to enhance projects. This study will discuss the basics of EVM and will lay out several reasons why EVM should be used in a more proactive way to measure and control project quality, particularly in the planning and scheduling phases, and give several suggestions on how this goal may be accomplished by modifying the existing EVM framework. Also, this study presents a theoretical framework for the application of TQM into EVM, and discusses several propositions. The model is called EQM or Earned Quality Management (Chavez & Busler, 2010).
The Relationship Between Learning Orientation and Business Performance and the Moderating Effect of Competitive Advantage: A View From Organizational Size

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ABSTRACT

The proposed study examines the influence of learning orientation on business performance (the achievement of sales and profit objectives) in the context of organization size. The conceptual framework used in this research has been drawn from marketing, finance, and organizational behavior theory. Specifically, relationships related to learning orientation, sources of competitive advantage and business performance have been identified. This research develops the theories of learning orientation (the core theory of this paper), competitive advantage, and identifies key business performance measures to examine some research questions - Is there a relationship between learning orientation and business performance—the achievement of sales and profit objectives in a) small organizations, and b) large organizations? Is there a statistically significant difference in the relationship between learning orientation and business performance among small organizations and large organizations? Is there a relationship between learning orientation and competitive advantage in a) small organizations, and b) large organizations? Is there a statistically significant difference in the relationship between learning orientation and competitive advantage among small organizations and large organizations? Does competitive advantage moderate the relationship between learning orientation and business performance in: a) small organizations, and b) large organizations? A survey based research methodology is used to explore these research questions and pertinent findings reported in the light of previous study (Martinette, 2006).
ABSTRACT:

Marketing studies acknowledge the phenomenon of customer impulse purchasing behavior while companies try to exploit it so as to increase their sales. However, its triggers and consequences (aside from short-term sales gains) are still not well understood. Moreover, in online contexts, its impact on companies remains largely unexplored. Only recently has this begun to attract research attention. Partly, this may be due to a persistent belief that online shoppers are much more rational and driven by price-comparison and information search than their traditional counterparts. A growing number of studies show this to be unfounded. More research is needed to understand the extent of impulse buying online and identify the Web site design factors and informational content which can promote or diminish it. In this paper, we propose a model which investigates such factors and content. Importantly, our model also takes into account buyer’s remorse and attributional processes and acknowledges that the consequences of customer impulse purchases may not necessarily be positive for online companies.
Section II

Selected Papers
Leaping the Abyss: the Challenges on Medical Practitioners’ Adoption of mHealth Initiatives in Global Healthcare

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ABSTRACT

Interest in mobile healthcare, also known as mHealth, has been increasing over the past several years. Despite the promising advantages of mobile technology for use in a global healthcare environment there is an observed gap existing between the intended use of mHealth applications and the actual usage of the system. The goal of this research is to discuss challenges and obstacles facing healthcare professionals when adopting mHealth applications in global healthcare. This paper seeks to develop a conceptual model to gain a greater understanding of the factors that contribute to mHealth adoption. Some key factors that are of significance for use in general technology acceptance models (TAM) are adopted in the research framework. These factors include: job relevance, result demonstrability, self-efficacy, subjective norm, image, and facilitating conditions. In addition, several intervention factors are included in the theoretical framework as significant determinants of perceived usefulness and perceived ease of use. Based on TAM3, three intervention factors—information-related design characteristic, system-design characteristic, and organizational support—are identified. Hypotheses were developed for empirical testing. Several future research directions are outlined.
1. BACKGROUND

1.1. Healthcare in the developing world

In September 2000, United Nations (UN) members signed the Millennium
Declaration (United Nations, 2008). The declaration outlined a plan for progress towards eight
“Millennium Development Goals” (MDGs) targeted for 2015. Three of the eight MDGs are
directly related to health. The MDGs for 2015 are as follows:

1. to eradicate extreme poverty and hunger
2. to achieve universal primary education
3. to promote gender equality and empower women
4. to reduce child mortality
5. to improve maternal health
6. to combat HIV/AIDS, malaria, and other diseases
7. to ensure environmental sustainability; and
8. to develop a global partnership for development

Progress towards the MDGs is measured through several established indicators, many of
which are directly or indirectly related to health. According to the World Health Organization
(World Health Organization, 2006), current available data indicates that while some countries
have made significant strides in achieving health-related objectives, other countries lag behind.
Unfortunately, the nations falling behind are frequently those with the most significant public
health issues. The UN reports extreme conditions throughout the developing world in critical
public health areas (United Nations, 2008). For instance, childhood mortality occurring prior to
the age of five is over 33 times more likely for a child born in a developing country versus a
child born in an industrialized nation. Furthermore, for every woman who dies from a childbirth-
related death, approximately 20 more suffer injury, infection, or disease, accounting for more
than 20 million every year. The report also shows that avoidable communicable diseases
including tuberculosis (TB) and malaria continue cause preventable deaths in the developing
world, due to lack of access to proper drugs and/or medical treatment. The issues facing
developing countries in enhancing healthcare delivery and quality are numerous. The scarcity
of health services resources, to include the human capital, is an enormous barrier to bringing health
information and care to rural and remote areas in need. Technological advances within the field
of electronic Health (eHealth) have recently aided in the facilitation of global health needs and
offered tremendous potential in supporting the public health function in the developing world.
Over the past several years, mobile health (mHealth) has been flourishing as a significant
component within the field of eHealth. However, the industry still lacks a formal definition for
these terms, the public health community offers these working definitions (Vital Wave
Consulting, 2009, p.8):
“eHealth – using information and communication technology (ICT)- such as computers mobile phones, and satellite communications – for health services and information.”

“mHealth – using mobile communications-such as PDAs and mobile phones – for health services and information.”

Though mHealth is still well within its infancy, it has already begun to transform the global healthcare delivery system. One of the essential impacts of mHealth on the healthcare field is that mobile applications provide a new frontier to assist health care practitioners in providing quality healthcare to a greater patient population. Mobile communication offers a cost-effective and globally accessible means for delivering health services. The usage of current mHealth applications has illustrated various benefits in health care practices. For example, there are currently 50 mHealth projects taking place around the world. In Africa, health professionals are encouraged to use mobile phones to provide emergency medical care. The initiative uses a toll-free mobile service provided in rural areas. Phones will use solar charges capable of charging 30 mobile phones per day. Doctors in the UK are monitoring patients vital signs remotely via small devices attached to a belt. The information is then sent by mobile phone to a medical specialist for consultation (Ganapathy & Ravindra, 2008). In South Africa, a pilot project is being implemented to facilitate TB and HIV treatment, with the objectives of remote consulting, recording patient data, and Tele-diagnosing (Mishra & Singh, 2008).

1.2. Mobile technology in Global Healthcare

Mobile technologies can be applied to healthcare in various ways including: voice communication, messaging, notification, asset tracking, and remote access (Siau & Shen, 2006). The essence of mHealth initiative is to enable health care providers to communicate and educate patients in remote areas, who may have minimal or no access to quality healthcare. In general, systems of communication within the health care environment include the following multiple channels: patient to medical supervisor, patient to physician, physician to expert system, and patient to medical customer relationship management (CRM) system (Mishra & Singh, 2008). These various communication routes among healthcare stakeholders attenuate interaction or collaboration efficiency, generate a high cost, and even create confictions between different parties. Mobile health technology, with the ability to provide flexible and effective medical information flow and exchange at a low cost, has been regarded as a promising solution to address the above issues in the global environment.

Based on contemporary literature, mHealth applications can be used to: monitor and track patients and disease, educate a broad population and promote healthy living, remotely collect data, communicate and train healthcare service workers, and provide diagnosis and treatment support (Vital Wave Consulting, 2009). Presented below are some of the major mHealth applications in the healthcare industry.

Short Message Systems (SMS) has been used in community health campaigns. SMS messages are an effective way to send health alerts directly to users (Shah, 2007). This allows
for the cost-effective social marketing of promoting healthy behaviors, sending information about treatment, testing, and other health services, and educating the public on disease management, thus, reducing the health risks for hard-to-reach populations. In addition, SMS systems allow health service workers to communicate health information to the end user in a somewhat inconspicuous way. This is especially important in countries where specific health related topics may be considered taboo (i.e., AIDS/HIV, STDs, etc.).

Among the burdens of health care disparities around the world, a major contributor is the lack of access to quality care. With internet-enabled mobile phone, physicians can access hospital databases, retrieve information, and view laboratory and imaging diagnostic testing results. Wireless Application Protocol (WAP) allows healthcare consumers to search hospital websites for relevant information and schedule appointments (Siau & Shen, 2006), thus, improving access to care and health outcomes for remote healthcare consumers across the globe.

Physicians can also use mHealth technology via Global System for Mobile Communication (GSM) to dial into a hospital’s network or database (Siau & Shen, 2006). This technology allows physicians remote access to electronic medical records (EMR), patient prescription information, and disease management databases. When physicians can remotely access such information treatment, diagnosis can occur virtually throughout any location in the world. In areas where there is a shortage of healthcare providers, this application can save lives.

The capability of mHealth technology to remotely monitor patients and improve disease management and health outcomes has recently been explored. Research has proven that monitoring chronic disease patients from home can help improve survival rates. Furthermore, providing patients with greater access to healthcare information and communication flow can empower the patient to become proactive in the care plan. As patients become more proactive in the care plan, healthy behavior is displayed and health risks are lessened. Having access to healthcare services and providers via mHealth allows for open communication between patient and health service providers. The developing world often has a limitation of hospital beds and outpatient facility access. Remote monitoring of patients can be a great asset in rendering care to hard-to-reach patients. For example, TB patients in Thailand were given mobile phones to communicate with healthcare workers, who monitored medication regime remotely. Medication compliance rates among this group reached 90% (Vital Wave Consulting, 2009)

In summary, developing countries face a growing battle to overcome health disparities and lower health risks to a hard-to-reach population. Shortages of healthcare workers, limited access to healthcare facilities, and failing healthcare infrastructure cannot meet the demands of a vast patient population in remote areas. MHealth is being utilized on a limited basis in such areas of the globe, as adoption of this technology improves, so will the overall health outcomes of the developing world’s population.

2. PURPOSE OF THE RESEARCH

Despite the promising advantages of mobile technology for use in a global healthcare environment there is an observed gap existing between the intended use of mHealth applications and the actual usage of the system (Fischer et al., 2003; Wu, Wang, & Lin, 2007). Insufficient
user acceptance has long been an obstacle to the successful adoption of IT/IS. For example, the public healthcare sector in South Africa was recognized as having lagged behind other industries in the use of adoption of new information technologies (Bower, 2005). Therefore, one major motivation of this study is to probe the determinants crucial to mHealth acceptance by healthcare professionals.

In order to gain a greater understanding of the factors that contribute to healthcare professional mHealth acceptance, it must be recognized firstly that the user adoption and system acceptance can be predicted adequately from the individual’s behavioral intent. The authors aim to provide management insight for healthcare industry stakeholders by identifying the essential antecedents of the behavioral intent of healthcare professionals’ mHealth application acceptance. Another purpose of this research is to examine the influence of design characteristics of mHealth systems (E.g., mobile device interface) on user acceptance. Furthermore, our third objective is to emphasize the importance of the need to develop and implement effective interventions in order to maximize healthcare professionals’ mHealth adoption and use.

3. RESEARCH FRAMEWORK

The path to success in the adoption of mobile healthcare initiative is not straightforward. The goal of this section is to identify possible technical, social, and organizational challenges facing the adoption of mobile technology in global healthcare. First, survey of relevant prior research on technology adoption, particularly technology adoption in healthcare was conducted. Based on the authors’ observation and intensive literature review, significant factors of influence were discussed and these formed a theoretical framework that could be tested against medical practitioners. Several hypotheses are proposed for future empirical studies.

3.1 Technology acceptance model and its application in healthcare

The research on individual-level IT adoption and use is mature and has provided rich theories and explanations of the determinants of adoption and use decisions (Sarker, Valacich, & Sarker, 2005; Venkatesh et al., 2003). The initial technology acceptance model (TAM) was developed to predict and explain individual adoption and use of new IT systems. It posits that individuals’ behavioral intention to use an IT is determined by two beliefs: perceived usefulness, and perceived ease of use (F.D. Davis, 1989; F. D. Davis, Bagozzi, & Warshaw, 1989). TAM2, the extended TAM, incorporates additional theoretical constructs spanning social influence processes and cognitive instrumental processes (Venkatesh & Davis, 2000). These models have been well tested, validated and proven to be reliable when used in the evaluation of user acceptance in studies of business organizations, corporations and even students. However, there is less research evaluating mobile technology adoption within a global healthcare context.

With accelerated hospital competition and the popularity of the Internet and mobile devices, there is a need to understand the factors that would entice healthcare professionals to use mobile healthcare systems (Wu et al., 2007). Generally, the essential characteristics of users and technologies in professional healthcare differ greatly from the customary commercial context
Thus, any model developed for the general public may not apply to a healthcare environment. Therefore, this study aims to explore specific factors impacting healthcare professionals’ incentives to use mobile technology in their practice.

3.2. TAM3 and the theme of intervention

One of the most common criticisms of TAM has been the lack of actionable guidance to practitioners (Lee, Kozar, & Larson, 2003). Notwithstanding the plethora of IT adoption studies, there has been limited research on the interventions that can potentially lead to greater acceptance and use of IT. It has been suggested in both the academic and trade press that managers need to develop and implement effective interventions in order to maximize employees’ IT adoption and use (Jasperson, Carter, & Zmud, 2005). Venkatesh and Bala (2008) synthesized prior research on TAM and developed a theoretical framework (TAM3) that represents the cumulative body of knowledge accumulated over the years from TAM research. TAM 3 shows four different types of determinants of perceived usefulness and perceived ease of use—individual differences, system characteristics, social influence, and facilitating conditions. The authors used TAM3 as the theoretical anchor and developed hypotheses based on these four different types of determinants. One of the distinctions of this study from prior technology adoption studies is the focus on the theme of intervention and the incorporation of specific intervention factors which hold the key to helping managers and policymakers make effective decisions to influence the healthcare professionals’ adoption of mobile technology and, consequently, the success of mHealth initiatives. The theoretical framework (TAM3) was replicated as shown in Figure 1.

![Figure 1 Theoretical Framework (TAM3)](Adapted from Venkatesh and Bala (2008))
In the original TAM3, System characteristics are those salient features of a system that can help individuals develop favorable (or unfavorable) perceptions regarding the usefulness or ease of use of a system. Individual difference variables include personality and/or demographics (e.g., traits or states of individuals, gender, and age) that can influence individuals’ perceptions of perceived usefulness and perceived ease of use. Social influence captures various social processes and mechanisms that guide individuals to formulate perceptions of various aspects of an IT. Finally, facilitating conditions represent organizational support that facilitates the use of an IT. When reviewing literature on the adoption of healthcare technologies by medical professionals it was found that part of determinants discussed in TAM3 apply to general healthcare systems such as telemedicine, internet health and clinical systems (Horan et al., 2004; Malhotra & Galletta, 1999; Wu et al., 2007). The authors integrated those studies and the specific propositions relevant to mobile technology adoption in global healthcare into the conceptual model for mHealth (as depicted in Figure 2).

