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Advice Seeking and Small Firm Strategy

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ABSTRACT

This article presents original survey data collected from owners or managers of 21 small hardware stores. Controlling for their proximity to "big box" retail hardware stores and using a social networking analysis, the data show a correlation between the networking behavior of the owners or managers and their respective firm's strategy. The results suggest that this area of research is fertile ground for future work in small firm strategy. The article also includes a discussion on the impact on network seeking behaviors of owner/mangers and its impact on small firm strategy.

Introduction

Research streams in small business strategy and social networking have grown in depth and breadth in recent years. However, this growth has been simultaneous and separate. We argue that these two burgeoning fields are interrelated and that by integrating these two streams of research, we can broaden the perspectives of both fields and increase their predictive and descriptive reach. We further argue that as small firm owners seek to implement their strategy, those to whom they go to for advice is dependent on what type of strategy they choose to pursue. This argument is based on the social network perspective (Scott, 2001) described in this article.

Social Network Analysis

Often research focuses on individual, job, or organizational characteristics to understand the outcomes of management processes. Alternatively, the social network perspective seeks to explain individual and organizational outcomes by studying the relationships between people. By exploring these relationships and the information that is shared between people, the social network perspective brings a new vitality and insight to the study of organizational life. The social network perspective has its roots in the gestalt theory of psychology and sociometry, among other fields (Scott, 2001).

The Gestalt theory of psychology suggests that as people acquire new information, they systematically organize this information in their mind. However, as this information is stored, it is not stored independently. The information is stored in patterns in the brain. These patterns are organized to maximize efficient recall of information. However, an added benefit to storing information in patterns is that it also cross pollinates this information and creates new ideas. Indeed, the pattern of thoughts and ideas becomes greater

and provides more insight than the sum of all the ideas themselves (Wertheimer, 1944).

The Gestalt theory of psychology leans heavily on the idea of totality, meaning one cannot fully understand or appreciate thoughts and actions when they stand alone. Authors have described the theory as "a faith that the world is a sensible coherent whole" (King, Wertheimer, Keller, & Crochetiere, 1994). This theory suggests that in order to understand a system, a researcher must study not only the parts, but how the parts relate to each other. Indeed, to more fully understand organizational life, researchers must study relationships and not just people.

In order to understand these relationships, and the influence that these relationships have on people, sociometry was developed as an analytical set of tools to map and evaluate these relationships (Moreno, 1947, 1953). The tools of sociometry allow a researcher to identify how and who people interact with and the information that is shared between them.

For example, using the tools of sociometry, a researcher can identify who an individual goes to for advice. The researcher can also identify the role an individual plays in advice giving and advice seeking in the social network of the organization. Thus, we can better understand the system of human interaction and study the organization as an interconnected social system rather than a sum of individual decisions (King et al., 1994; Scott, 2001; Wertheimer, 1944).

Research in Advice Networks

One stream of social network research focuses on the relationship between the receipt of advice and individual decisions. Gestalt theory suggests that as individuals receive advice from many sources, they begin to mentally organize this advice and create linkages between similar types of advice (Wertheimer, 1944). This mental organization and these linkages create a unique perspective that is built on the advice given to the individual. Thus, those whose advice is accepted have a significant influence on an individual's perspective and decisions. Indeed, this social web of advice givers profoundly impacts the options individuals consider and the decisions they make.

A recent theoretical article suggests that people consciously develop advice networks, often from the larger friendship network. As individuals sort through the information they have and the information they need, they consciously decide whom to go to for advice and what advice they can share in return (Nebus, 2006). Based partly on the quality of the advice, this interchange creates a subset of friends that an individual keeps as an advice network they begin to rely on. Advice networks have been studied in a number of contexts. One study, conducted during a time of change in a school system, found that an individual's advice network served as a stabilizing force on their professional values during changing times (Gibbens, 2004).

In another study, researchers theorized that CEO's would adjust their advice networks depending on the current success of the company they lead. The authors tested this theory by correlating a large sample of CEOs' advice networks with data on firm performance. They found that firm's with lower relative performance were led by CEO's who sought advice from their friends and CEO's of similar firms. Thus, if a firm's performance is decreasing, the firm's leader is likely to receive advice by firm's who are also struggling. The advise seeking of the CEO could create a downward performance spiral for the company (McDonald & Westphal, 2003). Indeed, we would expect in other contexts that those in an individual's advice network are self selected and give advice to the individual based on their experience and interactions with others in their own advice networks.

Advice Seeking and Small Firm Strategy

Research in advice networks is particularly relevant to the decisions and advice seeking of small business managers. The decisions of small business managers can have a quick and intrusive impact on an organization and its survivability. Many small firms work with small capital and cash reserves. Indeed, unopportunistic and misguided decisions by small firm managers can

quickly put a firm out of cash and out of business. Thus, a better understanding of the advice networks on small firm managers will provide insight into influence of others on these decision processes. If we can better understand the system as a whole, we will more clearly see the influence of social relationships on managers' decisions and firm performance.

The study of firm strategy often employs the delineation of strategy offered by Micheal Porter in his epic work Competitive Strategy (Porter, 198Ø). Porter (198Ø) identified four market positions. He argued that a firm's strategy will lead the firm to one of these market positions. Three of these positions (Low Cost, Differentiation, and Focus) lead to superior firm performance while the fourth (Stuck in the Middle) leads a firm to be forced to accept below industry average returns.

Porter's framework for the study of strategy is often employed in small firm research. For example, this framework was a critical element in exploring the marketing of handicraft items in tourist regions (Kean, Niemeyer, & Miller, 1996), exporting strategies of small firms (Namiki, 1988), economic analysis of firm behavior (Ormanidhi & Stringa, 2ØØ8), and building successful strategies for small retailers (Watkin, 1986). In this study we also use Porter's framework of successful strategies in differentiating between the advice seeking behaviors of small firm managers. Particularly we argue that small firm managers will select to seek advice by different groups of people based on the strategy their firm is pursuing. Our data does not allow for us to determine if the firm's strategy drives who the firm goes to for advice, or if those whom the firm manager goes to for advice influences the manager's selection of the firm strategy. However, we do suggest that these two will be correlated.

If a firm is pursuing a high quality strategy, in which products are superior in quality and design to those of competitors, the firm's manager will need to keep abreast of trends in quality within the industry and among competitor products and product lines. While much of this information is available through trade publications, much more of it is available through the opinions of store managers, those who are in the profession of moving goods off the shelf. It seems then that if a firm is pursuing a high quality strategy, the firm manager will rely heavily on the opinions of other store managers and will regularly seek advice from them.

H 1: Small firms pursuing a high quality strategy will seek advice from managers within the industry.

Alternatively, if a firm is pursuing a focus strategy by providing unique products to a specific niche market, it is likely that there may not be many direct competitors. It is likely that the firm manager will then have to rely on friends and family to give input on methods and means to meet the demands of this niche market. Although these friends and family may not know specific information about the focused niche, they may serve as a good sounding board for new ideas and innovations. It is likely then that firm's pursuing providing unique products to the market will turn to their friends and family for advice.

H 2: Small firms pursuing a focus strategy will seek advice from family and friends outside the business.

Finally, firms that pursue a low cost strategy are likely to focus their mental efforts on the internal operations of the store. Managers will spend time mulling over internal data that will provide the framework for them to cut costs to maintain their low cost position in the market. While their focus will be on cutting costs, they will be less likely to seek advice outside the firm from other store managers or from friends and family. Their efforts will be focused on squeezing every cent out of the store operations and cost of goods sold so that they can help the firm survive and maintain their low cost position. In fact, managers may be hesitant to seek advice from other store owners or friends and family as they may give away hits at their cost structure and systems and allow others to copy them. We then would expect that when a small firm pursues a low cost strategy, the manager will be less likely to seek advice from other store managers or family and friends.

H 3A: Small firms pursuing a low cost strategy will be less likely to seek advice from managers of other stores.

H 3B: Small firms pursuing a low cost strategy will be less likely to seek advice from friends and family.

Methods

The sample collected to test these hypotheses is drawn from a collection of hardware stores near a large city in the Southeast United States. These data were collected in the 2008. This site was selected based on the history of the construction industry in the area. The construction industry in the area had been, at the time of the data collection, in a growth mode and fairly stable for many years. This stability allowed small firms to entrench themselves in a specific strategy. During this growth mode, small firms were able to develop their niche within the home improvement industry. However, in the last several years, the market in the sample area has slumped. As success in this area often requires managers to seek advice from others, this environment and location seemed ideal for this data collection.

Small hardware firms had entrenched strategies and they were going through a slump that was forcing many of them to seek advice from people from whom they may not have sought advice in the past. This sample was also limited to one industry, home improvement stores. While limiting this research to one industry does limit generalizability of the results, it does allow for some consistency between firms so that the research does not need to control for effects across industries.

We selected a set of firms from topically organized phone listings available in public phone books of the area. These phonebooks are online via the web. This process does have some inherent bias as firm's select how they are listed in the phone book. All firms within the geographic region under study were included. The researchers mailed each firm a survey and cover letter describing the project and requesting that the manager or owner of the store complete and return the survey. Included with the survey was a self addressed stamped envelope.

As this research focuses on small firms, it was expected that the response rate would not be high. From an initial list of 365 hardware stores, 55 were returned undeliverable. This is somewhat expected as the target sample was small firms and the death rate of small firms is high, but it was also somewhat unexpected as the addresses were taken from an online database that is much easier to keep current than the print copy. From the remaining 311 firms, 21 returned useable responses (a 7% rate of return). This low response rate limits the generalizablility of these results. However, these small firms are often very difficult to access, particularly in the challenging economic times when they survey was administered. The responses do however provide interesting results that give insight into the research questions outlined above. After receipt, the responses were entered into a spreadsheet and then analyzed using SPSS statistical software.

Measurement of Variables

The variable "Founder" was included in the analysis to control for any effect on the strategy or performance of the company as a result of the owner/manager also being the founder of the firm (Wasserman, 2006). This variable was captured by the survey respondent answering yes or no to the question "Are you the founder of the store?"

With the recent rise of big box home improvement stores, the authors controlled for any effect that these stores may have had on the strategy of performance of the stores included in this study. To capture this data, the address of each survey respondent's store was entered in to a store locator on the web site of a major home improvement chain. The distance (in miles) between the survey respondent's store and the closest big box retail store was entered in the datasheet as the variable "Box Store Proximity."

The two variables used to collect data on the advice networks of store owners/managers were collected by asking two questions. The questions

were introduced with the following text: "One challenge faced by store owners and managers is selecting who to go to for advice. Please answer the following questions about who you go to for advice." To gather the advice seeking of family members, respondents answered the following question: "To what extent do you seek advice from your family members (including spouse)." To gather the advice seeking of friends, respondents answered the following question: "To what extent do you seek advice from your friends outside the business." These two items were combined to create the measure used for the advice seeking of family and friends. The Cronbach's coefficient alpha for these two items is α=.7Ø2. To measure the advice seeking behavior of mangers in the field, respondents answered the question "To what extent do you seed advice from managers of other stores." Each of these items had 7 response options ranging from "to no extent" through "to a very large extent."

To measure the firm's strategy, respondents answered the following questions: "To what extent is the business strategy to provide high quality products and/or services" (high quality strategy); To what extent is the business strategy to provide unique products and/or services" (focus/unique); and To what extent is the business strategy to provide low cost products and/or services" (low cost strategy). Each question had seven response options ranging from "to no extent" through "to a very large extent."

Results

Prior to performing the analysis to test the hypotheses, all variables were checked for homogeneity and normality. To check normality, a skewness and kurtosis statistic were calculated for each variable. All but two variables were found to be within twice the standard error of a normal distribution. The check for homogeneity, each independent and control variable was graphed against the dependent variable for each model below. Both dependent and controls appeared to be homogenous across all levels of the dependent variable. No data modifications were made to correct heterogeneity. Transformations to correct form normality are discussed below.

The "Box Store Proximity" variable had a stronger than acceptable positive skew. To correct for this positive skew, this variable was transformed using a logarithm. This is somewhat expected as Box Stores are not evenly distributed throughout the region under study. The log transformation brought this variable within .ØØ3 of the standard error of a normal distribution. The log transformation was used for the analysis.

The "High Quality Strategy" variable was found to have a negative skew that was outside the accepted norm of twice the standard error of a normal distribution. This is somewhat expected as many firms rated their strategy as selling high quality products. To normalize this variable the responses were squared. This transformation brought the variable well within the accepted limit of twice the standard error of a normal distribution.

For all correlations and the hierarchical regression analysis the log of "Box Store Proximity" and the square of "High Quality Strategy" were used. However, the mean and standard deviation shown in the correlation matrix are listed in the original units of the variables (see Table 1 on following page).

To test hypothesis I-3B hierarchical linear regression was employed by the authors. In all models, Model 1 regressed the two control variables on the dependent variable. In Model 2 the independent variable was added. In all analysis, the change in R2 is shown as well as the overall significance of the F statistic for the model. Results in Table II show that Hypothesis 1: Small firms pursuing a high quality strategy will seek advice from managers within the industry is supported with this data. The two control variables alone do not account for a significant portion of the variance in the dependent variable "Managers of other stores" (F=2.164, P>.Ø5). However, Model 2 shows that with the addition of the independent variable "High Quality Strategy" the model does account for a significant portion of the variance in the dependent variable "Managers of other stores" (F-3.689, P<.Ø5). This model accounts for nearly 4Ø% of the variance in decision makers seeking advice from managers of other

Table I
Correlation Matrix

			Correlation Coefficients					
Variables	**M**	**S.D.**	**1**	**2**	**3**	**4**	**5**	**6**
Founder	.38	.50						
Box Store Proximity	13.71	10.25	.091					
Managers of other stores	3.62	1.47	-.340	-.444*				
Friends/Family	4.26	1.68	.114	-.522*	.215			
High Quality	6.05	.97	-.039	.019	.399	.115		
Focus/Unique	5.05	1.53	-.353	-.241	.209	.510	.032	
Low Cost	4.71	1.23	.268	-.147	-.147	.074	-.072	.326

Notes: Missing data were removed listwise. Mean and standard deviation of variables that were transformed for the analysis are presented on this table in their origin units of measurement.
*P<.05 (2-tailed); n=21

stores (R2=.394). The data support the argument above that when a small business is pursuing a high quality strategy; they will seek the advice from owners of other stores. Thus Hypothesis 1 is supported.

Table II
Hypothesis 1 Results

	Model 1	Model 2
Variable	Std B	Std B
Founder	-.262	-.224
Box Store (Log)	-.291	-.376
High Quality Strategy (Squared)		.455*
R2	.194	.394
^R2	.104	.287
R2 Change	.194	.200*
Model F	2.164	3.689*
Dependent Variable: Managers of other stores *P<.05		

A similar process was followed to test Hypotheses 2: Small firms pursuing a focus strategy will seek advice from family and friends outside the business. Both control variables were regressed on the dependent variable "Friends and Family" in Model 1. These results show that the control variables alone did not account for a significant portion of the variance in the dependent variable. In Model 2, the independent variable "Focus Strategy" was added to the hierarchical regression to test the effect of "Focus Strategy" on the level of advice sought by decision makers from their family and friends outside the business. The results of Model 2 show that the independent variable "Focus Strategy" accounts for a statistically significant portion of the variance in advice seeking from friends and family (F=3.360, P<.05). The independent variable also accounts for a significant portion of the variance explained in the model (R2=2.83, p<.05). thus the model accounts for more than 37% of the variance in the dependent variable with the independent variable "Focus Strategy" accounting for at least 26% of that variance (^R2=.261). Thus Hypothesis 2 is supported.

Table III
Hypothesis 2 Results

	Model 1	Model 2
Variable	**Std B**	**Std B**
Founder	.191	.356
Box Store (Log)	-.287	-.123
Focus Strategy		.593*
R2	.089	.372
^R2	-.012	.261
R2 Change	.089	.283*
Model F	.884	3.360*
Dependent Variable: Family/Friends *P<.05		

This process was repeated to test Hypothesis 3A: Small firms pursuing a low cost strategy will be less likely to seek advice from managers of other stores and Hypothesis 3B: Small firms pursuing a low cost strategy will less likely to seek advice from friends and family. Table IV shows that neither model 1 nor model 2 account for a significant portion of the variance in the dependent variable "Managers of Other Stores" (F=2.164, P>.Ø5 and F=1.376, P>.Ø5 respectively).

Table IV
Hypothesis 3A Results

	Model 1	Model 2
Variable	**Std B**	**Std B**
Founder	-.262	-.252
Box Store (Log)	-.291	-.288
Low Cost		-.Ø4Ø
R2	.194	.195
^R2	.1Ø4	.Ø53
R2 Change	.194	.ØØ2
Model F	2.164	1.376
Dependent Variable: Managers of Other Stores *P<.Ø5		

Similarly, Table V shows that neither model 1 or Model 2 account for a significant portion of the variance in the dependent variable "Friends and Family" (F=.884, P>.Ø5 and F=.585, P>.Ø5, Respectively). These results show that there is no correlation between a small firm pursuing a low cost strategy and the likelihood that they will seek advice from either "Managers of Other Stores" or "Friends/Family." If Hypotheses 3A and 3B were supported, we sould find a significant negative correlation between a firm pursuing a "Low Cost Strategy" and seeking advice from Managers of Other Stores" (3A) and "Friends/Family" (3B). However this correlation was not found, therefore Hypotheses 3A and 3B are not supported.

