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Purdue University, Calumet

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LETTER FROM THE EDITOR

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Articles

OUTPUT DECISIONS OF FIRMS UNDER UNCERTAINTY: SOME MICRO-THEORETIC ANALYSIS

Kishor Kumar Guru-Gharana, McNeese State University
Matiur Rahman, McNeese State University
Satyanarayana Parayitam, University of Massachusetts Dartmouth

ABSTRACT

The theory of the firm under uncertainty has been traditionally studied using the expected utility approach. There are very few works done in this field of study using the risk-return approach despite the popularity of this dichotomy in the business world. This paper, therefore, applies various mean-risk models to the output decision making of a competitive firm facing uncertainty in the product price. The risk formulation used in this paper involves a pre-specified target level of profit, similar to those discussed in Fishburn (1977and 1984). Furthermore, the measure of risk-aversion used in this model indicates the relative weight given by the agent to the risk component of the mean-risk objective function. The results of various mean-risk models are compared to those in the corresponding expected utility literature, and significant differences are found in many cases. One important difference is that whenever expected utility results require decreasing absolute risk aversion as a sufficient condition, the corresponding sufficient condition in the risk-return model of this paper is given by the condition that marginal cost is at least as large as the sum of average cost and average target level of profit. The results of this paper, in our opinion, are intuitively more appealing compared to the relatively abstract concept of decreasing absolute risk aversion.

INTRODUCTION

Traditionally, risk-return models have been used in portfolio theory. The theory of the firm under uncertainty has not been analyzed with the risk-return approach except for few works such as the mean-standard deviation model of Hawawini (1978). Expected utility approach seems to be popular in this field of study notwithstanding the intuitive appeal of the risk-return dichotomy in the business world.

This paper is a theoretical re-exploration of various risk-return models to the output decision making of a competitive firm facing uncertainty in the product price. Our attempt here is to find if different results do arise under risk-return vs. expected utility approaches. The results of the risk-return models in this paper are compared to those of the expected utility literature. One important

difference in the results is that the risk-return approach requires some restrictions on the cost function of the firm whenever the assumption of decreasing absolute risk aversion is required in the expected utility approach in order to obtain deterministic comparative statics results.

The remainder of the paper is structured as follows. Section 2 presents a brief review of some related literature. Section 3 is on the output decisions of a competitive firm under product- price uncertainty within mean- general risk model, and mean- standard deviation model. Section 4 concludes by comparing the major findings of this paper with the corresponding results in the expected utility approach.

LITERATURE REVIEW

Mills (1959) studies a monopolist under uncertainty and is one of the earliest works introducing uncertainty in microeconomics. But Mills' work suffers from serious limitations, such as, assumption of risk neutrality. Zabel (1970) is a generalization of Mills' article in some respects. Zabel uses multiplicative form of uncertainty instead of additive separability of uncertainty. Sandmo (1971) and Baron (1970) deal with a competitive firm facing an uncertain price of its product. These two articles are complementary to each other. The marginal impact of changing the distribution of price is studied by Sandmo but not by Baron, while Baron studies the effect of an increase in risk aversion which Sandmo ignores. Sandmo finds that the overall-impact of uncertainty is to reduce output assuming that the marginal cost is rising. However, Sandmo himself could not determine the sign of the marginal impact of uncertainty (for example the effect of a mean-preserving spread). But this problem was later taken up by Ishi (1977) who showed that nondecreasing absolute risk aversion is a sufficient condition for the marginal impact to be in the same direction as the overall impact.

Baron proves that, "…optimal output is a nondecreasing function of the firm's index (Arrow-Pratt measure) of risk aversion." Moreover, an increase in fixed cost decreases output for decreasing absolute risk aversion. Baron also concludes that if risk aversion is prevalent, as seems reasonable, prices are higher and outputs are lower than if firms were indifferent to risk. Finally, Baron finds that under uncertainty it is possible for the short run supply function of the risk averse firm to have a negative slope. This is a result which cannot occur in deterministic microeconomic theory. Baron (1971) demonstrates that for an imperfectly competitive firm under uncertainty the strategies of offering a quantity or changing a fixed price yield different results. Leland (1972) considers three alternatives behavioral modes under uncertainty, and claims that the result of Baron (1970) and Sandmo (1971) are special cases of his more general results. Lim (1980) addresses the question of ranking these behavioral modes under risk neutrality.

Batra and Ullah (1974) follow Sandmo heavily except that they use a production function and adopt an input approach instead of an output approach. As shown by Hartman (1975,1976), the Batra and Ullah paper suffers from a partial approach in deriving their conclusions about the overall impact of uncertainty on input demands considering both inputs simultaneously. Batra-Ullah also

assume concavity of the production function and decreasing absolute risk aversion to show that the marginal impact of uncertainty in terms of mean-preserving spread is to reduce input demands. Hartman (1975) criticizes the partial approach adopted by Batra-Ullah and in his 1976 article, Hartman also relaxes the assumption that all inputs are chosen before the product price is observed. He claims that the results of Batra-Ullah and Sandmo are rather sensitive to that particular assumption. Korkie (1975) comments that Leland's conclusion is the result of the assumption called the principle of increasing uncertainty. Blair (1974) also discusses some implications of random input prices on the theory of the firm.

Similar to the objective function of the present paper involving mean and risk Arzac (1976) allows for substitution between expected profit and safety, and proposes the following objective:

> Maximize $x + g(\alpha)$, $g' < 0$, $g'' < 0$., where α is the probability that profit falls below a disaster level.

This criterion satisfies the continuity axiom but only its linear form satisfies the independence axiom and is compatible with utility theory (Markowitz (1959) and Arzac (1976)). Arzac also applies the safety-first approaches to the theory of the firm under uncertainty and concludes the followings:

a) The overall impact of uncertainty is to lower output.
b) Maximizing the certainty equivalent profit has the same comparative statics properties as the certainty model.
c) If suitable empirical evidence on the firm's past responses to changes in the profit tax rate and in lump sum taxes and subsidies are available, then an almost complete discrimination among the alternative criteria can be made.

A survey of stochastic dominance principle which is used in comparative statics analyses of this paper is found in Levy (1992). Examples of various applications of this principle in investment decision making are available in Levy and Robinson (1998) ,Kim (1998) and Kjetsaa and Kieff (2003). Empirical works on this principle are reported in Porter and Gaumnitz(1972) and Barret and Donald (2003).Gotoh and Konno(2000)study relationship between Third Degree Stochastic Dominance and Mean –Risk Analyses.

Output Decisions of a Competitive Firm Under Uncertainty

In this paper we study the output decision making of a competitive firm facing uncertainty in the product price, assuming that the firm has a subjective probability distribution for the product price.

Assumptions

i) The firm must choose the volume of output (denoted by x) prior to the sales date when the market price (denoted by p) becomes known.

ii) The firm's beliefs about the sales price can be summarized by a subjective probability distribution function F(p) with density function f(p) and mean $\bar{p}$. Since the firm is unable to influence this distribution function, the basic assumption is that the firm is a price taker in a probabilistic sense.

iii) We are concerned here with the short run decisions of the firm; the fixed cost (denoted by b) appears in the total cost function.

iv) We assume that the firm's objective function is given by $V = m - \lambda r$, where m is the mean and r is the risk of profit π. Profit is given by $\pi = px - c(x) - b$. The parameter $\lambda > 0$ is the relative weight given to risk component and can be interpreted as the rate of substitution between return and risk and also as a measure of risk-aversion of the agent. For a risk-neutral firm $\lambda = 0$.

v) The variable cost function c(x) is assumed to have the following properties:

$$c(0) = 0,\ c'(x) > 0, \text{ and } c''(x) \geq 0.$$

That is, we assume that marginal cost (denoted by MC) is a positive and nondecreasing function of the output level.

The assumptions about the risk function r will be different for different models and therefore will be stated at the appropriate places.

MEAN-GENERAL RISK MODEL

The Risk Function and the Objective Function

In the general risk framework risk r is given by

$$r = \int_{-c(x)-b}^{t} \psi(t-\pi) g(\pi)\, d\pi, \qquad (1)$$

Where $g(\pi)$ is the probability density function of profits, and t is the target value of profit. This risk measure implies that agents associate risk only with outcomes below a target value (Markowitz (1952, 1959), Mao (1970), Fishburn(1977and 1984) ,and Holthausen(1976 and 1981)).

The function ψ is assumed to have the following properties:

$$\psi(0) = 0,\ \psi'(\ ) > 0 \quad \text{for } \pi < t, \text{ and } \quad \psi''(\ ) \geq 0.$$

The lower limit –c(x)-b is the minimum profit level for a given choice of output x, and occurs when p is zero. Changing variables from π to p in equation (1) we obtain

$$r = \int_0^{\hat{p}} \psi[t - px + c(x) + b] f(p) dp, \tag{2}$$

where $\hat{p} = \dfrac{t + c(x) + b}{x}$. For lack of another name, we can call $\hat{p}$ as the "target" price or the price which would give revenue equal to target profit and total cost.

The objective function to be maximized is given by

$$V = \bar{p}x - c(x) - b - \lambda \int_0^{\hat{p}} \psi[t - px + c(x) + b] f(p) dp. \tag{3}$$

It can easily be shown that the necessary and sufficient condition for an interior maximum, is $\bar{p} > c'(0)$, which we assume below.

First Order Condition

The first order condition for maximization is

$$Vx = \bar{p} - c'(x) - \lambda \int_0^{\hat{p}} \psi'(\ )[c'(x) - p] f(p) dp = 0 \tag{4}$$

Solving (4) we can get the optimal value of x in terms of the parameters as

$$x = h(\bar{p}, t, b, \lambda). \tag{5}$$

The form of the function h is determined by the cost function c(x) and the risk function ψ. From the first order condition it is proved below that the expected level of price exceeds the marginal cost at the optimum output level.

Proposition (1) if x* denotes the optimum output level, then $\bar{p} > c'(x^*)$.

Proof: From the first order condition we have

$$\bar{p} - c' = \lambda \int_0^{\hat{p}} \psi'(t - \pi)(c' - p) f(p) dp, \tag{6}$$

Where $\pi = px - c(x) - b$.

Case (A): $c' \geq \hat{p}$. In this case, the integral in equation (6) is clearly positive because $\psi'(\ ) > 0$. Therefore, proposition (1) immediately follows.

Case (B): $c' < \hat{p}$. In this case we prove proposition (1) by the method of contradiction. The integral in equation (6) can now be rewritten as

$$I = \underset{+}{\int_0^{c'} \psi'(t-\pi)(c'-p)f(p)dp} + \underset{-}{\int_{c'}^{\hat{p}} \psi'(t-\pi)(c'-p)f(p)dp}. \qquad (7)$$

If $\hat{\pi}$ and $\hat{\pi}$ are such that $\pi(0) < \hat{\pi} < \pi(c')$, and $\pi(c') < \hat{\hat{\pi}} < \pi(\hat{p})$, then applying the mean value theorem, we obtain from equation (7)

$$I = \underset{+}{\psi'(t-\hat{\pi})\int_0^{c'}(c'-p)f(p)dp} + \underset{-}{\psi'(t-\hat{\hat{\pi}})\int_{c'}^{\hat{p}}(c'-p)f(p)dp}. \qquad (8)$$

Since $\psi'' \geq 0$ is assumed, we have from equation (8)

$$I = \geq \psi''[t-\pi(c')]\int_0^{\hat{p}}(c'-p)f(p)dp. \qquad (9)$$

From the definition of the expected value $\overline{p}$, we have

$$\overline{p} - c' = \int_0^{\hat{p}}(p-c')f(p)dp + \int_{\hat{p}}^{\infty}(p-c')f(p)dp, \qquad (10)$$

or

$$\int_0^{\hat{p}}(p-c')f(p)dp = \underset{+}{\overline{p}-c'} - \int_{\hat{p}}^{\infty}(p-c')f(p)dp. \qquad (11)$$

The sign of the integral on the right hand side of equation (11) follows from our assumption c' < $\hat{p}$. Now if proposition (1) is violated, that is, if $\overline{p} - c' \leq 0$, then from (11) we obtain

$$\int_0^{\hat{p}}(p-c')f(p)dp < 0, \qquad (12)$$

or equivalently,

$$\int_0^{\hat{p}}(c'-p)f(p)dp > 0. \qquad (13)$$

On the other hand, if $\bar{p} - c' \leq 0$, then from equation (6) we have

$$I \leq 0, \tag{14}$$

Which along with equation (8) implies

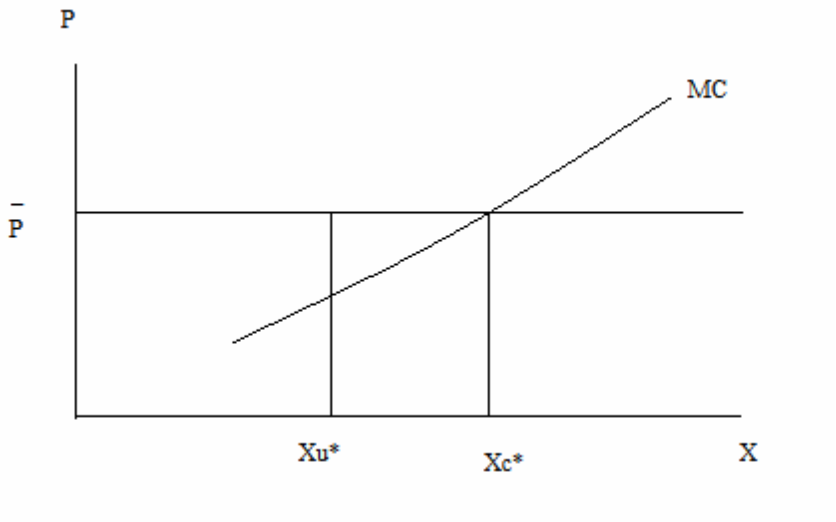
$$\int_0^{\hat{p}} (c' - p) f(p) dp \leq 0. \tag{15}$$

But inequalities (13) and (15) contradict each other. Therefore, it follows that we must have $\bar{p} - c' > 0$. This proves proposition (1).

One implication of proposition (1) is that the uncertainty output will be less than the corresponding certainty output. Sandmo (1971) calls this result the "overall impact of uncertainty." This result is illustrated in figure (2), where MC is the marginal cost curve.

In figure (1), x^*_c is the optimum output level for the corresponding certainty case (where price equals marginal cost), and x^*_u is the optimum output level for the uncertainty case (where $\bar{p} > c'$).

Figure (1) Overall impact of uncertainty



Considering equation (6), another implication of proposition (1), which we use in some comparative statics results, is that

$$\int_0^{\hat{p}} \psi'(t - \pi)(c' - p) f(p) dp > 0. \tag{16}$$

Second Order Condition

The second order condition for an interior maximum is given by

$$Vxx = -c''[1 + \lambda \int_0^{\hat{p}} \psi' f(p)dp] - \lambda \int_0^{\hat{p}} \psi''(c' - p)^2 f(p)dp \quad (17)$$

Our assumption $c'' > o, \psi'' \geq o,$ and $\psi'(0) \geq 0$ are sufficient for the second order condition to be satisfied.

Comparative Statistics

To find the effects of a change in a parameter i (where i can be one of the parameters $\overline{p}, t, b, and \lambda$) we proceed in the following way:

The first order condition can be written as

$$Vx[h(\overline{p},t,b,\lambda),\overline{p},t,b,\lambda] = 0. \quad (18)$$

Differentiating with respect to i, we obtain

$$V_{xi} + V_{xx}h_i = 0. \quad (19)$$

That is,

$$h_i = \frac{-Vxi}{Vxx}. \quad (19')$$

Since Vxx < 0 from the second order condition, the sign of h_i is the same as the sign of Vxi. Hence in the following, we will determine the sign of h_i from that of Vxi.

(a) Change in Risk Aversion.

From equation (4), the derivative Vxλ is given by

$$Vx\lambda = -\int_0^{\hat{p}} \psi'(c' - p) f(p) dp < 0 \quad (20)$$

Inequality (16) implies the sign of inequality in (20).
Thus, an increase in risk aversion indicated by a rise in λ, reduces the optimal output.

(b) Change in Fixed Cost.

From equation (4) we have

$$Vxb = -\lambda \int_0^{\hat{p}} \psi''(c'-p) f(p) dp - \frac{\lambda}{x} \psi'(0)(c'-\hat{p}) f(\hat{p}). \quad (21)$$

From equation (21) we infer

$$Vxb < 0 \text{ if } c' \geq \hat{p} = \frac{t+c+b}{x}. \quad (21')$$

That is, if marginal cost is at least as large as $\frac{t+c+b}{x}$, then an increase in fixed cost reduces the output level. However, the condition in (21') is only a sufficient condition but not necessary. If c' is less than $\frac{t+c+b}{x}$, then the second term in (21) is positive but the sign of the first term is ambiguous.

(c) Change in Expected Price.

In order to study the effect of a change in the expected price, we will transform p to p* = p + k, where k is the shift parameter. Then, we have the objective function as

$$V^* = (\bar{p}+k)x - c(x) - b - \lambda \int_0^{\hat{p}^*} \psi [t - (p+k)x + c(x) + b] f(p) dp, \quad (22)$$

Where $\hat{p}^* = \frac{t+c+b}{x} - k$. Therefore, the first order condition is

$$V^*_x = \bar{p} + k - c' - \lambda \int_0^{\hat{p}^*} \psi'[t - p^* x + c(x) + b].(c'-p^*)f(p)dp = 0. \quad (23)$$

Equation (23) gives x as a function of k. As discussed above, the sign of h_k will be the same as that of V^*_{xk}, and will show the direction of the effects of a change in the expected price on the optimal output.

We have from equation (23)

$$V^*_{xk} = 1 + \lambda \int_0^{\hat{p}^*} \psi' f(p) dp + \lambda x \int_0^{\hat{p}^*} \psi''(c'-p^*) f(p) dp + \lambda \psi'(0)(c'-\hat{p}) f(\hat{p}^*), \quad (24)$$

Where $\hat{p} = \frac{t+c+b}{x}$ as above. The last term contains $\hat{p}$ because $\hat{p}^* = \hat{p}$ when $p = \frac{t+c+B}{x} - k$.

From equation (24) we get the following results:

$$\text{If } c' \geq \frac{t + c + b}{x}, \text{ then } V^*_{xk} > 0 \qquad (24')$$

In other words, a sufficient condition for the supply function of the competitive firm to be positively sloped with respect to the expected price is given by the inequality $c' \geq \frac{t + c + b}{x}$.

This condition reduces to marginal cost greater than or equal to average cost when the target value t equals zero. Holthausen (1981) and Crosby, et al. (1985) conclude after the review of many empirical studies that the target level is frequently equal to zero. Also, the marginal cost is at least as large as average cost if average cost is everywhere nondecreasing. However, the sufficient condition in the comparative statics results for t equal to zero require only that the optimal output should not lie in the decreasing section of the average cost curve.

(d) Change in the Target Value.

The comparative statics analysis with respect to a change in the target value is of special interest because we know that, other things remaining the same, the measure of risk increases as the target value increases. Thus, an increase in the target value can be considered as one way of increasing the measure of risk. However, the derivative V_{xt} is found to be identical to V_{xb} and is therefore of ambiguous sign. Again, the inequality $\frac{t + c + b}{x}$ is a sufficient condition for an increase in the target value (and consequently in risk) to reduce the optimal level of output.

It may be interesting to note that, out of the four parameters $\overline{p}$, b, t, and λ, only the parameter λ gives an unambiguous comparative statics result. In the case of the other three parameters, the inequality $c' \geq \frac{t + c + b}{x}$ provides a sufficient condition for a determinate comparative statics result.

In the remainder of this paper we will study further comparative statics effects related to some changes in the distribution of p, and the tax rate.

(e.) A First Degree Stochastic Dominance (FSD) Shift.

Here we investigate the effects of a FSD shift which will make new distribution dominating. It is proved below that such a shift will increase the optimal output level if the inequality $c' \geq \frac{t + c + b}{x}$ is satisfied.

Let us denote the initial distribution of p by f^1 and the new distribution by f^2. We want to show that, if f^2 FSD f^1, then the optimal output corresponding to f^2 is larger than the optimal output corresponding to f^1. Let V^1 and V^2 denote the objective function corresponding to f^1 and f^2, respectively. Let x^1 denote the optimal output corresponding to f^1. Then, we have

$$^{1}x\big|_{x=x} = p^{-1} - c'(x^{1}) - \lambda\int_{0}^{\hat{p}}\psi'(t-\pi)[c'(x^{1}) - p]f^{1}(p)dp = 0, \qquad (25)$$

and

$$V^{2}x\big|_{x=x}1 = p^{-2} - c'(x^{1}) - \lambda\int_{0}^{\hat{p}}\psi'(t-\pi)[c'(x^{1}) - p]f^{2}(p)dp, \qquad (25')$$

Where p^{-1} and p^{-2} are the means of p corresponding to f^{1} and f^{2}, respectively. Denoting $\psi'(t - \pi)[c'(x^{1}) - p]$ by $\phi(p)$ we have from (25) and (25').

$$(v^{2}x - v^{1}x)\big|_{x=x}1 = (p^{-2} - p^{-1}) + \lambda\int_{0}^{\hat{p}}\Phi(p)[f^{1} - f^{2}]dp. \qquad (26)$$

We know that the first term on the right hand side of (26) is positive. Let us investigate the sign of the second term. We have, $\Phi(p) = \psi'(t-\pi)(c'-p)$. Since we assume $\psi' \geq 0$, it immediately follows that $\phi(p)$ is positive in the integral in equation (26) if c' is at least as large as $\hat{p}$. Therefore, the left hand side in (26) is also positive if $c' \geq \hat{p}$.
Now, differentiating $\phi(p)$ we obtain

$$\phi' = -\psi'(t-\pi) - x\psi''(c'-p) < 0, \qquad (27)$$

Since $\psi'' \geq 0$ is our basic assumption. Thus, ϕ is a decreasing function. Considering (26) and (27), and the results of stochastic dominance as derived in the article by Hadar and Russell in Balch, et al. (1974), it follows that the output increases as a result of a FSD shift which makes the new distribution dominating, given that c' is at least as large as $\frac{t + c + b}{x}$.

(f) Second Degree Stochastic Dominance (SSD) Shift.

We now show that the inequality $c' \geq \frac{t + c + b}{x}$, and the assumption $\psi''' \geq 0$ are sufficient for a SSD shift, which makes the new distribution dominating, to increase output. To show this result, we need to demonstrate that the function $\phi(p)$ in (26) is convex.

We have

$$\phi''(p) = 2x\psi'' + \psi'''x^{2}\ (c'-p) \geq 0, \qquad (28)$$

Since $\psi'' \geq 0$, $\psi''' \geq 0$, and $c' \geq \hat{p}$. Therefore, considering (26) and the results of stochastic dominance found in Hadar and Russell's article (1969 ,1971 and 1974) it follows that the output increases when the distribution is made dominating in the SSD sense.

(g) Change in Per Unit Tax.

Let us denote the per unit tax by δ. Then the net profit denoted by $\tilde{\pi}$ is

$$\tilde{\pi} = px - c(x) - b - \delta x. \tag{29}$$

The objective function is

$$V = \bar{p}x - c(x) - b - \delta x - \lambda \int_0^{\tilde{p}} \psi(t - \tilde{\pi}) f(p) dp, \tag{30}$$

Where $\tilde{p} = \frac{t + c + b}{x} + \delta = \hat{p} + \delta$. We show below that a rise in the per unit tax reduces output if c' is at least as large as $\frac{t + c + b}{x}$.

From equation (30) we obtain the first order condition as

$$V_x = \bar{p} - c' - \delta - \lambda \int_0^{\tilde{p}} \psi'(t - \tilde{\pi})(c' - p + \delta) f(p) dp = 0. \tag{31}$$

Differentiating V_x with respect to δ we have

$$V_{xt} = -1 - \lambda \int_0^{\tilde{p}} \psi' f(p) dp - x\lambda \int_0^{\tilde{p}} \psi''(c' + \delta - p) f(p) dp + \lambda \psi'(0)(c' - \hat{p}) f(\tilde{p}). \tag{32}$$

Therefore, it is evident from (32) that $c' \geq \frac{t + c + b}{x}$ is a sufficient condition for $V_{xt} < 0$. In other words, given the inequality $c' \geq \hat{p}$, a rise in per unit tax reduces output.

In the following section, we study the mean-standard deviation model where risk is defined as the standard deviation of the profit level.

Mean Standard Deviation Model

Let the standard deviation of price be denoted by σ and that of profit by σ_π. Then we have

$$\sigma_\pi = x\sigma. \tag{33}$$

The objective function in this framework is

$$V = \bar{p}x - c(x) - b - \lambda x\sigma. \quad (34)$$

Shut-Down Condition

Here, we have

$$Vx|x = 0 = \bar{p} - c'(0) - \lambda\sigma. \quad (35)$$

Assuming that V is concave in x (which in this model requires c" > 0), we find the necessary and sufficient condition for a positive output as

$$\bar{p} > c'(0) + \lambda\sigma. \quad (36)$$

As discussed earlier, the condition for a positive output level in the risk formulation involving a target value is that $\bar{p}$ exceeds c'(0). Thus, we see that the condition for a positive output level in the mean standard deviation model is more stringent than that in the model with the risk function defined in terms of the target level of profit.

In the subsequent paragraphs we derive the first and second order conditions for an interior maximum, assuming that inequality (36) is satisfied.

First Order Condition

From equation (34), we have the first order condition as

$$Vx = \bar{p} - c'(x) - \lambda\sigma = 0. \quad (37)$$

Solving for x we obtain

$$x = c'^{-1}(\bar{p} - \lambda\sigma) = h(\bar{p} - \lambda\sigma). \quad (38)$$

Equation (37) also gives

$$\bar{p} = c'(x) + \lambda\sigma > c'(x). \quad (39)$$

Thus, in this model we can explicitly express output as a function of a linear combination of mean and standard deviation of price. Moreover, the function h in equation (38) is the inverse of the marginal cost function with the linear combination of mean and risk as its argument. Equation (39) shows that, in this model too, the overall impact of uncertainty is to reduce output.

Second Order Condition

We have in this model

$$V_{xx} = -c''. \tag{40}$$

Therefore, c'' > 0 is necessary and sufficient for the second order condition to be satisfied in this model. In other risk formulations increasing marginal cost is not a necessary condition for an interior maximum.

Comparative Statistics

(a) Change in the Expected Price.

