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Contents

Gender Differences in the Effects of a Product's Utilities and Identity Consumption on Purchase Intentions

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This study will examine similarities and differences among men and women in forming purchase intentions. Theoretically, when exploring purchase intentions, identity consumption is an important determinant in purchase formation on its own, but the mechanism of how it interacts with other purchasing variables is still unclear. In the purchasing context, men are described as more instrumental than women, and women are described as more focused on the shopping experience. Hence, in addition to the main effect of acquisition and transaction utilities, the combination of high levels of identity consumption and a high degree of transaction utility should contribute to explaining purchase intentions among women only. In contrast, the combination of high levels of identity consumption and a high degree of acquisition utility should contribute to explaining purchase intentions among men only. The results show significant independent effects of both acquisition and transaction utilities in forming purchase intentions for both men and women. Interactive effects between utility and identity consumption indicate significance for transaction utility and identity consumption for women, and significance for acquisition utility and identity consumption for men. Implications of the findings for the general theory of consumer behavior as well as managerial insights are also discussed.

Consumers' intentions to purchase different products can be affected by a wide range of factors. In general, these factors can be broadly grouped around the product's utilities and the consumers' characteristics. Product utilities include *acquisition utility*

(i.e., the utility derived from the use of the product relative to its price) and *transaction utility* (i.e., the utility derived from the positive gap between the expected price and the actual price) (Thaler, 1985). In general, the higher the acquisition and transaction utilities, the more likely people will purchase the product, and vice versa. Among the consumers' characteristics that might influence potential behavior is their emotional orientation that can reinforce purchase intentions. One aspect of this emotional orientation that has received a great deal of attention in the literature is *identity consumption,* which is defined as the tendency to attach value to products that are perceived as compatible with the "self" of the person.

In addition to the rich literature about the effect of a product's utilities on purchase intentions, recent literature shows that identity consumption can also play a significant role in this process (e.g., Sirgy & Su, 2000; Wang, Yang, & Liu, 2009). Determining whether these factors have an additive effect or interact with one another should provide additional insight into the formation of purchase intentions. Such insights will help to identify the processes that play a role in purchasing decisions, and those that may involve combining different elements that are seemingly independent of one another. For example, it is intuitive to expect that a consumer who derives a high degree of acquisition utility from purchasing running shoes will be more likely to buy them. It is also intuitive to expect that for some consumers, identifying with the brand of the shoe might enhance the intent to purchase it. An additive effect, therefore, might be an intuitive way to represent these effects on purchase intentions. However, it is less intuitive to expect that an interaction between the two will have a positive or negative effect on purchase intentions. The same arguments might hold for transaction utility and identity consumption. Furthermore, the role that consumer heterogeneity plays in these potential relationships is also an important factor in understanding differences in how consumers form their purchase intentions.

Vast literature has shown gender to influence perceptions, attitudes, purchase intentions, and even product's choice considerations (Akhter, 2003; Darley & Smith, 1995; Lowengart, 2010; Temme, Paulssen, & Dannewald, 2008). Despite the potential importance of product utilities and identity consumption in forming purchase intentions, relatively little research has examined the combined effect of these two dimensions on different consumer groups, specifically, the moderating effect of gender on the relationship between a product's utilities, identity consumption, and purchase intentions in order to determine potential heterogeneity.

The current study seeks to fill this void in the literature by exploring gender differences in terms of this combined effect. To this end, the contribution of each dimension (product utility and identity consumption) through its effect on purchase intentions and the interactive effect of the two dimensions among men and women is examined. Such an analysis will provide a theoretical understanding about the process of forming purchase intentions, and in particular, the similarities and differences between men and women in how they formulate these intentions. From a practical standpoint, such insights will help managers tailor their marketing efforts more specifically to address different consumers' needs. Using these insights, managers can adopt different strategies with regard to both their products' attributes and their communications aimed at strengthening the effect of the appropriate dimensions.

Conceptual Framework

The basic premise of the conceptual framework, based on the literature, is that consumers derive utility from a product in two ways. The first is the product's utilities, meaning its features and the consumers' perceptions about the benefits of the transaction. The second is the consumers' utilities, meaning the degree of compatibility between the product's image and the consumers' self-perceptions. Consumers tend to engage in identity consumption when they want to gain social approval or maintain self-consistency (Allen & Ng, 1999).

Formally, this combined utility is expressed as:

$$U_i = PU_i + IDENT_i \quad (1)$$

where:

U_i - The total utility that consumer *i* receives from the product

PU_i - The product utility that consumer *i* receives from the product

$IDENT_i$ - The identity consumption of consumer *i* (consumer utility)

We define the product's utility PU_i as:

$$PU_i = AU_i + TU_i \quad (2)$$

where:

AU_i - The acquisition utility that consumer *i* receives from the product (i.e., the utility derived from the use of the product relative to its price)

TU_i - The transaction utility that consumer *i* receives from the product (i.e., the utility derived from the positive gap between the expected price and the actual price) (Thaler, 1985).

One way to present these relationships is through an additive functional form of these aspects, where:

$$U_i = AU_i + TU_i + IDENT_i \quad (3)$$

A different approach to explaining these relationships is through the interaction between these elements. The interactive effect of the product's utility and identity consumption can be expressed as follows:

$$U_i + AU_i + TU_i + IDENT_i + IDENT_i * AU_i + IDENT_i * TU_i \quad (4)$$

In the following sections, the theoretical background for these potential relationships between product utilities and identity consumption will be presented.

The Product's Utility

In general, the literature acknowledges that product utility is the main determinant of purchase intentions and is a factor that can influence actual behavior (e.g., Bei & Simpson, 1995; Gupta & Kim, 2010). Thaler's (1999, p. 201) definition of a purchase intention as "the decision to buy something" indicates that such an intention is a decision, the outcome of mental accounting, in which consumers code, categorize, and evaluate events. As prospect theory (Kahneman & Tversky, 1979) maintains, consumers

perceive outcomes in terms of a value function in which they try to avoid losses relative to a subjective reference point. In addition, prospect theory states that consumers do not value gains and losses equally. A reference point can be the result of a pre-evaluation of the expected price of the product of interest. Given that purchase intentions are influenced by the value of the purchase, the greater the utility, the stronger the purchase intentions.

The notion of product utility is a utilitarian perspective that creates a perceived value for a product. It is based on the utility the consumer receives from the price paid and from the features of the product (both internal features, such as the comfort of a shoe, and external features, such as brand name), PU_i. Product utility consists of cognitive components, where the value perceptions are the result of consumer comparisons of different price structures (Monroe, 1990). These price structures might include the actual price, *P*, and a reference price, *RP*. The latter is constructed from two different sources: an internal reference price, *IRP,* which is a price in the consumer's mind generated from past experience with the product, and an external reference price, *ERP*, which is a price consumers use for comparison that is generated by information from the external environment such as the advertised price of a product (see Lowengart, 2002 for a review of reference price constructs). Under the reference-price framework, consumers compare the actual price to the reference price, and the purchasing decision is influenced by the difference, *P - RP.* The perceived value of the purchase is a combination of acquisition and transaction values (Thaler, 1985). The acquisition utility of consumer *i*, AU_i , is the economic gain or loss from the purchase transaction and is a function of product utility and purchase price. The utility of the purchased good was loosely defined by Thaler (1985, p. 200) as "the inherent need satisfying properties of the product." The literature offered a specific definition of the construct as "the value equivalent of the usefulness of the item less the price paid. Acquisition utility might be assumed to vary only with the attributes of the product and the price and not with the name of the brand or category attached" (Creyer & Ross, 1996, p. 175-76). This focus implies that value-conscious consumers are concerned about the product's value in use over time, which is a stable characteristic of the product (Lichtenstein, Netemeyer, & Burton, 1990).

One way to evaluate the acquisition utility is to calculate the difference between the purchase price and the maximum price the consumer is willing to pay (i.e., reservation price, *RES-P*). A negative difference between the actual price observed by consumer *i* for product *j*, and the reservation price of consumer *i* for product *j*, $0 \leq P_{ij} - RESP_{ij}$ will affect the purchase intentions of consumers through acquisition utility. The transaction utility of consumer *i*, TU_i is defined as the pleasure or displeasure associated with the financial terms of the deal. A negative difference between the two, expressed as $0 \leq P_{ij} - RP_{ij}$, will affect the purchase intentions of consumers through transaction utility.

Grewal, Monroe, and Krishnan (1998) supported Thaler's (1985) theory, showing that at the aggregate level, the acquisition value was the primary determinant of the willingness to buy. The rationale for this finding was that consumers purchase products to solve a particular consumption problem. Therefore, any incremental utility produced by a noticeably low or high price would be of secondary importance for consumers compared to the importance of the product's ability to provide the desired solution.

Other research found that the probability of making a purchase is positively related to global perceptions about acquisition and transaction utilities (Della Bitta, Monroe, & McGinnis, 1981). In fact, these research studies seem to indicate that, in general, the perceived reference price (internal or external) influences purchase intentions and that both acquisition and transaction utilities are important in predicting the purchasing behavior of consumers.

Identity Consumption

As noted earlier, this study seeks greater insight into consumers' purchase intentions by adopting a broader approach that examines the relationships between a product's utilitarian factors and consumers' identity consumption, and examines these factors among men and women. The literature in this area has been mainly concerned with the calculation of utilities relative to the product's price and attributes, without examining the general responses of consumers with different identity consumption levels.

Identity consumption is defined as the extent to which people give symbolic meaning to a product as representing themselves. This factor becomes important when consumers want to gain social approval or maintain self-consistency (Allen & Ng, 1999). Onkvisit and Shaw (1987) developed the "image congruence hypothesis," which assumed that consumers tended to purchase a specific brand because its image fit their own self-image. Identity consumption was described in the literature as an affective component, a state of emotion-laden mental readiness that influences consumers' allocation of emotional, cognitive, and behavioral resources toward a particular target (Park & MacInnis, 2006). In the same manner, Elliott (1998, p. 1) highlighted the role of identity consumption in the process of choosing a product, and therefore defined the decision making as being "based on emotional processes rather than cognitive evaluation." Mikulincer et al. (2001) also claimed that strong associations between the object and the self result in a rich set of schemas, exemplars, and affect-laden memories linked to the object.

Some scholars such as Sparks and Shepherd (1992) showed that when self-identity was included in a model of planned behavior, it contributed significantly to the predictive power of behavioral intentions. Based on social identity theory, Cornwell and Coote (2005) found a positive relationship between consumer identification with a not-for-profit organization and the intention to purchase products from it. Others have also shown that consumers do not make consumption choices based solely on a product's utility. Some consumers also considered the product's symbolic meaning (e.g., Elliot & Wattanasuwan, 1998; Govers & Schoormans, 2005). This symbolic meaning can also be reflected in the idea that consumers are what they own, because their possessions are viewed as a major part of their extended selves (Belk, 1988). In an experimental study, Reed (2004) found that consumers tended to purchase products relevant to the identity they wanted to highlight. In sum, all of these studies demonstrated that there are consumers who prefer products, firms or brands with an image consistent with their own self-image. As noted earlier, not all consumers use identity consumption as a main consideration when forming a purchase intention, rather this emotional dimension can have a differential effect on this process for different consumer groups. Despite the abundance of studies in the field of identity consumption, there is very

little research on the differential effects of gender on these constructs and ultimately on purchase intentions.

Gender Differences in Purchasing Behavior

In general, emotional utility (such as identity consumption) seems to be more important for women and functional utility more important for men. Dittmar (1989, 1991) found that men and women relate differently to their material possessions. Confronted with lists of preferred possessions, women chose more objects with sentimental value, while men chose objects related to leisure and finances. Women saw their possessions as important due to the emotional comfort they provided and as symbols of their relationship with others. On the other hand, men highlighted elements related to use and activity. Kleine and Baker (2004, p.15) also provided support for this claim, noting that "the meaning of possessions tends to differ between the sexes: autonomy seeking for men and affiliation seeking for women."

For women, shopping is perceived as a pleasure-seeking activity that gratifies wants and desires and meets an expressive need (Campbell, 1997). For men, on the other hand, shopping takes place when a 'need' has been established and one goes out to satisfy this need. This view indicates that men are more utilitarian in their thinking, while women tend to be more emotional. As noted earlier, both elements may affect purchase decisions, but a real issue still remains unresolved: Are both sexes similar in how they form their purchase intentions? Does identity consumption affect the process differently for men and women?

Identity Consumption, Product Utilities, and Purchase Intentions Among Men and Women

Literature about identity consumption highlights the void in understanding the effect of gender on the relationship between identity consumption and purchase intentions. Puntoni (2001) claimed there was no research that assessed the influence of gender on the relationship between self-identity (as a component of identity consumption) and purchase intentions, and suggested examining this effect at different levels of consumer involvement in the purchase decision (which can influence the level of identity consumption). Mugge, Schifferstein, and Schoormans (2004) also argued that future research needed to examine the specific situations, product categories, and personal characteristics of consumers that influence their level of identity consumption, which is expressed in their desire to make a product they purchased more personal and an expression of the self.

A product's utility is a core element in purchase intentions. Therefore, it is proposed that it will be important for both sexes, so thus, the first two hypotheses are:

Hypothesis 1: The relationship between acquisition utility and purchase intentions will be positive for both sexes.

Hypothesis 2: The relationship between transaction utility and purchase intentions will be positive for both sexes.

This set of hypotheses essentially models Equation 3.

Interactions

In light of the first hypothesis, it is interesting to examine the relationships between identity consumption and product utilities (acquisition and transaction utilities), and the effect of these relationships on purchase intentions. Such an examination may shed more light on the decision-making processes of consumers about making purchases. In addition to the direct effect of acquisition and transaction utilities on purchase intentions, it can be expected that identity consumption will have an interactive effect on purchase intentions that is dependent on the utility examined according to gender and not as a main effect. Only under certain circumstances would one expect identity consumption to have an effect on this type of relationship. When predicting purchase intent, identity consumption is expected to interact with acquisition and transaction utilities differently according to gender. Given that men are described as being more instrumental and oriented to practical use, the combination of acquisition utility and identity consumption is expected to have an additive explanation of purchase intention. Hence, only when the acquisition utility is high will identity consumption add to purchase intentions, beyond the explanatory power of both acquisition and transaction utilities. On the other hand, women tend to focus on the "shopping experience," hence the combination of transaction utility, which represents the positive local shopping experience, and identity consumption is expected to add a meaningful explanation to predictions about purchase intentions. These assumptions lead to the next two hypotheses:

Hypothesis 3: There will be an interactive effect between acquisition utility and identity consumption in forming purchase intentions among men, but not among women.

Among men, when acquisition utility and identity consumption are high, there will be more intentions to purchase. Hence,

Hypothesis 4: There will be an interactive effect between transaction utility and identity consumption in forming purchase intentions among women, but not among men.

Among women, when transaction utility and identity consumption are high, there will be more intentions to purchase. These hypotheses follow Equation 4.

Methodology

Procedure

This study used a descriptive approach, with a quota sampling approach by gender. Data was collected at shopping centers, train stations, and on university campuses. Respondents were asked to evaluate various aspects of a given product on a close-ended questionnaire. The questionnaire had three parts. The first part presented a scenario that described a new athletic shoe and its attributes. It included a description of a brand name athletic shoe and the assertion that this brand's image matched the image respondents had of themselves. Respondents were asked to imagine the following scenario: "A major sports company is marketing a new sports shoe called Sigma. You

know that the shoes have unique qualities: they are comfortable and durable, absorb shock and sweat and have an innovative design. You think the shoe is compatible with the image you have of yourself." Subjects were then asked to predict the price of the product. Next, the market price was presented to the respondents, and they were asked to answer questions about the product's utility and evaluate their purchase intentions. In the second part of the questionnaire, respondents were asked to evaluate their level of identity consumption. In the third part of the questionnaire, demographic variables were collected. A pretest on a group of 60 subjects was conducted and resulted in minor changes in the wording of the questions.

The product category used in this study was athletic shoes, as consumers may vary widely in their assessments of the functional and symbolic aspects of this product. Some consumers viewed the product as an object with tangible utility that relates to the functional attributes of the product (e.g., convenience, functionality, efficiency, usefulness) or as an object with emotional utilities (e.g., social, experiential, psychological benefits).

Sample

The sample was quota sampling by gender, comprised mostly of students. 233 individuals, 122 (52%) of whom were women and 111 (48%) of whom were men. Respondents ranged in age from 18 to 60, with a mean of 29.31 years (SD=8.54). The mean level of education was 14.78 years (SD=3.091). The majority of respondents (59%) had an income level below the national average, 12% had an average income, and 29% made more than the national average. The average monthly use of an athletic shoe by respondents was 10.96 days (SD=9.073): 13.56 days (SD=9.375) for men and 8.59 days (SD=8.129) for women. These results indicated that respondents were very familiar with the product selected for this study. Therefore, it was not expected to have confounding effects of product familiarity and usage in the results.

It is important to note that there was no significant difference between the sexes in any of the demographic variables except for the last variable mentioned above, usage rate.

Measures

Scales for measuring the relevant constructs were based on existing scales found in the literature. Purchase intention was measured using a 3-item, 5-point behavioral intention scale (Armitage & Arden, 2002) that yielded a Cronbach's α of 0.94. Acquisition utility was measured with three items on a 5-point scale (Al-Sabbahy, Ekinci, & Riley, 2004) and resulted in a Cronbach's α of 0.82. Transaction utility was measured by two items on a 5-point scale (Urbany et al., 1997) with a Cronbach's α of 0.86. Identity consumption was measured in a similar fashion to the component of personal consistency that is part of Allen and Ng's (1999) symbolic meaning scale; it had a Cronbach's α of 0.76. The Cronbach's α results indicated that the scales and measures used in this study were reliable. For all of the items measured in this study, except the transaction utility scale, a 5-point Likert scale ranging from 1, "completely disagree" to 5, "completely agree" was used. For the measurement of the transaction utility construct, a 5-point semantic differential scale ranging from 1, "very inexpensive" to 5, "very expensive" was used.

Analysis

A three-stage analysis was used in this study. The first stage consisted of data dimensionality reduction in order to identify the relevant constructs in consumer product evaluation using a varimax factor analysis. The results of this analysis confirmed the expected structure. Each dimension was differentiated from another as follows: dimension 1 – subjective norms, dimension 2 – brand perception, dimension 3 – identity consumption, dimension 4 – acquisition utility, and dimension 5 – transaction utility. All of the dimensions were fully separated and explained 72.96% of the total variance (See Appendix 1 for more details).

In the second stage, the relationships between the different utility and identity consumption constructs and purchase intentions were analyzed in order to test the research hypotheses.

Results

To test Hypotheses 1 and 2, a factor analysis regression (FAR)-based model (Basilevsky, 1981) was used to analyze the data. The FAR model provided a simple way to predict intent by using factor scores as independent variables. Basilevsky (1981) described the method as unbiased and consistent for the coefficient vector of a multiple regression model, given the parameters of the factor analysis measurement model. Using the factor scores as predictors of purchase intentions, the study was able to simplify the complex multi-attribute case. Furthermore, FAR coefficients are linearly independent, so the effects of multicollinearity could be removed.