Table V
Hypothesis 3B Results

	Model 1	Model 2
Variable	**Std B**	**Std B**
Founder	.191	.174
Box Store (Log)	-.287	-.291
Low Cost		.Ø67
R2	.Ø89	.Ø94
^R2	-.Ø12	-.Ø66
R2 Change	.Ø89	.ØØ4
Model F	.884	.585
Dependent Variable: Friends/Family *P<.Ø5		

Discussion and Limitations

The findings of this study suggest that there may be a correlation between a firm's strategy and the people to whom the owner/manager go to for advice. Based on the theory of social networks and Gestalt psychology, this advice has the potential to create frameworks within the manager/owners mind that could guide his or her decision making. One limitation of the data presented in this article is that it is a limited dataset with a low response rate. However, the findings suggest that this area a research is fertile ground for future research on the influences on decision processes and strategic choices of small business owners and managers.

Future research could consider the whether or not there is a causal relationship between advice seeking and the selection of strategy by a firm owner or manager. It could be argued that in the nascent stage of firm creation, the advice that future owner/managers/ receive have a substantial impact on the firm strategy and structure selected. The alternative is that if an owner/manager selects a strategy, this strategy will guide and limit the individuals to whom they will go to for advice. As the data in this article rely on survey data and are collected at one point in time, the authors are not able to make statements about causality. Longitudinal data may be collected in future research projects to discover the causality of advice seeking and small firm strategy.

While this study is clearly not definitive in scope, it does provide some support that the social networks of owner/managers may correlate with the firm's strategy. It also provides a partial foundation for future research in the social network behaviors of small firm owner/managers. It is the hope of the authors that this research will provide another step toward understanding antecedents to and correlates with small firm strategy selection.

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Who Are We Leading?
Identifying Effective Followers: A Review of Typologies

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ABSTRACT

The study of followership recognizes a mutual interdependence between leaders and followers. Based on this reciprocal relationship, the more we understand about followers the more we empower our leaders. In this paper, a comparison will be made among the four most noted followership typologies to assess congruency among their respective criteria in an attempt to find convergence among these efforts. Upon the analysis of these typologies, their applicability to the practice of leadership is addressed. The ultimate goal of this research is to provide value to both current and future leaders alike.

Introduction

The idea of leadership connotes images of influential individuals wielding great power commanding troops in pursuit of the almighty cause. The role of the follower, on the other hand, has typically received much less acclaim. However in reality, without followers, leaders would cease to exist.

Often, success is attributed solely to the leader while the role of followers goes unnoticed (Hughes, Ginnet, & Curphy, 1996; Meindl & Ehrlich, 1987). However, followers have great influence on the success of the leader (Offerman, 2004). Contrary to common perceptions, influence is not solely possessed by the leader. The sheer existence of followers suggests that leaders are not the sole possessors of power. Followers have some control over their own destiny in that they choose to follow or not to follow. It may be said that it is the follower who gives a leader power, through the choice to follow.

Influence may arise from either party in the relationship (Hughes, Ginnet, & Curphy, 1996). While the leader may assume a more prominent role within the relationship, follower influence grants a balance of power as a part of social exchange (Homans, 1961). Thus, effective leadership is achieved through a process whereby reciprocity, power sharing and two-way influence exists (Hollander and Offerman, 1990).

The study of followership recognizes the mutual interdependence between leaders and followers. This research stream examines the influence of followers on leader effectiveness in an attempt to fill gaps left in the wake of the vast volumes of leadership research. Within the leadership literature, only a small amount of effort has been directed toward understanding the contribution of followership (Yukl, 2002). It is important to state that followership research should not be viewed as being competitive with leadership efforts as it is yet another perspective addressing toward assessing the same phenomenon. Coupled with an understanding of leaders, followership studies enable researchers and practitioners alike to attain greater perspective on the leadership phenomenon.

Types of Followers

Within the leadership phenomenon, the role of leader assumes a certain level of responsibility in order to achieve success. Leader may have creative freedom concerning how they choose to lead; however, the fact remains that the leader is ultimately responsible. Responsible for engaging

followers, showing initiative, motivating, inspiring, problem solving, establishing goals, pursuing tasks, assessing the situation, and processing information among other things. The role of the follower, however, can be quite different. Followers do not necessarily face the demands imposed upon leaders. There is a level of choice granted to followers. Beginning with the choice to follow, followers may then choose how to follow. Followers may often choose to engage the leader or wait until approached. Followers may choose to solve problems or have them solved by others. Followers may choose to pursue the task independently or wait until given orders. Based on their choices, followers may be categorized into groups.

Over the years, a few research endeavors have sought to develop well grounded means for such categorization. Based on key follower characteristics these efforts make provisions for managers to dissect their follower population to better understand who we are leading. In this paper, a comparison will be made among four highly recognized typologies to assess congruency among their respective constructs in an attempt to find a convergence among these efforts. Upon the analysis of these notable typologies, application of these typologies to the field of leadership will be addressed.

Zaleznik (1965)

Beginning with Abraham Zaleznik (1965), followers were categorized within a 2x2 matrix, which two criteria upon which the matrix axes are based. The first being the dominance vs. submission continuum by which at each extreme end followers are seen as wanting to control their superiors (dominance) or wanting to be controlled by them (submission). The second axis is the activity vs. passivity continuum by which at each extreme followers is viewed as initiating action (active) or doing nothing (passive). Zaleznik suggested four classes of followers based on placement in the grid.

The first group is labeled as 'impulsive'. This group is seen as being both dominant and active wanting to control and actively pursuing their desires. The next group is labeled 'compulsive'. These followers are seen as being dominant but passive. These followers secretly desire control but lack the activity to pursue their desires. Zaleznik's third class of followers is the 'masochistic' group. These followers are active within the organization but do not care to possess authority. Finally, the last group is labeled as the 'withdrawn' showing no desire for control and little activity in the workplace. Zaleznik's effort was the first notable attempt to categorize followers which provided a foundation for future attempts at categorizing followers.

Kelley (1988; 1992)

A few decades later, Robert Kelley (1988; 1992) provided a similar typology for identifying follower groups which also employed a 2x2 matrix structure. Kelley identified five categories of followers (effective, alienated, yes-people, sheep, and survivors) based on two dimensions: critical independent thinking and activity level. According to Kelley (1988):

> *Effective followers have the vision to see both the forest and the trees, the social capacity to work well with others, the strength of character to flourish without heroic status, the moral and psychological balance to pursue personal and corporate goals at no cost to either, and above all, the desire to participate in a team effort for the accomplishment of some greater purpose (p.107).*

In addition to Kelley's description, effective followers are more likely to interact with leaders due to their active nature, while their ability to think independently may increase the value of the information they provide (Kelley, 1992). It could be said that an effective follower is one that holds within it the potential of leadership. Behaviors that represent effective leadership such as the ability to think independently and to pursue action include attributes of good followership. Therefore, these effective followers hold the greatest potential to become effective leaders (Hollander & Webb, 1955; Kouzes & Posner, 1987). This premise reinforces the need for

greater understanding of followers which could simultaneously increase our knowledge of leaders.

According to Kelley's work, the four remaining groups of followers are deficient in either level of activity or independent thinking, or both. The 'alienated' followers are deficient in activity level. Members of this group possess the level of independent thinking to be effective; however, they choose to be inactive. Opposite of this group are the 'yes-people' who are highly active yet lack independent thinking skills. Combining the weak points of these two groups gives us the 'sheep' who are the farthest away from the effective group by displaying low levels of both activity and independent thinking. Possibly the most difficult group to lead are the 'survivors'. These individuals pursue their own agenda and act as a chameleon doing what ever is necessary to preserve self. In addition to the categorization Kelley (1992) published a 20-item, 2-dimensional scale used to classify follower type based on activity level and independent thinking measures. This scale will be addressed in an upcoming section of this work.

Chaleff (1995)

Following the work of Robert Kelley, was Ira Chaleff's 1995 book "The Courageous Follower". In this book, another 2x2 matrix is constructed to identify more specific followership styles. The two axes in this matrix represent two dimensions of courageous followership. The first dimension refers to the level of support given to the leader by the follower while the second dimension addresses the willingness of followers to challenge a leader on critical issues. Based on these criteria, four types of followers are established.

The first of Chaleff's typologies is the 'partner'. These followers provide strong support for their leader while maintaining the right to challenge their leader when discrepancies arise. The 'implementer' is the second group addressed in this study. These followers show vigorous support for their leader and are relatively unwilling to challenge the leader in the event of a discrepancy. These followers would likely knowingly follow a leader down the wrong path. Next, the 'individualist' is the type of follower who has little regard for the leader and is willing to challenge policies or procedures that are not acceptable. Finally, Chaleff proposed the 'resource' follower type. These followers put forth minimal effort showing little support while being unwilling to challenge a leader. The resource follower is predominately extrinsically motivated, cares little about the work relationship and shows little commitment to the leader or the organization.

Chaleff's "courageous follower" research is somewhat different from the other works addressed here due to the fact that it attempts to examine "the courageous follower". The specificity of this work attempts to narrow down it's typology to examine only those "courageous" characteristics. This work should be considered as pioneering the way for future works to specialize on certain criteria by which followers may be examined in a situational context. While Chaleff examines the courageous follower, future research may explore other attributes of followers with such specificity to enrich our understanding of the many pieces that form the followership puzzle.

Kellerman (2007)

The last typology addressed here was developed by Barbara Kellerman (2007). This typology uses a single continuum to classify followers. The first endpoint is anchored by "feeling and doing nothing" at the opposite end of the continuum followers are observed as "being passionately committed and deeply involved". It is important to note that, in this typology, those who show activity are assumed to act independently which might or might not be in support of a leader. The primary focus here is not upon the leaders behalf as it focuses on the follower propensity to engage the situation whether in support or opposition of the leader.

As Kellerman begins at one end and works toward the other, five follower types are addressed. Starting with "feeling and doing nothing" at the extreme level are the 'isolates'. These followers are totally removed from the situation and give minimal effort or attention to their leader. Mov-

ing down the continuum, 'bystanders' are attentive to the situation but refuse to pursue action. Self-interest is the primary motivator of their action. At the mid-point of the continuum, 'participants' are somewhat engaged in the relationship and workplace activities. These followers are willing to devote some effort toward making a difference. Now over the hump, the 'activists' are somewhat committed and involved. These followers have strong feeling about their environment. In conjunction with their strong feeling, these followers are willing to act on behalf of what they feel is right or wrong. Similarly, the final group of followers addressed by Kellerman is the 'diehards'. Diehards are committed and involved with pursuit of cause. This group is intensely committed and involved to the extent that they are willing to accept risks. The diehards are willing to go down with the ship, standing by what they think is right.

Research Comparison

Upon review of these efforts, this study will now to examine the criteria of these studies typologies in conjunction in an effort to gain congruency among this most notable body of work in the area of followership (See figure 1 below for summation of studies). At this juncture, it is important to understand that the role of the follower in each of these typologies is not static. Followers may move in and out of certain groups depending on the desires of the follower in a given situation. For instance, with a change in leadership or organizational environment followers may alter their behavior by becoming more or less active,

Figure 1
Typologies: Criteria and Groups

	Criteria	Follower Types
Zaleznik (1965)	Two Axes: Dominance vs. Submission Activity vs. Passivity	Impulsive: Dominant and Active Compulsive: Dominant and Passive Masochistic: Submissive and Active Withdrawn: Submissive and Passive
Kelley (1988, 1992)	Two Axes: Independent Thinking Activity Level	Effective: High Thinking, High Activity Alienated: High Thinking, Low Activity Yes-people: Mid Thinking, Mid Activity Sheep: Low Thinking, Low Activity Survivors: Low Thinking, High Activity
Chaleff (1995)	Two Axes: Level of Support Willingness to Challenge	Partner : High Support, High Challenge Implementer : High Support, Low Challenge Individualist: Low Support, High Challenge Resource: Low Support, Low Challenge
Kellerman (2007)	Continuum Endpoints: Feeling/Doing Nothing Passionately Committed/ Deeply Involved	Isolates: Feel Nothing, Do nothing Bystanders: Feel Little, Do Little Participants: Partially Committed and Involved Activists: Moderately Committed and Involved Diehards: Highly Committed and Involved

Figure 2
Convergence among Studies

Activity Level as a Criteria:

Zaleznik (1965)	Activity vs. Passitivity
Kelley (1988; 1992)	Activity Level
Chaleff (1995)	Willingness To Challenge & Level of Support
Kellerman (2007)	Doing Nothing & Deeply Involved

All of the above criteria are based on activity this construct is involved in 6 of 8 criteria employed in these works. This is the primary overlap identified in this review.

Follower Type Extremes:

High Extremes
Impulsive Followers (Zaleznik, 1965)
Effective Followers (Kelley, 1988; 1992)
Partner (Chaleff, 1995)
Diehards (Kellerman, 2007)

Low Extremes
Withdrawn Followers (Zaleznik, 1965)
Sheep (Kelley, 1988; 1992)
Resource Followers (Chaleff, 1995)
Isolates (Kellerman, 2007)

These follower types which are identified by the authors at the extreme high or low ends for all criteria appear to be highly similar for both the high and low respective groups. Further analysis would likely be necessary to identify if and where real differences exist between these classifications. The mid range classifications however, are more difficult to link similarities between typologies.

engaging, concerned, etc. As Chaleff (1995) continuously pointed out, many followers also have room for growth and development in certain areas. Similarly, followers may choose to withdraw or reduce participation for any given reason.

When assessing these typologies, one primary convergence quickly presented itself. That is the use of the activity criteria in each study as a key variable by which to identify and classify followers. In Zaleznik (1965) and Kelley (1988; 1992), the use of this criteria was highly evident. The latter used Activity vs. Passivity as an axis of the 2x2 matrix while the former used Activity level in the exact same fashion. While Chaleff's work is somewhat different, it does ultimately address activity as the primary criteria by which followers are categorized. The two criteria used to categorize followers in the work of Chaleff (1995) both address some level of activity by examining two specific activities: Support for Leader and Challenging of the Leader. Finally, Kellerman (2007) uses a continuum to classify followers by which each endpoint is somewhat double barreled with multiple criteria for each endpoint (Endpoint 1: Feeling Nothing/Doing nothing; Endpoint 2: Passionately Committed/Deeply Involved). While this does introduce issues in understanding the criteria, the "doing nothing" and "deeply involved" criteria is representative of follower activity.

Based on this analysis of relevant literature, it appears that the activity level criteria is considered by notable scholars to be extremely important in attempting to identify followers (See figure 2 below for comparison among studies). A secondary observation derived from this analysis of literature was the similarity between follower groups located at the extreme points of each typologies.

After careful review, it became difficult to differentiate between the follower types located at the extreme high or low end for each typology. It became much more different to assimilate the mid-range followers across typologies when compared to those at the extreme ends. Thus it appears that these groups, while given different names, are very similar (See Figure 2 on the previous page for comparison among studies).

Utilizing the Typologies

After review of these typologies, one must ask from an organizational leadership perspective, where does the value lie in such typologies? The answer lies in the instrument. A typology without a means for measurement is much like being given instructions to perform a task without having the necessary tools. If you merely read the instructions and have no tools to do the job then the task still remains. Thus, the value of these typologies lies in the ability to accurately categorize followers. In order to get the maximum value from such typologies, leaders need a means for gathering data and measuring these specific follower characteristics. Based on the previous review, this is especially true for the follower activity criteria. Therefore, when ideal criteria such as follower activity level, are specified measurement tools will allow leaders to more accurately identify targeted groups of followers in given situations.

Ideal types can be modeled using specified ideal profiles (Doty and Glick, 1994). Values may be assigned to these ideal criteria in an effort to form the ideal profile and establish grounds for measurement (Doty and Glick, 1994). Thus, if leaders are able to identify these ideal criteria to form classifications, the instrument will likely provide itself useful in classifying followers. Ultimately, the usefulness of such follower typologies arises from the leader's ability to categorize followers in a means to improve decision making abilities and increase leader effectiveness. Thus, proposition one is posited.

Proposition 1: Leaders who are able to identify ideal criteria to represent follower categories will be more likely to use typologies to increase leader effectiveness.

Of the above typologies, Kelley (1992) offers the only published instrument by which to assess and categorize followers based on specific measurements. Kelley's instrument provides a means for assessing the type of follower and allows leaders and followers alike to highlight specific areas for future development. Kelley provides a 20-item 2 dimensional measure which assesses the activity level of followers as well as the follower's propensity for independent thinking. The scale consists of 10 items which address the follower activity level construct and 10 items which address the independent thinking construct. This instrument is a self report measure by which followers answer questions based on frequencies utilizing a seven point Likert scale ranging from 0-Rarely, 3-Occasionally, to 6-Almost Always (See Figure 3 below for Kelley's Measure).