If we transform p to p* = p + k, k > 0, and denote the objective function corresponding to p* by v*, then we have

$$V^* = (\bar{p}+k)x - c(x) - b - \lambda x\sigma. \tag{41}$$

The first order condition is

$$V_x^* = \bar{p}+k-c'-\lambda\sigma = 0. \tag{42}$$

Differentiating with respect to k, we obtain

$$V^*_{xk} = 1 > 0. \tag{43}$$

Therefore, the supply function with respect to the expected price is upward sloping in this model without any additional assumption, whereas in other risk formulations we could only give a sufficient condition $\left(c' \geq \frac{t + c + b}{x}\right)$ for such a result.

Notably, the results of the mean-standard deviation model are closer to those of the corresponding deterministic model than to the results of other risk formulations. This is evidently

true in the case of the positive slope of the supply function which requires only that the marginal cost is upward sloping. We will find that the same is true for other comparative statics results, provided they are applicable to the certainty case.

(b) Change in the Risk Aversion Measure.

The derivative $Vx\lambda$ is given by

$$Vx\lambda = -\sigma < 0. \tag{44}$$

Hence, as in other models, an increase in risk aversion decreases output.

(c) Change in Fixed Cost.

The solution for the optimal output as in equation (38) clearly shows that a change in the fixed cost has no effect on the optimal output in this model. Again, we see that the result of the mean-standard deviation model is similar to that of the corresponding deterministic model.

Next, we consider a mean-preserving spread which changes the variance (and consequently the risk or the standard deviation) leaving the mean of the random variable unaltered. This is also a special type of SSD shift where the mean of the two distributions is the same.

(d) Mean-Preserving Spread (MPS).

We have from equation (37)

$$Vx\sigma = -\lambda < 0. \tag{45}$$

Thus, a MPS transformation of p will reduce the optimal output level for a risk averse firm, and will have no effect for a risk neutral firm.

(e) Change in Per Unit Tax.

If per unit tax is denoted by δ, then we have the objective function as

$$V = \bar{p}x - c(x) - b - \delta x - \lambda x\sigma. \tag{46}$$

The first order condition is

$$Vx = \bar{p} - c' - \lambda\sigma - \delta = 0. \tag{47}$$

Differentiating with respect to δ we obtain

$$V_{x\delta} = -1 < 0. \tag{48}$$

Thus, an increase per unit tax reduces output without any further assumption, whereas in other risk formulations we could provide only a sufficient condition for this result.

(f) Change in Profit Tax.

Let θ be the full loss offset profit tax rate. Then, the net profit is given by

$$\pi^* = (1-\theta)[px - c(x) - b]. \tag{49}$$

The objective function is

$$V^* = (1-\theta)[\bar{p}x - c(x) - b - \lambda x\sigma], \tag{50}$$

Since the standard deviation of π* is (1-θ)xδ. The first order condition is

$$V_x^* = (1-\theta)[\bar{p} - c' - \lambda\sigma] = 0. \tag{51}$$

Solving for the optimal output we have

$$x = c'^{-1}[\bar{p} - \lambda\sigma], \tag{52}$$

which is similar to equation (37). Equation (52) clearly shows that a change in the profit tax rate of the full loss-offset type does not affect output.

CONCLUSIONS

This paper concludes as follows:

(a) A positive slope of the supply function with respect to expected price is obtained in expected utility models by assuming decreasing absolute risk aversion as observed in Baron (1970). In our mean-risk models with a target value, a positive slope of the supply curve is obtained given the sufficient condition $c' \geq \frac{t + c + b}{x}$ (which reduces to marginal cost greater than or equal to average cost when t equals zero). On the other hand, in the mean-standard deviation model, this result holds without any further assumption.

(b) The effect of increased risk aversion on output is negative in mean-risk model, which is also true in expected utility models (see for example Baron (1970)).

(c) In the general risk formulation, the inequality $c' \geq \frac{t + c + b}{x}$ is a sufficient condition for an increase in fixed cost to reduce output, whereas in expected utility models the assumption of decreasing absolute risk aversion is a sufficient condition for such a result. Thus, the sufficient condition of the mean-risk model involves the behavior of the cost function, whereas the sufficient condition of the expected utility model involves the risk aversion attitude of the firm. In the mean-standard deviation model fixed cost does not have any effect on the optimal output.

Thus, we see that different models can give significantly different results. For example, suppose $c' < \frac{t + c + b}{x}$ holds for a firm, then the standard deviation model predicts zero effect, whereas the general risk model and the expected utility model give an ambiguous result. Similarly, if $c' = \frac{t + c + b}{x}$ holds for a firm, then the standard deviation model predicts zero effect of fixed cost on output, the general risk model predicts a negative result and the expected utility model gives ambiguous results if decreasing absolute risk aversion is not assumed.

(d) In the case of a mean-preserving spread, a negative effect on output is obtained in the mean-general risk model assuming $c' \geq \frac{t + c + b}{x}$, in the mean-standard deviation model without any further assumption, and in the expected utility model assuming non-increasing absolute risk aversion (see, for example, Sandmo (1971)).

(e) A negative effect of an increase in per unit tax is obtained in the mean-risk model involving a target value by assuming $c' \geq \frac{t + c + b}{x}$, in the mean-standard deviation model without any further condition, and in the expected utility in model by assuming non-increasing absolute risk aversion (see, for example, Sandmo (1971)).

(f) The effect of a proportional tax in the expected utility model of Sandmo (1971) depends on the monotonicity property of the measure of relative risk aversion. Our

mean-general risk model gives an ambiguous result. A change in the profit tax rate θ has no effect on output in the mean-standard deviation model.

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APPENDIX

In parts A and B of the appendix, we provide a summary of the main results. The sign (+) means a positive effect on output, the sign (–) means a negative effect on output, and (0) means no effect on output. The assumption of decreasing absolute risk aversion is denoted by DARA. To state further, the mean-standard deviation model has results almost identical to the deterministic model when price equals with probability of 1.To note again, a mean-preserving spread reduces output in the mean-standard deviation model without further assumption, whereas in the expected utility model the assumption of nonincreasing absolute risk aversion gives such a result. On the other hand, in the case of models involving a target value the inequality is a sufficient condition for this result.

Summary of Results: Part A

Model	Change in				
	Overall Price of Uncertainty	Expected Price	Fixed Cost	Per Unit Tax	Profit Tax at $\theta = 0$
General Risk Model	–	+ if $c' \geq \frac{t+c+b}{x}$	– if $c' \geq \frac{t+c+b}{x}$	– if $c' \geq \frac{t+c+b}{x}$	Ambiguous
Standard Deviation Model	-	+	0	-	0
Expected Utility Model	-	+ if DARA	- if DARA	- if nonincreasing absolute risk aversion	- if decreasing relative risk aversion
Deterministic Model with Price	Not Applicable	+	0	-	0

Summary of Results: Part B				
Model	Change in			
	Risk Aversion	Target Value	FSD Shift	SSD Shift
General Risk Model	–	– if $c' \geq \frac{t + c + b}{x}$	+ if $c' \geq \frac{t + c + b}{x}$	+ if $\psi''' \geq 0$, and $c' \geq \frac{t + c + b}{x}$
Standard Deviation Model	–	Not Applicable	+ Not available	Not available
Expected Utility Model	–	Not Applicable	Not Available	Not Available

CRISIS RESPONSE PLANS POST 9/11: CURRENT STATUS AND FUTURE DIRECTIONS

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ABSTRACT

The attacks of September 11, 2001 (9/11) on the United States had a profound impact on organizations both immediately following, as well as, several years after the attacks. This study focuses on the impact the attacks had on organizational crisis response plans (CRPs). The purpose of this study was to examine how organizations' CRPs have changed in response to the numerous crises that business have endured in the last decade. The study also examines the role technology plays in these changes. A survey was sent to executives to explore how their organizations made changes to their crisis response plans, crisis communication plans, succession plans, and technology. They were asked for the status of these issues prior to 9-11, three months after 9-11, and several years after 9-11. Implications of the results are discussed along with suggestions for using technology to improve CRPs.

INTRODUCTION

There have been a number of crises that have affected organizations during this decade. The events of September 11th, 2001 and Hurricane Katrina in 2005 demonstrated that a majority of organizations' Crisis Response Plans (CRP) were not adequate to respond to either man made or natural disasters of this magnitude. "On Sept. 11, 2001, terrorists attacked the World Trade Center, killing 2,749 people. The attack resulted in severe economic impact, especially to airlines, and a stock market loss of $1.2 trillion. On Dec. 26, 2004, a tsunami from a 9.1 earthquake overran the shores of many countries along the vast rim of the Indian Ocean. Over 283,000 people died. On Aug. 29, 2005, Katrina, a category-5 hurricane, knocked out electric and communication infrastructure over 90,000 square miles of Louisiana and Mississippi and displaced 1.5 million people." (Denning, 2006, p. 15). This past decade has been catastrophic, and there are still two more years to go.

September 11, 2001 started off as a normal Tuesday morning at work. That changed at 8:46 a.m., the time at which the first plane crashed into the North Tower of the World Trade Center in New York City. A day that started out normal for thousands of workers turned out to be the day that is now considered to be the worst terrorist attack ever launched on the United States. As a result, the attacks of 9/11 changed America, the work environment, and the workforce.

It is estimated that 2,749 people died on September 11, 2001 in the World Trade Center attack. This includes 343 firefighters, 23 police officers, 658 Cantor Fitzgerald employees, and 78 employees of the Windows of the World restaurant located at the top of the North Tower (Levitas, 2002). The people who were killed that day "were bond traders, chefs, firefighters, computer programmers, administrative assistants, custodians, vice presidents and flight attendants." (Caudon, 2004, p. 35).

The attacks of 9/11 showed that innocent civilians performing their daily work routine can be victims of crises, including terrorism. The attacks were not expected, and they were not planned for. Ian Mitroff (2004) categorizes crises as abnormal accidents or normal accidents. Abnormal accidents include kidnappings, bombings, cyber or internet attacks (e.g. viruses), and any other attack or event that is performed out of betrayal or sabotage. Normal accidents include floods, earthquakes, human errors, and system breakdowns. While these events are not necessarily expected, organizations may better prepare for them than they do abnormal accidents. The events of 9/11 highlighted the need for organizations to prepare for abnormal accidents (Mitroff, 2004).

Unfortunately, much of the knowledge corporations gained from dealing with the aftermath of the terrorist attacks was either forgotten or misused during the crisis following Hurricane Katrina. John Lawson (2005, p. 20), an official from Tulane University, recounts his experiences at Tulane, "… people were too dispersed for post-disaster activity, which was exacerbated by the communications failure. We couldn't get hold of people to find out where they were. I had my director of administrative computing evacuating to one city; my director of networking, who was supposed to go with me, ended up in a different city because of traffic. We had people spread out all over."

The level of security and safety that people felt towards their institutions, first challenged by the events of 9/11, was called into question by the planning incompetence exhibited by the Federal Emergency Relief Agency (FEMA) during Hurricane Katrina. "We still have difficulty grasping the notion that we are not safe from disaster in our own country. We couldn't imagine a foreign terrorist attack on our soil. It happened. We couldn't imagine an entire city disappearing under water, its population evacuated -- but too late. It happened. We must begin to imagine future disasters, perhaps multiple catastrophes, for they, too, may well occur." (Nussbaum, 2005, p. 36).

After the events of 9/11 and Hurricane Katrina, there were calls for organizations to improve crisis management. "Crisis management is broadly defined as an organization's pre-established activities and guidelines for preparing and responding to significant catastrophic events or incidents i.e., fires, earthquakes, severe storms, workplace violence, kidnappings, bomb threats, acts of terrorism, etc." (Lockwood, 2005, p. 1). Part of crisis management is having an effective Crisis Response Plan. Organizations need to constantly update their CRPs each time they experience a crisis because there are lessons to be learned each time a CRP is implemented during a crisis.

Lawson (2005) explains how he extrapolated from contingency planning he received from living through the 9/11 crisis to deal with Hurricane Katrina in New Orleans. Lawson suggests the

following (2005, p. 20): "You also need a business-continuity plan for your institution. You've got to think about how you are going to function if a disaster happens. How long can you go without printing transcripts, how long without sending paychecks out, how long without paying bills? How long can you tolerate not sending out accounts-receivable statements? You need to make those choices, so you'll know how much money you'll have to spend on disaster recovery."

However, research has found that organizations do not have adequate CRPs in place. A study released in December 2005 by the nonprofit agency, Trust for America's Health (TFAH), noted, "[Hurricane Katrina] provided a sharp indictment of America's emergency-response capabilities as the gaps between plans and reality became strikingly evident. Parts of the public health system did not work, and while many did work as intended, those functions were often too limited and divorced from other response activities to match the real needs in a timely way," (Young, 2006, p.197). The report went on to give specific examples of ways in which some of the most basic infrastructural services are still woefully unprepared, months after Katrina and years after 9/11. "… according to the report, hospitals in 15 states, including California, Florida, New York, Pennsylvania, Texas, and the District of Columbia, have not sufficiently planned to care for a surge of extra patients by using non-health care facilities, such as community centers, sports arenas, or hotels."

The 2004 report "Disaster Planning in the Private Sector: A Post 9/11 Look at the State of Business Continuity in the U.S." found that overall U.S. organizations are still unprepared for disaster. The survey of one thousand executives who were decision makers in their organization's crisis response planning efforts, found that 25% of the respondents did not have a crisis response plan in place in their organization. Respondents from Los Angeles were ranked as the least prepared with 30% of the companies not having a crisis response plan in place (Salierno, 2004). This finding is significant since intelligence reports suggest that Los Angeles, CA is likely to be the site of a future terrorist attack (http://www.cnn.com/2006/ POLITICS/02/09/bush.terror/index.html).

Companies that reported having plans in place acknowledged that the plans had not been updated. Twenty five percent of executives reported that their plans had not been tested within the past year; 40% indicated that the last time their plan was tested was over a year ago; and 11% responded that their plan had never been tested (Salierno, 2004). The report revealed that 200 of the participating companies indicated that they had experienced a disaster which resulted in revenue losses as high as one million dollars a day due to the crisis. Even with such huge financial losses, 75% of the firms reporting that they had suffered a disaster did not improve their crisis response plans or create a plan after the disaster (Salierno, 2004).

These findings were confirmed by another study which found that even those organizations that were directly impacted by a disaster still did not make improvements or changes to their crisis response plans. The study reports that "it was expected that organizations that were directly affected by the attacks of September 11, 2001, because of their location in the World Trade Center in New York, would create plans to be better prepared for emergencies and catastrophic events compared to employers that were not directly affected by the attacks. This was not found in the results of the

study" (Hurley-Hanson, 2006, p. 491). Interestingly, while the number of west coast companies that created crisis response plans increased, the number of east coast companies did not (Hurley-Hanson, 2006). However, all of the respondents felt "that their companies had improved their efforts in collecting emergency contacts for employees, in finding a way to communicate with employees after a crisis, in providing drills to help the employees become resilient and the employees had more confidence in the company's crisis planning, " (Hurley-Hanson, 2006, p. 489).

The purpose of this study is to examine how organizations' CRPs have changed in response to the numerous crises that American businesses have encountered. The study also examines the role technology played in these changes. The first section of the paper discusses the importance of Crisis Response Planning, Crisis Communication Planning, Succession Planning, and Technology in Crisis Response Plans. The second section of the paper describes the research methodology of the study and the results. The final section of the paper discusses the implications of the research results and provides suggestions for ways that technology can benefit CRPs.

CRISIS RESPONSE PLANNING

Crisis response planning, often called scenario or crisis planning, is a roadmap for employees when a disaster strikes. A typical crisis response plan outlines how employees should evacuate the work place during a crisis, where employees will work if they cannot return to the workplace, how food and shelter needs will be met in the event that employees cannot leave the work premises, and where back up records and files will be located (Benefits and Compensation Digest, 2006).

Business continuity was a major concern for companies following the events of 9/11, especially for financial organizations on Wall Street (Kennedy, Pettrottet & Thomas, 2006). Business continuity planning is the process of "closing the gaps between current and target states of asset readiness." Organizations with effective Crisis Response Plans are expected to experience better levels of business continuity.

CRISIS COMMUNICATION PLANS

Much of the research on crisis communication plans focuses on the importance of strong communication during a crisis and identifying the most appropriate communication channels during the crisis. Argenti states that during a crisis, "internal communications take precedence. Before any other constructive action can take place whether it's serving customers or reassuring investors- the morale of employees must be rebuilt." (Argenti, 2002). His research found that the companies that managed the crisis communication process most effectively, performed one or more of the following actions after 9/11: Managers were highly visible to employees; managers sent messages to employees who could be reached about updates; executives met with supervisors and managers weekly after 9/11 to discuss how the employees were doing; the meetings were recorded and put on

the intranet for all employees to view; executives sent messages during news talk shows to employees who could not be reached by telephone; and/or call centers were set up, so employees could call to let the company know that they were safe (Argenti, 2002).

Many of the problems and difficulties suffered by the people of Louisiana as a result of Hurricane Katrina were due to poor organizational communications. "At each level of government, leaders failed to hash out their differences beforehand. As a result, officials ran into communications roadblocks that should have been uncovered before the disaster struck." (Roberts, 2006, p. 26). Another problem that contributed to the organizational breakdown after Katrina was the result of a decentralized command center that failed to hold civil employees accountable to the fulfillment of their obligations as administrators of public services. "The report noted that in the days after Hurricane Katrina, more than 30% of the New Orleans Police Department did not report for duty, an indication that "planning must not only account for absences, but also seek to address worker concerns." (Young, 2006, p. 197). Also, the problems that subsequently occurred throughout FEMA and the federal response in the wake of Hurricane Katrina were largely due to personnel failing to competently communicate with one another. "The various agencies had major difficulties in coordinating and FEMA did not deliver what people thought it had promised. At all levels there was a lot of finger pointing and wrangling over who would do what and who would pay for what," (Denning, 2006, p.17). "Since the events of 11 September 2001, in New York there is now world-wide awareness of the necessity of having trained and coordinated teams available to respond to such unexpected catastrophes." (Smith, et al, 2003, 517).

SUCCESSION PLANNING

Succession planning is the process of identifying leaders who can step up and take a leadership role on short notice. In addition, the identified leaders are given the training, knowledge and tools to be able to take on a leadership role at some point in the future. This becomes critical in the event of a crisis, where several layers of management may be affected (Catrain, 2002). "A total of 343 firefighters, nearly 30 times the number ever lost by the department in a single event were killed in the attack. The dead included five of the department's most senor officials, including the chief who specialized in directing rescues from collapses of this sort." (Levitas, 2002). Along with the many lives that were lost, "the FDNY estimates that it lost 4,440 years of experience the day of the attacks" (Marquez, 2006). The massive losses experienced by the New York Fire Department during 9/11 illustrated to businesses in all industries the important role succession planning plays in a comprehensive crisis response plan. The poor planning that was exhibited by the Federal government in response to Katrina, highlights the need for strong leadership at all levels of an organization during both terrorist attacks and natural disasters. Despite its importance, many companies still do not have succession plans in place. An HR Magazine study reported that 43% of the respondents had no process for the transition of a CEO, and 25% did not know the strengths of

the managers two layers below their own job (Pomeroy, 2006). Greengard (2001) reported that 24% of Fortune 500 companies do not consider succession planning a priority and notes that succession planning has changed over the years because of 9/11. In the past, the second highest-ranking person would typically succeed the CEO. Since many senior level managers died on 9/11, the surviving managers of the organizations that suffered the most losses "had to confront the reality that key talent and brain-power were gone forever, but they also had to cope with gaping holes in their management structure. They immediately had to identify positions, competencies, and skills that they needed just to stay afloat." (Greengard, 2001, p. 1).

INFORMATION TECHNOLOGY

Information technology can play a major role in crisis response plans, crisis communication plans, and succession planning. Information technology can help organizations to take the correct precautions to ensure that when a crisis or a disaster strikes, an organization is prepared. In part, this is because … "Computerized information systems have developed from a mere transaction processing function through a data accumulation period to a decision support role." (Beckers & Bsat, 2002, p. 41). There are some good examples of companies employing IT to implement crisis response plans. Directly after the attacks on 9/11, American Airlines took immediate steps to assist its personnel. "After American Airlines Flight 11 crashed into the North Tower of the World Trade Center, American Airlines' most important public was the families of their passengers and crew. A crisis management plan called for the utilization of the Customer Assistance Relief Effort (CARE) program. CARE sent more than 350 specially trained volunteers from American to the departure and destination cities of the hijacked plane. They set up command centers to assist families of victims and helped them deal with such things as flight arrangements, hotel accommodations, and provided food if necessary. CARE volunteers, who speak a cumulative total of 50 languages, also escorted family members attending accident-related events, including memorials and funerals." (Feam-Banks, 2002, p. 30).

Coast Electric Corporation also learned valuable lessons from the events of 9/11 and decided to implement an ad-hoc system of additional, part time employees to deal with the problems created by Hurricane Katrina. "During the storm, Coast Electric saw its 230 full-time employee population swell to 3,000 with contract crews." (Babcock, 2006, p. 37). Ernst and Young created a Catastrophe Communications network to account for its employees affected by disaster. "The [so-called] 'Roll Call' database allows emergency personnel to view which employees have checked in and compare them against the list of workers assigned or "hoteling" at the office facing the emergency." (HR Focus, 2005, p. 6). This roll call can be issued at anytime via an acting manager and it helps track where personnel are during a crisis.

METHODS

Sample

Human Resources professionals located in downtown Los Angeles, who were also members of the Professionals in Human Resources Association (PIHRA) were chosen as the participants for this study. One of the most critical lessons learned from 9/11 was the importance of Human Resources professionals in crisis response plans. "HR is … the keeper of the keys. They have all the privacy information, they have to deal with the IT people, they know who to contact, and they have to be able to manage communication with employees en masse. It could be a very significant role, depending on the size of the organization" (Cadrain, 2004, p. 27).

A survey was sent out via email to 446 PIHRA members; 42 completed responses were received, yielding a 9.4% response rate. The respondents were primarily Caucasian women in their forties and fifties holding Bachelor's degrees. Most respondents held jobs in middle to upper management (HR managers and directors), and the majority of the respondents had been with their organization for 10 years or less. Respondents worked in a variety of industries, and organizations of all sizes were represented. The downtown Los Angeles geographic location was selected due to the size and importance of the metropolitan area.

Survey

The data was collected through a 48 question survey consisting of Likert scale responses measuring individuals' opinions on the topics of crisis response plans, crisis communication plans, succession planning, and the use of technology in these plans. Respondents were asked to rate eight Human Resource aspects from one to eight with one being the most important and eight being the least important. The survey included questions on respondent demographics and company attributes. The survey was administered on-line and the researchers did not have direct contact with the survey participants, as distribution of the survey was facilitated by PIHRA. A representative from PIHRA distributed the survey link including a short cover letter via email to further protect the anonymity of the participants.

RESULTS

Crisis Response Plans

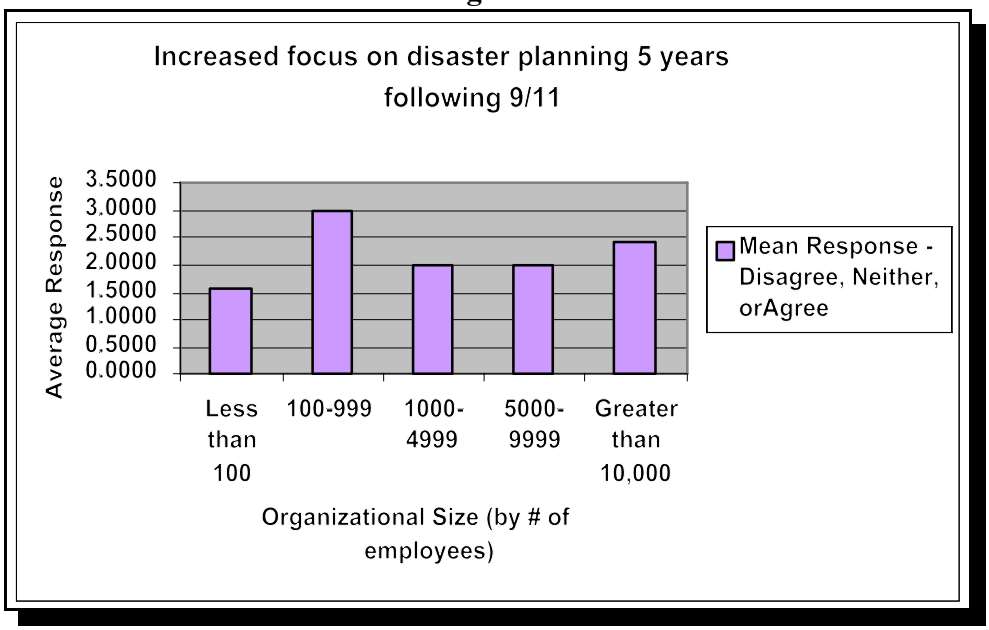
Survey results revealed that 33% of respondents said that their organization did not have a crisis response plan or disaster training prior to 9/11. Fifty-Seven percent of respondents indicated that their organization had a crisis response plan prior to 9/11. Respondents were asked to indicate

the importance level of eight Human Resource Management issues in the 3 months following 9/11. Crisis response plans were ranked as the third most important issue, above succession planning and technology. When asked to indicate the importance level of these same issues in the 5 years following 9/11, crisis response plans had fallen in rank to sixth place, below technology, succession planning, and crisis communication planning.

Seventy one percent of respondents reported that crisis response planning was a high priority in the years following 9/11. Fifty five percent of respondents said that the focus on disaster planning has increased in the years following 9/11. Thirty eight percent said that disaster planning budgets has increased and fifty two percent said that there was an increase in in-office disaster supply purchases. Fifty two percent of respondents reported that disaster training programs had increased in the years following 9/11. Thirty eight percent of respondents indicated that their organizations had set up off site work locations in the event of a crisis.

A significant relationship was found ($p<.03$) when analyzing the relationship between organizational size and an increased focus on crisis response plans. As illustrated in Figure 1, respondents in organizations with 100 employees or less indicated that their organization did not increase their focus on crisis response plans several years after 9/11. Respondents in larger organizations indicated that they either did not change their focus or they increased their focus on crisis response plans several years after 9/11.