In order to account for the contribution of the interaction, a hierarchical procedure was used. To control possible heterogeneity in the product usage level (measured by the average monthly use in days), this variable was entered first into the analysis. In the second stage, the independent variables were entered: acquisition utility, transaction utility and identity consumption. Finally, in the last stage, the interaction variables were entered: identity consumption with acquisition utility and transaction utility. Table 1 presents the results of this analysis.

The results presented in Table 1 provide support for all four hypotheses. As the table shows, both types of utilities, acquisition and transaction, influenced both men and women, thereby confirming Hypotheses 1 and 2. Furthermore, the interaction between identity consumption and transaction utility was significant for women only (t=-1.93, sig=0.042), while the interaction between identity consumption and acquisition utility was significant for men only (t=-2.63, sig=0.006), providing support for Hypotheses 3 and 4. In addition, the interaction added significantly to the explanation of purchase intentions with an R2 change for men of 7.3% (sig F change=0.013) and of 3.5% for women (sig F change=0.068).

To gain more insight into this interaction, consumers were separated into two subgroups. The first included respondents with a high level of identity consumption, one standard deviation above the average level. The second group included respondents with a low level of identity consumption, one standard deviation below the average (Cohen et al., 1983). Figures 2 and 3 present the differences between the two groups.

Table 1: *Regression Results – Basic Structure of Purchase Intention Determinants – Disaggregate Level Analysis*

		Men		Sig F Change	Women		Sig F Change
Model 1	**Variable**	**Coefficient**	**P-value**		**Coefficient**	**P-value**	
	Constant	3.112	0.000		3.045	0.000	
	Usage level	0.005	0.755		0.005	0.694	
R^2			0.001			0.001	
				0.755			0.694
Model 2	Constant	3.168	0.000		3.197	0.000	
	Usage level	-0.007	0.596		-0.005	0.647	
	IDNT	0.112	0.324		-0.068	0.432	
	AU	**0.581**	**0.000**		**0.424**	**0.000**	
	TU	**0.404**	**0.001**		**0.329**	**0.000**	
R^2			0.375			0.237	
				0.001			0.001
Model 3	Constant	3.126	0.000		3.262	0.000	
	Usage level	-0.005	0.496		-0.009	0.388	
	IDNT	0.109	0.333		**-0.104**	**0.230**	
	AU	**0.522**	**0.000**		**0.418**	**0.000**	
	TU	**0.451**	**0.013**		**0.372**	**0.000**	
	IDNT*AU	**-0.263**	**0.006**		-0.086	0.317	
	IDNT*TU	0.180	0.183		**-0.193**	**0.042**	
R^2			0.448			0.272	
				0.013			0.068

Figure 1: *Interaction between Transaction Utility and Identity Consumption Among Women*

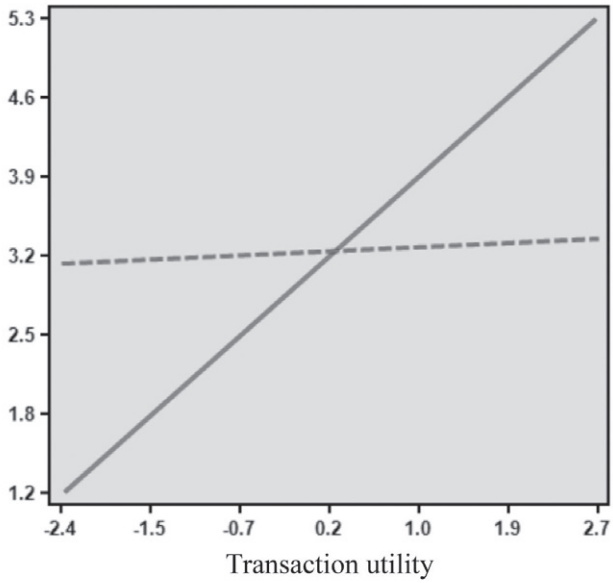

Figure 2: *Interaction between Acquisition Utility and Identity Consumption Among Men*

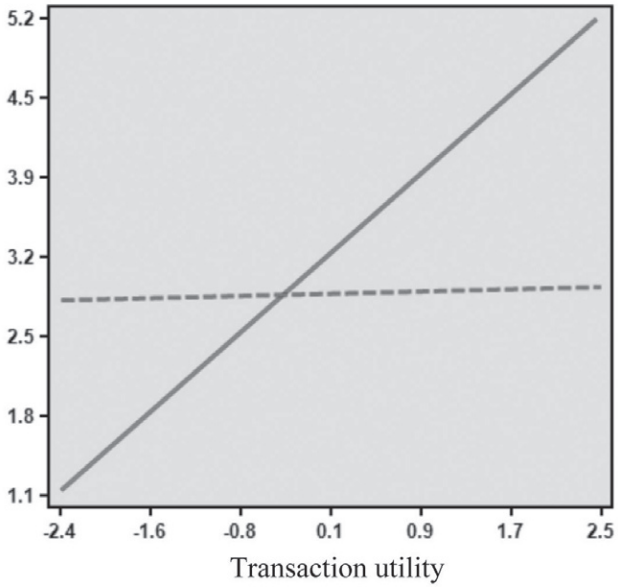

Figure 1 demonstrates that there is a differential effect in the strength of the relationship between transaction utility and purchase intentions as a function of identity consumption among women. This result accords with the prediction in Hypothesis 4. As for men (Figure 2), the level of identity consumption affects the strength of the relationship between acquisition utility and purchase intentions, just as Hypothesis 3 predicted. Based on this analysis, it appears that a high level of identity consumption contributes to purchasing behavior among both women and men, depending on the utility at hand. The implications of these interesting findings are discussed in the following section.

Discussion and Conclusions

The main purpose of this study was to expand the understanding of how consumers form their purchase intentions. Within this framework, the paper was interested in the separate and combined effect of each type of product utility and identity consumption on consumer behavior, and the differential effect of gender in this context. Previous research has shown that each of these aspects has an effect on purchasing behavior, but there are few studies that have examined the combined product-consumer effect, especially with regard to gender differences. This study developed a conceptual framework that took the combined effect into account and examined the model among men and women.

The analysis of the interactive effect between identity consumption and each of the product utilities on purchase intentions provided insights into the decision-making

processes used by men and women before purchasing a product. Identity consumption affects both men and women, depending on the type of utility examined.

As expected, when forming purchase intentions, identity consumption has a differential affect on men and women. For women, identity consumption contributes to purchase intentions when transaction utility is high (i.e., the product has a lower price than expected). This effect does not occur when transaction utility is low (i.e., the product has a higher price than expected). Thus, *transaction utility* represents a positive local shopping experience, and only when it is present, does identity consumption enhance women's intentions of purchasing a product. For men, whom research has determined are more targeted shoppers focusing on the purchase of practical items, identity consumption may contribute to purchase intentions only when the product has a high degree of acquisition utility. This situation does not occur when the product has a low level of acquisition utility.

Overall, the theoretical findings about a differential, gender based, interactive effect indicate the importance of accounting for consumers' heterogeneity in exploring the process through which purchase intentions are formed. Therefore, exploring the potential effects of heterogeneity is an area worthy of further research. Future research can also examine other product categories with different levels of involvement for men and women. As Browne and Kaldenberg (1997) found, there are differences between men and women with regard to the level of involvement in different product categories.

The results of this research have several managerial implications. First, depending on the product's category, managers should create a mixed marketing message that takes into account the product's utilities and the behavioral factors of their target audience. For example, when selling products such as sports shoes, managers should understand that a message that focuses on identity consumption (for example, "Choose the shoes that say who you are") might not have the same affect on men as on women. This message will probably affect men only when the acquisition utility is high (the shoes are perceived as useful) and affect women only when the transaction utility is high (the shoes are perceived as a good deal and less expensive than expected). Thus, when marketing to different genders, awareness of these two factors—the product's utilities and identity consumption—will help managers create messages that will increase purchase intentions.

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Appendix 1: *Factor Analysis Results*

	Item	Component				
		1	2	3	4	5
1	Compared to what I expected, 400 seems high/low*	.065	-.094	0.061	.165	.907
2	Compared to what I expected, 400 seems overpriced/underpriced*	.017	. 004	.095	.220	.894
3	I get a lot from the attributes of the product relative to its price (400)	.054	.01	.020	.865	-.006
4	I think the product meets my specific needs (comfortable, durable, sweat absorbent, etc.) at a reasonable price	.127	.099	.015	.801	.237
5	I think I am getting a product that will be useful, at a reasonable price	.127	.214	.192	.746	.361
6	I care about what people who are important to me (friends/family...) will say regarding a shoe I am about to purchase	.849	.175	.011	.122	.057
7	It is important to me that people whose opinions I value support a purchase I am going to make	.802	.237	.031	.097	.041
8	I would purchase a shoe just like the people who are important to me would do	.846	.083	.210	.067	-.028
9	I would like to purchase a shoe that fits the expectations of the people who are important to me	.779	.100	.220	.033	.062
10	I choose a shoe that is most compatible with the image I have of myself	.021	.830	.089	.078	-.047
11	I prefer a shoe that reflects who I am	.139	.867	-.043	-.059	-.080
12	The image a shoe portrays is an important part of my decision whether or not to buy it	.227	.644	.197	.065	.044
13	When I make a purchase of a shoe, I choose a product that I can proudly display	.321	.573	.261	.101	.016
14	Buying a brand-name shoe makes me feel good	.233	.193	.738	.007	.145
15	Shoes of a well-known brand are good products with good value for money	.088	.096	.872	.141	.092
16	Well-known sports shoe firms sell the best products	.102	.087	.878	.156	-.025
	% of variance explained	30.277	16.054	10.403	9.319	6.907

Key: Items 1-2 measure transaction utility*, items 2-5 measure acquisition utility, items 6-9 measure identity consumption, items 10-13 measure brand consumption.

*Items were reversed when analyzed.

The Quality Movement in the Supply Chain Environment

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The purpose of this paper is to introduce the demand for the quality movement practice in the supply chain environment. Both the need and application of these measures, especially the need for multivariate quality concepts to reduce the costs of operating supply chains, to control the flow throughout the supply chain will be shown. The purpose is to reduce costs in the supply chain system and improve the probability of meeting the "due time."

Supply chain management involves the leveraging of channel-wide integration to better serve customer needs. Increases in productivity, quality control, and improvement follow when firms implement and coordinate quality management activities upstream. When corporate management recognizes the aspects of supply chain management, quality control and quality assurance, two steps should then be taken. The first is the process whereby measures are taken to make sure defective products and services are not part of the final output and that the product design meets the quality standards set out at the initiation of the project. One may observe that quality assurance entails overlooking all aspects, including design, production, development, service, installation, as well as documentation. The quality movement is the field that ensures that management maintains the standards set and continually improves the quality of the output. According to Lee and Whang (2003, p. 26):

> The quality movement has offered sound lessons that can be very powerful to address supply chain security lessons. Instead of final, end-product source inspection, the quality movement emphasizes prevention, total quality management, source inspection, process control and a continuous improvement cycle. These are all ingredients for successful and effective ways to manage and mitigate the risks of supply chain security.

The philosophy and design of quality improvement is to achieve the best economic results of production and supply chain management. Stated differently, the goal of the quality movement is to reduce the expected total costs per unit in the supply chain

system and increase the probability of meeting the "due time" without sacrificing the quality of the supplier's output. This enables suppliers to fully satisfy their customers. This paper focuses on supply chain planning with quality control in an environment with multiple manufacturing centers and multiple customers. First addressed will be the needs for quality planning in the supply chain environment in order to focus on where the notion of statistical process (or quality) control (SPC) fits and why it is so vital to the performance of the supply chain environment in general and in a global environment. In turn, the desire for more sophisticated methods to ensure that quality and improvement are maintained in production processes involving more and greater sophisticated production methods will be discussed.

While supply chains are crucial to the health of business enterprises, these supply chains must be sustained by both preventative and emergency measures. Zhang, Yu, and Huang (2009) proposed several sophisticated strategies for dealing with SPC strategies in the supply chain environment. The study presented principle agent models regarding the customer's quality evaluation and the supplier's quality prevention level decisions. Studies such as this may have produced results not previously examined by the practitioners of SPC in the supply chain environment. In addition, threats to supply chains are real and many measures must be developed to indicate when supply chains are not operating in an efficient and productive manner. These measures include those of SPC which will indicate when risks are present in the supply chain. Since supply chains are increasingly globalized, these SPC measures must be appropriately placed in the supply chain and the choice of the particular SPC procedure is critical to developing an optimal plan.

Furthermore, Sun, Tsubaki, and Matsui (2006) proposed control chart systems in the supply chain management system to improve the customer satisfaction of suppliers. The purpose was to show the mathematical foundation in order to study the relationships between univariate control chart limits and the expected total cost per unit time in the arrival of (due) time for the product in the supply chain. The study gave evidence as to the use of simple univariate control on how the process of SPC reduced shipping costs and made certain that due time for arrivals were met. The study was limited to simple control charts and did not address the important question of whether SPC systems could vary when simple control chart design was the basis of the system or if more sophisticated models for SPC systems should be utilized.

Quality Control and Improvement Methodology

In the twenty-first century, competition no longer relies on the economic efficiency of one economic entity versus another or others. The global environment requires managers to analyze the supply chain of one system versus the supply chain of other systems. Quality management, including SPC, is supposed to positively impact the supply chain in order to reduce the total costs of manufacturing and distribution and to meet the expectation of "end-of-the-line" customers who require that due dates be met and the product delivered is fit for use. This manuscript proposes that supply chain systems become more efficient by reducing costs of unfit products. This results in greater costs to both the suppliers and the customers in order to meet the constraints on the

system by "due times." Supply chain systems can also become more efficient as a result of a loss in faith from customers who depend on supplies, by using optimal production scheduling, and other methods for streamlining manufacturing and distribution.

Most SPC methodologies assume a steady state process behavior where the influence of dynamic behavior is ignored. In the steady state system, dynamic behaviors are assumed not to be present and the focus is on the control of only one variable at a time. Specifically, SPC controls for changes in either the measure of location or dispersion or both. SPC procedures as practiced do in fact disturb the flow of the production process and operations. In recent years, the use of SPC methodologies to address the process where behavior is characterized by more than one variable is emerging. The purpose of this next section is to review the basic univariate procedures in order to see how they may be improved by more sophisticated methods while maintaining the same goal.

Univariate Control Charts

A Shewhart control chart which is the central foundation of univariate SPC has one recognized major shortcoming. The major drawback of the Shewhart chart is that it considers only the last data point and does not carry a memory of the previous data. As a result, small changes in the mean of a random variable are less likely to be rapidly detected. An Exponentially Weighted Moving Average (EWMA) chart improves upon the detection of small process shifts. Rapid detection of small changes in the quality characteristic of interest and ease of computations through recursive equations are some of the many properties of the EWMA chart that make it attractive (Appendix 1).

Although very useful, more recent studies indicated that misplaced control limits were present in many applications. These are the same methodologies commonly seen in quality management programs. For example Kuei, Madua, and Lin (2008) indicated that quality management practices were "closely associated" with better supply chain performance and greater capabilities. Flynn and Flynn (2005) also supported the desire for integration of quality management with supply chain management with empirical evidence. In addition, Kaynak and Hartly (2008) provided empirical data and analysis by statistical methods of the relationships between quality management and performance measures to further the improvement of customer relations and other constructs. Finally, Jarrett (2012) produced information that suggested that simple univariate control charts were often not the best method for quality management in the supply chain and managers should consider additional methods for the merging of quality management with supply chain management systems. Whereas EWMA charts may produce better control charts than simple univariate control charts, more sophisticated control charts will actually be easier to use and produce more efficient results.

Processes with Dynamic Inputs

In an extensive survey, Alwan and Roberts (1995) found that more than 85% of industrial process control applications resulted in charts with possibly misplaced control limits. In many instances, the misplaced control limits result from autocorrelation of the process observations, which violates a basic assumption often associated with the

Shewhart Control Chart (Woodall, 2000). Autocorrelation of process observations has been reported in many industries, including cast steel (Alwan, 1992), blast furnace operations, wastewater treatment plants (Berthouex, Hunter, & Pallesen, 1978), chemical processes industries (Montgomery & Mastrangelo, 1991), semiconductor manufacturing (Kim & May, 1994), injection molding (Smith, 1993), and basic rolling operations (Xia et al., 1994).

Several models have been proposed to monitor processes with autocorrelated observations. Alwan and Roberts (1988) suggested using an autoregressive integrated moving average (ARIMA) residuals chart, which they referred to as a special cause chart. For subsample control applications, Alwan (1992) described a fixed limit control chart, where the original observations were plotted with control limit distances determined by the variance of the subsample mean series. Montgomery and Mastrangelo (1991) used an adaptive exponentially weighted moving average (EWMA) centerline approach, where the control limits were adaptive in nature and determined by a smoothed estimate process variability. Lu and Reynolds (2001) investigated the steady state average run length of cumulative sum (CUSUM), EWMA, and Shewhart control charts for auto-correlated data modeled as a first order autoregressive process plus an additional random error term.

A problem with all these control models was that the estimate of the process variance was sensitive to outliers which is especially important in supply chain applications. If assignable causes present in the data are used to fit the model, the model may be incorrectly identified and the estimators of model parameters may be biased, resulting in loose or invalid control limits (Boyles, 2000). To justify the use of these methods, researchers have made the assumption that a period of "clean data" exists to estimate control limits. Therefore, methods are needed to assure that parameter estimates are free of contamination from assignable causes of variation. Intervention analysis with an iterative identification of outliers has been proposed for this purpose. Atienza, Tang, and Ang (1998) recommended the use of a control procedure based on an intervention test statistic, λ, and showed that the procedure was more sensitive than ARIMA residual charts for process applications with high levels of positive autocorrelation. The investigation of intervention analysis was limited, however, to the detection of a single level disturbance in a process with high levels of first order autocorrelation. Wright, Booth, and Hu (2001) proposed a joint estimation method capable of detecting outliers in an autocorrelated process where the data available was limited to as few as 9 to 25 process observations. Since intervention analysis is crucial to model identification and estimation, it is important to investigate varying levels of autocorrelation, autoregressive and moving average processes, different types of disturbances, and multiple process disturbances.

The ARIMA and intervention models are appropriate for autocorrelated processes whose input streams are closely controlled. However, there are quality applications, which are referred to as "dynamic input processes," where this is not a valid assumption. The treatment of wastewater is one example of a dynamic process that must accommodate highly fluctuating input conditions. In the health care sector, the modeling of emergency room service must also deal with highly variable inputs. The dynamic nature of the input creates an additional source of variability in the system,

namely the time series structure of the process input. For these applications, modeling the dynamic relationship between process inputs and outputs can be used to obtain improved process monitoring and control as discussed by Alwan (2000).