3.3. System characteristics and mobile technology adoption

TAM2 theorizes that individuals’ mental assessment of the match between important work goals and the consequences of performing job tasks using a system serves as a basis for forming perceptions regarding the usefulness of the system (Venkatesh & Davis, 2000). Four cognitive factors influence perceived usefulness: job relevance, output quality, result demonstrability, and perceived ease of use. Two system characteristics–related adjustments—that is, perceived enjoyment and objective usability—were further suggested in TAM3 to play a role in determining perceived ease of use after individuals gain experience with the new system. This study focuses on the construct job relevance and result demonstrability as two major system characteristics.

Job relevance is an individual’s perception of the degree to which the technology is applicable to his or her job. This construct is similar as “compatibility”, one significant innovation characteristic in Innovation Diffusion Theory (IDT) (Rogers, 2003) or “task-technology fit” in task-technology fit (TTF) model (Goodhue & Thompson, 1995). High degree of compatibility or task-technology fit can result in preferable adoption of innovation or new technology. The authors propose that health professionals would be more likely to take mobile technology usefulness into account if it were regarded as being compatible with current healthcare practices.

H1: Degree of job relevance has a direct effect on perceived usefulness of mobile technology.

Result demonstrability refers to the degree to which an individual believes that the results of using a system are tangible, observable, and communicable. The mobile technology should visibly improve health professionals’ quality of care provided and enhance effectiveness thus improving the quality of care. Therefore, the mobile device and technology demonstrated to the
health professionals should be able to help them deliver better quality care and provide outreach services for a wide array of health issues within a broader patient population.

H2: Degree of result demonstrability has a direct effect on perceived usefulness of mobile technology.

3.4. Mobile healthcare self-efficacy

Self-efficacy was defined as the degree to which an individual believes that he or she has the ability to perform a specific task/job using the computer. This belief has an influence on one’s ability to perform a specific task, degree of effort expended, and persistence of effort. In the context of mobile healthcare, the characteristics and operations of mobile devices (e.g., PDAs, tablet PCs, smartphones, etc.) may differ from those used for traditional computing or communication devices (such as desk computers). As a consequence, mobile technology self-efficacy is more preferable than computer self-efficacy or Internet self-efficacy for mobile healthcare (Wu et al., 2007). Currently, the mobile healthcare setting is still in its infancy. As previous studies stated, it will be a challenge for healthcare professionals to employ a new mobile IT/IS system due to low computer literacy (Chau & Hu, 2002). Healthcare professionals who may have little confidence in their capability to adopt mobile computing may cause poor performance on mobile healthcare as well as result in diminishing the intentions to use mobile healthcare systems.

H3: Mobile healthcare self-efficacy has a direct effect on perceived ease of use on mobile healthcare systems.

3.5. Social influence and mHealth initiative

Subjective norm and image are the two determinants of perceived usefulness that represent the social influence processes. Subjective norm was defined as the degree to which an individual perceives that most people who are important to him think he should or should not use the system. In other words, healthcare professions could be influenced by people who are close to them as for whether the device should be used or not. Image refers to the degree to which an individual perceives that use of an innovation will enhance his or her status in his or her social system.

H4: Subjective norm has a direct effect on behavioral intention to use mobile healthcare systems in practice.

H5: Image has a direct effect on perceived usefulness of mobile technology.

3.6. Facilitating condition and mHealth initiative

Facilitating conditions represent organizational support within facilitates for the use of an IT. In TAM3, perceptions of external control (or facilitating conditions) are related to
individuals’ control beliefs regarding the availability of organizational resources and support structure to facilitate the use of a system. To facilitate the efficient and effective usage of mobile healthcare, it is essential to have a better understanding about what practitioners need and to improve their technical skills with necessary and well-matched resources (including wireless network infrastructures, hardware/software, consultants and all relevant information) (Wu et al., 2007).

\textit{H6: Facilitating condition has a direct effect on perceived mobile healthcare system ease of use.}

3.7. Other organizational and technical factors

In addition to the above factors based on TAM, the authors also identified a number of additional factors, which were considered to be specific to the global mHealth context.

![Conceptual Model for mHealth](image)

\textbf{Figure 2 Conceptual Model for mHealth}
3.7. Other organizational and technical factors

First, healthcare providers need to redesign organizational processes and rethink their roles to fully integrated mobile applications (Siau & Shen, 2006). Organizational support captures the role of both internal and external experts who can help health professionals deal with the complexity associated with new systems as well as business processes. Furthermore, healthcare cannot escape political oversight. The degree of organizational and government support are proposed to have a direct affect on behavioral intention to adopt mHealth initiatives. In other words, the process of rethinking and reengineering is a demanding task, which poses a fundamental challenge when adopting mobile applications in healthcare.

In addition to the above factors based on TAM, the authors also identified a number of additional factors, which were considered to be specific to the global mHealth context. First, healthcare providers need to redesign organizational processes and rethink their roles to fully integrated mobile applications (Siau & Shen, 2006). Organizational support captures the role of both internal and external experts who can help health professionals deal with the complexity associated with new systems as well as business processes. Furthermore, healthcare cannot escape political oversight. The degree of organizational and government support are proposed to have a direct affect on behavioral intention to adopt mHealth initiatives. In other words, the process of rethinking and reengineering is a demanding task, which poses a fundamental challenge when adopting mobile applications in healthcare.

H7: Organizational support has a direct effect on behavioral intention to use mobile healthcare systems in practice.

Second, design characteristics of mobile devices and networks can positively influence user acceptance and system success. If a system can provide users relevant information in a timely manner, accurately, and in an understandable format, as well as help users make better decisions (Speier, Valacich, & Vessey, 2003), then it is more likely that users will perceive greater job relevance of the system, high output quality, and greater result demonstrability—the important determinants of perceived usefulness. Therefore, lack of consumer trust in mobile application and absence of information quality control would be important system-related design obstacles. System-related characteristics, on the other hand, include reliability, flexibility, and user-friendly interface. For example, a user-friendly interface on mobile devices is of great practical significance to mobile healthcare. Lack of interoperability in mobile network standards, limitations in mobile devices and networks (such as computational power, memory and disk capacity) would negatively influence perceived ease of use.

H8: Information-related design characteristics has a direct effect on perceived usefulness of mobile technology.

H9: System-related design characteristics has a direct effect on mobile healthcare system perceived ease of use
4. CONCLUSION AND FUTURE RESEARCH

Several of the Millennium Development Goals, as determined by the UN, are directly or indirectly related to global health issues. If nations are going to be able to accomplish these goals by the target date of 2015, healthcare providers, educators, and policy makers need to work together cohesively and globally. Technological advances have the unique capability to maximize quality care on a global scale. MHealth, which employs the usage of mobile technology to facilitate healthcare, has not yet been used to its full capability.

The goal of this research is to discuss challenges and obstacles facing healthcare professionals when adopting mHealth applications and investigate what technical, social, and organizational factors influence healthcare professional mHealth acceptance and perception in the global healthcare context. The first part of the paper provides a brief summary of current conditions in crucial public health areas in the developing world. The importance of mobile technology for the global expansion of health care services are discussed and emphasized. Several mHealth services and applications are illustrated in the context of global healthcare. The third part begins with a brief review of TAM literature pertinent to healthcare professionals’ acceptance of mobile technology systems. Then we progress to outline a conceptual model for predicting mHealth adoption by healthcare professionals in the developing world.

Some key factors that are of significance for use in general technology acceptance models are adopted in our research framework. These include: job relevance, result demonstrability, self-efficacy, subjective norm, image, and facilitating conditions. In addition, this research proposes a revised TAM framework to include intervention as one significant determinant of perceived usefulness and perceived ease of use, Based on TAM3 (Venkatesh & Bala, 2008) and latest work on UTAUT (Sykes, Venkatesh, & Gosain, 2009; Venkatesh & Bala, 2008), three intervention factors—information-related design characteristic, system-design characteristic, and organizational support—are identified. These factors have implications for policy makers, physicians, project managers and other healthcare professionals in global environment. For example, the construct of job relevance suggests the management of healthcare sector to put emphasis on the role of task-technology fit. Since physicians’ reluctance or resistance to adopt IT is often influenced by the lack of job relevancy, a technological support provided by the organization is critical to mHealth implication success. Practitioner utilization rates will increase with training and internal marketing of appropriate applications to improve patient care. An organizational culture of acceptance and technological advancement would allow practitioners to explore new methodologies in care delivery systems and would empower physicians to utilize advanced technological systems. Hypothesis 7 suggests that an organization must have appropriate training systems to support the direction of this utilization of mHealth systems or applications. Based on prior studies, most mobile healthcare systems and applications, in fact, have failed or have not been implemented as predicted (Berg, 1999; Short, Frischer, & Bashford, 2004). Among these, 70% of the failure rate results from technical factors (Johnson et al., 1998). Therefore, mHealth design characteristics and IT infrastructure support need further examination. Different technical obstacles should be identified and attended to by developers and access providers of mHealth systems.
Nine hypotheses are developed for empirical testing. A next step for research would be an empirical study investigating the acceptance and perspectives of a mobile clinical information system. The survey instrument will be designed based on prior validated indices. Another research direction would be reexamining the individual variables of the current conceptual models and equipping with specific mHealth application or service settings. New constructs could be added to the model to capture mHealth practices in the global context. A more precise picture of the factors affecting a user’s intention to adopt mHealth will be depicted.

5. REFERENCES:


The Academic Exception to the Incumbent’s Curse

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ABSTRACT

Numerous scholars have suggested that business research is hindered by the incremental nature of academic scholarship. To trace who is the most culpable for retarding radical research, I apply the framework of the incumbent’s curse to academia. The incumbent's curse states that new entrants are more likely than established firms to produce radical innovation. Mixed support for the theory implies that there may be an important dimension being overlooked in this relationship and we may benefit from exploring a novel industry setting. By distinguishing between radically innovative and incremental journal articles (N=975), I trace the origin of the most innovative research papers to determine that incumbents have a strong advantage in academia. I conclude that the curse may not apply in academia and that radically new ideas may be the result of many formative years first conducting incremental research.

I. INTRODUCTION

There has been a great deal of recent interest among academics in reflectively applying theory to systematically explain how research streams develop and emerge (e.g. Gulati, 2007). One particular enigma of academic research is whether it has a tendency to be overly incremental and if the institutional nature of the industry prevents truly revolutionary questions from being asked (Weick, 1989). Scholars of innovation have often noticed that certain firms can be plagued
by a similar aversion to radical transformation that prevents them from maximizing profits in a mercurial world (e.g. Audia, Locke, & Smith, 2000). Radical innovations are those that truly challenge the status quo and bring about a new way of thinking, while incremental innovations are those that merely build or expand upon existing models of thought.

The need to innovate is well accepted in both academic and practitioner journals, yet there is some disagreement as to who will be the firm to bring about the most radical of innovations. The earliest and most prolific researchers of innovation indicate that only large, well-established firms will innovate because they have the capacity and resources to benefit the most from new technology (Schumpeter, 1942; Porter, 1980). Later scholars not only disagreed with this logic, but found ample evidence that entrepreneurial ventures and new start-ups may have an advantage in the development of radical innovations because they are not entrenched in the current technological paradigm. This phenomenon, known as the incumbent’s curse, is explicates in management literature in the seminal paper by Lieberman & Montgomery (1988). The concept is that new entrants will be more likely to create radical innovations than incumbents.

As Tripsas (1997) notes, incumbents have an incentive to avoid radical innovations because they would have to go through costly and time-consuming steps in order to adapt their architecture and processes. While incumbent firms have numerous psychological, institutional, and market barriers to making radical changes, new entrants would generally be thrilled to introduce a radical innovation that changes the very nature of an industry so that their presence in the industry will immediately become known (Hill & Rothaermel, 2003).

Moreover, even when incumbents are willing to innovate, their old way of thinking may prevent them from being truly radical. Henderson (1993: 248) refers to incumbents’ attempts at radical innovation as inherently constrained by “incompetence” and “underinvestment,” and Rosenbloom & Christensen (1994: 655) denote incumbents’ unwillingness or inability to introduce radical innovation as a “stylized fact” of organization science. Christensen (2006) cemented this position in his theory of disruption, which unequivocally states that through creative destruction, new entrants will introduce radical innovations that destroy the competitive advantage of incumbents.

Nevertheless, empirical studies have always found mixed support for the incumbent’s curse, given the evidence that incumbents may still be more capable of radical innovation given their advantages in absorptive capacity (Cohen & Levinthal, 1990), customer knowledge (Chandy & Tellis, 2000), franchising opportunities (Bauer, 1960; Folkes, 1988; Gregan-Paxon & John, 1997), and market power (Mitchell, 1989). All of these advantages for incumbents seem to center around the benefits that come from specialized knowledge. Thus, there is reason to expect that the incumbent’s curse may actually work as a blessing when the product is knowledge itself, as is the case in academic research. The purpose of this paper, therefore, is to test whether there is an incumbency effect that stymies radical innovation when the products are ideas. Moreover, knowing whether there is an incumbent’s curse in academia will help researchers understand why we ask the questions we do and who are the scholars posing the most radical questions.
II. LITERATURE REVIEW

The Incumbent’s Curse

When firms have been successful with a strategy for many years, their leaders tend to become psychologically rigid, since they lack an incentive for change (Audia, Locke, & Smith, 2000). They expect that the same means that have led to financial prosperity in the past will continue to do so, even though the environment may have changed or competitors have eroded any competitive advantage that the firm at one time enjoyed. Conversely, when firms have failed to capture success, their leaders have a tendency to become even more rigid, scared to make a change lest they accelerate their downward spiral (Staw, et al. 1981). As Chandy & Tellis (2000: 2) state, incumbents tend to be “so enamored with their success or so hampered by their bureaucracy that they fail to introduce the next generation of radically new products.” Further, incumbents – those firms that have been competing in a given market for a significant amount of time – are subject to cognitive filters that may deter investment in radical innovation (Hannah & Freeman, 1977; Henderson & Clark, 1990; Nelson & Winter, 1982). For instance, a firm’s technological trajectories embed knowledge in its organizational processes that can be very hard to extract. This characteristic, known as architectural innovation (Henderson and Clark, 1990), explains why it is so easy for incumbents to pursue modular or incremental innovation, but so challenging to take on radical changes that are inconsistent with the lens through which a firm’s R&D staff have long been seeing. Indeed, part of the reason incumbents have been able to succeed in their existing markets is the ability to “focus efficiently on their current challenges” such as directing managerial attention to serve the current consumers through maximum application of existing technologies (Chandy & Tellis, 2000:3). Such individuals have trained their minds to develop innovation within the scope of an existing framework, and no matter how creative they may be, radically different ideas may simply not dawn on them. Obviously, if a firm fails to spot opportunities for new products, it certainly will not be able to develop or market them (Henderson, 1993).