Figure 1



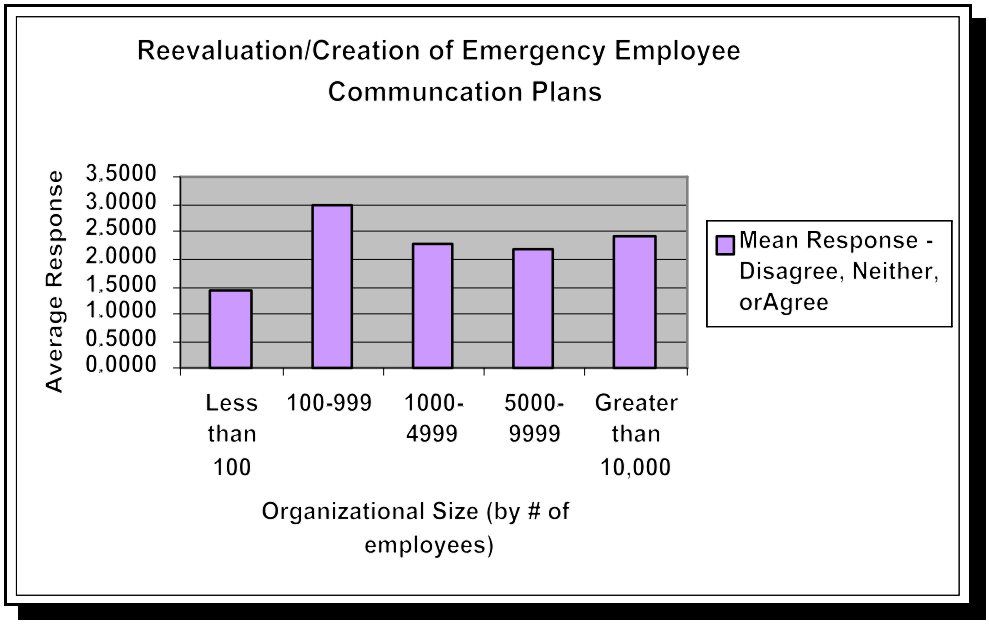
Crisis Communication Plans

Respondents were asked to indicate the importance level of eight Human Resource Management issues in the 3 months following 9/11. Crisis communication plans were ranked as the second most important issue, above succession planning, crisis response planning, and technology. When asked to indicate the importance level of these same issues in the 5 years following 9/11, crisis communication plans had risen in rank to first place, above technology, succession planning, and crisis response planning.

Sixty one percent of respondents reported that crisis communication plans were reevaluated or created in their organizations in the years following 9/11. Sixty two percent of respondents said that their organizations had implemented new methods of communication in the years following 9/11. Sixty two percent of respondents indicated that their companies had developed and regularly audited the emergency contact information for employees in their companies.

As indicated in Figure 2, a significant relationship was found ($p<.02$) when analyzing the relationship between organizational size and the creation or reevaluation of crisis communication plans. Respondents in organizations with 100 employees or less indicated that their organization did not reevaluate or create crisis communication plans several years after 9/11.

Figure 2



Succession Planning

Survey results revealed that 52% of respondents said that succession plans were not a focus in their organization prior to 9/11. In addition, 37% indicated that their organization did not have a succession plan prior to 9/11. Respondents were asked to indicate the importance level of eight Human Resource Management issues in the 3 months following 9/11. Succession planning was ranked as the sixth most important issue, below crisis response planning, crisis communication planning, and technology. When asked to indicate the importance level of these same issues in the 5 years following 9/11, succession planning had risen in importance to a third place ranking, above crisis response planning and technology. Fifty eight percent of respondents reported that their companies had increased focus on succession planning in the years following 9/11.

A significant relationship was found ($p<.03$) when analyzing the relationship between organizational size and an increased focus on crisis response plans. As illustrated in Figure 3, respondents in organizations with 100 employees or less indicated that their organization did not increase their focus on crisis response plans several years after 9/11. Respondents in larger organizations indicated that they either did not change their focus or they increased their focus on crisis response plans several years after 9/11.

Technology

Respondents were asked to indicate the importance level of eight Human Resource Management issues in the 3 months following 9/11. Technology was ranked as the fourth most important issue, above crisis communication planning and succession planning. When asked to indicate the importance level of these same issues in the 5 years following 9/11, technology had fallen in rank to fifth place, above crisis response planning. Seventy five percent of respondents reported that technology access security was emphasized more within their organizations in the years following 9/11.

A significant relationship was found ($p<.02$) when analyzing the relationship between organizational size and the importance of technology. As illustrated in Figure 3, respondents in organizations with 100 employees or less indicated that their organization did not increase their focus on technology several years after 9/11.

DISCUSSION

The results of this research study have shown how the events of 9/11 significantly impacted crisis response planning, crisis communication planning, succession planning, and technology. Although some of these areas were more affected by the impact of 9/11 than others, overall it was found that the events of 9/11 truly changed many aspects of crisis response planning and the

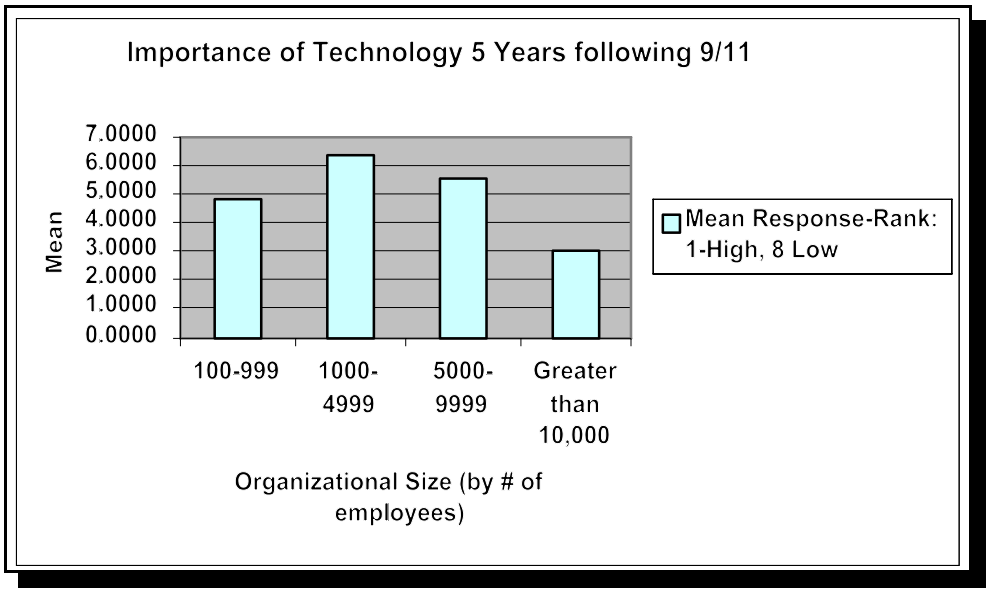
workplace as a whole. While past research indicated that little or no action had been taken by organizations to improve their responses to crises post 9/11 (Hurley-Hanson, 2006), this research found that organizations have taken actions to improve their crisis response plans.

Although the importance of crisis response planning was noted immediately after 9/11, there was a significant decrease in the ranking of its importance several years after 9/11. These results are not surprising, given the time and distance from the original crisis. Still, respondents reported that crisis response planning remained a high priority for organizations and that crisis response planning budgets, supply purchases, and training programs continued to increase in the years following 9/11.

Research results suggest that crisis communication planning retained its high importance ranking immediately following 9/11, as well as several years later. It consistently ranked higher in importance than crisis response planning, succession planning, and technology. While some companies created new crisis response plans, others reevaluated their crisis communication plans, implemented new methods of communication, developed, and/or frequently audited the emergency contact information for their employees.

The most dramatic change was in the area of succession planning. In the three months after 9/11, succession planning did not receive a high level of importance ranking. However, several years after 9/11, succession planning was ranked as more important than crisis response planning and technology. This jump in importance may reflect companies' growing awareness of how greatly the attacks had affected their workforce. With regards to technology, security access was identified as an area where information technology was utilized to improve organizations' responses to crises.

Figure 3



This study emphasized the important influence that organizational size plays in crisis preparedness. There was a significant difference between respondents of different size organizations in several areas. Across the board, smaller organizations, with 100 or less employees, reported that their companies had not increased their focus on crisis preparedness. Larger organizations were more likely to have focused on improving their responses to crises. One reason for this may be that large organizations have both the budget and technological infrastructure to build, maintain, and test crisis response plans. Small organizations may not see the value in crisis response planning because they have a smaller number of employees and do not have a large budget allocated to crisis response plans. Larger companies with more employees, and therefore, more liability, are faced with more stringent government regulations regarding employee safety and health.

Crisis communication plans may not be a vital part of organizations with fewer that 100 employees because most likely all of these employees are in the same location. Crisis communication plans would be more vital to larger companies because they have many more employees to account for during a crisis and it may be more difficult to reach them. In addition, larger companies may have employees in multiple locations around the world.

Employees working for smaller companies may not have rated technology as important as employees of larger companies either because their companies have a minimal crisis response plan or as many companies have rdone, they have their technology systems outsourced. If the technology systems are outsourced, the company itself does not have to focus on the direct cost or planning of the system. However, larger companies would have to put a significant amount of planning and budgeting into their technology system to align the system with their crisis response plan.

IMPLICATIONS

Ultimately, organizations cannot predict when a crisis is going to occur. This unpredictability is part of the reason that crises are so devastating. One of the most important things that an organization can do to prepare for a crisis is to test and evaluate the technology in their crisis response and crisis communication plans. "Test your communications plan and have a backup. Make sure you're as prepared as possible for your post-disaster activity. That means you need to know where your people are. You need to know how they can get back, and you need to have a place for them to get back to." (Lawson, 2005, p. 21).

Also, it is important to make sure that your organization is not overly dependent upon technology that could fail in an emergency. Even in this era of cellular phones, the internet and fax machines, the most sophisticated IT systems should be supplemented. "Don't rely upon cellular and push-to-talk networks. Have an old-fashioned radio system for backup communications on campus. Educate your key personnel on text messaging. We couldn't make a voice phone call, but we could use text messaging on our phones, because that used so much less bandwidth." (Lawson, 2006, p. 21).

In discussing the implications of the findings, two limitations of this research study should be noted. First, participants were asked to recall past situations. Although the individuals surveyed may have reacted strongly to the attacks and have vivid recollections of those events, over time, memories of organizational responses from that period may have diminished. Second, participants in this study worked in companies located on the West Coast. These companies may not have implemented significant changes to their crisis response plans given their geographical distance from New York city.

Despite these limitations, the findings from this study are important. Organizations are an important part of our lives. Our jobs help us determine who we are and they give us identity. When a disaster occurs, we want to know that we are safe where we work. This can only occur with proper planning and if early preparations are put into place.

Future research should focus on how the effects of 9/11, along with other recent natural disasters (e.g. Hurricane Katrina) and man made crises have changed the workplace. As this paper is being written several states in the mid West are experiencing unprecedented storms and flooding. It would be beneficial to understand how each of these events individually and collectively has affected organizations. The economic and human implications of these disasters can be expected to be felt for many years. Researchers are encouraged to examine the effects of these events and to use those findings to help better prepare organizations to survive and to care for their employees in times of crisis.

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IMPACT OF CUSTOMERS' PERSONALITY TRAITS IN RETAIL ENVIRONMENTS

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ABSTRACT

Services marketing literature on waiting at retail encounter indicates that customers' willingness to wait for the service varies with customers' perceptions about the importance of the service, their moods and emotions, and overall environment of the service encounter. Extant literature also indicates that there is little empirical research on customers' role on the co-production of service and customers' willingness on taking control of the service process and outcome. Situational factors make it difficult to integrate research results to form a coherent picture in this area. Customers' personality traits may have an effect on how they perceive and respond to waiting in line at a retail encounter and taking control of a retail situation, respectively. This exploratory study investigates how personality traits, namely extraversion, agreeableness and conscientiousness, influence customers' behavior with regard to waiting in and control over a retail situation. Study findings indicated that among these three personality traits, extraversion most strongly influences waiting in retail situations. Both conscientiousness and extraversion had an impact on consumer behavior with regard to control over a retail situation.

INTRODUCTION

Nobody looks forward to waiting in line to receive a service. Almost everybody would likely agree that waiting in line is both frustrating and unproductive. Katz, Larson and Larson (1991) found that, as waiting time increases, customer satisfaction decreases. As the shortage of time increasingly becomes a norm for a typical modern day shopper, even "short waits seem longer and more wasteful to them than ever before" (p. 44). How do individual responses to waiting in line differ?

Waiting at a Retail Encounter

In a service setting, there are three stages of waiting: *before* service production, *during* the service delivery, and *after* service consumption (Taylor, 1994). Pre-service waiting is the most dissatisfying stage of the three, partly due to the increase in uncertainty and anger created by the delay in service production. However, the actual waiting time may be drastically shorter than the

customer's perceived waiting time, because anger and uncertainty affect the perception of time and service quality.

On the other hand, there are times when customers do not mind waiting. Maister (1985) theorized that customers would be willing to wait longer if the service they were waiting for was perceived to be important and valuable. Group waiting, in contrast to solo waiting, also seemed to have a positive influence on customer satisfaction with waiting time.

Unfortunately, there is limited empirical research in this area (Swaidan, Smith, & Honeycott, 2002). Extant literature indicates that situational factors may be instrumental in shaping perceptions of waiting time. Customers, for example, may feel and act differently in a situation involving waiting for a doctor's appointment compared to waiting in a store checkout line.

Grewal, Baker, Levy, and Voss (2002) found that store crowdedness and wait expectations had a direct negative effect on store patronage. If customers expected that they would have to wait too long at a store, they were less likely to shop there, especially when in the cases of fast food and casual dining restaurants, special events, and amusement parks. For the current study, the investigators looked at four different wait situations —a doctor's office, a checkout line, a restaurant queue, and a special event.

Control over Retail Situation

One of the unique characteristics of services is that customers are usually active participants in the production and consumption of the service (Zeithaml, Parasuraman, & Berry, 1985). Co-production of a service gives customers some control over the process. Vargo and Lusch (2004) suggest that service firms need to build competitive advantage around this unique feature.

Jaworski and Kohli (2006) emphasized the importance of dialogue during the co-production of services. Co-production and dialogue indicate that customers are actively engaged in the production process. Their presence increases the likelihood that customers will take corrective actions, when necessary, to ensure that their services are satisfactory. Empirical research is scarce on the topic of customer intervention in the service production process.

Technological developments in self-checkout systems have pushed even more of the responsibility for the production of retail service to customers. Nowadays, the average grocery shopper does almost everything herself/ himself, including unloading items from the shopping cart to the moving belt, scanning, bagging, paying off electronically, and taking purchases to the car. The adoption of technology-based self-service (TBSS) checkouts has gained momentum among retailers (Dabholkar, Bobbitt, & Lee, 2003). In this co-production environment, do customers willingly participate in this trend and produce the grocery shopping service almost solely by themselves? What type of customers are they? What are the personality characteristics (traits) of these customers?

Personality Traits

Personality traits have been shown to influence consumer behavior. For this reason, personality testing has been used not only in consumer research, but also for employment assessments in retailing (Chang, 2006; Licata, Mowen, Harris, & Brown, 2003; Periatt, Chakrabarty, & Lemay, 2007). Therefore, customers' personalities may be expected to influence how they perceive and respond to waiting in line and taking control of a retail situation. This focus of this investigation is whether the personality traits of extraversion, agreeableness and conscientiousness have an effect on customer behavior in these retail situations.

Extraversion versus Introversion

Extraversion is characterized by outgoing, talkative, sociable and assertive behavior (Tubbs & Schulz, 2006). Extraverts often engage in "actions [that are] directed toward obtaining power and dominance" (Barrick, Stewart, & Piotrowski, 2002, p. 44). In a retail situation that requires waiting, extraverts may be more likely to act toward shorten the waiting time for themselves by showing their need for attention and social interaction (Hurley, 1998). This premise forms the basis for the first hypothesis (see below).

H1: Customers who rate themselves higher on extraversion will have lower tolerance for waiting in retail situations.

In situations where customers need to take charge in order to control outcomes, extraverts will have few problems speaking their minds or taking action. Introverts, on the other hand, will be more reserved and less likely to take charge (Hurley, 1998). This premise is expressed by the second hypothesis.

H2: Customers who rate themselves higher on extraversion will have less trouble taking charge in case of unwanted retail outcome.

Introverts, who are typically more reserved and withdrawn in social interactions, may be more likely to prefer the use of self-checkout systems, so that they may avoid unnecessary social interactions. The third hypothesis expresses this premise.

H3: Customers who rate themselves lower on extraversion will prefer to use self-checkout systems.

Agreeableness versus Antagonism

The personality trait of agreeableness is related to the need for pleasant, cooperative and harmonious relations. Agreeable people are courteous, flexible, tolerant and forgiving. By contrast, people who display low levels of agreeableness tend to be more competitive in their day-to-day activities. Periatt, Chakrabarty, and Lemay (2007) concluded that individuals scoring high on agreeableness have strong intentions for "communion striving (p.29)" and the need to get along with others. The fourth, fifth, and sixth hypotheses are based on the above premises.

H4: Customers who rate themselves higher in agreeableness will have higher tolerance for waiting in retail situations.

H5: Customers who rate themselves higher in agreeableness will have more trouble in taking charge of the unwanted retail outcome.

H6: Customers who rate themselves higher in agreeableness will prefer to use staffed checkout lanes.

Conscientiousness versus Non-Conscientiousness

The personality trait of conscientiousness is characterized by diligence and organization (Harris & Fleming, 2005). Conscientiousness is described by words like "precise," "efficient," "orderly," and "persistent." Conscientious individuals generally do not like the idea of spending a lot of time in waiting lines, since it is perceived to be inefficient. Similarly, their orderliness may motivate them to immediately intervene in retail services to bring about desirable outcomes. These premises are expressed in the seventh and eighth hypotheses.

H7: Customers who rate themselves higher in conscientiousness will have low tolerance for waiting in retail situations.

H8: Customers who rate themselves higher in conscientiousness will have less trouble in taking charge of the unwanted retail outcome.

Achievement-oriented, organized individuals may also appreciate the efficiency afforded by self-checkout systems. These systems may be more accommodating to their personal needs, for instance, by organizing purchases in categories such as food or personal care, or by providing multiple receipt requirements or payment options (i.e., simultaneous use of coins, paper money, or credit/ debit cards). Hence, the ninth hypothesis is stated below.

H9: Customers who rate themselves higher in conscientiousness will prefer to use self-checkout systems.

A review of the literature found that there is general agreement on the operationalized definitions of extraversion, agreeableness and conscientiousness. Other dimensions of personality were more controversial. For example, openness to experience was defined in some cases as being intellectual, imaginative, curious and broadminded (Tubbs & Schulz, 2006) and in others as experiencing the world as threatening and beyond one's control (Hurley, 1998), or solving problems through creativity.(Harris & Fleming, 2005). Similar inconsistencies were found with regard to neuroticism or emotional stability. Therefore, this current investigation focused on the first three personality traits (extraversion, agreeableness and conscientiousness), which have been clearly and consistently operationalized in previous research.

METHODOLOGY AND RESULTS

The data for this study came from a survey of undergraduate business students in their junior year at a large southeastern university. The survey was administered as part of a required team building exercise. The results of the personality traits were shared with the respondents. No other incentives were given to the respondents. A total of 337 students participated to the study, and only six cases had missing responses. No attempt was made to estimate the missing values. The ratio of males to females in the sample was 59:41, and the average age of respondents was 22 years. Almost half (49.4 percent) of the respondents reported having about 1.5 years of professional work experience outside the university. About two-thirds (64.2 percent) of the respondents reported that they were actively involved in business-oriented extracurricular activities. In terms of race and ethnicity, 3.3 percent identified themselves as African American, 0.3 percent as American Indian, 1.8 percent as Asian, 91.9 percent as Caucasian, 0.3 percent as Hispanic, and 2.4 percent as "other".

Three multi-item scales were used to measure personality traits of extraversion, agreeableness, and conscientiousness. The reliability testing of the scales yielded Cronbach alphas of 0.622, 0.567 and 0.534 respectively. Exploratory factor analysis was performed to test the construct validity. Four items on the extraversion scale had factor loadings ranging between 0.748 and 0.600. Four items on the agreeableness scale had factor loadings between 0.731 and 0.442. Finally, three items on the conscientiousness scale had factor loadings between 0.804 and 0.615. These numbers were similar to those obtained in the recent studies (Chang, 2006; Periatt, Chakrabarty, & Lemay, 2007).

Table 1: ANOVA Results												
	Corresponding Means				Corresponding Means				Corresponding Means			
	Extravert	Introvert	F-Stat	Sig.	Antagonist	Agreeable	F-Stat	Sig.	Conscientious	Non-Conscientious	F-Stat	Sig.
Waiting at a retail encounter												
If you are kept waiting at a doctor's office for an extended period of time, do you say something to the office staff? (Yes=1, No=2)	1.53	1.7	1.473	0.21	1.52	1.61	0.356	0.84	1.52	1.63	0.923	0.43
When you're waiting in line at a store and a cashier opens up another lane, do you typically switch lanes? (Yes=1, No=2)	***1.12***	***1.39***	3.502	0.008	***1.06***	***1.22***	2.854	0.024	1.14	1.17	0.103	0.959
Would the prospect of waiting in long lines at a sporting event or amusement park discourage you from going? (Yes=1, No=2)	***1.73***	***1.3***	5.09	0.001	1.69	1.48	1.341	0.254	1.61	1.66	0.716	0.543
If you go to a restaurant on a Friday night and find a 30-minute wait, do you go to another restaurant? (Yes=1, No=2)	***1.81***	***1.56***	3.082	0.016	1.82	1.78	0.885	0.473	1.86	1.78	1.57	0.197
Control over a retail situation												
Do you have any trouble ending conversations with telemarketers or door-to-door salespeople? (Yes=2, No=1)	**1.22**	**1.39**	2.27	0.062	1.1	1.26	1.827	0.123	**1.15**	**1.27**	2.214	0.086
Do you have trouble returning unwanted purchases to a store? (Yes=2, No=1)	***1.12***	***1.35***	2.629	0.034	1.17	1.22	0.83	0.507	1.16	1.24	0.723	0.539

Table 1: ANOVA Results

	Corresponding Means				Corresponding Means				Corresponding Means			
	Extravert	Introvert	F-Stat	Sig.	Antagonist	Agreeable	F-Stat	Sig.	Conscientious	Non-Conscientious	F-Stat	Sig.
If you got the wrong item at a restaurant or didn't get part of your meal, would you say something to your server? (Yes=1, No=2)	***1.11***	***1.3***	4.24	0.002	1.1	1.09	0.453	0.77	***1.09***	***1.27***	3.698	0.012
If you were ready to check out at a grocery store and both a staffed checkout lane and a self-checkout lane were available, would you choose staffed or self? (Staffed=1, Self=2)	1.52	1.56	0.065	0.992	1.58	1.48	0.662	0.619	1.61	1.51	1.649	0.178

Note: Bold : significant at alpha = 0.10%; Bold and italic: significant at alpha = 0.05%

Scales for personality traits have sufficient reliability and construct validity to warrant their use in further analysis. Therefore, a composite scale was formed for each of the three personality traits. Respondents were asked about their behavior while waiting and their propensity to take control in various retail situations. Their responses were analyzed using composite personality scales as categorization variables in one-way ANOVA.

The relationships among personality traits and behavior in various retail situations are shown in Table 1. The first set of questions is dedicated to waiting behaviors, and the second set of questions is dedicated to control behaviors.

DISCUSSION

Waiting at a Retail Encounter

In this study, the effect of situational factors on extravert and introvert personality types while waiting in line was clearly shown. Extraverts were more likely to switch lanes when a new lane opened up in a grocery store, providing partial support for hypothesis 1. Introverts were more

likely than extroverts to avoid sporting events or amusement parks when long waiting lines were expected. Introverts were also more likely seek another restaurant if there was a thirty-minute or longer wait. It seems like extraverts would prefer waiting with others for entertainment. But, they try to avoid waiting when it is a chore. Both personality types were indecisive in the case of an extended waiting time at a doctor's office.

In terms of waiting in line, the only significant difference between agreeable and antagonist personality types occurred when there was an opportunity to change lanes at a grocery store checkout. Antagonists were the ones who will change lanes if the opportunity arises. This provides a partial support for hypothesis four. In other waiting situations, no differences emerged between the two personality types.

In this study, conscientiousness had no significant impact on waiting in line behaviors in any of the situations, although conscientious types had slightly less tolerance for waiting in a grocery checkout lane than at a doctor's office, a sporting event or amusement park, or a busy restaurant.

These results suggest that the perceived importance and value of a service is related to the acceptability of waiting to receive that service. The prospect of waiting for a pleasurable activity such as a sporting event, amusement park, or restaurant generally does not discourage customers from going. This may be due to the fact that people usually wait in groups for such activities and the presence of friends may mitigate any negative experiences associated with waiting. This finding supports Maister's (1985) suggestion that group waiting feels like a shorter period if time than solo waiting because socialization in such environments (having an objective to see people and be seen by people) may increase the tolerance for waiting. This relationship was significant, especially for extraverts, who typically seek out social interaction more often than introverts. The higher tolerance for waiting in a doctor's office may partly stem from the expectation that the wait will always be long in this type of situation. If the doctor is the only available specialist in that geographic region, then changing is a less feasible option.

While there is some support for the hypotheses for behaviors while waiting, results show that not all retail encounter situations are equal. Further exploration by means of a qualitative study is warranted in order to understand customer emotions, motivations and behaviors in various waiting situations.

Control over Retail Situation

Results of ANOVA indicate that Hypothesis 2, that customers who rate themselves higher on extraversion will be more likely to take control in retail situations is strongly supported. Extraverts had no trouble in taking charge of the situation if necessary to ensure a favorable outcome. This is consistent with the assertive dominance seeking behavior of extraverts (Pervin & John, 2001). They usually are optimistic about the fact that they can correct the situation through interpersonal interaction.

Conscientious types also had no trouble correcting intervening, a finding which supports Hypothesis 8 stating that customers who rate themselves higher in conscientiousness will have less trouble taking control of the retail situation. Conscientious individuals are more goal-directed. They usually are more organized and punctual than an average individual (Pervin & John, 2001). Any retail situation that may be prone to failure, would have direct impact on their carefully thought agenda. Therefore, they would have a tendency to take charge before it is too late.

In this study, agreeableness did not have an impact on customer behavior. On average, both groups were equally willing and able to correct unwanted situations in retail encounters. Agreeable individuals are usually kind and cooperative. Antagonist individuals, on the other hand, are considered selfish and stingy (Pervin & John, 2001). In a retail situation where the outcome would be less than desired, both personality types do not hesitate to intervene. Their styles of correcting the behavior may be different. But, the details of their approaches are beyond the scope of this study.

The three personality traits under investigation were not related to likelihood of using self-checkout systems. On average, all groups indicated that they used self-checkouts in some situations and traditional checkouts in others. Even if both traditional check-out and self-check out lanes were available, none of the individuals with the personality traits under study showed a preference of one check-out lane over another. Therefore, further studies are needed to understand customers' decisions about using self-checkout systems and how personality traits relate with the check-out lane preferences.