When processes violate the assumptions of simple univariate control charts, another method for SPC must be found (Woodall, 2000). Earlier it was pointed out that the placement of quality control limits (Sun & Matsui, 2008) caused changes in the expected total cost per unit in the supply and in the "due time" as well. Misplacement of control by simple control charts will have a greater effect on the economic efficiency of the supply chain management system. In turn, the implication is that if a manager does not recognize the dynamics of the SPC system, the consequential effect will likely be to make the prevailing supply chain system noncompetitive. If this is so, other SPC systems that should be utilized to make the supply chain system competitive should be examined. Lastly, a question remains as to whether the effect of reducing the cost of the supply and improvement in meeting the "due time" will be met by the Alwan and Roberts method. Since it has been noted that control limits of simple control charts correlated with goals, more efficient methods that reduce the likelihood of false signals from control charts will reduce the number of products requiring additional effort to rework nonconforming units. Thus, a manager can only expect to reduce costs and increase the probability of meeting "due time" requirements. One additional model proposed by West, Delana, and Jarrett (2002) followed a transfer function model to solve problems having dynamic behavior. The result was to design a SPC system to produce dynamic control charts that had control limits that did not violate the assumption of autocorrelation in the various time series of data. The model was based on a study by Chen and Liu (1993a, 1993b) and followed the transfer function model of Box and Tiao (1975). Specific applications of the last model were given by Box, Jenkins, and Reinsel (1994, 2008) for the development of the transfer function term and for details of the intervention term. Other examples can be seen in Chang, Tiao, and Chen (1988) who extended the model of Box and Tiao (1975). Also, Chen and Liu (1993a, 1993b) discussed both autocorrelation and intervention disturbances in time series. These modelers, defined procedures for detecting innovational and additive outliers and for jointly estimating time series parameters. The study also demonstrated the need for future studies of the nature of outliers. However, further research into the relation of these methods is needed for determining control chart limits and their correlation with the probability of meeting the "due time" requirement and minimizing the expected cost per unit in the supply chain when such disturbances arise.

Multivariate Control Charts (MPC)

Charts that have only one limit to determine signals as to whether the process is in control or not would be additionally beneficial to supply chain systems managers. By having a single control limit based on the *average run length* (ARL), one can determine more easily the ability to control the "due time" and the expected total supply chain costs.

A multivariate analysis utilizes the additional information of the relationships among the variables. These concepts may be used to develop more efficient control

charts than simultaneously operated several univariate control charts. The most popular multivariate SPC charts are the Hotelling's T^2 (Sullivan & Woodall, 1996) and a multivariate exponentially weighted moving average (MEWMA) (Elsayed & Zhang, 2007). Multivariate control chart for process mean is based heavily upon Hotelling's T^2 distribution (Hotelling, 1947). Other approaches, such as a control ellipse for two related variables and the method of principal components, were introduced by Jackson (1956, 1959). A straightforward multivariate extension of the univariate EWMA control chart was first introduced in Lowry et al. (1992) and Lowry and Montgomery (1995) developed a multivariate EWMA (MEWMA) control chart. It is an extension to the univariate EWMA.

Interpretation of Multivariate Process Control Charts

Multivariate quality control (MPC) charts (Hotelling, 1947; Jackson, 1956, 1959, 1985; Hawkins, 1991, 1993; Kalagonda & Kulkarni, 2003; Wierda, 1994; Jarrett & Pan, 2006, 2007a, 2007b; Mastrangelo & Forrest, 2002) have several advantages over creating multiple univariate charts for the same business situation. They are:

1. The actual control region of the related variables is represented. In the bivariate case the representation is elliptical.
2. One can maintain a specific probability of a Type 1 error (the risk or α).
3. The determination of whether the process is in or out of control is a single control limit.

Currently, there is a gap between theory and practice. Many practitioners and decision-makers have difficulty interpreting multivariate process control applications, although the book by Montgomery (2005) addressed many of the problems of understanding not discussed in the technical literature noted before. For example, the scale on multivariate charts is unrelated to the scale of any of the variables, and an out-of-control signal does not reveal which variable or combination of variables causes the signal.

Often one determines whether to use a univariate or multivariate chart by constructing and interpreting a correlation matrix of the pertinent variables. If the correlation coefficients are greater than 0.1, it can be assumed the variables correlate, and it is appropriate to construct a multivariate quality control chart.

The development of information technology enables the collection of large-size data bases with high dimensions and short sampling time intervals at low cost. Computational complexity is now relatively simple for online computer-aided processes. In turn, monitoring results by automatic procedures produces a new focus for quality management. The new focus is on fitting with the new environment. SPC now requires methods to monitor multivariate and serially correlated processes existing in new industrial practices.

Illustrations of processes which are both multivariate and serially correlated are numerous in the production of industrial gases, silicon chips, and highly technical computer-driven products and accessories. In optical communication products

manufacturing, the production of fiber optic is based on SiO_2 rods made from the condensation of silicon and oxygen gasses. The preparation of SiO_2 rods need to monitor variables such as temperature, pressure, densities of different components, and the intensity of molecular beams. Similar processes exist in chemical and semiconductor industries where materials are prepared and made. In service industries, the correlation among processes are serial due to the inertia of human behaviors and also cross-sectional because of the interactions among various human actions and activities. As an example, the number of visits to a restaurant at a tourist attraction may be serially dependent and also related to: (1) the room occupation percentage of nearby overnight residences, and (2) the cost and convenience of transportation. Furthermore, the latter factors are also autocorrelated and cross-sectionally correlated to each other. Business management and span of control problems relate unit sales to internal economic factors such as inventory, accounts receivable, labor and materials costs, and environmental factors such as outputs, competitors' prices, specific demands, and the relevant economy in general. These problems are multivariate and serially correlated because one factor at one point in time is associated with other factors at other points in time.

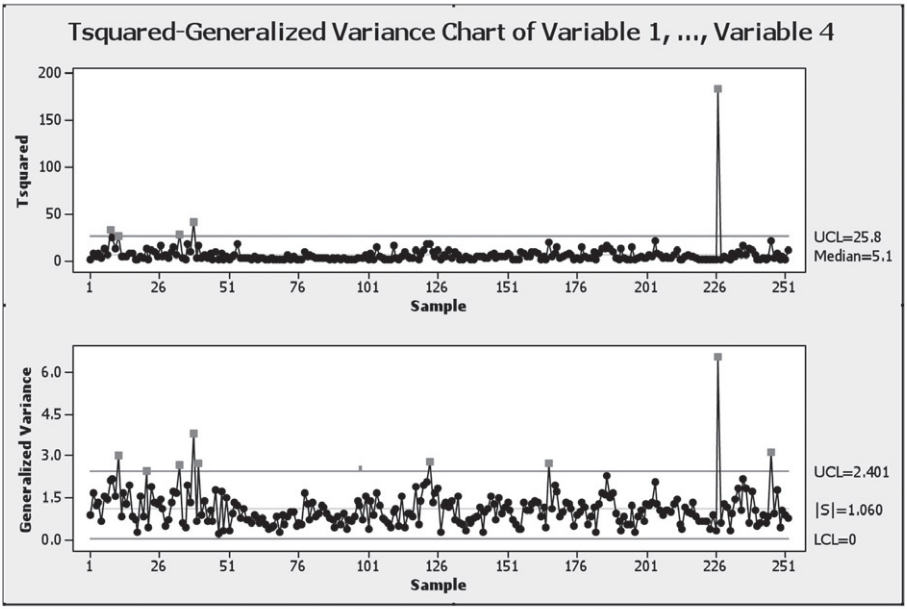
SPC emphasizes the properties of control for decision making while it ignores the complex issues of process parameter estimation. Estimation is less important for Shewhart control charts for serially independent processes because the effects of different estimators of process parameters are nearly indifferent to the criterion of ARL. In processes that have serial correlation, estimation becomes the key to correct construction of control charts. Adopting workable estimators is then an important issue.

Research on quality control charts for correlated processes focused on univariate processes. Box et al. (1994) and Berthouex et al. (1978) noticed and discussed the correlated observations in production processes. Alwan and Roberts (1988) proposed a general approach to monitor residuals of univariate auto correlated time series where the systematic patterns were filtered out and the special changes were more exposed. Other studies included Montgomery and Friedman (1989), Harris and Ross (1991), Montgomery and Mastrangelo (1991), Maragah and Woodall (1992), Wardell, Moskowitz, and Plante (1994), Lu and Reynolds (1999), West et al. (2002) and West and Jarrett (2004). English and Sastri (1990) and Pan and Jarrett (2004) suggested *state space methodology* for the control of auto correlated process. Further, additional technologies implemented by Testik (2005), Yang and Rahim (2005) and Yeh, Huang and Wu (2004) provided newer methods for enabling better MPC methods.

To consider how the MPC system works data from a manufacturing process to exemplify the system was collected. Note the simplicity of interpretation in Figure 1. The control charts, each containing a different multivariate algorithm, produced results simple to interpret. There existed on either control chart only one control limit which a manager would have to interpret. The *lower control limit* (LCL) did not exist on the upper chart, and the LCL equaled zero on the lower chart. Hence, only points (observations) above the *upper control limit* (UCL) yielded a signal that the process was out of control. The supply management system manager can more easily determine the total cost per unit of the supply chain management system and the likelihood of meeting the "due time" by the methods developed by Sun et al. (2006). While the mathematics of an MPC can be more difficult for some to understand, the resulting

control charts give rise to a system where a manager can meet the primary goals of the supply chain management system.

Figure 1: *Interaction between Acquisition Utility and Identity Consumption Among Men*



Note: Upper chart contains five points out of control and seventeen points almost out of control in T-Squared Chart. Lower chart (generalized variance) denotes eight points out of control and a large number nearly out of control. Only one control limit for ARL, to determine whether a is in control or not. This is a specific advantage for supply chain system managers. Last, MPC models of this type are more efficient in controlling the Probability of a Type 1 error and should have far less false signals.

Conclusions

This manuscript discussed the control chart usage and illustrated why better procedures are available to supply chain managers. For example, methods developed by Alwan and Roberts (1988) utilizing residual chart analysis were illustrated. Later, methods such as transfer function application and a traditional multivariate Hotelling T^2 chart to monitor multivariate and multivariate serially correlated processes (those with dynamic inputs) were explored. The scheme can be viewed as a generalization of Alwan and Roberts' (1988) special cause approach to multivariate cases. The guideline and procedures of the construction of VAR residual charts were also detailed in this paper. Molnau, Montgomery, and Runger (2001) produced a method for calculating ARL for multivariate exponentially weighted moving average charts (2001). Mastrangelo and Forrest (2002) simulated a VAR process for SPC purposes. However, the general

study on VAR residual charts was heretofore not reported. In addition, more recent studies by Kalagonda and Kulkarni (2003) and Jarrett and Pan (2006, 2007a, 2007b) indicated additional ways in which one can improve upon the multivariate methods currently available in commercial quality control software such as *Minitab®* and others. These newer techniques provided more statistically accurate and efficient methods for determining when processes are in or not in control in the multivariate environment. When these methods become commercially available, practitioners should be able to implant these new statistical algorithms for multivariate process control charts (MPC) using ARL measure to control and improve output.

These new methods provided methods for MPC charts focusing on the average run length. The purpose was to indicate how useful these techniques are in the supply chain environment where processes are multivariate, dynamic or both. Simple SPC charts, though very useful in simple environments, may have limited use in the supply chain. In any event, future research should focus on exploring the characteristics of the supply chain and finding the best model to implement quality planning and improvement programs. Multivariate analysis should provide many of the new tools for adaption in improving supply chain management. Further, it can be seen from Sun and Matsui (2008) that supply chain systems managers can minimize supply chain costs and in turn, have a system that is more competitive. Efficient supply chains are what both customers and suppliers need. The costs of security, stoppages, and threats to the supply chain will diminish when managers explore the usefulness of multivariate methods noted before. Lastly, these supply managers must be trained, retrained and continually trained in those methods that best fit the supply chain environment. In the future, it can be expected that examples of the efficiency of MPC in the supply chain system will occur such as with Pan and Jarrett (2013), who utilized methods of operations research on stable time series to improve the construction of control chart construction. Hence, the future is bright if these process control systems become a central part of the supply chain management system.

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Appendix 1

EWMA chart achieves faster detection of small changes in the mean. The EWMA chart is used extensively in time series modeling and forecasting for processes with gradual drift (Box & Draper, 1998). It provides a forecast of where the process will be in the next instance of time. It thus provides a mechanism for dynamic process control (Hunter, 1986).

The EWMA is a statistic for monitoring the process that averages the data in a way that gives exponentially less and less weight to data as they are further removed in time.

The EWMA statistic defined by

$$Z_{i=} \lambda \overline{X}_i + (1-\lambda) Z_{i-1} \quad \text{with} \quad 0 \leq \lambda < 1, \; Z_{o\,=} \mu_o \qquad (1)$$

can be used as the basis of a control chart. The procedure consists of plotting the EWMA statistic Z_i versus the sample number on a control chart with center line $CL = \mu_0$ and upper and lower control limits at

$$UCL = \mu_o + k\bar{\sigma}_{\bar{x}} \sqrt{\frac{\lambda}{2-\lambda} \; [1-(1-\lambda)^{2i}]} \qquad (2)$$

$$LCL = \mu_o + k\bar{\sigma}_{\bar{x}} \sqrt{\frac{\lambda}{2-\lambda} \; [1-(1-\lambda)^{2i}]} \qquad (3)$$

The term $[1-(1-\lambda)^{2i}]$ approaches unity as i gets larger, so after several time periods, the control limit will approach steady state values.

$$UCL = \mu_o + k\bar{\sigma}_{\bar{x}} \sqrt{\frac{\lambda}{2-\lambda}} \qquad (4)$$

$$LCL = \mu_o + k\bar{\sigma}_{\bar{x}} \sqrt{\frac{\lambda}{2-\lambda}} \qquad (5)$$

The design parameters are the width of the control limits k and the EWMA parameter λ. Montgomery (2005) gives a table of recommended values for these parameters to achieve certain average run length (ARL) performance.

In many situations, the sample size used for process control is n = 1; that is, the sample consists of an individual unit (Montgomery & Runger, 2003). In such situations, the individuals control chart is useful. The control chart for individuals uses the moving range of two successive observations to estimate the process variability. The moving range is defined as MR_i = abs (X_i – XI-1) an estimate of 6 is

$$6 = \frac{\overline{MR}}{d_2} = \overline{MR}/1.128 = 1.128 \qquad (6)$$

Because d = 1.128 when two consecutive observations are used to calculate a moving

range. It is also possible to establish a control chart on the moving range using D_3 and D_4 for n = 2. The parameters for these charts are defined as follows.

The central line (CL) upper and lower control limits for a control chart for individual are:

$$\text{UCL} = \bar{X} + 3\,\overline{MR - d_2} = \bar{X} + 3\,\frac{\overline{MR}}{1.128}$$

$$\text{CL} = \bar{X}$$

$$\text{and LCL} = \bar{X} - 3\,\overline{MR/d_2} = \bar{X} - 3\,\overline{MR}\,1.128 \quad (7)$$

For a control chart for moving ranges:

$$\text{UCL} = D_4\,\overline{MR} = 3.267\,\overline{MR}$$

$$\text{CL} = \overline{MR}$$

$$\text{UCL} = D_3\,\overline{MR} = 0 \quad (8)$$

Alliance Portfolio Diversity and Firm Performance: Examining Moderators

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The issue of the appropriate level of diversity in an alliance portfolio has emerged as a critical issue for managers and scholars. This study provides insight into how characteristics of alliance portfolios moderate the relationship between alliance portfolio diversity and firm performance. Firms should be able to best take advantage of diverse alliance portfolios when they have characteristics that enhance trust, knowledge sharing, and innovation. The effects of reciprocity and status similarity on the alliance portfolio diversity-firm performance relationship are examined. The findings of this study support the hypothesized inverted-U relationship between alliance portfolio diversity and firm performance. Findings also show that alliance portfolio characteristics are significant moderators of the alliance portfolio diversity-performance relationship. As predicted, reciprocity positively moderates this relationship while status similarity is unexpectedly found to negatively moderate this focal relationship.

A growing body of literature is focused on how individual firms benefit from a wide range of inter-firm alliance relationships. The benefits to firms can include increased legitimacy, enhanced stability, and reduced risk (Cowan & Jonard, 2009). Furthermore, partnering with multiple firms can "provide a superior means to access or acquire capabilities" and knowledge that firms cannot develop internally (Sampson, 2007, p. 365).

Not all alliances offer the same benefits and not all firms benefit equally from alliance partnerships. A growing number of studies have focused on alliance portfolio diversity as a driver of firm performance. Alliance portfolio diversity has been operationalized a number of ways, including heterogeneity of alliance type (Sarkar, Aulakh, & Madhok, 2009), technological knowledge (Ahuja, 2000; Sampson, 2007),

partner nationality (Koka & Prescott, 2002, 2008) and industry (Goerzen & Beamish, 2005). Greater alliance portfolio diversity has been found to have both positive and negative effects on firm performance. Studies that found positive effects attributed this to improvement in information accuracy and in innovativeness and creativity resulting from diverse knowledge (Beckman & Haunschild, 2002; Baum, Calabrese, & Silverman, 2000). Others have found that diversity, beyond very low or moderate levels, contributed to poorer performance and theorized that this was due to coordination and integration costs that outweighed the benefits of diversity (Ahuja, 2000; Goerzen & Beamish, 2005). While the existing body of research that investigated the relationship between alliance portfolio diversity and firm performance provided interesting insights, the limited and conflicting empirical evidence "prevented researchers from understanding how firms can best use alliances as part of their knowledge creation strategies" (Sampson, 2007, p. 382). Mixed findings in prior studies suggested that there are important moderators of the diversity-performance relationship that have not been studied. However, few studies have looked into alliance portfolio characteristics as moderators of this relationship. The existing research gap in this regard provided motivation for the current study. This study will first examine the relationship between alliance portfolio diversity and firm performance. The focus will then shift to two alliance portfolio characteristics — status and reciprocity — that are suggested as likely moderators (Benjamin & Podolny, 1999; White & Lui, 2005). The objectives of this study were to identify whether: a) evidence supports the hypothesized relationship between alliance portfolio diversity and firm performance, and b) to further understand potential moderating influences on that relationship.

Theoretical Development

Alliance Portfolio Diversity

Alliance portfolio diversity pertains to the heterogeneity of knowledge and resources represented across the portfolio of partnerships (Collins, 2013). Engaging in inter-firm alliances is driven in large part due to a desire to access a variety of resources and knowledge that are expected to help to improve overall firm performance. Alliance portfolios can then significantly vary in diversity (Jiang et al., 2010; Vasudeva & Anand, 2012). Investigating portfolios of alliances enables analysis of very different phenomena than when observed as an individual phenomenon based on a partner's technological capability (Anand et al., 2007; Vassolo et al., 2004). When the partners' technological approaches overlap, new ideas and knowledge are not being generated, instead alliance partners find a redundant theme of skills sets, ideas, and knowledge that lead to a weakened alliance portfolio (Anand et al., 2007).

Alliance portfolio diversity has been defined as the extent of variance in a focal firm's alliance partners, functional scopes, and authority or governance structures (Jiang et al., 2010). Prior research suggests that in order to achieve a strategic balance in new and old partnerships, firms involved should pursue partnerships across industries (Kruss, 2008). Industry-related diversity also has been highlighted in prior research as a critical way to achieve technology transfer (Chunhua, Mengchun, & Baojun, 2011) and used as a primary mechanism for successful new market entry (Hirt, Smit, & Wonsik, 2013).