Once the survey is completed, scores for each dimension are summed and categorized (See Figure 4 for Typology/Score relationships). The first category, Kelley's 'effective' followers, consists of those who score high on each dimension (greater than 40 for both dimensions). At the other end of the spectrum, the 'sheep' are those who score low on both dimensions (less than 20 for both dimensions). In the middle are the 'survivors', who have a mid-range score for both dimensions (between 20 and 40 for both dimensions). The 'alienated' followers are those who score high on the independent thinking dimension and low on the activity dimension (greater than 40 for independent thinking; less than 20 for activity). In contrast to the alienated followers, the 'yes-people' are those who score high on the activity level scale and low on the independent thinking scale (greater than 40 for activity; less than 20 for independent thinking).

While this scale has no published analysis of validity, leaders who utilize such an instrument will provide themselves with a grounded means of analysis of followers by which to categorize followers when compared to no measurable analysis at all. The use of measurement scales, such as Kelley's Followership Questionnaire, in conjunc-

Figure 3:
Kelley's Followership Questionnaire as published in Kelley (1992) "The power of Followership"

Instructions: For each statement, please use the scale below to indicate the extent to which the statement describes you. Think of a specific but typical followership situation and how you acted.

Rarely			Occasionally			Almost Always
Ø	1	2	3	4	5	6

___1. Does your work help you fulfill some societal goal or personal dream that is important to you?

___2. Are your personal work goals aligned with the organization's priority goals?

___3. Are you highly committed to and energized by your work and organization, giving them your best ideas and performance?

___4. Does your enthusiasm also spread to and energize your co-workers?

___5. Instead of waiting for or merely accepting what the leader tells you, do you personally identify which organizational activities are most critical for achieving the organizations priority goals?

___6. Do you actively develop a distinctive competence in those critical activities so that you become more valuable to the leader and the organization?

___7. When starting a new job or assignment, do you promptly build a record of successes in tasks that are important to the leader?

___8. Can the leader give you a difficult assignment without the benefit of much supervision, knowing that you will meet your deadline with highest-quality work and that you will "fill in the cracks" if need be?

___9. Do you take the initiative to seek out and successfully complete assignments that go above and beyond your job?

___10. When you are not the leader of a group project, do you still contribute at a high level, often doing more than your share?

___11. Do you independently think up and champion new ideas that will contribute significantly to the leader's or the organization's goals?

___12. Do you try to solve the tough problems (technical or organizational), rather than look to the leader to do it for you?

___13. Do you help out other co-workers, making them look good, even when you don't get any credit?

___14. Do you help the leader or group see both the upside potential and downside risks of ideas or plans, playing the devil's advocate if need be?

___15. Do you understand the leader's needs, goals, and constraints, and work hard to help meet them?

___16. Do you actively and honestly own up to your strengths and weaknesses rather than put off evaluation?

___17. Do you make a habit of internally questioning the wisdom of the leader's decision rather than just doing what you are told?

___18. When the leader asks you to do something that runs contrary to your professional or personal preferences, do you say "no" rather than "yes"?

___19. Do you act on your own ethical standards rather than the leader's or group's standards?

___20. Do you assert your views on important issues, even, though it might mean conflict with your group reprisals from the leader?

Key: Activity Items: 2,3,4,6,7,8,9,10,13,15
Independent Thinking Items: 1,5,11,12,14,16,17,18,19,20

tion with the respective typologies allows leaders to predict variance among specified constructs based on given criteria (Doty and Glick, 1994). Thus proposition two is posited.

Proposition 2: Leaders who are able to gather measurable data on specific follower characteristics will be better equipped to categorize followers.

Figure 4
Typology/Score Relationship

Typology	Activity Level Score	Independent Thinking Score
Effective	High	High
Passive	Low	Low
Survivors	Mid	Mid
Alienated	Low	High
Yes People	High	Low

Note: High = Greater than 40
Mid = Between 20 and 40
Low = Less than 20

Implications

Implications for leaders may arise in their ability to use the scale to identify followers who possess desirable characteristics for a particular role. Leaders who recognize these different types of followers may be better equipped when trying to mold and shape followers. The instrument may be especially useful to leaders who are not strongly linked to an organization or who have weak ties to followers. This may enable the leader to identify key followers with whom to begin building relationships. In the case of new employees, this scale might enable leader to assess the leadership/followership potential of new hires whose performance level has not yet been established. From an upper management perspective, this scale may help to identify future candidates for leadership positions. Combining the followership score with a performance appraisal may provide a great tool for assessing future leadership potential.

Future Research

Since the followership phenomenon has received little attention over the years, numerous avenues remain open for future research. A starting point for future research concerning the current work would be a validity assessment of Kelley's measure. Currently, there has been no evidence shown for the validity of the measure. While other tools by which to measure followers are non-existent, this measure does offer some means of structure for assessing and categorizing followers. Evidence of validity for this measure would reinforce its usefulness as a tool for categorizing followers.

Since this measure is highly subject to self-report bias, future research should address the possibility of modifying the instrument to gain a 360° perspective of followers. With slight altercations, the scale could utilize evaluations from peer groups, superiors, non-biased observers in conjunction with the self report to gain greater perspective and accuracy when classifying followers. Along with adding additional perspective outside the self-repot, leaders might conduct a comparative analysis of followership scores with more objective criteria derived from organizational records. These objective criteria may include but are not limited to performance appraisals, attendance records, work history, etc. Leaders might assess other relative criteria by which to help determine what the ideal characteristics of followers are for their unique leadership situation.

Conclusion

Realizing that followers contribute largely to the success of leaders is essential to the study of leadership. Research that recognizes these different types of followers and attempts to examine what causes followers to adhere to a specific follower class may better equip leaders when trying to mold effective followers. By utilizing these typologies, leaders my better understand their followers which may allow more precise action and decision making skills for the leader. Thus, a greater understanding of followers equals a more informed leader creating a more effective leader. While the cyclical nature of the leader follower

relationship continues into perpetuity, it is not without followers that leaders exit and not without leaders that followers have a purpose.

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Determinants of Perceived Trustworthiness in Managing Personal Information

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ABSTRACT

Concern about personal information policies is a major obstacle in the development of trust between organizations and their stakeholders such as customers and employees. We test the effects of three personal information policies on customers' perception of an organization's trustworthiness in managing personal information. Using a 2x2x2 experimental design, the present study examines the effects of policies concerning customers' ability to authorize disclosure (X_1), ability to limit target of disclosure (X_2), and customers' ability to edit/delete data in personal profiles over the Internet on customers' perception of an organization's trustworthiness (Y) in managing customers' personal information. Results indicate that the hypothesized main effects of three information policy variables on an organization's trustworthiness (Y) are positive and statistically significant. Findings from this research have implications for managers, customers, regulators, IS professionals and researchers interested in trust relations, which work as glue for human systems that depend on exchange of sensitive information among different stakeholders. Since the organization where the study was carried out is populated by citizens from different countries, the findings have global implications.

Introduction

Thanks to databases and data communications technologies, organizations are increasingly becoming more connected globally, and information-intensive. However, some information about customers, employees, suppliers, and alliance partners is valued as private, confidential and sensitive by the people about whom such information is collected. As computerized information and communication systems become the network of nerves and veins through which data flow within and between organizations, concern for security and privacy of personal data increases to be the most important ethical issue facing information management professionals (Peslak, 2006; Chen and Rea, 2004). For example, data collected about customers' economic status and habits, credit card users' spending habits, or Internet shoppers' spending and browsing habits can be abused by marketers, among others. The problem becomes acute when organizations share private data with affiliates and strategic partners outside an organization. A content analysis of the firms in the Fortune e-50 indicates that only 5.7% of the business-to-consumer firms fully comply with principles of fair information practices (Ryker, Lafleur, McManis and Cox, 2002). As abuses of consumers' personal information are reported in the popular media, public's demand for protection and trustworthy management of personal information becomes a loud outcry, drawing attention of governmental agencies and lawmakers. Information privacy concern has important implications for e-commerce (Furnell and Karweni, 1999) consumer behavior such as for online browsing and spending (Zviran, 2008) and other behavioral intentions such as removing oneself from a mailing list or refusing to disclose personal information (Korzaan and Boswell, 2008). As a technique for controlling individuals' concern about privacy of personal information, some consumers depend on falsification of personal information for online activities (Chen and Rea, 2004). The underlying question in the minds of customers is: how trustworthy is an organization with personal information?

Literature Review

Information Power and Organization Theory

One main issue relevant to organization theory is that of power struggle among different stake-

holders. Businesses exercise power over individual customers whom they purport to serve even though the ultimate sources of this power are the customers themselves. Organizations compete for customers. One resource that can help an organization compete is information about customers. Sometimes, information is shared with strategic alliance partners to have a competitive advantage over competitors in the marketing war to win and retain customers. Organizations and individual employees can trade one kind of information in exchange for another kind of information about customers or in exchange for other benefits. However, when organizations do not respect customers' rights and preferences in the way they collect, store, use, share and disseminate customers' private information, customers can feel powerless and entrapped. The basic theory behind the three independent variables in this study is that organizations, in order to earn and maintain customers' patronage, cooperation and trust, should adopt information management policies that empower and respect customers. One way to empower customers is to ask them for their consent, permission or authorization before collecting, using and releasing any information about them and/or restricting the release, access or sharing of customers' information with sub-units, branches, affiliates, alliance partners and others. Fair information management (Culnan, 1998) should allow customers to (a) know how organizations collect and use personal information, (b) have the right to prevent secondary use of personal data, and (c) feel secure that organizations will take reasonable precautions to prevent misuse of personal information. Letting customers have the power to control access, sharing and disclosure of information in their personal accounts and profiles and letting them edit or delete their personal data can be a way to empower customers and show respect for their rights and preferences.

Agency Theory and Transaction Cost Economics (TCE).

Customers can be viewed as principals and organizations can be viewed as custodians or agents of customers' private information. As in any principal-agent relationship, there is a chance for agents to profit at the expense of the principals. An organizational entity can sell a customer's private information to a marketer to profit at the expense of the privacy rights of customers. Transaction cost economics (TCE) tells us that agents will pay a price for not maintaining the trust of the principal. It takes a long time and millions of dollars of investment to build the reputation of being trustworthy, but once that trust is broken for a small, short-term, and probably one-time profit—customers in large numbers may leave the organization that has breached customers' trust. Losing customers because of losing reputation of trustworthiness is a high price to pay for an organization interested to stay in business in the long run. The main assumptions of TCE theory are: (1) each party is a utility maximizer; (2) each party is governed by self-interest or tends to behave opportunistically, and (3) before making a decision, decision makers will conduct cost-benefit analysis for each available alternative (Ring, 1996). So, according to TCE theory a rational organization's calculation will lead it to maintain customers' trust rather than lose it by breaching customers' privacy rights. An organization will do so not for altruism or civility but for the pure economic gain that it can realize from being trustworthy in the eyes of customers than not being so. TCE theory has been used in a variety of applications, particularly for explaining the choice of governance structure in interfirm alliances (e.g., Chiles and McMackin, 1996; Gulati, 1995). In this study TCE can be applied to implicit and/or explicit social contracts, psychological dependence, and expectations that define transactional relationships between organizations, especially organizations that operate in an Internet-dominated global environment, and their individual customers may be from different parts of the world.

Transaction Costs and Trustworthiness.

Beyond rational calculation which is limited by cognitive limits and availability of relevant information, a contractual relationship between a buyer and a seller is based on good faith and trust. This contract defines expectations of each party's duties and responsibilities to the other. A

part of the contract is explicit, often expressed in written legal terms, and the other part is implicit. Customers expect that organizations will use information about them in a manner that serves the best interests of customers. However, when they find out or suspect that the information that they provided in good faith is being used in a way that they did not authorize, their reactions can be defensive, aggressive or hostile. In reaction to fear of abuse, some customers may provide inaccurate data and others may choose to stay away from organizations that raise their suspicion of abuse of information and customers may feel alienated from an organization (Mollick, 2006) or from the online market space as a whole. Customers' risk perception has been documented in the early years of e-commerce as a primary obstacle to the future growth of online commerce (Culnan, 1998).

Organizational Procedures and Privacy Concerns

The impact of organizational practices driven by databases and computer networks on customers' increased concern for information privacy has been felt strongly in recent years in the context of organizational practices in the domain of electronic commerce between businesses and individual consumers (B2C). Because B2C requires sensitive information exchange over the open Internet infrastructure and uses information intensive strategies enabled by personalization technologies such as persistent cookies (Whitman, Perez and Beise, 2001) and target marketing tools, B2C vendors have evoked customers' and general public's fear of information privacy. Some researchers who studied invasion of privacy perceptions in the context of human resource information systems have focused on procedures used by organizations to acquire information from job applicants or employees, or the use of such information in making personnel decisions (Stone and Stone, 1990). Studies on organizational procedures such as authorization procedures, consequence of information release, target of release, advanced notice and purpose of request have been examined. The central finding of these studies is that organizations that act in a procedurally just manner will evoke fewer negative reactions from individuals than organizations that do not act in a procedurally just manner. For example, Stone and Stone (1990) finds, in the context of human resource information systems, that the lesser the perceived invasiveness of organizational actions, the greater the acceptance of such actions by job applicants or incumbents.

Greenberg (1990), among others, shows that procedural fairness is an important factor in determining people's reactions to organizational events. Regardless of the outcome of a decision, the individual who views procedures as fair will be happier with the decision than the individual who views procedures as unfair (Thibaut & Walker, 1975). As customers' moral intensity (Peslak, 2008) increases, they question if there is a red flag of immorality and unfairness in organizational privacy policies with regard to personal information (Liu and Arnett, 2002). The assumption underlying the current study is that when an organization allows customers to authorize disclosure of personal information (X1), select and restrict target of disclosure (X2), and empowers them to edit or delete information from their personal profiles (X3) over the Internet, customers will find such an organization's data handling procedure to be fair. Therefore, customers will consider the organization that follows such a fair procedure to be trustworthy (Y) of being the custodian of their private information.

The Research Question

The above discussion leads to the question—how do organizational policies regarding management of personal information about customers affect customers' perception of trustworthiness of an organization?

Coding the Policy Variables

Three procedural variables of interest in the present study, designed to answer the research question presented above, are: (1) *customers' ability to authorize* disclosure (X_1= 0,1); (2) customers' ability to target (X_2= 0,1) disclosure to an organization's internal (X_2 =0) or external (X_2 =1) parties; and (3) customers' ability to edit or de-

lete personal information (X_3= Ø,1). We experimentally investigate the effect of information privacy management policies of an organization of the Internet age on customers' perception of an organization's trustworthiness in handling personal data about customers (Y_1). Following the research model presented in Figure 1, each of the variables is defined, briefly described and theoretical literature that helps justify the hypothesized relationships is presented.

Table 1
Classification of Variable and Factor Level Combinations or Treatments (Ti)

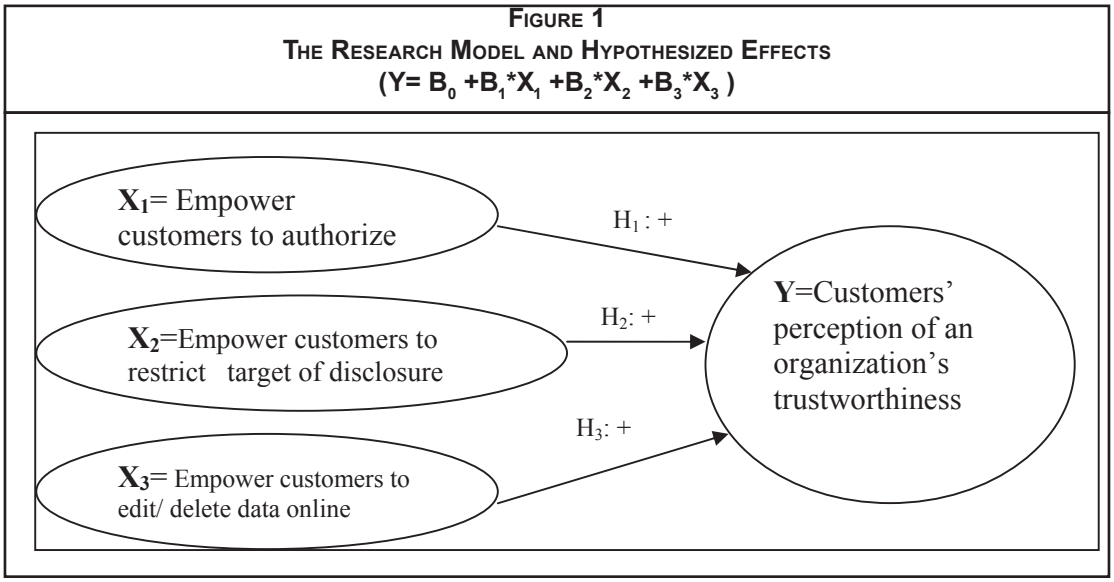
Policy Combination	X_1: Power to authorizing disclosure	X_2: Target of Disclosure	X_3: Power to Edit/ Delete?
T1	Yes	Internal	Yes
T2	Yes	External	Yes
T3	No	Internal	Yes
T4	No	External	Yes
T5	Yes	Internal	No
T6	Yes	External	No
T7	No	Internal	No
T8	No	External	No

Each factor level combination represents a category of organizations defined by a set of privacy policies. The subjects of the study rated these eight hypothetical organizations represented in Table 1 as T1 through T8. Subjects were instructed that these organizations were different only with regard to their privacy policies as specified in Table 1 and are assumed to be identical with regard to all other aspects that may influence customers' perception of an organization's trustworthiness.