FUTURE RESEARCH

Personality traits of customers in retail encounters is one area where future research is warranted, because previous research has primarily focused on employees' personality traits and behaviors (Harris & Fleming, 2005; Licata, Mowen, Harris, & Brown, 2003). Specifically, in technology-based self-service (TBSS) options (e.g., self-checkouts in grocery stores or hotels; self-checkins at airports; electronic kiosks in stores and shopping malls), service organizations increasingly treat their customers as human resources (Ford & Heaton, 2001) and partial employees (Dellande & Gilly, 1998). Further research is needed to test if personality traits of employees and personality traits of customers acting like partial employees or quasi employees would be quite similar or completely different.

Comparison of personality traits of regular employees and partial employees (customers) would help answer if the customers would be good enough for a particular service business in terms of their performances (Bateson, 2002). Better understanding of the personality traits of customers actively participating in service production and delivery would contribute toward more effective unification of the needs of the service organization and the customer based on customized service scripts. In building and sustaining relationships with their customers, businesses have started using not only CRM (Customer Relationship Management) techniques but also CPM (Customer

Participation Management) method (Seideman, 2001). Personality traits of customers would complete an important part in such systems.

Competent and willing customers in technology-based self-service environments are normally perceived to be a good thing that happens to service organizations in terms of increasing organizational productivity. However, sometimes customers may act like competitors to a service organization. "In some cases, customers even assess their own lifetime value to a company and use the knowledge to bargain for better terms" (Prahalad & Ramaswamy, 2000). Still, understanding personality traits of customers, besides knowing their financial information form company databases, would be quite helpful in interpreting customer's potential moves and how s/he would exercise her/his power to negotiate with the service organization.

Personality traits of customers would also be utilized in understanding what makes them start using and also keep using technology-based self-service options that are increasingly introduced by retailers, banks, hotels, restaurants, entertainment businesses and airports. Deeper understanding of customer traits would specifically help with market segmentation and why adopters of various TBSS options vary in their use of these options (Barczak, Ellen, & Pilling, 1997).

Another area warranting further investigation is the experience of waiting for services. The present study suggests the experience differs across various situations. Situational factors need to be identified, and customer responses to these factors need to be investigated. Customers by different personality types would also be used for segmenting the total market and targeting certain segments accordingly (Katz, Larson and Larson 1991). When service organizations do not provide an adequate social justice by adequately implementing "the principle of first-come-first-serve," this would influence customer satisfaction while waiting for, during or after service (Kumar, Kalwani, & Dada, 1997). Segmentation of customers by personality types based on their reactions/ behavior against a social injustice for waiting would also be another promising research path.

CONCLUSION

This study investigates how personality traits, namely extraversion, agreeableness and conscientiousness, influence customers' behavior with regard to waiting in and control over a retail situation. Study findings indicated that among these three personality traits, extraversion most strongly influences waiting in retail situations. Both conscientiousness and extraversion had an impact on consumer behavior with regard to control over a retail situation. Understanding personality traits of customers in retail environments would potentially be a valuable tool in managing customers as partial employees, segmenting markets for TBSS options, implementing customer participation management systems, developing and sustaining TBSS options, competing well in new economy.

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THE POWER OF INTRAFIRM NETWORKS

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ABSTRACT

This study highlights the importance and role of intrafirm networks, particularly strong intrafirm networks. We hypothesize that strong intrafirm networks help business units accrue intellectual capital (knowledge and knowing capabilities) and that this relationship is facilitated by two of the four conditions needed by organizations to exchange resources, as specified by previous research studies (Nahapiet and Ghoshal, 1997). These are the cultural attributes of collective rewards and cooperative norms, and absorptive capacity. Partial least square technique is used to analyze data, which is collected by administering surveys to 375 business unit heads/managers. The study's results endorse the direct relationship between strong intrafirm networks and intellectual capital and except for the moderation of cultural attributes on the relationship between intrafirm networks and knowledge, no significant moderating relationships are found.

INTRODUCTION

Several recent studies have emphasized the importance of the role of social networks in the transfer and development of knowledge (Collins & Clark, 2002; De Long & Fahey, 2000; Reagans & McEvily, 2003). Although a few researchers have empirically analyzed the relationship between inter-unit networks and knowledge-related activities such as innovation (Brass, Galaskiewica, Greve, & Tsai, 2004), none of the existing network literature ascertains the direct impact of knowledge sharing and exchange among business units in organizations, i.e. *intrafirm networks* on accumulation of *intellectual capital*. Moreover, limited attention has been given to the relational properties of intrafirm networks (Hansen, 1999). This paper attempts to fill in this gap by answering the research question: 'how do strong intrafirm networks help organizations and in particular, business units, attain and maximize competitive advantage?' Thus, the overall objective of this study is to understand the relationship between strong intrafirm networks and intellectual capital and conditions impacting this relationship.

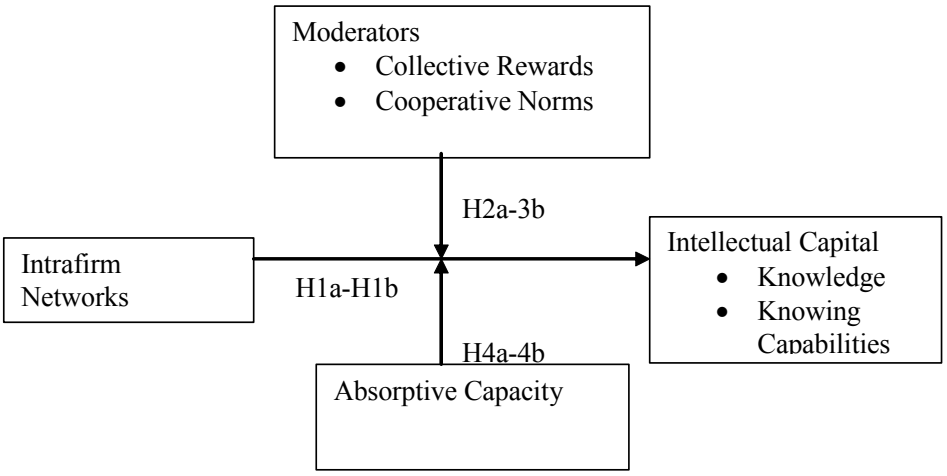
"Intrafirm networks" are defined *as a set of formal and/or informal relationships among business units of the same legal entity* (Achrol & Kotler, 1999). Under this arrangement each business unit has a sufficient degree of freedom to make most of its own resource allocation decisions while still working in close cooperation with its affiliated business units. "Intellectual capital" is defined as *the creative, technical and collaborative knowledge and knowing capabilities*

of a business unit (Nahapiet & Ghoshal, 1997; McGaughey, 2002). Thus, this paper contributes to the existing literature by studying the concept of intra-firm networks, analyzing the difference between intrafirm and extra-firm networks and the benefits of each, in particular, intra-firm networks in the accumulation of knowledge base and the development of knowing capabilities within units.

In this paper, we create an exploratory model, where we suggest that strong intrafirm networks are likely to help business units amass intellectual capital, which is a source of competitive advantage (Grant, 1996). In addition, absorptive capacity and motivational factors, such as cooperative cultural norms and collective rewards, two of the four conditions needed by organizations to exchange resources (Nahapiet and Ghoshal, 1997), are likely to increase the relationship between strong intrafirm networks and intellectual capital.

FIGURE 1

Hypothesized Model of the Relationhsip between Strong Intrafirm Networks and Intellectual Capital and its Moderators



In the subsequent section, we explore the constructs of intrafirm networks and intellectual capital, identifying the moderator variables and then articulating the hypotheses.

THEORY AND HYPOTHESES

The structural/ content stream of research in the field of resource-based view states that possession of key resources that are rare or unavailable leads to firms' competitive advantage. The process/capability stream of the theory acknowledges that it is the utilization of resources or knowing capabilities in the development of new knowledge and competencies that lead to firms'

competitive advantage (Lane, Koka, & Pathak, 2006). Hence, in this paper, we analyze both knowledge and knowing capability dimensions of intellectual capital. But how can new knowledge be developed and existing knowledge be nurtured within organizations?

Intra-firm Networks

Most business units are likely to develop some unique and differentiated sets of competencies and capabilities internally due to the product markets they serve and the internal rivalry that may exist among them for organizational resources (Bates & Flynn, 1995; DeCarolis & Deeds, 1999; O'Donnell, 2000). Such knowledge is termed "internal knowledge". However, units do find the need to utilize knowledge that is not resident within their own formal boundaries. Such "external knowledge" can take a variety of forms. It can be attained from intra-firm and/or interfirm sources. This study is confined to "external knowledge" being obtained from intrafirm sources, such as other business units within the organization. For instance, unit A may seek direction from a consultant of unit B to obtain knowledge about a new market unit A is planning to enter. Or a unit head may take internal advice from a friend in the organization on the economic impact of new government regulations on their industry.

In order to acquire and assimilate this "external knowledge" from within the organization, units are likely to use collaborative practices (Hamel, 1991; Powell, Koput, & Smith-Doerr, 1996), which are termed "intrafirm networks" in this paper. Knowledge acquired through intrafirm networks impact units' internal knowledge in two ways. First, new knowledge can be combined with the unit's existing internal knowledge to enhance their current knowledge base (Larson, 1992; Powell & Brantley, 1992). Second, when a unit compares new external knowledge to existing internal knowledge, the unit can often highlight inconsistencies within its existing internal knowledge. This discovery may help the unit develop new capabilities for the future (Abell, 1999). But "how are intrafirm networks beneficial?"

Benefits of Intrafirm Networks. It can be fairly stated that units within their own respective organizations are more likely to have easy and timely access to each other, than to businesses outside the organization (Cross, Parker, Prusak & Bogartti, 2002). Units are also likely to be better informed of the activities and agendas of other units within the organization (Gulati, 1998) than of businesses outside the organization because of regular company meetings or due to intranets that may encourage sharing within organizations. Additionally, business units can also rely on the support of their corporate office to help them identify and locate other units with which they can successfully collaborate, as it is beneficial not only for individual units but for the entire organization. A combination of all these advantages helps units reduce appropriation and negotiation costs (Gulati & Singh, 1998), financially benefiting the units and the organization. Hence, it is important to develop intrafirm networks within the organization, in order for knowledge and other

resources to be exchanged and distributed efficiently throughout the organization to gain competitive advantage (DeCarolis & Deeds, 1999; O'Donnell, 2000; Matusik & Hill, 1998).

*Embeddedness***.** The concept of embeddedness has been used by several scholars to analyze relationships among partners and have found to be a source of firm's future capability and expected performance, and is assumed to develop overtime through adaptation and trust (e.g. Gulati, 1998; Hansen, 1999; McEvily & Marcus, 2005; Uzzi & Lancaster, 2003). It should, therefore, be considered a continuous variable and not a dichotomy. There are two dimensions that characterize embeddedness among business partners- (1) relational embeddedness (Gulati 1998; Uzzi, 1999) and (2) structural embeddedness (Burt 1992). Relational embeddedness stresses the "role of direct cohesive ties as a mechanism for gaining fine-grained information" (Gulati, 1998: 296). Structural embeddedness, on the other hand, is the informational positioning of the partners in the relationship (Andersson, Forsgren, & Holm, 2002; Reagans & McEvily, 2003; Rindfleisch & Moorman, 2001). Previously, most studies in relationship literature have focused on the latter dimension (Gulati, 1998). However, in a growing number of recent studies, researchers have begun to explore the impact of relational embeddedness on interorganizational outcomes by examining inter-organizational reciprocal helping relations (Hansen, 1999), impact on execution-oriented and innovation-oriented task performance (Moran, 2005) and ease of knowledge transfer (Reagans & Mc Evily, 2003), to list a few.

In this study, strong intrafirm networks are held to be characterized by a high degree of relational embeddedness that display strong ties (Gulati 1998) that not only facilitate the exchange and combination of tacit knowledge and complex knowing capabilities but also have a positive impact on knowledge utilization (Rindfleisch & Moorman, 2001).

Intellectual Capital

Intellectual capital by definition constitutes of a stock of knowledge (DeCarolis, & Deeds, 1999) and the knowing capabilities (Barney, Wright, & Ketchen, 2001) that business units possess. *Knowledge* is defined as "any information, belief, or skill that the units can apply to its activities" (Anand, Glick & Manz, 2002:88). In general, tacit knowledge, which is sticky, complex, and difficult to codify, is likely to result in advantages that are sustainable, as they remain largely embedded in the routines and practices of the unit (Dyer & Nobeoka, 2000; Kogut & Zander, 1992; Szulanski, 1996) more so than explicit knowledge. The other dimension of intellectual capital, *knowing capabilities*, is seen to be somewhat consistent with the resource-based view of dynamic capabilities (Barney, 1991; Collis, 1994; Teece & Pisano, 1994). It is defined as "the unit's ability to adapt, integrate, and reconfigure the internal and external unit skills and resources to match changing environment" (Teece, Pisano & Shuen, 1997:510).

Strong Intrafirm Networks and Intellectual Capital

As we established earlier, organizational units differ in their internal knowledge, practices, and capabilities (Larson, 1992; Powell et. al., 1996). Strong intrafirm networks allow organizational units to access and utilize new knowledge and competencies from each other that contribute to market competitiveness (Kogut & Zander, 1992; Tsai, 2000; 2001). The benefits result in overall reduction of operational costs and better product differentiation. In general, strong intrafirm networks enhance reciprocity, cohesiveness, and connectivity (Rindfleisch & Moorman, 2001) among business units and facilitate the exchange of difficult-to-codify know-how and knowledge-intensive skills. This exchange, in turn, helps units accumulate intellectual capital. Hence:

Hypothesis 1a: *Strong intrafirm networks are positively related to knowledge within business units.*

Hypothesis 1b: *Strong intrafirm networks are positively related to knowing capabilities within business units.*

Moderating Factors

Researchers have previously suggested four basic conditions for exchange and combination of resources (Nahapiet & Ghoshal, 1997). The first two conditions, parties' accessibility for exchange and parties' finding value in the exchange are assumed to be instilled within the advantages of intrafirm networks. The remaining two conditions, parties' motivation to do the exchange and parties' combination capabilities or absorptive capacity to fulfill the exchange (Gupta & Govindrajan, 2000a; Nahapiet & Ghoshal, 1997) are hypothesized to moderate the relationship between strong intrafirm networks and intellectual capital and are discussed in detail below.

Motivational factors. Even though units may have informational and positional access to other units within the organization (Burt, 1992; Granovetter, 1973) and see a value in the exchange because of informational advantages, they still find the need to be motivated to share and exchange knowledge within the organization. As Szulanski (1996), in his research on internal stickiness, found that lack of motivation inhibits the transfer of best practice within the firm. Following suit, researchers have recommended that incentives and culture are two motivational factors that enhance knowledge exchange (Quinn, Anderson & Finkinstein, 2005) and in this paper these factors are posited to be collective rewards and cooperative culture.

Collective rewards. Rewards within the business units may be distributed based on individual performance or they can be based on collective performance in order to reinforce sharing and co-developing (Deal & Kennedy, 1982; 1999; Detert, Schroeder, & Mauriel, 2000; Fedor & Werther, 1995; Gibson & Zelhur-Bruhn, 2001; Gupta & Govindrajan, 2000b; Peters & Waterman, 1982;

Reynolds, 1986). This is a form of extrinsic motivation that the organization partakes to appreciate the participation of business units.

Cooperative norms. This dimension of culture enhances sharing and learning of knowledge within the organization, such that business units periodically discuss their initiatives and accomplishments in company meetings (Gupta & Govindrajan, 2000b; Storck & Hill, 2000). A cooperative culture can bring both private and common benefits to the unit (Khanna al. 1998), whereby they can use the exchanged knowledge for the general benefit of the partners or their own benefit per se.

I postulate that both the motivational factors further reinforce the exchange of knowledge, competencies, and capabilities for collective learning among business units (Deal & Kennedy, 1999; Gupta & Govindrajan, 2000a) that already persists due to the facilitation of intrafirm networks within organizations. Thus:

Hypothesis 2a: *Collective rewards positively moderate the relationship between strong intrafirm networks and knowledge.*

Hypothesis 2b: *Collective rewards positively moderate the relationship between strong intrafirm networks and knowing capabilities.*

Hypothesis 3a: *Cooperative cultural norms positively moderate the relationship between strong intrafirm networks and knowledge.*

Hypothesis 3b: *Cooperative cultural norms positively moderate the relationship between strong intrafirm networks and knowing capabilities.*

Absorptive capacity.

Absorptive capacity can be defined as "*the capability to assimilate and replicate new knowledge gained from other sources*" (Lane & Lubatkin, 1998; Tsai, 2001). It is a fundamental learning capability and its definition has evolved over several years (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998; Zahra & George, 2002; Lane et. al., 2006). More recently, two 'general states' of absorptive capacity have been identified; potential and realized. The former develops through its evolution with the environment and the latter defines the extent to which knowledge can be assimilated and commercialized in a specific situation (Zahra & George, 2002). We find an overlap between the ways we define knowing capability and the way realized absorptive capacity is

described. Hence, for clarity purposes, we take the general notion of absorptive capacity, i.e. internal learning capacity (Tsai, 2001).

In this paper we argue that the more the absorptive capacity, the greater the chances of business units to assimilate and integrate new knowledge from the network relationships. This, in turn, leads to increased accrual of intellectual capital within unit boundaries. Thus:

Hypothesis 4a: *Absorptive capacity positively moderates the relationship between strong intrafirm networks and knowledge.*

Hypothesis 4b: *Absorptive capacity positively moderates the relationship between strong intrafirm networks and knowing capabilities.*

METHOD

This section describes the research design and methodology used in this study. As this study relies heavily on primary data to measure independent, dependent, moderator and control variables, a few items on the measurement scale, such as ordinal measures for strong intrafirm networks and absorptive capacity were newly developed, and others were adapted from previous empirical studies. We collected non-relational data by mailing out surveys to business units' heads/ managers and used Partial Least Squares Technique (PLS) to analyze the data.

Data Collection

To attain maximum variance and generalizability, " Company and Business Database" was used for a cross-sectional sample from 145 companies in 26 different industries in various geographic regions within the United States. The sample was restricted to multi-divisional companies with at least 5 business units or divisions with revenues of above $500,000 for the year 2000. Surveys, with a cover letter, a dollar bill and a return envelope, were mailed to 375 business unit heads (high level managers). The key informant approach has been successfully employed in several studies and high-level respondents are considered to be ideal candidates for such surveys (Rindfleisch & Moorman, 2001). In addition, to make certain that business heads or managers were informed and suitable to fill out the survey, we posited two questions on the survey that confirmed their knowledge about the ongoing relationships with other business units within the organization and their involvement (Johnson, Sohi & Grewal, 2004). In general, as most respondents were high levels managers, their involvement in the formation of networks was not significant but they were very knowledgeable of relationship activities.

Four weeks after the first mailing, we received a total of 70 completed surveys. We then called each business unit who had not yet responded and mailed out another set of 50 surveys to

business heads that either had not received the survey or had misplaced it. A total of five completed surveys were returned from this mailing. In all, 75 surveys from were returned from the total sample giving us a response rate of 20%. In all, responses from varying divisions of 55 companies in 23 different industries were received. To test for non-response bias, we examine differences between respondents and non-respondents. A t-test showed no significant difference ($p<0.05$) between the two groups based on the number of full-time employees and total sales and asset of the units.

Statistical Analysis

Partial least square (PLS) technique is used to test the hypotheses. A second-generation method of analysis with minimal demands on measurement scales consists of a series of ordinary least-square analyses (Chin, 1998). The PLS technique focuses on predictor specification and on the variance of dependent variables. No assumptions are made regarding the joint distribution of the indicators or the independence of the sample cases (Chin, 1998; Chin & Newsted, 1999). The unique element of this second-generation technique is that it calculates weights and factor loadings of the outer model (i.e., parameters of the indicators leading to the latent variable) in the context of the theoretical model.

The interpretation of this technique is identical to that of traditional regression technique. The effect size f^2 explores the change in R-square. The corresponding standardized path estimates (inner model) are also examined and interpreted in the same manner. To estimate the t-statistics for the weights and loadings of the indicators of the latent variables and the path coefficients of the measurement model, bootstrapping technique is used. To assess the internal consistency for a given block of indicators, composite reliability is calculated. In addition, average variance (AVE) attempts to measure the amount of variance that a latent variable component captures from its indicators, relative to the amount due to measurement error. In a pretest, evaluation of composite reliabilities and average variance extracted (AVE) resulted in revisions and reduction of measurement items in the final survey.

Measurement

Both dimensions of intellectual capital (knowledge and knowing capability) were measured separately using a seven-point Likert scale. These measures were adopted by Constance (1998) and Kale, Singh, & Perlmutter (2000). The culture moderator variables of collective rewards and cooperative norms were also measured using seven- point Likert-scale items adopted by Denison (1990) and Reynolds (1986). However, strong intra-firm networks and absorptive capacity were operationalized using ordinal scale items. These items were developed in consultation with several professors and were pre-tested before they were included in the survey. These ordinal scales were converted into interval scales, for them to be used by PLS. To assess the construct validity of the

measures of potential and realized absorptive capacity, Jansen, Bosch, and Volberda (2005) compared the scores of the study variables with separate overall measure of absorptive capacity and found the results to be positive and significant, suggesting our overall measure of absorptive capacity to be valid.

Control variables.

In this study, we control for the impact of *size, industry*, and *age* of the business units. It is generally assumed that large and old business units have additional resources, which they use to facilitate the development of intellectual capital and increase organizational performance (Robertson, & Gatignon, 1998). However, we argue that younger units are more receptive to new ideas and inertia restrains the older units from innovation and incumbency sets in. The logarithm of unit sales is used to measure size, and the age of the business units is measured by the deducting the year of unit establishment from the year 2002. In addition, differences in industry appear to have led to idiosyncratic findings in organizational research (Osborn & Baugh, 1990). We suggest that the knowledge pool within different industries may differ depending upon which business units within their respective industries may have extended or limited opportunities for accumulating intellectual capital. Thus, orthogonal dummy variable (n-1) for each of the twenty-three different industries is calculated to create a score for the industry variable.

RESULTS

In this section, we analyze the correlation matrix, composite reliabilities, AVEs, and measurement models determined by the PLS technique. We double-checked coding and scoring of data points for all variables for any discrepancies before proceeding.

Table 1 show the correlations matrix with the diagonals indicating the square root of average variance extracted (AVE) to check for discriminant validity. The latent variables are seen to be distinct from each other, as they share more variance with their own block of indicators than with another component representing a different block of indicators.

However, high correlation exists among the independent, dependent, and the moderator variables. According to Baron and Kenny (1986), it is "desirable that the moderator variable be uncorrelated with both the predictor and the criterion variables to provide a clearly interpretable interaction term." However, in this paper, most of the variables are moderately correlated, and high correlations of above 0.4 are observed between absorptive capacity and the dimensions of intellectual capital, between the latter, which was understandable as they are measuring the same concept and between collective rewards and cooperative norms. Though these constructs are measured independently, they are not mutually exclusive.

Table 1: Correlation Matrix[a]

	1	2	3	4	5	6	7	8	9
1- Strong intrafirm									
networks	(0.941)								
2- Size	-0.146	(1.0)							
3- Age	-0.053	0.297**	(1.0)						
4- Industry	0.113	-0.188	-0.132	(1.0)					
5- Intellectual capital									
Knowledge	0.318**	-0.108	-0.104	-0.065	(0.917)				
6- Intellectual Capital									
Knowing Capabilities	0.344**	0.011	-0.056	0.056	0.697***	(0.856)			
7-Absorptive capacity	0.318**	-0.023	-0.110	-0.056	0.47***	0.43***	(0.732)		
8-Collective rewards	0.292**	-0.021	0.004	0.025	0.182*	0.227**	0.139	(0.954)	
9- Cooperative Norms	0.337**	-0.153	-0.105	0.058	0.293**	0.275**	0.126	0.769***	(0.915)

[a] n= 74. The diagonals in parentheses indicate square root of AVE.
* p< 0.5
** p< 0.01
***p< 0.005

Table 2: Composite Reliabilities and Average Variance Extracted (AVEs) of Latent Variables

Variables	Composite Reliabilities	AVE
Strong Intrafirm Networks	0.939	0.885
Intellectual Capital- Knowledge	0.941	0.841
Intellectual Capital- Knowing Capability	0.846	0.733
Absorptive Capacity	0.698	0.536
Collective Rewards	0.954	0.899
Cooperative Norms	0.952	0.869
Size	1	1
Industry	1	1
Age	1	1

Modest composite reliability = 0.7
Modest AVE score = 0.5

Table 3: Results of the Hypothesized Model: Relationship between Strong Intrafirm Networks and Intellectual Capital and their Moderators[a]

Intellectual Capital (Knowledge and Knowing Capabilities)								
Control Variables	Hypothesis 1a and 1b: Supported			Hypothesis 2a (supported) Hypothesis 2b (Not supported)		Hypotheses 3a (supported) Hypothesis 3b (Not supported)		Hypotheses 4a and 4b (Not supported)	
	Model 1	Model 1a (Knowledge)	Model 1b (Knowing Capabilities)	Model 2a (Knowledge)	Model 2b (Knowing capabilities)	Model 3a (Knowledge)	Model 3b (Knowing Capabilities)	Model 4a (Knowledge)	Model 4b (Knowing Capabilties)
Age	-0.141	-0.086	-0.072	0.085	-0.07	-0.074	-0.045	0.016	0.053
Size	-0.009	-0.054	0.08	-0.012	0.097	-0.036	0.137	-0.103	0.038
Industry	0.051	0.118	0.024	0.008	0.032	-0.097	0.064	-0.023	-0.188**
Independent Variable									
Strong Intrafirm networks		0.328***	0.354***	0.900***	0.522	0.096**	0.8	-0.166	-0.261
Moderator Variables									
Collective Rewards				0.901***	0.601				
Collective Rewards Intrafirm* Networks				*0.813***	*-0.543*				
Cooperative Cultural Norms						0.756**	0.629		
*Cooperative Cultural Norms*Intrafirm Networks*						*0.900**	*-0.782*		
Absorptive Capacity								0.664***	0.687***
Absorptive Capacity Intrafirm Networks*								*0.148*	*0.234*
R^2	0.029	0.131	0.13	0.205	0.161	0.205	0.18	0.465	0.512
f (effect size)- Adjusted R^2		0.12	0.12	0.08	0.001	0.06	0.02	0.006	0.01
df	3,71	4,70	4,70	6, 68	6,68	6,68	6, 68	6,68	6, 68

[a] n= 74. Standardized coefficients indicating two-tailed significance.
* p< 0.5
** p< 0.01
***p< 0.005

Due to moderate-to-high correlations among the variables, tolerance and variance inflation factor (VIF) to test for multicollinearity, were evaluated. The results indicate that the minimum tolerance value from among all the latent variables was 0.7 and the maximum VIF value was 1.428,

which are well above and below the common threshold values of 0.19 and 5.3, respectively (Hair, Anderson, Tatham & Black, 1998).