It has been argued that being involved with several alliances under a coordinated portfolio approach can provide value beyond that of individual alliances (Anand et al., 2007). Primary among the potential benefits, portfolios of alliances with other firms have a significant impact on a firm's innovation (Sampson, 2007) and overall firm performance (Jiang et al., 2010). Therefore, alliance portfolio diversity has also been identified as a salient construct when addressing the influence of alliance partnerships on a focal firm's performance (Cui & O'Connor, 2012). Improved firm performance is supported when inter-firm collaboration occurs within a diverse portfolio of alliances (Cui & O'Connor, 2012).

The optimal level of alliance portfolio diversity has emerged as a critical issue for managers and scholars as it is seen as a driver of the type and extent of knowledge transferred and overall firm performance (Collins, 2013; Vasudeva & Anand, 2012). It is widely recognized that managers use alliances to gain access to timely and relevant knowledge beyond what their firms can obtain alone (Hoffman, 2005). Alliances facilitate sharing between firms by establishing communication conduits enabling effective interactions between partnering firms to share best practices and other knowledge, to collaborate on joint problems, and to develop joint competencies (Kale & Singh, 2007; McGill & Santoro, 2009). Knowledge gained from alliance partners can enhance firm performance by increasing innovativeness and adaptability and by helping firms to recognize new opportunities (Gupta & Misra, 2000; Jiang et al., 2010).

Some have suggested that alliance partners with similar knowledge enjoy greater success in learning, innovation, and performance (Ahuja, 2000). Partner homogeneity may reduce conflict, facilitate knowledge sharing and assimilation, and enhance trust. Some research on individual alliances has provided support for this perspective, finding that as similarities increase, partners are more likely to share knowledge and to improve their innovation performance (Ahuja, 2000; Darr & Kurtzberg, 2000). However, others suggest that homogenous partners may be less able to take advantage of new opportunities and to generate innovative ideas and new capabilities because sharing similar knowledge and resources may be limiting (Hitt et al., 2001). Alliance partners having disparate knowledge, perspectives, technologies, and experiences can potentially learn more from each other, have a broader perspective, and be more innovative and creative, resulting in better performance than firms with more homogenous alliance portfolios (Beckman & Haunschild, 2002; Capaldo, 2007). These arguments have also been confirmed by empirical research that found that firms with a wide range of partners outperform those with more homogenous alliance partners (Baum et al., 2000).

Attempting to reconcile the contradictory arguments and findings, recent studies have tested and found a more complex relationship. Sampson (2007), using a telecommunications industry sample comprised primarily of U.S. and European firms, found an inverted U-shaped relationship between alliance technological diversity and performance. As diversity rose, performance improved until at high levels of diversity, performance began to decline. Thus, alliances with moderately diverse technological knowledge contributed more to firm innovation than alliances characterized as having relatively high or low levels of diversity. The study concluded that while increased technological diversity among partnering firms improved performance to a point, as

diversity became too high, the ability of firms to assimilate knowledge began to decline and performance suffered.

As alliance portfolio diversity begins to increase, firms should experience improved performance due to the benefit of having access to complementary stocks of knowledge (Rodan & Galunic, 2004). This knowledge can be combined in meaningful ways with a firm's existing knowledge, enabling the firm to capture new operational efficiencies, redesign their products and processes, and enhance product/service features. However, the relationship is expected to eventually become negative as the knowledge acquired via the portfolio of alliances becomes so diverse that it is increasingly difficult for partners to communicate and combine their knowledge and capabilities. Therefore,

> *Hypothesis 1: A curvilinear (inverted U-shape) relationship exists between alliance portfolio diversity and firm performance.*

Alliance Portfolio Characteristics

While firms are expected to benefit from alliance portfolio diversity as that diversity initially increases and then see the benefits diminish as alliance portfolios become overly diverse, they are better able to realize gains from such diversity when their alliance partnerships are marked by frequent and intense interactions (White & Lui, 2005). Therefore, certain alliance portfolio characteristics are argued to moderate the relationship between alliance portfolio diversity and firm performance. Embeddedness, the extent to which exchanges between partnering firms are shaped by social relations, directly influences the amount and quality of knowledge available via these partnerships (Uzzi, 1996). Repeated exchanges build trust and improve both the stability of relationships and knowledge sharing (Hagedoorn, 2006). Because not all firms are equally embedded, firms are likely to differentially benefit from a diverse alliance portfolio.

In part, the nature of connections held by a focal firm determines the degree to which the exchange of high quality, complementary stocks of knowledge is possible (Uzzi & Gillespie, 2002). Being highly embedded leads to close and detailed interactions, enabling firms to "create common languages, problem definitions, and problem solving heuristics" (Cowan & Jonard, 2009, p. 322) and to address problems that are difficult to understand and solve. Embeddedness also reduces information asymmetry problems (Hagedoorn, 2006). In addition, reputation benefits accrue to deeply embedded firms, which are often viewed as desirable partners that can provide access to knowledge and to potential partnership opportunities with other firms (Brass, Butterfield, & Skaggs, 1998). Embedded firms therefore, have knowledge-related and reputational advantages that increase the probability they will continue to access additional knowledge by entering into future alliances (Cowan, Jonard, & Zimmerman, 2007).

The presence of alliance portfolio characteristics that promote cooperative behaviors can help firms overcome the downsides of alliance diversity. For example, Artz and Brush (2000) found that the performance of diverse alliance partners improved as the connections between the parties deepened, enhancing trust and increasing opportunities for retaliation if either partner behaved opportunistically. Therefore, a firm can expect cooperation from others in its portfolio of alliances and a reduced

threat of opportunistic behavior by affecting actors' motivations, expectations, and decision-making processes (Capaldo, 2007, Uzzi, 1996). Here, two specific alliance portfolio characteristics are examined, reciprocity and status similarity, that are expected to significantly influence the ability of firms to combine diverse knowledge to improve overall firm performance, thereby moderating the relationship between alliance portfolio diversity and firm performance. Reciprocity is examined because it shapes the formation of attitudes regarding appropriate behavior by partnering firms. Status similarity is investigated because it influences the extent to which firms are willing to engage in various behaviors in regards to their alliance partners.

Reciprocity

Firm-to-firm connections encourage reciprocity in which actors will behave in a manner consistent with expectations while not receiving any direct benefit in return. Reciprocity is the expectation that partnering firms will make "quid pro quo exchanges within the group" (Das & Teng, 2002, p. 449). If reciprocity exists, the risk of opportunistic behavior is lowered significantly, coordination costs are reduced, and the likelihood of cooperation is enhanced (Artz & Brush, 2000). Should a party in an exchange violate an existing partnership norm, other firms have "a context for generalized reciprocal 'retaliation', defined broadly as the repayment of injurious or otherwise undesired acts" (Westphal & Zajac, 1997, p. 164). In other words, opportunistic behavior by one party in the current period can be met by opportunistic behavior by the other party in the next. Similarly, cooperation can be met with cooperation. Reciprocity increases a firm's willingness to incur short-term disadvantages since they are confident that future opportunities to recoup any concessions will exist.

The level of reciprocity within a firm's alliance portfolio is argued to moderate the relationship between alliance portfolio diversity and firm performance. A firm that violates norms can be collectively punished by numerous alliance partners or selectively punished by individual firms. The possibility of reciprocal behavior causes partnering firms to focus on actions that enhance relationships and discourage self-serving behaviors (Parkhe, 1993). Thus, firms are more willing to share proprietary knowledge, invest in alliance specific assets, and engage in joint activities to integrate knowledge (Artz & Brush, 2000). Thus, fear of damaging the firm's reputation is often a motivating factor to abide by reciprocity expectations. As a result, while greater alliance portfolio diversity can increase the difficulty of coordinating knowledge between partnering firms, reciprocity is expected to moderate those pitfalls and improve firm performance. Thus,

> *Hypothesis 2: Reciprocity within an alliance portfolio positively moderates the relationship between alliance portfolio diversity and firm performance.*

Status Similarity

Firms tend to pursue alliance partners that differ in some dimensions, but are similar in others (Kim & Higgins, 2007). Differences in technologies, knowledge and other capabilities can provide complementarities that create significant value (Hamel, Doz, & Prahalad, 1989). The potential benefits that accrue from such diversity can be

difficult to realize because of communication and coordination difficulties. Firms, then, have a tendency to also seek partners who are similar on some dimensions, as these similarities encourage social bonding, build trust and facilitate knowledge sharing. Thus, alliances are most successful when partners possess some complementary resources and capabilities, yet are similar enough to facilitate the social bonding necessary for effective coordination (Kim & Higgins, 2007).

Firm status, the prominence achieved by a firm, is one of the dimensions in which similarity influences alliances (Lin, Yang, & Arya, 2009). Status derives from the firm's ability to exercise power and influence over other alliance partners (Swaminathan & Moorman, 2009). Status, which is determined by patterns of affiliations and previous exchanges, strongly influences how potential partners view a firm's capabilities, quality, and reputation (Podolny, 1994).

Much of the existing alliance literature has focused on how status affects partner selection. Certainly, there are significant moral hazards (e.g., uncertainty and the possibility of opportunistic behavior such as stealing a partner's technology) that make alliance formation risky (Gulati & Sytch, 2007). One of the ways to alleviate these threats is through the development of close ties, which are important because extensive relations promote trust. Close ties allow firms to deeply understand each other's capabilities and thereby develop shared norms, evaluation processes, and knowledge-sharing routines (Walker, Kogut, & Shan, 1997). Extensive relations between alliance firms encourage each party to commit significant relationship-specific investments that only have value if a productive relationship between the parties is maintained. Close ties also promote joint problem-solving and the transfer of detailed knowledge (Uzzi, 1996). Greater knowledge sharing increases the likelihood that opportunistic behavior will be discovered and that such behavior will quickly become known to other related parties, thus damaging the offender's reputation (Gulati, Nohria, & Zaheer, 2000).

Partnering with firms of similar status creates close ties leading to numerous relationship dynamics that can enhance trust, facilitate knowledge sharing, and of primary concern in this research, moderate the alliance portfolio diversity-performance relationship. For example, high-status firms are very selective in their choice of alliance partners, as their status, reputation, and performance can suffer greatly from affiliations from disreputable partners (Stuart, 2000). As a result, high-status firms have been found more likely to ally and to form close relations with firms of similarly high status (Chung, Singh, & Lee, 2000; Lin et al., 2009). Others have suggested that firms of similar status assume that knowledge acquired is accurate and relevant, encouraging the exchange of more fine-grained knowledge, and further deepening ties between firms. In contrast, knowledge from firms with a lower status position is frequently less trusted and valued by other firms (Westphal & Zajac, 1997). Status similarity also lessens the power differential between partners and promotes mutual dependence (Gulati & Sytch, 2007). This mutual dependence means that the action of one partner is increasingly influenced by the actions of the other. Status similarity thereby encourages commitment and fairness and prompts firms to equally share alliance responsibilities, costs, and benefits.

While the potential benefits described above help to explain the empirical findings that firm status matters in alliance formation and that firms prefer to ally with others

of similar status, the management of alliances between firms of similar status are not without problems. An alliance between low-status firms in which neither firm possesses the experience nor systems necessary to manage relationships, can make the alliance difficult and unproductive. Moreover, such alliances may not provide the positive reputational and legitimacy effects necessary to attract additional higher status alliance partners and improve performance (Lin et al., 2009). Alliances between high-status firms can also be problematic because each partner wields significant power and influence. This power can result in conflict if either firm acts self-servingly and seeks to redistribute the overall value of the relationship in its favor (Gulati & Sytch, 2007).

It is also true that many alliances form between partners of different status. High-status firms may ally with low-status firms to access particular technologies or technical skills (Deeds & Hill, 1996). Low-status firms may ally with high-status firms to access new markets, speed product development, and enhance their reputations (Lin et al., 2009). However, alliances between firms of different status are likely to be more limited in scope and yield fewer potential benefits. In such alliances, the higher status firm may not fully commit its resources to joint efforts since the additional resources provided by the low-status firm may not greatly boost performance. Yet, the lower status firm expects the higher status firm to commit more resources as a sign of its commitment to the alliance. Thus, the expectations of firms of differing status are likely to diverge, leading to conflict. These conflicts usually make alliances between firms of dissimilar status less effective than those between firms of similar status (Chung et al., 2000).

The above arguments suggest that alliances between firms of similar status have a greater potential to provide significant value than those between firms of different status. Therefore it is posited that as status similarity between firms increase, it will have an increasingly positive effect on knowledge sharing, joint problem solving, coordination, and the like. These relationship characteristics will increase the ability of firms to realize the benefits from alliance portfolio diversity. Therefore,

> *Hypothesis 3: Status similarity within an alliance portfolio positively moderates the relationship between alliance portfolio diversity and firm performance.*

Methodology

Data and Measures

The sample consisted of a randomly selected panel of 300 Standard & Poor's 500 firms between 1999 and 2004. Alliance data were from the Securities Data Corporation (SDC) Database on Alliances and Joint Ventures, and financial data were from Compustat. The analyses in this study were based on a fixed-effects approach to control for omitted variables. Moreover, since the data for this study were panel data, cross-sectional time-series regression analysis were utilized to control for heteroskedasticity, autocorrelation among error terms, and contemporaneous correlation among residuals (Certo & Semadeni, 2006).

Dependent Variable

The dependent variable, *firm performance,* was operationalized as the return on

assets (ROA) in each year of the study. ROA was lagged by one year for each year within the window of observation (Zaheer & Bell, 2005).

Independent Variables

Alliance portfolio diversity was calculated as a heterogeneity index (Blau, 1977; Blau et al., 1982) related to the four-digit SIC codes of each firm with which a focal firm had an existing joint venture (JV) relationship. A high score indicated a high degree of diverse potential knowledge which could be exchanged between partner firms. This measure was calculated as:

$$1 - \sum p_i^2$$

where p was the proportion of sample in a given category, and i was the number of different categories across the sample.

Index measures are commonly used to assess diversity in categorical data. A perfectly homogeneous population would have a diversity index score of zero. A perfectly heterogeneous population would have a diversity index score of one (assuming infinite categories with equal representation in each category). As the number of categories increased, the maximum value of the diversity index score also increased.

Reciprocity was operationalized using density of a firm's alliance ties, a proxy for the overall level of reciprocity facing a firm (Wasserman & Faust, 1994). The density of each firm's ties was the ratio of its total number of ties to the total possible ties (Carrington, Scott, & Wasserman, 2005). The total possible connections for each firm represented the total number of connections which would exist if all firms in the sample were uniformly connected with all other firms via one direct connection. Thus, the total number of ties was calculated and then divided by the total possible connections. The total number of possible connections was defined as the number of connections required to connect all firms in this study via direct ties (Carrington et al., 2005). This measure was appropriate given "greater density makes ideas about proper behavior more likely to be encountered repeatedly, discussed and fixed; it also renders deviance from resulting norms harder to hide and, thus, more likely to be punished" (Granovetter, 2005, p. 34).

Status similarity was arrived at by first calculating the focal firm's and each partner firm's centrality in their alliance portfolio, which was a frequently used measure of firm status (Bonacich, 1987; Salk & Brannen, 2000). Centrality indexes measured the degree to which an actor was close to all other firms in the sample, either directly, or indirectly. A firm that was maximally close was directly related to all other sample firms. Mediated relationships were accorded increasingly less weight than direct relationships with each intervening node. Numerous approaches to measuring centrality existed in the literature (see Bonacich, 1987; Freeman, 1979). The primary interest for this study was 'betweenness' centrality, based on Freeman's (1979) formula (Carrington et al., 2005). This formula summed the probability of a firm falling on the shortest path between any two pairs of firms over all unordered pairs of firms. This value was then divided by $(n^2\text{-}3n + 2)/2$, where n equaled the number of firms in the sample.

The measure reflected the extent to which a focal firm mediated the knowledge flows between any two other firms. Then the ratio of the smaller to the larger centrality score of the focal firm and each of its partners was computed. The closer this ratio was to 1.0, the more similar the two firms' structural positions were (Gulati & Gargiulo, 1999; Podolny, 1994). Finally, status similarity was computed as the average ratio across all of a firm's partners.

Control Variables

Firm age was operationalized as the natural log of the number of years since the initial founding of each firm. *Firm diversification* was based on an entropy measure to calculate product diversification (Collins et al., 2009; Palepu, 1985), and *firm size* was measured as the log of number of employees. Industry-level controls included *industry revenue growth,* measured as the average level of revenue growth for firms in each industry represented in the sample, and *industry capital intensity,* measured as the average level of property, plant, and equipment held by firms within each industry. At the firm-level *revenue growth* and *capital intensity* were each control variables. Finally, two control variables related to a firm's alliances were also included: *total number of alliances* and *average duration of alliances*.

Empirical Results

Table 1 provided a correlation matrix while Table 2 reported the results for the hypotheses testing. The results of the analyses provided general support for the first two hypotheses. The curvilinear relationship between *alliance portfolio diversity* and *firm performance* supported Hypothesis 1. Firm performance initially increased as alliance portfolios became more diverse, before turning negative at higher levels of diversity. This result suggests firms indeed benefitted as they initially developed a more diverse set of alliance partnerships. Eventually managing a very diverse portfolio of partnerships became detrimental to the focal firm as it was increasingly difficult for partners to communicate and combine their knowledge and capabilities. *Reciprocity* positively moderated the relationship between *alliance portfolio diversity* and *firm performance,* confirming Hypothesis 2. This result indicated that firms benefit as they developed higher levels of reciprocity within their alliance portfolios. Reciprocity led to firms being more willing to share proprietary knowledge, engage in joint activities to integrate knowledge, and invest in alliance-specific assets. As a result, while greater alliance portfolio diversity could increase the difficulty of coordinating knowledge between partnering firms, reciprocity was expected to moderate those pitfalls and improve firm performance.

Somewhat surprisingly, Hypothesis 3 was not supported. Status similarity negatively moderated the *alliance portfolio diversity-firm performance relationship,* contradicting the expected positive moderating effect. This result indicated firms may actually garner more benefits from having alliance partners of dissimilar status positions. The control variables *firm age, firm size,* and *firm capital intensity* were each statistically significant in the analyses. In the full model, *industry revenue growth* was also significant.

