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STATISTICAL POWER FOR DETECTING PROCESS SHIFT IN A MULTI-STRATA PRODUCTION PROCESS

Atul Agarwal, University of Illinois at Springfield
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ABSTRACT

In spite of institutionalization of statistical process control (SPC) programs in U.S. industry to improve quality for over a decade, many companies continue to experience problems in implementing them. Most often these firms face difficulties in correctly applying SPC techniques to their processes. This is especially the case for multi-strata (population) production processes. Even if such a process is in a state of statistical control, there is a high likelihood that one or more strata could drift away from the target due to an assignable cause. It is critical that the control chart detects such changes as soon as possible so that corrective actions can be taken in a timely manner. Osborn (1990) states that an insensitive control chart may miss out in detecting small shifts in a process and jeopardize a company's continuous improvement efforts.

This paper investigates the problem of detecting a single stratum shift from the target with a high level of sensitivity for a multi-strata production process. Selection of an appropriate sampling method is proposed to have a strong bearing on the relative sensitivity of detecting the above shift. The choice of an appropriate sampling method for multi-strata production processes is not so easy. Most often, whichever is "simplest", "most convenient", or "seemingly logical" is used to determine the sampling method. In this paper, we develop power curves for the above mentioned process to study relative superiority of detecting process shifts under stratified and random sampling plans using both 0 and R control charts. It is expected that this study can provide QC practitioners with better insights on detecting process shifts with high sensitivity and its linkages to selecting appropriate sampling methods for stratified processes.

INSIGHTS INTO ORGANIZATIONAL CULTURE, OBJECTIVES, AND OWNERSHIP AS INFLUENCING FACTORS ON ADOPTION AND DIFFUSION OF MOBILE TECHNOLOGIES IN BUSINESSES IN THE UNITED ARAB EMIRATES

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ABSTRACT

In this paper, I would like explore the possible impact that organizational objectives, ownership patterns, and certain cultural attributes might have on the adoption and diffusion of mobile technologies in businesses in the United Arab Emirates. It is also an exploratory study in that it will investigate the adoption of different mobile technologies in businesses in UAE. The importance of this research stems from the fact that it is becoming common fact amongst researchers and professionals that mobile business is becoming a very important tool for businesses in their attempt to survive stiff and global competition. Thus, the objectives of this research attempt to investigate the status of mobile business in businesses in UAE and at the same time to elicit the views of these businesses about this technological innovation. It is expected that the outcome of this research to pin down the most impending issues concerning the adoption and diffusion of this important technology in businesses in UAE.

OBJECTIVES

It is believed that investigating the mobile business phenomenon in businesses in UAE will achieve the following main objectives:

1. Gain an understanding about the depth of the mobile business phenomenon in businesses in UAE:
   a. What mobile business technologies are being adopted or not and why?
   b. How are these mobile business technologies being used in the businesses environment?
2. Identify accelerators and/or impediments of mobile business adoption in businesses in UAE.
3. Compare the findings from the UAE perspective with other countries in the world.

Predicting Leadership Success in Agile Environments: An Inquiring Systems Approach

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ABSTRACT

In recent years a host of new agile software development methodologies have been introduced. These methodologies emphasize people over process, software over documentation, customer collaboration over contract negotiation and responding to change over following a plan. While there is still much debate over the effectiveness of these new agile methods, there is general agreement that they are quite different from the traditional process oriented approaches. One major implication of these differences is the need for a less rigid and formal approach to project management. Because of Agile's focus on people and collaboration combined with the need to embrace change, leadership requirements are vastly different than those using traditional process oriented approaches to software development. Personality characteristics of successful agile managers may contrast sharply with those of more traditional project managers. In this environment a leader's personality profile and way of interacting with others is at least as important as their intellectual ability and "hard" project management skills. In current management literature, the Myers Briggs Type Indicator (MBTI) has been cited extensively as an aid in leadership development and identification of individuals most likely to be successful leaders (Fitzgerald & Kirby, 1997; Gardner & Martinko, 1996). This paper will discuss the MBTI approach as it has been applied in the literature. As we will see, while a good tool for assessing dimensions related to an individual's view and perceptions of the world, there is also a need for an evaluative approach that emphasizes an individual's mode of interacting in a team environment. In this paper, such an approach is proposed, an inquiring systems perspective, based on Churchman's five modes of inquiry. The MBTI will be compared to this inquiring systems approach within the context of agile leadership requirements. This analysis suggests that the inquiring systems perspective provides a more effective tool for assessing an individual's propensity for success in an agile software development environment.

WILLINGNESS TO USE STRATEGIC IT INNOVATIONS AT THE INDIVIDUAL LEVEL: AN EMPIRICAL STUDY SYNTHESIZING DOI AND TAM THEORIES

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The literature seems to indicate that information technologies are crucial to corporate strategy and firm performance. But there remains a lack of study regarding how to determine problems with IT implementations early on, and the successful implementation of solutions to those problems. Without such knowledge, the complete benefits of information technologies to firm strategy and performance cannot be reaped.

Discovering what determines successful attitudes toward usage of such technologies at the individual level is critical to firm performance. There already exists an abundance of literature regarding information technology and various aspects of organizational performance (Akkermans, & van Helden, 2002; Chan, Huff, Barclay, & Copel, 1997; & Hitt, Wu, & Zhou, 2002). What is lacking is an analysis of how IT innovations are most productively adopted at the individual level, and how recognition of the critical success factors to usage of these technologies affects attitudes toward using them. In a global and increasingly fast-paced business environment, Willingness to Use IT innovations and the speed with which they are adopted can significantly affect competitive advantage.

The work of Rogers and Davis et al., and all subsequent research employing their models, leaves a critical gap in the existing knowledge of this important subject. That gap is precisely what I address in this research, namely identifying and empirically examining pre-adoptive behaviors toward technology adoption and usage. Corporate strategists need a better understanding of predictors of system usage and success before adoption and implementation rather than ex post.

DOI Theory and TAM suggest that an individual's willingness to adopt a new technology (PWS technology in this study) is influenced by three critical factors, as shown in the research model: Relative Advantage, Complexity, and Trialability. Hypothesis H1 stated that individuals will be more willing to use a PWS system when Relative Advantage is high. Results of the ANOVA analysis strongly support this hypothesis, indicating that individuals who perceived a high Relative Advantage from using the PWS system were more willing to use it than those who perceived a low Relative Advantage from using the system. This finding was supported by the ANOVA results of all three dependent variables employed in the study; the primary dependent variable of Willingness to Use, as well as the two supporting dependent variables of Rate and Overall Evaluation.

Hypothesis H2 stated that individuals will be more willing to use a PWS system when Complexity is low. The results of this study support this hypothesis with one qualification. Individuals who perceived a low level of Complexity in using PWS were more willing to use it than when the perceived level of Complexity of the PWS was high as tested with two of the three dependent variables. Specifically, H2 was supported by testing of the primary dependent variable

of Willingness to Use and the supporting dependent variable of Overall Evaluation. However the test of Complexity in the case of the Rate dependent variable was not significant.
Hypothesis H3 stated that individuals will be more willing to use a PWS system when Trialability is high. Results of the ANOVA analysis strongly supported this hypothesis as well. Individuals who perceived a high level of Trialability before adopting the PWS system showed an increase in Willingness to Use it across all three measures of the dependent variable.

The observed interactions also merit discussion. This study found a significant interaction effect between Relative Advantage and Complexity. This finding suggests that individuals are fairly willing to use a new technology when Complexity is low without regard to its Relative Advantage. When Complexity is high, the new technology must offer a pronounced Relative Advantage before individuals will be willing to use it. This study also found a significant interaction effect between Complexity and Trialability. The analysis indicated when Complexity of a new technology is high, Trialability is an especially important factor. Hands-on experience was found to be crucial to user acceptance of complex information technologies.

One of the primary purposes of this research was to add to the existing theoretical body of knowledge regarding the critical success factors behind information system adoption decisions. To that end, I have added to the existing research in terms of three factors that determine Willingness to Use a new technology. Specifically, the primary contributions of this study are to provide new empirical data on three previously tested independent variables, in an entirely new way. This was accomplished by testing DOI predictions, and illustrating conceptual linkages between DOI and TAM.

The vast majority of academic studies have focused on the rate of adoption of new technologies during implementation throughout organizations. This study is unique in that it focuses on the factors that influence user acceptance of new technologies ex ante, specifically Relative Advantage, Complexity, and Trialability. In addition to obtaining empirical data on these three variables, fascinating interactions between the variables were discovered that were heretofore under researched or not researched at all. The interaction between Relative Advantage and Complexity, as well as that between Complexity and Trialability discovered in this study add substantially to the existing knowledge regarding these phenomena.

The research model is unique in that incorporates attributes of DOI and TAM in assessing a user's willingness to adopt a new information technology. Conceptual linkages between these two theories were created in a novel way. DOI seeks to measure the longitudinal dependent variable of Rate of Adoption of Innovations by using the five independent variables previously enumerated. The TAM seeks to measure the dependent variable of post-adoption Actual System Use through measuring Perceived Usefulness and Perceived Ease of Use. By synthesizing Perceived Usefulness with Relative Advantage, and Perceived Ease of Use with Complexity, this study draws upon two well grounded theoretical bases to explain the behavioral intent of potential information technology adopters. Although prior studies have actuated similar syntheses of these variables, they have not done so in the unique manner conducted within this study. The novel contribution is in terms of the element of measurement of pre-adoptive behavioral intentions, and the particular variables that this study measures.

Although not the first study to use concepts from the highly validated and reliable scale established by Moore and Benbasat (1991) to measure Relative Advantage, Complexity, and

Trialability, it did so within the entirely new theoretical context of pre-acquisition. As such, this study entered a new area for empirical testing of this scale.

Another significant and new contribution to academic research was achieved through the distinctive research design. The research model was tested using three different measures of Willingness to Use which converge on the same results, thus increasing the convergent validity. The 21 item scale used to measure the three dependent variables proved to be extremely reliable. The design of the scale which included manipulation checks, measures of constant variables from DOI, and reverse scored scale items contributes significantly to the small body of knowledge regarding measuring the behavioral intent of individuals in ex ante IT adoption situations.

To my knowledge, this is the first study to focus on pre-adoption factors within a hybrid model combining DOI and TAM models at the individual level, utilizing a scenario-based research design. The results of this study serve to reinforce the notion that although a great deal of research has preceded in the field of information systems usage, we still as yet do not have a complete understanding of all of the complex variants that go into acquisition decisions.

The findings of the research have important practical implications for potential IT implementations. As never before, the study provides some preliminary evidence concerning the criteria that potential adopters utilize to evaluate IT innovations. This is important in the potential purchase decisions of IT innovations, some of which may have significant strategic implications. This is also important in the design of information systems and the associated implementation plans that will lead to acceptance and success of information systems.

The results of this study should assist managers in identifying and assessing the critical success factors of user acceptance of new information technologies before rather than after acquisition. Prior to investing in what may be mission-critical and costly information systems, managers should gauge their employees' perceptions regarding the Relative Advantage, perceived Complexity, and perceived Trialability of the new technology by the individual prior to acquisition. This study has shown that individual workers will likely be more willing to use a new technology if they perceive that it will offer them advantages, lack complexity, and allow them a chance to try it out before purchase. Given the problematic and costly history of failures of some enterprise wide systems such as ERPs, this is powerful knowledge that managers can use in order to ensure successful acquisitions and implementations, resulting in greater efficiency and profitability. Rather than falling into the trap of acquiring systems simply because the competition does, along with the attendant fear of operating at a competitive disadvantage, managers are well advised to learn more about the potential likeliness of successful outcomes. In some cases, regardless of system merits, premature acquisitions may by themselves place organizations at competitive disadvantages.

With regard to the findings of interactions between variables found within this study, managers should delve deeper into the nature of a proposed system's attributes before acquisition. For example, if a system is considered to be complex, workers are likely to be more willing to use it if it offers some distinctive advantage to them personally. Additionally, if a system is considered to be complex by workers, managers should plan some pre-adoption hands-on experience in order to ensure successful acquisition outcomes. These are crucial findings as managers might have a tendency to become so engrossed in technical or other details of potential systems that they overlook the importance of considering these factors.

Pending future research, organizational change agents may tailor IT demonstrations, marketing efforts, training programs, and other implementation interventions to emphasize criteria that end users actually employ to make their adoption decisions. This, in turn, should increase the likely effectiveness and efficiency of managerial interventions in the analysis and acquisition decisions of crucial IT applications.

This study represents a solid beginning in a new pre-adoption research area. It appears to nicely replicate some previous organizational-level research on post-adoption perceptions of new technology, extend that work to the new realm of individual pre-adoption judgments of technology, and raise some intriguing new insights. Additional research is called for to expand and enhance the findings.

Study results for Relative Advantage strongly support Hypothesis H1. The finding that Relative Advantage has a strong effect on Willingness to Use nicely replicates previous research and extends it to the realm of pre-adoption judgment. Specifically, a number of studies found Relative Advantage to be a strong indicator of post-adoption perceptions toward the adoption itself, within the context of the organization. One of these found a very significant relationship between Relative Advantage and Attitude Toward Use within the context of electronic customer relationship management (Wu & Wu, 2005). Other studies have found strong relationships between Relative Advantage and adoption at the individual level, but all measured the relationships in post-adoption contexts (Oh, et al., 2003; Murphy, 2005; & Lee, 2004). One study claimed to find support for the relationship between Relative Advantage and current usage of personalized features on a web site (Greer & Murtaza, 2003). This is one of the few studies reviewed that featured analysis at the individual level, however it was in the post-adoption context. Moreover, the analysis did not statistically show strong support for the relationship between Relative Advantage and current usage. This speaks to the need for additional research in the area of the relationship between Relative Advantage and Willingness to Use, prior to system adoption. The current study finds initial support for the importance of Relative Advantage on Willingness to Use new technology at the pre-adoption phase.

Hypothesis H2, that Willingness to Use would be higher when Complexity was low rather than high, was also strongly supported. Prior research on post-adoption perceptions of technology produced fairly inconsistent results. The current findings are similar to nearly half of the prior studies, with the rest finding either opposite, conflicting, or non-significant results. Specifically, of the fourteen studies reviewed within this research, six showed results in agreement with the support for hypothesis H2 (Ardis & Green, 1998; Vollink, et al., 2002; Tornatzky & Klien, 1982; Atkinson, 2007; Oh, et al., 2003; & Lee, 2004). Two found results in disagreement with the support for H2 (Greer & Murtaza, 2003; & Wu & Wu, 2005), while the remaining six found results that were either mixed, or not statistically significant (Kendall, et al., 2001; Faiers, et al., 2007; Sakraida & Draus, 2003; Teng, et al., 2002; Shelley, 1998; & Murphy, 2005). It is interesting that the two studies in disagreement examined web-based applications involving consumers. Perhaps some level of Complexity in terms of a variety of features or options may be desirable in the web context. Given the mixed prior findings for Complexity, and the diversity of contexts studied in the past, it is possible that Complexity may be context dependent. Future research might examine the contexts under which Complexity either enhances or restricts Willingness to Use new technology. The current

study provides initial evidence that high Complexity may restrict Willingness to Use new technology at the pre-adoption phase.

The finding of significance for hypothesis H3, that Willingness to Use would be higher when Trialability is high rather than low, is dissimilar to only two of the other thirteen studies reviewed within this research (Tornatzky & Klien, 1982; & Oh, et al., 2003). Interestingly, there are very few, if any, similarities between these two studies. The Tornatzky & Klien (1982) study is obviously very dated, thus it is difficult to draw any clear linkages between their findings and mine some 27 years later. Oh, et al. (2003) took an entirely different theoretical approach, essentially using attributes of DOI as antecedents to TAM variables combined with TPB constructs to predict "attitude." That study is entirely dissimilar to this one, and to the remaining eleven studies reviewed. There is solid theoretical basis for support of the relationship between Trialability and Willingness to Use. Additional research should serve to reinforce the notion that Trialability is a strong predictor of the individual's Willingness to Use information systems.

The finding of a significant interaction between Relative Advantage and Complexity merits additional research. Within the existing body of knowledge there appears to be only one study that addresses this interaction of variables (Wu & Wu, 2005). Their hypothesis that Complexity of electronic customer relationship management software significantly influences Relative Advantage was not supported. Given that Wu & Wu obtained findings contrary to those within this study, this relationship may be context dependent, requiring additional clarifying research. Similarly, the interesting interaction between Complexity and Trialability calls for additional research. Future studies should attempt to either support or disprove this finding.

This study represents a systematic exploration of some of the key factors influencing individuals' Willingness to Use new technology, in the form of a PWS (Personal Web Server), at the pre-adoption phase. I tested core assumptions from Diffusion of Innovations (DOI; Rogers, 2003) theory for Willingness to Use new technology, and used some key concepts from the Technology Acceptance Model (TAM; Davis, et al., 1989; Venkatesh, et al., 2002) to reinforce DOI. I employed portions of an empirically tested, valid, and reliable scale to measure Willingness to Use (Moore and Benbasat, 1991).

There already existed an abundance of literature regarding information technology and various aspects of organizational performance. What was lacking was an analysis of how IT system innovations are most productively adopted at the individual level, and how recognition of the critical success factors to usage of these technologies affects attitudes toward using them prior to adoption. In a global and increasingly fast-paced business environment, Willingness to Use IT innovations and the speed with which they are properly adopted, can significantly affect competitive advantage.

This was a theory building and explanatory study with the expressed intent to better understand the individual determinants of the success or failure of an IT innovation at the individual level. I studied PWS systems by employing independent variables of Complexity, Relative Advantage, and Trialability from Rogers, and used a conceptually similar definition to Davis's behavioral intent to predict Willingness to Use.

My findings showed that Relative Advantage, Complexity, and Trialability were all predictors of Willingness to Use a new technology. These findings as well as the interesting interactions of some of the independent variables should prove useful to those who seek to

understand these phenomena within the crucial context of pre-acquisition of information systems. The intent was to explain Willingness to Use at the individual level in a new way, which in turn is instructive toward organizational attitudes toward innovation. It is my hope that the results of this research will be instructive to researchers, empiricists, and practitioners who are interested in pre-adoptive intents and behaviors.

A CONTEXT BASED SEARCHING ALGORITHM FOR LYRIC WRITING IN TELUGU

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ABSTRACT

Natural Language Processing techniques are well applied to the context based web searching. Poem and lyric writing are special forms of poetry. These two forms demand a number of restrictions and rules. Writing a poem, or lyric becomes a challenge to the poet, observing these rules. In the present work, a study is made how the theory of NLP and morphological techniques can be applied to a specific field of Telugu literature, in particular to lyric writing. An algorithm that helps the poet to pick right word apt to the context will be a big challenge. In the present work a search algorithm based on context to help the poet to select write words is proposed. A dictionary searching algorithm based on context will be of great help to the poet to augment his skill. The objective of present study is to select the best way to organize the dictionary to suit an algorithm that can give help to the poet to pick up right words based on his contextual requirements. The study is aimed to design a search engine, which uses an efficient context based algorithm to pick up right set of words based on his query in such a way that he gets the desired information. In the present paper an introduction to the problem and proposed design are explained.

INTRODUCTION

The development of Language technology and its growth leads to the need for the detailed study of computational aspect of Language and especially for those who mastered the field of Technology. While Language is a form of communication that reaches even the ordinary people, computers were meant only for those who dealt with technology and sciences. Bridging these two is a great challenging task which is being studied under Computational Linguistics. Language is a set of rules, We use language for communication in everyday life. But when turn to language we use in writing, the demands on it are much more, for that writing to be called a piece of literary work. There different forms of literary work in any language like prose and poetry. With in prose there are so many called essays, novels, short stores, drams, news and journalism, scientific writings etc. Similarly in poetry we have poetry, lyrics and much many forms depending on the language and the literary history it has. In the present study we are taking Telugu as the language to study and design a special purpose context based search engine that helps the author to select words suitable for the context. While the type of rules for each form of poetic works changes. In particular we will be taking here on one form of poetry called lyrics. Here we concentrate on lyric writing; same concepts can be extended to other forms also. A dictionary searching algorithm based on context will be of great help to the poet to augment his skill.

PROBLEM DETAILS

A lot of research was conducted and a number of papers were published in the areas of context based searching on web using the techniques of Natural language processing and in the area of computational linguistics by a number of research workers. Basically context based searching focuses on gathering some extra data related to current search using different techniques. Similarly a lot of literature is available in dictionary searching. Combining these techniques, and experiences in research, an attempt is being made; as explained in this paper to search the dictionary meting certain criterion; for a specific domain of literature. Such techniques can be well extended to other domains and also to other areas of knowledge. Here we make an attempt to explain why this kind of research is needed, by giving some details about the research problem, in the domain of the problem.

There are so many forms of Telugu literature (Telugu Sahityam), widely divided as prose and poetry. In prose also we have several forms like novels, short stories, skits, plays. In poetry different forms are poems, songs, prabhandas, dwipada, Sataka. These are Janapada Sahityamu, Vachana Sahityamu, Padya Sahityamu, Padya Sahityamu, Champu Sahityamu, Sataka Sahityamu, Navala Sahityamu, Chinna Kadhalu, Avadhana Sahityamu, Asukavitha, Cinema Sahityamu. Every form of literature mentioned above has its own style, format and requirements. We shall concentrate on one them to explain the problem, say Padakavitha Sahityamu. These are different kinds songs, which are composed in olden days by the devotional poets like Annamayya, Ramdas, Tyagaraja and others. Same of their principles can be extended to modern lyrics also, but due to the modern free format style, some of these restrictions are not followed.