Table 2 highlights the composite reliabilities and AVEs of independent latent variables. In general, the composite reliabilities range from 0.698-1.00, indicating internal consistency of latent variables. AVE scores range from 0.536-1.00, which explain reasonable variance shared among the latent variables and their respective block of indicators.

To test the hypotheses, we used moderated regression analysis (MRA) as suggested by Gupta and Govindrajan (1984) and Venkatraman (1989), in PLS. This testing method minimizes the effects of multicollinearity among the variables comprising of the interaction terms. Table 3 summarizes the hypothesized measurement models.

Control Variables

Unlike conventional belief, size and industry are not found to significantly impact the two dimensions of intellectual capital; knowledge and knowing capabilities. However, as anticipated age shows an inverse significant relationship with knowing capabilities, implying that younger business units are willing to embrace new ideas and techniques to improve their existing knowing capabilities, whereas in older units, incumbency prevails due to internal inertia (Lavie & Rosenkopf, 2006). Age is not seen to impact knowledge accumulation. This is perhaps indicative of the notion that young business units focus more on enhancing their processes than simply knowledge improvement.

Independent and Moderator Variables

Hypotheses 1a and 1b are strongly supported by the positive relationship that exist between strong intrafirm networks and both dimensions of intellectual capital; knowledge and knowing capabilities (YMBOL98\f"Symbol"\s12= 0.328, $p<0.005$) and ($\beta= 0.354$, $p<0.005$) respectively. The relationship shows a moderate effect size of 0.12. Hypotheses 2a and 3a are also supported, as collective rewards and cooperative norms are found to moderate the relationship between strong intra-firm networks and knowledge ($\beta= 0.813$, $p<0.005$) and ($\beta= 0.900$, $p<0.05$) with small effect sizes of 0.08 and 0.05, suggestive that cultural attributes within organizations instigate units, to a certain extent, to enhance their knowledge base as units possess some level of redundant knowledge that they can align their existing knowledge with. However, hypotheses 2b and 3b are not supported ($\beta= -0.543$, n.s.) and ($\beta= -0.782$, n.s.) indicating that both collective rewards and cooperative norms do not moderate the relationship between intra-firm networks and knowing capabilities. Hypotheses 4a and 4b also show inconclusive results ($\beta= 0.148$, n.s.) and ($\beta= 0.234$, n.s.). Absorptive capacity does not influence knowledge accumulation nor does it aid in improving knowing capabilities.

DISCUSSION

The findings of this study suggest that strong intrafirm networks help business units accrue intellectual capital, as business units may possess both similar and dissimilar knowledge. Knowledge similarity is important for effective communication while diversity is important for intellectual capital enrichment (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998). Hence, chaining the business units together through modes of reciprocity and cohesion, facilitate exchange and combination of tacit knowledge and complex knowing capabilities. Additionally, the presence of non-redundant knowledge allows units to enhance existing knowledge base.

Contrary to previous studies, the motivational factors of collective rewards and cooperative cultural norms embedded within organizations, only play an important role in the accumulation of knowledge but the effect is very small, suggesting that these factors mildly impact the relationship. Moreover, these motivational factors do not enhance development of knowing capabilities. Apparently, the strong ties among business units supersede all the motivational factors and primarily drive units to share and learn from each other's new knowledge and knowing capabilities. When intrafirm networks are strong, the additional impetus is not required to encourage business units to share and exchange knowledge and knowing capabilities within organizations, as having strong relationships makes units self-aware of their internal weaknesses and the resources they lack (Powell, et. al., 1996). Hence, self-determination plays an integral part in the accumulation intellectual capital.

Another interesting finding of this study, is the lack of impact of absorptive capacity. There may be two plausible explanations for these results. First, due to non-redundant knowledge within the organization, individual units do not possess prior know-how such that new knowledge or knowing capability can serve as an extension of the old one (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998). Second, heavy reliance on external knowledge of alliance partners could actually degrade unit's absorptive capacity (Lane et. al., 2006) such that units do not invest in developing absorptive capacity due to reliance on learning directly from relationship.

Several theoretical and managerial contributions can be drawn from this study.

Theoretical Contributions

This study highlights the advantages and prevalence of intrafirm networks within organizations. More specifically, it stresses the relational characteristics ingrained within strong intrafirm networks that allow business units to exchange and combine difficult to codify knowledge and knowing capabilities. This study also explicates the conditions posited by researchers earlier that are essential for the business units to fully capitalize on the network relationships (Gupta & Govindrajan, 2000a; Nahapiet & Ghoshal, 1997). Two of the conditions—partner accessibility and

value contribution-- are satisfied by the advantages of intrafirm networks and the other two conditions – motivation and combination capabilities-- are hypothesized to play a moderating role.

This paper also accentuates the role of intellectual capital as a dependent variable. Previous studies have analyzed how intra-organizational exchanges can lead to increased innovation and performance (Tsai, 2001; 2002) and reduced project completion time (Hansen, 1999). More recently, intellectual capital has been categorized into three dimensions-- organizational capital, human capital, and social capital -- which are said to influence both incremental and radical innovations (Subramanium & Youndt, 2005). Our paper determines that business units can accumulate intellectual capital by participating in network relationships within organizations.

Managerial Contributions

The importance of the exchange and combination of tacit knowledge within organizations is emphasized in this study, as it has become absolutely essential for organizations to become knowledge-intensive in order to attain sustainable competitive advantage (Gupta & Govindrajan, 2000a; 2000b). Tacit knowledge triggers a sense of awareness within executives and managers that encourages entrepreneurship, innovation, and exchange. The results are the development and maintenance of intellectual capital within their business units that are the building blocks of all organizations (Birkinshaw, 2000). Other tangible resources are said to be easily imitable, and, therefore, are less likely to lead to competitive advantage (Miller & Shamsie, 1996).

The benefits associated with developing or facilitating intrafirm networks provide executives and managers sufficient evidence to initiate and implement networks within their own organizations. Intrafirm networks not only promote increased knowledge and resource exchange among business units, but networks can be a resource in themselves because of structural patterns of relationships, network tie modalities, capabilities instilled within networks, and in general, network membership (Gulati, Nohria, & Zaheer, 2000).

In addition, managers are made aware of the conditions that are important for any exchange. More importantly, the roles of organizational norms and practices, and units' internal capabilities that are required to effectively retrieve resources when weak ties exist are emphasized.

Limitations

Like any other study, this study has its limitations as well. I have tried to develop a new measurement scale for strong intrafirm networks and absorptive capacity. Because it hasn't been tested before there is always skepticism about the quality of the items used. Also, due to subjective reporting of all the variables by a single respondent, business unit heads or managers – measurement error and common method variance can be seen as another limitation of this study (Collins & Clark,

2003) although high level respondents are considered to be ideal candidates for such surveys (Rindfleisch & Moorman, 2001).

In addition, it is difficult to account for the lagged effect of the business relationships with respect to accumulation of knowledge, as it is not a static process. It is a continuous and dynamic process, and therefore, is difficult to measure for one period of time. Lastly, I did not use organizational structure, centralized or decentralized, as a control (Tsai, 2002). This variable is likely to have an impact on the business units' decision to accumulate knowledge through intrafirm networks or through any other mode.

Future Research

Future research studies could identify other dependent variables such as relational capital and performance measures, such as effectiveness and efficiency, to further explicate the importance of intrafirm networks. In addition, the post hoc analyses conducted in this study should be further explored. Use of additional subjective and objective measures should be used to operationalize variables.

Another interesting stream of research could be to study the antecedents of intrafirm networks, besides those that have already been analyzed in previous studies (Brass et. al., 2004), such as organizational culture. To understand the dynamism of internal networks, the impact of organizational strategies, such as diversification through mergers and acquisitions, and internationalization on the change in internal relationships, in general, could be studied.

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THE DU PONT MODEL: EVALUATING ALTERNATIVE STRATEGIES IN THE RETAIL INDUSTRY

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ABSTRACT

The purpose of this paper is to examine the financial performance of retail firms through the use of financial ratio analysis in the form of a modified Du Pont model and to identify the drivers of financial success under alternative business strategies. Firms in the retail industry are categorized according to their high/low relative net operating income to sales and asset turnover ratios. Firms with high relative net operating income to sales and low relative asset turnover are assumed to be pursuing a differentiation strategy and those with high relative asset turnover and low relative net operating income to sales are assumed to be pursuing a cost leadership strategy. Return on net operating assets is utilized as a performance variable.

Prior research suggests that a firm could, in theory, perform well following either strategy. However, the findings of this research suggest that retail firms pursuing a differentiation strategy are more likely to achieve a higher return on net operating assets than those firms pursuing a cost leadership strategy.

This paper will be of interest to members of the Academy whose teaching, scholarship, and business engagement activities include the analysis of businesses using financial statement information extracted from investment services.

INTRODUCTION

The Du Pont model is a timeless and elegant model of financial analysis that has been used by analysts and educators for almost a century. Most academic or professional books on financial analysis use some form of the Du Pont model to provide insight into return on assets (ROA) or return on equity (ROE). An effective presentation of the Du Pont model can be found in a book by Palepu and Healy (2008), who use a modified version of DuPont to evaluate management's execution of competitive strategy. They hypothesize a connection between the Du Pont factors, net operating income to sales and asset turnover ratios, and a firm's competitive strategy (cost leadership or differentiation).

For example, a cost leader like Wal-Mart may generate a relatively low net operating income to sales but balance that against a relatively high asset turnover. In contrast, a differentiator such

as Target may be successful by generating a relatively high net operating income to sales and a relatively low asset turnover. Conventional wisdom is that companies can devise successful competitive strategies around either profit margin or asset turnover.

The purpose of this paper is to examine the financial performance of retail firms through the use of a modified Du Pont model of financial ratio analysis and to identify the drivers of financial success under alternative business strategies. Firms in the retail industry are categorized according to their high/low relative net operating income to sales and asset turnover ratios. Firms with high relative net operating income to sales and low relative asset turnover are assumed to be pursuing a differentiation strategy and those with high relative asset turnover and low relative net operating income to sales are assumed to be pursuing a cost leadership strategy. The performance variable used is return on net operating assets.

BUSINESS STRATEGIES

Strategy can be defined as "the direction and scope of an organization over the long term, in order to achieve advantage for the organization through its configuration of resources within a changing environment, to meet the needs of the market and to fulfill stakeholder expectations." (Johnson & Scholes, 2002, p.10.) In essence, strategy defines a company's competitive stance within an industry.

A widely recognized model for characterizing business-level strategies is Porter's (1998) generic competitive strategies. He identifies three strategies, cost leadership, differentiation and focus. For our purposes, these can be narrowed to two, because a focus (niche market) strategy is either cost leadership or differentiation-based (Price & Newson, 2003).

Cost leadership strategy attempts to achieve organizational goals by delivering a product or service comparable to competitors' at a lower cost to the customer. Firms pursuing this strategy maintain tight controls on costs and often look for economies of scale and sales volume. Palepu and Healy (2008) suggest that a firm pursuing cost leadership strategy may generate a relatively low profit margin but balance that against a relatively high asset turnover. Soliman (2008), in his analysis of the components of the Du Pont method, while not using the cost leadership/differentiation terminology explicitly, clearly suggests their existence. He states that asset turnover measures "asset utilization and efficiency, efficient inventory processes and working capital management" (p. 824). He offers Dell Computers as example of this business model.

A differentiation strategy, alternatively, attempts to deliver to consumers some characteristic of product or service that will command a premium price. Examples of such characteristics include brand name, quality, service, design, delivery method and variety. Companies pursuing a differentiation strategy must balance expenditures for marketing and R&D with ability to price their product/service competitively against others in the same market (Palepu & Healy, 2008). Firms pursuing this strategy may be successful by generating a relatively high profit margin and a

relatively low asset turnover. Soliman (2008) states that profit margin is derived from "pricing power, such as product innovation, product positioning, brand name recognition, first-mover advantage and market niches." (p. 824). Abercrombie and Fitch is cited as an example of such a business model.

Retailers pursuing a differentiation strategy focus on the dimension of the product/service that commands a premium price, while not ignoring operating expenses. Likewise, cost leaders cannot ignore product characteristics desired by customers (Palepu & Healy, 2008).

Gooderham (1998) states that "no one right way to develop and implement strategy exists… The key is to get the right fit between the chosen tools and techniques, the organization's culture, capabilities and business environment, and the desired outcome." (p. 2). In addition, the theoretical underpinnings of the Du Pont model illustrate that a firm can be successful with either a cost leadership strategy through generating asset turnover or a differentiation strategy generating profit margins. This study provides empirical evidence testing this theory.

THE MODIFIED DU PONT MODEL

The original Du Pont method of financial ratio analysis was developed in 1918 by an engineer at Du Pont who was charged with understanding the finances of a company that Du Pont was acquiring. He noticed that the product of two often-computed ratios, net profit margin and total asset turnover, equals return on assets (ROA). The elegance of ROA being affected by a profitability measure and an efficiency measure led to the Du Pont method becoming a widely-used tool of financial analysis (Liesz, 2002). In the 1970's, emphasis in financial analysis shifted from ROA to return on equity (ROE), and the Du Pont model was modified to include the ratio of total assets to equity.

In order to more effectively evaluate operational managers, Nissim & Penman (2001) suggest using a modified version of the traditional Du Pont model in order to eliminate the effects of financial leverage and other factors not under the control of those managers. Using operating income to sales and asset turnover based on operating assets limits the performance measure of management to those factors over which management has the most control. The modified Du Pont model has become widely recognized in the financial analysis literature (See, for example, Pratt & Hirst (2009), Palepu & Healy (2008), and Soliman (2008). In addition, Soliman (2004) found that industry-specific Du Pont multiplicative components provide more useful valuation than do economy-wide components, suggesting that industry-specific ratios have increased validity.

The modified model is as follows:

$$\text{RONOA} = \text{OPM} \times \text{AT}$$

WHERE:

RONOA	=	Return on Net Operating Assets
OPM	=	Operating Profit Margin (Operating Income / Sales)
AT	=	Asset Turnover (Sales/ Net Operating Assets)
Operating Income	=	Sales - Cost of Sales - Operating Expenses
Net Operating Assets	=	Cash + Accounts Receivable + Inventory + Net Property, Plant, and Equipment – Accounts Payable

Either strategy could generate a relatively high RONOA when successful or low RONOA when not successful. In a homogeneous industry such as retail firms one could expect to see both successful and unsuccessful (as measured by RONOA) firms pursuing profit margin strategies (differentiation) or asset turnover strategies (cost leadership).

The data presented below depict the set of combinations of relative operating profit margin (OPM) and relative asset turnover (AT) performance paired with the overall performance measure, return on net operating assets (RONOA).

	Relative OPM	Relative AT	Relative RONOA
Category			
1.	HIGH	HIGH	HIGH
2.	HIGH	LOW	HIGH
3.	LOW	HIGH	HIGH
4.	HIGH	LOW	LOW
5.	LOW	HIGH	LOW
6.	LOW	LOW	LOW

A firm with relatively high OPM and AT will yield a relatively high RONOA. The opposite RONOA effect is true of firms with relatively low OPM and AT. The categories of special interest for purposes of this research analysis are categories 2 – 5. Is there a significant difference in performance, as measured by RONOA, between retail firms that employ an OPM/differentiation strategy (Categories 2 and 4) or those that pursue an AT/cost leadership strategy (Categories 3 and 5)?

RESEARCH METHOD

The Value Line Investment Analyzer (2008) was used to select a total of 146 companies from the retail industry with fiscal years ending between 10/31/2007 and 3/31/2008. Companies with missing data for the variables used in this study were eliminated, leaving 129 companies. These companies are in the following retail industry categories:

Retail (special lines)	90 companies
Retail (automotive)	12 companies
Retail (building supply)	6 companies
Retail Stores	21 companies

The companies remaining in the sample were then sorted by the 50 highest and 50 lowest relative values for the variables OPM, AT, and RONOA, leaving 29 companies in the middle category (neither relatively high nor relatively low).

The identification categories for OPM, AT, and RONOA were sorted such that the 50 highest relative RONOA and the 50 lowest relative RONOA retail firms could be analyzed to determine the number of firms in the high/low/middle relative OPM categories versus those in the high/low/middle relative AT categories. The findings of this analysis can be found in the results section of this paper.

The next step in the research process was to run ANOVA statistics on those retail firms in the relative high OPM and low AT category (differentiation strategy) and those in the relative high AT and low OPM category (cost leadership strategy) to test if there was a statistically significant difference in the RONOA performance of the two different categories.

RESEARCH RESULTS

The data presented below reveal nine categories of relative OPM and relative AT performance measures for the 50 retail firms with the highest relative RONOA and the 50 retail firms with the lowest relative RONOA.

Interestingly, of the 23 retail firms in the differentiation strategy category (high OPM and low AT), 21 of the firms are in the high relative RONOA category and only two firms are in the low category. However, all of the 18 retail firms in the cost leadership strategy category (high AT and low OPM) are in the low relative RONOA category. There are an additional 8 firms in the differentiation strategy category (high OPM and low AT) and an additional 9 firms in the cost leadership strategy category (high AT and low OPM) that are in the middle relative RONOA

category. The differentiation category then contains 31 (23 plus 8) firms and the cost leadership category contains 27 (21 plus 8) firms. See Appendices A and B for a complete list of the companies in each category.

	Relative RONOA	Relative OPM	Relative AT	Number of Firms
Category				
1.	HIGH	HIGH	HIGH	8
2	HIGH	HIGH	LOW	21
3.	HIGH	HIGH	MID	11
4.	HIGH	MID	HIGH	10
5.	LOW	HIGH	LOW	2
6.	LOW	LOW	HIGH	18
7.	LOW	LOW	LOW	13
8.	LOW	LOW	MID	10
9.	LOW	MID	LOW	7

The 31 retail firms in the differentiation strategy category (high OPM and low AT) and 27 retail firms in the cost leadership strategy category (high AT and low OPM) were used in one way ANOVA models to test if there is a statistically significant difference in the RONOA performance of the two different strategy categories and to test for any statistically significant firm size difference between the two categories. The natural log of sales was used to represent the size variable.

The data reported below show sample statistics for the variables used in the one way ANOVAs models for each of the strategy categories:

Differentiation Strategy Category					
Variable	Firms	Mean	Std. Dev.	Max.	Min.
RONOA	31	0.292	0.099	0.582	0.135
LOGSALES	31	3.208	0.871	4.888	1.328
Cost Leader Strategy Category					
RONOA	27	0.073	0.174	0.237	-0.464
LOGSALES	27	3.318	0.726	4.812	1.696

The RONOA for the sample of 31 firms in the differentiation strategy category (high OPM and low AT) ranges from a low of 13.5 percent to a high of about 58 percent with a mean of about

29 percent. Alternatively, the RONOA for the sample of 27 firms in the cost leadership strategy category (high AT and low OPM) are considerably lower, ranging from a low of about minus 46 percent to a high of about 24 percent with a mean of about 7 percent. The size variable (LOGSALES) does not differ in a significant way between the two strategy categories.

An ANOVA procedure was run using a categorical variable for the independent variable representing the strategy categories as the high OPM and low AT differentiation strategy and the high AT and low OPM cost leadership strategy. The dependent variable is RONOA. The results of the ANOVA shown below indicate a statistically significant difference in the mean values for RONOA in the two strategy categories. As expected, the size variable represented by LOGSALES is not statistically significant different between the two strategy categories.

Variables	Pr > F
Dependent:	RONOA
Independent: Strategy Categories	<0.0001
$R^2 = 0.389$	

CONCLUSIONS

The results of this study suggest that retail firms that pursue a differentiation strategy (high OPM and low AT) outperform those retail firms that use a cost leadership strategy (high AT and low OPM) as measured by the performance variable RONOA. The mean values for RONOA for the 31 firms in the differentiation strategy category are much higher that the values for the 27 firms in the cost leadership category and the differences are statistically significant. In addition, 21 of the 31 retail firms in the differentiation strategy category show up in the high relative RONOA performance category while none of the retail firms in the cost leadership strategy show up in the high relative RONOA performance category and 18 of the firms are in the low RONOA performance category.

These results indicate that the premise that either strategy can be successful is not true for this sample of retail firms. Only those firms with a relatively high level of OPM were able to generate high levels of RONOA. How generalizable these results are is difficult to say. The data used were for one fiscal year. Recreating the study with other years when economic conditions were different would address the issue of generalizability. In addition, alternative performance measures, such as price/market valuations or cash flow measures could be used to test the outcomes of this study.

A key finding of this study suggests, however, that all strategies are not created equal. The pursuit of a cost leadership strategy, depending on asset turnover for results, is not as effective as

the pursuit of a differentiation strategy (charging premium pricing) when effectiveness is measured by RONOA.

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APPENDIX A
High Net Profit Margin & Low Asset Turnover Firms
(Differentiation Strategy)

Abercrombie & Fitch
bebe stores, Inc.
Buckle (The), Inc.
Chico's FAS
Coach, Inc.
Escalade, Inc.
Fossil, Inc.
Gymboree Corp.
Inergy, L.P.
Inter Parfums, Inc.
Joseph A. Bank
Merisel, Inc.
Movado Group
NBTY, Inc.
Ocean Bio-Chem, Inc.
Sotheby's
Tiffany & Co.
Tween Brands
Urban Outfitters
Winmark Corp.
Copart, Inc.
Munro Muffler Brake
O'Reilly Automotive
Fastenal Co.
Home Depot
Lowe's Cos.
Kohl's Corp
Macy's. Inc.
Nordstrom, Inc.
Penney (J.C.)
Target Corp.

Appendix B
High Asset Turnover & Low Profit Margin Firms
(Cost Leadership Strategy)

Charming Shoppes
Children's Place
Circuit City Stores
drugstore.com
Emerging Vision, Inc.
Insight Enterprises
Jo-Ann stores
Joe's Jeans, Inc.
Nautilus, Inc.
Pantry (The), Inc.
Pier 1 Imports
PriceSmart, Inc.
Sharper Image
Sport Chalet
Trans World Entertainment
Value Vision Media
Asbury Automotive
Autonation, Inc.
CarMax, Inc.
Group 1 Automotive
Penske Auto
Sonic Automotive
BJ's Wholesale Club
Costco Wholesale
Duckwall-ALCO Stores
Fred's Inc 'A"
Steinmart

NBA PLAYER: MONEY TREE OR MONEY PIT

Martha Lair Sale, Florida Institute of Technology
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ABSTRACT

According to popular perception and the assertions of franchise managers, sports franchises in the United States are operated as for-profit businesses. One premise of operating a business for profit is that investments in the business are undertaken with the expectation of producing a profit either now or in the future. The choice of inputs and their cost is a strategic choice in the management of a business. This research examines player salaries in the NBA and the choice of player salary cost level as a strategic variable. It compares player salary cost and operating income to determine if there is a positive relationship between these two elements.

INTRODUCTION

While abundant research is available on certain aspects of sports marketing and on the relationship between winning records and various measures of success, there is little, if any research examining the relationship between the choice of inputs and the financial success of the sports team (Irwin, et al. 1999). The purpose of this paper is to examine if there is a positive relationship between player salary cost and the financial performance of a franchise in professional basketball. While this paper does not address the salary caps and financial structures of professional sports, it does examine the effectiveness of differing managerial approaches to the choice of sports talent. In other words, is an investment in higher salaries for NBA players justified on a return on investment (ROI) basis?

Performance in the context of this paper refers to financial results. Performance, in terms of wins and losses, will be mentioned but was not the basis of research for this paper. The reasoning for this approach is simple; ownership of a professional NBA team represents a significant financial investment and player salary cost is the most significant operating category. Despite the institution of salary caps and the high labor cost for players, considerable latitude is exercised by team management in the strategic choice of how much to pay in total player salaries. Therefore, performance in this context will be measured as the correlation between total player salary cost and the financial performance of the team.

It has been argued that the production, distribution and consumption of professional sports are unique in many respects (Stotlar, 1994). However, there is a common assumption that a professional sports team in the United States is a profit seeking business. In fact, professional sport

executives maintain that a professional sports team is managed similarly to any other business (Mullin et al., 1993). Player personnel selections greatly influence the business strategy of the professional sports team (Nourayi, 2006). In this paper we consider the willingness to incur higher player salaries as a strategic input-choice characteristic of team management. This characteristic is measured by total player salary cost. We attempt to determine the correlation between this strategic management characteristic and the financial performance of the team. The expected correlation will be modified by uncontrollable market variables such as market size. In addition to these market variables, player salary is almost certainly influenced by a host of moderating variables such as win/loss records and the popularity of individual players. However, if the perceived similarities between professional sports and other businesses exist, the cost of this most important input should influence financial performance. It is hoped the results of this analysis will provide useful information on how this managerial characteristic impacts financial success.

PRIOR RESEARCH

As previously noted, there is little research available which is relevant to the current research question. The available body of research concentrates primarily on attendance (Soucie, 1994) or win/loss records (Wakefield and Sloan, 1995) as measures of success in performance. The weakness in this approach is analogous to a corporation measuring performance based on market share or gross receipts. Moreover, as reported in Irwin, et al., (1999), Spolestra (1997) resoundingly refuted the idea that more victories equals more profit. In spite of these findings, the news media continue to attribute financial success of professional sports teams to win/loss records (Teaford, 2002).

In addition to a large body of sports marketing research, a limited number of papers on a variety of other elements of professional sports management have been published. Ferrand and Pages (1999) focus on the image of the professional sports team and associations between professional sports and sponsorships from other corporations. Nourayi (2006) demonstrated the suitability of applying a continuous improvement framework and benchmarking to professional sports team management. This ambitious work not only analyzed the relationship between win/loss ratio and fan attendance (ticket sales), it also examined the playing characteristics of individual players, identified performance gaps, and explained success in the terms of win/loss.

METHODOLOGY

This study assesses the relationship between total player salary cost and a team's financial success as measured by operating income. If player salary cost usually provides an adequate return on investment, then an increase (decrease) in player salary cost should generate a corresponding proportional increase (decrease) in operating income. Therefore, the null hypothesis would be stated as:

H_O: *Player salary cost has a positive relationship with team financial performance.*

A regression analysis is performed in which player salary cost serves as the independent variable while operating income is the dependent variable. This study also analyzes total player salary cost, operating income, and operating income as a percentage of player salary cost by team to identify trends and/or patterns.

DATA COLLECTION

For the purposes of this paper, total player salary cost includes salaries, benefits, bonuses, and penalties incurred as a result of exceeding the team's salary cap. In the NBA, franchises may exceed the salary cap, but when they do so, they must pay a penalty equal to the amount by which they exceed the cap (Salary Cap for 2004-05 is $43.87 million, 2005). Total player salary cost and operating income for each NBA franchise was obtained for a ten year period, 1998 to 2007 (NBA Team Valuations, 2007). For comparability purposes, the Charlotte Bobcats are excluded from the analysis since this expansion team has only existed since 2005.