Table 1: *Correlation Matrix*

	Mean	Std Dev	1	2	3	4	5	6	7	8
1. Firm Performance	0.03	0.62	1.00							
2. Firm Age	4.28	3.91	0.14	1.00						
3. Firm Size	3.70	4.11	0.23 *	0.11	1.00					
4. Diversification	0.69	0.11	-0.01	0.17	0.31 *	1.00				
5. Firm Revenue Growth	0.49	0.69	0.02	-0.05	-0.10	-0.03	1.00			
6. Firm Capital	8.21	1.37	0.17	0.22 *	0.23 *	0.06	0.02	1.00		
7. Industry Revenue Growth	0.03	0.05	0.08	0.32 **	0.02	0.01	0.00	0.41 ***	1.00	
8. Industry Capital Intensity	6.25	1.57	0.08	0.21 *	0.14	0.26 *	0.01	0.43 ***	0.47 ***	1.00
9. Total Number of Alliances	3.42	8.68	0.09	-0.06	0.21 *	0.18 *	0.00	0.37 **	0.02	-0.06
10. Duration of Alliances	11.50	34.26	0.05	0.06	0.06	0.15	-0.02	0.39 **	0.26 *	0.18 *
11. Alliance Portfolio Diversity	0.64	0.18	0.04	0.07	0.04	0.13	0.03	0.39 **	0.17	0.16
12. Reciprocity	0.20	0.26	-0.03	0.00	0.02	0.20 *	-0.02	-0.17	-0.03	0.00
13. Status Similarity	0.19	0.58	0.08	-0.10	0.17	0.14	0.00	0.35 **	0.04	-0.04

	Mean	Std Dev	9	10	11	12	13
9. Total Number of Alliances	3.42	8.68	1.00				
10. Duration of Alliances	11.50	34.26	0.51 ***	1.00			
11. Network Diversity	0.64	0.18	0.41 ***	0.34 **	1.00		
12. Reciprocity	0.20	0.26	-0.43 ***	0.00	0.05	1.00	
13. Status Similarity	0.19	0.58	0.25 *	0.44 ***	0.30 *	-0.20 *	1.00

n = 1315

* = p<.05; ** = p<.01; *** = p<.001

Table 2: *Regression*

Dependent Variable = Firm Performance	Model 1		Model 2		Model 3	
Firm Age	0.002	***	0.002	***	0.002	***
Firm Diversification	0.024		0.014		0.012	
Firm Revenue Growth	0.001	*	0.001		0.005	
Firm Size	0.033	***	0.022	**	0.026	**
Firm Capital	0.026	***	0.026	***	0.030	***
Industry Revenue Growth	-0.010		-0.011		-0.024	†
Industry Capital	-0.006		-0.005		-0.008	
Total Number of Alliances	0.000		0.000		0.000	
Duration of Alliances	0.000		0.000		0.002	
Alliance Portfolio Diversity	0.343	**	0.554	***	0.384	**
Alliance Portfolio Diversity^2	-0.317	**	-0.630	***	-0.467	**
Reciprocit			0.285	**	0.304	**
ReciprocityXDiversity					0.189	*
Status Similarity			-0.234	*	-0.239	*
Status					-0.335	**
Wald chi^2	48.99	***	65.17	***	71.49	***

† = p<.10
* = p<.05
** = p<.01
*** = p<.001
n = 1315

Discussion

The findings here added evidence to the small, but growing number of studies that have examined the relationship between alliance portfolio diversity and overall firm performance. The findings of this study supported the hypothesized inverted-U relationship between alliance portfolio diversity and firm performance. This study's findings were in line with Sampson (2007), despite the fact that her study used an

innovative performance measure, post-alliance patents, and the focal study used a financial performance measure. Both studies found an inverted-U relationship.

Another significant contribution of this study was that the findings showed that alliance portfolio characteristics (i.e., reciprocity and status similarity), were significant moderators of the alliance portfolio diversity-performance relationship. As predicted and consistent with past findings, reciprocity positively moderated the relationship between diversity and performance (Artz & Brush, 2000; White & Lui, 2005). Reciprocity was expected to positively moderate this relationship because norms of reciprocity would mitigate some of the coordination costs associated with sharing knowledge across alliance partnerships. Those firms that were more heavily embedded in alliance relationships did see a benefit to firm performance.

The findings on status similarity complemented the alliance portfolio diversity finding. It was expected that firms with alliance portfolios characterized by greater status similarity would experience performance benefits and that status similarity would positively moderate the returns to diversity. Instead, both the main and moderating effect for status similarity were negative. Thus, diverse alliance portfolios offer greater returns. This finding supported the growing emphasis of the benefits of accessing diverse knowledge across a firm's portfolio of partnerships.

High-status firms were likely to have developed alliance management mechanisms and expertise. Because alliance management capability was firm-specific, the particular processes and practices that comprised alliance management capabilities varied from firm-to-firm. Low-status firms, while they may be very successful in a particular alliance, were less likely to have highly ingrained alliance management capabilities (Winter & Szulanski, 2001). Two high-status firms with different alliance capabilities may experience a higher degree of conflict as both seek the upper hand and because there were disagreements about which partners' firm-specific processes and structures to use. Low-status firms may lack the well-established processes that have been honed through past alliances, making them less efficient and/or effective in structuring and managing an alliance. On the other hand, when a low-status and high-status firm partner, there may be less conflict and the high-status firm will often take the lead in ensuring that appropriate and effective structures and management are in place. A lower status firm may cede leadership in this area because certain firms tend to be perceived by others as being more expert in executing and managing alliances (Hamel, 1991) and centrally-located (i.e., high-status) firms are likely to be perceived this way.

In sum, the results of this study suggested that one must be cautious in applying findings about what leads to success at an individual alliance level to the firm-level effects of alliances. Future studies also must be cautious in equating factors that have been found to increase the propensity to form an alliance with factors that will enable a firm to benefit from its portfolio of alliances.

Limitations/Future Research

One limitation of this study is the lack of control for technological complexity of the alliances in the study. Certainly the nature of the knowledge utilized within a given alliance can vary greatly. Including either a control variable or a fine-grained predictive

variable in future research would make for interesting studies. Future work could also further the understanding of factors that positively and negatively impact alliance portfolio diversity. In addition to variables such as number and strength of social capital connections held by a firm's key executives, it also would be worthy of study to test whether specific governance mechanisms, organizational structure, or resource configurations have an impact on alliance portfolio diversity. The organizational context within which firm-level choices are made surely has an influence on firms' alliance partner selections. Therefore, examining that context could provide an even richer understanding of alliance portfolios.

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Industry Peer Networks: Constructive Collaboration for Effective Marketing and Management Practices

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With small businesses becoming increasingly important to economic growth and job creation, there must be new ways of structuring to take advantage of collaboration and to be able to compete against large firms. Industry peer networks (IPNs) have emerged to meet this challenge. This study investigates the processes and effectiveness of an IPN whose member small firms are located in the United States, Canada, the United Kingdom, and Australia. The findings suggest that the more socially embedded the IPN members are within their respective peer groups (i.e. organizing IPN-related activities, partnering with business endeavors, discussing and advising each other about business issues, and participating in socializing activities), the higher the perceived level of learning in marketing and management practices. The findings also suggest that the implementation of transformational leadership practices is partially mediated by the perceived level of management learning, but the width of the product portfolio was not mediated by the perceived level of marketing learning.

Successful small business founders are often characterized as being innovative, proactive, and having a strong risk-taking propensity (Covin & Slevin, 1989; Wiklund & Shepherd, 2003). In an ever-changing and increasingly competitive environment, apart from having an entrepreneurial orientation, small business founders need to collaborate and network with external entities to enhance the effectiveness of their operations. Mentors, advisory boards, and trade associations are the traditional external resources for small businesses owners. Mentors can play a critical role in providing the heads of small businesses with crucial opportunity-related information, such as information on industries, technologies, markets, and government policies (Ozgen & Baron, 2007). Active and able advisory boards contribute valuable advice related to operational problems and help founders of new ventures develop strategic networks with their environment (Borch & Huse, 1993). As for trade associations, members collaborate to lobby the state, set industry standards, and develop joint marketing programs (Zuckerman & Sgourev, 2006).

Although these traditional outside resources have been useful, with increased competitiveness, the time has come for new thinking and new collaborative structures for small businesses such as found in industry peer networks (IPNs). IPNs are a unique form of "parallel peers" in which the members of the network belong to a subsegment in a given industry that draws on similar inputs to provide similar goods or services targeted to different sets of customers, such as automobile dealers with well-defined sales territories. These non-competing (and non-colluding) members gather regularly in small groups (typically 20 or fewer carefully selected members), in an atmosphere of significant trust, to share knowledge, exchange information about industry trends beyond their core markets, and discuss issues related to company performance (Sgourev & Zuckerman, 2006). Such private information is often hard to obtain either through the market or other social relationships, such as rivals and suppliers.

In their own way, IPNs embody many important characteristics of mentors, advisory boards, and trade associations. Individual members often discuss their management issues one-on-one with specific peers whom they identify as mentors. Moreover, during a typical IPN meeting, a facilitator guides the members to present their operational/financial data, discuss their management, finance, and marketing issues, and provide constructive criticism of their business. In other words, the group members act as an advisory board for each of the members. It is also not uncommon for members to collaborate together to achieve a common goal, such as submitting business proposals together. Through face-to-face meetings and electronic communications in between the meetings, IPN members stave off problems of myopia and inertia by staying current with industry changes, learning vicariously from the experiences of their peers, and collaborating on mutually beneficial projects (Sgourev & Zuckerman, 2006).

The two major objectives of this article are to show how industry peer networks facilitate business learning among founders of small businesses and to shed light on how participating in IPN activities positively influences business performance in terms of marketing and management practices. After providing the theoretical foundation and deriving the study hypotheses, the context and results will be presented. The paper will conclude by discussing the key findings and considering the practical implications of the lessons learned from the investigation.

Theoretical Foundation and Study Hypotheses

Meaning and Dynamics of Industry Peer Networks

Previous cross-industry research has suggested that IPNs are most common in retail and service industries as they draw on similar inputs but serve customers in non-competing geographic areas. It is estimated that about 10% of U.S. retail and service industries have one or more IPNs, with incidence rates ranging from about 1% (e.g., residential remodeling) to 25% (e.g., auto retailing) (Zuckerman & Sgourev, 2006). Prior research has also suggested that IPNs are likely to be absent in manufacturing and distribution industries as firms in these industries tend to operate across geographic boundaries such that parallel (i.e., noncompeting) peers are unlikely to exist (Zuckerman & Sgourev, 2006).

Although IPNs should intuitively provide a lot of value to their members, they also require members to invest time and effort in maintaining active membership. IPN members are generally selectively admitted. For example, the admission of a prospective member into an established peer group may require unanimous consent of the existing group members. Also, members of a peer group typically have similarly sized companies, comparable business models, and do not compete in the same geographic markets (Zuckerman & Sgourev, 2006).

Apart from paying membership dues and receiving information of industry trends (as a "spectator"), members are also expected to actively participate (as a "player") in all formal and informal IPN activities. Some of the formal activities include attending face-to-face quarterly meetings that last two to four days, interacting with vendors during annual (or bi-annual) IPN conferences, and sharing operational/financial data in a prescribed template to allow for easy benchmarking. Members who fail to consistently engage in these activities are often voted out by their peers. In other words, membership within a peer group is dynamic and changes over time, as new members are inducted into peer groups while non-contributing members are expelled. Therefore, myopic vision is avoided as new perspectives are regularly introduced and stimulated by new members.

Of special interest to this study was that IPN peer group activities are set up to help members achieve a high level of learning (Zuckerman & Sgourev, 2006). In particular, IPNs may have discussion guidelines in place to encourage disclosing key performance information. This practice allows members to maintain a big-picture orientation, as the open disclosure of financial information allows companies to compare how they are performing relative to their peers. Thus, IPN members are exposed to alternative business models, and their performance impact, that are not available through their local market. This practice allows member firms to learn vicariously through the successes and/or failures of other parallel peers within their groups.

Finally, IPNs also provide a trusting environment for firms to acquire and absorb complex tacit knowledge that would otherwise be difficult to obtain. Beyond mere observation of other firms' activities, IPN members are encouraged to critique one another and challenge each other's assumptions in order to facilitate the learning process and instill accountability of management actions for their members.

Social Embeddedness and Organizational Learning

If the social interactions among IPN members were only limited to quarterly face-to-face meetings, it is unlikely that they would develop strong, trusting ties, and open their books to share confidential information. While veteran members might be willing to share their private operational/financial data with peers, new affiliates might be more reluctant to open up during initial meetings. To facilitate information sharing and knowledge transfer, IPNs are set up to encourage the development of what has become known as "swift trust" (Meyerson, Weick, & Kramer, 1996). Apart from meeting their peers formally for quarterly group meetings, IPN members are generally encouraged to also network with their colleagues intensively between meetings. These activities include participating in monthly teleconferencing, conducting on-site visits at peer firms, and communicating privately via phone, e-mail, or publicly via listserv or chat boards to discuss organizational issues. Moreover, even during quarterly meetings, significant time is allocated for socializing activities such as prayer breakfasts, organized morning jogs, golf tournaments, card games, and dining out. These informal ties facilitate the development of embedded relationships among IPN members. Therefore, it becomes important to examine what impact these formal and informal types of IPN networking activities have on the learning of effective marketing and management practices for small business founders.

Extant research on social networks has demonstrated that network members acquire knowledge through repeated and enduring exchange relationships (Inkpen & Tsang, 2005). Network size, accessibility, and diversity are associated with the founding, legitimacy, and future profitability of new ventures (Aldrich, Rosen, & Woodward, 1987; Dubini & Aldrich, 1991). Individuals and organizations develop the relational dimension of exchange relationships through a history of frequent and close interactions (Krackhardt, 1992). Through these exchanges of information, individuals and organizations are able to access and leverage resources embedded in relationships. Weak network ties are characterized by infrequent contact between individuals but do offer flexibility and access to new information (Burt, 1982; Granovetter, 1973). Such weak network ties have been identified as critical for opportunity discovery (Elfring & Hulsink, 2003).

By contrast, strong network ties are characterized by frequent contact. The social embeddedness of these strong network ties are more likely to promote an in-depth and efficient exchange of information between network partners (Kraatz, 1998) and facilitate vicarious learning from the insights and experiences of peers (Hansen, 1999; McFadyen & Cannella 2004). In addition, research has also stressed the need for strong tie networks that can provide sufficient density and diversity to establish the legitimacy of a new venture (Dubini & Aldrich, 1991). Finally, the trust and mutual identification among network partners with strong ties makes it more likely that valuable tacit knowledge will be shared and acted upon (Lubit, 2001), resulting in better firm performance (Collins & Clark, 2003) and start-up success (Baum, Calabrese, & Silverman, 2000).

Based upon the above, it is hypothesized that socially embedded ties will be positively associated with a high level of organizational learning, particularly in the areas of effective marketing and management practices. Although marketing and

management principles may be learned via codified formats (e.g. books and trade newsletters), the tacit knowledge of implementing effective marketing strategies and executing effective management practices (e.g., partnering with specific vendors, offering leadership retreats for management teams) is not easily transmitted in written documents. Trustworthy, embedded relationships are a prerequisite for the transfer of complex knowledge (Hansen, 1999), particularly among small business founders who often obtain new information filtered through their social contacts (Martin, 2009). For example, it has long been understood that friendship and colleague networks are instrumental in product-related decisions such as the adoption of new industrial technology (Czepiel, 1974) or the introduction of new drugs to patients (Coleman, Katz, & Menzel, 1957). Therefore, for this study the following is hypothesized:

> *Hypothesis 1a: The higher the level of social embeddedness, the higher the perceived level of marketing learning.*

Moreover, interorganizational networks also encourage the spread of management practices, such as matrix management (Burns & Wholey, 1993), human resource compensation strategies (Westphal, Seidel, & Stewart, 2001), foreign country entry decisions (Connelly et al., 2011), and acquisitions and mergers (Haunschild & Beckman, 1998). Therefore, the following is hypothesized:

> *Hypothesis 1b: The higher the level of social embeddedness, the higher the perceived level of management learning.*

Consequences of Learning

Apart from acquiring new knowledge, another major motivation for small business founders to join an IPN would include being held accountable for their business decisions. As mentioned previously, IPNs serve as a *de facto* "board of directors" for network members. The role of peer network members is to provide advice and hold each other accountable for improving performance by applying the knowledge acquired through the IPN or other sources (Zuckerman & Sgourev, 2006). Nevertheless, prior IPN research has not directly measured the consequences of learning (i.e., if small business founders implement the recommended practices after they have been exposed to new knowledge about industry trends and effective management practices). Therefore, an interesting research question is whether the learning gained as an IPN member translates to improvement in business performance.

Research on organizational learning suggests that companies with a strong learning orientation are likely to engage in a high level of market information-processing behaviors, which in turn increases the degree to which companies make changes in their marketing strategies (Sinkula, Baker, & Noordewier, 1997). Specifically, a firm's learning orientation is likely to facilitate generative learning that leads to innovations in products, procedures, and systems (Baker & Sinkula, 1999). Moreover, a learning orientation helps firms improve their relative market share, new product success, and business performance by improving the quality of their market-oriented behaviors (Baker & Sinkula, 1999; Mavondo, Chimhanzi, & Stewart, 2005) and by increasing

flexibility and proactivity in allocating resources (Hughes, Morgan, & Kouropalatis, 2008), especially under high environmental turbulence (Hanvanich, Sivakumar, & Hult, 2006).

However, many of the above performance measures do not necessarily apply to small businesses. For example, the operations of a small business may be limited to product reselling that has only negligible market share in its sales territory. Small businesses often do not conduct separate analysis for marketing decisions from other business decisions. They perceive the various functional issues are highly intertwined and often lack the expertise that distinguish between the various business issues in order to implement "business decisions." This is especially true among those who start their companies with only technical competencies and have no prior knowledge or experience in business management (Carson & Gilmore, 2000). In addition, small business founders often lack experience, knowledge, and education in strategic planning. Instead of focusing on price, small businesses tend to prioritize quality, delivery performance, responsiveness, flexibility, and service in choosing their suppliers in order to maintain their operations and solve their problems (Ellegaard, 2009).

In this study, the consequences of marketing learning on the width of IPN members' product portfolio were specifically examined. Such product offering is generally recognized to be the heart of marketing strategy. As the technological environment evolves, members with a high level of marketing learning are likely to partner with more vendors, so as to keep up with the changes in external industry trends and customer needs. Thus, the following hypothesis is tested:

> *Hypothesis 2a: The higher the perceived level of marketing learning, the greater the width of the product portfolio. That is, marketing learning mediates the relationship between social embeddedness and the width of the product portfolio.*

As for the consequences of management learning, the extent that IPN members have carried out transformational leadership practices was examined. While small business founders have a diverse set of knowledge, skills, and abilities, competencies in the area of management can be developed with the growth and expansion of their businesses (Lichtenstein & Lyons, 2010). A transformational leadership approach by small business founders is recognized to stimulate and inspire employees to both achieve extraordinary outcomes and, in the process, develop their own managerial effectiveness (Bass & Riggio, 2006). Moreover, transformational leaders do not merely react to circumstances in the competitive environment, they also attempt to shape and create the future. Transformational leadership has also been found to be positively related to subordinate satisfaction and performance (Lowe, Kroeck, & Sivasubramaniam, 1996). Specifically, small business founders who practice transformational leadership are likely to meet the challenges of adapting and growing their companies to an ever-changing business environment. Therefore, the following hypothesis is presented:

> *Hypothesis 2b: The higher the perceived level of management learning, the greater the extent of implementation of transformational leadership*

practices. That is, management learning mediates the relationship between social embeddedness and the implementation of transformational leadership practices.