Even if a firm’s creative team has an idea for a radical innovation, investment in a new product may not strike the firm’s managers as a possibility worth considering. Radical change also can disrupt the intra-organizational norms for companies, as structure and culture must often change to adapt to the new innovation. This disruption is anathema to managers who strive for smooth, consistent, and routine operations (Watson, 1982). Finally, should the firm develop radical innovations, it may still be hesitant to produce or market anything that would require substantial internal changes or carry a large risk to its reputation. Because radical innovations are far more difficult to implement, they carry a greater risk for failure. Yet, when a small, entrepreneurial boutique fails to deliver, it receives far less media attention than when a Fortune 500 companies introduce a flop. The damage to a firm’s reputation may not be worth the risk after the years it took to establish its premier brand name.

Chandy & Tellis (2000) also demonstrate that there is a persistent fear of radical change among incumbent firms, consistent with Staw and colleagues’ (1981) notion of threat-rigidity. Managers would often rather maintain the status quo than risk introducing change that carries
with it a great deal of uncertainty. And while conventional wisdom suggests that it is better for firms to cannibalize their own products than wait for a competitor to introduce a new product that effectively destroys the existing generation of technology, few firms are willing to assume the role of cannibal and instead simply wait and hope that their rivals will not introduce new technologies either (Chandy & Tellis 1998). Ghemawat (1991: 161) furthers this argument by suggesting that incumbents’ high investment in the existing market inevitably leads to “technological inertia.” After all, “radically new products hold the potential to make existing products obsolete. Introducing a radically new product could therefore jeopardize the rents from existing products” (Chandy & Tellis, 2000: 3). This is the same reasoning that led authors Ali (1994) and Reinganum (1983) to conclude that incumbents have a lower marginal incentive than non-incumbents to “develop or commercialize radical innovations in the short run.” New entrants, obviously, do not have to concern themselves with the impact new products will have on cannibalizing existing products because the new product will be their only foray into the market.

Under certain conditions, rational reasons may exist for firms to refrain from introducing radical innovations. Reinganum (1983) noticed that even when the expected profits from radical new products to exceed those of existing products, mathematical modeling may still advocate maintaining the status quo. If firms are locked into a specific set of fixed assets, it may be more lucrative to harvest what profit they can from their heavy sunk costs rather than try to start anew with radical transformations. Ghemawat (1991) found the same result when there was no fixed cost associated with the new product introduction because there is always a non-financial cost to the organization when it sacrifices existing norms and routines. Dougherty and Heller (1994: 213) employ institutional theory to argue that incumbent organizations resist radically innovative endeavors because strategies which have not been confirmed through time-tested use are regarded as illegitimate actions that will be subject to “the brunt of institutional forces within the organization.” Organizational routines in R&D departments tend to focus on incremental changes, and are therefore not accustomed to using different technologies to develop radical innovations (Henderson, 1993). Trying to change those organizational routines would not only be a difficult process, but one that may threaten the legitimacy of the institution and lead to resistance from investors, employees, and business allies (Hannan & Freeman, 1977).

**Academic Context**

Many of the constructs and relationships associated the incumbent’s curse clearly translate onto the academic setting. For instance, an incremental innovation can be thought of as isomorphic to an incremental theoretical contribution, while a radical innovation would be a radical theoretical innovation. Evidence for this reasoning can be found in the work of numerous scholars. Whetten (2002) distinguishes between contributions to and of theory as those articles that merely replicate existing models in a new context and those studies that truly challenge the norms of extant dogma or develop a brand new paradigm for a field. Accordingly, those studies that introduce a broad stretching theory or refute a commonly accepted assumption of scholarship should be considered radical innovations, as opposed to those studies that make incremental contributions, such as introducing a new moderating or mediating variable.
Therefore, if the incumbent’s curse holds true, then it should be expected that the more radical papers will be composed by scholars who have recently entered the marketplace of ideas, and the more incremental papers by incumbent scholars who have been in the industry for some time. Newly minted assistant professors, especially at Research I universities, are under a great deal of pressure to publish important articles. The clichéd threat of publish-or-perish (deRond & Miller, 2005) may be comparable to the drive in high-technology industries for firms to continuously innovate lest they be pushed out of the market. Ergo, theory suggests that there should be a positive relationship between the new entry status of an article’s author and the number of times the article is cited.

Anecdotal evidence, as well, supports the possibility of an incumbent’s curse within academia. The best known theories within management, such as the Resource-Based View of the firm (RBV), Upper Echelons theory, and Institutional theory all came relatively early in their authors’ careers (Barney, 1991; Hambrick & Mason, 1984; DiMaggio & Powell, 1983). Even Albert Einstein’s best known brainchild, the general theory of relativity, was published in 1915 a mere four years after he began working in academia. Such indications suggest that if academic research is too incremental, the fault may lie at the feet of incumbent scholars who have become rigid in their thinking. Thus, it would behoove us to empirically test to what extent there is evidence in support of the incumbent’s curse in scholarly research. Only then can we discern which researchers are most responsible for the radical contributions of theory and the incremental contributions to theory (Whetten, 2002).

III. METHOD

Sample

Four AASCB Research I universities in the United States were randomly selected. All universities had stand-alone business schools with undergraduate, graduate, and post-graduate programs. The sample included one Ivy League, one private, and two state schools, all of which had a strong research focus as part of their mission and culture. Schools chosen were also geographically distinct, covering New England, the Midwest, the Mid-Atlantic, and the Southwest. At each school two departments from the business school, Management and Accounting, were chosen, and all publications of current faculty in those departments were tracked.

Each professor’s CV was parsed through the WebofScience Citations Index to build a database of all publications in A-journals in either management or accounting. Because the focus of this study is high-impact, radical products, only those articles published in premiere A-level journals were included in the study. Though some articles were published in what could be considered A-level journals from disciplines outside of management and accounting, those were excluded, as it is more difficult to determine when such articles can have an impact within accounting and management academe. It is likely that researchers are less prone to citing articles from outside of their own field, even when they may be considered radically innovative. To avoid any adverse impact cross-field effects may have on citations, we restricted the study to those journals that have the highest ISI impact factor for their respective fields (Perkel, 2005).
Further, Judge, et al (2007) found that the prestige of the journal in which an article appears is the most important predictor of its citation count. Therefore, to include articles published in journals with varying levels of prestige would effectively be comparing apples and oranges. The complete list of journals used for the study appears in Table 1. A count of the total number of times each article has been cited (as of April 2007) was recorded, and each article was labeled as the product of a new entrant or an incumbent as explained in the Measures section. This resulted in a final sample size of 975 articles.

Measures

New Entrant Status

Two separate measures of new entrant status were used for robustness. In the first regression, the first year in which an author published in any A-journal was considered his or her market entry. For all subsequent years, the author was treated as an incumbent. Because of the time it takes for an article, much like a new product to take off as a success (Golder & Tellis, 1997), authors will very often be crafting their second year of new articles before they know whether their first year’s work is even going to be published. The pressure to emerge as a radical innovator is not likely to have waned by the second year, and all of the characteristics of a new entrant should still apply to most scholars. Accordingly, a second measure of new entrant status was applied to the first two years of A-level publishing.

Despite being a cross-sectional study, it is possible to label the same entity as both a new entrant and an incumbent since the unit of analysis is the article (product) and not the author (firm). Such an approach is the most logical and theoretically consistent manner to analyze the existence of an incumbent’s curse.

Radical Innovativeness

As mentioned, academic articles that challenge the status quo are likely to either become dominant designs or to be controversial enough to merit challenging. In either case, the level of radicalness for an article will be directly tied to the number of times future scholars opt to cite it in their own work. It is probable that radically innovative papers will be the cornerstone for a greater amount of future research than those papers that merely extend a theory to a new population or add another variable to an extant model. As such, those radical papers will be the ones that are cited more frequently in future scholars’ works, as they will be the building blocks for both incremental and radical research. This reasoning is further supported by Newman & Cooper’s (1993: 520) finding that articles with “exploration plots” that explore new paradigms, or “carry a paradigm into more unknown territory” receive more citations than those articles that merely refine or extend existing theories. Indeed, even if the theoretical reasoning of a paper is not accepted by those in the ivory tower, it will often receive citations by refuters with a cf. (confer) preface.
Chandy & Tellis (1998: 475) define radical product innovation as “a new product that incorporates a substantially different core technology and provides substantially higher customer benefits.” The first criterion related to novelty is isomorphic to the concept of an emergent paradigm in the philosophy of science literature (e.g. Kuhn, 1962). If a new scholarly publication creates a new frame of thinking, it will be the basis for more future research and will receive more future citations. Similarly, the second criterion of customer benefit applies to the academic market as well. Since the “market” of novel scholarly ideas consists of fellow scholars who read the journal publications, it is safe to say that the most valuable benefit that an article can provide to its readers is fodder for future articles. And if an article inspires fellow authors to pen additional papers, the source will be most likely included in the paper at least in passing. Thus, a very reasonable proxy for determining the radicalness of an article is the number of citations it receives.

IV. ANALYSIS & RESULTS

Because the dependent variable being predicted is a count, number of citations, a Poisson regression is most appropriate method for capturing true variance (Long, 1997). Poisson regression models the variance as a function of the mean and implicitly uses a log transformation which adjusts for the skewness and prevents the model from producing negative predicted values. As required, the observations are independent because citation in one article should not make citation in another any more or less likely.

Two separate counts were summed for each professor: one in which only the first year of A-publication was considered to belong to a new entrant, and another in which the first two years of A-publication were used. In each case, the citations from all remaining articles were attributed to an incumebnt. The results of the two regressions may be found in Tables 2 and 3, respectively. In both cases, the results indicate a significant negative relationship between new entrant status and radical innovativeness. The fact that the second regression was less significant (0.02 compared to less than .001) may indicate that the duration of new entrant status is really quite a short period. Inclusion of an additional year had a dramatic effect on the β parameter, as well. Nevertheless, in both regressions, a significant result indicates that there is a strong incumbency effect in academia, but in the opposite direction of what theory would predict.

A common problem with Poisson regression is excess zeros: if there are two processes at work, one determining whether there are zero events or any events, and a Poisson process determining how many events there are, there will be more zeros than a Poisson regression would predict. In this case, excess zero citations may result from the inclusion of articles written so recently that they have not yet had the chance to be cited. To control for this, an alternate regression was computed wherein articles written within the most recent two years were excluded from the dataset. This did not result in any significant differences.
V. DISCUSSION

This study tested the incumbent’s curse in the realm of scholarly publications. Its primary contribution is the counter-theoretical finding that incumbent scholars, rather than new entrants, are responsible for more innovative research articles. By understanding the difference between academic research and technological industries, we can better explain what the root causes of stagnation in academia are and who can help bring about an era of more radical and fruitful research.

Results demonstrate that incumbent academics are more likely than new entrants to pen radically innovative articles in A-level publications. Because this finding is inconsistent with the theory of disruption (Christensen, 2006), it poses a potential limitation to the incumbent’s curse. One possible reason for this discrepancy is that the inclusion of only Research I universities leads professors to feel the same compulsion to publish nuanced articles, regardless of their tenure status. In fact, the steep learning curve in academia may provoke seasoned scholars to include more radical contributions in their pipeline once they no longer have the high employment risk that comes with being an untenured assistant professor. This conforms with Romer’s (1987) research in economics in which he noted that knowledge is one of the only realms not subject to the law of diminishing marginal returns. If this is indeed the case, however, then service firms or those that rely on human talent to develop new technologies and processes should also be able to avoid the incumbent’s curse. Future scholars will have the tasks of explaining what academia can learn from industry to encourage more innovation among its new entrants, as well as what industry might learn from academia to allow its incumbents to remain prosperously innovative.

Future Research

Expansions on this study may prove more robust if able to control for additional effects that were not able to be captured herein. For example, it may be necessary to take into consideration the total number of articles that came from the same author, as authors whose later research is highly related to earlier research have a stronger threat of cannibalization than those with broader interests. It is unlikely that authors who retract part of their earlier contributions in follow-up research can expect their initial articles to be cited with much regularity any longer. Additionally, authors under pressure to publish in higher quantities may slice their research so thin that the quality prevents an article from being considered radical. For instance, if assistant professor turns her dissertation into two publications, and another assistant professor turns his into seven publications, they may each receive the same total number of citations, but each individual article would tend to receive fewer citations and be considered less radical for the second author.

Furthermore, while authors’ current universities were included in this model, it may be more accurate to include each author’s institution at the time the research was actually conducted. For many new assistant professors, this could be an especially difficult task because research is often conducted while they are still doctoral students, but the byline lists where the
scholar is working at the time of publication. Because there can be between a one and six year gap before articles are actually seen in print, the university listed on a publication may not always be an accurate representation of where the paper was created. For similar reasons, future research may consider not only the university where professors are at time of research, but also the doctoral program from where the professor received his or her training, as graduates of certain universities may have more of a drive to produce radical innovations irrespective of what university hires them.

While the university that housed the author was not found to be a significant covariate of number of citations, future research may seek out larger and more diverse samples to determine whether certain schools or types of school (i.e. public, private, Ivy) are more prone towards hiring professors who would pursue radical innovations. Status Characteristics Theory (Berger, et al., 1977) states that more evidence of legitimacy must be applied to new entrants, because individuals or organizations that have not been cushioned by a long history of high performance in certain arenas will be under extreme scrutiny when they first enter. Thus, individuals may not work as hard to be radical once they have already proven themselves. Similarly, universities with reputations for innovative faculty may not have to work as hard to recruit the top people in their field. Conversely, institutional theory would dictate that top universities have the most pressure to maintain legitimacy by finding and recruiting the best and most innovative scholars.

For example, Lee & James (2007) found that new female CEOs in Fortune 500 companies are held to higher standards than their male counterparts because their gender has not been as well represented historically. Institutions may be subjected to similar oversight and their leaders feel more pressure to demonstrate superiority. As such, schools that are known for their seasoned scholars may be more willing to maintain and even promote new entrants who have not yet developed radical publications, while those schools that are in the top tier, but have not always been recognized as industry leaders, may become more adverse and have lower survival rates for new entrants who fail to meet the minimum publication and citation standards.