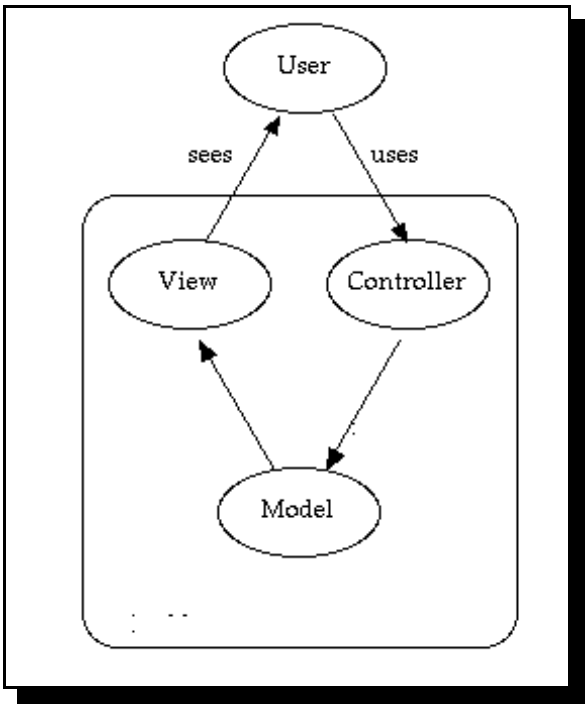
RELATED WORK

Using context for search is not a new idea. A number of existing information retrieveal systems utilize the notion of context some extent or other. But is the definition of Context, everybody has their own definition of it. Context based search is still very much in infant stage of research. Context based search means, using changes to the basic settings of the search scene by using the context of the query as an additional input. A well known problem for Web search is targeting search on information that satisfies users' information needs. User queries tend to be short and hence often ambiguous, which can lead to inappropriate results from general-purpose search engines. This has lead to a number of methods for narrowing queries by adding information. There are several methods of gathering the contextual information, for example, when a user requests a search for a word suitable for his document by providing some input information and submits it for search, the system captures the context surrounding the text, and utilizes it to yield more focused results. The context may include the sentence containing the query word or phrase, a few sentences surrounding the query term, or the paragraph in which it resides, or even an example. An alternative approach [David B. Leake, 2001] that aims to improve query results by using knowledge of a user's current activities to select search engines relevant to their information needs. These thoughts can be extended to dictionary searching; by adding suitable Meta knowledge. Using the context for superior search focus constitutes a considerable algorithmic challenge. One need to find ways to extract the right amount of context which best optimizes the information retrieved, as well as

devising adequate ways to use the context extracted for focusing the response to the original query. In IACS (Incremental Algorithm for Context-Based Search) [David Leake, 2005], suggest an initial term-based context description. Dictionary searching is another area where Context based searching can be used. Dictionary is an abstract data type storing items, or values. A value is accessed by an associated key. Search strategies allow us to use different methods for generating the desired result.

THE CONTEXT BASED SEARCH

The idea behind the current work is an extension of the thoughts explained in the above research work areas. In the work presented here, instead of using just a dictionary based search, the search is conducted using the Meta data, a comprehensive rule base, which will generate the result. The working model is as follows:-



View: It is context based word result in the required format.

Controller: It is the interface that accepts input word and query and invokes the dictionary search using the meta data and rule base and computes the result and generates the output to display result in view.

Model: Computes the word input by controller and passes data structure to view module.

The algorithm under development helps the poet to pick right word from dictionary; will be of immense use. The objective of present study is to select the best way to organize the dictionary to suit an algorithm that can give help to the poet to pick up right words based on his contextual requirements. The study is aimed to design a search engine, which uses an efficient context based algorithm to pick up right set of words based on his query in such a way that he gets the desired information.

The purpose of the study is to design an algorithm for dictionary searching based on context. The scope of topic is limited to Telugu language lyric writing, but same ideas can be extended to any natural language, to any particular form of literary work, that too; in particular to Indian languages. Further same ideas can be extended to any dictionary particular to any domain of knowledge. This study is aimed at determining the best data structure suitable for implementing this kind of dictionary, and to determine the best algorithm suitable for fetching the information required, based on context, to meet the need of person, seeing that information. There is a need for developing a search algorithm using the minimum query input and by gathering relevant context

information, and provide maximum relevant results to the user. This approach can be used for other domain specific knowledge areas.

DESIGN DETAILS

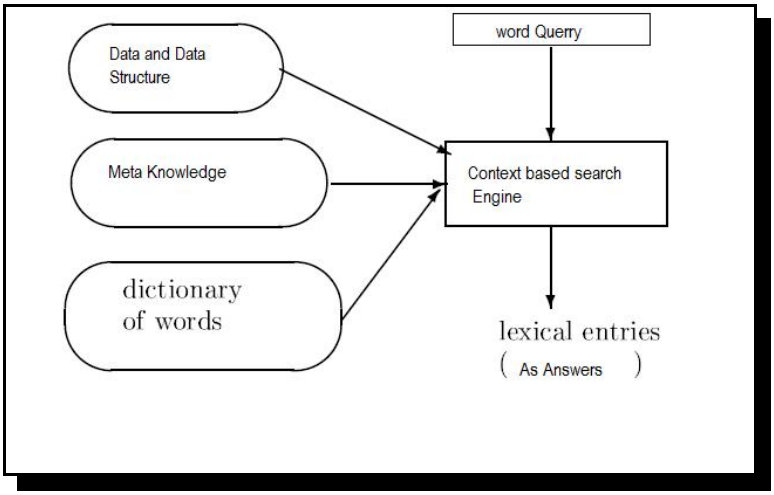
This study is to determine the best manner the dictionary can be organized, with all required information, so that domain specific queries can be handled in an efficient manner based on context. To achieve this goal the following questions are proposed.

1. *What is the best data structure suitable the domain data and domain specific Meta Knowledge?*

2. *What is the best algorithm suitable for getting the query information based on context?*

To get an answer to both these questions; the efficiency of the proposed algorithm is determined in terms of resources consumed, like response time, CPU time, memory, disk and others. The work is initiated by collecting requirements from a group of domain specialists. From this study the search based requirements are established. Based on this study, the suitability of data structures currently used by dictionary searching algorithms are being studied and their merits and demerits will be established. A comprehensive search engine will be designed using a context based algorithm and using the search requirements, a number of searches will be done and the resource utilization for each search will be determined. A comparison of the results will be made and the merits and the efficiency of the search engine will be established. The computational linguistics techniques used and NLP principles applied for this development will be highlighted and scope of further growth and research will be suggested. The following diagram depicts the skeleton diagram of the proposed search engine. This will take the "word query" from its user, it will look the data dictionary for suitable word, using the meta knowledge and the data structure and generated the required result.

After establishing the query requirements suitable data structures and Meta data will be determined, and to support these tests, suitable data will collected, organized, and entered as dictionary. It is planned to organize the Meta data and data in XML format.



CONCLUSION

The results of the present research work will explore new searching technique which are more comprehensive, which will search the dictionary based on context using different search algorithm for different contexts, for this specialized domain. The concepts can be extended to other domains in similar lines. The findings of this will be useful to all software companies across the globe, to apply for any language and develop useful front end tools and query processors and database SQL engines for providing easy interfaces to the users, who do not know much programming and have no computer knowledge. Such tools will be useful for professionals and experts in other domains to use computers for their routine work without spending much time in learning computer skills.

REFERENCES

A. C. Cem SAY, Özlem ÇET_NO_LU, _eniz DEM_R, Fatih - A Natural Language Processing Infrastructure for Turkish Ö_ÜN Department of Computer Engineering, Bogaziçi University

A. Parimalagantham, Ph.D. A Study of Structural Reduplication in Tamil and Telugu - A Doctoral Dissertation

Akshar Bharati1, Rajeev Sangal1 and Vineet Chaitanya1, 1990 Natural language processing, complexity theory and logic;, Lecture Notes in Computer Science, Springer berlin/ Heidelberg, Volume 472/1990

Balajapally, P., et al, 2006. Multilingual book reader interface: transliteration and translation. in VALA. Melbourne, Australia.

Balakrishnan, N., et al. 2004 Million Books to Web: Technological Challenges and Research Issues. in Proc. Tamil Internet conference. Singapore.

Balakrishnan, N., et al., 2005, Digital Library of India: testbed for Indian Language Research. IEEE Technical Committee on Digital Libraries Bulletin: Special Issue on Asian Digital Library Research. In press.

Brown, C.P., 1991 The Grammar of the Telugu Language, New Delhi: Laurier Books Ltd.

Can Tekeli 2002. TERIM_SON. B.S. Thesis, Department of Computer Engineering, Bogazici University. CL research Project. http://www.clres.com/site_map.html

David Leake, Ana Maguitman, and Thomas Reichherzer, 2005, Exploiting Rich Context: An Incremental Approach to Context-BasedWeb Search

Douglas Lenat 1995. CYC: A Large-Scale Investment in Knowledge Infrastructure. In "Comm. ACM, 38/11", pages 33-38.

Eda Bilsel 2000. Poem Analyzer, B.S. Thesis, Department of Computer Engineering, Bogazici University.

Elton Ballhysa 2000. Albanian-Turkish-English Translator.

Ender Özcan, _adi E. _eker and Zeynep. I. Karadeniz 2004. Generating Java Class Skeleton Using A Natural Language Interface. In "First International Workshop on Natural Language Understanding and Cognitive Science-NLUCS".

Ganapathiraju, M., et al. 2005, OM: "One Tool for Many (Indian) Languages". in ICUDL: International Conference on Universial Digital Library.. Hangzhou.

Helin Duta_ac? 2002. Statistical Language Models for Large Vocabulary Turkish Speech Recognition.

Ibrahim Maden, _eniz Demir and Ender Özcan 2003, M.S. Thesis, Department of Computer Engineering, Bogazici University..

Jayaraman, A., et al. 2004, OmSE: Tamil Search Engine. In Proc. Tamil Internet conference.. Singapore.

Madhavi Ganapathiraju and Lori Levin, 2006, - TelMore: Morphological Generator for Telugu Nouns and Verbs. Proc. Second International Conference on Universal Digital Library, Vol Alexandria, Egypt, Nov 17-19, 2006

S. Rajendran, Ph.D. August 2006, PARSING IN TAMIL -PRESENT STATE OF ART -LANGUAGE IN INDIA, Strength for Today and Bright Hope for Tomorrow, Volume 6 : 8

CREATING A CULTURE OF SUSTAINED INNOVATION AND CUSTOMER SERVICE IN ORDER TO REMAIN COMPETITIVE IN A DYNAMIC MARKET

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ABSTRACT

The purpose of this research is to illuminate how businesses can create and foster a culture of innovation and customer service in order to remain competitive in the business environment. In order to accomplish this, a definition of innovation was provided. Types of innovation and sources of innovation were explored and the processes explained, with a focus on the importance of corporate culture and management involvement in creating an atmosphere where innovation can flourish. The work of several researchers on innovation was discussed. The consensus does seem to point to the idea that without an all out commitment from management innovative processes would suffer.

INTRODUCTION/CONCLUSIONS

Future research is suggested based upon prior research and theory (Buckley and associates, 1992- present; Carland and associates 1984-present). Full paper available from first author.

REFERENCES

Buckley, M.R., Carraher, S.M., Carraher, S.C., Ferris, G.R., & Carraher, C.E. (2008). Human resource issues in global entrepreneurial high technology firms: Do they differ? *Journal of Applied Management & Entrepreneuership*, 13 (1), 4-14.

Buckley, M., Fedor, D., Veres, J., Wiese, D., & Carraher, S.M. (1998). Investigating newcomer expectations and job-related outcomes. *Journal of Applied Psychology*, 83, 452-461.

Buckley, M., Mobbs, T., Mendoza, J., Novicevic, M., Carraher, S.M., & Beu, D. (2002). Implementing realistic job previews and expectation lowering procedures: A field experiment. *Journal of Vocational Behavior*, 61 (2), 263-278.

Carland, J. & Carland, J. (1993). The role of personality in new venture creation. *Entrepreneurship, Innovation and Change*, 2(2), 129-141.

Carland, J & Carland, J. (1995). The case of the reluctant client. *Journal of the International Academy for Case Studies*, 1(2), 76-79.

Carland, J. & Carland, J. (1997). A model of potential entrepreneurship: Profiles and educational implications. *Journal of Small Business Strategy*, 8 (1), 1-13.

Carland, J. & Carland, J. (2003). Pawn takes queen: The strategic gameboard in entrepreneurial firms. *Academy of Strategic Management Journal*, 2, 93-104.

Carland, J. & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. *Academy of Entrepreneurship Journal*, 10(2), 104-114.

Carland, J. & Carland, J. (2006). Eminent domain: What happens when the state takes part of your land? *The Entrepreneurial Executive*, 11, 95-113.

Carland, J.A.C., & Carland, J.W. (1991). An empirical investigation into the distinctions between male and female entrepreneurs managers. *International Small Business Journal*, 9 (3), 62-72.

Carland, J.A., Carland, J.W., & Stewart, W.H. (1996). Seeing what's not there: The enigma of entrepreneurship. *Journal of Small Business Strategy* 7 (1), 1-20.

Carland, J., Carland, J.A., & Abhy, C. (1989). An assessment of the psychological determinants of planning in small businesses. *International Small Business Journal*, 23-34.

Carland, J., Carland, J., & Carland, J. (1995). Self-actualization: The zenith of entrepreneurship. *Journal of Small Business Strategy*, 30-39.

Carland, J.W., Carland, J.A., Hoy, F., & Boulton, W.R. (1988). Distinctions between entrepreneurial and small business ventures. *International Journal of Management*, 5 (1), 98-103.

Carland, J.W. III, Carland, J.W., Carland, J.A., & Pearce, J.W. (1995). Risk taking propensity among entrepreneurs, small business owners and managers. *Journal of Business and Entrepreneurship*, 7 (1), 12-23.

Carland, J.W., Hoy, F., Boulton, W.R., & Carland, J.A.C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9 (2), 354-359.

Carland, J.W., Hoy, F., & Carland, J.A.C. (1988). Who is an entrepreneur? is the wrong question. *American Journal of Small Business* 12 (4), 33-39.

Carraher, S.M. (1991). On the dimensionality of the pay satisfaction questionnaire. *Psychological Reports*, 69, 887-890.

Carraher, S.M. (2005). An Examination of entrepreneurial orientation: A validation study in 68 countries in Africa, Asia, Europe, and North America. *International Journal of Family Business*, 2 (1), 95-100.

Carraher, S.M. (2008). Using E-Bay to teach global and technological entrepreneurship. *International Journal of Family Business*, 5 (1), 63-64.

Carraher, S.M. & Buckley, M. R. (1996). Cognitive complexity and the perceived dimensionality of pay satisfaction. *Journal of Applied Psychology*, 81 (1), 102-109.

Carraher, S.M. & Buckley, M.R. (2008). Attitudes towards benefits and behavioral intentions and their relationship to Absenteeism, Performance, and Turnover among nurses. *Academy of Health Care Management Journal*, 4 (2), 89-109.

Carraher, S.M., Buckley, M.R., & Carraher, C. (2002). Cognitive complexity with employees from entrepreneurial financial information service organizations and educational institutions: An extension & replication looking at pay, benefits, and leadership. *Academy of Strategic Management Journal*, 1, 43-56.

Carraher, S.M., Buckley, M. & Cote, J. (1999). Multitrait-multimethod information management: Global strategic analysis issues. *Global Business & Finance Review*, 4 (2), 29-36.

Carraher, S.M., Buckley, M., & Cote, J. (2000). Strategic entrepreneurialism in analysis: Global problems in research. *Global Business & Finance Review*, 5 (2), 77-86.

Carraher, S.M., Buckley, M., Scott., C., Parnell, J., & Carraher, C. (2002). Customer service selection in a global entrepreneurial information services organization. *Journal of Applied Management and Entrepreneurship*, 7 (2), 45-55.

Carraher, S.M. & Carraher, C. (1994). ISO 9000 - theories of management. *Polymer News*, 19, 373-376.

Carraher, S.M. & Carraher, C. (1996). ISO 9000. *Polymer News*, 21, 21-24.

Carraher, S. & Carraher, S.C. (2005). Felt fair pay of small to medium, sized enterprise (SME) owners in Finland and Latvia: An examination of Jaques' equity construct. *Journal of Small Business Strategy*, 16 (1), 1-8**.**

Carraher, S.M. & Carraher, S.C. (2006). Human resource issues among SME's in Eastern Europe: A 30 month study in Belarus, Poland, and Ukraine. *International Journal of Entrepreneurship*. 10, 97-108.

Carraher, S.M., Carraher, S.C., & Mintu-Wimsatt, A. (2005). Customer service management in Western and Central Europe: A concurrent validation strategy in entrepreneurial financial information services organizations. *Journal of Business Strategies*, 22, 41-54.

Carraher, S.M., Carraher, S.C., & Whitely, W. (2003). Global entrepreneurship, income, and work norms: A seven country study. *Academy of Entrepreneurship Journal*, 9, 31-42.

Carraher, S.M. & Courington, J. (2008). Designing an applied graduate program in Organizational Leadership: Research or no research? *International Journal of Family Business*, 5 (1), 17-30.

Carraher, S.M., Courington, J., & Burgess, S. (2008). The design of the SBI model graduate program in entrepreneurship that encourages entrepreneurship, ethics, and leadership in health care management and public service. *International Journal of Family Business*, 5 (1), 3-6.

Carraher, S.M., Gibson, J. W., & Buckley, M.R. (2006). Compensation satisfaction in the Baltics and the USA. *Baltic Journal of Management*, 1 (1), 7-23.

Carraher, S.M., Mendoza, J, Buckley, M, Schoenfeldt, L & Carraher, C. (1998). Validation of an instrument to measure service orientation. *Journal of Quality Management*, 3, 211-224.

Carraher, S.M. & Parnell, J. (2008). Customer service during peak (in season) and non-peak (off season) times: A multi-country (Austria, Switzerland, United Kingdom and United States) examination of entrepreneurial tourist focused core personnel. *International Journal of Entrepreneurship*, 12, 39-56.

Carraher, S.M., Parnell, J., Carraher, S.C., Carraher, C., & Sullivan, S. (2006). Customer service, entrepreneurial orientation, and performance: A study in health care organizations in Hong Kong, Italy, New Zealand, the United Kingdom, and the USA. *Journal of Applied Management & Entrepreneurship*, 11 (4), 33-48.

Carraher, S.M., Parnell, J., & Spillan, J. (2009). Customer service-orientation of small retail business owners in Austria, the Czech Republic, Hungary, Latvia, Slovakia, and Slovenia. *Baltic Journal of Management*, 4 (3), 251-268.

Carraher, S.M., Scott, C., & Carraher, S.C. (2004). A comparison of polychronicity levels among small business owners and non business owners in the U.S., China, Ukraine, Poland, Hungary, Bulgaria, and Mexico. *International Journal of Family Business*, 1 (1), 97-101.

Carraher, S.M. & Sullivan, S. (2003). Employees' contributions to quality: An examination of the Service Orientation Index within entrepreneurial organizations. *Global Business & Finance Review*, 8 (1) 103-110.

Carraher, S.M., Sullivan, S. & Carraher, S.C. (2005). An examination of the stress experience by entrepreneurial expatriate health care professionals working in Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Niger, Nigeria, Paraguay, South Africa, and Zambia. *International Journal of Entrepreneurship*, 9 , 45-66.

Carraher, S.M., Sullivan, S.E., & Crocitto, M. (2008). Mentoring across global boundaries: An empirical examination of home- and host-country mentors on expatriate career outcomes. *Journal of International Business Studies*, 39 (8), 1310-1326.

Carraher, S.M. & Welsh, D.H.B. (2009). *Global Entrepreneurship*. Dubuque, IA: Kendall Hunt Publishing.

Carraher, S.M. & Whitely, W.T. (1998). Motivations for work and their influence on pay across six countries. *Global Business and Finance Review*, 3, 49-56.

Chait, H., Carraher, S.M., & Buckley, M. (2000). Measuring service orientation with biodata. *Journal of Managerial Issues*, 12, 109-120.

Crocitto, M., Sullivan, S.E. & Carraher, S.M. (2005). Global mentoring as a means of career development and knowledge creation: A learning based framework and agenda for future research. *Career Development International*, 10 (6/7), 522-535.

Deng, F.J., Huang, L.Y., Carraher, S.M., & Duan, J. (2009). International expansion of family firms: An integrative framework using Taiwanese manufacturers. *Academy of Entrepreneurship*, 15 (1), 25-42.

Lockwood, F., Teasley, R., Carland, J.A.C., & Carland, J.W. (2006). An examination of the power of the dark side of entrepreneurship. *International Journal of Family Business*, 3, 1-20.

Paridon, T. & Carraher, S.M. (2009). Entrepreneurial marketing: Customer shopping value and patronage behavior. *Journal of Applied Management & Entrepreneurship*, 14 (2), 3-28.

Paridon, T., Carraher, S.M., & Carraher, S.C. (2006). The income effect in personal shopping value, consumer self-confidence, and information sharing (word of mouth communication) research. *Academy of Marketing Studies Journal*, 10 (2), 107-124.

Scarpello, V. & Carraher, S. M. (2008). Are pay satisfaction and pay fairness the same construct? A cross country examination among the self-employed in Latvia, Germany, the U.K., and the U.S.A. *Baltic Journal of Management*, 3 (1), 23-39.

Sethi, V. & Carraher, S.M. (1993). Developing measures for assessing the organizational impact of information technology: A comment on Mahmood & Soon's paper. *Decision Science*, 24, 867-877.