Organizational Policy of Allowing Customers to Authorize Disclosure (X_1)

Ability to authorize the disclosure of information has been widely studied. These studies found that policies that require employee authorization prior to personal information release are perceived as less invasive of privacy than policies that do not require such authorization. Theoretical support for the importance of the ability to authorize disclosure in determining people's reactions is found in the streams of literature on organizational privacy and procedural fairness. An important determinant of invasion of privacy perceptions is the degree to which the subsequent release or disclosure of data is made with an employee's permission (Stone and Stone, 1990). It can be argued that what is true in the case of an employee will be even more true in the case of a customer who often has more freedom and power to switch to another business than does an employee. One of the elements of pri-

Figure 1
The Research Model and Hypothesized Effects
($Y= B_0 + B_1*X_1 + B_2*X_2 + B_3*X_3$)



vacy is one's ability to control information about oneself (Culnan, 1993). The ability to authorize disclosure allows the individual to maintain control over the information management process, which subsequently leads to a customer's perception of being in the hands of a trustworthy organization.

H_1: ($B_1>Ø$) Organizations that have policies that let customers have the ability to authorize before disclosure of personal information ($X_1 = 1$) will be perceived as more trustworthy than those that do not require authorization before disclosure ($X_1 = Ø$).

Organizational Policy Restricting Target of Disclosure (X_2)

Models of privacy (Stone & Stone, 199Ø) suggest that the target of disclosure is an important determinant of invasion of privacy. Information from a customer information system may be released to a variety of individuals. Supervisors, coworkers, marketers, branch offices, affiliates and strategic partners external to the company are all potential targets of information release. The recent increase in interconnectedness of organizations, enabled through Internet-based technologies, has made research on the effects of this variable salient. Specifically, with advancement and proliferation of databases and data sharing technologies, organizations are able to gather information about customers, store the information in electronic databases, easily access the information, and disseminate it worldwide with little or no effort. Theories of privacy (Stone & Stone, 199Ø) suggest that individuals will perceive the gathering of personal information to be less invasive of privacy when it will be subsequently disclosed to others within an organization than when it will be disclosed to others outside of an organization such as other companies, private investigators, mailing-list database companies and the like. There is a certain expectation that personal information will be properly used within an organization for decision-making purposes. That same expectation may not exist for the release of personal information outside of such an organization. Past studies showed that individuals felt more comfortable releasing personal information to their employing organization than to other types of organizations. These studies have been mostly in the context of human resource information systems. There has been no experimental examination of the relationship between organizational policy of allowing customers to restrict the target of disclosure and customers' perception of trustworthiness of an organization such as a university and its students in the Internet age. Findings of prior studies can be generalized and it can be argued that students will feel more comfortable releasing personal information to *their* university's internal employees than to outsiders. It seems reasonable to infer that customers would want personal information released to an organization to remain within that organization's boundary and control, and not be released to other, outside organizations. It can be argued that an organization that empowers customers to restrict the target of disclosure of personal information will be perceived as more trustworthy than an organization that does not empower customers to restrict target of disclosure.

H_2: (B2>Ø) Organizations that have policies that empower customers to restrict disclosure of personal information to parties inside the organization ($X_{2=}1$) will be perceived as more trustworthy than organizations that do not empower customers to do so ($X_{2=}Ø$).

Organizational Policy of Allowing Customers to Edit or Delete Information (X_3)

The theory behind allowing customers to edit or delete data in their personal profile or account is based on empowerment of people, letting individuals control their own information. Control has been identified as the central element of one's information privacy concern (Culnan, 1993). Literature search for this variable of control and empowerment is similar to the arguments presented to support variable X_2. The main logic is based on an organization's procedural fairness resulting from recognizing the concerns and rights of the person most at risk, and giving control to that person, and empowering the concerned customer to protect his or her own rights.

H_3: **(B_3>Ø)** Organizations that have policies that empower customers to edit or delete personal information over the Internet, (X_3 =1) will be perceived as more trustworthy than organizations whose policies do not require such delegation of power and control to the customer (X_3=Ø).

Method

Subjects in this study were students in the school of business who have the experience of being a customer in relation to an organization. Students are customers to the university they attend. Each of the eight cells labeled T1 through T8 in Table 1, represents a category of universities defined in terms of the three privacy policies they have adopted in managing students' personal information. Students were asked to give a score, on a multi-item scale between 1 and 7, as to how much they perceived each hypothetical university to be trustworthy in managing students' personal information.

Eight information management policies were generated according to the three independent variables used in this study. There were (2x2x2) eight privacy policy statements that each student read in a random order before evaluating each policy and giving a trustworthiness score to the organization that follows each specific policy. Subjects were told that only the researcher will have access to their data and no use will be made of the collected data except for the purpose of the research in which they volunteered to participate in exchange for some extra credit points.

Manipulation of Independent Variables

The manipulation of the independent variables occured through the description of information policies that were presented to the subjects. Examples of some of the manipulations are as follows.

Ability to authorize disclosure (X_1).

In the ability to authorize condition (X_1=1), the following policy was presented: "Your personal information will *not* be released without your prior consent. Your personal data will only be released once you have given prior consent for the release of your personal information." In the no ability to authorize condition (X_1=Ø), the following policy was presented: "Your personal information can be released without your prior consent. Your personal data will be released at the time of request. A list of requests will be maintained by the Dean's office, although you will not be informed of the requests on a regular basis. Once your information is stored in the computer database, it can be released without your prior approval."

Target of disclosure (X_2)

In the condition of empowering customers to restrict target of disclosure (X_2=1), the following policy was presented: "Your personal information will be available only to faculty members. The MBA Program Administrator will maintain the information that you have just provided to the computer database. Some faculty would like to have access to your information in order to track students in their concentrations. Your personal information will be provided to faculty for purposes of tracking your progress. Nobody outside of the University will have access to your personal information." In the condition of no empowering customers to restrict target of disclosure (X_2=Ø), the following policy was presented: " Your personal information will be available to faculty members and outside organizations. The MBA Program Administrator will maintain the information that you have just provided to the computer database. Some faculty would like to have access to your information in order to track students in their concentrations. Other organizations outside of the University would also like to have access to your information. For instance, credit agencies, potential employers, and insurance agencies often request information from the University. Your personal information will be provided to faculty members and outside organizations."

Edit-Delete Option (X_3).

The policy that has edit-delete option (X_3=1) was stated "You will have password-protected access to your data through the Internet, and you will be able to edit or delete your data when you want

to." The policy that does not have edit-delete option (X_3=Ø) was state "You will have password-protected access to your data through the Internet, but you will not be able to edit or delete your data when you want to. You have to come to the office in person or mail in a form requesting the office staff to edit or delete your personal data."

Measurement of the Dependent Variable

A 5-item instrument was used to measure the dependent variable trustworthiness (Y). Items in this instrument were borrowed and based on Stone et al (1983), Gulati (1995) and Chiles et al (1996). Since each item could range from 1 to 7, the summated scale value could range from 5 to 35.

Method of Analyses.

A multiple regression procedure was used to analyze the data and test hypotheses H_1, H_2 and H_3. Since the independent variables in the study are all dichotomous and the dependent variable was measured on a continuous scale, regression was considered a simple but appropriate technique for analyzing the data.

Results

Results of Manipulation checks

The manipulation checks on the three strategy variables were correct by 99%, 97.5% and 97.5% for the three policy variables X_1, X_2 and X_3, respectively. These numbers reflect that the subjects clearly understood the differences among the policy statements presented to them.

Results of Reliability Tests

Reliability of the scale used to measure the dependent variable perceived trustworthiness was assessed using Cronbach's alpha. Cronbach's alpha value of Ø.97 associated with the five items used to measure an organization's trustworthiness indicates that the scale has a very high reliability in measuring what it was supposed to measure. Inter-item correlation, reported in Table 2a, and item-total correlations, reported in Table 2b, were assessed to evaluate the internal validity of the five-item scale and conclude that each of the items reliably belong to the scale used to measure trustworthiness.

Table 2a
Inter-Item Correlation Matrix

	Trustworthy	Dependable	Reliable	Credible	I trust this entity
Trustworthy	1.ØØØ	.912	.863	.867	.842
Dependable	.912	1.ØØØ	.899	.868	.8Ø6
Reliable	.863	.899	1.ØØØ	.917	.81Ø
Credible	.867	.868	.917	1.ØØØ	.8ØØ
I trust this entity	.842	.8Ø6	.81Ø	.8ØØ	1.ØØØ
The covariance matrix is calculated and used in the analysis.					

Table 2b
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Trustworthy	16.57	48.292	.925	.874	.955
Dependable	16.52	49.4Ø5	.923	.881	.955
Reliable	16.48	5Ø.Ø8Ø	.925	.887	.956
Credible	16.48	49.589	.912	.864	.957
I trust this entity	16.96	47.372	.852	.738	.969

The covariance matrix is calculated and used in the analysis.

Test of Hypotheses

Results of regression analysis reported in Table 3 show that all three research hypotheses are supported by the data collected from the experiment. However, the p-values associated with each of the three beta coefficients indicate that the evidence is stronger for research hypothesis H1 and H2 than for H3. H1 and H2 are supported with one-tailed p-values less than .001 and hypothesis H3 is supported with a p-value of 0.0289.

Discussions

Theoretical implications

The results confirm hypothesized predictions that organizational policies related to seeking consent of individuals before releasing data about them will have implications for the trustworthiness of an organization. It also confirms that organizational policies concerning empowering customers to restrict target of disclosure of personal data affects an organization's perceived trustworthiness. The policy variable related to allowing customers to directly edit or delete information about them directly over the Internet shows to be significant, with a 1-tailed p-value of .0289, in influencing an organization's trustworthiness score in the minds of customers. These findings are consistent with a theory of power struggle among different organizational stakeholders (Jones, 1995) in the domain of information power. Since trustworthiness in the minds of customers can be a source of competitive advantage for organizations and trust reduces transaction costs, agency costs and risk perceptions organizations have an incentive to attempt to earn and maintain high score on perceived trustworthiness in the minds of customers. Earned trust will allow organizations to realize the competitive advantages that

Table 3
Regression Output and results of tests of hypotheses

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.6190
R2	0.3832
Adjusted R2	0.3800
Standard Error	6.8571
Observations	600

y-hat=12.67+8.38*S1+6.70*S2+1.06*S3

ANOVA

	df	SS	MS	F	Significance
Regression	3	17406.78	5802.26	123.40	0.00000
Residual	596	28023.72	47.02		
Total	599	45430.50			

	Coefficients	Standard Error	t Stat	P-value (1-tailed)	Ho	Ha	Conclusion
Intercept	12.67	0.5627	22.52	0.0000			
S1	8.38	0.5599	14.97	0.0000	$\beta 1 \leq 0$	$\beta 1 > 0$	Ha1 supported
S2	6.70	0.5599	11.97	0.0000	$\beta 2 \leq 0$	$\beta 2 > 0$	Ha1 supported
S3	1.06	0.5599	1.90	0.0289	$\beta 3 \leq 0$	$\beta 3 > 0$	Ha1 supported

can be realized from cooperative exchanges that can be facilitated by information resources.

Practical Implications

Findings of this study have implications for managers of information systems, regulatory agencies that control data sharing practices of organizations, consumers and consumer rights groups. Managers can improve trustworthiness score for their organizations in the domain of informational custodianship by seeking customers' informed consent and authorization before releasing data about them. Managers can also improve trustworthiness of an organization and by restricting the targets to whom data are released or the parties who are granted access privileges to customer data. Data should not be shared with outside parties except with explicit and specific authorizations of customers. Giving more power and control to customers over their personal information stored in organizational databases, by allowing them to access and edit or delete data about them, is a policy that will help an organization improve its trustworthiness in the minds of customers.

Limitations

The limitations of the study include the artificiality of the experimental condition in which subjects are asked to evaluate hypothetical universities. Universities and students have a specific type of relationship. Another limitation is that what may be true about the relationship between universities and students may not be true in relationships that exist between other types of organizations and their customers. The fact that we used a within-subjects design where each subject had to evaluate all eight policies may have influenced students' mental states and the scores they gave to each hypothetical organization. Randomization of the order of presentation of the policies was used to evenly distribute any order effects. As with all experimental studies, this study has high internal validity but low external validity.

Future Study

Future studies can attempt to identify other organizational policy variables that may influence organizational trustworthiness. The effects of the three policy variables that have been used in this study can be tested on other dependent variables such as perceived customer-orientation of an organization, willingness to transact with an organization, willingness to bring law suits against an organization and other justifiable variables related to information-intensive exchange relations between organizations and individuals. How trustworthiness is perceived differently in the domain of personal information management practices across national and cultural boundaries can be studied by incorporating variables related to nationality and culture of individuals.

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An Exploratory Study of Web Use by the Golf Course Industry

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ABSTRACT

Despite golf industry's size and economic importance comparatively little empirical academic research has been published. As part of a larger study aimed at investigating the web-based marketing and operations aspects of country/golf clubs and their effectiveness involving a representative sample of over 1100 golf clubs in the United States, we sampled all such clubs in the state of Kentucky. In this paper, we present our preliminary findings. Our study of Kentucky golf clubs indicates that while a large majority of them have some sort of web presence in most cases the websites play a mainly promotional/informational role. Few of them take advantage of the many marketing and operational opportunities offered by appropriately designed and operated websites that can help them to gain and sustain competitive advantage. We strongly suspect that the results obtained for Kentucky are very likely to be confirmed by our comprehensive nationwide study.

Introduction and Literature Review

Since the game of golf arrived in the United States in the last quarter of the nineteenth century it has been subject to driving forces such as decentralization, the growth of the middle class, war, economic depression, suburbanization, the growing role of the federal government, the information/knowledge economy, and the internet revolution (Napton, & Laingen, 2008). As of this writing, approximately 16,000 golf courses serve 25 million Americans who play golf each year. The total number of golfers has witnessed some decline over the past two decades while the number of golf courses has dramatically increased. Thus there has been increasing competition to attract golfers to individual clubs and additional pressure on managers to formulate consumer-oriented strategies to retain those customers (Petrick et al., 2001).

Under these circumstances websites assume an enormous potential in selling and facilitating the total golf experience. Appropriately designed and operated websites that enable players to set tee times, reserve carts, buy golf equipment from pro-shops, etc. online would be very attractive to potential customers.

The study and analysis of motivations has proven to be a useful tool in designing attractive services for customers (Prentice, 1993, Staurowsky, et al., 1996). Research indicates that outdoor recreationists' participation is often motivated by different factors (Prentice, 1993). The identification of factors which restrict golfers from participation as often as they like is also very useful to golf course managers (Petrick, et al., 2001). Analysis and understanding of such restraining factors are often considered important in formulation and implementation of management and marketing strategies (Jackson, 1994, McGuire & O'Leary, 1992).

Kotler, et al., (1996) suggests that for leisure service marketing efforts to be successful they should be concentrated on specific groups. Various attempts at segmentation of golfers have been based on lifestyle (Gray, 1982), profile conjoint analysis (Toy, Rager, & Guadagnola (1984), Schreyer, et al.,1989), loyalty (Backman, 1991),

demographics (PGA, 1996), and attachment (Petrick, et al., 1998). In order to identify distinct segments of users by investigating their past behavior and experience levels Williams, et al., (1990) made use of Experience Use History or EUH that was originally developed by Schreyer, et al., (1984). In their study of river trips Williams, et al., (1990) created a six-category measure to represent previous participation. The six categories were Novices, Beginners, Collectors, Locals, Visitors, and Veterans. Petrick, et al., (2001) used EUH as a tool to investigate differences in golfers' motivation and constraints to participation. Based on their study they suggested specific promotion and advertising strategies to target golfers in each of the six modified categories of Infrequents, Loyal-Infrequents, Collectors, Locals, Visitors, and Veterans.

Petrick, et al. (2001) indicate that the largest segment in their study, Visitors, should respond best to marketing efforts that emphasize golf as an elitist sport and at the same time offer special rates on tee times that generally go unfilled. Their results also show that more frequent players, that is: Visitors, Veterans, and Collectors are more likely to be enticed by marketing efforts that stress competition compared Infrequents, Loyal-Infrequents, and Locals, while Collectors specifically tend to find lower prices and value most attractive. They also indicate that Locals are more likely to respond best to advertising in local media. Finally they suggest that promotions for weekend or after work play would be most welcome by Loyal-Infrequents.

Conceptual Framework and Methodology

The purpose of this study is to identify the level of web utilization as a promotional, marketing, and/or operational tool that currently exists in the golf/country club industry. The Professional Golfers' Association of America, in their Merchandising and Inventory Management Training Manual (2000), indicated that "the Internet is the fastest growing promotional vehicle ... and that many golf facilities have their own websites." Yet Berman and Evans (2007) indicated that at a time when customer service expectations are high; some retailers remain unsure what to do with the Web. "They are still grappling with the emphasis to place on image enhancement, customer information and feedback, and sales transactions." In keeping with this line of thought, it is the objective of this research to determine:

1. the number of golf courses that have a website;
2. the number of golf course websites that are informational/promotional only;
3. the number of golf course websites that are comprehensive marketing sites;
4. the number of golf course websites that are geared to business operations (i.e., setting "tee times", reserving golf cars or a caddy, reserving driving range times, scheduling lessons, registering for club tournaments, or purchasing golf shop merchandise, such as golf attire, golf clubs, or other equipment.)