Study Context and Method

IPN members of "technology industry resellers" were studied. What began in 2005 as an informal gathering of 12 small companies in the Midwest expanded to include groups based throughout the United States, Canada, the United Kingdom, and Australia. As of December 2009, there were 22 peer groups in the network, comprised of 6 to 12 firms in each peer group. The peer group members gather each quarter for several days of intense face-to-face meetings. Peer group members also communicate with each other extensively throughout the year via electronic means. In addition, the IPN under investigation holds bi-annual "ALL" conferences in which all members of the 22 peer groups convene together. During the ALL conference, in addition to the meetings with their own peer group, IPN members attend special sessions and events that provide them with opportunities to meet people outside of their own peer group.

Data gathered for this study were generated from observations and interviews conducted during face-to-face peer meetings and sessions held during the ALL conference, along with numerous communications with the IPN founder, committee chairpersons, and peer group facilitators. The cases with missing data were not included in the analysis, yielding an effective sample size of 111. Based on the understanding of the context, a longitudinal survey was developed to track the social interactions and the level of learning of the members. The findings reported here are based on this survey data.

Dependent Variables

To test the learning hypotheses, two dependent variables were used: marketing and management learning. The two variables were measured with a list of five and seven items respectively, adapted from a knowledge transfer scale developed by Griffith, Zeybek, and O'Brien (2001). Additional items, such as industry trends and peer benchmarking, were included in the "management learning" variable based on insights that emerged during initial fieldwork. Specifically, respondents indicated how much new knowledge they acquired from their peer groups in the past 12 months. An index was constructed by adding the responses to each item (α = .88 for marketing learning and α = .90 for management learning).

To test the mediation model hypotheses, two dependent variables were used: product portfolio and transformational leadership. Product portfolio was measured by adding a list of 28 supplier relationships that are relevant to the IPN in this study, such as Microsoft, Ingram Micro, ConnectWise, Hewlett Packard, and so on (α = .82). As for transformational leadership, respondents were asked to report their practices on the 20-item Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 1995). An index was constructed by adding the responses to each item (α = .90). Almost all variables, except the transformation leadership scale items, were collected first and then three months later the leadership data were collected in order to help minimize same source bias (Podsakoff et al., 2003).

Independent Variables

The level of social embeddedness was measured with a list of sociometric questions (Ibarra, 1993) regarding respondents' relationships with their peer group members since the last IPN meeting: (1) "which of the following persons have you collaborated on IPN-related activities?", (2) "which of the following persons have you collaborated on non-IPN activities?", (3) "with whom have you discussed what is going on in your organization between the IPN meetings?", (4) "who are important sources of professional advice who you approach if you have a work-related problem or when you want advice on a decision you have to make?", and (5) "who are very good friends of yours, people whom you see or talk to socially outside of work?" Answers to these questions provided the raw data used to define networking activities beyond formal IPN activities, such as communication, advice, and friendship networks outside of regularly scheduled meetings.

Principal component factor analysis was conducted to determine if the five embeddedness questions should be combined. The five questions made up a single factor, with eigenvalues dropping to .72 beyond the first factor. Despite the conceptual difference in instrumental (i.e., questions #'s 1-4) and friendship networks (i.e., question #5), the 60% of variance accounted for by this factor strongly suggested combining the five questions into a single composite index, social embeddedness (α= .83).

Control Variables

Company Size

Company size is a surrogate measure such as total resources, slack resources, technical expertise of employees, and organizational structure that favors learning and adoption of new practices (Rogers, 1995). The mean company size of the small businesses sampled in this study was 13.83 employees.

Number of Years Firm in Business

Over time, a company accumulates institutional knowledge, such as routines and competencies, and new practices are judged and selected based on that accumulated knowledge (Aldrich, 1999). Moreover, older firms are more likely to overcome the liabilities of newness and smallness (Aldrich & Auster, 1986). Therefore, the number of years a firm is in business would likely have a positive impact on business performance and the speed of acquiring new knowledge. The mean age of the small businesses sampled in this study was 14.46 years.

Predominant Business Model

Since 2008, IPN members have used a third-party service to process their operational/financial data and provide members with comparative data for use in analyzing the outcomes of their managerial actions. In order to facilitate meaningful benchmarking, the third-party service provider identified ten "predominant business models" that help the members devise model-specific best practice applications and optimized channel programs. Based on discussions with representatives of the IPN leadership team and the third-party service provider, the ten predominant business models were further consolidated into three models: product-centric, managed

services, and other services. Therefore, two dummy variables, "predominant business model managed services" and "predominant business model others" were included in the regression analyses, while "product-centric" was identified as the comparison dummy variable. Compared to other business models, product-centric companies are likely to have higher revenues but lower profit margins and such phenomenon may influence the level of slack resources that can be allocated for the implementation of new practices.

New Knowledge Source Diversity

This variable measured the respondent's propensity to learn new knowledge from diverse sources. Firms that are exposed to a variety of sources are more likely to learn about different types of best practices and choose the most appropriate ones for implementation. Respondents indicated the relative importance of various sources (such as vendor newsletters, trade journals, and membership in professional associations) in helping them learn new knowledge. A composite index was constructed by adding the responses to each item ($\alpha = .79$).

Number of Months in IPN

As relationships need time to develop and new knowledge of best practices also takes time to implement, the longer the small business founder is an IPN member, the more likely that member's business can improve. On average, the members in the study have joined the IPN under investigation for 37 months.

Analysis and Results

Table 1 shows the correlation matrix for the study variables. The hypotheses was tested related to marketing and management learning using a two-step hierarchical linear regression analysis. In Step 1, the control variables were entered (i.e., company size, number of years in business, predominant business model, new knowledge source diversity, and number of months in the IPN), followed by the social embeddedness composite in Step 2 (see Table 2). The model with only the control variables (Model 1) explained 10% of the variance in marketing learning ($F = 3.05$, $p < .01$). Adding the social embeddedness composite in Model 2 further increased the explained variance to 16% and had the highest positive significant impact on marketing learning (Model 2: $\beta = .27$, $p < .01$), which supported Hypothesis 1a. Similar results were found for the models that tested management learning. The model with only the control variables (Model 3) explained 10% of the variance in the dependent variable ($F = 3.07$, $p < .01$). Adding the social embeddedness composite in Model 4 further increased the explained variance to 15% and had the highest positive significant impact on management learning (Model 4: $\beta = .25$, $p < .01$), which supported Hypothesis 1b.

Table 1: *Descriptive Statistics and Correlations*

	Variables	Means	s.d.	N	1	2	3	4	5	6	7	8	9	10	11
	Dependent Variables														
1.	Perceived marketing learning	24.03	6.33	158											
2.	Perceived management learning	36.32	8.29	158	.88**										
3.	Product portfolio	4.25	1.66	163	.10	.07									
4.	Transformational leadership	60.89	8.80	130	.21*	.25**	.07								
	Control Variables														
5.	Company size	13.83	14.16	116	-.02	-.04	.13	.13							
6.	No. of years firm in business	14.46	9.42	161	.03	.05	.15*	.06	.37**						
7.	PBM: managed services	.43	.50	115	-.13	-.12	-.01	-.09	-.18*	-.33**					
8.	PBM: others	.45	.50	115	.11	.10	-.003	-09	.09	.31**	-.77**				
9.	New knowledge diversity	49.13	8.15	161	.30**	.26**	.17*	.09	-.002	.03	-.05	.007			
10.	No. of months in IPN	37.13	17.94	163	.24**	.27**	.30**	-.04	.25**	.23**	-.08	.09	-.02		
	Independent Variable														
11.	Social embeddedness	20.00	10.81	163	.33**	.36**	.49**	.15	.04	.124	.05	.06	.15	.34**	

*p < .05, **p < .01

Table 2: *Standardized Estimates of the Impact of Social Embeddedness on Marketing and Management Learning*

	Model 1: Marketing Learning		Model 2: Marketing Learning		Model 3: Management Learning		Model 4: Management Learning	
Variables	b	t-value	b	t-value	b	t-value	b	t-value
Control Variables								
Company size	-.10	-.94	-.09	-.90	-.17	-1.59	-.16	-1.57
Number of years firm in business	-.006	-.06	-.06	-.57	.06	.58	.01	.12
Predominant business model: managed services	-.15	-.98	-.22	-1.47	-.17	-1.15	-.24	-1.60
Predominant business model: others	-.03	-.20	-.11	-.73	-.08	-.53	-.15	-1.01
New knowledge source diversity	.31**	3.39	.25**	2.74	.27**	3.02	.22*	2.40
Number of months in IPN	.21*	2.16	.16	1.63	.25**	2.62	.20*	2.12
Independent Variable								
Social embeddedness			.27**	2.88			.25**	2.64
Adjusted R^2	.10		.16		.10		.15	
ΔR^2			.06				.05	
N	111		111		111		111	

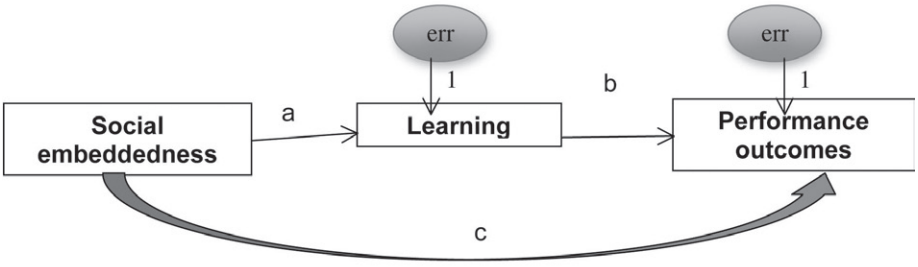
*p < .05, **p < .01

The control variable of new knowledge source diversity was a significant positive predictor of both marketing and management learning in Models 1 to 4. This suggested that small business founders who were exposed to multiple sources of information were more likely to obtain a high level of marketing and management learning (Model 1: $\beta = .31$, $p < .01$; Model 2: $\beta = .25$, $p < .01$, Model 3: $\beta = .27$, $p < .01$, Model 4: $\beta = .22$, $p < .05$). The number of months in an IPN was also found to be a significant positive predictor in Models 1, 3, and 4. However, the variable became insignificant after the social embeddedness composite was added in Model 2 (Model 1: $\beta = .21$ $p < .05$; Model 2: $\beta = .16$, $p = .11$, Model 3: $\beta = .25$ $p < .01$; Model 4: $\beta = .20$, $p < .05$), suggesting the variance explained by the length of membership in an IPN may be partially attributed to the network interactions that occur. Nevertheless, the VIF of length of membership and network interactions were low (ranges from 1.1 to 1.3), suggesting no problems with multicollinearity.

Next, the role of learning as a mediator between social embeddedness and performance outcomes was examined. Instead of using the traditional three-step method of testing mediation (Baron & Kenny, 1986), a relevant alternative was used to estimate the path model as shown in Figure 1. In this model, the direct effect of social embeddedness on performance is represented by path c, and the indirect (mediation) effect by paths a and b. If a, b, and c are path coefficients, the strength of the mediation effect is a x b, and the percentage mediation (i.e. mediation effect/total effect) is given by a x b/ (a x b + c) (Iacobucci, Saldanha, & Deng, 2007). In the analyses described below, model parameters were derived using the AMOS program. Two path models

were estimated (one for product portfolio, one for transformational leadership) and the results are shown in Table 3.

Figure 1: *Mediation Path Model*



Note: "err" is error variance.

Table 3: *Mediation Model Results*

		Standardized path coefficients							
Dependent variables	α	a	t-score	b	t-score	c	t-score	% mediation[a]	Sample items
Product portfolio	.82	.21**	5.12	.02	.65	.09**	7.24	-	Microsoft Ingram Micro ConnectWise Hewlett Packard
Transformational leadership	.90	.28**	5.25	.24*	2.46	.05	.72	58.68	I instill pride in others for being associated with me I talk about my most important values and beliefs I talk optimistically about the future I seek differing perspectives when solving problems I help others develop their strengths

*p < .05, **p < .01
[a] Omitted where mediation effects are insignificant

The first column of Table 3 shows the Cronbach's alpha of the measures, and the next six columns present the path coefficients and their corresponding t-score for the paths depicted in Figure 1. This is followed by the percentage mediation, with the significance level for the null hypotheses of no mediation, based on a test of the joint significance of a and b. The results demonstrate that although product portfolio is not mediated by marketing learning, a sizeable proportion of the variance in transformational leadership can be accounted for by social embeddedness and management learning. Therefore, while Hypothesis 2a was not supported, Hypothesis 2b was supported.

Discussion and Implications

This study used qualitative data to design a quantitative analysis that for the first time examined the impact of IPN members learning and implementing specific effective marketing practices such as the width of their product portfolio and effective management such as taking a transformational leadership approach. Small businesses are becoming increasingly recognized as an important source of innovation processes, products, services, and job creation. For example, small firms accounted for 65 percent (or 9.8 million) of the 15 million net new jobs created in the U.S. between 1993 and

2009 (Headd, 2010). However, it is also true that nearly half of all small businesses fail within their first five years of operation (Headd, Nucci, & Boden, 2010). Thus, it is critical that new business founders collaborate and learn through peer networks in order to improve their likelihood of success and to be able to compete against counterparts both domestically and abroad.

Specific results from this study indicated that IPNs serve as an important source of new knowledge for small business founders. New knowledge source diversity was identified as the best predictor in the baseline model (Models 1 and 3), indicating that as small business founders are exposed to a more diverse set of knowledge sources through IPN networking activities, they achieve a higher level of perceived marketing and management learning. As social embeddedness is added in the regression analysis (Models 2 and 4), the beta coefficient values of source diversity decrease and those of social embeddedness become statistically significant. Such findings suggest that industry peer networks provide a facilitating platform for marketing and management learning on a variety of levels. Exposure to diverse knowledge sources within an IPN provides access to non-redundant information (e.g., approaching members for professional advice about work-related problems) while forming embedded network ties with peer group members (e.g., sharing financial data and best practices). In other words, IPN membership can help develop valuable tacit knowledge for effective business practices that the small business would not be able to attain by itself. The IPN supports the commonly expressed truism that "we is stronger than me."

As for the mediation models that tested the implications of perceived level of learning, it was found that the implementation of transformational leadership practices was partially mediated by the perceived level of management learning. In other words, networking with peers exposes IPN members to various effective leadership approaches. However, peer network members need to own such an approach as transformational leadership, share the knowledge, and model the actual leadership behaviors with their own management teams back home. Therefore, network embeddedness indirectly influences the adoption of transformational leadership practices within membership firms.

In the marketing area, the width of a product portfolio was not found to be mediated by the perceived level of marketing learning. This result suggested that even though IPN members who engaged in IPN networking activities achieved a significant level of marketing learning and were likely to offer a wide array of products to their clients, their product width decisions seemed to be more influenced by their embedded ties and did not require a high level of marketing learning. While a significant gain in knowledge about marketing-related supplier information may be evident after just a few peer group meetings, the implementation of newfound leadership and management knowledge demands significantly more efforts and learning from the members.

This study supported the value of IPNs in marketing and management practices. However, with increasing global competitiveness, small business founders who join an IPN may be more interested in growing their business and more disciplined in efforts toward reaching those goals. Therefore, future research needs to test the mediation model of learning among a sample of new small business founders who do not belong to an IPN, to better isolate and confirm the learning benefits brought about

by IPN participation. Such research could also yield important insights regarding the differential learning effects of other types of network sources, such as chambers of commerce, trade associations, individual mentors, and professional organizations. In conclusion, there seems little doubt that much can be gained by small business owners participating in an IPN, but this study empirically verifies that they "get what they put in" to such IPN membership.

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Environmentally Friendly Business Strategies: BP – A Case of Rhetoric or Reality?

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This paper briefly reviews the anthropocentric and the ecocentric strategies in an effort to determine the best business strategy that encompasses both people and the environment. Also examined is the literature on whether 'going green pays' and a legal compliance strategy is compared with a strategic approach that recognizes, implements, and fosters integrity in business decisions as they relate to all stakeholders, including various environmental elements. A comparison is made between the actions of BP to assess how 'green' the company actually is. The paper promotes a quadruple bottom line of people, planet, profits, and principles rather than the triple bottom line that ignores the underlying ethical basis for actions. Finally, a warning is provided about the need to link rhetoric to reality in assessing firms' environmental performance.

In the last decade, more and more profit-oriented businesses have begun to engage in and espouse environmentally-friendly strategies, policies, and activities. What is not clear is whether these businesses are doing so because legal/regulatory policies mandate such actions, because organizational stakeholders have emphasized the need for such actions, or because the businesses believe that such programs are cost-beneficial and, in the long-run, profitable. If the latter belief exists, then there is a secondary issue: are the businesses simply seeking to maximize profits with no true regard for corporate social responsibility (CSR) or with an underlying concession to the edicts of CSR and an embracing of the idea that 'going green pays'?

Green Initiatives as Corporate Strategy

Business managers in the not-too-distant past often saw environmental issues as "a compliance challenge" or "a marketing and PR concern," but companies are now more apt to link such issues with strategy and profitability because of "increasing regulation, investor activism, and changing consumer behavior" (Dittmar, 2010). Concern for the environment has been building for decades (Vandermerwe & Oliff, 1990; Porter, 1991; Clemens & Papadakis, 2008; Kautish & Soni, 2012; Research & Markets, 2012). According to the International Finance Corporation and Global Reporting Initiative, "There is a clear link between good ESG [environmental, social, and governance] performance and the ability of enterprises to be profitable and survive turbulent times" (IFC & GRI, 2010). However, considerable debate exists about whether the adoption of environmentally-friendly mission statements and strategies is cost-beneficial for firms. The overarching question is whether stockholders believe that the statements and strategies provide a reasonable rate of return on investment or if such expenses are too expensive in the short run.

Two-thirds of the 3,000 respondents to a 2011 survey indicated that sustainability was a competitive necessity in today's market; 70% stated that sustainability had been made a permanent part of their management agendas (Haanaes et al., 2012). A commonly touted outcome of environmental and corporate social responsibility (CSR) strategies is a positive competitive advantage created by promoting beneficent attitudes from consumers towards the "green" firm and providing cost savings for the firm and benefits to the environment. Cost savings are engendered by such things as cleaner production, material conservation, energy efficiency, pollution reduction, minimization of waste, and by-product utilization (Kjaerheim, 2005; Geiser, 2001; Dincer, 1999; Hart, 1995; Baas, 1995; Lee et al., 1992). Other studies found that succeeding generations will change their consumption habits to be more in line with environmental health, while firms will also become more environmentally conscious, as minimization of waste and more efficient operations are more profitable. Similarly, López-Gamero et al. (2008, p. 210) found that positive environmental performance could "lead to more efficient processes, improvements in productivity, lower compliance costs, and new market opportunities."