Sturman, M.C. & Carraher, S.M. (2007). Using a Random-effects model to test differing conceptualizations of multidimensional constructs. *Organizational Research Methods*, 10 (1), 108-135.

Sullivan, S.E., Forret, M., Carraher, S.M., & Mainiero, L. (2009). Using the kaleidoscope career model to examine generational differences in work attitudes. *Career Development International*, 14 (3), 284-302.

Williams, M.L., Brower, H.H., Ford, L.R., Williams, L.J., & Carraher, S.M. (2008). A comprehensive model and measure of compensation satisfaction. *Journal of Occupational and Organizational Psychology*, 81 (4), 639-668.

COULD DECISION TREES HELP IMPROVE FARM SERVICE AGENCY LENDING DECISIONS?

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ABSTRACT

This study examines whether a statistically derived decision tree could serve as a means to improve U.S.A. Farm Service Agency lending decisions. The study is a substantial extension and reanalysis of an earlier work by Barney et al. (1999). Results indicate that a decision tree could be a valuable tool for Farm Service Agency employees in their lending decisions. The decision tree provides as good or better predictive accuracy than neural networks and logistic regression models at reasonable cutoff levels of Type II to Type I costs of lending. The decision tree also meets the transparency criteria for Farm Service Agency purposes by providing logical, understandable rules for lending decisions.

A STUDY OF THE RELATIONSHIP BETWEEN SOFTWARE PROJECT SUCCESS AND EMPLOYEE JOB SATISFACTION

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ABSTRACT

The purpose of the study is to find out if there is a relationship between software project success and Information Technology (IT) employee job satisfaction in IT companies. Employee attrition constitutes substantial costs to IT companies. There will be many stakeholders, such as project sponsor, project manager, team members, local governments, customer, end users, networking team, senior management involved in any IT project and different stakeholder may evaluate project success. Project success measurement criteria must therefore ponder views of all stakeholders concerned with the project. A quantitative methodology will be used to gather information on and record the data required for this research study, and depict the relationship between software project success and Information Technology (IT) employee job satisfaction in an IT company.

STATEMENT OF RESEARCH PROBLEM

According to Standish Group CHAOS report (Hartmann, 2006), published in 2004, only 29% of the IT projects succeeded and the rest of 71% of the projects failed in various factors such as not meeting the agreed upon requirements, scope and schedule slippages in the project, quality related issues like more defects found in production systems (Debbie, Timothy & Mark, 2007; Hartmann, 2006). According to a study released in 2002 and commissioned by the Department of Commerce's National Institute of Standards and Technology (NIST), it was found out that software defects in IT projects cost the U.S. economy approximately $59.5 billion per year. Gardner and Stough (2003) assessed the relationship between Emotional Intelligence (EI), job satisfaction and organizational commitment, and stated that there is a positive relationship between EI and job satisfaction. It is not known how and to what extent a relationship exists between software project success and Information Technology (IT) employee job satisfaction in IT companies. Bellamy (2003), Sy et al. (2006), Wong and Law (2002) and Villard (2004) found that there is a significant relationship between EI and job satisfaction and job performance. Examining the association between software project success and employee job satisfaction in IT companies provides valuable information to all IT companies.

IT companies across the globe have the pressure of increasing their software projects success in order for winning new contracts, projects from same clients new clients and improve profitability of their companies. Information technology (IT) software project success has been a common topic

in peer reviewed literature and the subject of study by research analysts and practioners over the past 15 years. Although, some of the earlier studies focused on finding out the causes of project success and failure (Shenhar et al. 2002, p. 111), 'there has been little attempt in the past to determine the success criteria for Information Technology projects in various domains' (Wateridge 1998, p. 59).

It will be indispensable that senior management of IT companies realize the relationship between software project success and employee job satisfaction and take appropriate actions in accordance with the study findings towards enhancing their employees job satisfaction, which in turn affects software projects success rate, get more business from existing and new clients and improve their and shareholders' profitability. Studies learned that EI plays a pivotal role in employee productivity and employee job satisfaction (Jordan et al., 2002; Mallinger and Banks, 2003). If IT companies are earnestly interested in developing policies that improve IT employee job satisfaction, understanding if there is an effect of improving IT employee job satisfaction towards software project success becomes overriding. Thus, this study examined the relationship between software project success and employee job satisfaction in an IT company. Employee job satisfaction is an important area to focus upon by the senior management of all organizations, because job satisfied employees contribute a lot to the organization in terms of reduced absenteeism, improved performance, contribution towards team work and improved productivity (Koh & Boo, 2001).

RESEARCH QUESTIONS

The study seeks to determine whether, to what extent, and in what manner software project success is associated with Information Technology (IT) employee job satisfaction. To achieve this goal, the following research questions are proposed.

1. *What is the relationship, if any, between software project success and IT employee job satisfaction?*
2. *To what degree is there relationship between software project success and IT employee job satisfaction?*

METHODOLOGY FOR THE STUDY

There has been some indication that there may be a potential association between software project success and IT employee job satisfaction. This study is of paramount importance as IT companies are incurring huge losses due to software project failures and high IT employee attrition rate. A quantitative descriptive survey approach will be used to gather information on and record the data required for this research study, and depict the relationship between software project success and Information Technology (IT) employee job satisfaction in an IT company.

A descriptive survey is generally applied in scenarios of studying a current day condition or phenomenon (Leedy & Ormrod, 2001), and historical analysis used for understanding past events or conditions (Leedy & Ormrod, 2001).The survey will be distributed to IT employees working in a software development project in an IT company which is located in India, and serving clients all over the world.

Possible surveys to be considered in this proposed study are

1. *Employee job satisfaction survey is a questionnaire used to capture the employee job satisfaction level of the employees in an IT company.*
2. *Software project success survey is a questionnaire used to collect data from employees on if their job satisfaction helps in achieving IT project success and to what level their job satisfaction affects software project success?*

DATA COLLECTION

IT companies will have many software development projects which are developed simultaneously for clients in different business domains, across all of their facilities spread across the globe. The unit of study for this research study will be one software development project which has more than 30 IT employees and developed in any technology and business domain, in a large IT company which is located in India, and serving clients all over the world. The data collected from the survey will be analyzed, summarized and reported and the results will include a profile of all respondents to the survey.

SIGNIFICANCE OF THE STUDY

This study is important because of the increased software projects failure rate and employee attrition in the IT companies all over the world. According to Standish Group CHAOS report (Hartmann, 2006), published in 2004, it was reported that only 29% of the IT projects succeeded. The majority of the failures fall into categories of either budget overruns or time overruns. IT employees are only one type of stakeholders who play a pivotal role towards software project success. There are many other stakeholders who are involved in software projects, such as clients, end users, project sponsors, project managers, IT employees, Non-IT employees such as accountants, hiring managers, training managers, sales and marketing, governmental agencies.

Prior studies on project failures suggest that many of the IT project failures are avoidable (Heekens 2002) and warning signals would be given long before an IT project has begun to fail. As IT companies work towards meeting software project success criteria like meeting triple constraints of completing projects on time, within budget and on schedule by meeting all quality goals, they also face challenges of employee attrition. As job satisfied IT employees contribute a lot towards team work, taking initiatives, communication within the tam and with customers, productivity improvements, it is very important to find out if there really exists a relationship between software project success and IT employee job satisfaction.

This proposed study will examine the relationship between software project success and Information Technology (IT) employee job satisfaction in IT service company. By studying the relationship between software project success and IT employee job Satisfaction in an IT service company, the policies which help in improving IT employee job satisfaction in one IT service company in a country, can be replicated in other IT companies across the globe.

REFERENCES

Bellamy, A.R. and A.R. Bellamy, 2003. Emotional intelligence and transformational leadership: Recursive leadership processes within the context of employee work attitudes. *The Midwest Academy of Management* for Presentation Within the 2003 Meeting.

Debbie, Tesch., & Timothy, Kloppenborg J., & Mark, Frolick N. (2007). IT project risks: The project management professional perspective. *The Journal of Computer Information Systems.*

Gardner, L. and C. Stough, 2003. Assessing the relationship between workplace emotional intelligence, job satisfaction and organizational commitment. *Proceeding of the 5th Australia Industrial and Organizational Psychology Conference* Melbourne, June 26-29.

Gardner, D. (2007). *IT Managers Expect Problems With Tech Projects*. Retrieved February 10, 2010, from http://www.informationweek.com/news/global-cio/showArticle.jhtml?articleID=204801097

Heerkens, G. R. (2002). *Project Management*. New York: McGraw-Hill

Hartmann, D. (2006). Interview: Jim Johnson of the Standish Group. *Info Q*.

Jordan, P.J., N.M. Ashkenazi, C.E.J. Hurtle and G.S. Hooper, 2002. Workgroup emotional intelligence scale development and relationship to team process productivity and goal focus. *Hum. Resour. Manage. Rev*., 12: 195-214.

Koh, H.C. & Boo, & Boo, E.H.Y; (2001). The Link Between Organizational Ethics and Job Satisfaction: A Study of Managers in Singapore. *Journal of Business Ethics* 29: 309-324.

Leedy, P. D., & Ormrod, J. E. (2001). *Practical Research: Planning and Design* (Seventh ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Shenhar, AJ, Tishler, A, Dvir, D, Lipovetsky, S & Lechler, T 2002, 'Refining the search for project success factors: a multivariate typological approach', *R &D Management*, vol.32, no. 2.

Villard, J.A., 2004. Determining the Relationship Between Job Satisfaction of County Extension Unit Employees and the Level of Emotional Intelligence of Extension County Chairs. LINK Ltd., Ohio.

Wateridge, J 1998, 'How can IS/IT projects be measured for success', *International Journal of Project Management*, vol. 16, no. 1, pp. 59-63.

A COGNITIVE PROCESS MODEL OF INFORMATION REQUIREMENT ANALYSIS

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ABSTRACT

Information requirement analysis is an error prone process, especially for novice information analysts. In order to improve the accuracy of requirement specifications, various requirement analysis techniques have been proposed and used by academics and practitioners as an effective tool to help information analysts to capture, understand, and represent business information requirements. However, the cognitive abilities of information analysts are still the most important determinant for the accuracy of requirement specifications. Empirical studies have showed that four characteristics of modeling behaviors that set expert and novice information analysts apart: model-based reasoning, mental simulation, critical testing of hypotheses, and analogical domain knowledge reuse. The purpose of this research study is to propose a cognitive model that can explain the cognitive differences between novices and experts in the modeling process of information requirement analysis

INTRODUCTION

Information requirement analysis is an error prone process, especially for novice information analysts. Empirical studies have shown that lack of knowledge is a major cause for novice information analysts making more errors in requirement specifications (Schenk, Vitalari, & Davis, 1998). Empirical studies have also shown that four characteristics of modeling behaviors that set expert and novice information analysts apart: model-based reasoning, mental simulation, critical testing of hypotheses, and analogical domain knowledge reuse (Sutcliffe & Maiden, 1990). However, it is unclear how the knowledge of information analysts may influence their modeling behaviors in information requirement analysis. Therefore, the research question of this research is "What is the cognitive process model of information requirement analysis that can explain how the differences of knowledge of information analysts may lead to different modeling behaviors?"

In this article, a cognitive process model of information requirement analysis is constructed on the basis of the structure-mapping model of analogy. The cognitive process model of information requirement analysis can explain the interactions between the knowledge of information analysts and modeling behaviors from the perspective of the dynamic process of information requirement analysis.

A COGNITIVE PROCESS MODEL OF INFORMATION REQUIREMENT ANALYSIS

On the basis of the structure-mapping model of analogy (Falkenhainer, Forbus, & Gentner, 1990; Gentner, 1983; Gentner & Markman, 1997), I propose a cognitive process model of

information requirement analysis to explicate the modeling behaviors of information analysts as shown in Figure 1 (Huang & Burns, 2000).

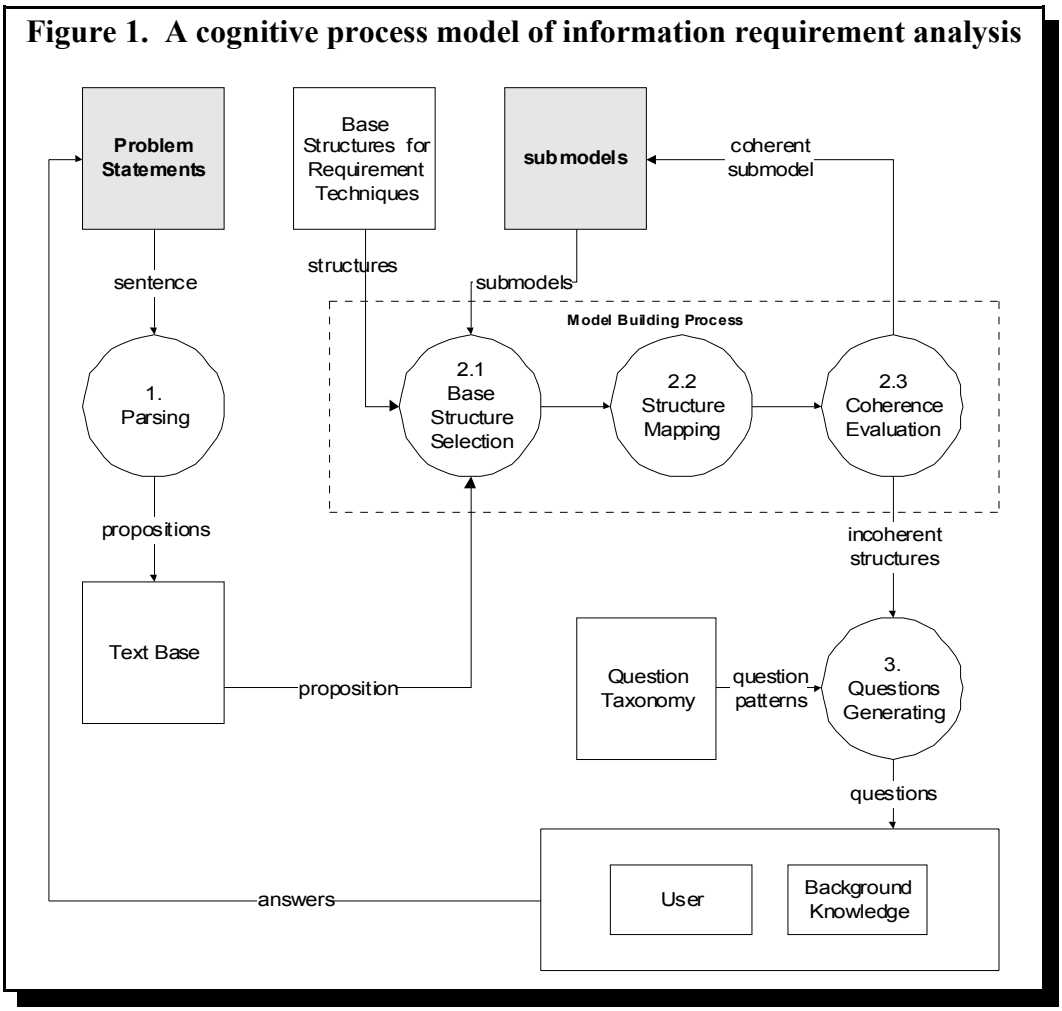
In this section, we will assume a requirement sentence, "The customer first sends an order to John, the order clerk," in a problem statement of an order processing system as an example to illustrate the cognitive process of information requirement modeling. On the basis of the cognitive process model depicted in Figure 1, the cognitive process of information requirement analysis can be divided into three parts: parsing, modeling, and questioning as follows.

Parsing

Parsing as the first step in modeling translates the example sentence into a target structure in the form of propositional knowledge as follows (Kintsch, 1974):

send (CUSTOMER, ORDER, ORDER CLERK)
send : predicate; CUSTOMER: agent; ORDER: object; and ORDER CLERK: agent.

Figure 1. A cognitive process model of information requirement analysis



The translation depends on analysts' knowledge mainly about natural language (in this case, English) and domain knowledge. In this article, we assume that both novice and expert information analysts have the same level of ability to understand English text and necessary domain knowledge about an ordering system. Thus, we can assume that both novice and expert information analysts can come up with a piece of propositional knowledge similar to the above one.

Modeling

Modeling is the process that translates the received target structure into the form of a base structure of a particular requirement analysis technique. In this article, we assume that the selected requirement analysis technique is the data flow diagrams. On the basis of the cognitive process model, the modeling process can be divided into three subprocesses: accessing, mapping and evaluating as follows:

1. Access a Base Structure.

In order to specify the information requirements in the problem statement by a particular requirement analysis technique, information analysts access the base structures of the requirement analysis technique to match the incoming target structure. Basically, two factors are considered while determining which base structure will be selected: the principle of continuity (Zwaan, Graesser, & Magliano, 1995) and the types of similarity (Gentner, 1983). First, on the basis of the principle of continuity, information analysts tend to access the base structure that can be connected to the submodels that have been built so far, especially the most recent one. This principle reflects that information analysts try to build a connected and coherent model for the whole problem statement.

Second, there are four types of similarity between target and base structures that can trigger the access of a particular base structure: literal similarity, analogy, abstraction, and surface similarity. First, on the basis of literal similarity, the information analyst may decide that the order processing system under investigation is like that of company X I analyzed last year. Second, on the basis of analogy, the information analyst may conclude that the order processing system is like the library system he or she analyzed two years ago. Third, abstraction reasoning may make the information analyst use the base structure, inflow (external entity, dataflow, process), from data flow diagrams to model the target structure. Fourth and finally, surface similarity may attract the information analyst's attention and decide too model customer as external entity, and order as data store.

Empirical evidence shows that human knowledge is more likely organized by object-attribute similarity, rather than by structural similarity. Thus, novice information analysts tend to access base structures by literal similarity or surface similarity because both have the feature of object-attribute similarity. Abstraction and analogy are rarely used by novice information analysts to access base structures because the structural similarity is more difficult to identify.

On the other hand, expert information analysts have learned from experience that structural similarity (or even higher-order structure similarity) has better explanation power than object-attribute similarity. Therefore, expert information analysts will prefer abstraction and

analogy to surface similarity in selecting base structures. Empirical evidence shows that experts learn from experience to organize their knowledge by abstract relations rather than objects or attributes (Halford, 1987).

For illustration, if the information analysts decide to use the data flow diagrams to model the example sentence mentioned above, the expert information analysts may select a higher-order relational base structure like inflow (external entity, data flow, process). On the other hand, novice information analysts may select an object-attribute base structure like external entity, data store, and external entity to match the three concepts in the problem statement: CUSTOMER, ORDER, and ORDER CLERK.

2. Mapping the Base Structure onto the Target Structure

While mapping the base structure onto the target structure, a higher-order relation (or predicate) will be more likely to be imported into the target structure than is an isolated relation or object-attribute on the basis of the principle of systematicity. For example, if the selected based structure is inflow (external entity, data flow, process), then the information analyst will be able to get the following three results on the basis of model-based reasoning:

(1) CUSTOMER will be mapped as external entity, and ORDER as data flow;

(2) ORDER CLERK cannot be mapped as process. The information analyst may therefore make inferences to decide that the process is what the order clerk does---order processing; and

(3) The information analyst may find out by abstraction that the requirement "customer first sends an order to the order clerk" is an input data flow for a high-order structure---an order processing system. On the basis of the principle of systematicity, the information analyst may try to model the whole order processing system by identifying data stores and output data flows from his or her domain knowledge.

3. Evaluating the Submodel

The result submodel will finally be evaluated on the basis of coherence. For example, by using the base structure inflow (external entity, date flow, process) to match the requirement sentence send (CUSTOMER, ORDER, ORDER CLERK), we will find ORDER CLERK can not be matched by process because ORDER CLERK is obviously an agent rather than a process. If the information analyst cannot identify "processing order" as the process by model-based reasoning, then the mismatch between ORDER CLERK and "process" will cause an incoherence. Consequently, the information analyst may decide to abandon the mapping and try another base structure; or he may choose to keep it and solve the incoherence later.

Asking Questions about the Incoherences in the Submodel

The incoherences in submodels will become the cues for questioning. For example, in order to erase the incoherence on the mismatch between ORDER Clerk and "process," information

analysts may ask questions to identify the missing process in the submodel. Example question may be like:

What task is done by the order clerk? Or more directly, what is the process for the incoming order?

AN EXPLANATION FOR THE NOVICE-EXPERT DIFFERENCES

First, how does the knowledge of information analysts influence the model-based reasoning? The purpose of model-based reasoning is to identify the concepts for requirement specifications correctly and completely. Expert information analysts organize their knowledge by abstract relations. Thus, expert information analysts can make model-based reasoning effectively because they access base structures for modeling target structures on the basis of structural similarity. Consequently, expert information analysts can get fewer errors in their requirement specifications. On the other hand, novice information analysts organize their knowledge as concrete objects sparsely in the long-term memory. Thus, they select base structures on the basis of object-attribute similarity that will be more likely to cause errors or incomplete concepts in the requirement specifications (Sutcliffe & Maiden, 1992).

Second, how does the knowledge of information analysts influence mental simulation? The purpose of mental simulation is to reason about the interactions among the parts of a system and then to establish coherent connections among the parts for a more complete requirement specification. Expert information analysts organize their base structures in bigger units that have higher coherence. The higher coherence will, in turn, provide richer explanation power for mental simulation while modeling the target structures. As a result, fewer errors will be generated in their requirement specifications. On the other hand, novice information analysts have their base structures in smaller units that will result in many small fragments of requirement specifications. Even worse, many of the smaller requirement fragments may be generated on the basis of object-attribute similarity. As a result, the limited or even wrong explanation power will make the mental simulation difficult and thus many errors will be generated during the integration of requirement fragments into bigger and more complete requirement specifications.