The focus of this study is directed toward golf course operations in the state of Kentucky. An observation approach was used to determine website availability and the purposes for which they could be used. A complete enumeration of the population was used for this study. The population came from the 2008 Kentucky Section of PGA, Member and Apprentice Roster and included 223 observations. Using the directory, the researchers attempted to access the club's website to determine whether one existed or not. After finding the website, an attempt was made to determine whether the website was interactive or simply an information/promotional one-way site. If the website was interactive, an attempt to observe the operational nature of the site was made. A limitation of this study was that it used only a population of one state in the United States which is at least geographically limiting.

Data Analysis and Results

A simple frequency distribution was used to analyze the observations of the population. It was found that of the total population (223) studied only 102 (46%) of the courses observed had a website available. Of the 102 golf courses with websites, twenty of the golf course websites (9%)

were found to be interactive. The interactive sites were either operational (10 sites) allowing customers to make tee-times, reserve golf cars, purchase merchandise, etc. or they were informational (10 sites) allowing visitors to navigate the site accessing course information or promotions. Of the golf courses with a website, ninety-three (91%) courses had a website that was an informational/promotional site. Most of these websites were fixed (one-way) and did not allow for customer interaction.

Summary and Conclusions

This study of website utilization by the golf course industry revealed that less than half the golf courses in the state make use of the Web for either marketing or operational purposes, and of those using the Web most used it to provide course information with one-way applications. This supports the observation provided by Berman and Evans (2007) that some retailers (golf course industry) remain unsure what to do with the Web.

It also indicates that even with the promotion of the internet by the PGA (2000) as the fastest growing promotional tool, Web use has not grown as quickly as expected. One would expect that with the growth of electronic technology in the United States being as dynamic as it is currently, the golf course industry would be embracing Web technology as a valuable marketing and operational asset. It is expected that a study sample including golf courses throughout the United States will reveal similar results.

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Does Size Really Matter? What about Other Project Characteristics?

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ABSTRACT

Scope creep is the growth of the scope of a project's requirements beyond those originally intended. Information technology projects, in particular, suffer scope creep. One comment from an IT project manager about this research acknowledged the prevalence of scope creep, noting the paucity of solutions. While many researchers have looked at surveys of various people involved in or with IT projects, the goal of this research is rather to explore scope creep based on project characteristics: using regression analysis to create a model for scope creep for software projects. The results of the regression analysis should help to better understand not only scope creep, but also the influence of some project characteristics on scope creep.

Introduction

Information technology projects are plagued by scope creep. It is an ongoing problem that also affects software projects (a subset of IT projects). The persistence of scope creep in IT projects is problematic because it is difficult to complete a project on-time or within budget if the software's functionality continues to expand. It is hard to provide increased functionality without using more resources. Additionally, given the difficulties of evaluating IT projects, including their costs, benefits (potential and realized), and overall success or lack thereof; the potential that scope creep may impact any or all of these dimensions only increases the challenge. Should the estimation of a project's cost include a provision for the expenses that may result from scope creep? If so, how much expense should be so allocated? When one considers the potential benefits of a project, how should scope creep be treated? Does scope creep pull resources or use them in a non-optimal way for firms? Answers to these nagging questions are beyond the scope of this research. The questions, however, illustrate the importance of scope creep.

Prior Research

According to the Wideman Comparative Glossary of Common Project Management Terms (v3.1), Scope Creep is defined as "[o]n-going requirements increase without corresponding adjustment of approved cost and schedule allowances. As some projects progress, especially through the definition and development phases, requirements tend to change incrementally, causing the project manager to add to the project's mission or objectives without getting a corresponding increase in the time and budget allowances" (Wideman, 2008). Wideman's definition helps to clarify the term, but the concept is familiar to project managers and IT professionals. Indeed, runaway projects, and the difficulty of their management (or mismanagement) is a central focus of project success generally. Scope Creep is a primary contributor to some of the most notorious project failures (Nelson, 2007). This is particularly true in IT projects, where "the average project experiences about a +25% change in requirements over its lifetime" (Nelson, 2007). Given its negative potential, it comes as no surprise that numerous articles, books, blogs and wiki have explored the concept of Scope Creep.

One reason that scope creep remains so elusive is that it is inextricably linked with the natural evolution of a project's implementation. The reality of a project's implementation can distort its original vision. Projects fail to meet deadlines, eclipse their original budget, and frequently change in terms of direction and organizational enthusiasm. It can be difficult to recognize what is scope creep and what is distortion. Perhaps for this reason, focused concerns such as scope creep are sometimes ignored or subsumed into purely financial measures of project success (Irani, et al., 2005). The determination and limitation of prospective project features remains a great challenge (Yadav, et al., 2009; Crowston and Kammerer, 1998).

To avoid scope creep, the original project's scope and the fundamental parameters of that scope must be identified, but the critical parameters of any project can prove difficult to identify or isolate. Researchers continue to attempt to define the relevant critical success factors for project success. Nelson proposes a model of three process-related criteria: (1) Time, (2) Cost, (3) Product; and three outcome-related criteria: (4) Use, (5) Learning, and (6) Value (Nelson, 2005). Alternatively, Keil, Tiwana, and Bush (2002) describe 23 distinct risk factors which might imperil a given project, as identified by a Delphi study of users and project managers. Project managers identified "misunderstanding the requirements" as their second most significant risk factor, "unclear/misunderstood scope/objectives" as their ninth most significant risk factor, "changing scope/objectives" as their tenth most significant risk factor, and "introduction of new technology" as their twelfth most significant risk factor. Users identified "misunderstanding the requirements" as their sixth most significant risk factor, and "changing scope/objectives" as their twelfth most significant risk factor (Keil, et al, 2002). Thus it seems that while scope creep is a recognized problem, its significance in project distortion may be under-represented in the minds of some project managers and in the corporate cultures of some organizations. Given the difficulty in assessing the success of IT projects that the literature suggests (Gable, et al., 2008), this lack of emphasis can be more easily understood.

Failure to identify and properly characterize the relevant factors will inhibit or diminish project success, and may lead to unexpected and undesired investments of money, time, scope, and organizational focus. The problem is particularly profound in IT projects and software development (Keil, et al., 2003; Zmud, 1980), where runaway projects are well-known and sometimes notorious, but have received surprisingly "little attention from information systems researchers." (Keil, et al., 1994). "Although runaway projects are eventually terminated or significantly redirected, anecdotal data suggest that many of these projects are allowed to continue for too long before appropriate action is taken" (Keil, et al., 1994). De-escalation, defined as "the reversal of escalating commitment to failing courses of action, either through project termination or redirection" (Keil and Robey, 1999), has been addressed in the project success literature in only a limited fashion (Mahring, et al., 2008).

Nelson surveyed 13,522 IT projects, finding that nearly two-thirds suffered from limited or total failure (Nelson, 2005). Philbin states that "increased complexity, together with the non-linear nature of technology-based projects and the tighter connectivity between subsystems, is leading to a greater risk attached to the delivery of projects and programs" (Philbin, 2008). Given the realities of potential project failure, or the mitigated success of bloated projects (Nelson, 2005), an approach to identify scope creep is clearly very important. Monitoring an ongoing project is both challenging and essential (Njaa, 2008). While many variables are certainly involved, some specific factors have been recognized as influencing the evolution and success of a project (Barki, et al., 2005). Among these are the size of the project, and the experience of the project team (McFarlan, 1981). Other recognized factors are technical newness, application newness, and novelty of application (Barki, et al, 2005).

While not explicit, it seems reasonable to assume that certain organizations and industries are more fundamentally likely to possess relevant experience in the development of a given project than other organizations or industries might

possess. The relevance of industry has long been recognized. Specifically addressed as to their impact on project definition and success are industry structure, competitive strategy, and industry position (Batiste and Jung, 1984; Rockart, 1979).

While scope creep can sometimes be recognized and minimized, it can also contribute to runaway projects. Two possible explanations for the prevalence of runaway projects can be found in Self-Justification Theory, and Prospect Theory. The former suggests that rationalization may play a part in the continued support for a project despite adverse feedback. The latter suggests persons may be willing to continue to invest resources in a poorly-performing project, because the cost of complete and utter failure seems higher than that of continued investment (Keil, et al, 1994). Moreover, a phenomenon known as the "Mum Effect" describes the reluctance of a project member to discuss ongoing or potential problems (Park, et al., 2008). Given the reality of these human dimensions, scope creep seems unlikely to go away. Useful tools to identify the elements most likely to contribute to scope creep remain very important.

Initial Scope Creep Model and Methodology

While previous authors have looked at IT projects and software projects, this research sought to better understand the impact of project characteristics on scope creep. We used regression analysis to explore scope creep in actual projects using self-reported data that belongs to the International Software Benchmarking Standards Group. The authors wish to thank the International Software Benchmarking Standards Group for the use of their data. The data used in the regression analysis included 371 software projects. These projects range across a variety of industries and types of software projects. The project characteristics include both factors that are discretionary, and also others that cannot be changed. For example, an organization can choose to execute a project internally, or to hire someone else to do the project externally. Does this choice impact scope creep? That is one question we examined. An organization in a given industry (excluding the IT services industry) would only undertake projects for their own organizational goals. For example, a bank would likely only make use of banking or banking-related IT projects. Does industry influence scope creep? The authors explored this question as well.

We applied regression analysis to identify a model for scope creep given the modeled characteristics of software projects. The model uses scope creep as the dependent variable. In our model, scope creep is operationalized as added functional points, i.e. functional points added to the project are our measure of scope creep. The independent variables that are used for the model are: (1) size of the project, (2) requirements analysis, (3) extent of newness or change of the project, and (4) industry. In our model, size is operationalized as Adjusted Function Points in the project. It seems likely that the larger a project is, the harder scope creep will be to control. After all, as project size grows the marginal change for adding a few function points may seem relatively small. Also, if larger projects are harder to manage (as we would expect), then it should be harder to stop increasing their scope.

Requirements analysis is the state of system development where services and resources required to support selected objectives are clearly identified (Hoffer, et al., 1999; Nelson, 2007; Yadav, et al., 2009). The project success literature supports the proposition that this identification is crucial to project success, particularly in a turbulent environment (Battin, et al., 2003; Yadav, et al, 2009). Project failure has been attributed to "poor requirements determination" (Nelson, 2007). Mathiassen, et al. reinforces the significance of requirements development by elaborating three Requirement Development Risks: (1) Requirements Identity, (2) Requirements Volatility, and (3) Requirements Complexity (Mathiassen, et al., 2007). Requirements analysis is hypothesized to be a significant variable in our scope creep model. For this model, requirements analysis is measured as the percent of work effort that was used to determine requirements.

The newness or change of the project is the classification of a project as an enhancement, a re-

development, or a new development. These classifications were hypothesized to be significant because the extent of change or newness should impact scope creep. A project that is an enhancement or re-development would include current knowledge about the project and the related functionality. An organization that undertakes a project to change something that already exists ought to involve people with knowledge about the project area/domain which should result in a better understanding of the needs for the project prior to undertaking the project. A new development project should have more potential for additional functionality over the course of the project and less organizational knowledge about the project area.

The industry of the firm undertaking a software project was hypothesized to be significant, with variation by given industry. Industries with greater information needs and industry infrastructure needs should have more experience with IT projects. This increased experience with IT projects, along with greater IT resources already in place, should result in less potential for scope creep. Industries with less familiarity or sophistication in IT project development are more likely to outsource their project needs, creating further potential for scope creep due to the potential lack of domain knowledge of the development team (Dibbern, et al., 2008; Gefen, et al., 2008). While Nath concludes that the quality of off-shore project development may be equivalent to local development, the author also notes that more research is needed (Nath, 2008). Relevant domain knowledge is also recognized in the literature as a benefit to project development (He and King, 2008).

In the data we are using, industry is self-reported. For example, finance is an industry that is very information intensive and requires intensive information infrastructure. The authors hypothesized that finance projects would be less likely to suffer scope creep because of the extensive use of IT resources and experience with IT. If this is not the case, an alternate explanation might be that people in industries with greater IT resources may be more inclined to want and ask for more functionalities in projects. Other industries may be more likely to suffer scope creep in their projects. Government entities are widely thought of as inefficient, and many examples exist of government IT projects that have failed. The IRS provides an example as does the Denver Airport (Montealegre and Keil, 2000; Nelson and Ravichandran, 2004). The authors hypothesized that government projects would be more likely to suffer scope creep.

Results

After applying regression analysis to our data set, we found that our initial model was significant. Our F-value of 172.64 is significant. Our initial model resulted in an adjusted R^2 value 0.836. While we found our model to be successful, not all of our independent variables were significant. The independent variables that were not significant included the various industries, the classification of the project as internal or external, and requirements analysis. The industries were Utilities, Manufacturing, Finance and Banking, Government, Communications, and Insurance. The lack of significance of the industry variables suprised us for the reasons described above. Finding that requirements analysis was not significant also came as a suprise given the findings in the prior literature. The significant variables are shown in the Model 1 below.

Model 1
Significant Independent Variables

Variable	B	Std. Error	t	Significance
Size	0.676	0.017	38.970	0.05, 0.01
New Development	193.616	42.445	4.562	0.05, 0.01
Re-Development	366.985	110.241	3.329	0.05, 0.01

Our curiosity regarding our results led us to consider two additional models. In the second model we used the percentage of scope creep for our dependent variable. The purpose of this change was to explore whether size would still be significant if scope creep were measured as a percentage of the size of the project, rather than as the number of added functional points. Linear regression through the origin was used instead of linear regression with a constant. The reason for this change was to include in our independent variables all three types of projects: new developments, re-developments, and enhancements.

The second model we analyzed included the following independent variables: Size, Internal, Requirements Analysis, New Development, Redevelopment, Enhancement, Utilities, Manufacturing, Finance and Banking, Government, Communications, and Insurance. The F-value for our second model was calculated to be 117.231. The adjusted R^2 was Ø.789. In the second model, size was no longer significant and was now negatively signed. This result contradicts the prior research and counters the idea that larger projects are more likely to have scope creep problems. Internal versus external continued to be non-significant. Requirements analysis also remained non-significant. Utilities and communications were non-significant. Government as an industry was not significant. The significant independent variables are in Model 2 below.

Our third model also used percentage of scope creep as our dependent variable. Again we used linear regression through the mean (i.e., no constant term) for the same reasons as given for the second model. Our third model used Size, Internal versus External, Requirements Analysis, New Development, Redevelopment, and Enhancement for the independent variables. The mixed results for the significance of the various industries led us to experiment with what would happen if industry were excluded from the model. This third model had an F-value of 218.11 and an adjusted R^2 of Ø.777. In this model, only size was non-significant. The significant independent variables are presented in Model 3 below.

It is clear from all three models that the extents of change of the project (New Development, Redevelopment, and Enhancement) are highly significant variables for understanding scope creep. We found it interesting that all three have positively signed coefficients, given that we anticipated that enhancement projects would be negatively signed. The coefficient for enhancement projects is lower than the coefficients for new develop-

Model 2
Significant Independent Variables

Variable	B	Std. Error	t	Significance
Manufacturing	21.957	11.445	Ø.Ø5	Ø.1Ø
Finance and Banking	16.6Ø4	7.Ø51	2.36	Ø.Ø5
Insurance	24.3Ø6	7.761	3.13	Ø.Ø5, Ø.Ø1
New Development	8Ø.916	6.774	11.95	Ø.Ø5, Ø.Ø1
Redevelopment	94.273	13.Ø53	7.22	Ø.Ø5, Ø.Ø1
Enhancement	37.911	7.523	5.Ø4	Ø.Ø5, Ø.Ø1

Model 3
Significant Independent Variables

Variable	B	Std. Error	t	Significance
Internal versus External	1Ø.463	3.887	2.69	Ø.Ø5, Ø.Ø1
Requirements Analysis	Ø.Ø95	Ø.Ø57	1.67	Ø.1
New Development	77.239	4.313	17.91	Ø.Ø5, Ø.Ø1
Redevelopment	83.216	11.183	7.44	Ø.Ø5, Ø.Ø1
Enhancement	37.1Ø9	3.918	9.47	Ø.Ø5, Ø.Ø1

ments and redevelopments, which suggests that there is a difference in the magnitude, if not the sign.

The impact of size on scope creep appears to depend on how scope creep is measured. Interestingly, although size was not significant in models two or three, the sign of the coefficient changes to become negative when scope creep is operationalized as scope creep percentage. We constructed an additional model using scope creep (not as a percentage) as the dependent variable, and using only size as the independent variable. In that model, the adjusted R^2 was only slightly lower than that for the three other models. This final model compares with the first model we analyzed - in which size was also significant.

The independent variables requirements analysis and internal versus external varied in significance based on the models used. We found it interesting that the initial model did not indicate that these factors would significantly impact scope creep. A review of prior research supported our anticipated hypotheses that these variables would be significant. Prior to our analysis of the various models, we expected to find that requirements analysis would have a significant negative impact on scope creep. In the only model where requirements analysis was significant, the coefficient was positively-signed.