RESULTS

As noted in Table 1, player salary cost is negatively related to operating income in all but the first of the ten of the years tested. This relationship is statistically significant at alpha equal to .05 for the combined model of all ten years and six of the ten individual years (2001, 2003-2007). These results support a rejection of the null hypothesis which stated that total player salary cost is positively related to operating income. The results for 1998, 1999, 2000, and 2002 are not significant at a level of alpha equal to .05. However, all but the one of these years also show a negative relationship between player salary and operating income. While the 1999 results may be influenced by the NBA strike which occurred during the season, no other events can readily explain the insignificant results for these years.

Table 1: Regression Analysis P-Values

	Coefficient X	t-Statistic	P-value
All	-0.17802011	4.748405017	.002831767
2007	-0.81114231	-3.656029367	.001091241
2006	-0.85700253	-4.570937585	.000096468
2005	-0.47335541	-2.127663513	.042645796
2004	-1.09379673	-4.693681922	.000069379

Table 1: Regression Analysis P-Values			
	Coefficient X	t-Statistic	P-value
2003	-1.5339911	-5.903464851	.000002730
2002*	-0.21300697	-0.883473409	.384779734
2001	-0.46595732	-2.083729186	.046779412
2000*	-0.07345917	-0.286325759	.776814190
1999*	-0.18395018	-0.694457324	.493328341
1998*	0.115494832	0.504497664	.618004351

Table 2 lists the teams with one of the five lowest operating incomes as a percent of total player salary cost in at least three years during the study period. Not surprisingly, there are a number of teams that consistently fall into this category and over the ten years of the study, only six distinct teams fall into this category.

Table 2: Teams Producing the Lowest Operating Income as a % of Player Salary cost										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Mavs	(24.1%)	(62.5%)	(16.7%)	(38.3%)	-	(24.0%)	(41.0%)	(18.9%)	(24.7%)	-
T-blazers	-	-	(17.1%)	(21.1%)	(27.4%)	(85.0%)	(63.5%)	(35.6%)	(22.7%)	(33.5%)
Grizzlies	-	-	(20.0%)	(25.5%)	-	(37.0%)	-	(22.9%)	(25.4%)	(16.0%)
Bucks	-	(65.2%)	(27.1%)	(26.7%)	(14.3%)	(24.2%)	-	-	-	-
Nuggets	(25.0%)	-	-	-	(9.4%)	-	-	-	-	(11.0%)
Knicks	-	-	-	-	-	-	(14.6%)	-	(33.1%)	(41.0%)

Table 3: Teams Producing the Highest Operating Income as a % of Player Salary cost										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bulls	-	100.0%	160.0%	157.6%	90.7%	104.3%	64.9%	58.3%	80.3%	115.8%
Lakers	65.8%	-	63.8%	47.7%	78.6%	-	-	57.6%	42.9%	-
Pistons	107.1%	-	-	45.0%	-	47.1%	-	43.1%	34.9%	75.8%
Suns	-	24.0%	34.7%	55.6%	-	-	-	83.3%	74.5%	86.5%
Celtics	-	9.5%	-	--	35.4%	46.4%	-	-	-	-
Clippers	-	-	41.4%	36.4%	47.1%	-	-	-	-	-

Similarly, Table 3 presents the teams which generated one of the five highest operating incomes as a percent of total player salary cost in at least three years during the 10 year study period. The Chicago Bulls, which are considered by most to be one of the most, if not the most, successful

NBA team ever, tops this list. A case might be made that the investment in player salaries during the years prior to 1999 resulted in the exceptional return on player salary in the subsequent years.

During those pre-1999 years the Bulls roster included many hugely popular, talented, successful, and expensive players. It is highly possible this investment in talent built a fan-base that continues to contribute to the financial success of the franchise. In 1998, the Bulls incurred more player salary cost, $69 million, than any other team; this was the only year the Bulls did not rank in the top five teams for the highest operating income as a percentage of player salary cost. As a result of restructuring in an attempt to eliminate some older and more expensive players, the Bulls lost Scotty Pippen, and Dennis Rodman, among others. These changes, along with Michael Jordan's retirement, decreased the Bull's player salary cost significantly. Despite disappointing performance on the court, this decrease in player salary cost allowed them to generate the highest operating income and the highest operating income as a percentage of player salary cost in seven of the next nine years, and they were in the top five the remaining two years (2002/2006 and 2004/2005, respectively).

While no one can dispute the fan appeal of top athletes such as Michael Jordan, Dennis Rodman, and Scotty Pippin, the higher salaries paid to keep these athletes does not necessarily generate enough revenue to cover the higher salary salary cost and provide an adequate return on investment for the owner(s) of the sport franchise. This finding moderates Spolestra's (1997) finding that more victories corresponds to higher profit only to the extent that these victories may be achieved without excess player salary cost.

Generalization of this study is limited. This study was limited to one league of one sport. It remains to be seen whether or not similar results would be found with other sports or other sport leagues.

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BUSINESS STRATEGY PERSPECTIVES AND ECONOMIC THEORY: A PROPOSED INTEGRATION

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ABSTRACT

Prospect theory as developed in psychology and applied to economic behavior by Daniel Kahneman and others claims that an individual's personal position relative to a good or service will determine the value of that good or service to the person in addition to the individual's position relative to the general market for the good or service. Similar ideas have been discussed as "fuzzy-set" social science. In the related field of organizational theory the argument is being made that rational choice theory is inadequate as a basis for describing and explaining reality and an historical political economy contingency perspective is being offered as an improvement. Similar themes appear in the business organization strategy work of Raymond Miles and Charles Snow who discuss the "prospecting strategy." In this paper, the conceptual relationships between these prospect theories are developed and discussed. A comparative assessment reveals that the perspectives have three very similar theoretical underpinnings and that future empirical and macro theoretical integrative work is necessary. The paper concludes with a case illustration.

INTRODUCTION

The assumption of rationality in economics has been challenged most recently by prospect theory. Prospect theory has claims that an individual's personal position relative to a good or service will determine the value of that good to the person in addition to the individual's position relative to the general market for the good (cf. Kahneman, 1999; List, 2003a; List, 2003b; Thaler, 1980). Similar ideas have been discussed as "fuzzy-set social science" (Ragin, 2000; Sen, 2002; Baliamoune, 2003). In the related field of organizational theory, Zey (1998) has argued that rational choice theory is inadequate as a basis for describing and explaining reality; she argues for an historical political economy contingency perspective. The same underlying conceptual themes appear in the work of Miles and Snow (1994) who discuss the "prospecting" strategy.

In this paper, the conceptual relationships between prospect theory as developed and applied to the field of economics by Kahneman and Tversky (2000a, 2000b), Kahneman and Lovallo (1994) and Tversky and Kahneman (2000, 1981) and prospect theory as developed and applied by Miles and Snow (1994, 1978) are discussed. The paper concludes that there is a clear convergence of these theoretical perspectives and that future empirical and macro theoretical integrative work is necessary.

TWO PROSPECT THEORIES

In this section, two theoretical statements will be described, their similarities will be presented and the argument will be presented that because of these similarities, "prospect theory" has far greater applications than envisioned by their respective proponents. The first of these theories is the "prospect theory" developed by economist Daniel Kahneman and various collaborators and stands in contradiction to standard expected utility theory. Expected utility theory underlies much of the reasoning of contemporary economic theory. The second is the "prospect theory" developed by the organization management theorists Raymond Miles and Charles Snow and various collaborators and stands in contradiction to standard rational contingency theory. Rational contingency theory underlies much of the reasoning of contemporary organizational theory.

Economic Prospect Theory

Economic prospect theory was created, essentially, because of apparent weaknesses in the conventional wisdom of classical economic theory. As Edwards (1996) describes:

> Prospect theory was formulated . . . as an alternative method of explaining choices made by individuals under conditions of risk. It was designed, in essence, as a substitute for expected utility theory [because the] expected utility theory model did not fully describe the manner in which individuals make decisions in risky situations and that therefore, there were instances in which a decision-maker's choice could not be predicted. For example, they point out that expected utility theory does not explain the manner in which framing can change the decision of the individual, nor does it explain why individuals exhibit risk-seeking behavior in some instances and risk-averse behavior in others. (Edwards, 1996)

Essentially, then, economic prospect theory attempts to demonstrate that a major flaw of expected utility theory is that it assumes that people assign values to final outcomes and make choices on the basis of them. An example of this assumption is the use of the conventional "present value" formulation to estimate the final value of assets as a crucial element in assessing the desirability of alternative courses of action. Prospect theorists, however, assume that people differentially evaluate gains and losses and not expected outcomes or goal states. They demonstrate, for example, that people value "probable" outcomes differently than they do "certain" outcomes; when outcomes are more probable people will exhibit more risky behavior than when outcomes are less risky. That is, the domain of the utility function for expected utility theory is final states rather than gains or losses per se! And prospect theory correctly locates the utility function in gain/loss assessment.

In their systematic presentation of this argument to show that expected utility theory is invalid (and prospect theory is a valid alternative) Kahneman and Tversky (2000b) develop three effects: (1) the certainly effect (people weigh outcomes that are probable differently than outcomes that are certain as they will behave with more risk with more probable events than with less); (2) the isolation effect (people discard components that are shared by all prospects under consideration thus they value prospects differently when they presented differently because they assign value to gains and loses not final states); (3) reflection effect (the certainly effect is reversed when the focus is on relative losses and not relative gains).

Having made the case against expected utility theory, Kahneman and Tversky then develop prospect theory proper and divide human decision making into two distinct phases, editing and evaluation. Editing involves simplifying the decision of selecting from among various prospects through coding, combination, segregation, cancellation, further simplification and dominance detection. Evaluation is the actual selection of a prospect. To summarize, they indicate that "an essential feature of the theory is that the carriers of value are changes in wealth [and] people are expected to exhibit more risk seeking in deciding whether to accept a fair gamble than in deciding whether to purchase a gamble for a fair price" (2000b:33,42).

This prospect theory work by Kahneman and Tversky has stimulated a wide variety of research focuses (Edwards, 1996). For example, Thaler (1985) applies the concepts of economic prospect theory to "mental accounting" which refers to the type of analysis which consumers frequently use to make purchase decisions. An illustration of this application is in situations where consumers self-justify paying premium prices for goods which they intend to give as gifts to others. While the consumers would not pay the price for the good if they intended to keep it for themselves, they are willing to pay a higher price because of the altruistic character of gift giving. Another illustration given by Thaler is the common situation where a married couple (1) owns an adequate home and automobile but (2) wishes to purchase a new home and automobile and (3) decide to wait to purchase a new home until they have accumulated sufficient interest-earning savings but (4) immediately purchase a new automobile by obtaining an interest bearing loan. Traditional rational expected utility theory would suggest that these are contradictory decisions and should not occur.

Chang, Nichols and Schultz (1987) apply prospect theory to taxpayer attitudes toward tax audit risk. In their study of 56 business executives, they discovered differences among subjects in terms of the perception of tax payments. Some of the subjects perceived tax payments as reduced income to be received which is consistent with expected utility theory yet others perceived the tax payment as loss of income already received which is not consistent with expected utility theory. Thus two motivations for evading tax payments, maximizing income versus minimizing loss, are contradictory and according to expected utility theory should not occur. Kanto et al. (1992) apply prospect theory to racetrack betting behavior and find similar contradictions from an expected utility theory perspective. For example, they discovered in a study of Finnish racetrack bettors, that there

was a strong preference for the longshot bet in direct opposition to predictions which would be derived form expected utility theory.

In a study of five dissimilar groups of subjects, Harrell and Stahl (1986) discovered, for all groups, that as the subjects' expectations of success in obtaining a desired outcome rose, their motivation to participate decreased. Under expected utility theory this should not have occurred yet it is a very commonly understood phenomena. In competitive team sports, anecdotes abound concerning teams that perform better against the best teams; university students are often said to exhibit higher academic achievement when requirements for courses are difficult. The empirical work by Harrell and Stahl (1986) adds credence to these conventional ideas which are accounted for by economic prospect theory.

Organization Prospect Theory

Miles and Snow (1978; 1994) have provided a very useful service to the field of business management by making it clear that there are three viable alternatives, not just "one best way" to orient the strategy of a firm. The three forms which they discuss are "defending," "prospecting" and "analyzing". Defender strategies are based on the maintenance of fairly easy to identify outcomes by firms which are well established and tend to dominate markets. Analyzer strategies are based on the assessment of the success of capturing a specific market niche. Prospecting strategies, however, focus on means -- executive effort is put into continuous development of new, untried products and services and internal processes to produce them. Studies by Shortell and Zajac (1990) and James and Hatten (1995), among others, have documented the technical reliability and validity of these concepts.

Since the introduction of Miles and Snow's typology to the literature of strategic management almost thirty years ago, the theoretical and research literature has reported a wide variety of applications. The major underlying application of the typology through time, however, has been at the level of strategic decision-making, planning and management. From Hambrick's (1983) early assessment of the frequency of prospecting, defending and analyzing strategies to DeSarbo et al.'s (2005) recent study of information technology, a clear trend related to the objective of this paper has become apparent. Specifically, the trend over this period of time has been a gradual increase in the use, and apparent relevance, of the prospecting strategy. In the early 1980s, Hambrick (1983) noted that the prospecting strategy was uncommon; ten years later, Slater and Narver (1993) found that the prospecting strategy was prominent in firms with a strong market orientation and that business firms were generally giving greater emphasis to marketing; by 1999/2000, the prospecting strategy had become prominent in two increasingly common situations: firms that offered information technology services and equipment (Croteau, et al.,1999); firms that had successfully emerged from Chapter 11 bankruptcy proceedings (Evans and Green, 2000). Finally, the 2005 paper by DeSarbo et al (2005) clearly indicates that the prospecting strategy has

become the predominant strategy in industries which rely on information technology and short term profitability and they note that such firms are increasing in their frequency.

The position taken by Miles and Snow (1978; 1994) is that prospect theory does not stand in contradiction to other theories but rather that it is an alternative to the defender and analyzer theories. Such prospecting theories have been found to be relevant in a variety of fields. In a study of 164 business firms, Withey and Panitz (2001) discovered that in prospecting firms where the goal was to introduce new products/services, the sales staff and managers were especially dependent upon marketing support, as they state: "Sales people and their managers should be aware of and understand the role of advertising and promotion. Public relations and company image should also be presented as connected to selling activities. Overall, organizations should strive for more integrative systems of business operation that include the sales function. Isolating the selling activity as a field operation driven by quotas and sales goals should be avoided." (Withey and Panitz, 2001:7). Clearly, such a recommendation is contrary to the general goal driven rational model which has been prominent in organizational theory.

In a related study of accounting firms, Panitz (1995) concluded that prospectors were more like to develop business activity by developing new services to offer to existing clients rather than offering existing services to new clients. Such a development strategy would seem to be inconsistent with efficient rational processes where the least cost alternative is to develop new clients not new services. In terms of marketing strategy, McDaniel and Kolari (1987) make a similar point in distinguishing defending strategies from prospecting strategies:

> Significant differences in marketing orientation and anticipated marketing-related behavior are found between defenders and prospectors . . . defenders are found to be least likely to consider specific marketing strategy elements as being important to achieving their organization's overall strategic objectives. These organizational types are also more likely to rely on the more traditional products in their industry, rather than placing much emphasis on newer technology and product types . . . prospector organizations [however] are oriented toward finding and exploiting new product and market opportunities. (McDaniel and Kolari, 1987:29)

The sequence of act => evaluate => plan of the prospecting approach is contrasted with the plan =>act => evaluate sequence of the defending approach and the evaluate => act => plan sequence of the analyzing approach (Miles and Snow, 1994:13). The point being that the prospecting approach is much more aligned to gains and losses than it is with ultimate outcomes as Miles and Snow (1978:56) state: "For a prospector, maintaining a reputation as an innovator in product and market development may be as important, perhaps even more important, than high profitability." Standard rational contingency theory is reflected in the defender position, with the striving for a desired end of market dominance, and the analyzer position, with the striving for a

desired end of market niche development. Prospect theory, however, is focused on action taken, often for its own sake, in a "continuous state of development."

Miles and Snow point to a number of elements of prospecting theory that serve to distinguish it from the other approaches and these are compatible with the focus on means and extra-rational pursuit of innovation. Among other such elements are the need to "develop and maintain the capacity to monitor a wide range of environmental conditions, trends and events" (Miles and Snow, 1978:56). In terms of organizational growth, the rates are sporadic and respond to self-imposed innovation. As Miles and Snow indicate, prospectors are immune from the pressures of a changing environment because they thrive on unexpected opportunities to gain (and avoid loss); forecasted predictable ends such as profitability or returns on investment are only of secondary importance. In terms of engineering problems and solutions, "the prospector's choice of products and markets is not limited to those which fall within the range of the organization's present technological capability [and their] technologies are embedded in people not in routine technical operations" (Miles and Snow, 1978:56).

Perhaps the most relevant discussion centers on the topic of costs and benefits. Miles and Snow indicate that the prospector's reluctance to invest heavily in any given technology may result in inefficiencies compared to competitors who develop more standardized and efficient approaches. In discussing the prospector's approach to administrative problems and solutions, Miles and Snow indicate that the manager's problem is how to facilitate rather than to control organizational operations. Planning is characterized by broad rather than intensive efforts and, correspondingly, structures tend to have a minimal division of labor and low degrees of formalization with short horizontal feedback loops.

Miles and Snow (1978) summarize their characterization of the prospector orientation in terms of three "cost and benefit" assessments: (1) product and market innovation protects the organization from a changing environment but the organization runs the risk of low profitability and overextension of its resources; (2) technological flexibility permits a rapid response to a changing domain, but the organization cannot develop maximum efficiency in its production and distribution system because of multiple technologies; (3) the administrative system is ideally suited to shift when necessary to maintain technological flexibility and effectiveness but this may underutilize and misuse resources.

ECONOMIC AND ORGANIZATION PROSPECT THEORIES INTEGRATED

The most direct comparison between these prospect theories is in terms of the "costs and benefits" of Miles and Snow and the "effects" of Kahneman and his collaborators as discussed above and summarized in Table 1.

Table 1: Three Integrating Elements of Economic and Organizational Prospect Theories		
Integrating Prospect Theory Element	Economic Prospect Theory (Kahneman, Tversky and others)	Organization Prospect Theory (Miles, Snow and Others)
1. Short Term Foci	1. The Certainly Effect	1. Innovation, not end result, orientation.
2. Flexibility Emphases	2. The Isolation Effect	2. Change technology to fit, not dominate.
3. Survival Goals	3. The Reflection Effect	3. Shifting administration, not efficient.

Hence there are three common links, or "integrating elements" between the decision making process of individuals (economic prospect theory) and the decision making process of organizations (organization prospect theory). Taken together these three links contradict, respectively, expected utility theory and rational contingency theory. Connections similar to these have been noted in the literature. For example, Barney (1994) points to themes underlying prospect theory and game theory at the level of the behavior of the firm and McDermott (1998) applies similar themes to the setting of American foreign policy.

BENEFITS AND FUTURE IMPLICATIONS OF THE INTEGRATED THEORY

An integration of theories always presents a risk of losing the precision and applicability of each of the separate theories. Thus, a theoretical integration must have clear and substantial benefits. In the case of the theoretical integration presented in this paper and summarized in Table 1, there are clear benefits and positive implications for the future of organizational research and the risks resulting from integration are minimal.

There are three major areas of specific benefits which the integrated theory provides. One major area of benefit is the connecting of individual behavior (economic prospect theory) with an organizational level perspective (organization prospect theory). That is, the direct effects of individual actions on the overall organization and vice versa, are clearer. For example, when an organization moves to a short term focus, the expectation overall is for the emphasis on innovation to increase with a corresponding decrease in the emphasis on the end result (organization prospect theory). This, in turn, encourages individuals in the organization to become somewhat less risky in their actions because events have become less predictable (economic prospect theory certainly effect). This integrated linking of individual decision-making with organizational strategy adds depth as well as breath.

A second area of benefits of the integrated theory is the explicit connection of the research and teaching fields of the psychology of economic behavior with organization management (cf. Cushner, 1998) . In traditional postsecondary business curricula these two fields have generally been taught as separate courses under typical labels of “organizational behavior,” "organizational theory,” and "microeconomic theory". Empirical research, likewise, has been fragmented with

specialized journals and professional associations which serve, however, unintentionally, to maintain the distinctions. The integrated perspective permits a more realistic, holistic, perspective in which both sets of elements are taken into account which should aid the development of more effective business policy decision-making as a wider array elements are taken into consideration.

The third major area of benefits relate to the need of business organizations to develop more global perspectives because of the expansion of international trade, the increasing reliance of business firms on international suppliers and distributors and international capital markets (cf. Korine and Gomez, 2002). This need to develop more global perspectives relates not only to international business firms but also domestic firms, as the concluding case in this paper illustrates. The integrated theory provides the broader perspective required by international business concerns as the prospecting mode becomes more frequent due to traditional rational models losing continuity across cultures (Welsch, 1999). Having an integrated framework which includes individual and organizational elements enables firms to develop comprehensive strategies. For example, the literature is clear that increased global considerations bring an increased need for flexibility (Korine and Gomez, 2002; Welsch, 1999). Flexibility, in turn, is a key element of the integrated theory (refer to table 1) which requires an increased emphasis on fitting into, rather than dominating, the situation and assigning value to gains not final outcomes – the isolation effect.

In terms of risk of loss of identify through integration, these theories are major perspectives of their respective disciplines, and will likely continue into the future with their separate applications in tact. The fact that they have a new set of possibilities though integration, as discussed above, thus represents a net gain of benefits.

There are several implications of this integrated theory for the future. Perhaps the most immediate implication is the clear need for additional detailed theoretical integration work. While this paper has described the basic elements of the integration, each requires elaboration for the theory to be more useful. Hence, in this sense, the article presents a theoretical development agenda. Initial theoretical tasks could focus on expanding each of the cells of table 1, for example, with subtopics and additional connections to a more diverse literature. Similarly, a second implication is for empirical research. There has been substantial research conducted within each framework and, at this point, research which focuses on the connections between the focuses could be conducted. An initial step might be the development of an extensive set of testable hypotheses that would enable comprehensive empirical assessments of the details of the integration. For example, the various probability experiments conducted by Kahneman and Tversky (2000b) and others could be repeated within each of Miles and Snow's (1994) strategic orientations to determine the exact, empirical, nature of the connections between the prospect theories.

An additional implication of the integrated theory is that there should be an increased emphasis on the systemic aspects of business strategies where individual and organizational systems are blended as they often seem to be on a daily basis by people who are driven by a need to survive and to minimize losses – the reflection effect (Kannemann, 2000b). Finally, and most importantly,

the implication is that increasingly business firms will rely on the prospecting type of organizational strategy and individual decision making. This paper has provided a conceptual basis upon which to develop tactics which would enable a more successful implementation of a prospecting view.

IN CONCLUSION: A CASE ILLUSTRATION

The common elements of these two prospect theories are illustrated by the case of the Rouille family business. This is an actual French business known by the author and disguised, here, by the use of pseudonyms. The Rouille family has cultivated and distilled lavender for more than five generations on the family farm, which is located in the southern region of France near the village of Cassis on the Mediterranean Sea. The family cultivates 120 hectares of lavender and the business is one of the most important producers of lavender in the area. The family is quick to point out that they produce authentic lavender not the recent hybrid, lavandin (Distilleries, 2005). Lavender begins to bloom by the middle of June. By the end of July the grass-like plant is cut and the flowers are mashed with water and distilled. The lavender essential oil is high quality and has many medicinal properties in addition to its pleasant aroma. Popular products include soaps and scented candles.

The family has never been too concerned about competitive products or, for that matter, the world economy. They always manage to survive and remain quite flexible. Perhaps the most dramatic evidence of this perspective is the expansion of the business to include a retail shop -- La Maison de la Lavande. Fifty percent of sales income from their product comes through products sold on the premises through the shop. During the severe recession of the 1980s, when demand for their products became very low, there were always visitors with an interest in the product and the beautiful fields of lavender in bloom. In response, the family opened the shop which provided an additional source of income. When the French economy improved, and with the advent of lower cost distribution systems of the European Union, the shop continued to flourish and gave the product sales aspect of the business great leverage. The family has no long-range plans and does not speculate on the "present value" of their business at a fixed date in the future. For them, the farm and family business cannot be given a financial value (even though for lawful accounting practices and insurance premium estimation, a genuine asset value of the business has been developed by tax consultants and other legal experts). The product itself provides an enormous source of intrinsic value which the family quite effectively communicates through informal tours of their farm.

The Rouille family provides evidence that the prospecting theories of Kahneman and Miles and Snow are more realistic models for certain types of business firms. Localized family businesses, which are passed down from one generation to another, are very clear, yet accurate, examples. Professional financial analysts for whom the firm ceases to exist at the end of the day can never drive the clear attachment which family members have to the business. For the Rouille family, the business exists every hour of every day and market value of the firm is not a central element to

decision making. Thus, the emphasis is on living each day for its own value and letting the long run take care of itself ("short term foci") doing what ever is necessary including adding a retail shop to a farm business ("flexibility emphasis") to keep the organization alive at all costs ("survival goals").

Clearly, the similarities of the elements of the prospecting theories of Kahneman and Miles and Snow are striking enough to call for systematic and empirically rigorous qualitative case studies and quantitative demographic and survey/observational studies to determine under what conditions prospect theories are superior in explanatory power. Work such as that done by List (2003a, 2003b) can serve as useful guides as to the types of studies which should begin this effort.

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MARKET PERCEPTION OF SYNERGIES IN RELATED ACQUISITIONS

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ABSTRACT

This research examines whether market participants are able to identify post-acquisition operating synergies at the time of the acquisition announcement. We examine the abnormal returns of the bidding firm and its major rival and relate equity gains or losses during acquisition announcements to subsequent post-acquisition operating performance. Empirical results suggest that the abnormal stock returns of the acquiring firm surrounding the announcement is positively associated with post-acquisition operating performance, and the abnormal stock returns of the major rival firm is negatively associated with post-acquisition operating performance of the combined firm. These results indicate that abnormal stock returns, that is, the variations in the stock price movements of the acquiring and rival firms in a given window following an acquisition announcement, reflect the potential synergies at the time of acquisition announcements.