Third, how does the knowledge of information analysts influence critical testing of hypotheses? Critical testing of hypotheses is important to validate the coherence of requirement specifications. On the basis of base structures with higher abstraction and bigger unit, expert information analysts can make critical testing of hypotheses more effectively to derive more important concepts on the basis of the principle of continuity. As a result, more complete requirement specifications can be generated. On the other hand, with a model built from object-attribute similarity, novice information analysts can generate hypotheses only at a general level and make few attempts to test hypotheses.

Fourth and finally, how does the knowledge of information analysts influence the performance of analogical domain knowledge reuse? On the basis of the principle of systematicity, expert information analysts can identify opportunities of analogical reasoning more easily because they use abstract concepts to organize their knowledge. In addition, expert information analysts can reuse specifications in bigger units and with higher quality because they store in memory the details of the well tested and validated specifications from their past analysis experience. On the contrary, novice information analysts have difficulty in identifying analogies because they focus on concrete

objects and attributes. As a result, they often need to develop requirement specifications on the basis of the first principle.

CONCLUSION

The cognitive process model proposed in this article has explicated the influence of the cognitive variables on the correction of requirement specifications from the perspective of dynamic process of information requirement analysis. In addition, by linking the knowledge of information analysts with the modeling behaviors of information analysts, the cognitive model provides the theoretical explanation about why novice and expert information analysts have different modeling behaviors during information requirement analysis. Finally, the cognitive process model has also shown that the structural similarity between users' problem statements and requirement analysis techniques is an important determinant for the degree of difficulty in information requirement modeling.

(Reference is available upon request)

EXPLORING THE OPEN-SOURCE ERP ALTERNATIVE FOR TEACHING BUSINESS PROCESS INTEGRATION IN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

With the advent of enterprise systems, supply chains are now operating with up-to-the-minute information. The value of the information flow is marked by speed, accessibility, accuracy, and most of all relevancy. The field of supply chain management has changed greatly and rapidly. As it continually evolves, the supply chain management curriculum needs to stay current and relevant. This paper advocates the use of technology such as Enterprise Resource Planning (ERP) to teach business process integration. The paper describes the needs for teaching business process integration and stresses the roles of ERP in a supply chain process. It then presents two approaches: the Sap University Alliances program and the open-source ERP option. Next, it provides a closer look at the potentials of open-source ERP through an xTuple experience. Finally, the study ends with a conclusion and practical implications.

INTRODUCTION

Supply chains are now operating on the basis of up-to-the-minute information. The value of the information flow is marked by speed, accessibility, accuracy, and most of all relevancy. As the field of supply chain management continues to evolve, its curriculum must stay current and relevant by addressing the depth, speed, and direction of these changes. The paper attempts to describe the needs for teaching business process integration and to stress the roles of ERP in a supply chain process. The focus is on the open-source ERP alternative.

THE USE OF ERP IN FACILITATING SUPPLY CHAIN MANAGEMENT

Supply chain in a simple term could be characterized as an organizational process that control and decide the flow of materials from as far back as production of raw materials to as close to the eventual customers. At the core of supply chain capabilities is the ability to coordinate and manage a complex network of sub-processes to achieve the goals of the organization. Therefore, firms that use an integrated ERP to facilitate supply chain management can reap the benefits of cost structure reduction, shortened response time, and improved transparency. In turn, such benefits can lead to better customer satisfaction and higher profitability for these firms.

THE NEED FOR TEACHING BUSINESS PROCESS INTEGRATION WITH ERP

For many years, business educators stressed the need for a curriculum change that would allow graduates to learn and understand an integrated business processes (Porter and McKibbin, 1988). In this respect, the use of ERP software might provide a missing link that could be used as an integrating mechanism in business college curricula (Johnson, et al., 2004). The following sections explore the potential of open-source ERP as an alternative to the traditional SAP University Alliances model.

THE OPEN-SOURCE ERP ALTERNATIVE

The SAP University Alliances program offers a valuable tool to help universities facilitate the learning and understanding of business processes through a widely used package and at the same time help students gain a valuable skill in ERP. However, the cost of the program, though having decreased in recent years, remains an inhibitive factor for many universities that are struggling with their limited resources and budget.

In recent years, open-source software has been increasingly recognized by businesses and organizations interested in an alternative to proprietary software. Its wide adoption has been in part fueled by the availability of successful and popular software such as Linux, Ubuntu, the Firefox web browser, OpenOffice suite, MySQL, PostgreSQL, etc, and most importantly, the web server software Apache (Conlon and Hulick, 2006; Conlon 2007). Despite the growth of open-source software popularity, there is only a limited availability for open-source ERP. It is recognized that open-source ERP packages are still in their infancy, but their potential growth is quite promising especially during the current economic downturn. The reason is that many companies are increasingly under pressure to streamline their operations for efficiency and to reduce costs. As they reassess their information systems cost, they are attracted to open-source software because of the lack of license fees. Since open-source ERP was developed under the open-source license terms, the cost to acquire the software is perceived to be minimal. By contraries, the commercial ERP is costly because buyers have only two choices either going with SAP or Oracle. The buyers have little leverage in controlling their overall costs that do not include just the initial purchase of license and setup but also costly support and maintenance agreements. (Lemos, 2008) On the other hand, the open-source ERP solutions allow anyone to view, audit, change, and distribute the source code freely. This is a significant breakthrough in the market that is dominated by mainly the proprietary software from SAP and Oracle.

Since ERP systems often require a great deal of customization, having an open-source ERP seems like a good fit (Lemos, 2008). At the present time, there are only a handful of open-source ERP vendors. Among the best-known are Apache OFBiz, Compiere, Openbravo, and xTuple. Apache OFBiz is probably the closest to the ideal open-source software since there is no cost to download and to use the software. The Apache Software Foundation, the organization that supports the development of Apache OFBiz, receives contributions from its sponsors, and there may be some consultation fees to help users. In effect, there is no fee for using Apache OFBiz unless the user encounters problems. Openbravo is somewhat similar to the Apache OFBiz business model in that there is no fee in acquiring and using their ERP system. Unlike Apache OFBiz, there is an annual

subscription service from Openbravo to help end-users navigate issues in using Openbravo. Compiere and xTuple both receive revenue from the use of their ERP systems. Compiere outsources its maintenance and support functions to their partners, but does retain a revenue stream due to training and sales of books. xTuple does not outsource support services. Table 1 below shows the summary of fees and services offered through these vendors.

Table 1: Summary of fees and services offered by open-source ERP vendors

Package	Use of Package	Consultation	Other source of revenue
Apache OFBiz	No Fee	Available, cost of consultation is unknown	Apache Software Foundation Sponsoring Program
Compiere	Per User	Available from Compiere's partner	Sales of books, training modules
Openbravo	No Fee	Available through annual subscription from Openbravo	Installation and implementation fee, Training
xTuple	Per User	Available through xTuple	Training

A CLOSER LOOK AT THE POTENTIALS OF xTUPLE

OpenMFG began its development in 2000 and later changed its name to xTuple. xTuple markets its ERP systems to small and medium enterprises (SME) and manufacturers in particular. In 2007, xTuple launched the PostBooks Edition. It is part of an open-source ERP system. There is no license fee or subscription option because it is freely available and distributed without any support. PostBooks was built from the open-source technology including the PostgreSQL database, and the open-source Qt framework for C++. It is a full-featured, fully-integrated accounting, ERP, and CRM system. Its capabilities include the following modules: Accounting (general ledger, accounts receivable and payable, bank reconciliation, financial reporting), Sales (quotes, order entry, sales reporting, shipping), CRM (universal address book, incident management, opportunity management, to-do lists, project management), Purchasing (purchase orders, receiving, vendor reporting), Product Definition (items, infinite-level bills of material), Inventory and Distribution (multiple locations, other advanced warehouse features), Light Manufacturing (work orders, strong support for make-to-order), OpenRPT open-source report writer. Similar to the other two commercial products, PostBooks runs equally well on Windows, Linux, and Mac - and is fully internationalized (multi-currency, support for multiple tax structures, and multilingual translation packs maintained by our global community). PostBooks is licensed under CPAL, the OSI-certified Common Public Attribution License. (website http://www.xtuple.com/postbooks)

To allow prospective buyers a chance to experience with its product, xTuple offers a free hosted demo of its flagship Manufacturing Edition. Here is basically how it was set up. xTuple provides access to one of its servers that hosts its Manufacturing Edition. All it is required to run this demo is a connection to the Internet and a downloaded xTuple client. After the register process, a user can then log on to the hosted demo and try out the application.

At this point, we were able to test the application. This demo is relatively easy to follow. It walks one through a basic business process flow. All the data are already in the system. The user just needs to follow a series of related screenshots.

From this example, one can see the level of complexity when information is flowing through different processes and is interrelated through an enterprise perspective. Yet, the demo is so effective in illustrating how an ERP application can help facilitating and supporting business process integration. After going through the demo, one can understand much better the interconnection among different processes to form an integrated enterprise system. In this case, the trigger was made when the Sales Order was generated. Based on the information from the Sales Order, a Purchase Request was created. It was then sent to two different functions: the Purchasing and the Production. The two functions took on the information from the Purchase Request and carried out until the end of the process. This simple illustration shows successfully how xTuple is capable of linking various functions together, coordinating smoothly the information flow, tracking on the status of the order, and generating detailed information for review and monitor. This is why an ERP system such as xTuple provides valuable experience for students to see how the business processes work and how they are integrated.

After testing out the hosted demo, we moved forward with the download and installation of xTuple PostBooks Edition to run on a Ubuntu server. The website here (http://www2.selu.edu/Academics/Faculty/mhuynh/xTuple/doc/) provides the documentation that describes in detail how we installed and setup xTuple on our server and how we used xTuple in an example to illustrate an integrated business process flow.

DISCUSSION

One of the reasons that we were attracted to xTuple was the readily available demo and very detailed documentation. We were surprised at the company's openness. It did not withhold any information unnecessarily or try to make it difficult for users to access its applications as we encountered when we tried out OpenBravo. We found that the documentation and online guide from xTuple were very helpful. While we were using xTuple Manufacturing Edition application, we also discovered a wealth of supports that was accessible directly from the menu. By clicking "Community" on the menu, we could reach xTuple.org, online customer support (only for authorized users and paid customers), and other non-paid support options. We did check the discussion forum. The information was quite well-organized. In addition to the discussion forum, there was an FAQ page to cover support-type topics. Furthermore, using the free hosted demo of xTuple Manufacturing did allow us to assess other attributes associated with installation of a software system. When we did our installation and setup, we encountered a few difficulties. However, we post our questions to the xTuple user community forum as well as the Ubuntu community support. We got helpful hints and suggestions from other users. The resources from the user community are surprisingly rich and quite accessible. This user driven support is perhaps one of the distinctive features of open-source software and is a very effective way to get help.

CONCLUSION

For the purpose of evaluation and teaching, we would recommend xTuple because of its ease of use, comprehensive documentation, rich resources, and a good example to illustrate an integrated business process facilitated by an ERP application. There is, however, one potential improvement that can be made to increase its pedagogical value and xTuple's marketability. From our experience, it is a very promising open-source ERP system that can be integrated for teaching about enterprise systems in core business classes. However, the faculties who intend to incorporate this pack may need to spend significant time on development of appropriate content. The current demo may be appropriate for first-time users and for an introduction to computer information systems classes, as the demo shows how to build an ERP system.

We believe that it is feasible to adopt an open-source ERP system, install and deploy it for the purpose of teaching. We also acknowledge that there may be a steep learning curve to commit using an open-source ERP system. Although one of the major incentives for adopting open-source software is the absence of license fees, the experience that we had with xTuple does raise an important fact about other costs such as support, training, implementation, and maintenance costs. All of these costs should be taken into consideration.

REFERENCES

Conlon (2007). An Examination of Initiation, Organization, Participation, Leadership, and Control of Successful Open Source Software Development Projects. *Information Systems Education Journal, 5*(38). http://isedj.org/5/38/. ISSN: 1545-679X. (A preliminary version appears in *The Proceedings of ISECON 2007:* §2554. ISSN: 1542-7382.)

Conlon and Hulick (2006). Is There a Role for Open Source Software in Systems Analysis? *Information Systems Education Journal, 4*(88). http://isedj.org/4/88/. ISSN: 1545-679X. (A preliminary version appears in *The Proceedings of ISECON 2005:* §2562. ISSN: 1542-7382.)

Johnson, T., Lorents, A., Morgan, J. and Ozmun, J., (2004). A Customized ERP/SAP Model for Business Curriculum Integration, *Journal of Information Systems Education*, October, 15(3), 245-254.

Lemos, R., (2008). Open-source ERP grows up, *InfoWorld,* April 22, 2008, http://www.infoworld.com/t/applications/open-source-erp-grows-615

Porter, L. and McKibbin, L., (1998). *Management Education and Development: Drift or Thrust into the 21st Century?*, McGraw-Hill, New York, NY.

CLASSIFICATION ALGORITHEM FOR TIME SERIES DATAMINING

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ABSTRACT

Classification is an important problem in Pattern recognition. The classification of the data is based on the nature of the data collected according to spatial or temporal characteristics. In temporal data collection, time series forms an important class. Time series classification is one of the most predominant factors for efficient data analysis in image processing, signal processing, medical imaging, speech recognition etc. In this paper we develop and analyzed classification algorithm for time series data mining. It is assumed that the whole data set is characterized by a M-component mixture of bivariate AR (1) model. The number of components are known and fixed by defining the query under consideration. The model parameters are estimated using EM algorithm. The classification algorithm is developed by utilizing component maximum likelihood and Bayesian information criteria. The performance of the developed algorithm is studied through real time data collected from a cardiac centre. A comparative study of the developed algorithm is made with existing data mining algorithm with univariate AR(1) model. It is observed that this proposed algorithm performs much better than the existing algorithms.

Keywords : Classification, EM algorithm, Time series, Bivariate AR(1) model.

INTRODUCTION

The technique of classification is often necessary to extract useful information for the solution of real world problems arising from different domains. In economics for instance, the investigation of economic cycle sometimes require the seasonal adjustment of consistent number of time series, in such a situation Marcella Corduas (2008) [8] considered the time series under scrutiny can be classified in to groups with similar dynamic behavior so that they can be treated by the same seasonal adjustment. Classification algorithm can be developed for each class of time series data. When a new time series is given, a class label is assigned to it based on the developed model.

LITERATURE REVIEW

Fedric C.M.hans and Soowhan Han (1996) [3] studied classification of cardiac arrhythmias using fuzzy ARTMAP model. J J Rajan (1996) [5] discussed the time varying AR model with regard

to modeling non stationary time series. Guvenir HA et.al (1997) [4] studied on a supervised learning algorithm for arrhythmia analysis. Dingfei Ge et.al (2002) [2] have used Autoregressive model for cardiac arrhythmia classification. Javier Contreras et.al (2003) [6] predicted the next day electricity prices based on ARIMA methodology. Jorge Caiado et.al (2006) [7] proposed a new measure of distance between time series based on the normalized periodogram. Venkataramana Kini B and C.Chandra Sekhar (2008) [10] has used AR model with class labeling for the time series classification. U.Rajendra Acharya et.al. (2008) [9] has used fast fourier transformation, autoregressive model for the analysis of heart rate variability (HRV) signal for predicting the risk of cardio vascular diseases.

In all these papers, the authors considered the univariate time series models for classification. But in many time series data sets, there will be more than one tuple which play a significant role for class labeling. For example, in the studies of classification of stock portfolios the B.S.E index as well as N.S.C index both are correlated and form an important feature vector. Hence, it is needed to have a bivariate time series classification algorithm.

METHODOLOGY

The Autoregressive process is a generative model in the sense that the current value of the time series is generated as a linear combination of previous values. In particular, the bivariate time series forms a linear combination of both variates under consideration. The model parameters are estimated through Expectation Maximization (EM) algorithm with suitable initial estimates. A classification algorithm with Bivariate AR(1) model is developed by using maximization of likelihood function. A comparative study of this algorithm with earlier algorithms is also carried through data collected from a hospital. It is observed that the proposed algorithm serve much better than the earlier existing algorithms for classifying the time series.

A bivariate process $\left\{\begin{pmatrix} X_t \\ Y_t \end{pmatrix},\ t \in T\right\}$ is said to follow a Bivariate Autoregressive process of order 1 if it can be expressed as

$$Z_t = \mu + \Phi\left(Z_{t-1} - \mu\right) + \in_t, where\ \ Z_t = \begin{pmatrix} X_t \\ Y_t \end{pmatrix},\ \Phi = \begin{pmatrix} \phi_{11} & \phi_{12} \\ \phi_{21} & \phi_{22} \end{pmatrix} and\ \in_t = \begin{pmatrix} e_{X_t} \\ e_{Y_t} \end{pmatrix}$$

and $\in_t of\ Z_t,\ t = 1,2,3,\ldots,n$ follows a bivariate Gausssian distribution with mean zero and variance –covariance matrix as $\sum = \begin{pmatrix} \sigma_{e_X}{}^2 & \rho\sigma_{e_X}\sigma_{e_Y} \\ \rho\sigma_{e_X}\sigma_{e_Y} & \sigma_{e_Y}{}^2 \end{pmatrix}$.

The probability density function of a bivariate Gaussian distribution is

$$f\left(e_x, e_y\right) = \left(\frac{1}{2\pi\,\sigma_{e_X}\,\sigma_{e_Y}\sqrt{1-\rho^2}}\right)\exp\left\{-\frac{1}{2\left(1-\rho^2\right)}\left(\frac{{e_{X_t}}^2}{{\sigma_{e_X}}^2} - \frac{2\rho e_{X_t} e_{Y_t}}{\sigma_{e_X}\sigma_{e_Y}} + \frac{{e_{Y_t}}^2}{{\sigma_{e_Y}}^2}\right)\right\}$$

$$-1 < \rho < 1,\ \sigma_{e_X} > 0 \ and\ \sigma_{eY} > 0 \tag{3.1}$$

Let us assume that the time series data are generated by M different bivariate AR(1) models which corresponds to the *M* class labels of interest with weights .

$$P\left(\omega_1\right), P\left(\omega_2\right), ..., P\left(\omega_M\right)$$

Let $L\left(Z\left|\omega_k, \Phi_k\right.\right)$ denote the conditional likelihood function of component model as the set of parameters for the model. Then the conditional likelihood function of the mixture of finite bivariate AR process of order 1 can be expressed in the form of

$$P\left(Z\left|\,\Theta\right.\right) = \sum_{k=1}^{M} P\left(Z\left|\omega_k, \Phi_k\right.\right) P\left(\omega_k\right) \tag{3.2}$$

(Box and Jenkins (1998)) [1]

where, $\Theta = \left\{\Phi_1, \Phi_2, ..., \Phi_M, P\left(\omega_1\right), \left(\omega_2\right), ...P\left(\omega_M\right)\right\}$ represents the set of model parameters for the mixture model . A bivariate time series *Z* is assigned to cluster ω_k with posterior probability $P\left(\omega_k\left|Z\right.\right)$

where $\sum_{k=1}^{M} P\left(\omega_k\right) = 1$

Let $D = \left\{Z_1, Z_2, ..., Z_N\right\}$ are N time series and assuming that these are conditionally independent under the given model, the likelihood function of the realization is

$$P\left(D \mid \Theta\right) = \prod_{i=1}^{N} P\left(Z_i \mid \Theta\right) \quad = = \prod_{i=1}^{N}\sum_{k=1}^{M} P\left(Z_i \mid \omega_i, \Phi_k\right) P\left(\omega_i\right)$$

The Log likelihood function of the realization *D* is

$$ln\, P\left(D \mid \Phi\right) = \sum_{i=1}^{N} ln\left[\sum_{k=1}^{M} P\left(Z_i \mid \omega_i, \Phi_k\right) P\left(\omega_k\right)\right]$$

For obtaining the model parameters we utilize the EM algorithm. In EM algorithm, the first step is to obtain the expectation of the log likelihood. Given the observed data set D and the current

parameter estimate $\Theta(r)$, the expected value of the log likelihood for M labels of time series n each having points of observations can be expressed as

$$Q\left(\Theta\middle|\Theta(r)\right) = E(\log P(D \mid \theta))$$

$$= \sum_{i=1}^{N}\sum_{k=1}^{M} P\left(\omega_k \middle| X_i, \Theta(r)\right) \ln P\left(Z_i \middle| \omega_k, \Phi_k\right) + \sum_{i=1}^{N}\sum_{k=1}^{M} P\left(\omega_k \middle| Z_i, \Theta(r)\right) \ln P\left(\omega_k\right) \tag{3.3}$$

where, the posterior probabilities $P\left(\omega_k \middle| Z_i, \Theta\right)$ are computed using the Bayes rule as

$$P\left(\omega_k \middle| Z_i, \Theta\right) = \frac{P\left(Z_i \middle| \omega_k, \Phi_k\right) P\left(\omega_k\right)}{\sum_{u=1}^{M} P\left(Z_i \middle| \omega_u, \Phi_u\right) P\left(\omega_u\right)}, \qquad i = 1, 2, ...N \text{ and } k = 1, 2, ...M.$$

and $P\left(\omega_k\right) = \frac{1}{N}\sum_{i=1}^{N} P\left(\omega_k \middle| Z_i, \Theta(r)\right)$ (3.4)