After studying phenomenon on individual level, it may be worth developing an alternative measure that tests whether certain universities are more innovative than others, since theories such as absorptive capacity (Cohen & Levinthal, 1990) discuss diffusion of knowledge throughout institutions. Thus, while some schools may have more individuals prone to innovations, a test of organizational innovativeness would have to examine how a university capitalizes on individual professors’ ingenuity to create radical innovations throughout the entire department, business school, or campus.

Another problem that was not appropriate addressed in this study is co-authorship. Articles with more than one author were simply entered into the model several times until all new entrants or incumbents were accounted for. In effect, this meant that if there were two new assistant professors who wrote the article, it was double counted and if there was one new assistant professor and one seasoned full professor, the two entries cancelled each other out. The theory of disruption in its current format makes no predictions regarding products borne out of joint ventures between incumbents and new entrants. Future research may wish to draw on the
alliance literature to find a connection between innovativeness that is brought about through multiple constituencies. For example, Singh (1997) proposes that technological complexity is accompanied by higher risk in interfirm cooperation. Using data from the US hospital software industry, he found that alliances buffer some but not all the risk involved with technological complexity. Robertson and Gatignon (1998), as well, find in a study using transaction cost economics that firms investing in technology alliances are more capable at measuring innovation performance and may be able to overcome individual firm barriers to innovation. Thus, incumbents who coauthor papers with new entrants may actually be more inclined towards radical innovation than new entrants alone. Finally, order of authorship or number of authors may be factors worth considering in future models.

Limitations

The current form of this study has three main limitations. The first is the proxy of number of citations being used as a proxy for radical innovativeness. There may be several reasons other than radicalness why articles receive citations (Judge, et al., 2007). There may be a stronger recency than primacy effect, wherein authors’ later works are cited more because they are well-known and add legitimacy to articles, even if the article being cited does not directly pertain to the topic at hand. Lee, Koka & Pathak (2006), for example, found that the topic of “absorptive capacity” had become so reified in literature that seminal articles tend to be cited whether or not they were relevant to actual article. Hambrick (unpublished) has found that over 10% of the papers in Strategic Management Journal misrepresent the information in the articles being cited. Thus, a high citation rate may not be indicative of radicalness so much as popularity or bandwagon effects (Staw & Epstein, 2000). Future research could consider alternate measurements of radicalness, such as best paper awards, cross-disciplinary citations, or simply expert panel assessments of innovation within academia.

Second, there may be a survival bias that results from the stringencies of the tenure process. Gimeno and colleagues (1997) found that entrepreneurs have a threshold of performance below which they will exit the marketplace in favor of more attractive endeavors. Accordingly, this study may undercount the number of new entrant failures who never had the opportunity to publish radical articles as incumbents because they were either denied tenure or left academia for a more lucrative position in industry. The exclusion of non-survivors in the industry may misidentify the advantage new entrants have over incumbents, especially since articles may be cited long after the authors have ceased to publish. In most consumer industries, it is unlikely that a product will remain on the market if the firm that launched it has gone out of business.

Finally, the industry of academia may have contextual abnormalities that limit the generalizability of any findings. Though this study was limited to Research I universities with a strong emphasis on research over teaching and consulting, there is still a pervasive industry-wide tenet that scholarly research wanes after tenure. Because full professors are not fired (except in very rare circumstances), the pressure to publish or perish is no longer in effect (deRond & Miller, 2005). This may prevent the academic cycle from being considered analogous to other
industries, where lack of innovativeness may lead to obsolescence and firm exit. In academia, tenured professors may simply opt for a less stressful existence or devote time to service instead of publishing. Opportunities for deanships or board of director seats open to well-known faculty, and these opportunities may take time away from publishing ability. Nevertheless, a cursory examination of curriculum vitae for the authors of articles used in this study reveals that over 99% have working papers listed. This would seem to imply that professors are still publishing well after they receive tenure, at least at Research I universities where faculty are more likely to desire notoriety and less likely to settle for higher teaching loads.

VI. CONCLUSION

Despite its limitations, this paper ultimately demonstrates that there is at least one industry immune to the incumbent’s curse. In fact, incumbent professors were shown to produce radical work at a far greater frequency than new entrants. While scholars of high technology industries may be hesitant to generalize from academia to other realms, these findings help explain why there has been only mixed support for the incumbent’s curse in prior research: a failure to consider the logical path from entry status to level of radicalness and not the other way around. Additionally, scholars of management and accounting are one now step closer to understanding why we ask the questions we do and to whom we should look in the future if we want more radical and less incremental questions to start being posed.

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- Contemporary Accounting Research (CAR)
- Journal of Applied Psychology (JAP)
- Journal of Accounting and Economics (JAE)
- Journal of Accounting Research (JAR)
- Organization Science (OS)
- Strategic Management Journal (SMJ)
- The Accounting Review (AR)

**Table 1: Publications Classified as Premiere (A-Level) Journals in Accounting & Management Based on Citation Index**
| Year     | Coeff. (B) | Standard Error (σ) | Standardized Coeff. (β) | P<|z| | Confidence Interval | Confidence (95%) |
|----------|------------|--------------------|-------------------------|-----|---------------------|------------------|
| New Entrant | -1.24362* | .1799833           | -6.91                   | 0.000* | -1.596381          | -.8908592         |
| School 1  | .1342797   | .2310903           | 0.58                    | 0.561 | -.318649           | .5872083          |
| School 2  | .0516634   | .29383             | 0.18                    | 0.860 | -.5242328          | .6275596          |
| School 3  | .2940115   | .2467345           | 1.19                    | 0.233 | -.1895793          | .7776023          |
| Constant  | 5.324836   | .1947007           | 27.35                   | 0.000* | 4.94323            | 5.706442          |

*Significant at P < .05

| | Inalpha | .7920167 | .0743541 | .6462853 | .9377482 |
|-------------------------------+------------------------+------------------------+------------------------+------------------------|
| alpha                         | 2.207845               | .1641624              | 1.908438              | 2.554223              |

Likelihood-ratio test of alpha=0: chibar2(01) = 7.0e+04 Prob>chibar2 = 0.000

**Table 2: Poisson Regression New Entry Status on Number of Citations from First Year Versus Remainder**
| Year 1 & 2          | Coeff. (B) | Standard Error (σ) | Standardized Coeff. (β) | P>|z| | Confidence (95%) | Interval |
|--------------------|------------|--------------------|-------------------------|-----|------------------|----------|
| New Entrant        | -.4844596  | .2107903           | -2.30                   | 0.022* | -.8976011        | -.0713181 |
| School 1           | .0446087   | .2712115           | 0.16                    | 0.869 | -.4869561        | .5761735  |
| School 2           | -.0975186  | .3436729           | -0.28                   | 0.777 | -.771105         | .5760678  |
| School 3           | .236479    | .289322            | 0.82                    | 0.414 | -.3305817        | .8035398  |
| Constant           | 5.120395   | .2319258           | 22.08                   | 0.000* | 4.665828         | 5.574961  |

*Significant at P < .05

/lnalpha | 1.114216 | .0776366 | .9620514 | 1.266381

alpha | 3.047179 | .2365725 | 2.61706 | 3.54799

Likelihood-ratio test of alpha=0: chibar2(01) = 7.6e+04 Prob>=chibar2 = 0.000

Table 3: Poisson Regression New Entry Status on Number of Citations from First Two Years Versus Remainder
A GARCH Analysis of Volatility in Country Indices

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ABSTRACT

This paper estimates the coefficients of the Heston-Nandi GARCH(1,1) model of the distribution of log-returns, for each country with an MSCI index as of 1996. These parameters are compared across developing and developed nations. I also test whether these parameters are affected by the level of governance in each country. I find that total risk, adjusted for kurtosis, is a significant predictor of whether the country is developed or developing. Further, I find that relative total volatility, between developed and developing nations, varies over time. Further, there is no constant relationship between governance indicators and the skewness or kurtosis of log-returns in the country indices. These results imply that financial analyses which rely on the distribution of returns, particularly derivative pricing and value-at-risk, may be implemented in the same fashion across developed and developing markets so long as the analyses account for differing first and second moments.

I. INTRODUCTION

The goal of this article is to relate the moments of the distribution of a country’s market index log-returns to measures of that country’s governance quality, and level of overall development. To this end I make use of the Heston-Nandi GARCH(1,1)\(^1\) model to estimate coefficients which describe the distribution of an asset’s log-returns.

This article contributes to the literature on how a country’s governance quality affects financial markets and the behavior of participants in those markets. Moreover, since I am

\(^1\) See Heston, S.L. and S. Nandi, “A Closed-Form GARCH Option Valuation Model” forthcoming in the Review of Financial Studies

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considering each country’s volatility (risk), this analysis begins to quantify the cost of poor governance.

**Hypothesis**

Foremost, we should expect developing nations to have higher total risk. Beyond a higher overall volatility, we would further expect the distribution of returns in developing countries to exhibit more kurtosis. Because developing countries tend to have lower scores in governance measures, it follows that low governance scores should accompany greater kurtosis.

Possible differences in the asymmetry of the log-return distribution (skewness) between developing and developed nations are debatable, and therefore on this point my analysis will take a more investigatory stance. With regards to the persistence of volatility, however, I should expect less developed markets to have more persistent volatility.

**Application**

In this paper I investigate the mean, variance, and higher moments of the distribution of log-returns of country indices. The ability to correlate attributes of a country, such as level of development or governance, with the behavior of these characteristics of the log-return distribution of that country’s index has important implications to risk management and derivative pricing. Specifically, we may consider Value-at-Risk (VaR), and option pricing.

1. **VaR**

   In VaR we are interested in finding the smallest number x such that the probability that the next day’s loss on our index (or portfolio) will be greater than x is, say, not greater than 1%. By letting L be the next day’s loss, we may denote this as:

   \[ P[L \geq x] \leq 0.01 \]

   In implementing VaR, one must decide which distribution to use to model the portfolio’s return. Commonly, a normal distribution is used.

   If a normal distribution is assumed when the actual distribution exhibits kurtosis, then the x found in the VaR calculation will understate the actual x. In other words, the likelihood of large losses is understated, and therefore the portfolio will have more risk that the VaR shows.

   So, to implement (parametric) VaR, it is important to understand the higher moment of the distribution of log-returns. In this paper I investigate whether there is a significant difference in kurtosis between developed and developing nations with a logit model. I further test whether governance indicators are a good predictor of kurtosis. If kurtosis is present, there would be a strong argument to use a nonparametric, historical VaR.
2. Option Pricing

The more the log-returns of an asset deviate from the normal distribution with a constant variance, the less applicable is the Black-Scholes model of the price of an option on that asset. The analysis which follows investigates whether developing nations exhibit greater deviation in the higher moments of their log-return distribution than do developed nations. If so, the Black-Scholes model would be less applicable with respect to options on developing market indices, and this would support the necessity of using stochastic volatility models in these markets.

II. DATA AND METHODOLOGY

Data

The sample of countries used in this analysis consists of all countries for which there was a MSCI country index for the years 1996 and thereafter. This is a sample of 47 countries. For each country I downloaded the MSCI country price index in local currency, with a weekly frequency. I downloaded the time series for the years 1996 through 2006. I next converted the weekly prices into a time series of log returns.

For each of these countries I obtained measures of voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption from the World Bank’s Aggregate Governance Indicators Dataset 1996-2004. These data are available for the even years starting with 1996 and ending with 2004. I also obtained each country’s lending interest rate for each even year 1996 – 2004 from the World Bank’s Development Dataset. Lastly, I found a classification for each country as either developed or developing.

Volatility Analysis

In this paper I am interested in the characteristics of the distribution of returns of each country’s index as measured by the coefficients of the Heston-Nandi GARCH(1,1) model. The Heston-Nandi GARCH(1,1) model assumes that the log-spot price of the asset follows the following GARCH process over time intervals of length $\Delta$:

$$\log(S(t)) = \log(S(t-\Delta)) + r + \lambda h(t) + \left(\sqrt{h(t)}\right)z(t)$$

(1a)

where

$$h(t) = \omega + \beta h(t-\Delta) + \alpha \left(z(t-\Delta) - \gamma \sqrt{h(t-\Delta)}\right)^2$$

(1b)

where $r$ is the continuously compounded interest rate over the interval $\Delta$, and $z(t)$ is a standard normally distributed random variable. The conditional variance of the log-return between $t-\Delta$ and $t$ is $h(t)$, and $h(t)$ is measurable with respect to the information set at time $t-\Delta$. Note that $S(t)$ includes dividends.
In the mean equation (1a), the term $\lambda h(t)$ may be interpreted as the risk premium. Note, that the expected spot return on the asset is a linear function of the conditional variance $h(t)$ (as $\lambda$ is a constant). Further, if the conditional variance $h(t)$ is zero, then the asset earns the risk-free rate $r$. Also, note that as $\alpha, \beta$ approach zero, this model approaches the Black-Scholes model of the spot price, observed at discrete intervals (as the conditional variance is a constant $\omega$). The model is stationary if $\beta + \alpha \gamma^2 < 1$.

We may rearrange (1a) and (1b) to solve for the conditional variance at time $t+\Delta$, $h(t+\Delta)$, given variables observed at time $t$ and earlier as:

$$h(t + \Delta) = \omega + \beta h(t) + \alpha \left( \frac{\left( \log(S(t)) - \log(S(t-\Delta)) - r - \lambda h(t) - \gamma h(t) \right)^2}{h(t)} \right)$$

(2)

Above, $\alpha$ measures the kurtosis of the distribution of log returns. As $\alpha \to 0$, $h(t+\Delta)$ approaches a non-random variance which is a function of time. The coefficient $\gamma$ measures the asymmetric relationship which the shock term, $z(t)$, has with the next period's conditional variance. To wit, $\gamma$ allows the model to capture that a large negative shock may affect $h(t+\Delta)$ greater than a large positive shock. This is the widely observed feature that the implied volatility in options usually increases as the market falls, and decreases as the market rises. The relationship between the spot return and the next period conditional variance can be seen in the covariance between the two:

$$\text{Cov}_{t-\Delta}[h(t + \Delta, \log(S(t))] = -2\alpha \gamma h(t)$$

(3)

So, by estimating the Heston-Nandi GARCH(1,1) we will obtain estimates of the five coefficients $\lambda$, $\beta$, $\omega$, $\alpha$, $\gamma$, for each index for each year. Moreover, from the aforementioned, these coefficients will afford us measures of how: the average spot return depends on the level of risk, $\lambda$; the kurtosis ($\alpha$) and skewness ($\gamma$) of the distribution of log returns; as well as the mean and variance of the log returns.

Of particular interest across countries are the signs of $\alpha$ and $\gamma$. If both are positive, then we can see from (3) that spot returns and the next period conditional variance are negatively correlated.