The industry independent variables were only significant when scope creep was measured as a percent. In the two models incorporating industries, the signs of the coefficients were mixed - and not necessarily as we anticipated. In both models with industry, government projects were not significant but did have negatively-signed coefficents. This contradicts some prior works. It does seem worth discussing given that some works suggest that government projects may be more prone to failure.

Conclusions

This work applied regression analysis to several models for scope creep in software projects. The goal of the research was to explore the impact of the independent variables on scope creep. While our results were mixed for the models (except for extent of change of the project), our results contribute to the understanding of scope creep and how some of the project characteristics impact scope creep. Our results can be used by practitioners to encourage awareness of how these factors can increase the risk of scope creep for certain software projects.

While our results were mixed, perhaps they also reflect some of the complexity faced by industry in trying to manage or avoid scope creep. While our results contribute to the understanding of software projects, they do not provide a simple answer to this difficult question.

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Examining the Stability of the Psychological Contract: A Confirmatory Factor Analytic Approach

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ABSTRACT

The psychological contract relates to the social and economic exchange relationship between the employee and the organization (Argyris, 1960; Schein, 1965). Rousseau (1990) developed a new measure consisting of employee and employer obligations of the psychological contract. Robinson, Kraatz and Rousseau (1994) employed Rousseau's measures in a survey of graduating MBA students just prior to graduation and entry into their employing organizations and after two years of employment. They conducted item level t-tests of changes in employee perceptions of the psychological contract across two time periods. The purpose of this research was to extend the work of Robinson et al., by utilizing covariance structure analysis in order to assess the stability of the four subscales included in the measures of the psychological contract. Data for the study were taken from the item level correlation matrix of the Robinson et al., study. Empirical analyses with LISREL indicated that three of the four subscales (perceived employee obligations) used to measure the psychological contract were relatively absent of significant beta and gamma changes.

Assessing the Changing Psychological Contract

The relationship between employees and their organizations has often been described as an exchange relationship (Mowday, Porter, & Steers, 1982). Historically, there have been two types of exchange proposed in the literature, including economic and social exchange (Blau, 1964). Economic exchange focuses on explicit monetary exchanges (employee effort for merit pay), whereas social exchange tends to be more open-ended and based on trust (employee loyalty for job security). An important element of the exchange relationship is the sense of underlying obligation which may develop, particularly when the relationship is predominantly based on social exchange (Blau, 1964, Rousseau, 1989). Without a sense of obligation, there would be little basis for reciprocity unless formally required in the employment contract. Although some obligations in the employment relationship can be created via formal contracts, many employment obligations are not communicated explicitly (Shore & Tetrick, 1994).

Until recently, the applied psychology and management literatures have given little attention to the employee's beliefs and perceptions of the obligations underlying the employment relationship (Robinson, Kraatz, & Rousseau, 1994). In an effort to fill that void, Rousseau (1990) developed a measure of the psychological contract which asks employees for perceptions of the organization's obligations to them (e.g., promotion, high pay) as well as their own obligations to the organization (e.g., working overtime, loyalty). As yet, limited research has been conducted utilizing this scale (Barksdale & Shore, 1993; Robinson et al., 1994). Prior to a proliferation of research based on Rousseau's scale, it is important to examine the measurement properties of the scale. Thus, the purpose of this study was to examine the measurement stability of the employee and employer obligations scale.

Schein (1965) described the psychological contract as the depiction of the exchange relationship between the individual employee and the organization. Likewise, Rousseau (1989) defined the psychological contract as referring to "an individual's beliefs regarding the terms and conditions of a reciprocal agreement between the fo-

cal person and another party" (p. 123). In this exchange, the organization agrees to do certain things for the employee, such as provide status, job security, and reasonable job requirements, while the employee reciprocates through hard work and reasonable attitudes toward the organization. It is the fulfillment of the agreement by one party that creates an obligation to the other party to reciprocate.

The psychological contract (Argyris, 196Ø; Rousseau, 1989; Schein, 1965) incorporates elements of both economic and social exchange when describing the employment relationship. In their conceptual development of the psychological contract, Rousseau and her colleagues (Parks, 1992; Rousseau, 1989; Rousseau & Parks, 1993) drew on work by MacNeil (1985) to distinguish between two forms of the psychological contract, called transactional and relational obligations. They linked the former type of contract with economic exchange and the latter type of contract with social exchange. Transactional contracts tend to be of short and specific duration where the focus is on pecuniary benefits. Relational contracts are typically open-ended and long-term and may focus on both pecuniary and non-pecuniary benefits.

Several studies have examined the underlying factor structure of Rousseau's (199Ø) psychological contract scale (Barksdale & Shore, 1993; Robinson et al., 1994; Rousseau & Tijoriwala, 1998) but none have approached the stability of the measures across time. Robinson et al., provided evidence via exploratory factor analysis that the psychological contract measure represented four constructs; employee transactional and relational obligations, and employer transactional and relational obligations. Barksdale and Shore utilized confirmatory factor analysis to confirm the factor structure of the employee and employer obligations scales identified by Robinson et al. (1994). Although several items contained high levels of measurement error, they found the measures to reflect four correlated factors.

Of particular interest to researchers studying the psychological contract is how the employee forms perceptions underlying the psychological contract at organizational entry. Likewise, it is critical to understand how employees change their perceptions of the psychological contract given sufficient information once they have entered the organization. Robinson et al., (1994) collected data of initial employee perceptions of the psychological contract, and subsequent perceptions 2 years later. In addition, Robinson et al., examined the extent to which employees viewed the contract as being violated through actions of the employer. The procedure followed by Robinson et al., (1994) to examine the changing psychological contract was to empirically test mean change in item scores from Time 1 to Time 2 with univariate t-tests. They noted their substantive interest was in the mean change in individual items composing the contract, as opposed to mean changes in the four subscales of the perceived obligations measures. Nine of 15 items were found to have significant changes across time periods. Their treatment of individual items assumed that each item in the psychological contract measures reflected an independent construct of interest. Given their substantial efforts to establish construct validity of Rousseau's (199Ø) measure via factor analysis, it seems reasonable to support their study with an assessment of the changes in the psychological contract at the subscale level of analysis. Thus, the purpose of this study was to examine the stability of measurement of the psychological contract through the use of LISREL VII covariance structure analysis which allows for an evaluation of measurement equivalence across different time periods or different groups.

Measurement equivalence

Recent research by Schaubroeck and Green (1987) and Vandenberg and Self (1993) have outlined in detail the processes of measurement equivalence. In particular, there are three types of changes in psychological measurement that are of interest. Alpha changes represent true change in mean level of a given construct from one time period to the next. Assessment of this change assumes a constantly calibrated instrument and a constant conceptual domain. Beta change occurs when the subjects conceptually recalibrate the anchors of the measurement instrument. In other words, a 5 (on a 5 point Likert scale) may come

to represent a 4 in later administrations of the instrument. In this case, a change in the mean value of a measure from one time period to the next could conceivably be meaningless. Gamma change occurs when the subject re-conceptualizes the construct such that the construct measured at Time 2 is conceptually different than at Time 1. In this case, mean changes in the level of the construct are meaningless because the constructs being compared are different. Covariance structure analysis allows the researcher to assess the extent to which beta and gamma changes are present in a given instrument. When either of these changes is present, interpretation of alpha change (true change in mean levels) becomes impossible.

Method

Sample

The data for this study were the 96 MBA students in the Robinson et al., (1994) study. Briefly, Robinson et al., administered a survey containing the psychological contract measures to 260 MBA students upon graduation and entry into their first jobs. The second survey was administered two years after the initial survey. Of the two surveys, 96 subjects who had remained with the same employer were present in both samples and thus, the sample size for this study was 96.

Measures

The psychological contract was represented by the measures developed by Rousseau (1990). Employer obligations (what the employee feels the organization is obligated to provide the employee) has two subscales - transactional, measured by 3 items and relational obligations, measured by 4 items. Employee obligations (what the employee feels he or she is obligated to provide the organization) also has two subscales - transactional, measured by 5 items and relational measured by 3 items. The question stem for perceived employee obligations read: "To what extent do you feel obligated to give your organization the following?" The stem for perceived employer obligations read: "To what extent do you feel your organization is obligated to give you the following?" All responses for the psychological contract items were made with a 5 point Likert scale (1=not at all; 5=to a very large extent). Subscale reliability analysis was not provided by Robinson et al.

Procedure

The item level correlation matrix and standard deviations from the Robinson et al., (1994) study were used to develop input covariance matrices for all subsequent analyses in this study. The PC version of LISREL was used to analyze the factor structure of the employee and employer obligations measure. The goodness of fit of models was evaluated with several indices including the chi-square (χ^2) goodness of fit test, goodness of fit index (GFI), Tucker-Lewis index (TLI: Tucker & Lewis, 1973), normed fit index (NFI; Bentler & Bonett, 1980) adjusted by Bollen (1989). The analyses proceeded in 4 steps. First, we conducted an analysis of the homogeneity of the covariance matrix for each subscale of the measures. For this analysis, the multi-sample feature of LISREL was utilized. This analysis requires a "stacked" input file with the first matrix being the Time 1 covariance matrix for items composing the measure of interest and the second matrix being the Time 2 covariance matrix. The hypothesis being tested is simply whether the covariance matrix from T1 and T2 are homogeneous ($\Sigma_1 = \Sigma_2$). Since beta changes (like alpha changes) assume a constant conceptual domain, the next step in the analysis was to assess the extent to which gamma changes were present in the data. The reason for this is that, strictly speaking, when gamma changes are present, analyses should cease, because the measure in question has been reconstituted by the subjects to the point that interpretations of changes across time are meaningless. Gamma changes are assessed by testing whether or not the number of common factors is the same from one time period to the next. In this study, each subscale was a single factor, thus the models were estimated by specifying a single factor at each time period. A model was run in which the covariance matrix was composed of the measures within subscale, across time periods. The model specified two correlated factors with no remaining parameters constrained. A second test of

gamma change is whether the factor covariances are equal. Given this study was dealing only with two time periods, the model only provides a single factor covariance (T1 to T2), thus this form of gamma change was not estimable.

Given the absence of significant gamma changes, we sought to identify beta change in the last step in the analysis. Assessing beta change is done in two steps. The first step is conducted by specifying equal factor variances. This step was conducted by constraining the diagonal of PSI (Ψ) to be equal across factors. The second step is conducted by specifying equality constraints on the factor loadings in addition to factor variances. This step was conducted by additionally constraining the corresponding factor loadings to be equal. In a model where the subscale had three indicators this implies that λ_{y11} and λ_{y42}, λ_{y21} and λ_{y52} , λ_{y31} and $\lambda_{y62,}$ respectively, were constrained to be equal.

Results

The means, standard deviations, and correlations for the measures in this study are in available in Robinson et al., (1994). The stem and items are presented in the appendix to this paper. Table 1 contains the item level alpha Table 2 contains the results of the LISREL analysis. The test for equality of the covariance matrices suggested the lack of equality from T1 to T2 (χ_2=23.78[6]; p<.001). Thus, the covariance among items has changed across measurement time periods. Model 1 reflects the extent to which gamma changes were found in the subscale. These results (χ_2[8]=9.26; GFI=.969; NFI=.989; TLI=.971; p<.321) suggest the absence of significant gamma change, thus we can conclude that the single factor structure holds across time in this sample. Model 2 reflects the extent to which beta change occurred across time periods by constraining factor variances to be equal. The results (χ_2[9]=14.81; GFI=.954; NFI=.952; TLI=.915; p<.096) suggest that the factor variances are indeed similar across time periods. Model 3 reflects the extent to which beta change occurred by further restricting the factor loadings to be equal across time periods. The results (χ_2[11]=15.70; GFI=.952; NFI=.960; TLI=.944; p<.153) support the conclusion that no significant loss in model fit occurred by constraining the factor loadings. Thus, a general conclusion would be that the mean changes in the level of the employee's perception of employer transactional obligations can be interpreted as

Table 1
Change in Perceived Employer Transactional Obligations
Adapted from Robinson Et Al., (1994)

	Time 1	Time 2	t	p
Advancement	2.90 (1.31)	3.76 (1.11)	6.51	.001
High Pay	2.76 (1.19)	3.52 (0.99)	7.35	.001
Merit Pay	4.11 (0.96)	4.45 (0.66)	3.45	.001

Table 2
Test of Gamma and Beta Change on Employer Transactional Obligations Scale

Employer Transactional Obligations	χ^2	df	P	GFI	NFI	TLI	$\Delta\chi^2$	Δdf
H_{Σ}	23.78	6	.001					
Model 1 (Γ)	9.26	8	.321	.969	.989	.971	--	--
Model 2 (β1)	14.81	9	.096	.954	.952	.915	5.55	1
Model 3 (β2)	15.70	11	.153	.952	.960	.944	.89	2

true change in the employer transactional obligations.

Table 3 contains the item level alpha change for perceived employer relational obligations. The results indicate only one of four items in this subscale reflect significant change from T1 to T2. In addition, three changed in the same direction, representing an increase in the employee's perception of the organization's relational obligations while a fourth (provision of development) reflected an increase. Table 4 contains the results of the LISREL analysis. The test for equality of the covariance matrices suggested the lack of equality from T1 to T2 (χ_2=43.44[10]; p<.001). Thus, the covariance among items has changed across measurement time periods.

Model 1 reflects the extent to which gamma changes were found in the subscale. These results (χ_2[19]=69.20; GFI=.850; NFI=.583; TLI=.336; p<.000) suggest the presence of significant gamma change, thus we can conclude that the single factor structure fails to hold across time in this sample. Further analysis is not necessary, but provided for purposes of this conference. Model 2 reflects the extent to which beta change occurred across time periods by constraining factor variances to be equal. The results (χ_2[20]=69.22; GFI=.850; NFI=.588; TLI=.381; p<.000) suggest that the factor variances are also different across time periods. Model 3 reflects the extent to which beta change occurred by further restricting the factor loadings to be equal across time periods (χ_2[23]=69.83; GFI=.848; NFI=.598; TLI=.488; p<.000). Thus, a general conclusion would be that the while mean changes in the level of the employee's perception of employer transactional obligations are not present, the construct has been sufficiently reconstituted by subjects to the point that interpretations are not possible.

Table 5 contains the item level alpha change for perceived employee transactional obligations.

Table 3
Change in Perceived Employer Relational Obligations
Adapted from Robinson et al., (1994)

	Time 1	Time 2	t	p
Training	3.61 (1.04)	3.35 (1.20)	-2.21	.05
Support	2.04 (0.92)	1.96 (0.99)	-.90	ns
Job security	2.42 (1.01)	2.37 (1.07)	-0.42	ns
Development	3.81 (0.96)	3.95 (0.92)	1.28	ns

Table 4
Test of gamma and beta change on employer relational obligations scale.

Employer Relational Obligations	χ^2	df	p	GFI	NFI	TLI	$\Delta\chi^2$	Δdf
H_Σ	43.44	10	.001					
Model 1 (Γ)	69.20	19	.000	.850	.583	.336	--	--
Model 2 (β1)	69.22	20	.000	.850	.588	.381	.02	1
Model 3 (β2)	69.83	23	.000	.848	.598	.488	.61	3

The results indicate only three of five items in this subscale reflect significant change from T1 to T2. In addition, four items changed in the same direction, representing an decrease the employee's perception of the their transactional obligations. Table 6 contains the results of the LISREL analysis. The test for equality of the covariance matrices suggested equality from T1 to T2 (χ_2=13.11[15]; p<.594). Thus, the covariance among items remained stable across measurement time periods. Model 1 reflects the extent to which gamma changes were found in the subscale. These results (χ_2[34]=47.51; GFI=.911; NFI=.520; TLI=.610; p<.062) suggest the potential presence of significant gamma change. The incremental fit indices suggest a problem with an overall lack of fit to the data in comparison to a null model of independent items. Model 2 reflects the extent to which beta change occurred across time periods by constraining factor variances to be equal. The results (χ_2[35]=47.61; GFI=.910; NFI=.510; TLI=.640; p<.076) suggest that the factor variances are similar across time periods although once again, the incremental fit indices are somewhat low and the p-value is fairly small. Model 3 reflects the extent to which beta change occurred by further restricting the factor loadings to be equal across time periods (χ_2[37]=60.46; GFI=.895; NFI=.390; TLI=.378; p<.000). These results suggest significant beta change via both factor variances and factor loadings may be present within this subscale.