In the M- step of EM algorithm, we have to find a new parameter estimate by maximizing $Q\left(\Theta\middle|\Theta(r)\right)$ with respect to each $P\left(\omega_k\right)$ by using Lagrangian multiplier method subject to the condition that

$$\sum_{k=1}^{M} P\left(\omega_k\right) = 1 \tag{3.5}$$

Differentiating $Q\left(\Theta\middle|\Theta(t)\right)$ with respect to the parameters, equating the resultant equations to zero and then solving the equations simultaneously, we obtain the refined estimates of the parameters $\sigma^2_{e_{X_k}}, \sigma^2_{e_{Y_k}}, \phi_{11k}, \phi_{12k}, \phi_{21k}, \phi_{22k}$ *and* ρ_k . To utilize the EM algorithm, we have to initialize the parameters using training data set. For the parameters, $\sigma^2_{e_x}$ *and* $\sigma^2_{e_Y}$ we consider the sample variances of the estimated residual of X_t *and* Y_t as initial estimates respectively. The initial estimates of $\sigma^2_{e_x}$ *and* $\sigma^2_{e_Y}$ are

$$\tilde{\sigma}^2_{e_X} = \frac{1}{n}\sum_{t=1}^{n} e^2_{X_t} \text{ and } \tilde{\sigma}^2_{e_Y} = \frac{1}{n}\sum_{t=1}^{n} e^2_{Y_t}$$

For initializing the $\phi_{11}, \phi_{12}, \phi_{21}$ *and* ϕ_{22} we use the best linear estimators of the bivariate Autoregressive process of order 1 given as $\tilde{\phi}_i = \left(Z'_{it-1} Z_{it-1}\right)^{-1} Z'_{it-1} Z_{it}$

where, $Z_{it} = \left(X_{it}, Y_{it}\right)'$, $\phi_i = \begin{bmatrix} \phi_{11} & \phi_{12} \\ \phi_{21} & \phi_{22} \end{bmatrix}$ and $\in_t = \begin{bmatrix} e_{X_t} \\ e_{Y_t} \end{bmatrix}$ for each class $i = 1, 2, \ldots, N$

The initial estimate of ρ_i is the sample correlation coefficient between X_{it} *and* Y_{it} and defined as $\tilde{\rho}_i = \dfrac{Cov(X_i, Y_i)}{\sqrt{Var(X_i)Var(Y_i)}}$, $i = 1, 2, \ldots, N$

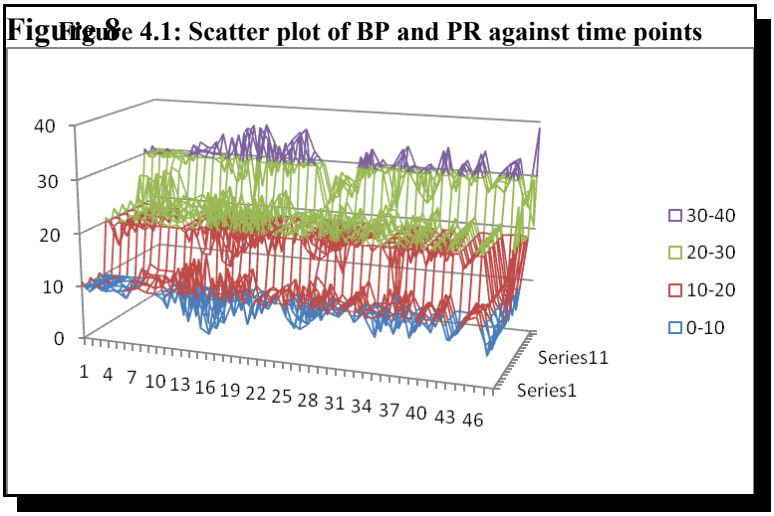
Now, the classification algorithm for a new time series data is as follows:

Step 1: Identify the number of class labels.
Step 2: Obtain the initial estimates of model parameters using the given methodology.
Step 3: Obtain the refined estimates of model parameters using EM algorithm.
Step 4: For the new data point compute the conditional likelihood with the model parameters of the i^{th} class derived from step 3 and assign to the class for which the component conditional likelihood is maximum. i.e. the classification is $\hat{C} = \arg\max_k P(Z|C_k)$ where, $\hat{C}$ is the maximum likelihood class and Z is the new time series data.

RESULTS

We demonstrate the utility of developed classification algorithm to classify the patients with cardiac problem. After discussions with medical personal, it has been observed that 3 categories of persons namely, Normal, Pro-Cardiac and Cardiac patients, usually visit the hospital. These 3 categories can be taken as class labels and for simplicity we consider that the number of groups is known. The data of 100 patients who visited the hospital with respect to two attributes namely blood pressure (BP) and pulse rate (PR) is collected for 48 time points. This bivariate time series for each individual is characterized with Bivariate Autoregressive process of order 1. From this data set we have considered 75 time series as the training data set and 25 time series for the test data. A scatter plot BP and PR against time is plotted and shown in figure 4.1.

Figure 4.1: Scatter plot of BP and PR against time points



From the above scatter plot, it is observed that the time series are stationary after obtaining the deviation from mean values. Assuming that the time series are generated from Bivariate AR process of order 1, the model is trained. Using the initial estimates of the parameters and EM algorithm, we obtained final estimates of parameters. With these final estimates, the model characterizing the three groups are estimated as

Group 1:
$$\begin{pmatrix} X_t \\ Y_t \end{pmatrix} = \begin{pmatrix} -0.380 & 0.022 \\ 0.075 & -0.308 \end{pmatrix} \begin{pmatrix} X_{t-1} \\ Y_{t-1} \end{pmatrix} + \begin{pmatrix} e_{X_t} \\ e_{Y_t} \end{pmatrix}$$

Group 2:
$$\begin{pmatrix} X_t \\ Y_t \end{pmatrix} = \begin{pmatrix} -0.027 & 0.076 \\ 0.111 & 0.079 \end{pmatrix} \begin{pmatrix} X_{t-1} \\ Y_{t-1} \end{pmatrix} + \begin{pmatrix} e_{X_t} \\ e_{Y_t} \end{pmatrix}$$

Group 3:
$$\begin{pmatrix} X_t \\ Y_t \end{pmatrix} = \begin{pmatrix} 0.097 & -0.308 \\ -0.154 & -0.273 \end{pmatrix} \begin{pmatrix} X_{t-1} \\ Y_{t-1} \end{pmatrix} + \begin{pmatrix} e_{X_t} \\ e_{Y_t} \end{pmatrix}$$

Here, X_t is the blood pressure of the patients at time t and Y_t is the pulse rate of the patient at time t. A comparative study with respect to performance measures is presented.

Comparative Performance

	Bivariate AR(1)			Univariate AR(1) Blood Pressure			Univariate AR(1) Pulse Rate		
	Cluster			Cluster			Cluster		
	I	II	III	I	II	III	I	II	III
TPR	1	0.9	1	1	0.75	0.8	0.8889	0.7	0.8333
FPR	0.0625	0	0	0.125	0	0	0.0625	0.0067	0.1579
FDR	0.1	0	0	0.181	0	0	0.111	0.125	0.375
F Measure	1	0.9474	1	0.8999	0.8571	0.8889	0.8482	0.7778	0.7143
Sensitivity	1	0.888	1	1	0.6	1	0.888	0.466	0.8333
Specificity	0.857	1	1	0.714	1	1	0.9	1	0.733
Accuracy %	96	96	100	92	88	96	92	84	84
Misclassification Rate	4%			12%			20%		

SUMMARY

In this paper, we proposed a classification algorithm based on Bivariate Autoregressive process of order 1 for time series classification. The performance of the developed algorithm is

compared through quality metrics like sensitivity, specificity, accuracy and misclassification rates with the existing classification algorithms of univariate AR(1) classifier and found that the developed algorithm out performs the others. This algorithm is also useful for classifying the bivariate time series data arriving in many applications from scientific, sociological, financial and other domains. It is possible to extend the classification algorithm with bivariate AR(p) model.

REFERENCES

[1] Box,G.E.P., Jenkins G.Mand Reinsel, G C , *Time series Analysis : Forecasting & Control* (3rd Edition), 1994.

[2] Dingfei Ge, Narayanan Srinivasan and Shankar M Krishnan, Cardia arrhythmia classification using auto regressive modeling , *Bio medical engineering online*, http://www.biomedical-engineering-online.com/content/1/1/5, 2002.

[3] Fedric C.M.hans, Soowhan Han, Classification of Cardiac Arrhythmias using Fuzzy ARTAP, *IEEE Transactions on Biomedical Engineering*, Vol. 43, No.4, pp 425-430, 1996.

[4] Guvenir HA, Acar B.Deminoz, Cekin A, A supervised machine learning algorithm for arrhythmia analysis , *Computers in cardiolog,y* 197, Vol. 24, pp 433-436, 1997.

[5] J J Rajan, Generalized Feature extraction for time varying autoregressive models , *IEEE transactions on signal processing* , Vol. 44, No 10, 1996.

[6] Javier Contreras, Rosario Espinola, Francisoo J, Nogales and Antonio J.Conejo , ARIMA model to predict next day electricity prices , *IEEE transactions on power systems,* Vol. 18, No 3, 2003.

[7] Jorge Caiadoa,b, Nuno Cratoa,c, Daniel Peñad, A paraodogram – based metric for time series classification , *Computational Statistics and data analysis,* No.50, pp 2668-2684, (2006).

[8] Marcella Corduas, Domenico Piccolo, Time series clustering and classification by autoregressive metric, *Computational Statistics and Data Analysis*, Vol. 52, No.4, pp.1860-1872, 2008.

[9] U.Rajendra Acharya, Meena sanakaranarayanan, Jagadeesh Nayak, chen Xiang and Toshio Tamura, *Information Sciences*, Vol. 178, No. 23, pp 4571-4582, 2008.

[10]Venkataramana Kini B, C.Chandra Sekhar, Large margin AR model for Time series classification, *19th International Conference on pattern recognition*, ICPR(2008), pp 1-4, 2008.

PRODUCT UPGRADE AND TIME-TO-MARKET

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ABSTRACT

The introduction of upgraded products is challenging, especially in a market consisting of two consumer segments with different valuations for quality. In this paper, we apply the self-selection approach to study optimal product upgrading strategies. We propose a two-period product-upgrade model with the time-to-market of upgraded products incorporated. The model profit is benchmarked with that of a one-period model without product upgrading. We identify the conditions that are optimal to introduce upgraded products. The degree of cannibalization and the time-to-market are shown to be decisive factors. In particular, the product-upgrade model is optimal when the degree of cannibalization is small and when the time-to-market of upgraded products is less than a threshold value. Otherwise, the one-period benchmark model is optimal.

INTRODUCTION

Firms periodically introduce upgraded products. Microsoft released its popular operating system Windows XP in October of 2001, an upgraded Windows Vista in November of 2006 and the most recent, more user-friendly Windows 7 in November of 2009. The prominent Apple product iPhone was first launched in June 29, 2007. Its next version iPhone 3G followed one year later and was on the market on July 11, 2008.

The introduction of upgraded products is challenging, especially in a market consisting of two consumer segments with different valuations for quality. Market segmentation provides firms opportunities to offer differentiated products to segmented consumers. If firms can efficiently direct the differentiated products to their intended consumer segments, i.e., low-segment consumers purchase a basic-quality product and high-segment consumers purchase an upgraded-quality product, then higher profits could be obtained.

However, in a segmented market, the demand of upgraded products could be cannibalized. Upgraded products are usually targeted to consumers in the high-segment, which is the segment with a higher valuation. The other segment with a lower valuation is defined as low-segment. Under certain product configurations, high-segment consumers may purchase a product that is intended for low-segment consumers. Profit will be less under this cannibalization situation. It may be optimal for firms not to offer upgraded products if cannibalization becomes too serious.

In addition, the time-to-market of upgraded products has a great impact on consumer's purchasing decisions. High-segment consumers need to wait a certain period of time for upgraded products. The longer the waiting time for upgraded products, the lower the product valuations would

be for consumers. What's more, the longer the introduction time of upgraded products, the less the present value of profit would be for firms.

Firms need to take into consideration the issues we discussed above in the decisions of upgraded products introduction. Particularly, many important questions need to be addressed. How would the degree of cannibalization affect the introduction of upgraded products? When is it optimal to offer (or not to offer) upgraded products? What would be the optimal product configurations when there is product upgrading and when there is not? What would be the optimal product introduction strategy with or without product upgrading? We develop a self-selection model in this paper to answer these questions.

We first consider a one-period benchmark model with no product upgrading, and conclude the optimal product introduction strategies. We then present a product-upgrade model, where a basic-quality product is offered first and its upgraded version one period after. The time-to-market of the upgraded product is incorporated into the discount factors of valuation and profit in the second period. We characterize the optimal product upgrading strategies, after comparing the profits from the two models. In particular, we identify the conditions that are optimal to introduce the upgraded product. We find that the product-upgrade model is optimal when the degree of cannibalization is small and when the time-to-market of upgraded products is less than a threshold value. Otherwise, the one-period benchmark model is optimal.

The remainder of this paper is organized as follows. We review the literature in the next section. We then present model setups. In the last sections, we remark on paper contributions and future directions.

LITERATURE REVIEW

Our work adds to the growing body of literature on product development decisions, especially those adopting the self-selection approach. Interested readers should refer to Krishnan & Ulrich (2001) for an excellent review of this literature. According to Mussa & Rosen (1978), self-selection process, along with a price-quality schedule, can efficiently allocate consumers along the quality spectrum on a segmented market. Moorthy (1984) considers a market segmentation problem with product line design under self-selection constraints. Desai et al. (2001) adopt the segmentation theory to investigate the tradeoff between product differentiation and component commonality in product design. Moorthy & Png (1992) apply the self-selection approach on a two-segment market. They show that selling a high-end product in the first period followed by a low-end product in the next period is an optimal strategy. Mallik & Chhajed (2002), build upon Moorthy & Png (1992), identify optimal product introduction strategies with consumer valuation change and cost savings from a learning curve. Kim & Chhajed (2002) extend the single attribute analysis, and provide insights on product design with multiple attributes.

Our model is mostly related to Moorthy & Png (1992) and Mallik & Chhajed (2002). In their works, both low-end and high-end products are available in the two considered periods. The decision to make, is which product(s) to offer in which period. By contrast, we consider a product upgrading scenario, where the upgraded product, if introduced, is only available in the second period. The decision to make, is whether to introduce the upgraded product or not.

What's more, time-to-market is another focus in our model. We incorporate the time-to-market of the upgraded product in model formulation, and provide timing conditions that are optimal for product upgrading. Cohen et al. (1996) provide a good example in the time-to-market analysis. They model the tradeoff between time to market and product performance. We focus on the time-to-market's negative impacts on valuation and profit in the second period.

MODEL SETUPS

In this section, we describe consumer and product configurations, as well as model assumptions and setups.

Consider a product that may be differentiated by some attributes, for example, profile and battery life for cell phones, security and software compatibility in operating systems, style and fabric for clothes, etc. We call this attribute "quality" and denote it by q. We consider a two-period model. A monopolist produces and sells a basic-quality product in the first period. Its quality level is denoted by q_L. The first period lasts time t, where t?0, during which the quality of the product will be improved and upgraded. The upgraded product with a higher quality q_H will be offered in the second period. We assume only one set of product configurations (price and quality) is offered in each period, due to resource constraints.

We further assume the product is a durable product. Durable goods provide a significant service period to consumers and are often considered a one-time buy. Thus, a consumer will leave the market forever, once she has bought a unit of the product, regardless of quality. In other words, we do not consider repeated purchase.

The cost of manufacturing the product is assumed to be quadratic in the quality level with coefficient c. This assumption is consistent with the literature (Moorthy & Png, 1992, Kim & Chhajed, 2002, Mallik & Chhajed, 2006). Specifically, for quality level q, the manufacturing cost is cq^2.

Consider a market consisting of two segments: a high segment H and a low segment L. The size of segment H is n_H and the size of segment L is n_L. The high segment values quality level q at ?_H q, and the low segment values it at ?_L q, where ?_H > ?_L. Here ?_i (i = H, L) is the marginal valuation of the consumer per unit of quality. The term ?_i q is the consumer's maximum willingness to pay for a quality level q. The utility Ui that a consumer, in segment i (i = H, L), derives from a product is U_i=?_i q-p, where p is the price of the product. The consumer only purchases the product that gives her maximum non-negative utility. If no product gives her a positive utility, she can choose not to buy any product.

We assume consumer's marginal valuation ?_i decreases in time. The longer a consumer has to wait to consume a product, the less desirable the product would be. At the end of a waiting time t, we assume a consumer's marginal valuation diminishes to ??_i e?^(-t). Particularly, when t=0, we obtain ??_i e?^(-t)=?_i. Consumer's marginal valuation does not change when there is no waiting. When t=?, we obtain ??_i e?^(-t)=0. If the waiting time for the product is infinite, then the product has no value for the consumer anymore.

The monopolist's objective is to maximize the profit (the product price minus manufacturing cost and multiplied by the number of consumers in each segment). The monopolist sells the basic-quality product in the first period and only offers the upgraded-quality product in the second

period. The profit obtained from the second period will be discounted by a time sensitive factor e^(-t), which is decreasing in time t. Again, when t=0, the time sensitive factor becomes e^(-t)=1. The present value of the profit stays the same when there is no gap between the first and the second period. When t=?, the factor is e^(-t)=0. If the second period profit can only be realized in the infinite future, then its present value would be zero.

For maximum profit, the monopolist would like to target the basic-quality product to the L segment and the upgraded-quality product to the H segment. However, the consumers can self-select the two types of products. They may buy either of them, but not necessarily the one targeted at their segment. Therefore, the monopolist has to decide the product qualities and prices in such a way that it would be optimal for the consumers to choose the products targeted at their segment. The consumer's objective is to maximize the utility in their purchasing decision.

We further assume the monopolist commits in advance to the timing and product configurations. Therefore, H segment could evaluate the upgraded product accordingly and decide whether to wait and buy in the second period.

CONTRIBUTIONS

Our work contributes to the literature of product development decisions. We provide detailed requirements of cannibalization and time-to-market for the introduction of upgraded products. The requirements are applicable for business practitioners, and can provide valuable insights and guidance in related business operations.

FUTURE RESEARCH

This paper can be extended in several directions. First, we assumed there was only a single attribute (quality) in the product. An important extension would be to include multiple attributes. The paper by Kim & Chhajed (2002) serves as a good reference. Second, like most other papers (Moorthy & Png, 1992, Desai et al., 2001, Mallik & Chhajed, 2006), we only considered a monopoly situation. The effect of competition would be interesting to explore. Third, we exogenously assumed the time-to-market of upgraded products in our model. More valuable insights might be obtained by examining the timing factor as a decision variable. Finally, for simplicity, we did not consider production cost savings due to learning curve and design effort in the second period. Incorporating cost savings might be another interesting extension.

REFERENCES

Cohen, M., J. Eliashberg, & T. Ho (1996). New product development: the performance and time-to-market tradeoff. *Management Science*, 47(2), 173-186.

Desai, P., S. Kekre, S. Radhakrishnan, & K. Srinivasan (2001). Product differentiation and commonality in design: balancing revenue and cost drivers. *Management Science*, 47(1), 37-51.

Kim, K., & D. Chhajed (2002). Product design with multiple quality-type attributes. *Management Science*, 48(11), 1502-1511.

Krishnan, V., & K.T. Ulrich (2001). Product development decisions: a review of literature. *Management Science*, 47(1), 1-21.

Mallik, S., & D. Chhajed (2006). Optimal temporal product introduction strategies under valuation changes and learning. *European Journal of Operational Research*, 172, 430-452.

Moorthy, K. (1984). Market segmentation, self-selection, and product line design. *Marketing Science*, 3(4), 288-307.

Moorthy, K., & I. Png (1992). Market segmentation, cannibalization, and the timing of product introductions. *Management Science*, 38(3), 345-359.

Mussa, M., & S. Rosen (1978). Monopoly and product quality. *Journal of Economic Theory*, 18(6), 310-317.

HOW SERVICE QUALITY AFFECTS CUSTOMER LOYALTY

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ABSTRACT

This study attempts to examine the impact of service quality on customer loyalty. The practice of customer relationship management is now an essential factor in determining the success of a business. The problem most organizations face is not knowing how to provide quality service that will lead to customer retention. This paper will explore the relationship between service quality and customer loyalty by reviewing several publications. This paper will also be looking at the relationship between good service quality and how that translates into loyal customers. We will look at some of the industry leaders in customer service scores and how it relates to their success. We will also look at some of the service philosophies of companies and examine how they make service quality a priority in order to have customer retention. Customers will remain faithful to companies that are providing quality service on a consistent basis. There are many examples of how companies that have positive revenue growth year after year also rank high in their customer service scores. These companies continuously provide a value to their customers, which keep them coming back for their products or services. While it is important to have new sales in a company, if you have business going out the back end because of shoddy service, you can't expect a business to grow. The results indicated that providing quality service leads to competitive advantage, organizational growth, and enhanced profitability. The results also showed that service quality is positively associated with customer loyalty.

INTRODUCTION/CONCLUSIONS

Future research is suggested based upon prior research and theory (Buckley and associates, 1992- present; Carland and associates 1984-present).

REFERENCES

Buckley, M.R., Carraher, S.M., Carraher, S.C., Ferris, G.R., & Carraher, C.E. (2008). Human resource issues in global entrepreneurial high technology firms: Do they differ? *Journal of Applied Management & Entrepreneurship*, 13 (1), 4-14.

Buckley, M., Fedor, D., Veres, J., Wiese, D., & Carraher, S.M. (1998). Investigating newcomer expectations and job-related outcomes. *Journal of Applied Psychology*, 83, 452-461.