Similar to the standard GARCH(1,1) model, the estimation of (1b) also allows the calculation of the persistence of volatility (the degree of autoregressive decay in the squared residuals). This is possible as in a GARCH(1,1) model the errors are uncorrelated, however the squared errors are correlated. For the Heston-Nandi GARCH(1,1) model, volatility persistence may be measured as (using the estimated coefficients from (1b)): 

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\[
\beta + \alpha(y^2 - 2y + 1) \tag{4}
\]

Next, I ran a standard GARCH(1,1) model of the form:

\[
y_t = \xi + \varepsilon_t \tag{5a}
\]

\[
\varepsilon_t = \nu_t \sqrt{\kappa + \phi \varepsilon_{t-1}^2 + \eta h_{t-1}} \tag{5b}
\]

where \(\xi, \kappa, \phi, \eta,\) are estimated coefficients, \(h_t\) is the conditional variance of \(\varepsilon_t,\) and \(\nu_t\) is a white noise process. Note that the persistence of volatility is measured as \((\phi+\eta)\) in (5b). From (5b) I also calculate the long-term volatility:

\[
\sqrt{\frac{\kappa}{1 - \phi - \eta}} \tag{6}
\]

Lastly, I calculated the standard deviation of weekly returns for each asset, in order to ascertain if the GARCH models afford any information beyond that conveyed by the total risk of the index.

Therefore, the data set used in this analysis consists of, for each country and for each even year ranging from 1996-2004, the six measures from the World Bank Aggregate Governance Indicators Dataset; the five coefficients estimated with the Heston-Nandi GARCH(1,1) model as well as the volatility persistence from (4); the three coefficients from the standard GARCH(1,1) model as well as the long-term volatility; the standard deviation; and whether the country is developed or developing.

**Logit Analysis**

To investigate whether the moments of the distribution of log-spot prices (the coefficients in the Heston-Nandi GARCH(1,1) model), are good predictors of whether the market index is in a developed or developing country, I will run a logistic regression. In this regression the dependent variable will be 0 for developing countries and 1 for developed countries. I will run 5 logistic regressions, one for each even year 1996-2004 inclusive.

The independent variables are \(\lambda, \alpha, \gamma,\) and persistence from the Heston-Nandi GARCH(1,1) model; and the orthogonalized total risk of the market index measured as the orthogonalized standard deviation. I orthogonalize the standard deviation with respect to alpha.
(α), as the standard deviation is the square root of the second moment of the distribution of log returns while alpha (which measures the kurtosis of the distribution) is the fourth moment.

This means that the larger the kurtosis (which measures the fatness of the tails of the distribution), the larger will be the standard deviation. I am interested in the standard deviation in excess of that caused by the kurtosis in the distribution. Therefore, to orthogonalize the standard deviation, I run a simple OLS regression with standard deviation as the dependent variable and alpha (kurtosis) as the independent variable. In the logistic regression I include the residuals of this regression to measure this excess standard deviation.

Note, the standard deviation acts as a control. Since developing market indices tend to have a higher standard deviation, we need to control for the parameters of the GARCH model that are affected by the higher standard deviation.

**Multivariate OLS Analysis**

To investigate whether a country’s governance measures affect the characteristics of the volatility in that country, I will run a series of multivariate OLS regressions. The dependent variables will be, from the Heston-Nandi GARCH(1,1) model, λ, α, γ, and persistence. For each of these dependent variables I will run a regression for each even year 1996-2004 inclusive.

The independent variables in these regressions will be indices for a country’s control of corruption, government effectiveness, political stability, rule of law, regulatory quality, voice and accountability. Standard deviation is not included as an independent variable as it is, as aforementioned, the square root of the second moment of the distribution of log returns, while the dependent variable kurtosis is the fourth moment of the distribution. It would be to no avail to orthogonalize standard deviation and then include the excess standard deviation in an OLS regression with kurtosis as the dependent variable, as the orthogonalization process would cause the coefficient of the excess standard deviation to be zero.

Total volatility, and the characteristics of that volatility, changes significantly from year to year, however, governance indicators generally change very little. For this reason I am using a separate regression for each year, and not a panel data regression.

**III. RESULTS**

**Logit Analysis Results**

The results from the 5 logistic regressions may be found in Table I. One of the most notable results of the logistic regressions is that, generally, the best predictor of whether a market is in a developed or developing market is the index’s total risk as measured by its orthogonalized...
standard deviation. The sign of the coefficient is as we would expect as I coded a developed market as 1 and a developing market as 0. In every year, besides 2002 when excess standard deviation is insignificant, the coefficient of excess standard deviation is negative. This implies the larger the excess standard deviation, the higher the probability the market index is located in a developing country.

The dependent variable is 0 for a developing market and 1 for a developed market. Pr( > |z|) is given in parenthesis below the coefficients. ** denotes significance at the 0.001 level, * the 0.05 level, ~ the 0.1 level. AIC denotes Akaike’s Information Criterion which is a model selection criterion that imposes a larger penalty on overparameterization than does adjusted $R^2$.

<table>
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</tr>
</tbody>
</table>

Table I
Logit Analysis

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2 See *Econometric Analysis, fifth edition*, Greene, William H.
**Multivariate OLS Regression Results**

The skewness (gamma) was only significant at the 10% level in 2004. Though, in 2004 gamma had a positive coefficient, and remembering the covariance of \( t(t+\Delta) \) and \( \log(S(t)) \) is \(-2\alpha \gamma h(t)\), we can see that in 2004 the inverse relationship between spot return and subsequent volatility is more associated with developed than developing nations’ indices.

Persistence was negative and significant in 2004 at the 5% level. The negative coefficient implies the more persistent the volatility, the more likely the index is in a developing nation.

Lambda is significant in 1998, 2000, and 2002, though it changes sign being positive in 1998 and 2000 while negative in 2002. This brings up another salient point in the logit model results; namely that the way in which the parameters of the log returns’ distribution relate to the level of development of the home market change over time. The parameters of a country index’s volatility seem mutable.

Of the multivariate OLS regressions run, the most significant results are regarding kurtosis (alpha (\( \alpha \))) as the dependent variable, and the results are listed in Table II. Note, higher governance indicator values relate to better governance outcomes.

There are three governance measures which at some point exhibit a significant relationship with the kurtosis in the distribution of log spot returns (the fatness of the tails). These are political stability, rule of law, and regulatory quality. Of the six instances where a coefficient is significant, four coefficients have the expected sign. We would expect these three variables to be negatively related to the fatness of the tails in the return distribution. These two out of the six instances are more evidence for the mutable nature of volatility.
The dependent variable is the kurtosis of the distribution of log-returns for each country’s index, as measured by the Heston-Nandi GARCH(1,1) model. **denotes significance at the 0.001 level, * the 0.05 level, ~ the 0.1 level.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Intercept</td>
<td>0.0001519*</td>
<td>0.0004858*</td>
<td>3.321e-04**</td>
<td>3.4e-04***</td>
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<td></td>
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<td>(0.0216)</td>
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<tr>
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<td>(0.1030)</td>
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<td>(0.1562)</td>
<td>(0.0925)</td>
<td>(0.34339)</td>
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<td>-4.346e-04~</td>
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<td>Adj. R²</td>
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</table>
Table II
Multivariate OLS Results

Similar results are found in the other OLS regressions, though with less significance.

More often than not, it seems, increases in such measures as regulatory quality decrease kurtosis, though in some states of the world the correlation reverses and the more regulatory quality the more kurtosis.

IV. IMPLICATIONS

Prominent among the implications of this study is that the most significant, and most consistent, measure segmenting developed from developing markets is total risk, adjusted for the risk induced by kurtosis, as measured as the excess standard deviation. This measure was significant, with the expected sign, in four out of the five years estimated with the logistic model. Though, this leads into the second salient implication.

While standard deviation is the best predictor of the development of a market, even this measure loses both the desired sign and significance in one of the five years. The departure from the expected relationship may be fleeting, but it highlights that any relationship between sets of countries and their relative risk is mutable, likely striking discordant notes in times of economic turbulence.

The persistence, skewness, and kurtosis of volatility are on the whole poor predictors of whether a country is developed or developing. However, they do become significant in one of the five years, reinforcing the second implication.

From the multivariate OLS regression, we find four of the six instances of significance have the expected sign, which supports the hypothesis that better governance leads to less kurtosis in the log-return distribution. This implies that the governance measures have at best passing effect on the third and above moments of the log-return distribution.

In aggregate, this paper is evidence for the portability of financial practices across borders. Specifically, the similarity of the higher moments of the log-return distributions of developing and developed market indices is evidence for the use of the same VaR and option pricing methods across these markets. The significant difference between developed and developing markets is in their respective standard deviations, and VaR and the Black-Scholes model both account for differing standard deviations.
V. CONCLUSION

In this article I have found evidence supporting that developed countries have relatively less risk than developing countries, even when you adjust for the effect of kurtosis on the total risk. That is to say, the increased standard deviation in developing market’s indices is not solely located in the tails, but rather there is a significant difference in the excess standard deviations alone.

Moments in the distribution of log-returns higher than the variance seem to be affected little by governance quality, and therefore are not good predictors of the development of a country’s market. More work can be done in this regard, though, particularly as more data becomes available with respect to governance.

Lastly, the relative level of risk, between developing and developed markets, has shown evidence of changing over time. Moreover, the moments of the distribution above the variance do become significant within the sample period. Likewise, while usually insignificant, governance measures do become significant in particular years. More work can be done to correlate the timing of the significance with macroeconomic events.

The aforementioned would clearly be important for derivative pricing and VaR. It would be worthwhile to know for such endeavors, in what states of the world, the assumptions about relative volatility, the asymmetry of returns, and the fatness of the tails of the return distribution become invalid.

REFERENCES

Available upon request.
Li & Fung: Exploring Innovation and Change

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ABSTRACT

This paper examines the processes and theories necessary to motivate employees at Li & Fung to accept organizational innovation and change. Attention is given to the background and history of the organization and the type of leadership that is needed to create and foster innovation. The general characteristics of innovation are explored and examples provided on how the organization uses innovation to successfully meet the needs of their customers. A SWOT analysis is conducted on two systems of innovation and consideration is given to the role of ethics and corporate responsibility in implementing innovation and change. The paper identifies the obstacles and hindrances to innovation and concludes by providing a model that organizations can use to successfully implement innovation.

I. INTRODUCTION

Li & Fung is a supply chain management company that oversees the production of consumer products such as garments, fashion accessories, and toys. Li & Fung created a niche for themselves by serving as the mediator between buyers and suppliers. With visionary leadership and managerial capabilities the company has been able to connect and organize relationships in the supply chain. Since 2004, Li & Fung has more than doubled in size (Hoovers Online, 2008). The company follows an aggressive strategy of acquisitions designed to increase market share and expand product offerings through innovation (Li & Fung, 2008). In comparison to industry averages the company has done very well. Their average return on investment was 30.9% compared to an industry average of 20.1% (Mergent Online, 2008). Recent acquisitions include Levi's Signature and Red Tab, American Marketing Enterprises, Integrated Distribution Services, The Ralsey Group, Young Stuff Apparel Group, Oxford Women's Wear, Rosetti, Briefly Stated, Homestead, Regatta Pacific Alliance, Peter Black International Ltd., and Tommy Hilfiger's Sourcing Operation (Lisanti, 2008). With so many acquisitions in a relative short period of time, management is faced with the challenge of integrating the different organizational cultures into one (Marcus, 2005). Acquisitions and mergers are not new to corporations; however, research indicates that they are successful less than 50 percent of the time (Varughese & Bond, 2008). Successful acquisitions involve more than simply combining revenue streams.
Adequate consideration must be given to how employees will react to the acquisition and how best to deal with the initial shock (Valentino, 2004). When reviewing the acquisitions of Li & Fung it is apparent that the organization only acquires companies that can provide long-term value and innovative solutions to their customers (Beng-yan, 2007). This innovative approach has allowed the organization to create and maintain a competitive advantage.

II. LITERATURE REVIEW

As organizations become more globally connected and competition increases there is greater focus on indentifying leadership styles that support innovation and change. Research conducted by Arnold et al. (2007) supports the notion that transformational leadership is positively associated with psychological well-being. In corporate settings transformational leaders are more prone to demonstrate leadership qualities that support innovation. When employees perceive their jobs to be meaningful their motivation to perform becomes centered on psychological factors (Arnold, et al., 2007). Detert and Burris (2007) further the discussion of transformational leadership by considering a leader’s openness to ideas from subordinates. The researchers found that employees exhibited a higher degree of change-oriented behaviors when they felt supported by their managers (Detert & Burns, 2007). For innovation to occur within organizations there must be a defined system in place that allows for new ideas to be reviewed and ultimately implemented.

Organizational culture is also an important factor in supporting innovation. Research findings demonstrate that organizations that support teamwork among employees are more innovative (Masood, et al., 2006). The concept of teamwork and collectivism can take on completely different meanings from a global perspective. Bryan and Farrell (2009) define leadership in the global context as the ability to create strategic and tactical options when competing in an uncertain business environment. This view is particularly relevant given the current global economic crisis that organizations are forced to compete it. According to Bryan and Farrell (2009), “this may, for example, be the time to destroy the vertical organizational structures, retrofitted with ad hoc and matrix overlays, that encumber companies large and small” (p.1). Leadership from the global perspective requires a more streamlined process of decision making in order for the organization to respond quickly to market changes.

Another definition of leadership focuses on the leader’s ability to balance individual effort with the output of teams (Andolsen, 2008). This structured leadership style helps to build consensus among employees that encourages innovation. Employees are motivated because they understand how their individual job performance directly impacts the success of the organization. In multicultural organizations displaying the appropriate leadership is critical. In research conducted by Burkard et al. (2006) it was found that cultural sensitive of the leaders increased satisfaction of employees. Drawing from this research study leadership can be defined as the act of drawing upon individual cultural differences in a responsive manner to meet business objectives (Buckard, et al., 2006). A repeating theme that was apparent in research on leadership and innovation is the attention on the individual. Leadership can only be expressed when there are individuals to influence and motivate. Innovation can only occur when
individuals express their ideas and opinions. Thus leadership that supports innovation must be able to influence the behavior of individuals by fostering their creativity to achieve organizational goals in a consistent manner in various settings.

The strategies implemented by Li & Fung closely align to recommended strategies supported by research. The organization has created a competitive advantage by being able to create a demand for their services in new markets that are not targeted by their competitors. The ability to create demand is the cornerstone of the blue ocean strategy described by Kim and Mauborgne (2005). Organizations that follow a blue ocean strategy create demand by providing something of value that consumers are willing to pay for.

The manner in which innovation is carried out in the organization is also important for its success. When organizations are under pressure to perform leaders may be tempted to use unethical strategies to promote innovation. The current economic crisis in the United States has caused increased attention on business practices and operations. In particular the finance and banking industry has received much scrutiny. Organizations that have been able to weather the storm are those that have followed an ethical business strategy. For example, Jamie Dimon, CEO, JP Morgan Chase & Co, stated it best when he said, “If you are the captain of the ship, you should pay the price” (Smart, 2009, p. 17). This view has allowed JP Morgan to capitalize on the weaknesses of their competitors. Dimon has displayed ethical leadership by withholding bonuses of top executives, cutting club memberships, and other perquisites (2009). These actions have placed the organization in a positive light and have helped to deepen the relationship with stakeholders.