Baugh (2010) advocated green strategy implementation for its human resource and physical space benefits. Olson (2008) pointed to a "common culture of awareness and action," that enhanced decision making and operational activities, and new channels for strategic differentiation in products and services as outcomes of a green strategy. Supply chain management may also be improved with a green organizational strategy. Although taking only a manufacturing perspective, Lee and Chen (2010) presented a compelling rationale for involving the entire supply chain in an entity's green strategy planning:

> Green manufacturers entail a higher level of requirements for manpower, materials, financial strength, and technologies throughout the entire process, including green design, green process planning, green materials, green marketing, etc. In this connection, [the] supply chain … has to adhere to

> the fundamental belief of the green manufacturing. If the supply chain lacks due attention to the environment…, the business activities will be unable to create any benefit to the environment thereby [reducing] the enterprises' economic benefits and … [weakening] the enterprises' competitive edge and their strategic administration capabilities in the long-run (Lee & Chen, 2010, p. 144).

Data analyses by Margolis, Elfenbein, and Walsh (2007) and Orlitzky, Schmidt, and Rynes (2003) suggested a positive, but small, relationship between environmental performance and financial benefits. Thus, financial performance is increased not at the expense of the environment, but as a result of respectful use of resources (Clarke et al., 1994; Hart & Ahuja, 1996; Shrivastava, 1995b; Miralu, 1999; Menguc, Auh, & Ozanne, 2010; Lo, Yeung, & Cheng, 2012). Meisner (2001) and Stead et al. (1990, 1998) found that embracing a strategy designed to use and respect the environment as a source of inputs in a symbiotic relationship created a competitive advantage for the firm. These thoughts led to the conclusion that firms are voluntarily seeking to develop and implement corporate mission statements and strategies that have the respectful use of the environment and its elements as a premise.

Other research, however, takes issue with the above findings. Clemens and Papadakis (2008, p. 488) found that firms only engage in strategic planning that includes a more cognizant and ethical approach to the environment because they are legally obligated to do so, or "…[f]irms that did the right thing were doing so in the face of high levels of regulatory intensity." Further, Friedman (1970) and Walley and Whitehead (1994) found that firms sought to avoid environmentally-oriented strategies because they had a negative effect on profits. Karagozoglu and Lindell (2000, p. 820) found that "comprehensive superiority in relative environmental performance" would not "necessarily lead to environmental competitive advantage." Additionally, adopting only a few environmental policies—especially if only for a short period of time—would not create competitive advantage, especially when characteristics such as uncertainly, complexity, and munificence of the business environment were considered (Aragón-Correa & Sharma, 2003).

Meric, Watson, and Meric (2012) studied the effects of a company's "green score," a measure combining the company's Environmental Impact Score (EIS), Green Policies Score (GPS) and Reputation Survey Score (RSS), on its stock price to find that there appeared to be no market incentive for companies to go green. They reviewed Newsweek's Green Rankings of the 500 Largest Companies and found the highest and lowest Green Scores, providing a sense of which companies were engaging in some fashion with green strategies. For example, Dell, Hewlett-Packard and IBM ranked as the highest scorers on the green spectrum, while Ameren, Bunge and Peabody Energy scored the lowest. Exhibit 1 provides Newsweek's 2010 listing of Global Oil and Gas Companies with their green scores, environmental impact scores, green policies development and reputation; this exhibit provided a snap-shot assessment of these companies' environmental efforts and associated perceptions. As can be seen, at that time, BP was the 92nd largest global company in size; it compared favorably to only four companies, while lagging behind nine other oil and gas companies such as Chevron

and Royal Dutch Shell in terms of Green Score and Reputation. After the spill, however, the 2011 and 2012 Newsweek rankings of BP fell to 376 and 371, respectively.

Exhibit 1: *2010 Green Rankings: A Snapshot of the Oil and Gas Industry*

Rank		Green Score	Envir. Impact	Green Policies	Reputation
62	Total	64.74	21.99	59.81	62.57
70	Exxon Mobil	54.27	16.94	51.37	41.46
73	ConocoPhillips	52.96	17.93	48.96	42.55
75	Lukoil	51.73	25.95	46.76	19.90
80	Eni	49.81	12.98	46.80	50.57
84	Petroleo Brasileiro	47.54	11.00	38.67	80.38
86	Chevron	45.80	19.91	33.48	52.76
88	Royal Dutch Shell	44.43	22.98	25.93	70.74
92	**BP**	**41.13**	**21.00**	**29.91**	**33.60**
94	Rosneft Oil	34.30	14.96	28.53	21.17
95	PetroChina	25.90	9.91	26.20	1.00
96	Gazprom	23.36	11.99	15.94	9.09
98	China Petroleum & Chemical	22.35	31.99	1.00	5.84
Rank (2011)		**Green Score**	**Envir. Impact**	**Envt'l Mgmt**	**Disclosure**
376	BP	50.5	47.9	43.7	92.3
Rank (2012)					
371	BP	52.6	50.2	45.5	94.9

BP's ranking below Chevron is notable. In a study of Chevron and the idea that there are indeed green oil companies, Cherry and Sneirson (2012, p. 153) concluded that, very often, CSR statements and promises were "overblown blandishments, the afterthought of a clever marketing department, or part of a public-relations effort to control damage through greenwashing." The authors asserted that Chevron's response to the BP spill of agreeing that the environment "matters" was superficial at best and revealed that consumer and investor pressure alone were not sufficient to mandate environmental advocacy. One study investigated 13 companies in order to better understand their motives for "going green." Although a number of these companies suggested that they felt environmental concern was "the right thing to do" and that responsible companies would "do their best to be *seen* to be reducing their impacts," the real reasons were less altruistic (Saha & Darnton, 2005, p. 130). The research indicated that companies pursued "greening" because of *inter alia,* pressure exerted by nongovernmental organizations and government regulations, as well as increased business opportunities from the enhanced reputation such environmental actions may bring.

Given the uncertainty of the relationship among environmental strategy, profitability, and competitive advantage, an organization's management may be conflicted about whether to pursue an environmentally-friendly business strategy. However, the increase in significance of environmental actions can be seen as a type of institutional isomorphism (coercive, mimetic, or normative) or a tendency of organizations to establish some level of structural homogeneity because of their

interactions and interorganizational influences (DiMaggio & Powell, 1983, 1991). Therefore, businesses develop and implement environmentally-friendly policies because of pressures from regulatory edicts or adverse public opinion about organizational practices (coercive isomorphism), because other companies have successfully (meaning more positive image and/or greater profitability) adopted such policies (mimetic isomorphism), or because organizational management's thought processes and decision making skills have been infused (through education, peer interaction, or research) with positive ideas or constructive models about the benefits of such policies (normative isomorphism). According to the first annual Business of Sustainability Global Survey undertaken by MIT Sloan Management Review and the Boston Consulting Group (Berns et al., 2009, p. 21), over 90% of survey respondents said their companies were addressing sustainability issues, but most indicated that the actions being taken "appear to be limited to those necessary to meet regulatory requirements." Almost 70% stated their companies had "not developed a clear business case for sustainability." However, regardless of the underlying reason, environmental activities are becoming an increasingly important element of organizational strategy and will continue to be so in the future (Crowe & Brennan, 2007, p. 268, Gonzalez, Perera, & Correa, 2003; Klassen & Whybark, 1999; Newman & Hanna, 1996).

Environmental Strategy as a Corporate Value

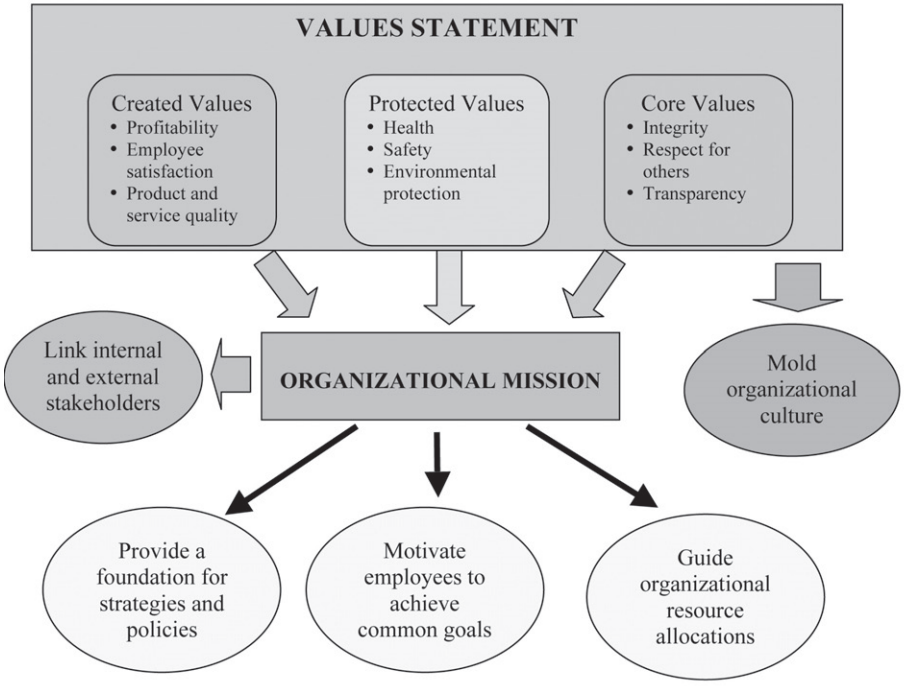
Corporate strategy development, regardless of the issue involved, should reflect an underlying consideration of ethical behavior. According to Velasquez (1999, p. 7), ethics is the "study of morality," indicating that the words *ethics* and *morals* can be used as synonyms. Making ethical or moral judgments implies that the decision-maker is concerned with the decision's moral rightness or wrongness rather than its legality. Another viewpoint, expressed by Carroll (1991) and Freeman and Gilbert (1988), defined ethics as an understanding of, and the ability to choose between, what is right and fair, good or bad, acceptable or unacceptable conduct or behavior.

An organization seeks, in part, to express its ethical position through its values statement, which organizes priorities and indicates its culture and moral focus. Values can be viewed as socially or personally desirable elements (Joyner & Payne, 2002; Joyner, Payne, & Raiborn, 2002) or as the core set of beliefs and principles deemed to be desirable (by groups) of individuals (Andrews, 1987; Mason, 1992). Values are classified by Wenstop and Mermyl (2006) into three categories:

1. Created values—those that stakeholders have agreed are the underlying reasons for the organization's existence; the priorities of such values are subject to trade-offs produced by decision makers or bargaining processes.
2. Protected values—those (such as safety, health, and protection of the environment) that should not be able to be infringed upon; attempts to subjugate these values to others are considered unethical.
3. Core values—those that prescribe the organization's behavior, culture, and attitude.

A firm's values should influence its purpose and scope of operations, which should be delineated in the mission statement to provide a foundation for strategy and policy formulation and implementation. Organizational mission statements can also be used to motivate employees to achieve common goals and guide resource allocation. These functions have long been identified by management professionals and theorists (Hofer & Schendel, 1978; Ireland & Hitt, 1992; Thompson & Strickland, 1992; Raiborn & Joyner, 2004). The mission statement should also be a source of cohesion between the firm and its internal stakeholders. Linkages among the mission statement, values statement, and organizational activities are shown in Figure 1.

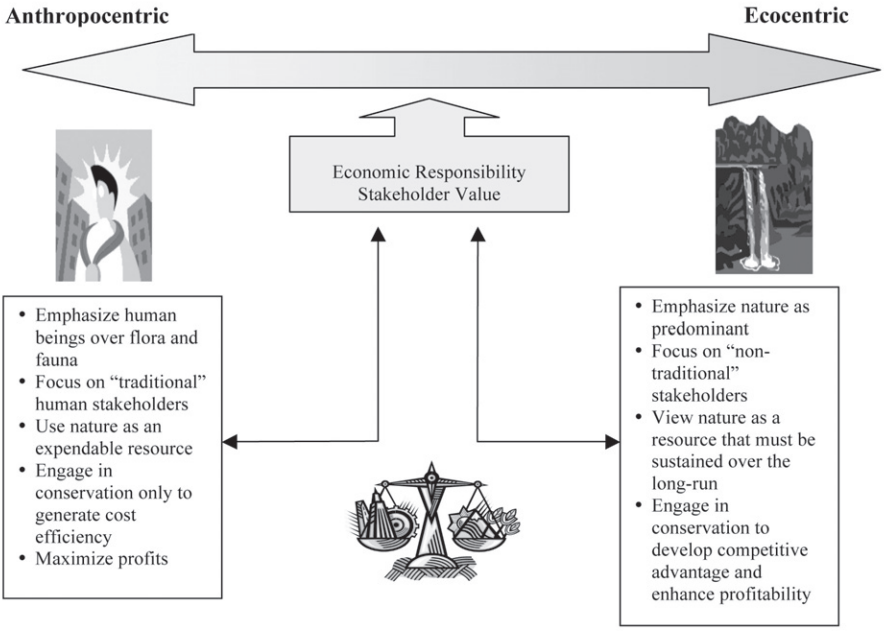
Figure 1: *Linkage among Values Statement, Mission Statement, and Organizational Activities*



Although environmental preservation is considered a protected value, the strategic emphasis placed by organizational management to not degrade the environment varies widely along a continuum. As shown in Figure 2, the continuum ranges from an anthropocentric strategy to an ecocentric strategy. The anthropocentric strategy is the more historical approach that emphasizes the 'traditional' stakeholders: employees, management, creditors, consumers, suppliers, and so forth. This strategy takes the position that man is predominant over nature and that nature is essentially "an expendable resource for furthering the interests of humans [who] have a right to exploit nature without any real concern for maintaining its integrity" (Shrivastava, 1995a). Under this strategy, environmental efforts should not progress beyond eco-efficiency (Walley & Whitehead, 1994). This strategy reflects to some degree, Friedman's idea

(1970) that the sole responsibility of business is to maximize profit, regardless of social costs such as those associated with poor environmental practice.

Figure 2: *Environmental Strategy Continuum*

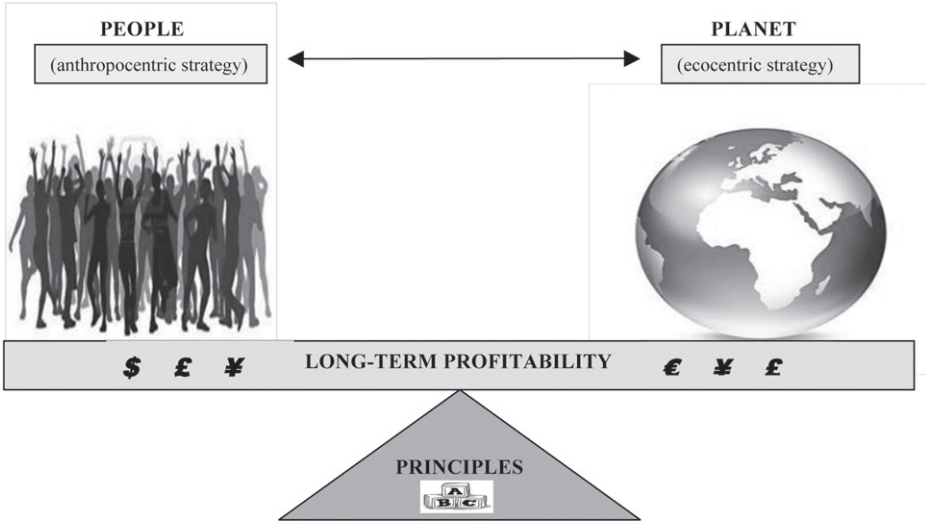


The second, ecocentric strategy is more all-encompassing and includes some stakeholders that are not directly associated with the firm, but still feel the effects of corporate policy. This model envisions nature as the predominate element of the environment, which has mankind being just one of many inhabitants (Whiteman & Cooper, 2000). Thus, when an ecocentric strategy is embraced, one of the primary societal relationships that must be considered is that between the organization and the natural environment in which it operates. Newton (2002) described this model as requiring a radical restructuring of industrialism. From the most basic standpoint, the decision of whether businesses should consider the essential nature of the environment is seen by some as indisputable. "The question on moral standing of nature has been raised. … All things, living or non-living, naturally deserve our moral consideration for various purposes in an overall reflection on nature and existence" (Cheng, 2005, p. 346). Additionally, supporters of the ecocentric model believe that concern for the environment "makes sound economic sense since a company's better environmental record gains consumer endorsements and thus long-term profits, while attracting better employees and achieving benchmark environmental standards" (Gopalkrishnan, 1999). However, regardless of the validity or venerability in the idea of the environment as a protected value, most organizations' management teams do not have the inclination, motivation, or financial capital to fully embrace an ecocentric

environmental strategy. This conclusion illustrates the premise that "protected values exist in judgment, but cannot fully exist in action" (Baron & Spranca, 1997).

As with all continuums, usually neither end represents the best strategic position. Reviewing the components of values classifications indicates that what is currently known as the "triple bottom line" of profits and people (created values) and planet (protected value) ignores the entire classification of core values. Therefore, the bottom line focus should, in fact, be a quadruple one: profits, people, planet, and principles (integrity, respect for others, and transparency). Without principles, an organization will have no solid foundation for decision making because pressure from one group or another will likely result in discriminatory capitulation rather than discerning compromise. Colbert and Kurucz (2007) found that a sound majority of Fortune 500 companies have committed to fully capitalize their corporate value through adherence to the United Nations' three pillars of sustainability (economic, environmental and social). Eighty-five percent of executives and investors surveyed believed that corporate social responsibility initiatives were significant in investment decisions in 2005, while in 2000, only 44% believed that CSR mattered in investment decisions (The Economist Intelligence Unit, 2005). "Competitive and successful firms have begun to value their environmental performance" (Meric et al., 2012, p. 16). In the long-term, the use of corporate social values such as integrity and transparency can be a boon not only to the firm's bottom line, but to the environment and, thus, to society as a whole as well. Principles provide the fulcrum on which the often competing concerns of people (total anthropocentric strategy) and planet (total ecocentric strategy) are balanced to produce a long-term, profitable equilibrium (see Figure 3).

Figure 3: *Quadruple Bottom Line*



Trying to develop a mission statement, values statement, and organizational strategy that would balance people and planet on a foundation of underlying principles

so as to result in long-term profitability is difficult. Doing so requires the use of Paine's (1994) integrity rather than legal compliance strategy. These two strategies reflect "the classic distinction between the spirit of the law (morality) and the letter of the law (legality)" (Raiborn & Payne, 1990).

Often, if a firm's actions are only shown to be in compliance with the letter of the law, public outrage may ensue over perceived illegal or immoral acts, trust may be lost, and public image may be tarnished. Additionally, pursuit of a strict legal compliance strategy would be at odds with a U.S. Department of Justice (1991) report on six items to review in determining when and how to prosecute environmental violations: voluntary disclosure, cooperation, preventative measures and compliance programs, pervasiveness of non-compliance, internal disciplinary action, and subsequent compliance efforts. In contrast, integrity strategy attempts to equalize economic profitability (or profit enhancement) and environmental commitment, and thus support the business case for engaging in 'green' activities. Having an integrity strategy in place would likely engender a more positive perspective and a greater possibility for leniency in the event of legal actions for violations than would a mere legal compliance strategy. A comparison of appropriate actions and underlying rationales of these strategies is shown in Table 1.