Buckley, M., Mobbs, T., Mendoza, J., Novicevic, M., Carraher, S.M., & Beu, D. (2002). Implementing realistic job previews and expectation lowering procedures: A field experiment. *Journal of Vocational Behavior*, 61 (2), 263-278.

Carland, J. & Carland, J. (1993). The role of personality in new venture creation. *Entrepreneurship, Innovation and Change*, 2(2), 129-141.

Carland, J & Carland, J. (1995). The case of the reluctant client. *Journal of the International Academy for Case Studies*, 1(2), 76-79.

Carland, J. & Carland, J. (1997). A model of potential entrepreneurship: Profiles and educational implications. *Journal of Small Business Strategy*, 8 (1), 1-13.

Carland, J. & Carland, J. (2003). Pawn takes queen: The strategic gameboard in entrepreneurial firms. *Academy of Strategic Management Journal*, 2, 93-104.

Carland, J. & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. *Academy of Entrepreneurship Journal*, 10(2), 104-114.

Carland, J. & Carland, J. (2006). Eminent domain: What happens when the state takes part of your land? *The Entrepreneurial Executive*, 11, 95-113.

Carland, J.A.C., & Carland, J.W. (1991). An empirical investigation into the distinctions between male and female entrepreneurs managers. *International Small Business Journal*, 9 (3), 62-72.

Carland, J.A., Carland, J.W., & Stewart, W.H. (1996). Seeing what's not there: The enigma of entrepreneurship. *Journal of Small Business Strategy* 7 (1), 1-20.

Carland, J., Carland, J.A., & Abhy, C. (1989). An assessment of the psychological determinants of planning in small businesses. *International Small Business Journal*, 23-34.

Carland, J., Carland, J., & Carland, J. (1995). Self-actualization: The zenith of entrepreneurship. *Journal of Small Business Strategy*, 30-39.

Carland, J.W., Carland, J.A., & Hoy, F. (1992). An entrepreneurship index: An empirical validation. Babson Entrepreneurship Conference, Fontainebleau, France.

Carland, J.W., Carland, J.A., Hoy, F., & Boulton, W.R. (1988). Distinctions between entrepreneurial and small business ventures. *International Journal of Management*, 5 (1), 98-103.

Carland, J.W. III, Carland, J.W., Carland, J.A., & Pearce, J.W. (1995). Risk taking propensity among entrepreneurs, small business owners and managers. *Journal of Business and Entrepreneurship*, 7 (1), 12-23.

Carland, J.W., Hoy, F., Boulton, W.R., & Carland, J.A.C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9 (2), 354-359.

Carland, J.W., Hoy, F., & Carland, J.A.C. (1988). Who is an entrepreneur? is the wrong question. *American Journal of Small Business* 12 (4), 33-39.

Carraher, S.M. (1991). A validity study of the pay satisfaction questionnaire (PSQ). *Educational and Psychological Measurement*, 51, 491-495.

Carraher, S.M. (1991). On the dimensionality of the pay satisfaction questionnaire. *Psychological Reports*, 69, 887-890.

Carraher, S.M. (2005). An Examination of entrepreneurial orientation: A validation study in 68 countries in Africa, Asia, Europe, and North America. *International Journal of Family Business*, 2 (1), 95-100.

Carraher, S.M. (2008). Youth entrepreneurship: Strategic exercises for developing entrepreneurship among elementary school students. *International Journal of Family Business*, 5 (1), 67-68.

Carraher, S.M. (2008). Using E-Bay to teach global and technological entrepreneurship. *International Journal of Family Business*, 5 (1), 63-64.

Carraher, S.M. & Buckley, M. R. (1996). Cognitive complexity and the perceived dimensionality of pay satisfaction. *Journal of Applied Psychology*, 81 (1), 102-109.

Carraher, S.M. & Buckley, M.R. (2008). Attitudes towards benefits and behavioral intentions and their relationship to Absenteeism, Performance, and Turnover among nurses. *Academy of Health Care Management Journal*, 4 (2), 89-109.

Carraher, S.M., Buckley, M.R., & Carraher, C. (2002). Cognitive complexity with employees from entrepreneurial financial information service organizations and educational institutions: An extension & replication looking at pay, benefits, and leadership. *Academy of Strategic Management Journal*, 1, 43-56.

Carraher, S.M., Buckley, M. & Cote, J. (1999). Multitrait-multimethod information management: Global strategic analysis issues. *Global Business & Finance Review*, 4 (2), 29-36.

Carraher, S.M., Buckley, M., & Cote, J. (2000). Strategic entrepreneurialism in analysis: Global problems in research. *Global Business & Finance Review*, 5 (2), 77-86.

Carraher, S.M., Buckley, M., Scott., C., Parnell, J., & Carraher, C. (2002). Customer service selection in a global entrepreneurial information services organization. *Journal of Applied Management and Entrepreneurship*, 7 (2), 45-55.

Carraher, S.M. & Carraher, S.C. (2006). Human resource issues among SME's in Eastern Europe: A 30 month study in Belarus, Poland, and Ukraine. *International Journal of Entrepreneurship*. 10, 97-108.

Carraher, S.M., Carraher, S.C., & Mintu-Wimsatt, A. (2005). Customer service management in Western and Central Europe: A concurrent validation strategy in entrepreneurial financial information services organizations. *Journal of Business Strategies*, 22, 41-54.

Carraher, S.M., Carraher, S.C., & Whitely, W. (2003). Global entrepreneurship, income, and work norms: A seven country study. *Academy of Entrepreneurship Journal*, 9, 31-42.

Carraher, S.M., Gibson, J. W., & Buckley, M.R. (2006). Compensation satisfaction in the Baltics and the USA. *Baltic Journal of Management*, 1 (1), 7-23.

Carraher, S.M., Mendoza, J, Buckley, M, Schoenfeldt, L & Carraher, C. (1998). Validation of an instrument to measure service orientation. *Journal of Quality Management*, 3, 211-224.

Carraher, S.M. & Parnell, J. (2008). Customer service during peak (in season) and non-peak (off season) times: A multi-country (Austria, Switzerland, United Kingdom and United States) examination of entrepreneurial tourist focused core personnel. *International Journal of Entrepreneurship*, 12, 39-56.

Carraher, S.M., Parnell, J., Carraher, S.C., Carraher, C., & Sullivan, S. (2006). Customer service, entrepreneurial orientation, and performance: A study in health care organizations in Hong Kong, Italy, New Zealand, the United Kingdom, and the USA. *Journal of Applied Management & Entrepreneurship*, 11 (4), 33-48.

Carraher, S.M., Parnell, J., & Spillan, J. (2009). Customer service-orientation of small retail business owners in Austria, the Czech Republic, Hungary, Latvia, Slovakia, and Slovenia. *Baltic Journal of Management*, 4 (3), 251-268.

Carraher, S.M., Scott, C., & Carraher, S.C. (2004). A comparison of polychronicity levels among small business owners and non business owners in the U.S., China, Ukraine, Poland, Hungary, Bulgaria, and Mexico. *International Journal of Family Business*, 1 (1), 97-101.

Carraher, S.M. & Sullivan, S. (2003). Employees' contributions to quality: An examination of the Service Orientation Index within entrepreneurial organizations. *Global Business & Finance Review*, 8 (1) 103-110.

Carraher, S.M., Sullivan, S. & Carraher, S.C. (2005). An examination of the stress experience by entrepreneurial expatriate health care professionals working in Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Niger, Nigeria, Paraguay, South Africa, and Zambia. *International Journal of Entrepreneurship*, 9 , 45-66.

Carraher, S.M., Sullivan, S.E., & Crocitto, M. (2008). Mentoring across global boundaries: An empirical examination of home- and host-country mentors on expatriate career outcomes. *Journal of International Business Studies*, 39 (8), 1310-1326.

Carraher, S.M. & Welsh, D.H.B. (2009). *Global Entrepreneurship*. Dubuque, IA: Kendall Hunt Publishing.

Carraher, S.M. & Whitely, W.T. (1998). Motivations for work and their influence on pay across six countries. *Global Business and Finance Review*, 3, 49-56.

Chait, H., Carraher, S.M., & Buckley, M. (2000). Measuring service orientation with biodata. *Journal of Managerial Issues*, 12, 109-120.

Crocitto, M., Sullivan, S.E. & Carraher, S.M. (2005). Global mentoring as a means of career development and knowledge creation: A learning based framework and agenda for future research. *Career Development International*, 10 (6/7), 522-535.

Huang, L.Y. & Carraher, S. (2004). How effective are expatriate management and guanxi networks: Evidence from Chinese Industries. *International Journal of Family Business*, 1 (1), 1-23 .

Lockwood, F., Teasley, R., Carland, J.A.C., & Carland, J.W. (2006). An examination of the power of the dark side of entrepreneurship. *International Journal of Family Business*, 3, 1-20.

Paridon, T. & Carraher, S.M. (2009). Entrepreneurial marketing: Customer shopping value and patronage behavior. *Journal of Applied Management & Entrepreneurship*, 14 (2), 3-28.

Paridon, T., Carraher, S.M., & Carraher, S.C. (2006). The income effect in personal shopping value, consumer self-confidence, and information sharing (word of mouth communication) research. *Academy of Marketing Studies Journal*, 10 (2), 107-124.

Scarpello, V. & Carraher, S. M. (2008). Are pay satisfaction and pay fairness the same construct? A cross country examination among the self-employed in Latvia, Germany, the U.K., and the U.S.A. *Baltic Journal of Management*, 3 (1), 23-39.

Sethi, V. & Carraher, S.M. (1993). Developing measures for assessing the organizational impact of information technology: A comment on Mahmood & Soon's paper. *Decision Science*, 24, 867-877.

Sturman, M.C. & Carraher, S.M. (2007). Using a Random-effects model to test differing conceptualizations of multidimensional constructs. *Organizational Research Methods*, 10 (1), 108-135.

Sullivan, S.E., Forret, M., Carraher, S.M., & Mainiero, L. (2009). Using the kaleidoscope career model to examine generational differences in work attitudes. *Career Development International*, 14 (3), 284-302.

Williams, M.L., Brower, H.H., Ford, L.R., Williams, L.J., & Carraher, S.M. (2008). A comprehensive model and measure of compensation satisfaction. *Journal of Occupational and Organizational Psychology*, 81 (4), 639-668.

A QUALITATIVE STUDY ON DETERMINING MANAGERIAL STYLES FOR SOFTWARE DEVELOPMENT LIFE CYCLE STAGES

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ABSTRACT

Organizations are consistently looking for ways of improving project success, and many scholars have documented the role of project managers' leadership style on project success. Project managers conduct post-project analysis using information collected during various phases of system development lifecycle of a project, to identify the outcome of a software project, and factors that contributed to success or failure of the project. However, analyzing these factors during individual phases could mitigate the risk of project failure. Accordingly, this study was an investigation into determining managerial styles for various phases of software development lifecycle. The research question for the study examined the managerial styles during individual phases of system development lifecycle (SDLC) in increasing project success. A qualitative study will be used to determine managerial styles for software development life cycle stages by analyzing data collected from project manager by conducting structural interviews. Project failures can result in organizations not being able to compete in market place, loose money, time, and jobs. The study will benefit all the organizations looking for ways of improving project success.

INTRODUCTION

According to Shore (2005), the success of an Information Systems (IS) project often depends on three factors: the external environment, the organization context, and technological context. The organizational context refers to the corporate culture, IS knowledge base, top level support and leadership. Without proper leadership, the risk of project failure increases as leadership has the potential to affect the rest of organizational context. Shore (2005), explored several questions surrounding IT leadership, challenges in IS project management; identify what leadership style is more effective, and how leadership is affected by global IS projects. Shore (2005), explained that different styles of leadership are suitable for different phases of project. Shore suggested that charismatic leadership is more suitable in the initial phases of project; task oriented leadership is suitable during actual project development and implementation; and relationship oriented leadership style is needed in all stages of project. Shore also argued that a leadership style that is successful in one country may not be as effective in other countries. Task oriented leaders are preferred in high power distance cultures, and collectivistic cultures; relationship oriented leadership style is more effective in low power distance cultures.

PROBLEM STATEMENT

The problem addressed in this proposed research is failure of information technology (IT) software projects, factors that contribute to project failures, and ways of mitigating project failures. According to Chaos report published by the Standish Group (2004), only 29% of the IT projects succeeded and 71% of the projects failed in meeting the measures of success (The Standish Group International, 2004). The five measures that are commonly used for measuring the software project success are: quality, time, staff, money, and scope. Organizations are constantly searching for identifying the factors that contribute to project success and increasing software success by adopting the recommendations of scholars and practitioners who have conducted research on IT software project success. Ever since, IT software project success was extensively studied by scholars, research analysts, and project managers over the past 15 years (Korrapati & Rapaka, 2009). Although, many studies focused on finding out the causes of project success and failure, all the studies focused on measuring the success after the project has been delivered. There is not much literature available that studied the success of a project during various stages of system development life cycle of a project (SDLC).

Information system development consists of several essential steps such as planning, requirement gathering, analysis, design, implementation, and maintenance, commonly known as SDLC (Royce, 1970). SDLC represents a logical process used by systems analysts and information technology (IT) managers for building information systems. a quantitative study of determining managerial styles for software development life cycle (SDLC) stages that can positively influence project success. The activities and skill levels of staff required for activities in these phases are different, and hence need to be planned and managed differently (Royce, 1970). A project management style suitable for one phase of SDLC may not be suitable for another phase of the project (Shore, 2005). Similarly the measure of success may vary from one stage to another stage. Thus there is a need for measuring the success during every stage of the SDLC. However, no significant research has been undertaken to measure the success during individual phases of SDLC.

The project manager plays an important role in the execution of a project and the project manager's leadership style affects the outcome of the project. There is a positive correlation between IT project managers' leadership style and the success of a software project. Different project management styles are suitable for different stages of SDLC (Shore, 2005). The project managers switch his leadership style during different phases of SDLC, with the intention of making the project successful (Prabhakar, 2005). In the period of project management, the project was always analyzed after-the-fact using post-project analysis technique was used to identify the outcome of a project. Any project failure was conceived to be quantitative. There is a need to analyze these factors during individual stages of SDLC. Thus, a study is needed to analyze the impact of project manager's style on project success. Since there is no quantitative data available on various factors during individual stages of SDLC, a qualitative study is required to collect the data from project managers and synthesize the information to identify the project manager's styles that are suitable for various stages of SDLC.

RESEARCH QUESTION

The primary research question is to identify the managerial styles suitable for various phases of system development lifecycle.

METHODOLOGY

A qualitative study will be used to determine managerial styles for software development life cycle stages. A qualitative study is used as a broad explanation for behavior and attitudes by exploring and understanding the meaning individuals attach to a problem (Creswell, 2009). Data is collected in the participant's settings, and data analysis is performed inductively building from particulars to general themes, and making interpretations of the meaning of the data. There is a positive correlation between IT project managers' leadership style and the success of a software project.

Independent Variable - Managerial style
Dependent Variable - Software project success (on time delivery, with-in budget)

DATA SOURCES

All data will come from various project managers to ensure integrity and validity through triangulation and repeatability. The interview responses are captures in hand written notes, and audio taped. The interview responses, researcher observations, and other legitimate sources that become available to the researcher will be used as evidence. Structured interviews will provide a mechanism to find out the role of various factors on the software project success in offshore IT companies. The sample will be composed of project managers working in IT software projects and are selected to best represent the population.

SIGNIFICANCE OF STUDY

Project failures will have significant impact on employees and in some cases may even result in job losses. In the current economic conditions loosing a job due to project failures will have serious consequences on the lives of not just the project team members but their families as well. The purpose of this quantitative study is to identify the relationship between leadership style and IT project implementation. This study will contribute to existing research required to address this problem by identifying the relationship between leadership styles and IT project outcome. The findings of the research will help in increasing the success rate of IT projects, thus saving lot of money, time, and especially jobs. Companies can employ the leadership styles found in the research to be contributing to the success and avoid the leadership styles that cause failures. The improved project success lets the companies increase performance and competencies, thus contributing to the shareholder value and better economy.

REFERENCES

Creswell, J. (2009). *Qualitative inquiry & research design: Choosing among five approaches*. (3rd. Ed.). Thousand Oaks, CA: Sage Publications, Inc.

Korrapati, R. & Rapaka, S.R. (2009). Successful Leadership Styles in Software Projects in Offshore Centers in India. *Academy of Information and Management Sciences*, 13 (2), 56-59 Retrieved December 10, 2009 from www.alliedacademies.org

Royce, W. W. (1970). Managing the Development of Large Software Systems. *Proceedings of the 9th international conference on Software Engineering*. (pp. 328-338). Retrieved February 1, 2010 from leadinganswers.typepad.com

Shore, B. (2005). Failure Rates in Global IS Projects and the Leadership Challenge. *Journal of Global Information Technology Management*, 8(3), 1-5. doi: 879520061.

Standish Group International, 1994. CHAOS: *Project Failure and Success Research Report*, Dennis, MA: Standish Group International, Inc.

Standish Group International, 2005. CHAOS: *Project Failure and Success Research Report*, Dennis, MA: Standish Group International, Inc.

STATISTICAL PREDICTIVE MODELS FOR VEHICULAR TRAFFIC ACCIDENTS AT SIGNALIZED INTERSECTIONS ON CITY ROADS

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ABSTRACT

The objective of this research is to develop statistical predictive models for vehicular traffic accidents at the city intersections. The research hypothesizes that there are some controllable factors that contribute to traffic accidents on specific intersections. Therefore, delineation and subsequent improvement of these factors should improve the traffic safety at a given city intersection. With this objective in perspective, the analysis was performed in three simple steps, selection of intersections, traffic volume and regression model.

Intersection safety is viewed as a high-priority/high-payoff area by the Research & Technology Partnership members since 50% of all crashes occur at intersections. Congestion can be often attributed to crashes at intersections. Congestion chokepoints existing in the cities can be identified through traffic flow and accident analysis at the different intersections.

This study analyzed historical accident data at different intersections within a city. The structural factor included variables such as area topography, lane patterns, type of road signs, turning lanes, etc., the administrative factor included variables such as signal types, signal polices, road closures, etc., and maintenance factor included variables such as road conditions, condition of the signals, condition of road signs, etc. The information derived from the accident analysis could assist in improving road structures, road conditions and/or modify the administrative policies to reduce accidents and congestion at intersections.

A basic regression-based statistical model has been developed based on 30 most accident prone intersections in the City of Norfolk. The factors included in the models are AADT, number of lanes, number of turn lanes, number of driveways, median, pedestrian crossings, extra hazards (line railway crossing), etc. The following regression model explained about 61% of the variations.

The model developed above has been validated at 10 other intersections in the City of Norfolk. It provides an approximately 10% lower predicted value of the actual number of intersection accidents in the city.

THE ROLE OF CONSULTANTS IN THE IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING SYSTEMS

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ABSTRACT

Previous research shows that most organizations use consultants to assist with ERP implementations, but little, if any, research has been performed to determine in which phase of an ERP implementation consultants are perceived to be most effective and most necessary. Using survey methods, this research examines two issues. First, this study examines whether consultants are perceived to be more effective in the tasks they perform and more necessary within the different phases of ERP implementations. Second, this study examines which characteristics possessed by ERP consultants contribute to their effectiveness. Results show that ERP consultants are rated as more effective and necessary in the configuration and integration phase of an ERP implementation than in other phases. Results also show, although not conclusively, that technical skills and knowledge contribute more to the effectiveness of ERP consultants than other characteristics.

HUMAN FACTORS IN THE EFFECTIVENESS OF PASSWORD SECURITY

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ABSTRACT

Despite concerns raised by security specialists, the vast majority of systems with access control base their control on passwords alone. "Risky" human behaviors with respect to passwords are critical elements that can weaken their effectiveness. Some examples of risky human behaviors include the use of simple passwords that are easy to guess, writing down passwords, using the same password for multiple systems including web-facing systems, and sharing passwords with others. A variety of password rules have been instituted in the attempt to make passwords more secure. Some common rules include: requiring a minimum length for the password, specifying that each of several types of characters be included in the password, mandated periodic changes to the password, preventing reuse of an old password, and locking accounts after some number of incorrect log-in attempts have been tried. While password requirements are aimed at improving password security, rules that are overly burdensome may be counterproductive by causing the risky behaviors described above to occur more frequently.

The intent of this study is to examine tradeoffs between increased restrictions via password rules and the likelihood of risky behavior using statistical probability analysis. We obtained data from a student survey at Northern Arizona University. Respondents were given a set of rules that must be followed for in generating a password of a hypothetical information system. These sets of rules were varied across the respondents. Respondents were also asked how likely they would be to engage in risky behaviors that might compromise the security of their password. We will analyze the data to determine what the most common types of compromising behaviors are and to determine if greater password complexity leads to user behavior that may actually reduce security. Respondents were also asked to specify a hypothetical password (meeting the rules for the scenario they were given). The hypothetical passwords will be examined to determine patterns in the types of passwords selected and identify characteristics leading to strong passwords that are easily remembered.