Innovation entails being able to predict what consumers will value. This requires the organization to research the innovation thoroughly before deciding to implement it. There are countless examples where organizations pursued innovation using strategies that did not work. The lessons learned from these instances support the argument that innovation is continuous and also time consuming. Innovation involves the evolution of ideas and this requires time for ideas to germinate. Many organizations are so focused on bringing new products and services to the market that they do not permit adequate time for the innovation to fully evolve. The problem with rushing innovation is that it allows room for mistakes and the misunderstanding of what is valued by consumers.

III. HISTORY OF LI & FUNG

The corporate structure of Li & Fung is very family centric. The company was founded in 1906 by Fung Pak-lieu and current oversight of the organization is carried out by his grandsons Victor and William Fung. Both bring with them a strong business background obtained from their studies at Harvard and Massachusetts Institute of Technology (MIT) respectively (Bang-Yan, 2007). The strong family focus that has made Li & Fung successful now represents significant challenges as they acquire other organizations and seek to expand international business operations. Li & Fung greatly relies on the expertise from employees to improve operations and procedures (Fung, Fung, & Wind, 2008). Li & Fung follows a business strategy
that if the skills and abilities needed for efficiency can not be found within the organization they will obtain it from outside the organization by acquiring other companies. Promotions within Li & Fung have typically been given to family members and close associates. The close family ties that have served the company for more than 100 years must now change to allow for increased organizational capacity. To enhance their competitive advantage, Li & Fung must continually access the knowledge and skills of employees and the success of their competitors (Fung, Fung & Wind, 2008).

Li & Fung follows a blue ocean strategy with regards to their innovation of services offered to customers. A blue ocean strategy is one where focus is given to finding new customers by repositioning or recreating current products or services in a new way (Kim & Mauborgne, 2005). For this strategy to be successful employees must be empowered to make decisions concerning their job responsibilities and assigned tasks. Management must be willing to accept feedback from employees and take action when appropriate. Timely feedback encourages continuous innovation and experimentation with new ideas (Hogue, 2008). For innovation to flourish employees must be rewarded accordingly. The more than 13,300 employees of Li & Fung represent a key asset (Li & Fung, 2008). Empowering the people of the organization to take responsibility for the company’s financial growth allows for the innovation of processes and technology. Innovation is the final outcome when the people (employees) of the organization are allowed to create processes that utilize technology to decrease costs and increase value for customers. The first step is to communicate with employees what the expectations are and why they are needed in order to accomplish the mission of the organization. Change occurs rapidly when an organization is acquired and this creates an increased need for employees to want to know where they stand within the new arrangement. Management must have in place a communication strategy that addresses the basic concerns of employees and eliminates rumors (Varughese & Bond, 2008). Management must ask employees what they need and listen to their answers without preconceived opinions. To accomplish the second step of motivating employees requires creating an environment where employees feel connected to the organization. This occurs when employees believe they are accepted, valued, and appreciated. The third step involves empowering employees to drive the cultural integration forward. Key staff should be identified in the fourth step to monitor employee feedback and bring to the attention of management. The last step is to reward employees for their success.

In 2005 the company implemented a Three-Year Plan 2005-2007. One of the key strategies of the plan was to gain new customers by providing complete outsourcing solutions to retailers. The company also introduced an innovative flexible ‘pay as you go’ plan to help their customers meet their production schedule (Li & Fung Surpasses, 2008). This demonstrates that Li & Fung management is making the needs of their customers a business priority. It is also highlights how innovation can be used to increase value to customers.

Sharing of information and resources across people, processes, and technology is necessary for organizations to achieve a competitive advantage through innovation. Successful acquisitions depend on management’s ability to manage the course of action of the acquisition (Marcus, 2005). CAPS Research conducted a study that revealed that companies in the supply
chain management industry are hiring more employees, paying them higher salaries, and spending more to train them (Purdum, 2007). Investment in employees equates to an investment in innovation. Li & Fung provides a clear example of how innovation can drive profits and create sustainability. The success of firms in this industry depends on their ability to recreate themselves and find new and innovative ways to meet supply chain management needs of organizations. Li & Fung has responded well to this challenge by establishing themselves as the industry leader which is evident by the fact that they have very few competitors.

IV. SWOT ANALYSIS

Li & Fung has more than 13,000 employees and conducts business in the U.S., Canada, Europe, Australasia, Central and Latin America (Datamonitor, 2008). Conducting a SWOT analysis on two systems of innovation within Li & Fung reveals some striking similarities. First, Li & Fung management is committed to promoting innovation among employees and provides timely feedback to employee suggestions. Second, the organizational culture supports change and business procedures are continually enhanced and updated. Finally, Li & Fung has a clear understanding of what their weaknesses are and strives to turn them into opportunities for innovation.

Distribution and Production Technologies

The core of Li & Fung’s business is being able to respond to customer demands in a timely fashion. Li & Fung does not own any manufacturing facilities but is still able to coordinate the production of clothing for retailers such as the Gap, Tommy Hilfiger, and Levi’s. They use innovative technology to coordinate every step of the distribution and production process from design of the product, finding the right materials and parts for manufacturing the product, deciding on the factory and location where it will be produced, and transporting the product to the customer (Meredith, 2006).

The distribution and production technologies developed by Li & Fung have allowed them to become the leader in supply chain management and logistics. The company’s strong reputation has allowed them to expand their market base without much financial investment. When CBS Consumer products decided to launch their new 90210 brand based on the 1990s television drama they immediately turned to Li & Fung (90210, 2008). Li & Fung has successfully utilized their distribution and production technologies to attract new customers and to expand the capacity of current customers. Li & Fung has established a partnership with their customers built on trust. The organization customizes a supply chain model that is specifically tailored to meet the needs of the customer and delivers high quality at a low cost (Hagel & Brown, 2005).
**SWOT Analysis – Distribution and Production Technologies**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>• Highly skilled workforce</td>
<td>• Competitors can duplicate technologies</td>
</tr>
<tr>
<td>• Strong company reputation</td>
<td></td>
</tr>
<tr>
<td>• Complete outsourcing system for retailers</td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>• Highly skilled workforce</td>
<td>• Declining retail sales</td>
</tr>
<tr>
<td>• Increase global acquisitions</td>
<td>• Decrease in consumer spending</td>
</tr>
<tr>
<td>• Flexibility to meet customers demands</td>
<td>• Rising fuel prices</td>
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**Borderless Manufacturing**

Li & Fung does not allow geographic boundaries to prevent them from competing. Management concentrates their efforts on bridging borders and integrating the company’s internal assets throughout their network of suppliers and producers (Fung, et al., 2008). This innovative approach of communicating with suppliers and helping them to build their capacity is critical for Li & Fung to meet the demand of customers. The organization has leveraged their ability to communicate and manage customers, suppliers, managers, and employees to be a major strength. Li & Fung recognizes that their performance is directly linked to the performance of those inside and outside the organization (Gattorna, 2006).

**SWOT Analysis – Borderless Manufacturing**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
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<tbody>
<tr>
<td>• Managerial capabilities</td>
<td>• Overdependence on U.S. market</td>
</tr>
<tr>
<td>• Quick response to customer demands</td>
<td>• Organizational growth hard to monitor</td>
</tr>
<tr>
<td>• Global network of suppliers</td>
<td></td>
</tr>
<tr>
<td>• Strong relationship with suppliers</td>
<td></td>
</tr>
<tr>
<td>• Expert knowledge in international trade policy</td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>• Growing services industry in Hong Kong</td>
<td>• Poor economy in U.S.</td>
</tr>
<tr>
<td>• U.S. companies outsourcing more</td>
<td>• Consolidation of customers</td>
</tr>
<tr>
<td>• Emergence of private labels</td>
<td>• Imposing quotas on Chinese made textiles</td>
</tr>
<tr>
<td>• Growth in global apparel market</td>
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</table>

Li & Fung stays abreast of the political arena and the affects on international trade and governmental ambiguities between countries. By being at the forefront of trade discussions Li & Fung is positioned to advise their customers to make better decisions in times of political uncertainty (Meredith, 2006).

The borderless manufacturing innovation is best suited for Li & Fung. Organizations are increasingly becoming more focused on global operations and competition. Li & Fung can use
this innovative strategy to recreate the traditional supply chain logistics market and redefine the industry expectations. Successful organizations must see beyond geographic boundaries and create a competitive advantage by finding global profit making strategies. This requires making sure that business strategy, organizational culture, and leadership styles of management are properly aligned with the marketplace (Gattorna, 2006). Gattorna (2006) suggests that companies in the supply chain management industry will be successful when they obtain dynamic alignment. This has certainly been the case for Li & Fung. Their systematic approach of utilizing the borderless manufacturing model allows for management to respond quickly to changes in the market.

IV. CHALLENGES AND SOLUTIONS

A major challenge for Li & Fung is being able to implement innovation throughout the entire organization. The organization has a vast global reach that requires understanding the cultural differences and similarities between countries. An innovative approach that is successful in Hong Kong may not produce the same results in the United States. As the organization becomes more interconnected management is faced with the obstacle of being able to bring diverse groups of employees together in order to create innovation that leads to a competitive advantage. Organizational culture can directly impact employee commitment and motivation. Findler, Wind, & Mor Barak (2007) studied a theory-based model that tested the relationship between diversity characteristics, organizational culture, and employee outcomes. The study attempted to explore the use of the theory-based model to understand the impact of diversity on a global scale. Findler, et. al (2007) hypothesized that employees from diverse backgrounds were more likely to experience exclusion and more job-related stress.

The research concluded that diversity characteristics and organizational culture are related to employee outcomes of well-being, job satisfactions, and organizational commitment (Findler, Wind, & Mor Barak, 2007). The most important component that affects organizational culture is the inclusion-exclusion variable. Employees that feel included and part of the organization view the organization as offering more support and opportunity for success. Employees that felt excluded were less likely to display signs of organizational commitment. Employees of minority groups showed lower organizational commitment in comparison to the majority (2007). Management must be proactive in ensuring that all employees feel a part of the organization. HR policies must be aligned with organizational goals and support internal business operations.

Another challenge for Li & Fung is ensuring that that have the internal talent necessary to take the organization to the next level. Li & Fung predicts that in the next 10 to 20 years consumers will use the internet to buy directly from the factory (Estulin, 2005). The company is taking steps to make sure they are developing employees with the skills needed to remain competitive as this trend takes place. The role of HR becomes increasingly more important in developing and providing training opportunities for employees. Innovation can occurs when employees are inspired to take their current knowledge to create something new.
Role of Ethics and Corporate Responsibilities

It is often said that hindsight is 20/20. The inability to predict the future makes the role of ethics and corporate responsibilities even more critical. Management must thoroughly investigate all possible ramifications of innovation. All organizations have a mission and vision that guide their business operations. It is important that the organizational values are in alignment with the way the organization conducts business. Collins (2008) states that there are three components of a vision, “(1) an organization’s fundamental reason for existence beyond just making money; (2) its timeless unchanging core values and (3) huge and audacious but ultimately achievable aspirations for its own future” (p.5).

Ferdig (2007) defines sustainable leadership as a strategy employed by organizational leaders who consider the impact of their decisions on the earth, society, and the health of local and global economies. This ethical view of leadership employs organizational leaders to take into account the outcomes of their actions in a much broader context and not solely on company profits. During times of increased competition and tight economic conditions organizations must focus more on generating sustainable business practices (Brown, 2008). This requires working with suppliers in innovative ways that produces a win-win for both parties. Li & Fung has successfully demonstrated that conducting business in an ethical manner that benefits their suppliers’ results in profits for everyone. The traditional way of conducting business that focuses on profits first, everything else second is no longer viable in a global market. Organizations must work together and the success of one will directly affect the success of the other.

According to Levine (2008), “in the supply chain context, issues assessed in inspections that evaluate suppliers’ respect for CSR standards range from basic legal compliance in areas such as labor and employment, workplace and product safety, customs and trade, and environmental protection to human rights impacts and the scope of community engagement” (p.50). For an organization to act ethically all of these issues must be addressed. For Li & Fung to be socially responsible they must ensure that all of their suppliers are also socially responsible. If they try to bypass the process and allow suppliers the option to follow ethical standard, the reputation of the organization will suffer.

Ethical leaders must lead with bravery, respect, humility, consideration and honor (Schmincke, 2007). This is often easier said than done. Organizations that want to create long-term prosperity must align their leadership strategy to promote prosperity for all. Acting this manner requires bravery because it goes the traditional thought of survival of the fittest. Being willing to help competitors is not seen as a way to create a competitive advantage. However, faced with global challenges organizations must work together and create alliances that support everyone. Innovation may have adverse ramifications that are not apparent at the outset. Organizations that have the humility to admit and rectify their failures will build trust among stakeholders and customers.

In a study conducted by Chun (2006) of 407 managers from three service organizations it was revealed that there was a direct correlation between integrity, courage, employee satisfaction
and innovation. The study concluded that innovation is sustainable when linked positively to both integrity and courage (2006). Integrity encompassed qualities of social responsibility, trust, and honesty. Innovation was described as imaginative, exciting, and spirited. Organizations that are able to display the integrity to support decisions in an ethical manner attract applicants that are motivated to be innovative in a similar way. Building an organizational culture that fosters ethical innovation requires having both ethical leaders and employees. If organizational leaders and employees are not following the same strategy ethical innovation will not be achieved.

Ethical leadership also involves the ability to handle conflicts of interest. Conflicts of interest occur when personal values are not aligned with organizational values. The organization must put into place policies and procedures that clearly outline the company’s view on important matters and provides support for making decisions (Nelson, 2009). This was the situation that Gap, Inc. was faced with when trying to acquire suppliers. Top executives were focused on keeping production cost low and not considering the steps that suppliers were utilizing to meet their demands. When it became known that suppliers were using child labor to meet production quotes, Gap, Inc. was forced to respond by creating a supplier agreement that outlined acceptable production standards.

V. PRINCIPLES AND PRACTICES FOR IMPLEMENTING INNOVATION

In research conducted by Choi and Chang (2009) it was noted that organizational culture directly impacts the attitudes and motivation of employees towards innovation. The researchers identified three organizational factors of management support, resource availability, and support for learning as key enablers for innovation (2009). All three factors were found to be significantly correlated to implementation, however, only management support was determined to be a significant predictor of innovation (2009). This research supports the conclusion that when employees are fully engaged in the process of innovation success is more likely to be achieved. Organizations must have in place procedures that encourage innovation throughout the entire company. Every employee must feel vested in the company and continually seeking ways to improve processes. Innovation is effective when it allows the organization to create a competitive advantage by creating something that is valued by customers. A collective view of innovation within the organization allows for everyone to understand how their individual contributions affect the overall results.