INTRODUCTION

Unlike the mergers and acquisitions (M&A) era of the 1970s and 1980s where the predominant motives for acquisitions were hubris, empire building, market power, and agency (Jensen, 1991; Roll, 1986; Trautwein, 1990), an increasing number of acquisitions in the 1990s, and in this decade, have been purportedly undertaken for synergistic reasons (Hitt, Harrison, & Ireland, 2001). Synergy has been defined in various ways such as, utilization of the resources that creates value for the combined entity (Chatterjee, 1986), as "valuation of a combination of business units which exceeds the sum of valuations for stand alone units" (Davis & Thomas, 1993: 1334), and as "increases in competitiveness and resulting cash flows beyond what the two companies are expected to accomplish independently" (Sirower, 1997). The synergy motive for acquisitions states that by combining the resources of the two firms, economies of scale and scope are created, which in turn, creates value for the combined entity (Slusky & Caves, 1991).

Both market and accounting measures have been used to measure the performance of firms engaged in synergistic acquisitions. Researchers using market measures have focused on the wealth gains to shareholders. The basic findings of these studies can be summarized as follows: (1) shareholders of target firms earn significant positive abnormal common stock returns immediately

following the acquisition (Jensen, 1986; Jensen & Ruback, 1983), (2) irrespective of the extent of relatedness between the two firms, acquiring firms earn negative abnormal common stock returns in approximately 65% of the acquisitions (Berkovitch & Narayana, 1993; Datta, Pinches & Narayanan, 1992; Loughran & Vijh, 1997; Lubatkin, 1987), and (3) bidding firms often overestimate the value of the target firms by underestimating the cost of exploiting relatedness with targets (Salter & Weinhold, 1979; Seth, 1990).

Accounting measures to study the operating performance of the combined entity following the acquisition have also been extensively used. The basic findings of these studies can be summarized as follows: (1) acquisitions, on average, do not create value (Ravenscraft & Scherer, 1987), (2) the presence of synergies is not sufficient: effective integration of the two firms is essential to realize the synergies (Haspeslagh & Jemison, 1991; St. John & Harrison, 1999), and (3) synergy is an elusive concept, difficult to define and measure and therefore firms often overestimate the perceived synergies between the two partners (Collis & Montgomery, 1995; Markides & Williamson, 1996; Martin & Eisenhardt, 2001).

In this paper, we propose a novel method to identify and measure synergy using the efficient capital market theory. Past researchers of corporate strategy have attempted to measure synergy using several proxies such as relatedness in product/markets (Rumelt, 1974), relatedness in the underlying process and assets of the business units (Markides & Williamson, 1994), presence of similarities (or differences) in the resource base of the two partners (Capron, 1999; Harrison, Hitt, Hoskisson & Ireland, 1991; Salter & Weinhold, 1979), opportunity to share or combine resources among businesses (Brush, 1996; Farjoun, 1998; Haspeslagh & Jemison, 1991), or, as an outcome (abnormal returns) associated with acquisitions (Seth, 1990). Our method to measure synergy is novel because we examine whether market participants are able to identify post-acquisition operating synergies arising out of unique combinations at the time of the acquisition announcement. For this, we examine the abnormal returns of the *bidding* firm and *its major rival* and relate equity gains or losses during acquisition announcements to subsequent post-acquisition operating performance. For example, when the merger between Chemical Banking and Chase Manhattan was announced, the market reaction was a 11% increase in the share price of Chase and a 9.6% increase in the share price of Chemical (Pulliam, 1995). The increase in price was attributable to merger-related synergies perceived by investors (Hitt, Harrison & Ireland 2001). There has been very little research in the area of synergy measures despite three decades of inquiry into the M&A phenomenon. Healy, Palepu, and Ruback (1992) used the abnormal returns of the combined firm and related them to post-acquisition operating performance, and Chatterjee (1986, 1992) studied the abnormal stock returns of the merging firms, and the firm that is the major rival to the *target* firm.

Our study makes a contribution to the literature by examining the abnormal returns of the *bidding* firm and its major *rival* firm, and relating them to post-acquisition operating performance. Because Healy et al. (1992) examine the abnormal returns of the combined firm, their results do not allow us to disentangle the individual contributions of the bidding and target firms. Chatterjee's

studies (1986, 1992) do not examine the relationship between abnormal returns and post-acquisition operating performance and thus do not provide a test of operating synergy. Our research design allows us to isolate any synergy valuation effects associated with the market perception of post-acquisition operating performance to the valuation of the bidder and its major rival.

We examine 50 large U.S. acquisitions that occurred during 1992 and 1996 between firms where the businesses of the combining firms were related. Our results indicate that the abnormal returns of the bidding firm are positively associated with post-acquisition operating performance as measured by return on sales (ROS). Second, and more critically, our results show that the abnormal returns of the major rival firm are negatively associated with post-acquisition operating performance of the combined bidder and target firm. Taken together, the results suggest that the market is able to identify acquisition-related synergies at the time of the acquisition announcement.

THEORETICAL DEVELOPMENT

Motives for Mergers and Acquisitions

While an extensive body of literature in finance, economics and strategy has examined the motives and consequences of mergers and acquisitions, some of the basic questions still remain unanswered (Agarwal, Jaffe & Mandelkar, 1992). For example, there is no consensus on whether the stock market fully comprehends the consequences of an acquisition immediately on announcement (Jensen & Ruback, 1983). Second, there has been limited success in relating equity gains during acquisition announcement to subsequent operating performance.

However, in recent times, it may be easier to predict the subsequent performance of acquisitions by studying their equity gains or losses during the acquisition announcement. This is because many institutional investors have taken on a greater role as a watch-dog of firms' value destroying activities and firms are less likely to pursue deals for size alone (Investors Business Daily, 1995; Useem, 1993; Zuckerman, 2000). In deals completed in the 1970s and 1980s, the target usually received all the abnormal returns and the bidding firms witnessed negative returns even when the capital market perceived synergistic gains from the acquisition. However, in the deals completed in the 1990s, the acquiring firm was not penalized if the acquisition was perceived to be synergistic (Sirower, 1997). Hence, if we assume that the capital markets are semi-strong efficient, then security prices will reflect all publicly available information (Chatterjee, 1992; Fama, 1976).

Measurement of synergies using stock prices

The efficient capital market theory offers a useful theoretical lens to understand synergies because if indeed, security prices reflect all publicly available information, there are advantages to measuring performance by studying stock price movements around the time of an acquisition

announcement. The efficient capital market theory assumes that stock prices are fully specified and not limited to a specific aspect of performance such as sales growth or profits, is readily available for all publicly traded firms and cannot be manipulated by managers (Fama, 1976). Woolridge and Snow (1990) make a strong case for the efficacy of semi-strong version of an efficient capital market and their position is strongly supported by finance (Chang, Chen, Hsing & Huang, 2007; Dow & Gorton, 1997) and strategy researchers (Seth, 1990; Sirower, 1997). They argue that the capital market is capable of judging the existence of positive potential synergy in any major long-term investments such as joint ventures, research and development, or acquisitions that firms may announce to the public. Thus, initial reactions of the stock market to an acquisition announcement are representative of the market's perceptions of long-term performance (Sirower, 1997).

In this context, we argue that valuable information may well be obtained from the market's perception of the acquisition. Within the backdrop of efficient markets, the resource-based view offers a useful approach to understand synergistic acquisitions. According to the resource-based view, resources contribute to the advantage of one firm over another in a particular industry. In the context of acquisitions, the following types of synergies have been defined: operational synergies arising out of similarities and complementarities in the value chain that result in economics of scale and scope (Chatterjee, 1986), collusive synergies arising out of increased market power (Caves & Porter, 1977), financial synergies arising from diversification (Lubatkin, 1987) and managerial synergies that arise from applying complementary competencies and by creating a more efficient transacting environment (Coase, 1937; Martin & Eisenhardt, 2001). However, in the context of related acquisitions, particularly those relationships that are complementary, operational and managerial synergies play a critical role in creating value for the organization (Brush, 1996; Hitt, Harrison & Ireland, 2001; St. John & Harrison, 1999).

Operational and managerial synergies are derived from the resources of the combined entity. Combining the operating assets or resources of the two firms such as marketing, manufacturing, logistics, or procurement may result in economies of scale and scope (Brush, 1996; Rumelt, 1974). In an efficient capital market, the market may perceive that the combined firm possesses a unique combination of resources not easily replicable by its major competitors (Barney, 1988; Chatterjee, 1986). If this is indeed true, buyers may be willing to purchase the combined firms' outputs at prices significantly above their costs and are not likely to switch to competitors who offer similar or substitute products (Coombs & Ketchen, 1999).

Barney (1988) argues that not all potential bidders have complete information about their targets. Thus, a bidder with private synergy based on perceived uniqueness is likely to have an advantage over other potential bidders (Chatterjee, 1992). Private synergy refers to synergy between the acquiring and target firm that is due to unique resource complementarity not found among other potential bidders for a specific target. Barney (1988) argues that complementary acquisitions have the potential to create greater value because the synergistic relationship between the two firms is unique, difficult to imitate, and durable. An imperfectly competitive market can exist when a target

is worth more to one bidder than it is to others. Once acquired, the performance of the combined firm will be greater than expected and generate abnormal returns for its shareholders. If other bidders cannot duplicate the uniqueness of the newly combined firm then the shareholders of the combined firm will earn abnormal returns and that firm can gain a competitive advantage (Barney, 1991). Hitt, Harrison, and Ireland's (2001) case studies reveal that successful acquisitions are ones in which complementary resources exist between the acquiring and target firms.

A complementary relationship between the partners offers opportunities for asset improvement and asset creation (Haspeslagh & Jemison, 1991; Markides & Williamson, 1994). Over a period of time, the changing knowledge of the organization's workforce enables the consolidated organization to combine the resources so that new capabilities are developed. These capabilities may then be applied to help improve the strategic value of the existing assets which may eventually result in new product offerings for existing and new markets (Teece, 1980). Markides & Williamson (1994) argue that value is created when the organization is able to utilize its competencies (pools of knowledge, experience, and systems that exist elsewhere in the corporation) in existing businesses to create new assets in a new business faster, or at a lower cost. The stock market is indeed capable of sensing such uniqueness as revealed in empirical and anecdotal studies. Woolridge and Snow (1990) found that the stock market reacts positively to announcements concerning new product offerings in old and new product markets. As mentioned earlier, the announcement of a merger between Chemical Banking and Chase Manhattan was followed by a 11% increase in the share price of Chase and a 9.6% increase in the share price of Chemical (Pulliam, 1995). Hitt, Harrison, and Ireland (2001) argue that Wall Street perceived a complementary, synergy yielding relationship, between the two partners.

Seth (1990) argues that any abnormal returns that accrues to the combined firm after the acquisition announcement is due to synergies that the market is able to perceive. She measured synergy by comparing the value of the combined firm after all gains were incorporated into the stock price with the combined value of the bidder and target had there been no acquisition. Healy, Palepu, and Ruback (1992) found that combined firms have increases in post-merger operating performance compared to the industry and that there is a positive association between combined abnormal returns for the target and the bidder at the time of the merger announcement and the post-merger operating performance. Sirower (1997) found that stock market losses or gains on announcement of acquisitions are indicative of long term stock performance. Extending this argument, if the market assigns a greater value to mergers that exhibit the potential for operating synergies, then it will bid up the price of both the acquiring firm and the target. That is, the shareholders of bidding firms would gain from the acquisition. If these "perceived" synergies are indeed materialized in the form of better operating performance after the acquisition, then there should be an association between the stock price of the acquiring firm at the time of the acquisition announcement and the post-acquisition operating performance of the combined firm. Hence we predict that greater perceived

synergies between the acquirer and acquired firm would be associated with higher post-acquisition performance.

Hypothesis 1: *There is a positive association between the abnormal returns of the bidding firm and the post-acquisition operating performance of the combined firm.*

Impact of acquisition on rival firm

If the market perceives a synergy from the acquisition then it should also affect the market's valuation of rival firms. It is generally believed that rival firms benefit from an acquisition in at least two major ways. First, an acquisition increases collusion or concentration, which in turn increases the market power of the entire industry including that of the rival firms. Indeed, Kim and Singal (1993) examined 14 large airline mergers and found that rival firms also benefited from market power after the merger and therefore, increased prices of their services. Second, if a merger signals a need for restructuring for the entire industry then rivals would also benefit from the merger (Chatterjee, 1992). For the rivals to benefit from the acquisition, the predominant process for creating value should be restructuring because it is likely to be industry-wide instead of being limited to the combined entity (Chatterjee, 1992). Hence, if upon an announcement, the stock prices of the major rivals to the bidding firm decrease, it suggests that synergy rather than restructuring may be the motive behind the proposed acquisition.

Chatterjee (1986) argues that the wealth gain attributable to a merger should be related, assuming that the impact of collusion has been controlled for, to either an operational or a financial synergy. If the acquisition is perceived to create cost efficiencies for the combined organization, the rivals of the acquiring firm may face a lower final price of the product and also a higher cost of raw materials (due to monopsony power) and therefore, are likely to experience a reduction in their market value. This is based on the assumption that the rivals are not in position to adopt the same cost-efficient production process (Chatterjee, 1986; Eckbo, 1983). Further, synergistic acquisitions are likely to provide the combined entity with increased bargaining power over customers and suppliers. They may be in a position to sell complementary products to a common buyer, bundle products, use common logistics or distribution and thus reduce the search costs for buyers (Nelson, 1970). Additionally, increased scale of purchasing may improve their negotiating position with suppliers (Adelman, 1949). The combined firm's improved bargaining power may come at the expense of its rival firms in the competitive cost and price environments of the 1990s.

Finally, assuming an efficient capital market, the market may perceive that the combined entity may limit the competitors' ability to contest their input markets, processes, or output markets, and may encroach into markets where the competitors may not be able to quickly respond (Sirower, 1997). Drawing on the above arguments we predict that a synergistic acquisition will hurt a rival

firm because the uniqueness perceived in the combination is likely to translate into improved long-term operating performance which is not replicable by the rivals of the bidder (Barney, 1991). Additionally, in the absence of collusion, the improvement in performance is likely to come at the expense of their rivals.

To our knowledge, there is no study that has examined whether the stock performance of the bidding firm's rival firm is affected by the potential for post-acquisition synergies. However, to the extent that the bidding firm obtains these synergies, it strengthens the post-acquisition position of the combined firm. Hence, if synergies indeed exist, the abnormal stock performance of the rival firm surrounding the acquisition announcement should be negatively associated with post-acquisition operating performance of the combined firm. Hence we predict that greater perceived synergies between the acquirer and acquired firms would be associated with lower stock price performance of rival firms during the time of the acquisition announcement.

Hypothesis 2: *There is a negative association between the abnormal returns of the major rival firm and the post-acquisition operating performance of the combined firm.*

METHODOLOGY

Sample and Data

A list of all the U.S. mergers and acquisitions completed during the years 1992-1996 was obtained from the Almanac editions of *Mergers and Acquisitions*. We selected this time period for two reasons. First, the U.S. economy was facing robust growth during this period after emerging from the recession during the late 80s and early 90s. Second, after 1996, internet based firms became a significant economic force, and the market was perceived to be overvalued.

To be included in the final sample, both the bidder and the target firm had to be sufficiently large, and have generated revenues of at least $200 million at the time of the acquisition. We restricted our sample to large related acquisitions because such acquisitions entail a higher degree of operational integration compared to unrelated acquisitions and therefore, have greater potential to create synergies not easily duplicated by competitors (Chatterjee, 1992; Oliver, 1997; Seth, 1990). From the same we excluded the following: all acquirers who were acquired within two years after the acquisition, acquisitions by privately held groups, firms which made other major acquisitions during the two years following the acquisition, acquisitions which did not result in single ownership, and foreign acquirers. This was to ensure that the stock price change was not influenced by other confounding events. Also, firms that witnessed significant events (such as top-management changes, or changes to the product mix) in the 240 day window prior to the announcement were deleted. The above criteria were adopted to (a) reduce the noise in the data pertaining to the acquiring company

and obtain a "clean" sample (Seth, 1990) and, (b) ensure that the acquisition has a considerable impact on the operations of the combined entity (Kroll, Wright, Toombs & Leavell, 1997).

Related acquisitions were identified in two ways. First, the two-digit SIC code of the bidder and the target for the major lines of business had to be the same. Second, the acquisition had to be undertaken for reasons of "synergies" as stated by the firm in any of the leading newspapers featuring the announcement. We chose a broad measure for relatedness because managers seek to increase the likelihood for operational synergies by acquiring firms that may have multiple businesses (Brush, 1996). These criteria resulted in a sample of 50 related acquisitions and included both horizontal and non-horizontal acquisitions. Including non-horizontal acquisitions, as long as they were broadly related at the 2-digit SIC level, was important because first, the product/factor price effect is assumed to have an impact on the rival if it had a stake in that industry and second, complementary relationships are usually witnessed when firms operate within the same 2-digit SIC level, and are likely to generate unique synergies (Chatterjee, 1986; Haspeslagh & Jemison, 1991; St. John & Harrison, 1999).

Rival firms were identified using the Hoovers Database, which identifies the biggest rival firms for each bidding firm. We also examined the *COMPUSTAT* database for firms that operated in the same major 4-digit SIC levels as the bidding firms during the year of the acquisition. This procedure yielded at least two domestic publicly–traded rivals for every bidding firm which were then scrutinized to ensure that the major lines of business were common for each bidding firm, target firm, and rival firm.

Independent Variables

Perceived Synergies

CAR of acquiring firm surrounding the announcement.

Recall that perceived synergy is measured by analyzing the stock market's response to the acquisition announcement. Following an announcement, the target's price usually increases whereas the bidder's stock declines slightly or stays relatively flat (Hayward & Hambrick, 1997). If the bidder's price drops very sharply it reflects investor uncertainty associated with acquisition costs and concerns regarding the viability of the combined entity. Additionally, it may also indicate that the market doubts whether the relationship between the bidder and target is indeed synergistic. If the bidder's price does not decrease significantly, or increases marginally, investors may perceive synergies from the combination (Chatterjee, 1992).

CAR of the rival firm surrounding the announcement.

The stock price of the bidder firm's rival may also be influenced as a result of the announcement. If the stock price of the rival decreases, then it implies that investors perceive synergies in the original combination and believe that the acquisition could have an adverse impact on the subsequent performance of the rival firms. If there is little change in the stock prices of the rival firms, investors may not perceive major synergies from the combination.

Consistent with prior research, we measured perceived synergies as the cumulative abnormal returns (CAR) for the bidding firm surrounding the acquisition announcement. Security returns were obtained from the CRSP database. The following event windows were used in our main analysis: (1) -1 to 1 days with 0 denoting the date of the acquisition announcement (3-day window), and (2) -2 to 2 days with 0 denoting the date of the acquisition announcement (5-day window). We also used an 11-day window (-5 to 5 days) in supplemental analysis and found no significant results, corroborating the findings in previous research that increasing the event window creates greater noise in the data (Brown & Warner, 1985; McWilliams & Siegel, 1997). For the rival firms, the CAR for the 3-day window around the announcement was used.

We calculate abnormal common stock returns for each firm using standard event study methodology with a market model based upon a value-weighted market index estimated over a 240-day estimation period with the estimation period ending 45 days preceding the acquisition announcement.

Using the market model, we defined abnormal returns (AR) of a firm *i* on any given day *d* as follows:

$$AR_{id} = R_{id} - a_i - b_i R_{md} \quad (1)$$

Where *a* is the risk-free rate of return and *b* is the sensitivity of the return to the market portfolio. *a* and *b* are estimated from the following OLS regression:

$$R_{id} = a_i + b_i R_{md} + e_{id} \quad (2)$$

In equation (2), R_{id} is the daily return of the individual firm and R_{md} is the daily return of the market portfolio. The CAR for a 3-day window is computed as:

$$CAR = S^{n}_{i=-1} AR_{id} \quad (3)$$

Where day 0 is the date of the acquisition announcement and n equals the 3 days surrounding the announcement.

In sensitivity tests, we also calculated abnormal common stock returns for each firm using a net-of-market methodology as

$$MAR_{id} = R_{id} - R_{md} \quad (4)$$

Where R_{id} is the return of firm i on day d and R_{md} is the return of the market portfolio on day d.

The simple excess returns over the market is essentially the same as the market model in equation (1) where a=0 and b=1 for all securities. This measure is free from the parameter biases from the estimation period in the market model (Sirower, 1997). The results (not reported) using this alternative methodology were not qualitatively different from the results presented in Table 3 in terms of the direction and significance of the coefficient estimates.

Dependent Variable (Post acquisition performance of combined entity)

Accounting measures

We used the combined firm's return on sales (ROS) in the year following the acquisition as our measure of post-acquisition operating performance. ROS, obtained from the COMPUSTAT database, is measured as operating income (before acquisition adjustments) divided by net sales. We used ROS rather than an equity based performance measure such as firm value or Return on Equity (ROE), or an asset based performance measure such as Return on Assets (ROA) for several reasons. First, ROS is less sensitive to unexpected economy and industry factors compared to firm value. Second, a performance measure using assets as a base will be affected by the alternative accounting methods allowed under generally accepted accounting principles as well as the two acquisition accounting methods available during our sample period, purchase and pooling of interests (Ayers, Lefanowicz, & Robinson, 2000). Third, ROS reflects the operational performance of a firm and is therefore, a better indicator of any synergies that may arise from the acquisition (St. John & Harrison, 1999). Finally, our sample is comprised of U.S. firms that operate in a business environment that is short term in orientation, and hence a one-year ROS appears to be an appropriate measure that is likely to capture the synergies.

Control Variables

Post-acquisition year ROS of the industry

This variable was included as a control for the post-acquisition year performance of the industry. This allows us to control for unmeasurable factors that may affect all the firms in the industry.

Prior performance of the acquiring firm

Prior performance can influence the strategic actions of top managers. Firms may undertake acquisitions as a means to improve their performance or to reduce slack (Porter, 1987; Hambrick & Cannella, 1993). Prior performance was measured as the return on sales (ROS) of the acquiring firm in the year prior to the acquisition.

Pre-acquisition year ROS of the industry

This was used to control for the pre-acquisition performance of the industry, thereby providing industry adjusted pre-acquisition bidder performance.

Competing bid

This variable controls for acquisitions where there was a competing bid from another firm. This measure was included because the presence of a competing bid may push up the price of the target and affect the post-acquisition behavior of the merging firm.

Payment type

Prior research indicates that payment type is an important determinant of post-acquisition operating performance (Morck, Schleifer, & Vishny, 1990; Sirower, 1997). To control for the type of payment, we divided our sample into three categories; stock acquisitions, cash acquisitions, and cash-stock combination acquisitions. We use the variable *Equity-Based Payment,* which is a dummy variable that takes the value of 1 if the acquisition was financed using stock, or else it has a value of zero. Similarly, *Cash-Based Payment* is a dummy variable that takes the value of 1 if the acquisition was financed with cash, else it is zero. The combination-financed acquisition was the omitted dummy.

Nature of Acquisition

Friendly acquisitions are more likely to result in superior post-acquisition performance compared to hostile acquisitions because in the former, integration problems are easier to overcome. Following the method suggested by Jensen and Ruback (1983) and subsequently employed by Loughran and Vijh (1997), an acquisition was classified as friendly if the target managers were favorable, the board of directors and shareholders voted to approve the acquisition, and the general tone of the acquisition was friendly. An acquisition was coded as hostile if the tone was unfriendly and there was no shareholder approval. Acquisition climate was assessed from statements made in

the *Wall Street Journal* and other business journals (Hambrick & Cannella, 1993). This variable was coded as 1 for hostile acquisitions and 0 otherwise.

Empirical Model

The following empirical model was used to test our hypotheses.

$$\textit{Post acquisition ROS of combined firm in the year following the acquisition} = a + b_1*(\textit{CAR of acquiring firm surrounding the announcement}) + b_2*(\textit{CAR of the rival firm surrounding the announcement}) + b_3*(\textit{Post-acquisition year ROS of the industry}) + b_4*(\textit{Prior performance of the acquiring firm}) + b_5*(\textit{Pre-acquisition year ROS of the industry}) + b_6*(\textit{Competing bid}) + b_7(\textit{Equity-Based Payment Dummy}) + b_8*(\textit{Cash-Based Payment Dummy}) + b_9*(\textit{Nature of acquisition - friendly or hostile}) \quad (5)$$

RESULTS

Table 1 provides the mean values for the variables used in the study. It can be observed that the ROS of the combined entity is lower in the post-acquisition year compared to the pre-acquisition year. The average CAR for the acquiring firm is approximately -2% around the time of the announcement, consistent with previous studies (Sirower, 1997). However, there is considerable cross sectional variation in the returns as evidenced by the large standard deviation. Similarly, the CAR for the rival firms is also negative. In approximately 26% of the acquisitions, a competing bid was present and 20% of the acquisitions were hostile. Regarding method of payment, 46% of the acquisitions were financed using only equity, 28% were financed using cash, and 26% were financed using a combination of cash and stock.

Table 1: Means for Variables used in the Analyses*

Variable	Mean (Standard Deviation in Parenthesis) N=50
Post-Acquisition Return on sales (ROS) of the combined entity (Net Operating margin (before acquisition adjustments) divided by net sales.)	6.36 (5.03)

Table 1: Means for Variables used in the Analyses*	
Variable	Mean (Standard Deviation in Parenthesis) N=50
Cumulative Abnormal Return of the Acquiring Firm	-0.0205 (0.0571)
3 day period surrounding the announcement	-0.0207 (0.0607)
5 day period surrounding the announcement	-0.0234 (0.0686)
11 day period surrounding the announcement	
Cumulative Abnormal Return of the Rival Firm	-0.0032 (0.0302)
3 day period surrounding the announcement	6.26 (3.90)
Post-Acquisition Year ROS of the Industry	6.59 (5.93)
Prior performance of the acquiring firm	6.28 (3.95)
Pre-Acquisition ROS of the Industry	0.26 (0.44)
Competing bid present (1=yes)	23
Payment Type	14
All Equity (number of acquisitions)	13
All Cash	
Mixed	0.20 (0.40)
Nature of Acquisition (1=hostile)	
* Means for the 50 related acquisitions	

Table 2 provides the Pearson correlation coefficients for the variables used in the analysis. The pre-acquisition ROS performance of the industry is highly correlated with the pre-acquisition performance of the firm ($r=0.60$, $p<0.001$), and the post-acquisition performance of the industry ($r=0.85$, $p<0.001$). Hence, separate regressions were run including and excluding one of the correlated variables. Competing bids and hostility are also related and therefore, we perform similar analysis using only one of them.