A QUANTITATIVE STUDY OF EXTERNAL FACTORS BASED ON WORK LOCATION THAT INFLUENCE IT PROJECT SUCCESS

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ABSTRACT

Information technology project success depends on several external factors. For an IT project to succeed, the project manager must have effective leadership, decision-making, and management skills. If the resources are working from different locations, factors such as (a) culture and strategy, (b) risks, (c) cultural and language issues, (d) legal issues, (e) management factors, and (f) cost benefits must be considered. If monitored and addressed with utmost consideration, the success factors such as motivating skills, team building skills, communication skills, goal setting, strategic management and prioritization of deliverables, user satisfaction, impact of time zones, and geographic distance can pave the way for project success. IT offshore projects can be successful only if proper metrics and governance are in place. The critical success factors (CSFs) depend on the type of organization, company size, geographical location, project type, project size, culture, language barriers, and legal rules of the host nation The purpose of this quantitative study is to address the impact of external factors such as geographic location, culture, time zone, and language barriers on IT project. Theories such as the attribution theory, resource-based theory, person-organization fit theory, participation theory, and resource-dependency theory will be analyzed and presented in this paper.

INTRODUCTION

For an IT project to be successful, the management team must ensure that the correspondence failure, process failure, interaction failure, and expectation failure related issues are addressed and corrective actions are taken. The team members must be made aware of the organizational issues and efforts must be made to align IT to business strategy. In addition to these efforts, users should to encourage involving in IT projects and adequate training should be imparted to the users (Remus & Wiener, 2009).

Effective leadership skills, decision-making skills, and management skills of project managers can enhance the project success rate. Meeting user requirements is a key indicator of project success. In order to achieve customer satisfaction, one has to ensure that user requirements do not change at frequent intervals and that an effective change management process and protocols are in place (Standing, Guilfoyle, Lin, & Love, 2006).

For a project to be successful, process, tools, and procedures should be in place. In order to measure IT project success, one has to consider project efficiency, impact on the customer, business

success, and long-term use (Thompson, 2008). Cultural issues, linguistic issues, and poor project management are some of the major reasons or forces acting against the offshore OSD model. In order to succeed in OSD, the CSFs should be given importance. As mention by Remus and Wiener (2009), areas such as contract, decision, environment, organization, performance, relationship, culture, and strategy should be considered. Corporate culture (values), project manager competencies (values), organizational structure (values), performance measurement systems (values), and supporting business processes (values) when properly aligned will lead to project success (Kendra & Taplin, 2004). To complete IT projects in an efficient manner, the project manager must have effective leadership skills, decision-making skills, and management skills (Sharma, Stone, & Ekinci, 2009). IT projects should be managed so as to create economic value and competitive advantage. For a project to be successful, process, tools, and procedures should be in place. In order to measure IT project success, one has to consider project efficiency, impact on the customer, business success, and long-term use. Team cohesiveness, team synergy, motivation, cultural awareness, and job satisfaction of the employees are essential for achieving project success. Proactive steps must be taken to conduct training programs to bridge the cultural and knowledge issues. Bi/multilingual manages should be employed to tackle the language barriers (Oza & Hall 2005). Efficient communication tools such as video conferencing, instant messaging, emails, phone conversations, and frequent team conference calls can address the geographic distance issue. The time zone impact can be minimized by better documentation, onshore presence, and overlapping work schedules.

STATEMENT OF PROBLEM

The problem addressed in this study is that external factors such as nation of origin, family and work cultures, time zone differences, and geographic locations also affect the success of IT projects, in addition to management, individual, and organizational factors. The study is important because virtual teams are becoming more common in organizational structures. According to a survey conducted by Deloitte, the success rate of Enterprise Resource Planning (ERP) implementations is less than 20% (Ke and Wei, 2005). This study is intended to investigate the external factors based on work locations that influence project success.

Research Questions

The purpose of this study is to answer the following questions:

1. *What is the impact of external factors such as nation of origin, family and work cultures, time zone differences, and geographic locations on IT project success?*

To answer these research questions, the following hypotheses will be addressed.

Research Hypothesis

H1o: There is no relationship between project success (PS) and nation of origin (NO).

H2o: There is no relationship between project success (PS) and work culture (WC).
H3o: There is no relationship between project success (PS) and time zone (TZ).
H4o: There is no relationship between project success (PS) and geographic location (GL).
H5o: There is no relationship between project success (PS) and language barriers (LB).
H6o: There is no relationship between project success (PS) and scarce resources (SR).

SIGNIFICANCE OF STUDY

This study is significant in that it will shows statistical verification of the correlation between external factors and the success of IT projects. Therefore, the findings in this study may assist organizations in developing strategies that may lead to better project management, productivity, cost benefits, and efficiency. As mentioned by Cooke-Davies (2002), it is important to make a distinction between project success and project performance. In some cases, projects that are executed as planned, on time, and within budget have resulted in failure because they failed to produce actual benefits to the customer, intended outcome, or expected profit (Dvir, Raz, & Shenhar, 2003). There are cases where a troubled project with several issues, delays, and overruns did finally turn out to be successful (Shenhar, Dvir, Levy, & Maltz, 2001). However, the external factors that contribute to IT project success is not discussed clearly by any researcher. The impact of time zone, the language barriers, the geographic distance between teams, and the cultural differences can have major impact on IT project governance and success.

REFERENCES

Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management*, 21, 89-95.

Kendra, K., & Taplin, L. (2004). Project success: A cultural framework, *Project Management Journal*, 35(1), 30-45.

Ke, W., & Wei, K. K. (2005). Organization culture and leadership in ERP implementation. *Decision Support Systems*, 45(2), 208-218. doi: 10.1016/j.dss.2007.02.002

Remus, U., & Wiener, M. (2009). Critical Success Factors for Managing Offshore Software Development Projects. *Journal of Global Information Technology Management*, 12(1), 6-29.

Sharma, D., Stone, M., & Ekinci, Y. (2009). IT governance and project management: A qualitative study. *Journal of Database Marketing & Customer Strategy Management*, 16(1), 29-50. doi:10.1057/dbm.2009.6

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project success: A multidimensional strategic concept. *Long Range Planning*, 34, 699-724.

Standing, C., Guilfoyle, A., Lin, C., & Love, P. (2006). The attribution of success and failure in IT projects. *Industrial Management + Data Systems*, 106(8), 1148-1165. doi:10.1108/02635570610710809

Thompson, T. (2008). *The relationship between job satisfaction and project success: A quantitative study of project managers in Houston, Texas*. Dissertation Abstracts International Section A, 69.

STUDENT ASSESSMENTS OF IS RELATED ETHICAL SITUATIONS: DO GENDER AND CLASS LEVEL MATTER?

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ABSTRACT

Over the past decade a number of high profile ethics scandals in the business community have led to increased focus on business ethics and the responsibility of university business programs to place more emphasis on ethics education and certainly information systems (IS) technology has given rise to new and challenging ethical issues. In this study, a set of university students is presented with a number of scenarios in which some individual has engaged in an activity relating to the use of IS which involves some degree of ethical breach and asked to assess the behavior in each scenario, then these responses are pooled for each student to provide an overall measure how seriously the student views such breaches. The survey data allow us to compare freshman level students in an introductory level IS course to MIS students in a junior/senior level MIS course. Results suggest that students in the higher level course tend to judge the set of ethical breaches presented to be somewhat more serious than the introductory students. Also, we hypothesize that male students may enter university education at a lower level of ethical maturity than female students. Our empirical results suggest that this is true and further indicate that male students ethical judgments tend to change more across age during college years and class level than their female counterparts.

MANAGEMENT OF INNOVATIVE E-LEARNING ENVIRONMENTS

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ABSTRACT

Technology is central to every educational institution. Without incorporating technology into every aspect of student activities, no educational institution can expect to succeedor excel. E-learning is designed to provide students with uninterrupted access to education through electronic media. This paper reviews and discusses strategies to enhance the quality of e-learning and instruction for freshman by analyzing the e-learning experiences of freshmen students and their instructors. Faculty and student perspective surveys carried out at SUNO during this research revealed potential problems facing students and instructors participating in online courses.

Analysis of students' online grades for three consecutive semesters show that grade point averages increased from 1.04 to 1.13 and 1.23 consecutively. However, freshman retention rates dropped from 296 to 225 to 130 sequentially among students overall, and from 68 to 54 to 33 for online students. Findings from this research may provide educational institutions with necessary strategies to enhance the quality of e-learning and the retention of e-learners.

Keywords: Administrators, E-learning, Orientation, Retention, Assessment, Outcome.

HOW DOES JOB STRESS AND WORK-LEISURE CONFLICT IMPACT RETENTION OF IT PROFESSIONALS?

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ABSTRACT

To enhance employee retention, organizations have introduced various initiatives, which have led mixed results. Based on a survey conducted in a large global bank, this study examines how various job stressors impact the retention of information technology (IT) professionals and how these impacts are mediated by work-leisure conflict. The results indicate that among all the job stressors, role ambiguity has the most adverse influence on retention. Work-leisure conflict partially mediates the negative relationship between role conflict and retention, and fully mediates the negative relationship between role overload and retention. The empirical findings imply that organizations should tackle role ambiguity with highest priority and relieve work-leisure conflict to effectively retain employees under job stress.

E-COMMERCE AND CUSTOMER SERVICE

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ABSTRACT

Commerce in its simplest form is defined as the "exchange or buying and selling of goods or services in a large scale requiring transportation from one place to another." When this exchange or buying and selling of goods and services takes place over electronic systems like internet, email or other computer networks, then it is known as e-commerce. With the advancement of the digital world and its strong presence in our everyday life, it is only natural for the businesses to move in this direction. E-commerce consists of everything from online shopping to electronic transfer of funds or online travel reservation to online banking as well as online auctions and online information sharing. With a business transaction only a few key strokes or mouse clicks away, e-commerce has not only simplified the business process but has also brought together buyers, sellers and producers from all over the world. Thanks to e-commerce, businesses can reach a large market of consumers and similarly, consumers can choose and shop from a large number of businesses online.

E-commerce also provides a great leverage to the producers or manufacturers of goods. Now, the producers can set up their own online stores in the form of web sites and sell directly to the consumer without relying on the wholesalers or retailers. If they lack the technical expertise to set up their own site, they can set up their online store in one of the many online retail stores like EBay and Amazon, for a small fee.

However, e-commerce is more than just online shopping. It also includes business to business (B2B) transactions where big companies and financial organizations use the internet to exchange financial data to facilitate domestic and international business. A form of B2B e-commerce is practiced by computer retail giant, Dell. The company doesn't manufacture its own computer parts but buys them from other manufacturers. It assembles the parts and then sells them to consumers. When Dell purchases computer parts from its manufacturers electronically, it is engaging in B2B e-commerce. In the current paper we examine on-line customer service in B2B and B2C situations.

INTRODUCTION/CONCLUSIONS

Future research is suggested based upon prior research and theory (Buckley and associates, 1992- present; Carland and associates 1984-present).

REFERENCES

Buckley, M., Fedor, D., Veres, J., Wiese, D., & Carraher, S.M. (1998). Investigating newcomer expectations and job-related outcomes. Journal of Applied Psychology, 83, 452-461.

Buckley, M., Mobbs, T., Mendoza, J., Novicevic, M., Carraher, S.M., & Beu, D. (2002). Implementing realistic job previews and expectation lowering procedures: A field experiment. Journal of Vocational Behavior, 61 (2), 263-278.

Carland, J. & Carland, J. (1993). The role of personality in new venture creation. Entrepreneurship, Innovation and Change, 2(2), 129-141.

Carland, J & Carland, J. (1995). The case of the reluctant client. Journal of the International Academy for Case Studies, 1(2), 76-79.

Carland, J. & Carland, J. (1997). A model of potential entrepreneurship: Profiles and educational implications. Journal of Small Business Strategy, 8 (1), 1-13.

Carland, J. & Carland, J. (2003). Pawn takes queen: The strategic gameboard in entrepreneurial firms. Academy of Strategic Management Journal, 2, 93-104.

Carland, J. & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. Academy of Entrepreneurship Journal, 10(2), 104-114.

Carland, J. & Carland, J. (2006). Eminent domain: What happens when the state takes part of your land? The Entrepreneurial Executive, 11, 95-113.

Carland, J.A.C., & Carland, J.W. (1991). An empirical investigation into the distinctions between male and female entrepreneurs managers. International Small Business Journal, 9 (3), 62-72.

Carland, J.A., Carland, J.W., & Stewart, W.H. (1996). Seeing what's not there: The enigma of entrepreneurship. Journal of Small Business Strategy 7 (1), 1-20.

Carland, J., Carland, J.A., & Abhy, C. (1989). An assessment of the psychological determinants of planning in small businesses. International Small Business Journal, 23-34.

Carland, J., Carland, J., & Carland, J. (1995). Self-actualization: The zenith of entrepreneurship. Journal of Small Business Strategy, 30-39.

Carland, J.W., Carland, J.A., & Hoy, F. (1992). An entrepreneurship index: An empirical validation. Babson Entrepreneurship Conference, Fontainebleau, France.

Carland, J.W., Carland, J.A., Hoy, F., & Boulton, W.R. (1988). Distinctions between entrepreneurial and small business ventures. International Journal of Management, 5 (1), 98-103.

Carland, J.W. III, Carland, J.W., Carland, J.A., & Pearce, J.W. (1995). Risk taking propensity among entrepreneurs, small business owners and managers. Journal of Business and Entrepreneurship, 7 (1), 12-23.

Carland, J.W., Carland, J.C., & Koiranen M. (1997b). The exportation of the American model of entrepreneurship: Reality or illusion? A comparative trait study of American and Finnish entrepreneurs. Paper presented at the International Council of Small Business World Conference, San Francisco, CA. June 1997.

Carland, J.W., Hoy, F., Boulton, W.R., & Carland, J.A.C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. Academy of Management Review, 9 (2), 354-359.

Carland, J.W., Hoy, F., & Carland, J.A.C. (1988). Who is an entrepreneur? is the wrong question. American Journal of Small Business 12 (4), 33-39.

Carraher, S.M. (1991). A validity study of the pay satisfaction questionnaire (PSQ). Educational and Psychological Measurement, 51, 491-495.

Carraher, S.M. (1991). On the dimensionality of the pay satisfaction questionnaire. Psychological Reports, 69, 887-890.

Carraher, S.M. (2005). An Examination of entrepreneurial orientation: A validation study in 68 countries in Africa, Asia, Europe, and North America. International Journal of Family Business, 2 (1), 95-100.

Carraher, S.M. & Buckley, M. R. (1996). Cognitive complexity and the perceived dimensionality of pay satisfaction. Journal of Applied Psychology, 81 (1), 102-109.

Carraher, S.M. & Buckley, M.R. (2008). Attitudes towards benefits and behavioral intentions and their relationship to Absenteeism, Performance, and Turnover among nurses. Academy of Health Care Management Journal, 4 (2), 89-109.

Carraher, S.M., Buckley, M.R., & Carraher, C. (2002). Cognitive complexity with employees from entrepreneurial financial information service organizations and educational institutions: An extension & replication looking at pay, benefits, and leadership. Academy of Strategic Management Journal, 1, 43-56.

Carraher, S.M., Buckley, M. & Cote, J. (1999). Multitrait-multimethod information management: Global strategic analysis issues. Global Business & Finance Review, 4 (2), 29-36.

Carraher, S.M., Buckley, M., & Cote, J. (2000). Strategic entrepreneurialism in analysis: Global problems in research. Global Business & Finance Review, 5 (2), 77-86.

Carraher, S.M., Buckley, M., Scott., C., Parnell, J., & Carraher, C. (2002). Customer service selection in a global entrepreneurial information services organization. Journal of Applied Management and Entrepreneurship, 7 (2), 45-55.

Carraher, S.M. & Carraher, S.C. (2006). Human resource issues among SME's in Eastern Europe: A 30 month study in Belarus, Poland, and Ukraine. International Journal of Entrepreneurship. 10, 97-108.

Carraher, S.M., Carraher, S.C., & Mintu-Wimsatt, A. (2005). Customer service management in Western and Central Europe: A concurrent validation strategy in entrepreneurial financial information services organizations. Journal of Business Strategies, 22, 41-54.

Carraher, S.M., Carraher, S.C., & Whitely, W. (2003). Global entrepreneurship, income, and work norms: A seven country study. Academy of Entrepreneurship Journal, 9, 31-42.

Carraher, S.M., Gibson, J. W., & Buckley, M.R. (2006). Compensation satisfaction in the Baltics and the USA. Baltic Journal of Management, 1 (1), 7-23.

Carraher, S.M., Mendoza, J, Buckley, M, Schoenfeldt, L & Carraher, C. (1998). Validation of an instrument to measure service orientation. Journal of Quality Management, 3, 211-224.

Carraher, S.M. & Parnell, J. (2008). Customer service during peak (in season) and non-peak (off season) times: A multi-country (Austria, Switzerland, United Kingdom and United States) examination of entrepreneurial tourist focused core personnel. International Journal of Entrepreneurship, 12, 39-56.

Carraher, S.M., Parnell, J., Carraher, S.C., Carraher, C., & Sullivan, S. (2006). Customer service, entrepreneurial orientation, and performance: A study in health care organizations in Hong Kong, Italy, New Zealand, the United Kingdom, and the USA. Journal of Applied Management & Entrepreneurship, 11 (4), 33-48.

Carraher, S.M., Scott, C., & Carraher, S.C. (2004). A comparison of polychronicity levels among small business owners and non business owners in the U.S., China, Ukraine, Poland, Hungary, Bulgaria, and Mexico. International Journal of Family Business, 1 (1), 97-101.

Carraher, S.M. & Sullivan, S. (2003). Employees' contributions to quality: An examination of the Service Orientation Index within entrepreneurial organizations. Global Business & Finance Review, 8 (1) 103-110.

Carraher, S.M., Sullivan, S. & Carraher, S.C. (2005). An examination of the stress experience by entrepreneurial expatriate health care professionals working in Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Niger, Nigeria, Paraguay, South Africa, and Zambia. International Journal of Entrepreneurship, 9 , 45-66.

Carraher, S.M., Sullivan, S.E., & Crocitto, M. (2008). Mentoring across global boundaries: An empirical examination of home- and host-country mentors on expatriate career outcomes. Journal of International Business Studies, 39 (8), 1310-1326.

Carraher, S.M. & Welsh, D.H.B. (2009). Global Entrepreneurship. Dubuque, IA: Kendall Hunt Publishing.

Carraher, S.M. & Whitely, W.T. (1998). Motivations for work and their influence on pay across six countries. Global Business and Finance Review, 3, 49-56.

Chait, H., Carraher, S.M., & Buckley, M. (2000). Measuring service orientation with biodata. Journal of Managerial Issues, 12, 109-120.

Crocitto, M., Sullivan, S.E. & Carraher, S.M. (2005). Global mentoring as a means of career development and knowledge creation: A learning based framework and agenda for future research. Career Development International, 10 (6/7), 522-535.

Klentzman, J. (2009). Viscous flow, evaporation, and phase explosion in thin liquid films. Unpublished doctoral thesis Southern Methodist University.

Lockwood, F., Teasley, R., Carland, J.A.C., & Carland, J.W. (2006). An examination of the power of the dark side of entrepreneurship. International Journal of Family Business, 3, 1-20.

Paridon, T. & Carraher, S.M. (2009). Entrepreneurial marketing: Customer shopping value and patronage behavior. Journal of Applied Management & Entrepreneurship, 14 (2), 3-28.

Paridon, T., Carraher, S.M., & Carraher, S.C. (2006). The income effect in personal shopping value, consumer self-confidence, and information sharing (word of mouth communication) research. Academy of Marketing Studies Journal, 10 (2), 107-124.

Scarpello, V. & Carraher, S. M. (2008). Are pay satisfaction and pay fairness the same construct? A cross country examination among the self-employed in Latvia, Germany, the U.K., and the U.S.A. Baltic Journal of Management, 3 (1), 23-39.

Sethi, V. & Carraher, S.M. (1993). Developing measures for assessing the organizational impact of information technology: A comment on Mahmood & Soon's paper. Decision Science, 24, 867-877.

Stewart, W., Watson, W., Carland, J.C., & Carland, J.W. (1999). A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers. Journal of Business Venturing, 14, 189-214.

Sturman, M.C. & Carraher, S.M. (2007). Using a Random-effects model to test differing conceptualizations of multidimensional constructs. Organizational Research Methods, 10 (1), 108-135.

Sullivan, S.E., Forret, M., Carraher, S.M., & Mainiero, L. (2009). Using the kaleidoscope career model to examine generational differences in work attitudes. Career Development International, 14 (3), 284-302.

Williams, M.L., Brower, H.H., Ford, L.R., Williams, L.J., & Carraher, S.M. (2008). A comprehensive model and measure of compensation satisfaction. Journal of Occupational and Organizational Psychology, 81 (4), 639-668.

CLOUD SECURITY FOR SMALL BUSINESSES

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ABSTRACT

Cloud computing is one of the latest developing technologies in virtualization that will eliminate the need of purchasing software or maintaining hardware. The users do not need to have expertise in the technology infrastructure to use cloud computing services. This research addresses the power of cloud computing for small businesses. Cloud computing reduces the need for small businesses to purchase and install software, minimizes expensive infrastructure and with the expertise of cloud vendors, tasks as upgrades and maintenance, backups, can be handled efficiently. Cloud computing provides many benefits to small businesses which is crucial in current times of economic crisis. Security and governance issues are also not reasons of concern for small businesses as clouds vendors offer more secure measures than what most small businesses can afford.

INTRODUCTION

Cloud computing provides users with ways to access technology applications "in the cloud", that is hosted on remote servers which can be accessed by users using the Internet. The advantages of clouds it that businesses do not need to purchase or install software and thus reduces costs, implementation and maintenance time. The charge paid to the cloud provider is determined by various factors as hours of usage, software type and storage space utilized. Traditional models of purchasing and hosting in-house software will soon be replaced by cloud computing and cloud computing implementations are predicted to double by 2012 [1].