Core Aspects of Leadership

The core aspects of leadership critical to leading innovation and change are vision, communication, and responsibility. In 2008 a group of scholars and business leaders identified twenty-five factors that are important for managers in implementing innovation (Hamel, 2009). Key among them was that management must have a clear vision for the organization. The organizational vision provides a roadmap for employees by defining what the organization hopes to accomplish. Communication is important because it allows for the exchange and refinement of ideas. Effective communication requires that organizations not become bogged down with hierarchal thinking that can typically slow down the communication process. Large organizations
must operate like small organizations and be able to respond quickly to organizational and market changes (Hamel, 2009).

Successful organizations must focus on goals that are socially responsible (Hamel, 2009). Innovation is not just creating the coolest new gadget but it is creating the coolest new gadget that serves the environment in a sustainable manner. As organizations become more global the focus on corporate social responsibility increases. Organizations can no longer operate within a silo. The actions of one organization can affect many others. Xerox in Connecticut, Telmex in Mexico, and Li & Fung in Hong Kong are all dedicating more internal resources to support corporate social initiatives that will have a long-term impact on society (Westlund, 2008b). It is evident that in hard economic times organizations must make critical decisions. According to Westlund (2008a) it is no longer sufficient for organizations only to make a profit and comply with the law. They must also be socially responsible and give something back to the community that they serve.

Implementing Innovation and Change

Basic management principles that encourage employees to participate in the innovation process are more sustainable in creating organization value. A key practice for implementing innovation change is to improve product development efficiency (Study, 2009). Organizations must be willing to adapt to following lean and open innovation (2009). Lean practices are those that recognize the availability of resources and are able to use them in such a way to generate value to customers. Resources consist of assets that the organization has at its disposal to create innovation that leads to a competitive advantage. These assets could be internal, external or both. Internal assets include employees, management, or a strong financial standing. External assets are those things outside the organization that affect its ability to compete and can include factors such as the company’s reputation, availability of technology, and raw materials needed for production.

An open innovation strategy requires an organizational culture that is receptive to employee feedback and encourages a dialogue of ideas. When employees are encouraged to express themselves in an environment that is non-threatening ideas can be easily shared and one idea from an employee can be enhanced by another. This interchange of information of ideas is the center to an open innovation strategy. Communication is able to flow throughout the organization because the traditional roadblocks have been removed. Organizations that are not willing to adapt to changes and evolve will find themselves lacking behind their competitors.

Hindrances to Leading Innovation and Change

A major hindrance to innovation is the unwillingness to accept and be receptive to change. Ford Motor Company’s lack of response to innovation suggested by their suppliers has resulted in declining profits and market share (Supplier, 2007). Ford finished last in openness to new ideas in a survey conducted by Automotive News of eleven automakers in North America (2007). Ford’s inability to be innovative is directly linked to their flow of communication. Ford
follows a traditional top-down approach. This traditional communication strategy places the burden of innovation on top executives. Lower level employees are viewed as the instruments that will implement the innovation. The problem with this approach is that it fails to empower employees to be the creators of innovation.

Hewlett Packard (HP) is another company that has had difficulty in sustaining innovation. In the early years the organization was a leader in bringing innovative products and services to market. However, today, they have allowed their competitors to take the lead. Under the leadership of Mark Hurd management has let their focus on business operations to override their vision to be innovative (Lashinsky & Burke, 2009). Focusing strictly on operational efficiency does not provide an environment that can generate and sustain innovation.

General Electric (GE) has a rich history of innovation. Under the direction of Jack Welch the organization experienced record growth and innovation seemed easy to implement. However, with the transition of leadership to Jeff Immelt in 2001 it became apparent that managers were not adequately trained to continue the high level of innovation previously experienced (Prokesch, 2009). The lack of employee training became a major hindrance to innovation for GE. To maintain their position in the market they need to make sure employees not only focus on the bottom line but also on growth through innovation (2009).

Ford Motor Company, Hewlett Packard and General Electric could have achieved success with implementing organizational innovation and change if they had followed six steps. 1) Be willing to accept criticisms from those outside the organization; 2) Encourage communication to start at the bottom of the organization and flow up; 3) Do not over emphasize business efficiency at the stake of innovation; 4) Invest resources in employee development to maintain a highly skilled workforce; 5) Never rely on past success to predict future success; and 6) Be willing to take a risk.

VI. MODEL FOR IMPLEMENTING INNOVATION

Pulling together key factors from various innovation theories and models provides the basis for creating a concise model that organizations can use to implement innovation. The Organizational Model for Implementing Innovation consists of three major components:

(1) \textit{Input}. Management must understand what employees are able to bring to the table and provide them the opportunity to change business procedures and processes. The employees must also be empowered to make decisions. When management is able to establish a trusting relationship with employees, employees are more motivated to be innovative on their jobs and share new ideas.

(2) \textit{Process}. The appropriate tools and technological resources must be in place for employees to carry out their ideas. Without adequate resources employees will become frustrated and their motivation to be innovative with decline. Innovation comes with a cost. The cost of research, production, and marketing the new product must all be considered before implementation.
Innovation. The final step of innovation represents the product or service that has been created. There must be a clear connection with the outcome with the organization’s mission. At this step management must reevaluate their core business units and decide if their current business structure needs to change to meet the demands of consumers. After careful analysis it may become apparent that the organization must undertake a new business model that allows them to benefit from the innovation.

Organizational Model for Implementing Innovation

This model focuses on the importance of employee participation similar to that described in Likert’s System 4. Likert’s system was published in 1967 and is a participative management model that consists of “supportive relationships, group methods of supervision and decision making, and the establishment of high-performance goals by the organization” (Salopek, 2004, p.26). The system is best described based on the behavior of the leader. A leader that uses System 4 is supportive of peers, able to build individual into cohesive work groups, communicates effectively with subordinates, and expects high performance from themselves and others (Stenberg & Likert, 1981). For System 4 to be effective managers must understand the leadership and interactional components that are involved (1981).

Likert (1967) describes the four systems in terms of six managerial dimensions: leadership, motivation, communication, decisions, goals, and control. Each managerial dimension must be an integrated part of the organizational culture to achieve organizational success and create sustainability. The dimensions help to reinforce innovation and create an organizational culture that is open to change. System 4 brings together all six dimensions in a concise manner that produces a positive effect on organizational procedures. The order of performing each of the managerial dimensions must be considered. First, the appropriate leadership must be established that employees trust and can rely on. When employees feel that
leaders have their best interest at heart they are more motivated to perform on the job. This motivation is further enhanced with communication strategies are in place that provide timely feedback and allow for open discussion of ideas and criticisms. Open communication will assist management in making better decisions because they have accurate and adequate information upon which to base decisions. The decisions that are made will then lead to establishing concrete organizational goals and provide a mechanism for controlling the entire process.

VII. CONCLUSION

Innovation is not easy but is necessary for organizations that wish to remain competitive and maximize profits. Management must communicate a clear organizational vision to employees and trust that employees have the skills necessary to move the organization in the direction necessary. Organizations exist because they fulfill a need in a society. When they are no longer able to provide a product or service that is valued by consumers they will cease to exist. The challenge for leaders is being able to predict what consumers will value and respond accordingly. Innovation is the way the organizations are able to build sustainability and ensure that the company can move forward. Future research should discuss how innovation and leadership strategies differ in a global context. As organizations become more interconnected new innovation strategies will be developed that will change the rules of competition. Following the traditional business strategy of trying to force a product or service on consumers is a sure way to meet with failure. Leaders must turn their attention to building relationships with employees and listening to feedback from consumers.

Communication is critical for innovation. Unless there is an opportunity to exchange ideas innovation will not occur. Successful organizations encourage open communication and take steps to remove obstacles that block the flow of communication. Capable leaders recognize that they are not an expert on every facet of the business and surround themselves with those that are. This view further supports the importance of teamwork in implementing innovation. When employees feel part of the group and understand where the organization is headed they are motivated to participate and use their talents to help the organization move forward. Innovation is synonymous with movement. Li & Fung provides a good example of an organization that uses innovation to move forward and meet the demands of their customers.

VIII. REFERENCES


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Value Chain Orchestration in the Global Biotechnology and Other Industries – Empirical Findings of Antecedents and Consequences

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ABSTRACT

This paper examines how firms expand international and cross industry boundaries through the orchestration of external value chains. Value chain orchestration is intended as way to create and capture value by structuring, coordinating, and integrating activities of previously unrelated markets and by effectively relating these activities to in-house operations with the aim of developing a network of activities that link previously unrelated industries and that create fundamentally new markets. The research is based on an in-depth analysis of the agrochemical and biotech industry and is illustrated by two case studies. Based on the preliminary results of these case studies, the paper concludes that the orchestration of external value chains expands international firm boundaries and leads to superior financial results.

I. INTRODUCTION

Alliances, mergers and acquisitions, and joint ventures are playing an increasingly important role in corporate development. The growing number of publications on this subject only mirrors this trend. The present paper also examines interfirm alliances, albeit from a different angle. In an empirical study I have observed companies which make use of alliances beyond the scope examined by extant theory, i.e. risk sharing, competence enhancement or market development (Powell, 1998). Instead, they use their network of alliances, joint ventures, and acquisitions, which has been configured along an extended, cross-industry value chain, linking formerly separate industries in order to create fundamentally new markets. This activity, which I will call “virtual value chain orchestration” is studied in this paper.

The paper is organized as follows. After reviewing existing literature in this field, a framework for value chain orchestration is presented. Next, after a section dedicated to research methods, value chain orchestration is illustrated by two empirical case studies. I will attempt to shed some light on the relationship between value chain orchestration and financial
results. Subsequently, we discuss the results of our empirical research. The paper concludes with directions for future research and final remarks.

II. LITERATURE REVIEW

In recent years, there has been an unprecedented growth in corporate partnering and various forms of external collaboration. Ever since the 70s and 80s, many companies gave up their long-held beliefs in the benefits of vertical integration, preferring instead to engage in a variety of contractual agreements with other companies. Empirical research across a diverse set of industries has found that alliance formation activity has grown between 25% and 35% annually over the past years (Margulis, 2002). Revenues from alliances accounts for approx. 20% of total revenues for US firms and approx. 24% of total revenues for European firms (Margulis, 2002).

The various types of interfirm alliances take on many forms, ranging from outsourcing agreements, strategic alliances, equity joint ventures to reciprocal shareholdings and other, more complex arrangements. The advantages of risk sharing, increased organizational competencies, access to new markets and the possibility of interorganizational learning have all been cited as possible rationales for this development. After the functional, divisional and matrix structure, organizational scholars view the network organization as an alternative capable of overcoming their deficiencies. (e.g. Miles & Snow, 1994). Recent literature examined the formation of networks resulting from intense partnering such as strategic blocks or strategic supplier networks (Jarillo, 1988). On the other hand, managers, such as those within Omnicom, further developed and adapted this organizational model to industry-specific contingencies (e.g. Kelley, 2000). Recent management scholars have suggested that the network position of a given firm might explain intercompany profitability differences more accurately than a firms market position, thereby implying the conceptual superiority of a relational, rather than atomistic approach in examining competitive behaviour (Gulati, Nohria, & Zaheer, 2000). In theoretical and empirical studies knowledge, then, was found to reside not within firms alone, but within networks of companies (Kogut, 2000). The access to interorganizational networks is seen as form of social capital that increases in value with subsequent use (Coleman, 1988). Network experience intended as knowledge on how to collaborate as well as knowledge gained from collaborations was found to be positively linked to sales growth, innovation rates, or other measures of firm performance (Chung, 1996; Hagedorn, & Schakenraad, 1994; Powell, Koput, Smith-Doerr, & Owen-Smith, 1999; Stuart, 2000).

Predominant focus of the extant literature on strategic alliances and networks, however, is the relationship between the attributes of the partner firms and the resources of the partnering firm in domains of business activity that are critical for competitive success in the current market.

In this paper, networks will be examined under a different perspective: I will study the creation of intercompany networks purposeful configured along the extended, cross-industry
value chain and managed with the aim of linking previously unrelated industries in order to create fundamentally new markets.

This paper thus takes a dynamic, cross-sectional view on patterns of network formation activity. With this we answer a widely and frequently expressed need in extant literature calling for more research on “how network structure and competitive dynamics evolve” (Gnywali & Madhavan, 2001; page 442). Similarly, Parkhe, Wasserman, and Ralston (2006) urge researchers to devote more attention to “process issues” (Parkhe, Wasserman, & Ralston, 2006; page 563) of network formation, a call which is repeated by Dhanarai and Parkhe (2006) suggesting that in the future researchers “need to focus attention on process, as opposed to position and structure” when studying organizational networks (Dhanarai & Parkhe, 2006; p 666).

Current literature sheds light on a further gap in existing research, namely a near total lack of understanding of performance implications of network formation activities: Koka, Madhavan and Prescott (2006) point out a strong “need to understand performance implications of networks” (Koka, Madhavan, & Prescott, 2006; page 734); similarly Möller and Rajala (2007) suggest that future research be dedicated to the “assessment of performance of different nets” (Möller & Rajala, 2007; page 906).

This paper further makes use of in-depth case studies of value chain orchestration in one particular industry, the global agricultural-biotech industry. We thus take up a suggestion by Anderson, Hakansson, and Johanson (1994) proposing the use of “directed case studies to guide theory development” on business networks (Anderson, Hakansson, & Johanson, 1994; p 11).

In sum, we study the process of linking a set of previously unrelated industries through what I call virtual value chain orchestration, i.e. through linking alliances partners, joint venture partners and acquired companies to in-house activities. This paper extends current research in three directions: first I study innovation resulting from linking previously separate industries (as opposed to the current focus of extant research examining innovation in firms current industries); I employ a cross-sectional, dynamic approach and am thus able to document the process of network formation; finally, I shed light on the performance implications of alliance activity (and am thus able to offer preliminary results on outcomes of networking activities).

The two distinct tasks of network configuration – i.e. selection of partner companies – and network management – i.e. optimal resource utilization – will be analysed separately in the following pages. Six steps can be distinguished in this process.

2. 1. Six steps of value chain orchestration

1. Analyse internal value chain: The first step in value chain orchestration is an internal perspective on costs and value added at each step. While nothing new, this exercise provides a
first view of the total value added and the effectiveness of internal operations. If compared to leading competitors, conclusions can be drawn quickly. While this exercise is a standard tool in everybody’s toolbox, unfortunately most companies simply stop here.