Table 1: *Comparison of Legal Companies and Integrity Strategies*

Strategy	***Strategic Actions***	***Underlying Rationale***
Legal Compliance	Follow the letter of the law	Preclude negative legal action and penalties
		Exhibit commitment to laws
Integrity	Communicate values and commitments relative to the spirit of the law	Preclude organizational ethical lapses
	Avoid compulsion to exploit legal loopholes	Avoid infringement on human and non-human rights
	Emphasize core values of exemplary and responsible conduct	Address the root causes of organizational misconduct
	Engender personally committed management	Instill a sense of shared accountability within employees
	Integrate values into strategic decision-making	Use errors and failures as a continuous improvement tool
	Design structure (including internal controls) to support and reinforce ethical principles	Establish a basis for seeking legal leniency under sentencing guidelines if wrongdoing occurs
	Train managers to use values and commitments in all activities	
	Emphasize a concept of self- governance rather than mere legal adherence	
	Have employees accept responsibility and be held accountable for their actions and decisions	
	Acknowledge any ethical problems, promptly correct any problems, investigate problem causes, and integrate insights gained into future actions and decision-making	

BP and Green Strategy

People often assess an organization's green efforts using media or self-reported public information. However, the use of such information alone may lead to incorrect or incomplete conclusions. A gap often exists between the rhetoric espoused by companies and the reality of their actions, with companies "accused of paying green lip service" to some of their activities (Walker & Jones, 2012). Fifty-nine percent of the respondents to the 2009 State of Corporate Citizenship survey indicated that many companies promoted corporate citizenship (which includes protecting the environment), but "are not truly committed to it" (BCCCC, 2009, p. 16).

BP is used as a corporate example of the gap that can exist between words and actions of green organizational strategic performance. In 2007, BP was named the world's most accountable company by AccountAbility, a London think-tank. AccountAbility uses publicly reported company information and data on actual and environmental performance to measure "the extent to which companies have built responsible practices into the way they do business and looks at how well they account for the impact of their actions on their stakeholders" (AccountAbility, 2010). In 2008, BP's standing fell to ninth place which was still fairly impressive. In April 2009, Greenopia rated BP as the Greenest Oil Company for its investments in alternative fuel research and "the transparency, breadth and accuracy of its environmental reports" (Meade, 2009). That rating was revised after the Deepwater Horizon oil spill, but merely moved BP from first place to third (Butler, 2010; Greenopia, 2010).

Given these publicly-reported accolades, it would seem that BP as a company, in concert with management personnel, would be highly in concurrence with both ecocentric and integrity strategies. Thus, the authors reviewed various BP documents and external news sources to assess the level of congruence between the company's actions and its words: does BP walk the environmental walk or merely talk the environmental talk?

In 2010, BP's mission and values statements were combined under "What We Stand For." In 2012, the company separated the information into "What We Stand For" and "What We Value" (see Table 2). In 2010, the statement clearly indicated that BP wanted to be engaged in the energy business in a manner that didn't damage the environment. This concept was further emphasized in the "Responsible" section, which addressed a commitment to community and societal safety, with an "aim for no accidents, no harm to people and no damage to the environment." This type of phrasing indicated an ecocentric, rather than anthropocentric, bend. But it is difficult to reconcile the 'green' accolades and the 2010 values statement with the following selected incidents in which BP has been involved, incidents that resulted in multimillion dollar fines, penalties, or settlements:

2005 – In March, an explosion at a BP refinery in Texas City, Texas, killed 15 people and injured 170; the $87 million fine was for failure to correct safety hazards was proposed in October 2009 (Kahn, 2010; US DOL, 2009). A BP spokesman stated that the explosion was "a preventable accident" and a report on the incident indicated that there were eight incidents between 1994 and 2005 which "signaled grave problems" (Byron, 2006).

2006 – In March, over 200,000 gallons of oil spilled from a BP pipeline in Prudhoe Bay, Alaska, resulting in a fine of approximately $20 million. "A U.S. congressional committee said 'a mountain of evidence' showed the company's cost-cutting on maintenance had led to the…spill" (Buncombe, 2007). Much of the substantial documentation was "written by more than 100 company whistleblowers and date [sic] back as far as 1999" (Leopold, 2009).

2006 – In April, BP paid a $2.4 million fine for safety and health violations at its refinery in Ohio (Slocum, 2010).

2007 – In July, BP agreed to settle charges for manipulating the Western Energy Markets during 2001 for the sum of $18 million (US FERC, 2007a).

2007 – In October, BP agreed to settle, for $303 million, charges "for manipulating and attempting to manipulate the price of TET propane in February 2004, for cornering the market for TET propane in February 2004, and for attempting to manipulate the price of TET propane in April 2003" (US CFTC, 2007).

2007 – In October, the Federal Energy Regulatory Commission (FERC) ordered BP to pay a $7 million civil penalty for engaging in anti-competitive practices relative to its natural gas pipelines (US FERC, 2007b).

2010 – In March, the Occupational Safety and Health Administration (OSHA) cited BP with 42 willful violations and 20 serious violations for exposing workers to various hazards; proposed fines total $3 million (US DOL, 2010).These violations were at the same refinery as cited in April 2006.

2010 – In April, BP's Deepwater Horizon oil rig exploded: 11 crew members died and 17 were injured; over 200 million gallons of oil were spilled into the Gulf of Mexico (AP, 2012). As of October 1, 2010, BP promised to establish a $20 billion trust fund to pay individual claims (AP, 2010). BP estimates that the spill will eventually cost $40 billion, including cleanup and penalties; a criminal investigation by the Justice Department may find the company guilty of gross negligence and the possibility of substantial fines/penalties (Chazan, 2011).

2011 – In November, BP agreed to pay the State of Texas $50 million for 72 air pollution violations, some of which related to the 2005 Texas City refinery explosion (Plushnick-Masti, 2011).

2012 – In April, BP presented a federal judge with an approximate $7.8 billion settlement offer related to the claims of 100,000+ people and business related to the Deepwater Horizon spill; however, the settlement does not include a cap (Burdeau & Kunzelman, 2012).

2012 – In July, BP agreed to pay penalties of $13 million for the majority of the remaining safety violations found at its Texas City refinery in 2009. BP is attempting to sell the refinery to help pay for Deepwater Horizon costs (Lefebvre, 2012).

Table 2: *Comparison of Legal Companies and Integrity Strategies*

Part a: BP's 2010 "What We Stand For" Statement

BP is progressive, responsible, innovative and performance driven.

Progressive
We believe in the principle of mutual advantage and build productive relationships with each other, our partners and our customers.
Responsible
We are committed to the safety and development of our people and the communities and societies in which we operate. We aim for no accidents, no harm to people and no damage to the environment.
Innovative
We push boundaries today and create tomorrow's breakthroughs through our people and technology.
Performance driven
We deliver on our promises through continuous improvement and **safe**, reliable **operations.**

Source: BP, *Our Values,* http://www.bp.com/sectiongenericarticle.do?categoryId=9002630&contentId=7005204 (accessed 10/27/10; no longer posted).

Part b: BP's 2012 "What We Stand For" and "What We Value" Statements

We care deeply about how we deliver energy to the world… [and] that starts with safety and excellence in our operations. This is fundamental to our success. Our approach is built on respect, being consistent and having the courage to do the right thing. We are committed to making a real difference in providing the energy the world needs today, and in the changing world of tomorrow. We work as one team. We are BP.

Safety
Safety is good business. **Everything we do relies upon the safety of our workforce and the communities around us. We care about the safe management of the environment.** We are committed to safely delivering energy to the world.
Respect
We respect the world in which we operate. **It begins with compliance with laws and regulations. We hold ourselves to the highest ethical standards and behave in ways that earn the trust of others.** We depend on the relationships we have and respect each other and those we work with. We value diversity of people and thought. **We care about the consequences of our decisions**, large and small, **on those around us.**
Excellence
We are in a hazardous business and are committed to excellence through the systematic and disciplined management of our operations. **We follow and uphold the rules and standards we set for our company.** We commit to quality outcomes, have a thirst to learn and to improve. **If something is not right, we correct it.**

Courage

What we do is rarely easy. Achieving the best outcomes often requires the courage to face difficulty, to speak up and stand by what we believe. **We always strive to do the right thing.** We explore new ways of thinking and are unafraid to ask for help. We are honest with ourselves and actively seek feedback from others. We aim for an enduring legacy, despite the short-term priorities of our world.

One Team

Whatever the strength of the individual, we will accomplish more together. We put the team ahead of our personal success and commit to building its capability. We trust each other to deliver on our respective obligations.

Part b of Table 2 shows a shift in the tenor of the company's environmental commitment in 2012. At that time, the company seemed to deliberately minimize its ecocentricity by saying that BP "cares about the safe management of the environment [and] decision consequences," while concomitantly showing a much more distinctive legal strategy focus (under the Respect and Excellence categories) by addressing "compliance with laws and regulations" and company "rules and standards." The legal strategy was tempered to some extent by the statement that company personnel held themselves to the highest ethical standards. As shown in Table 3, the year 2012 also used more 'hedging' or damage control phraseology. An extremely important change seemed to be an emphasis on how difficult it was for BP to engage in its mission of energy provision, whereas such difficulties were never even mentioned in 2010's forthright elucidation of company values of being progressive, responsible, innovative, and performance driven.

Table 3: *Important Phraseology Changes in BP's "Stand For" and "Values" Statements*

2010	2012
"…build productive relationships"	"…depend on the relationships we have"
"…committed to the safety and development of our people and the communities and societies in which we operate"	"…committed to safely delivering energy to the world." "…committed to excellence through the systematic and disciplined management of our operations" "…commit to building [the team's] capability" No mention of societies
"…committed to the safety … of our people and the communities and societies in which we operate"	"Safety is good business." "…safety of…the communities"
"We deliver on our promises…"	"…care about the consequences of our decisions" "We always strive to do the right thing." "We follow and uphold the rules…"
"…continuous improvement"	"…have a thirst to learn and to improve" "If something is not right, we correct it."
Not a single use of the term "energy"	"…how we deliver energy"; "…providing the energy"; "safely delivering energy"
"…no damage to the environment"	"…care about the safe management of the environment"
No discussion of legal requirements	"…compliance with laws and regulations"
"We push boundaries…"	"We are in a hazardous business"
"…create tomorrow's breakthroughs"	"What we do is rarely easy."

A criminal obstruction of justice case was filed in April 2012 against a BP engineer for violating company requirements to save all electronic communications related to the spills (Fowler, 2012a). In May 2012, the Justice Department began investigating whether BP officials lied to Congress about the quantity of oil that was leaking from the Deepwater Horizon spill; if substantiated, such actions could "lead to additional criminal charges against current and former company employees" (Fowler, 2012b). A report issued by the Chemical Safety Board in July 2012 stated that BP's focus for offshore facilities was on employee work injuries and fatalities, which led to complacency relative to "managing the potential for catastrophic accidents" (CSB, 2012). The circumstances underlying these issues could have been an impetus to the move toward a more legal-oriented strategy.

Even limited reflection on the above incidents—and their related levels of punitive costs—would challenge any presumption of BP's walking the environmental walk, let alone engaging in an ecocentric or integrity strategy. The same conclusion is evident after reviewing the "critical factors" mentioned in BP's own Texas City Refinery explosion investigation report:

1. The working environment [was] characterized by resistance to change, and lacking of trust, motivation, and a sense of purpose. Coupled with unclear expectations around supervisory and management behaviors, this meant that rules were not consistently followed, rigor was lacking and individuals felt disempowered from suggesting or initiating improvements.
2. Process safety, operations performance and systematic risk reduction priorities had not been set and consistently reinforced by management.
3. [There was a] lack of clear accountability and poor communication, which together resulted in confusion in the workforce over roles and responsibilities.
4. [People accepted uncommonly high levels of risk due to a] poor level of hazard awareness and understanding of process safety.
5. [The] poor vertical communication and performance management process [resulted in an inadequate] early warning system … [and no] independent means of understanding the deteriorating standards in the plant (BP, 2005).

Although these factors were enumerated five years prior to the Deepwater Horizon explosion, such systemic problems might only have been correctable with a massive change in corporate suite personnel. However, of the 11 executive personnel listed in the 2004 SEC Form 20-F filing (dated June 24, 2005, and indicating that all the individuals listed were in place in March 2005 when the Texas City explosion occurred), five were still part of the management team shown in the 2009 Form 20-F list dated February 18, 2010: the Executive Director, Executive VP of Human Resources, Chief Executive of Refining and Marketing, Chief Financial Officer, and Chief Executive of Exploration and Production—all critical positions in the determination of overall corporate culture. The company, however, had significant changes in management personnel in late 2010,

with two of the biggest changes being the departures of Chief Executive Tony Hayward and second-in-command, Andy Inglis.

Thus, a high level of integrity emanates from the verbiage on the BP website information ("talk the talk"), but when confronted with the multiple instances of environmental and criminal behavior ("walk the walk"), the public statements about integrity seem to be in direct odds with the actual concern for the environment and other social responsibility issues (community, employees, and safety). Table 4 presents some of the contradictions between the words in BP's 2010 code of conduct (no longer posted) and the actions of the corporate entity or management. None of the specific phrases that are underlined in the table are included in the 2012 code of conduct.

Table 4: *Contradictions between BP's 2010 Words and Various Actions*

Words	**Actions (*DH* refers to *Deepwater Horizon*)**
The underlying philosophy of the code is that there should be no gap between what we say and what we do. (p. 1)	Between April and August 2010, BP spent approximately $5 million per week on advertising or "more than three times what it spent during the same period" in 2009…seems to be more about "polishing the corporate image than helping Gulf Coast states recover…" (Daly, 2010).
[It is crucial that we have] an open culture where people feel secure in seeking advice and in raising concerns. (p. 1)	The Texas City incident report stated that BP's working environment was characterized by resistance to change, and lacking of trust, motivation, and a sense of purpose (BP, 2005).
[Supervisors] must promote compliance and ethics by example – in other words, show by their behaviour what it means to act with integrity. (p. 6)	The Texas City incident report indicated that "the lack of effective leadership was systemic, touching all levels of BP's corporate management" (Colvin, 2010).
[O]ur commitment to integrity means we must never ignore a legal or ethical issue that needs to be addressed. (p. 7)	Ten of eleven containment boom manufacturers that had contracts with BP were "out of money" and many were "deeply in debt, … forced to lay off workers and delay payments to vendors" after BP stopped accepting deliveries in early August. One of BP's "integrity-assessment coordinators" recognizes that some suppliers "have been left in the lurch" (Zimmerman, 2010).
BP is committed to providing all BP employees – and those of other companies working on our premises – with a safe and secure work environment where no one is subject to unnecessary risk. (p. 14)	Process safety, operations performance and systematic risk reduction priorities had not been set and consistently reinforced by management; people in the Texas City plant accepted uncommonly high levels of risk due to poor level of hazard awareness and understanding of process safety (BP, 2005). According to a U.S. Coast Guard and Bureau of Ocean Management investigation of the *DH* incident, BP employees said 360 overdue maintenance problems had been found (McIntyre, 2010).
Wherever we operate, we will strive to minimize any damage to the environment arising from our activities. (p. 16)	The *DH* well leaked oil continuously for three months… (Repanich, 2010).
BP strictly adheres to … laws that promote or protect free and fair competition… . (p. 36)	In October 2007, BP agreed to pay $303 million related to TET propane price manipulation charges and a $7 million penalty for engaging in anti-competitive practices relative to its natural gas pipelines.
[The] … communities in which we operate should … benefit from our presence – through the wealth and jobs created… . (p. 46)65	In October 2010, six months after the DH explosion, "the environment and economy of the entire northern Gulf of Mexico region remain in a state of uncertainty, with overturned livelihoods, out-of-work fisherman, reluctant tourists, widespread emotional anguish and untold damage to the sea and its shores." (AP, 2010)
[Employees] must make sure that any information [provided to government or regulatory agencies] is truthful and accurate … . (p. 50)	In 2010, BP was fined $15 million by the EPA related to three incidents in 2004 and 2005 in its Texas City refinery, in part for failing to disclose all the regulated pollutants used at the facility (Plushnick-Masti, 2010).
[BP seeks] to engage in open and transparent dialogue and consultation with communities …[that] have a legitimate interest in our operations. (p. 51)	There are questions as to accuracy of the internal DH report, since it "laid most of the blame on [BP's] contractors" (Casselman & Swartz, 2010).

Conclusion

Given that sustainability is being perceived as an important part of business activity, it might be prudent for company managements to revisit their strategic approach to corporate interaction with the environment. In the short-term, firms need to assess their environmental risks, reevaluate their mission/vision/values statements to be inclusive of a sustainability focus, and enhance material eco-efficiency, energy efficiency, green management, and green supply chain efforts (Albino et al., 2009). In the long-term, firms should be more proactive in adopting ecocentric and integrity strategies, not simply because it may engender positive reputations that may translate into competitive advantage but also because it is the "right" thing to do. Actor Robert Redford made a good point in a Yosemite National Park dedication in 1985: "I think the environment should be put in the category of our national security. Defense of our resources is just as important as defense abroad. Otherwise what is there to defend?"

BP promoted itself, and was attributed to be a 'green' company. Unfortunately, many of its corporate actions did not uphold the elements of its code of conduct or the values espoused in its code of conduct. Accidents, minimal and severe, will happen. But, when an accident having the enormity of the Deepwater Horizon occurs, the chief executive of a truly 'green' company would never publicly announce: "The Gulf of Mexico is a very big ocean. The amount of volume of oil and dispersant we are putting into it is tiny in relation to the total water volume" (Webb, 2010) or "…everything we can see at this moment suggests that the overall environmental impact will be very, very modest" (Palkot, 2010).

In early 2013, BP pled guilty to manslaughter and a judge approved a $4 billion settlement of criminal charges between BP and the Justice Department related to the Gulf oil spill (Krauss, 2013). That amount raised BP's total costs of fines, settlements, and cleanup to over $30 billion (Fowler, 2013). However, the company still faces a civil suit that a former chief of the Justice Department estimated could "cost BP more than twice as much as the criminal settlement" (AP, 2013).

Time will only tell what the organizational and personnel changes made at BP will engender. Will the company now take an integrity strategy approach that balances people and planet on a basis of ethical principles to produce profitability? Or might the company take a legal strategy approach that stresses the difficulty of its mission choice and the mere "management of the environment" rather than "no damage to the environment"? BP must recognize some decisions, especially ones having environmental implications, are always likely to have significant short-term costs that need to be measured against long-term benefits. BP's new CEO, Bob Dudley, has created a new safety division that reports to him directly. The specialists in this division can "stop any operation at any time" which has been done in Trinidad, Egypt, and Alaska; additionally, BP now uses external rather than internal inspectors for its blowout protectors to remove potential conflicts of interest (Helman, 2012). Hopefully, the materiality of the company's short-term costs related to the Gulf spill (and other environmental penalties) will influence BP management to refocus on a more 'walk the walk, not simply talk the talk' ecocentric policy.

The use of words to gain goodwill from stakeholders is not new. However, when

words and actions are at odds, the result is sometimes deception. As individuals affected by the actions of organizations, people need to be aware of the importance of searching below surface rhetoric to get to the behaviors and actions that turn words into reality. It is not enough to read values statements, mission statements, and other discourse in judging the organizations in our world. It behooves everyone to check for the actions that give those statements meaning and truth.

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