Due to their small size, small businesses often face frequent financial problems [2]. Cloud computing offers small businesses many advantages because infrastructure is rented from vendors and thus maintenance or operating costs are low. Another problem faced by small businesses is hiring of qualified employees. Clouds are suited for small businesses since clouds offer technical support, lower cost and customer support [3]. Hence small businesses have reduced need for qualified employees. Cloud computing is ideal for small businesses for it lowers cost on maintenance and support.

Security threats as malware, spam, spoofing, man-in-middle attacks, exist in all cloud communications and is one of the major reasons that not all major enterprises have switched to cloud computing. Many small businesses do not have well established security practices. One of the biggest problems of small businesses is that they do not have money to invest in security. Therefore security incidents in small businesses are usually addressed by employees with no expertise in security. Many small businesses do not realize they face the same security threats that large organizations face [4]. In addition, small businesses do not have any disaster recovery or business

continuity plans, Hence cloud computing is of great advantage as security is managed by cloud vendors who offer better security measures than what most small businesses can afford.

CONCLUSION

Cloud computing is ideal for small businesses because it provides better security at lower cost and minimizes many problems faced by small businesses.

REFERENCES

IDC: Cloud Computing Implementations to Double by 2012 http://www.networkcomputing.com/other/idc-cloud-computing-implementations-to-double-by-2012.php?type=article Retrieved March 2010

Small business from http://en.wikipedia.org/wiki/Small_business Retrieved March 11 2010

Why Your Small Business Needs Cloud Computing http://www.cloudcomputingworld.org/cloud-computing-for-businesses/why-your-small-business-needs-cloud-computing.html Retrieved March 2010

S. Keller, S.; A. Powell; B. Horstmann, C. Predmore & M. Crawford (2006). *Information Security threats and practices in Small businesses*, 22, 7-19.

FACTORS AFFECTING DISTANCE EDUCATION AT SOUTHERN UNIVERSITY AT NEW ORLEANS A HISTORICALLY BLACK UNIVERSITY

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ABSTRACT:

Southern University at New Orleans (SUNO) has been offering online classes, since 2001. Distance education, or distance learning, is a field of education that aims to deliver education to students who are not physically "on site". The majority of factors that are barriers to teaching online at SUNO are found in the area of administrative and technical support. The following are the main hindering factors of distance learning at SUNO are: faculty workloads, lack of release time, lack of faculty training and class sizes. Faculty feel that time spent on course development alone takes away from time that could be devoted to research. This paper identifies several factors affecting distance education at Southern University at New Orleans.

HISTORY

Southern University at New Orleans is a senior state institution of higher learning. It was founded as a branch of the Southern University Agricultural and Mechanical College, Baton Rouge by Act 28 of the Extraordinary Session of the Louisiana Legislature on September 4, 1956, and began its initial year of operation on a seventeen acre site on the perimeter of Pontchartrain Park. Since the original freshman class of 158 students, the university had grown to awarding 450 undergraduate and 70 graduate degrees annually and had serviced 3,600 students each semester prior to Hurricane Katrina. Immediately following the storms of 2005, the Fall-2005 and Spring-2006 enrollment reached 2,100 students and increased by 17% for the Fall-2006 semester. Strategic enrollment expectations include 4,000 students in 3 to 5 years.

A range of degree programs in the liberal arts and sciences, substance abuse, social work, and education as well as graduate degree programs in Social Work, Criminal Justice, Management Information Systems, Museum Studies, and Urban Education are among the offerings. The University has maintained a highly qualified faculty of 70, with 50% the full-time faculty holding the earned doctorate. The University's mission is to create and maintain an environment conducive to learning and growth, to promote the upward mobility of diverse populations by preparing them to enter into new as well as traditional careers, and to equip them to function optimally in the mainstream of the global society. Having served as a beacon of inspiration to its constituency, Southern University at New Orleans continues to contribute meaningfully to the upward mobility of the people of the community which it serves.

SUNO has always been driven by a need to serve students where they are (academically deficient) when they enter the University. Consequently, a wide range of programs of instruction (from remediation to honors) exist on the campus.
SUNO has been offering online classes since 2001 and still lacks infrastructure for Distance Learning.

STATEMENT OF THE PROBLEM

Deficiencies include lack of enough Blackboard administrative staff, faculty training, technical support staff knowledge, and faculty release time; course content and attitude of students. Each one of these has an effect on the overall quality of distance learning as a product. In many ways, each of these issues relates to the others. We will examine each of these issues separately.

PURPOSE AND METHODOLOGY

The purpose of this study was to identify the weaknesses and improve the distance learning at Southern University at New Orleans. Data were gathered from the primary and secondary sources. Anecdotal data is also used.

RELATED LITERATURE: HISTORY OF DISTANCE LEARNING

Distance education, or distance learning, is a field of education that aims to deliver education to students who are not physically "on site". According to the U.S. Department of Agriculture, it is a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both. Distance education courses that require a physical on-site presence for any reason including the taking of examinations is considered to be a hybrid.

Distance education dates to at least as early as 1728. The University of London was the first university to offer distance-learning degrees in 1858. In Australia, the University of Queensland established it Department of Correspondence Studies in 1911. Another pioneering institution was the University of South Africa, which has been offering Correspondence Education courses since 1946.

The first president of the University of Chicago, William Rainey Harper developed extended education and was considered one of the founders of "learning by correspondence programs". Charles Wedemeyer of the University of Wisconsin -Madison is considered one of the fathers of modern distance education in America.

In 2006 the Sloan Consortium reported that more than 96 percent of the largest colleges and universities in the United States offered online courses and that almost 3.2 million U.S. students were taking at least one online course during the fall 2005 term.

The use of online legal education is a rapidly growing phenomenon in the United States. The California State Bar registers and regulates (but does not accredit) online law schools.

The history of distance education leading up to today's Web-based formats can be summarized within the following periods:

1700 -mid-1900s	Correspondence courses
1950s-1960s	Video conferencing
1950s-1980s	Teleconferencing
1990s-present	Web-based instruction

An online class can be formatted to be synchronous, asynchronous, or a combination of both. Synchronous communication occurs when the students and their instructors meet online in real time (at the same time) in a computer format such as a chat room to discuss topics, issues, and concerns surrounding the class. Asynchronous communication occurs via announcements, bulletins, discussion boards, and email. Asynchronous information may be posted at any time and read by the intended recipient whenever convenient.

FINDINGS

SUNO leases and host the online classes in Virginia and it is maintained by the Black board at the rate of $150,000 per year. The total number of courses offered at SUNO is 680 per year and from this 120 courses are online. There are 2000 students enrolled at least in one online class and some of these students are taking more than one online class. There are 4000 to 6000 duplicated students in online classes. There are 60 faculty members who are teaching online classes at SUNO. The following are the problem areas of distance learning at SUNO:

- Lack of financial commitment by the administration
- Heavy Faculty workloads and the lack of release time
- Quality of Instruction
- Large online class sizes i.e. 40 students per class
- SUNO has a separate e-learning department, which consists of two employees and none of them had any training or formal education in distance learning. They are understaffed.
- High enrollment and very low completion rate in online classes
- Testing and evaluation

CONCLUSIONS AND RECOMMENDATIONS

Assessment need to be performed to identify the training needs of the faculty, site facilitators and other members of the university involved in distance learning projects. Lack of familiarity with distance education technologies and the lack of training for the faculty are major problem areas. Proper training of faculty, site-facilitators, support personal and administrators. A Professional Development Certificate in distance education should be required for the e-learning facilitators.

REFERENCES

Maguire, L.L.(2005). Literature Review – Faculty Participation in Online Distance Education: Barriers and Motivators. Retrieved on March 13, 2010 from http://www.westga.edu/~distance/ojdla/spring81/maguire81.htm

Valentine, D.(2002). Distance Learning: Promises, Problems, and Possibilities. Retrieved on March 13, 2010 from http://www.westga.edu/~distance/ojdla/fall53/valentine53.html

Farnsworth, K., Bevis B Teresa. A Field Book for Community College Online Instructors, Community College Press.

Distance Education Wikipedia, the free encyclopedia. Retrieved on March 13, 2010http://en.wikipedia.org/wiki/Distance_education#Types_of_distance_education_courses

CONSOLIDATION OF SERVERS FOR A GREENER IT DEPARTMENT

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ABSTRACT

The advent of computer networks has caused servers to be sprawled all over the computing landscape. Many, if not most organizations, have been using distributed computing and networks for many years. In the area of distributed computing and networking, the current trend of deploying 3-tier client-server networks, cloud computing, web services, social networking, remote storage services, and service-oriented architectures, will only increase use of servers. The organizational benefits of all these technologies are compelling - they all result in more efficient and cost effective business processes. They also often add to the strategic advantages of the organization. It is, however, becoming increasingly apparent that there are many direct and indirect environmental costs associated with these same information technologies (IT). The purpose of this paper is to summarize the many environmental consequences of Information technology, and the possible solutions to minimize them. In particular, the focus of this research is to describe, and analyze the benefits of a particular solution, known as server consolidation, in minimizing the environmental effects of IT.

Server consolidation (Mann, 2006) results in a significant improvement in server utilization. For example, instead of operating 100 servers at 10% utilization rate, we could just operate 20 severs at 50% utilization rate. Virtualization essentially allows enterprises to combine the workload from multiple underutilized servers, and run them on fewer servers. This dramatically reduces the overall hardware spending, as it requires far fewer physical systems for the same application workload. It dramatically reduces costs associated with power consumption, cooling, storage, real-estate, and physical administration. Server consolidation

In summary, information technology is a large contributor to environmental problems, and consequently climate change. The impact of IT on the environment is an area that is very fertile for future research. One relatively easy and cost effective solution to this important problem is server consolidation or server virtualization. By being environmentally greener, many organizations will also make more profits. This paper will be beneficial to academic researchers as it will provide a basis for conducting relevant research in the Environmental-IT area. Business managers in organizations will greatly benefit from the paper, as it would make them aware of modern solutions to make IT more sustainable, help reduce the environmental damages, and increase their bottom-line.

THE IMPORTANCE OF SUCCESSFUL CUSTOMER SERVICE FOR NEW AND EXISTING VENTURES

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ABSTRACT

New businesses and existing businesses need to establish customer service programs that result in highly satisfied customers. Satisfied customers make a business profitable not only in the short term but in the long term. Customer satisfaction is linked to customer loyalty, trust, and emotional components of the relationship between customer and business. Businesses are advised to measure the effectiveness of their customer service and to choose their customers wisely. Customer service does not end after the purchase. The modern businesses are often equipped and should use IT programs within the customer service context. In a global economy, businesses need to be aware of cultural differences in customer perception of customer service. Employees should be trained to use these in order to be effective in the provision of customer service. Customer service is essential in the modern business environment.

INTRODUCTION/CONCLUSIONS

Future research is suggested based upon prior research and theory (Buckley and associates, 1992- present; Carland and associates 1984-present). Full paper available from first author.

REFERENCES

Buckley, M.R., Carraher, S.M., Carraher, S.C., Ferris, G.R., & Carraher, C.E. (2008). Human resource issues in global entrepreneurial high technology firms: Do they differ? *Journal of Applied Management & Entrepreneurship*, 13 (1), 4-14.

Buckley, M., Fedor, D., Veres, J., Wiese, D., & Carraher, S.M. (1998). Investigating newcomer expectations and job-related outcomes. *Journal of Applied Psychology*, 83, 452-461.

Buckley, M., Mobbs, T., Mendoza, J., Novicevic, M., Carraher, S.M., & Beu, D. (2002). Implementing realistic job previews and expectation lowering procedures: A field experiment. *Journal of Vocational Behavior*, 61 (2), 263-278.

Carland, J. & Carland, J. (1993). The role of personality in new venture creation. *Entrepreneurship, Innovation and Change*, 2(2), 129-141.

Carland, J & Carland, J. (1995). The case of the reluctant client. *Journal of the International Academy for Case Studies*, 1(2), 76-79.

Carland, J. & Carland, J. (1997). A model of potential entrepreneurship: Profiles and educational implications. *Journal of Small Business Strategy*, 8 (1), 1-13.

Carland, J. & Carland, J. (2003). Pawn takes queen: The strategic gameboard in entrepreneurial firms. *Academy of Strategic Management Journal*, 2, 93-104.

Carland, J. & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. *Academy of Entrepreneurship Journal*, 10(2), 104-114.

Carland, J. & Carland, J. (2006). Eminent domain: What happens when the state takes part of your land? *The Entrepreneurial Executive*, 11, 95-113.

Carland, J.A.C., & Carland, J.W. (1991). An empirical investigation into the distinctions between male and female entrepreneurs managers. *International Small Business Journal*, 9 (3), 62-72.

Carland, J.A., Carland, J.W., & Stewart, W.H. (1996). Seeing what's not there: The enigma of entrepreneurship. *Journal of Small Business Strategy* 7 (1), 1-20.

Carland, J., Carland, J.A., & Abhy, C. (1989). An assessment of the psychological determinants of planning in small businesses. *International Small Business Journal*, 23-34.

Carland, J., Carland, J., & Carland, J. (1995). Self-actualization: The zenith of entrepreneurship. *Journal of Small Business Strategy*, 30-39.

Carland, J.W., Carland, J.A., & Hoy, F. (1992). An entrepreneurship index: An empirical validation. Babson Entrepreneurship Conference, Fontainebleau, France.

Carland, J.W., Carland, J.A., Hoy, F., & Boulton, W.R. (1988). Distinctions between entrepreneurial and small business ventures. *International Journal of Management*, 5 (1), 98-103.

Carland, J.W. III, Carland, J.W., Carland, J.A., & Pearce, J.W. (1995). Risk taking propensity among entrepreneurs, small business owners and managers. *Journal of Business and Entrepreneurship*, 7 (1), 12-23.

Carland, J.W., Hoy, F., Boulton, W.R., & Carland, J.A.C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9 (2), 354-359.

Carland, J.W., Hoy, F., & Carland, J.A.C. (1988). Who is an entrepreneur? is the wrong question. *American Journal of Small Business* 12 (4), 33-39.

Carraher, S.M. (1991). A validity study of the pay satisfaction questionnaire (PSQ). *Educational and Psychological Measurement*, 51, 491-495.

Carraher, S.M. (1991). On the dimensionality of the pay satisfaction questionnaire. *Psychological Reports*, 69, 887-890.

Carraher, S.M. (2005). An Examination of entrepreneurial orientation: A validation study in 68 countries in Africa, Asia, Europe, and North America. *International Journal of Family Business*, 2 (1), 95-100.

Carraher, S.M. (2008). Youth entrepreneurship: Strategic exercises for developing entrepreneurship among elementary school students. *International Journal of Family Business*, 5 (1), 67-68.

Carraher, S.M. (2008). Using E-Bay to teach global and technological entrepreneurship. *International Journal of Family Business*, 5 (1), 63-64.

Carraher, S.M. & Buckley, M. R. (1996). Cognitive complexity and the perceived dimensionality of pay satisfaction. *Journal of Applied Psychology*, 81 (1), 102-109.

Carraher, S.M. & Buckley, M.R. (2008). Attitudes towards benefits and behavioral intentions and their relationship to Absenteeism, Performance, and Turnover among nurses. *Academy of Health Care Management Journal*, 4 (2), 89-109.

Carraher, S.M., Buckley, M.R., & Carraher, C. (2002). Cognitive complexity with employees from entrepreneurial financial information service organizations and educational institutions: An extension & replication looking at pay, benefits, and leadership. *Academy of Strategic Management Journal*, 1, 43-56.

Carraher, S.M., Buckley, M. & Cote, J. (1999). Multitrait-multimethod information management: Global strategic analysis issues. *Global Business & Finance Review*, 4 (2), 29-36.

Carraher, S.M., Buckley, M., & Cote, J. (2000). Strategic entrepreneurialism in analysis: Global problems in research. *Global Business & Finance Review*, 5 (2), 77-86.

Carraher, S.M., Buckley, M., Scott., C., Parnell, J., & Carraher, C. (2002). Customer service selection in a global entrepreneurial information services organization. *Journal of Applied Management and Entrepreneurship*, 7 (2), 45-55.

Carraher, S.M. & Carraher, S.C. (2006). Human resource issues among SME's in Eastern Europe: A 30 month study in Belarus, Poland, and Ukraine. *International Journal of Entrepreneurship*. 10, 97-108.

Carraher, S.M., Carraher, S.C., & Mintu-Wimsatt, A. (2005). Customer service management in Western and Central Europe: A concurrent validation strategy in entrepreneurial financial information services organizations. *Journal of Business Strategies*, 22, 41-54.

Carraher, S.M., Carraher, S.C., & Whitely, W. (2003). Global entrepreneurship, income, and work norms: A seven country study. *Academy of Entrepreneurship Journal*, 9, 31-42.

Carraher, S.M., Gibson, J. W., & Buckley, M.R. (2006). Compensation satisfaction in the Baltics and the USA. *Baltic Journal of Management*, 1 (1), 7-23.

Carraher, S.M., Mendoza, J, Buckley, M, Schoenfeldt, L & Carraher, C. (1998). Validation of an instrument to measure service orientation. *Journal of Quality Management*, 3, 211-224.

Carraher, S.M. & Parnell, J. (2008). Customer service during peak (in season) and non-peak (off season) times: A multi-country (Austria, Switzerland, United Kingdom and United States) examination of entrepreneurial tourist focused core personnel. *International Journal of Entrepreneurship*, 12, 39-56.

Carraher, S.M., Parnell, J., Carraher, S.C., Carraher, C., & Sullivan, S. (2006). Customer service, entrepreneurial orientation, and performance: A study in health care organizations in Hong Kong, Italy, New Zealand, the United Kingdom, and the USA. *Journal of Applied Management & Entrepreneurship*, 11 (4), 33-48.

Carraher, S.M., Parnell, J., & Spillan, J. (2009). Customer service-orientation of small retail business owners in Austria, the Czech Republic, Hungary, Latvia, Slovakia, and Slovenia. *Baltic Journal of Management*, 4 (3), 251-268.

Carraher, S.M., Scott, C., & Carraher, S.C. (2004). A comparison of polychronicity levels among small business owners and non business owners in the U.S., China, Ukraine, Poland, Hungary, Bulgaria, and Mexico. *International Journal of Family Business*, 1 (1), 97-101.

Carraher, S.M. & Sullivan, S. (2003). Employees' contributions to quality: An examination of the Service Orientation Index within entrepreneurial organizations. *Global Business & Finance Review*, 8 (1) 103-110.

Carraher, S.M., Sullivan, S. & Carraher, S.C. (2005). An examination of the stress experience by entrepreneurial expatriate health care professionals working in Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Niger, Nigeria, Paraguay, South Africa, and Zambia. *International Journal of Entrepreneurship*, 9 , 45-66.

Carraher, S.M., Sullivan, S.E., & Crocitto, M. (2008). Mentoring across global boundaries: An empirical examination of home- and host-country mentors on expatriate career outcomes. *Journal of International Business Studies*, 39 (8), 1310-1326.

Carraher, S.M. & Welsh, D.H.B. (2009). *Global Entrepreneurship*. Dubuque, IA: Kendall Hunt Publishing.

Carraher, S.M. & Whitely, W.T. (1998). Motivations for work and their influence on pay across six countries. *Global Business and Finance Review*, 3, 49-56.

Chait, H., Carraher, S.M., & Buckley, M. (2000). Measuring service orientation with biodata. *Journal of Managerial Issues*, 12, 109-120.

Crocitto, M., Sullivan, S.E. & Carraher, S.M. (2005). Global mentoring as a means of career development and knowledge creation: A learning based framework and agenda for future research. *Career Development International*, 10 (6/7), 522-535.

Huang, L.Y. & Carraher, S. (2004). How effective are expatriate management and guanxi networks: Evidence from Chinese Industries. *International Journal of Family Business*, 1 (1), 1-23 .

Lockwood, F., Teasley, R., Carland, J.A.C., & Carland, J.W. (2006). An examination of the power of the dark side of entrepreneurship. *International Journal of Family Business*, 3, 1-20.

Paridon, T. & Carraher, S.M. (2009). Entrepreneurial marketing: Customer shopping value and patronage behavior. *Journal of Applied Management & Entrepreneurship*, 14 (2), 3-28.

Paridon, T., Carraher, S.M., & Carraher, S.C. (2006). The income effect in personal shopping value, consumer self-confidence, and information sharing (word of mouth communication) research. *Academy of Marketing Studies Journal*, 10 (2), 107-124.

Scarpello, V. & Carraher, S. M. (2008). Are pay satisfaction and pay fairness the same construct? A cross country examination among the self-employed in Latvia, Germany, the U.K., and the U.S.A. *Baltic Journal of Management*, 3 (1), 23-39.

Sethi, V. & Carraher, S.M. (1993). Developing measures for assessing the organizational impact of information technology: A comment on Mahmood & Soon's paper. *Decision Science*, 24, 867-877.

Stewart, W., Watson, W., Carland, J.C., & Carland, J.W. (1999). A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers. *Journal of Business Venturing*, 14, 189-214.

Sturman, M.C. & Carraher, S.M. (2007). Using a Random-effects model to test differing conceptualizations of multidimensional constructs. *Organizational Research Methods*, 10 (1), 108-135.

Sullivan, S.E., Forret, M., Carraher, S.M., & Mainiero, L. (2009). Using the kaleidoscope career model to examine generational differences in work attitudes. *Career Development International*, 14 (3), 284-302.

Williams, M.L., Brower, H.H., Ford, L.R., Williams, L.J., & Carraher, S.M. (2008). A comprehensive model and measure of compensation satisfaction. *Journal of Occupational and Organizational Psychology*, 81 (4), 639-668.