2. Analyse flow of goods from primary sourcing to consumption and analyse total amount of value created in the extended value chain. Rarely is a company’s internal value chain the only point where value is added to a given product. Consequently, the next step involves an analysis of all upstream or downstream industries which come in contact with the product and add value or could add value to the product.

Subsequently, the actual contribution of each industry to the overall value creation is determined or estimated. This step will reveal the amount of value created – measured by EVA (Economic Value Added) or approximated by EBIT (Earnings Before Interest and Taxes) – by each of the industries in the cross-industry value chain.

3. **Identify ways to increase the amount of value created by the extended value chain.** Once the value created presently by the extended value chain has been determined, ways to substantially increase this amount through innovation are identified. The objective is to produce radically innovative ideas on value creation. Value is created by improving the quality of products or services or by reducing costs – potentially at each step of the extended value chain.

4. **Configure network around identified opportunities of value creation:** Once potential growth opportunities outside a company’s internal value chain have been identified, links with other companies ensure that the potential value created is delivered to customers. The task of configuration of a network can be split in two: selection of partner companies and determination of the most effective form of the relationship with selected partner companies.

The selection process: As pointed out earlier, recent organization scholars have asserted that competences lie not only within firm boundaries, but also within networks of companies (Kogut, 2000). If we follow Andrews in his view of strategy as match between firm competencies and environmental opportunities, network members should be selected both for their capacity to add to firm specific competencies and for their capacity to broaden available market opportunities.

Form of the relationship with partner companies: The question of the appropriate ownership structure for various economic transactions has long occupied academic research. In particular, the organizational capability perspective, which sees the firm essentially as a bundle of relatively static and transferable resources (Prahalad & Hamel: 1990; Cool & Schendel: 1988) views the firm boundary issue as a capability-related issue. Where the firm already has a strong knowledge base, acquisition provides an advantage and would be the preferred way of undertaking the activity. On the other hand, the capability constraint becomes important when the firm enters into unfamiliar areas of activity, where the technological distance of the target activity is high in relation to firm capabilities (Madhok, 1997). Empirical studies have confirmed that joint ventures, rather than acquisitions, are the preferred vehicle
when acquirers do not know the value of the assets desired, i.e. when they are in different industries.

As value chain orchestration implies the coordination of a wide array of partner companies belonging to different industries, value chain orchestrators will exhibit a significantly higher strategic alliance activity along the extended value chain than other companies in the industry.

5. Identify ways to capture value created:
While strategic alliances with lower resource commitments and increased flexibility are key for expanding a network across a wide array of unrelated industries, they come with one main disadvantage: lack of control. In instances where value creation is joint but ownership is disjoint, conflicts can arise over the appropriation of resulting rents. Transaction cost theory, in particular, under assumption of bounded rationality and opportunistic behaviour, has identified the conditions for market failure, thus highlighting circumstances under which internalisation – i.e. acquisition – is more efficient or less costly (Williamson, 1975). Difficulties in observation, measurement, and contractual specification increase the potential for opportunistic behaviour and hence raise transaction costs. Under these circumstances, transaction cost theory suggests internalisation of concerned activities. I therefore hypothesize the following: At the point of the extended value chain where rent appropriation concerns or measurement problems regarding contributions of partner companies are greatest, acquisitions or joint ventures, rather than strategic alliances will be predominantly employed.

6. Management (“Orchestration”) of cross-industry value chains

Once a network of network has been set-up, orchestrators need to coordinate the activities of a wide array of partner companies and effectively relate them to in-house activities. Given the diversity of partner companies, orchestrators need “value creation insights” (Campbell, Goold, & Alexander, 1995) in order to successfully manage and develop the network. In particular, as direct ties serve both as a resource and as a channel for information (Ahuja, 2000), knowledge transfer between the focal firm and its partners and between partners themselves is critical. As central firms, orchestrators develop ideas in the sense that they take ideas from network partners and add value by developing them further in their own organizations (Lorenzoni & Baden Fuller, 1995).

As a result, we expect value chain orchestrators to achieve performance levels significantly higher than those realized by their industry peers: The intense and purposeful development of a wide network of partner companies should give value chain orchestrators the potential to achieve superior operational performance compared to companies pursuing another type of strategy.
III. METHOD OVERVIEW

The setting of this study is the global agrochemical and biotech industry, a slowly growing market valued at around $30 billion per year (Philips McDougall, 2001). In the context our company’s effort to identify and implement a biotech strategy, I have been involved as a project manager in one specific area of the overall strategy. The project, which spanned several years from kick-off until implementation of the identified strategies, can be divided in three major phases. Phase one involved an extensive assessment of current and future customer needs, competitive strategies, and the company’s core competencies. Interviews with selected executives of industry associations, investment banks and consultancies complemented the first phase. In the second phase alternative strategic options were tentatively identified and evaluated based on technical and financial criteria. In an attempt to gain a deeper understanding of the viability of the selected options, structured interviews with suppliers, customers, customers of customers, competitors, regulatory agencies and again selected industrial consultants were conducted in Germany, France, and Great Britain. In total, the transcripts of 90 interviews could be usefully analysed. A literature review of CEO interviews, newspaper articles, research reports by investment banks, Harvard Business School case studies and other background material on the biotech industry completed the second stage of the project. In the final phase of the project, about 18 months after kick-off, research findings and the preferred strategic option were summarized in a report issued to the Board of Management.

IV. ORCHESTRATION IN ACTION – THE EMPIRICAL EVIDENCE

Monsanto:

Monsanto’s search for growth beyond industry boundaries was triggered in 1995 when Monsanto’s leadership team, under the direction of its CEO, Shapiro, drafted a new strategy for the company. The team recognized that an increasing world population, the ongoing pollution of the environment especially in developing countries, and decreasing acreages of arable land would put the world’s environment under sensible pressure over the next decades. Shapiro’s vision of “sustainable growth” lead the company to a fundamental shift in its strategic approach: rather than producing chemicals sprayed on fields, the company would produce information – genetic information – to be incorporated in plants which would add value for the farmer and the consumer. “A closed system like the earth cannot withstand a systematic increase of material things, but it can support exponential increases in information and knowledge”, Shapiro says. Biotechnology was the mean to achieve this vision (Magretta, 1997).
Arnold Donald, CEO of Monsanto Agro, expressed the incumbent paradigm shift in the following way: “Traditionally, agricultural inputs were produced, distributed, and marketed as separate products: seed was produced and distributed by seed companies, herbicides, insecticides by chemical companies, and quality improvements were done by processing companies. Donald saw a system “where these separate channels would merge. Through biotechnology the insecticide is hosted by the plant itself. Quality can be built in directly into the genome of the plant. We will witness a paradigm shift.”

Monsanto also recognized that this paradigm shift required a fundamentally different approach to the traditional food chain: rather than viewing it as a system of clearly separated steps where each company would focus on optimising its specific contribution, Monsanto recognized the opportunity of seeing it as interconnected where the potential existed for a selected number of companies to directly or indirectly influence the whole chain. For this to become true, a network of partner companies would be needed – on all levels along the extended, cross-industry value chain.

By following a strategy of value chain orchestration, Monsanto created a dense network of partner companies covering every step of the extended value chain.

*Insert figure 1 & 2 about here*

**DuPont**

In 1998, after having spun-off Conoco, DuPont’s petrol subsidiary, in the largest ever IPO on Wall Street so far, Charles Holliday was considering his company’s next moves, He knew the company’s future lay predominantly in biotechnology. Within DuPont, research efforts in biotech had been exploratory until the mid 1980s. In 1986, however, biotech started to receive increased management attention and financial resources. DuPont recognized that, eventually, plant could be transformed into “tiny factories”, capable of enhancing the value of agricultural products in many ways.

The company recognised the potential of biotechnology to fundamentally reshape current industry value chains. Stephen Potter, DuPont vice president of strategy and business development, stated: “We are moving from an asset-based industry into a knowledge business. This will redefine and reshape our industry’s value chains. The application of bioscience, genomics, and technology will dramatically alter the ability to create and capture value. “He continued: “Many of the best opportunities will arise from the convergence of two or more formerly separated fields. In short, we will have to figure out how to use the existing systems better to create more value and to cut costs.”

**Value capture:** Holliday recognized: “To deliver output traits, one has to have a delivery mechanism, and that's seed.” In 1998, DuPont acquired Pioneer, a leading US seed company;
following a series of other, smaller acquisitions, the company is recognized today as the largest seed company in the world.

Michael Ricciuto, head of DuPont biotech communication, said: “The business system just does not exist for distributing and marketing branded products. So we are creating it.” In the creation of the new business system involving a broad range of partner companies DuPont relies heavily on strategic alliances. The company attempts to build partnerships without actual integration: “Virtual integration” stands for the company’s commitment of long-term cooperative arrangements with independent firms (West & Kasper, 1999).

The underlying logic of identifying the most desirable partner companies was the logic of virtual value chain orchestration. The extended, cross-industry value chain and the purpose of creating fundamentally new markets became the framework for identifying, evaluating and selecting alliance partner companies. Ultimately, DuPont “covered” all steps of the extended value chain with a dense network of R&D collaborations, joint ventures, strategic alliances, and acquisitions.

Performance standards with partner companies are managed through service level agreements, i.e. predefined commitments on expected outcomes between DuPont and partner companies. Star-performers can thus earn a more central and hence more important role in the network, while underperforming companies are expelled, if they do not reach specified milestones.

Other players in the industry

Although I will not report in detail about competitive strategies of other industry participants, I made considerable efforts to gather reliable data on the alliance and acquisition activity between 1996 and 1999 in the industry. Main sources of information were industry journals Agrow and Chemical Week – where all significant alliance and acquisition activities are reported – annual reports, research reports by investment banks, and field interviews. The table below lists the number of alliances and acquisitions/joint ventures in the industry for the period analysed, and provides specific information for the two companies discussed in detail.

Insert table 3 about here

Financial results

Alliance activity: It was suggested before that orchestrators would exhibit a significantly higher alliance activity along the extended value chain than other companies. The data above confirm that Monsanto (25 alliances) and DuPont (21 alliances) exhibit a significantly higher alliance activity than their industry peers (13 alliances on average).
Acquisition activity: We then hypothesized that acquisitions, rather than strategic alliances, would be employed at the point of the extended value chain, where uncertainties regarding rent appropriation were greatest. As already mentioned, this point is represented by the seed industry in the global agrochemical and biotech industry. The data above show the following: at the level of the seed industry Monsanto has a total of 19 acquisitions and 2 alliances, DuPont has a total of 5 acquisitions and 1 alliance, while other companies have on average 3 acquisitions and 2 alliances. The available empirical data thus support the hypothesis.

Financial results: A word of caution is necessary before interpreting financial results of orchestrators and other companies in our study. As mentioned already, investments in biotechnology are long-term investments, where, so far, costs and revenues have not materialized in the same way. Monsanto’s CEO stated that, even after the significant investments of his company in biotechnology, “a commercial breakthrough [in output traits] was still a long way off” (Magretta, 1997). Tom McKillop, at that time CEO of Zeneca, echoed his words: he recognized that biotechnology would only add significant contributions to the bottom in the mid to long-term.

Thus, rather than analysing present financial results, I decided to look at expected financial results. Here, research reports by investment banks provide useful data. Research reports by Merrill Lynch, HSBC, Deutsche Bank, and Morgan Stanley were scanned for data on the global agrochemical industry, as well as on data for expected profits and sales for Monsanto and DuPont. (Investment Banks, 2001) The table below summarizes estimates by investment banks on the expected profitability and growth of Monsanto, DuPont, and their industry peers.

*Insert table 4 around here*

Expected sales growth for the industry (year 2000-2010) is 3.4% per year, while Monsanto and DuPont are expected to grow by 8.3% and 7.2%, respectively. The expected profitability in the industry (defined as EBIT/sales) is 14.0%, while Monsanto and DuPont are expected to realize profitability margins of 22.0% and 20.5%, respectively. The data from the two case studies thus seems to indicate that value chain orchestrators are expected to exhibit significantly higher sales growth and profitability ratios than their industry peers.

On a final note, I want to add that biotechnology was initially met with scepticism – especially in Europe and Japan. Today, by contrast, it seems that solid scientific research has been successful in convincing consumers worldwide about the benefits of the responsible use of agricultural biotechnology (Yan & Kerr, 2000).

In Europe, where consumers initially were most sceptical about the consumption of produce from genetically modified crops, agricultural biotechnology has recently received a strong support from the leading European regulatory body, the European Food Safety Authority (Efsa), which has declared that “healthy clones [i.e. genetically modified organisms] … do not
show any significant differences from their conventional counterparts” (Financial Times, 2008).

V. DISCUSSION AND CONCLUSIONS

In this paper I have attempted to explore the theory and practice of an emergent phenomenon of organizing and strategizing: virtual value chain orchestration has been defined as way to create and capture value by structuring, coordinating, and integrating activities of previously unrelated markets and by effectively relating these activities to in-house operations with the aim of developing a network of activities that create fundamentally new markets.

The dynamics of interorganizational relationships, and especially the challenges linked to the configuration and management of an extended network of partner companies, were illustrated by two companies operating in the highly dynamic environment of the global agrochemical and biotech industry.

I explored the relationship between strategic orientation (i.e. virtual value chain orchestration vs. “traditional” strategies) and financial results: Companies implementing a strategy of value chain orchestration were found to exhibit significantly higher sales growth and profitability rates than their industry peers.

In a review of network studies Oliver and Ebers (1998) remark that, despite the growing number of publications on inter-organizational networks, only limited attention had been given to outcome variables, such as cost/price, revenues, learning and innovation. Through the two illustrative case studies I have attempted to shed some light on the relationship between network structures and financial results of focal firms. Specifically, our analysis of the global agrochemical industry has shown that value chain orchestration and the creative management of a wide array of partner companies along the extended value chain indeed seem to translate into superior financial performance.

Our study has several limitations. First, the superior results determined for orchestrators are not actual results, but expected results: we have made an effort to use a reliable and unbiased source (investment banks), but of course there is no guarantee that these results will actually be met.

Second, the evidence presented here is anecdotal, rather than systematically scientifically grounded. More research is needed to empirically ground the concept of value chain orchestration, possibly in other industry contexts using historical financial results.

Despite these limitations, I see the model of value chain orchestration as an emerging way of organizing and strategizing, which underscores the importance of relationships, competencies, and systemic innovation. It probably represents a further step beyond the model of virtual outsourcing in the sense that a compelling and clear-cut logic underlies the evolution of a web of partners. As stated above, this model of organizing and strategizing is still emergent, in the sense that we need more empirical research to undermine its foundation.
paper should therefore be considered as a first puck on the ice at the beginning of a very long game.

VI. REFERENCES


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Appendix

Figure 1&2: Monsanto’s network in the agchem-biotech industry

Table 3&4. Alliance and acquisition activity in the global agrochemical and biotech industry; performance implications of value chain orchestration

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