Table 7 contains the item level alpha change for perceived employee relational obligations. The re-

Table 5
Change in Perceived Employee Transactional Obligations
Adapted From Robinson et al., (1994)

	Time 1	Time 2	t	p
No competition	3.32 (1.38)	3.54 (1.35)	1.45	ns
Transfers	2.52 (1.09)	2.26 (1.13)	-2.99	.05
Advance notice	4.15 (1.04)	3.39 (1.22)	-5.79	.001
Minimum stay	2.99 (1.38)	2.05 (1.28)	-6.31	.001
Protection of proprietary information	4.85 (0.49)	4.74 (0.54)	-1.79	ns

Table 6
Test of Gamma and Beta Change on
Employee Transactional Obligations Scale

Employee transactional obligations	χ^2	df	p	GFI	NFI	TLI	$\Delta\chi^2$	Δdf
H_Σ	13.11	15	.594					
Model 1 (Γ)	47.51	34	.062	.911	.520	.610	--	--
Model 2 (β1)	47.61	35	.076	.910	.510	.640	.10	1
Model 3 (β2)	60.46	37	.009	.895	.390	.378	12.85*	2

sults indicate two of the three items in this subscale reflect significant change from T1 to T2. In addition, all three changed in the same direction, representing an decrease in the employee's perception of the their relational obligations. Table 8 contains the results of the LISREL analysis. The test for equality of the covariance matrices suggested equality from T1 to T2 (χ_2=6.41[6]; p<.378). Thus, the covariance among items has changed across measurement time periods. Model 1 reflects the extent to which gamma changes were found in the subscale. These results (χ_2[8]=10.49; GFI=.967; NFI=.972; TLI=.943; p<.232) suggest the absence of significant gamma change, thus we can conclude that the single factor structure holds across time in this sample. Model 2 reflects the extent to which beta change occurred across time periods by constraining factor variances to be equal. The results (χ_2[9]=12.26; GFI=.963; NFI=.953; TLI=.934; p<.199) suggest that the factor variances are also similar across time periods. Model 3 reflects the extent to which beta change occurred by further restricting the factor loadings to be equal across time periods (χ_2[11]=14.97; GFI=.952; NFI=.954; TLI=.934; p<.184). Thus, a general conclusion would be that the while mean changes in the level of the employee's perception of employer transactional obligations are present, the construct as measured is relatively stable across time periods.

Discussion

The results of this study provide initial insight into the potential measurement stability of Rousseau's (1990) measures of the perceived employee and employer obligations. When analyzed at the item level the perceived employer transactional obligations suggest significant change (increase) in mean level of this measure. As employees adjusted to their perspective organization, their perception of what the employer was obligated to provide increased significantly. The LISREL analysis was somewhat supportive of the absence of beta and gamma changes, although the cova-

Table 7
Change in Perceived Employee Relational Obligations
Adapted from Robinson et al., (1994)

	Time 1	Time 2	T	p
Overtime	3.91 (0.80)	3.68 (1.35)	-2.28	.001
Loyalty	3.87 (0.93)	3.24 (1.23)	-5.70	.001
Extra-Role Behaviors	3.30 (1.00)	3.13 (0.99)	-1.65	ns

Table 8
Test of Gamma and Beta Change on
Employee Relational Obligations Scale

Employee Relational Obligations	χ^2	df	p	GFI	NFI	TLI	$\Delta\chi^2$	Δdf
H_s	6.41	6	.378					
Model 1 (Γ)	10.49	8	.232	.967	.972	.943	--	--
Model 2 (β1)	12.26	9	.199	.963	.963	.934	1.77	1
Model 3 (β2)	14.97	11	.184	.952	.954	.934	2.71	2

riance matrices from T1 to T2 changed significantly. As a whole, it appears that this measure was equivalent across time periods. The analysis of the perceived employer relational obligations suggested very different conclusions. While the univariate test of alpha change only found one item to significantly change in mean level, the LISREL analysis suggested that the gamma change was so prevalent in this measure that any change in mean level, or lack of change, would be without interpretation.

In contrast to the employer transactional and relational subscales, both the employee transactional and relational subscales appeared to exhibit properties implying measurement equivalence. The univariate tests for alpha change in employee transactional obligations found all but one item decreased significantly across time periods. The LISREL analysis, ignoring the low TLI and NFI values, suggested absence of significant beta and gamma changes. In general, the same was true for the employee relational obligations measures, although the incremental fit indices were satisfactorily large.

A certain pattern in the results seemed to surface. Items in the employee obligations all reflected decrease in mean level across time. In contrast, items in the employer transactional obligations subscale increased while items in the employer relational subscale decreased. Likewise, the evidence for measurement equivalence was on the whole, more supportive of measurement equivalence for the employee transactional and relational obligations, whereas they were less supportive of employer obligations subscale equivalence. This pattern implies that what an employee perceives as their own obligations may be represent more stable obligations than what they perceive the organization is required to provide. From an organizational perspective, this finding is not too surprising. An employee's initial expectations of what the organization should be obligated to provide are based on limited information of what the work norms, values, and general work environment are like. In contrast, initial employee obligations are more likely to be based upon a more stable internal condition that is less likely to change, or at least, less likely to lose its form. That is, employees may change their sense of personal obligation

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Appendix
Items from Rousseau's Perceived Employee and Employer Obligations Measures

ITEM	Employee Relational Obligations	Employee Transactional Obligations	Employer Relational Obligations	Employer Transactional Obligations
Working Extra Hours	x			
Loyalty	x			
Volunteering to do non-required tasks	x			
Advance notice if taking a job elsewhere		X		
Willingness to accept a transfer		X		
Refusal to support the employer's competitors		X		
Protection of proprietary information		X		
Spending a minimum of two years in the organization		X		
Training			x	
Long-term job security			x	
Career development			x	
Support with personal problems			x	
Promotion				x
High Pay				x
Pay based on current level of performance				x

Limitations and Remedies of the Industrial Innovation Life Cycle Model

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ABSTRACT

This paper reveals three shortcomings of the current industrial innovation life cycle model, i.e. the Abernathy-Utterback (A-U) model, based on a thorough literature review on innovation types and innovation dynamics. It points out that the usefulness of the A-U model is discounted by its exclusion, oversimplification and insufficient sorting function. To overcome the limitations, an accessible innovation gateway, a set of innovation binding forces, and a multi-pace coordination are suggested to form a more accommodative innovation life cycle.

Introduction

Research on innovation has been increasing dramatically during the last several decades. While researches are expanding the spectrum of innovation by identifying more types of innovation, such as architectural innovation (Henderson et al 1990), value innovation (Jim et al 1997), disruptive innovation (Christensen 1997), user innovation (Von Hippel 1999), open innovation (Chesbrough and Rosenbloom 2002), platform innovation (Cusumano and 2002), demand innovation (Slywotzky and Wise 2003), and total innovation (Xu et al 2007), concept on innovation life cycle, particularly industrial innovation life cycle, has been stagnated. To explore the mismatch, this paper focuses on revealing the weakness of the current industrial innovation life cycle model in embracing the complexity of modern innovation.

Currently well known innovation life cycle model was developed by Abenarthy and Utterback in 1970s, which has been termed as A-U model. The model consists of two building blocks: product innovation and process innovation. The interaction of them displays four stages of a life cycle in an industry context (the original model had only three stages. The forth stage was added on late by the author): introduce/fluid, growth/transitional, mature/specific and decline/discontinuities phase. In addition to identifying the pattern or stages of innovations going through, the model explains the transition from one stage to another by highlighting the roles of dominant design and standardization (Abenarthy and Utterback in 1978). Since the A-U model demonstrates the integration of product and process over time, it becomes one of benchmarks for dealing with innovation and related issues (DeBresson and Lampel 1985). Many researches are carried out based on this four-stage time sequence, such as alliance and acquisition analysis over Microsoft's development (Roberts and Liu 2001), and the usage of the three generic competitive strategies at different stages (Porter 2001).

However, there are also problems with the A-U model. The most obvious one is that there is not a correspondence between innovation types and innovation stages within the A-U model. Therefore, the following questions are difficult to be answered by employing the A-U model: (1) What is the time stamp of each type of innovation? How different types of innovation can be linked chronically?

Given the problem, this research will first discuss the scope and reasons of the problem. Then, it will provide some remedy suggestion. The paper is organized as follows. After this brief introduction, section two will review literature on the connotation of innovation, which shows that innovations evolve from a narrow sense to a broader sense with more composite types of innovation identified. Section three will scruti-

nizes previous studies on the dynamics of innovation—different processes and related driving forces, which demonstrates the complexity in consolidating different phenomena into a development rhythm. Combining the two research streams, section four will highlights the three major shortcomings of the A-U model. The last section will point out certain remedies for expanding the innovation life cycle model.

Innovation Types

When Schumpeter first entered the frontier of innovation, he set up several landmarks in the virgin land: claiming the crucial role of innovation in economic and social development, drawing the boundary of innovation by separating innovation from invention, highlighting the actors of innovation by defining entrepreneurs or entrepreneurship, and identifying several types of innovation such as product, process, radical and incremental innovation to show the functioning of an innovation process (Schumpeter 1939).

Late comers to the innovation domain labor hard on every corner of the conceptual edifice that Schumpeter built (Rosenberg 1982). But they are increasingly unsatisfied with Schumpeter's legacy of separating innovation and invention, in which nursing and exploitation of technical creativity and business creativity are paralleled, and innovations always has an exogenous origin (Lan 1996). Researches on innovation, therefore, generate waves of convergence. The first convergence is a vertical expansion of an innovation domain to include technological creative activities. Researches in this area are characterized by treating innovation as an endogenous process or phenomena instead of an exogenous one. Topics include vertical technology transfers, internal knowledge generation, and research and development (R&D) management (Rogers 1962, Arrow 1962, Mansfield 1968, 1975, Rosenberg 1982, Nonaka 1991 Rousesel et al. 1991). The second convergence is the horizontal interaction of different functionalities within the innovation domain (Daft 1978, Damanpour 1991). The research reveals alternative uses of both technical and non-technical creativity for initiating an innovation (Cooper 1993), disrupting a process (Henderson et al. 1990, Christensen 1997), exploiting a new technology (Anderson and Tushman 1990), and generating a high growth (Markides 1997, Kim and Mauborgne 2000). The third convergence lifts the platform for integrating various innovations in a broad context (Lan 2006). Studies display a networked infrastructure (Shapiro and Varian 1999), a shifting knowledge landscape and multiple innovation realization paths (Chesbrough 2003), global existence and coordination of innovation components (Kao 2007), establishment of innovation communities (Sawhney and Prandelli 2001), multiple measurement of innovative activities (Kpalan and Norton 1996), and multi-dimensional innovation battle field (Sawhney, Wolcott and Arroniz, 2006).

As part of this converging trend, innovation is defined broadly, and divided intricately. The former shows not only the enlargement of innovation domain, but also the expansion direction of innovation studies. The latter indicates both complexity of innovation and interaction of different innovation components. This review will concentrate on the identification of different types of innovation, and briefly trace the changes of definitions.

In Schumpeter's mind, innovation, although important, is only the change of a production function, or a new combination of production factors (Schumpeter 1939). Innovation starts from a business arena and goes back to the business arena. It is entrepreneurs and entrepreneurship possessed organizations that drive an innovation process. While some scholars inherit this view and confine innovation as the specific function of entrepreneurship by which the entrepreneur either creates new wealth producing resources or endows existing resources with enhanced potential for creating wealth (Drucker 1985), more scholars define innovation in a broad sense. Porter (1990) defines innovation as improvements in technology and better methods and ways of doing things, which can be manifested in product changes, process changes, new approaches to marketing, new forms of distribution, and new conceptions of scope. Ulrich (2002) regards innovation as new ideas have impact. Verloop (2004) defines innovation as a business process to create change which bridges a technology-driven process and an opportunity-driven process. Tidd,

Bessant and Pavitt (2005) term innovation as a process of weaving different knowledge sets together under highly uncertain conditions. Kao (2007) defines innovation as ability of individuals, companies, and entire nations to continuously create their desired future, which is creating what is both new and valuable.

Beneath the broadening of innovation domain, the recognition of different types or natures of innovation demonstrates a trend of complexity, which means that newly identified innovation is often a composite innovation consisting of more than one sub-innovation. The major composite innovations include the followings.

Dual-core innovation suggests that a success innovation consists of two components: administration/business innovation and technology innovation (Daft 1978, Teece 1986, Damanpour 1991). While an enterprise has technical innovation to generate technical excellence, it needs market and organizational innovation to guarantee obtaining required complementary assets (Teece 1986). On the one hand, openness, freshness and willingness to say "yes", and thriving on a bit of chaos are needed for obtaining creativity. On the other hand, discipline, sound analysis and a willingness to say "no", and relying on an orderly environment are needed for succeeding implementation (Verloop 2004).

Architectural and modular innovation is a pair of innovations which activate in different combinations of both a system and its components. When an architectural innovation emerges, sub-innovation on changing the linkage of different components is active, while sub-innovation on altering core-design or knowledge foundation of the components remains inactive. When a modular innovation emerges, sub-innovation on replacing or improving a component is vigorous, while sub-innovation on changing the architecture of assembling components tends to stationary (Henderson and Clark 1990). The differences of the sub-innovations make two types of innovation show different competitive effects. It is documented that it is difficult for the established organizations to recognize and response to architectural innovation (Henderson and Clark 1990); particularly, even architectural innovation is destroying the organizations' competence (Anderson and Tushman 1990). Both architectural and modular innovation are burdening in modulated production involving many components (Gottardi 2000).

Value innovation is a framework suggested by Kim and Mauborgne (1997) for tracing and producing business model innovation. It becomes an umbrella covering various studies which emphasize the roles of innovatively altering business variables at a given technological platform. It suggests that a company can achieve a high growth by treating its operational environment as a temporary one (Sutton 2002); instead of paying attention to its competitors, paying attention to a potential large customer base (Kim and Mauborgne 1997), or an underserved segment (Rosenblum, Tomlinson and Scott 2003), and engaging customers as creators (Von Hippel 1999); reducing the overshooting in manufacturing its products or designing its services (Christensen 1997); and changing the ways for organizing enterprise and conducting business (Druker 1985), with particular reference to making CEO as an entrepreneur (Verloop 2004).

Disruptive innovation emphasizes that some dramatic changes in competition come from creative combining of technical functionality and business configuration (Christensen 1997). To start a disruptive innovation, it is not necessary for an innovator to have a technical superiority, and often it is the opposite. However, the business configuration has to be oriented to a larger customer base or an unmet market segment (Christensen and Raynor 2003). The novel combination of technical functionality and business configuration could bring to market a very different value proposition that had been unavailable previously and cause disruption. The pursuing of disruptive innovation provides enterprises guidelines for seeking more profitable opportunities (Anthony, Eyring and Gibson 2006).

User innovation happens in a super ideal situation for any innovator. On the one hand, customers will purchase products or services provided by an innovator. On the other hand, customers are enthusiastically engaged in helping the innovator to create the products or services (Von Hippel

1999). The magic for reaching such a state relies on the mixture of various innovation conducted by an innovator, including marketing innovation for locating lead users, technical innovation for better spotting the trend of functionality development, organizational innovation for adjusting the social division of labor, and process innovation for customizing products and services (Von Hippel 2005).

Differing from user innovation, which concentrates the linkage between innovators and users, open innovation identifies the novelty of practicing innovation at a large scale, involving more participants, and deals with more aspects (Kogut and Turcanu 1999, Sawhney and Prandelli 2000, Chesbrough and Rosenbloom 2002, Lan 2006). Open innovation emphasizes that organizational innovations lead to better and fast technical innovations. With proper arrangement, a wide range of creative resources out of an organization can be drawn in for benefiting innovators (Chesbrough 2003). By opening the boundaries previously tightly guarded, a spectrum of open innovation, judged by leaders' roles and the ownership of intellectual properties (IP) in a given context, emerges. It ranges from total openness--weak sponsorship and give away IP (Kogut and Turcanu 1999), to various innovation community model--strong sponsorship, shared IP, open to insiders and closed to outsiders of the community (Sawhney and Prandelli 2000), to orchestrating model—selected openness, weak sponsorship and self control of IP (Brown 2002).

Platform innovation is the combination of product family and open innovation. It identifies ways for enhancing and transforming technical advantages to business advantages through multi-level partnership (Cusumano and Gawer 2002). When a common platform is formed for accommodating various designs and components shared by a set of products, or a product family (Meyer and Utterback 1993), strategic innovation can be channeled in to open the platform and form innovative partnership. In so doing, creativity and other assets of partners can be internalized into the platform (Sawhney and Prandelli 2000). Competition then will be enlarged from single product to bundles of product, from one firm to bunch of firms, and from one process to multiple processes (Cusumano and Gawer 2002).

The latest efforts in identifying the type or nature of innovation are grouped in total innovation which offers a panorama view on innovation (Xu et al. 2006, Sawhey et al 2006). As suggested by its name, total innovation means that innovation is complex system, in which every type of innovation has its position and roles (Xu et al. 2006); in which various value drivers including technological, business and societal have to be in balance (Verloop 2004); and in which various methods are complementary. For example, balanced score card is used to show the dynamic of enterprises by tracing various components of innovations (Kpalan and Norton 2006); a multifactor index is employed to measure the innovativeness of organization (Liu 2005); and an innovation wind rose map is utilized to check the innovation healthiness of an enterprise from 12 aspects (Sawhey et al. 2006). Given the scope and complexity of innovation in total innovation, methodology considerations are still evolving.

Innovation Dynamics

Innovation dynamics in Schumpeter's framework is mainly reflected in innovation's economic and social impacts, i.e. the "creative destruction gale", or economic "long waves", in which an invention—innovation—diffusion cascading is implied (Verloop 2004). The impacts start with an innovation which increases the purchasing power of the innovator. Under the increasing demand, suppliers could advance their operations. In this process, the initial innovation will be amplified to a substantial innovation stream. The triggering off the cumulative "virtuous" processes then leads to new patterns of specialization both by firm and by industry (Schumpeter 1939). Two themes exist in Schumpeter's reasoning. One is fluctuated supply of technical creativity concreted in inventions. The other is entrepreneurs' continuous pursuing of profitability based on externally supplied inventions. The interaction of the two threads forms the ups and downs of innovation along the timeline.

Departing from Schumpeter's tradition, modern studies on innovation dynamics treat innovation

as an endogenous process (Lan 1996). Collectively, they form a full spectrum ranging from new ideas creation to new ideas realization. Separately, they focus on different stage of the overall process.

As a description and application of the S-curve of growth trajectory, life cycle model offers an explanation around the dynamics of firms and industries (Kuznets 1930, Vernon 1966). In 1970s, Abernathy and Utterback introduced the most articulate version of innovation life cycle, based on identifying the features of product and process innovation and their interaction overtime. The A-U model suggested that an aggregated innovation will go through three stages or show three patterns in its life time: introduce or fluid phase, growth or transitional phase, and mature or specific phase. The hallmarks of the changes are dominant design and associated standardization, which not only emphasizes the roles of process and incremental innovations, but also points out the linkage between dominant design and the shift of innovation priority. As the popularity of the A-U model grows, more concerns about the model and its applications have been aired. Some concentrated on the curve of innovation life cycle by pointing out that the model did not account for discontinuity (DeBresson and Lampel 1985), and not all technologies show evidence of a single S-shaped curve (Sood and Tellis 2005). Some doubted about the transition mechanism between stages by arguing that standardization and diversification are both default of development trajectory (DeBresson and Lampel 1985), and the roles of dominant designs is an exaggeration (Klepper and Simons 1996). Some concerned the practical applications of the model by arguing that the A-U model is biased to gradual transition and mass production of homogenous product (Teece 1986), which gives a narrow choice to CEOs on innovation (DeBresson and Lampel 1985). Some argued that an industrial innovation life cycle consists of more than one cycle and the industrial innovation is the repeat alternative of ferment and incremental innovations (Anderson and Tushman 1990).

Limited modifications on the model were conducted in several aspects over the last three decades. First, the model was expanded from three stages to four stages by adding a decline or discontinuities phase, which is characterized by dematurity, or a reverse evolution from stable process technology and product design to a turbulent period of technological change (Abernathy and Clark 1985). In this phase, new innovations will sweep away much of a firm's existing investment in technical skills and knowledge, design, production technique, plant and equipment (Utterback 1994). Secondly, more business considerations for the applications of the model were channeled in. The similarities and differences of the applications between assembled-product and nonassembled-product industries were highlighted (Utterback 1994). Thirdly, stage transformation is supplemented by a "segmented" model, which consists of three production modes: "batch", "line" and "custom", because different production mode is believed to show different rates of product and process innovation over time (DeBresson and Lampel 1985). Those modifications, however, fail to treat business innovation as an equal component as product and process innovation. Therefore, the A-U model remains a technical oriented life cycle.

Studies on innovation funnel or new product development concentrate on the very early stage of innovation development. They reveal a phenomenon of distilling—a success innovation consumes hundreds or thousands of creative ideas (Stevens and Burley 1997), and evolves in a complex interactive process (Cooper 1993, Verloop 2004, Fleming 2007). A common theme in this school is a stage-gate process, which means the success of an innovation needs to go through several phases from idea generation to product or service roll-out and exploitation, and certain phases are extremely danger or crucial for surviving (Morrison 2003). Differences among different studies are mainly shown in the numbers of suggested stages and associated gates, which range from three (Verloop 2004) to six stages (Cooper 1993). The differences are also shown in the purposes for setting up the gates. Some are based on specific objectives that have to be delivered at the end of each stage (Cooper 1993). Some are based on functional and managerial requirements derived from the characteristics of each stage (Verloop 2004). Criticisms on the stage-gate process focus on its linear nature, because innovation

does not occur in a straightforward way. During development process, innovation may hit unexpected hurdles and have to go back to an earlier stage (Gaynor 2002).

Product family or product generation study mainly concerns the up-middle stream of innovation process and reveals the co-existence of linear replacement and nonlinear branching of products. Product family study treats the development of product as the synergy of two forces (Meyer and Utterback 1993). One is family core, which includes common product platform, common user needs, common distribution channels, and common manufacturing process. The other is product applications. While the underlining technology is applied to the same market, replacement of one generation of product by the next generation happens. This replacement is based on the following changes of the family core: renewing platform, increasing modularity, enhancing common functionality, and reducing costs. The changes of product and its applications are characterized by increasing product diversity, enlarging share in a market, adding new market niches, and shortening refinement cycle. While the underlining technology is applied to a new market, a branching of product family happens. The branching is based on the formation of a new product platform, which produces products with completely new secondary dimension from the original product. The branching process is regarded as random and unpredictable (Sood and Tellis 2005).

Research on innovation diffusion focuses on the downstream of innovation development. Two types of diffusion can be identified. One is product embedded diffusion exemplified in product acceptance curve (Rogers 1962). According to the curve, product embedded diffusion goes through five stages with five types of adopters—innovators (accounting for 2.5% of the population), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%)—dominating each stage respectively. Within the curve, a particular bottleneck or "chasm" exists between the early adopters and early majority or pragmatists due to the different underlying value (Moore 2004). The other is non-product embedded diffusion demonstrated in various forms of technology transfer, such as from research institutes to enterprises (Mansfield 1971, Rosenberg and Nelson 1994) and from enterprises to enterprises (Quinn 1969, Lan 1996). Differing from linear product-embedded diffusion, non-product-embedded diffusion tends to show a network nature with multi-diffusion channels at information age (Chesbrough 2003).

Innovation trajectory studies reveal the industrial diversity of innovation life cycle. Several innovation trajectories, such as science based, supplier dominated, specialized suppliers intensive, scale intensive and information intensive innovation trajectories are identified (Pavitt 1984, 1990). The differences revealed are reflected in several aspects. Firstly, the shape of the life curves is different. For example, information technology industry shows a much shorter opportunity window and a life cycle than the manufacturing industry (Powell and Moris 2004). Secondly, the priorities of innovation tasks are varied among industries. Powell and Moris (2004) show that six industrial groups, consisting of about 300 projects in completed Advanced Technology Program, all have different combinations of product, process and service innovation. Thirdly, the cumulativeness and diversification of innovation, with a particular reference to innovation outside "core business", are stable within an industry and distinguishable among industries. For example, a survey over 4,000 UK firms reveals that upstream innovation diversification is common in scale-intensive and supplier dominated industries. While chemical firms tend to diversify into all upstream, horizontal and downstream innovation, mechanical, instrument and electrical-electronic engineering firms tend to diversifying into only horizontal and downstream innovations (Pavitt, Robson and Townsend 1989).

Differing from the above streams, discontinuity and disruption studies focus on certain turning points in the innovation process. On the one hand, they label the venues for discontinuity happening. For example, disruption I, or new consumption disruptive innovation, usually happens in the stage of introducing a new technology, which serves an unmet market segment (Christensen and Raynor 2003); and disruption II, or low cost consumption disruptive innovation, of-

ten happens after a period of incremental innovation (Tushman and Anderson 1986), especially when technology overshooting is obvious in an established industry. Then disruption II innovation aims a larger customer base by starting from a previously belittled market segment (Christensen 1997). On the other hand, discontinuity and disruption studies offer a wide range of explanations on the reasons of fluctuations. In a broad sense, it acknowledges the roles of knowledge advancement in activating ferment stage of innovation from incremental innovation stage (Anderson and Tushman 1990), and the characteristics of technology in reinforcing the alternative development (Rosenberg 1982). In a specific sense, it links architectural innovation that restructuring barriers. Studies show that development of knowledge on architectural innovation is often attributed to the failure of structure adjustment for established enterprises (Henderson and Clark 1990). At a micro level, it is the mismatch between knowledge advancement and the DNA of firms, i.e. resources-processes-value chain (Christensen 1997) that triggers competence-destroying and fails established firms to recognize and response to disruptive technology (Anderson and Tushman 1991).

Three Limits of the A-U Model

It is apparent that the recognition of the importance of innovation attracts increasing studies from multiple disciplines. However, there is still a scarcity of models for bridging increasing innovation types and complex innovation dynamics. Without a proper channel for integrating them, a general innovation system is difficult to be established or be more functional than the sum of its components (von Bertalanffy 1975).

Among the efforts for exploring the dynamics of innovation, Abernathy and Utterback's (1978) model is widely accepted (DeBresson and Lampel 1985). However, the A-U model's further application is discounted in the current world. Combining the above survey on innovation types and innovation dynamics, several shortcomings of the model can be revealed. The shortcomings are mainly reflected in the following aspects: exclusion, oversimplification and insufficient sorting function.

Exclusion means that business innovation is excluded from the foundation of the A-U model. A wide rage of business initiatives neither has a position in the life cycle, nor can show their figure prints systematically in the model (Teece 1986, Keating 2004), and different organizational options coexist to a greater extent than the A-U model might suggest (DeBresson and Lampel 1985). More recent research demonstrates that business innovations play an important role at either industrial level, or enterprise level (Kim and Mauborgne 1997, Christense 1997, Von Hippel 1999, Rosenblum, Tomlinson and Scott 2003, Sawhney, Wolcott and Arroniz 2006, Markides 2006); and managing non-technical innovation is becoming one of the most important tasks for top managers (Brown 2003, Verloop 2004, McGregor and Barrett 2006). Since technology innovation itself does not have a value without commercialization arrangement in a knowledge-based economy (Carr 2003, Chesbrough 2003), an innovation life cycle without business innovation as an integrated component has difficulty to reveal the true dynamics of an innovation process.

Oversimplification means that the A-U model fails to reveal the complexity of an industry evolution, particularly after a dominant design—a new product synthesized from individual technological innovations introduced independently in prior product variant (Abernathy and Utterback 1978). According to the A-U model, the surfacing of a dominant design is a watershed. When a dominant design is established, innovation will fade out or concentrated mainly in process improvement. The landscape of competition since then is difficult to change. However, in the reality this explanation does not work very well. Firstly, the model focuses on the traditional view of assembly-line view of U.S. industry (Vonortas 1997), and it is difficult to apply to service or service intensive industries which are the main stake of the current economy (Thomke 2003). Even within manufacturing industries, the model does not suit industries with small niche markets (Teece 1986). Secondly, innovation does not stop after having a dominant design. Inside the industry, standardization and diversification coexist even with a dominant design (DeBresson and Lampel 1985). Outside the industry, a trajec-

tory of innovations could be coupled with original technology (Pavitt, Robson and Townsend 1989, Jovanovic and MacDonald 1994). Longitudinal studies on automobiles, tires, televisions and penicillin industries demonstrate that shakeouts are not triggered by dominant designs (Klepper and Simons 1996). For example, Ford Company lost its top car manufacturer position to GM after it invented and practiced dominant design of automobiles for decades (Mazzucato and Semmler 2000). Complex interactions continue between technical and non-technical innovation, and individual firm's initiatives and industrial aggregative efforts along the time line (Teece 1986, Verloop 2004).

Insufficient sorting function means that different types of innovations can not be converted into a comparatively clear time sequence. Although A-U model points out that product innovation comes prior to process innovation, and radical innovation gradually shifts to incremental innovation, it has difficulty to sort many new types of innovation in the time dimension (Lan et al 2007). More studies have revealed that a type of innovation is not only context specified (Gaynor 2002), but also time specified (Henderson and Clark 1990, Christensen 1997, Cusumano and Gawer 2002). Without effective conversion of an innovation spectrum to an innovation time sequence, the dynamics of innovation is hard to be understood and handled, and the strategic choices given to managers are also too limited (DeBresson and Lampel 1985).

Conclusion: Remedies for the A-U Model

Remedies to the limitations were offered by the A-U model developer and others. The obvious efforts include pointing out dematurity—reverse evolution occurs from stable process technology and product design to a turbulent period of technological change (Abernathy and Clark 1985), replacing the "stage" model by a "segmented" model for considering customer, batch and assembly line production (DeBresson and Lampel 1985); and discussing the double sided impacts of innovation and adding some business considerations into the model applications (Utterback 1994). The fixings, however, did not improve the internal exclusiveness of the model. Therefore, increasingly identified innovations still cannot be accommodated in the model. The linkage between different types of innovation, between innovation temporal dimension and other dimensions are still vague.

Given the problems of the A-U model, the future remedies should be straightforward with several tasks. First of all, a new innovation gateway has to be introduced to replace the current dichotomy of product vs. process innovation. One suggestion here is to use an innovation tripartite—product, process and business innovation as the new gateway to innovation domain. Since product innovation focuses on creating functionalities; process innovation focuses on improving delivery of the functionalities; and business innovation focuses on changing relationships associated to the creation and delivery of the functionalities, each of them is representative separately. Jointly, they form an accommodative denominator for dealing with various innovation situations, because their combination can generate seven basic innovation statuses, which forms a complete spectrum for innovation activity. By using this new gateway, all innovation activities can be easily accessed.

Secondly, it is important to acknowledge and identify the existence of multi-pace and multi-peak innovation. One assumption in most previous studies on innovation dynamic, particularly in the A-U model, is a single-peak life curve of innovation components. This assumption may be applicable to an isolated simple technical innovation, but it is difficult to apply to aggregated innovation in an industrial background. Many industry analyses prove that substituted technology has been an integrated part of an industry's evolution (Porter 1985, 2007). When innovations interact with other innovations deprived from the original functionality creation at different stages, the pattern of innovation evolution is differentiated (Pavitt, Robson and Townsend 1989) and complex (DeBresson and Lampel 1985, Sood and Tellis 2005). To deal with this problem, multi-pace and multi-peak innovation process has to be identified. One suggestion here is to trace the life curve of each component of the innovation tripartite. So, the complexity of innovation process can be examined.

Thirdly, it has to recognize the existence of innovation binding forces. In the current A-U model, product and process innovation is connected by dominant design. It is undoubted that dominant design plays an important role in manufacturing industries, but its roles in service industry are decreasing. Also, other studies have pointed out that dominate design does not matter to many innovation process changes. Therefore, better innovation binding forces have to be identified. One suggestion here is to use learning mechanisms, perceived consequences, and achieving requirements as basic binding forces. Learning is the precondition for innovation, whether the innovation is aiming at creating functionality, increasing efficiency or capturing values. Perceived consequences are judgments on phenomena. They serve as a connector for bridging innovative activities, particularly gluing different innovation stages. Achieving requirements reflect prioritized coordination for realizing certain perceived consequence. They are the further expansion of perceived consequences but with a distinguished focus on the integration of various activities related to the realization of perceived result. By using the three binding forces the internal logic of innovation development can be better understood.

Finally, it should expand the stages of innovation life cycle. Since the current 4-stage innovation life cycle does not reflect the complexity of innovation process, it is nature to constitute a life cycle with more stages. One suggestion here is to replace the 4-stage by 7-stage in order to corresponding to the seven basic innovation statuses mentioned in suggestion 1. Since the seven basic innovation statuses come from all meaningful combinations of the innovation tripartite, they are representative on one hand. On the other hand, the chronically linkage of the seven statuses makes every major innovation not only has its spatial location, but also a temporal position. In this way, each stage of the innovation life cycle shows either unique innovation contents, or internal link mechanisms and external connection interfaces.

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JOINT CONFERENCE
May 31st, June 1st, and June 2nd 2010 in Nashville, TN at the legendary Opryland Hotel

Academic Business World International Conference (ABWIC.org)

The aim of Academic Business World is to promote inclusiveness in research by offering a forum for the discussion of research in early stages as well as research that may differ from 'traditional' paradigms. We wish our conferences to have a reputation for providing a peer-reviewed venue that is open to the full range of researchers in business as well as reference disciplines within the social sciences.

Business Disciplines

We encourage the submission of manuscripts, presentation outlines, and abstracts pertaining to any business or related discipline topic. We believe that all disciplines are interrelated and that looking at our disciplines and how they relate to each other is preferable to focusing only on our individual 'silos of knowledge'. The ideal presentation would cross discipline. borders so as to be more relevant than a topic only of interest to a small subset of a single discipline. Of course, single domain topics are needed as well.

Conferences

Academic Business World (ABW) sponsors an annual international conference for the exchange of research ideas and practices within the traditional business disciplines. The aim of each Academic Business World conference is to provide a forum for the discussion of research within business and reference disciplines in the social sciences. A secondary but important objective of the conference is to encourage the cross pollination of disciplines by bringing together professors, from multiple countries and disciplines, for social and intellectual interaction.

Prior to this year, the Academic Business World International Conference included a significant track in Learning and Administration. Because of increased interest in that Track, we have promoted Learning and Administration to a Conference in its own right. For the full call for pa-

International Conference on Learning and Administration in Higher Education (ICLAHE.org)

All too often learning takes a back seat to discipline related research. The International Conference on Learning and Administration in Higher Education seeks to focus exclusively on all aspects of learning and administration in higher education. We wish to bring together, a wide variety of individuals from all countries and all disciplines, for the purpose of exchanging experiences, ideas, and research findings in the processes involved in learning and administration in the academic environment of higher education.

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

Learning

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

Academic Administration

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