Table 2: Pearson Correlation Coefficients

	1	2	3	4	5	6	7	8	9	10	11
1 Post-acquisition ROS	--	0.18	0.09	-0.25*	0.77***	0.65***	0.63***	-0.15	-0.00	-0.09	-0.11
2 CAR bidder - 3 day window		--		0.19	0.06	0.09	0.09	-0.07	-0.26	0.10	-0.22
3 CAR bidder - 5 day window			--	0.20	0.00	0.03	0.04	-0.09	-0.32**	0.19	-0.22
4 CAR rival - 3 day window				--	-0.22	-0.25*	-0.09	0.16	0.03	0.01	0.17
5 Post-acquisition year ROS of the industry					--	0.85***	0.44***	-0.24*	-0.07	0.07	-0.07
6 Pre-acquisition year ROS of the industry						--	0.60***	-0.18	0.01	-0.02	-0.13
7 Prior performance of the acquiring firm							--	-0.07	-0.01	-0.36***	-0.30**
8 Competing Bid								--	0.00	0.14	0.62***
9 Equity-Based Payment									--	-0.56***	-0.16
10 Cash-Based Payment										--	0.24
11. Nature of Acquisition (1=hostile)											--

* p < .05, ** p < .01, *** p < .001

Table 3 contains the results of the regression analysis. Column 1 provides the results for the 3-day window and column 2 provides the results for the 5-day window. For both windows, the CAR of the acquiring firm has a large positive and significant coefficient. These results are consistent with Hypothesis 1 and suggest that higher perceived synergy (CAR) values are associated with greater post-acquisition ROS. Thus, the market is able to perceive synergistic acquisitions at the time of the acquisition announcement, and acquisitions that are more likely to result in operating synergies are assigned a greater value by the market. Similarly, for both windows, the CAR for the rival firm has a significantly negative coefficient. Thus, higher post-acquisition ROS is associated with lower CAR for the rival firms, suggesting that the market assigns a lower value to rival firms which are most

likely to be affected by the synergistic acquisition. These results are consistent with hypothesis 2. We also substituted industry-adjusted pre-acquisition year ROS instead of including the pre-acquisition ROS of the acquiring firm and the industry separately. The results are substantively the same. The industry-adjusted ROS of the pre-acquisition firm had a positive and significant coefficient.

Table 3: Results from the Regression Analysis - Predictors of Post-Acquisition Return on Sales
(Standard Errors in Parentheses)

Post acquisition ROS of combined firm in the year following the acquisition = a + b_1(CAR of acquiring firm surrounding the announcement) + b_2* (CAR of the rival firm surrounding the announcement) + b_3*(Post-acquisition year ROS of the industry)+ b_4*(Prior performance of the acquiring firm)+ b_5* (Pre-acquisition year ROS of the industry) + YMBOL98\f"Symbol"\s12$_6$*(Competing bid) + b_7* (Equity-Based Payment Dummy)+ b_8* (Cash-Based Payment Dummy)+ b_9*(Nature of acquisition - friendly or not)*

Predictor	Dependent Variable = ROS of the Combined Firm in the Year Following the Acquisition	
	(1) 3-day Window	(2) 5-day Window
Cumulative Abnormal Return (CAR) of the Acquiring Firm Surrounding the Announcement	20.04** (7.56) t=2.65	16.29** (7.41) t=2.20
Cumulative Abnormal Return (CAR) of the Rival Firm Surrounding the Announcement	-25.06** (13.92) t=-1.80	-23.65* (13.24) t=-1.79
Post-acquisition Year Return-On-Sales of the Industry	0.98*** (0.11) t=9.24	1.00*** (0.11) t=9.23
Prior performance of the acquiring firm	0.43*** (0.09) t=4.72	0.43*** (0.09) t=4.56
Pre-acquisition Year Return-On-Sales of the Industry	0.05 (0.04) t=1.29	0.06 (0.04) t=-1.33
Competing Bid (1=yes)	-0.49 (1.18) t=-0.41	-0.30(1.20) t=-0.25
Equity-Based Payment (1=yes, 0=no)	0.59 (0.97) t=0.61	0.50 (1.00) t=0.51
Cash-Based Payment (1=yes, 0=no)	-0.28 (1.12) t=-0.25	-0.41 (1.15) t=-0.36

Table 3: Results from the Regression Analysis - Predictors of Post-Acquisition Return on Sales
(Standard Errors in Parentheses)

Post acquisition ROS of combined firm in the year following the acquisition = a + b_1(CAR of acquiring firm surrounding the announcement) + b_2* (CAR of the rival firm surrounding the announcement) + b_3*(Post-acquisition year ROS of the industry)+ b_4*(Prior performance of the acquiring firm)+ b_5* (Pre-acquisition year ROS of the industry) + YMBOL98\f"Symbol"\s12$_6$*(Competing bid) + b_7* (Equity-Based Payment Dummy)+ b_8* (Cash-Based Payment Dummy)+ b_9*(Nature of acquisition - friendly or not)*

Predictor	Dependent Variable = ROS of the Combined Firm in the Year Following the Acquisition	
	(1) 3-day Window	(2) 5-day Window
Nature of Acquisition (1=Hostile)	2.05 (1.38) t=1.49	1.81 (1.41) t=1.29
Intercept	-0.79	-0.91
Adjusted R^2	0.74***	0.73***
N	50	50

p < .05, ** p < .01, *** p < .001

For the control variables, higher post-acquisition return on sales for the industry is associated with higher ROS for the merging firms. Pre-acquisition ROS for the acquiring firms is positively associated with post-acquisition ROS suggesting that prior performance has a significant influence on post-acquisition performance.

The adjusted R^2 of the model using the 3-day window is 0.74. This is relatively high compared to previous studies. To examine this further, we partitioned the adjusted R^2 by first entering only the control variables and then entering the rival CAR and compared the incremental explanatory power of the synergy measures. The adjusted R^2 for the model containing only the control variables was 0.69 for the 3-day window. The incremental adjusted R^2 of the rival CAR was 0.02 and the incremental adjusted R^2 of the bidder CAR was 0.03. These are comparable to previous studies which examine the association between CAR and other outcome variables. Similar incremental adjusted R^2s were observed for the 5-day window model. Finally, we applied Cook's test to examine the role of outliers. Our analysis revealed outliers to present no problem.

Our study is restricted to examining post acquisition operating performance (ROS) for one year because of the inherent limitations associated with longer time periods. Over longer time periods, there could be significant changes in the external environment, related or unrelated to the acquisition, which may violate the clean data criterion (Ramaswamy, 1997). Further, the U.S. business environment had been very active in acquisitions and acquisitions during the period of our study with many of the firms in our sample engaging in further acquisitions. Thus, adding further years is likely to add noise to the data.

DISCUSSION

This study examines whether the market expectations of synergies following an acquisition are associated with post-acquisition financial performance. Using a sample of 50 related acquisitions, results indicate that there is a strong positive association between abnormal security returns for the bidding firm surrounding an acquisition announcement and the post-acquisition operating performance as measured for by return on sales for the combined firm. Results also show a strong negative association between post-acquisition ROS and abnormal returns for the firm that is a major rival to the acquiring firm. Taken together, these results indicate that the market is able to accurately perceive synergies from an acquisition.

There are several reasons as to why the market reacts negatively to most announcements of acquisitions. First, managers perceive synergies because they may find it difficult to separate the real opportunities from the illusions (Goold & Campbell, 1998). The market, assuming it is efficient, may not perceive any synergies in the combination. Second, even if there are potential synergies in the combination, the stock market may not have confidence in the firm's ability to successfully integrate the acquisition and to implement operational strategies to extract these synergies after the acquisition. This lack of confidence may have its roots in the previous experience of the bidding firm in integrating acquisitions, composition of the current top management team, high premium for the target, size of the acquisition and possible cultural incompatibility between the two firms (Hitt, Harrison, & Ireland, 2001). When the market reacts positively to an acquisition announcement, that is, there are abnormal gains to the acquiring firms relative to the market, the market may believe that the combined entity is capable of integrating the value chains of the two firms (Lee & Lim, 2006), and effectively meshing the cultures of the merging partners, or, as Hitt, Harrison, and Ireland (2001) argue, it may sense a resource complementarity between the two partners.

Synergy is not an easy concept to define or operationalize and it has been argued that synergy cannot be seen and that only its effects can be studied in organizations. Our major contribution to this area of research is to revisit the notion of synergy by examining the reactions of the stock market to the announcement of major acquisitions and relating the abnormal gains (or losses) of the bidding firms to subsequent post-acquisition operating performance. Acquisitions represent strategic decisions that have major long-term performance implications and therefore, their effects have to be examined on the wealth of the acquiring firm's shareholders (Sirower, 1997). Additionally, by examining the impact of an announcement on the abnormal returns of the major rival to the bidding firm and linking it to post-acquisition operating performance of the combined organization, a more complete test of synergy is provided.

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THE RELATIONSHIP BETWEEN MARKET ORIENTATION AND PERFORMANCE UNDER DIFFERENT ENVIRONMENTAL CONDITIONS: THE MODERATING EFFECT OF THE TOP MANAGEMENT TEAM'S RISK TAKING BEHAVIOR

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ABSTRACT

The literature on market orientation finds support for its positive relationship with organizational performance. However, it is important to know what conditions moderate this relationship. Using a sample of 166 Canadian companies (in a post-NAFTA environment), we find evidence to suggest that the risk propensity of the firm's top management team (TMT) plays a critical role in translating market orientation to improved performance. The moderating effect of the TMT's risk propensity varies across various environmental conditions such as market turbulence, competitive intensity, and technological turbulence. The implications of these findings are discussed.

INTRODUCTION

The construct of market orientation captures the interface between the organization and its external environment. Ever since the construct was operationalized in the 1990s (Narver and Slater, 1990; Kohli and Jaworski, 1990), a vast and growing body of literature has found support for a positive relationship between market orientation and organizational performance (e.g. Kirca, Jayachandran, and Bearden, 2005; Verhees and Meulenberg, 2004; Baker and Sinkula, 1999; Jaworski and Kohli, 1993; Pulendran, Speed and Widing, 2000**,** Matsuno, Mentzer and Ozomer, 2002; Pelham and Wilson, 1996; Kumar, Subramanian and Yauger, 1998; Slater and Narver, 1994b; Slater and Narver, 2000; Subramanian and Gopalakrishna , 2001). From a behavioral point-of-view, market orientation focuses on intra organizational activities that relate to the collection, dissemination, and response to external environment stimuli. However, for market orientation to have a palpable payoff, the organization has to develop norms and behaviors (i.e., the culture) that

encourage decision makers to make use of the market information to strategically position the organization.

One of the main challenges facing firms pursuing a market-orientation is avoiding the "tyranny of the served market" (Hamel and Prahalad, 1991). Market intelligence may uncover important trends that indicate that the current served market is crowded, there is a trend toward commoditization of the product, and that the heightened intensity of competitive rivalry has resulted in a zero-sum fight for market share. The same market intelligence may provide a siren call to identify "blue oceans" (Kim and Mauborgne, 2004), the virgin market space that is bereft of competition. To take advantage of this opportunity, the firm's managers must be willing to take the risk of entering such uncharted markets. Risk averse managers may not be willing to do this, instead steering the organization to stay the course. Without managers who are willing to take risks, the organization may take a conservative approach and be content to satisfy the expressed needs of current customers in existing markets. Thus it has been argued that in order to successfully pursue a market orientation, it is necessary to have a management team willing to take risk (Jaworski and Kohli, 1993; Pulendran, Speed, and Widing, 2000). In fact, Narver, Slater, and MacLachlan (2004) refer to this concept as "proactive" market orientation, as opposed to one that is merely responsive.

PURPOSE OF THIS STUDY

Research that has explored the relationship between the top management team's (TMT) level of risk aversion and market orientation has been equivocal (e.g. Jaworski and Kohli, 1993; Pulendran et al 2000). These mixed results may be due to the failure of these studies to include the environmental context. In other words, the importance of being wedded to the "served markets" may be more pronounced in stable markets, while dynamic market conditions may favor exploiting "blue ocean" arenas. The industry as a whole and the various niches in it are typically well-defined in stable markets. It behooves firms in these markets to concentrate on the "served markets" rather than seek uncharted territories. In dynamic contexts, on the other hand, the industry definition and its boundaries are constantly in flux, thus encouraging and necessitating firms to look for new market spaces. To date, the literature on market orientation does not address the impact that a TMT willing to accept risk may have on the market orientation-performance relationship under different environmental conditions. Thus the purpose of this study is to examine the impact that risk-taking behavior has on the market orientation-performance relationship under different environmental conditions.

The importance of the study stems from two fronts. First, it extends the extant research on market orientation by identifying the role of the TMT under different environmental conditions. Since it is the upper echelon that sets the strategic mandate for the firm, it is important to know when risk taking would be rewarded and when it would be penalized. Second, from a practical

perspective, the study's findings offer a fine-grained analysis of when it would pay off to use market information to shift the organization's strategy.

RESEARCH HYPOTHESES

In their meta analysis of the relationship between market orientation and performance, Kirca, Jayachandran, and Bearden (2005) found empirical support for the moderating influence of three aspects of the competitive environment--market turbulence, competitive intensity, and technological turbulence. Market turbulence refers to the number of customers and the stability of their preferences (Subramanian and Gopalakrishna, 2001; Slater and Narver, 1994a; Kohli and Jaworski, 1990). Competitive intensity refers to the level of competition faced by an organization (Jaworski and Kohli, 1993), which could be both current as well as potential competition that is typically a result of fading industry boundaries. Technological turbulence refers to the rate of technological change (Kohli and Jaworski, 1990). While these three aspects of the competitive environment may co-exist in some markets, this may not always be the case and hence cannot be taken as a given.. The literature (e.g., Narver and Slater, 1990; Kirca, Jayachandran, and Bearden, 2005) has always treated them separately for this reason.

It may be perfectly appropriate to be risk averse under environmental conditions when market and technological turbulence are low and competitive intensity is low. In such conditions an organization could concentrate on the "served market" where competitive advantage can be maintained by focusing on customer satisfaction (Slater and Narver, 1998). In fact deviating far from current successful practices based on the chance that new products and/or services may be successful may hurt profitability because these deviations come at a cost that may not be recouped.

Thus, while having a risk tolerant TMT is not necessary in stable environments in order to successfully implement a market orientation, it is necessary as market turbulence, competitive intensity and technological turbulence increase. In order to maintain a competitive advantage in an increasingly turbulent environment, it will be necessary to move away from satisficing existing customer needs to satisfying latent needs (Slater and Narver, 1998), by introducing new products/services. Given the nature of the changing environment there will be a high level of uncertainty associated with the success of these new products/services. If the TMT is unwilling to accept the risk associated with this uncertainty then the tyranny of the served market becomes an issue. Thus a market-oriented firm in a turbulent environment requires a risk tolerant TMT.

Based on the foregoing, its is hypothesized that

H1a: In environments that are characterized by low market turbulence, TMT risk taking behavior does not moderate the relationship between market orientation and performance

H1b: In environments that are characterized by high market turbulence, TMT risk taking behavior does moderate the relationship between market orientation and performance

H2a: In environments that are characterized by low competitive intensity, TMT risk taking behavior does not moderate the relationship between market orientation and performance

H2b: In environments that are characterized by high competitive intensity, TMT risk taking behavior does moderate the relationship between market orientation and performance

H3a: In environments that are characterized by low technological turbulence, TMT risk taking behavior does not moderate the relationship between market orientation and performance

H3b: In environments that are characterized by high technological turbulence, TMT risk taking behavior does moderate the relationship between market orientation and performance

METHOD

The post-NAFTA Canadian business milieu provides a useful setting to study the impact of TMT risk propensity on market orientation and organizational performance. The January1, 1994 agreement between the U.S., Canada, and Mexico created a free trade area for a population of 360 million and a GDP of U.S. $ 6 trillion (Cooper, 2005). For Canadian companies the passage of the agreement profoundly changed their business environment. They now faced well-entrenched U.S. companies who now competed in their markets. Many Canadian companies had to change their strategic posture to compete in this turbulent environment. A senior Canadian trade expert summed up the impact of NAFTA after more than ten years of the agreement's existence: "What NAFTA did was to force (Canadian) companies to look at themselves and how they compete, improving their ability to compete on a North American basis and, in turn, improving their ability to compete on a global basis" (quoted in Cooper, 2005).

A sample of Canadian companies was randomly identified from the following two sources: Canadian Trade Index published by Canadian Manufacturers' Association, and the Canada Company Handbook published by *The Globe and Mail*. The first source was for manufacturing companies and the second for service companies. A notification letter was first mailed to the Chief Executive Officer of 970 randomly selected firms informing them of the proposed study and

soliciting their participation. Twenty-seven of the firms refused to participate leaving a sample of 943 firms. Two weeks later the survey was mailed to the CEO of the 943 firms. Fifty-eight of the surveys came back undelivered because of change in address or change in the person to whom the survey was addressed, thus leaving a sample of 885 firms from whom the data was sought to be collected. A total of 176 surveys were returned for a response rate of 19.87 percent. Of these 176 surveys, 10 could not be used because of incomplete response, thus leaving 166 responses for use in the study.

Since the response rate was relatively low, sample bias was assessed using the time-trend extrapolation test (Armstrong and Overton, 1977). The assumption underlying this test is that non-respondents are more like late respondents than early respondents. No differences were apparent between these two groups (early respondents and later respondents) in terms of size, geographic scope, ownership, scope (manufacturing vs. service), asset size and number of employees.

Since the intent of the study was to use both subjective and archival (objective) measures of performance, each of the responding firms was identified in the questionnaire. The details of these firms, obtained from the Canada Company Handbook, were subsequently added to the data obtained through the survey questionnaire. Analysis of the sample showed that fifty five percent of the responding firms were primarily manufacturing companies while forty five percent were primarily service companies. In terms of ownership an overwhelming 91% of the firms were privately/publicly owned, with Canadian ownership. In terms of size, 18 percent of the firms in the sample had less than 100 employees, 28% had between 100-500 employees, 9% had between 500-1000 employees, 32% had between 1000-5000 employees and 13% had more than 5000 employees. Thus, in terms of size the sample was well distributed between small mid-sized and large firms. In terms of industries to which these firms belonged, the range was quite broad with no single industry dominating the sample. Industries to which the sample firms belonged included food products and beverages, paper products and packaging, precious metals, mining and oil and gas production, biotechnology and pharmaceuticals, industrial products, wholesalers and retailers, management companies, and other services companies. The median revenue of the sample firms was Canadian $16.25 million and the median asset was Canadian $14.78 million.

MEASURES USED IN THE STUDY

Market orientation was measured using the scale originally constructed and validated by Narver and Slater (1990), and later revised, refined, and expanded by Kumar, Subramanian, and Yauger (1998). This scale measures the five components of market orientation through five multi-item sub-scales. The revised scale has a total of 25 items, 5 each for interdepartmental coordination, long term focus, and survival and growth/profit emphasis, 6 items for customer orientation and 4 items for competitor orientation. The reliability of the 25-item scale for this study was 0.93; the split half reliability was 0.94 and 0.88.

As indicated earlier, three aspects of the competitive environment were measured. These were: market turbulence, competitive intensity, and technological turbulence. These items were measured using scales developed and validated in the literature (Kumar, Subramanian, and Yauger, 1998). Market turbulence was measured using a five-item scale, competitive intensity was measured using a six-item scale, and technological turbulence was measured using a four-item scale. The coefficient alpha for the three scales was 0.73, 0.78, and 0.85 respectively. These reliability coefficients compare favorably with the reliability coefficients reported by previous researchers who used other measures of these constructs (Slater and Narver, 1994a; Jaworski and Kohli, 1993).

The criteria used to measure performance in this study included growth in revenue, return on capital, profit margin, customer retention, and return on investment. These metrics have been used consistently in the extant research on market orientation. The business performance of the sample group was measured using a combination of objective data and subjective approach. The objective approach to measuring business performance used absolute values of the performance measure (Chakravarthy, 1986; Cronin and Page, 1988), viz., return on capital. Published data on firm performance was obtained through Canadian Trade Index published by Canadian Manufacturers' Association, and the Canada Company Handbook published by *The Globe and Mail*.

The subjective approach to collecting information on firm performance consisted of asking respondents for their assessment of their organization's performance on various measures (Covin, Prescott and Slevin, 1990; Greenley, 1995; Slater and Narver, 1995). Business performance was measured using a modified version of an instrument developed by Gupta and Govindarajan (1984). The respondents were first asked to indicate on a 7 point Likert-type scale, where 1=of little importance and 7=of extreme importance, the importance their organization attaches to various performance criteria. The respondents were then asked to indicate on a second 7-point Likert-type scale, where 1=highly dissatisfied and 7=highly satisfied, the extent to which their organization was currently satisfied with their performance on each of the same performance criteria. For each performance measure, a weighted average was computed by multiplying the "satisfaction" score with the "importance" score. Appendix A contains the items used in the study.

DATA ANALYSES

To examine the influence of TMT risk taking on the market orientation-performance relationship under conditions of high and low market turbulence, high and low technological turbulence and high and low competitive intensity, the sample was first divided into two groups along each of the three environmental conditions of market turbulence, technological turbulence and competitive intensity. Firms that were in the top one-third and bottom one-third of the score along these three dimensions were grouped as high and low. Since the research objective was to examine the influence of TMT risk taking on market orientation-performance relationship under high and low levels of these conditions, it appears reasonable to examine the impact under two extremes of these

environmental conditions. The relationship was then tested using moderated multiple regression analysis (MMR) (Arnold, 1982, Sharma, Durand, and Gur-Arie, 1981). The procedure requires the introduction of a multiplicative interaction term into the regression equation. Accordingly, a multiplicative interaction term was created by multiplying the value of market orientation with the values of TMT risk taking, the hypothesized moderator. A series of equations were built and tested by estimating the following regression equation:

$$Y=b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2 + e$$

where Y is the performance measure (e.g., return on capital, profit margin), X_1 is market orientation, X_2 is risk taking, the moderator variable, and where X_1X_2 is the multiplicative interaction term (the cross product of the independent and moderator variable, market orientation and TMT risk taking). In each equation, performance measures were simultaneously regressed on market orientation, risk taking and the interaction term.

RESULTS

Table 1 presents the mean, standard deviation and the correlation of the study variables.

Table 1: Mean, Standard Deviation and Correlation of Variables

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12
1	Market Orientation	5.33	0.88	**.93**										
2	Market Turbulence	3.45	1.18	.43**	**.87**									
3	Competitive Intensity	4.71	1.08	.26*	.29*	**.86**								
4	Technological Turbulence	4.73	1.43	.07	.46**	.26*	**.85**							
5	TMT Risk Taking	4.20	0.99	.31**	.34**	.19	.32**	**.84**						
6	Revenue Increase	27.04	10.11	.32**	.07	-.12	-.17	.05	--					
7	ROC (Subjective)	27.71	10.82	.25*	-.11	-.08	-.27**	-.07	.51**	--				
8	Profit Margin	27.11	10.28	.32**	.09	-.14	-.24*	-.08	.68**	.75**	--			

Table 1: Mean, Standard Deviation and Correlation of Variables

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12
9	Customer Retention	31.71	11.57	.47**	.20	.05	.07	.06	.28*	.36*	37**	--		
10	ROI	25.62	10.81	.38**	-.02	.07	-.11	.12	.43**	.71**	.64**	.36**	--	
11	ROC (Archival)	8.92	17.78	.31**	-.14	-.04	-.15	-.22	.25*	.37**	.30*	.17	.29*	--
Size	4.25	1.35	.19	.25*	.23	.05	-.08	.28*	.14	.15	.31**	.10	.26*	--

n=166, reliability coefficients are presented in the diagonal, **p<.001, *p<.01

Tables 2, 3, and 4 tabulate the results of the multiple moderated regression analyses for each of the three moderator variables.

Table 2: Results of Multiple Moderated Regression Analysis
TMT Risk Taking, Market Orientation and Performance

	Performance Variables					
Independent Variables	Revenue Growth	Return on Capital	Profit Margin	Customer Retention	Return on Investment	ROC (Archival)
High Market Turbulence [(a)]						
Market Orientation	.69**	.57**	.45**	.42**	.50**	.63**
TMT Risk Taking	1.76	.14	2.19*	-.58	.12	-.62
Interaction Term	.25*	.36*	.43**	.25	.05	.32*
R^2	.58	.45	.46	.24	.29	.51
Adjusted R^2	.53	.39	.40	.15	.21	.45
F-value	12.45***	7.36**	7.36**	2.79	3.71^{+}	9.20***
Low Market Turbulence [(b)]						
Market Orientation	.49**	.71**	.56**	.38**	.50**	.77**
TMT Risk Taking	-.35	-.53	.15	.03	.17	-1.62*
Interaction Term	.21	.14	.15	.24	-.22	-1.58*
R^2	.28	.51	.33	.18	.25	.67
Adjusted R^2	.20	.46	.26	.09	.16	.63
F-value	3.56^{+}	9.63**	4.50^{+}	2.09	2.83	17.51***

[(a)]n=34 , [(b)]n=42. *p<.001 **p<.01 $^{+}$p<.05

Table 3: Results of Multiple Moderated Regression Analysis
TMT Risk Taking, Market Orientation and Performance

	Performance Variables					
Independent Variables	Revenue Growth	Return on Capital	Profit Margin	Customer Retention	Return on Investment	ROC (Archival)
High Technological Turbulence [(a)]						
Market Orientation	.40**	.42**	.40**	.18	.72**	.42**
TMT Risk Taking	.05	-.45	-.02	-.24	-.40	-.34
Interaction Term	.44*	.34*	.28^{+}	.30*	.21^{+}	.23^{+}
R^2	.17	.29	.23	.12	.57	.23
Adjusted R^2	.13	.26	.20	.05	.55	.20
F-value	4.3*	8.96**	6.62**	2.98	28.79***	6.53**
Low Technological Turbulence [(b)]						
Market Orientation	.57**	.43*	.61**[t]	.30**	.64*	.45
TMT Risk Taking	-.35^{+}	-.35	.57	-.09	-.14	.67
Interaction Term	.63	.81	-.55**	.63	.40	.58*
R^2	.41	.27	.56	.11	.42	.41
Adjusted R^2	.36	.21	.52	.04	.38	.36
F-value	8.38*	4.80*	16.26***	1.52	9.25**	8.91**

[(a)]n=68 , [(b)]n=52. *p<.001 **p<.01 $^{+}$p<.05

Results of the study generally confirm the hypotheses that TMT risk taking will moderate the relationship between market orientation and performance under conditions of high market turbulence and high technological turbulence, since the moderator effect was noted for all but two of the performance measures. However, the support for TMT moderating the market orientation-performance relationship under conditions of high competitive intensity was limited to only one performance measure return on capital (subjective measure). Results also generally provided support for the hypotheses that TMT risk taking will have no moderating effect on market orientation-performance relationship under conditions of low market turbulence, low technological turbulence and low competitive intensity. However, it was interesting to note that a negative moderator effect

was present in terms of profit margin under conditions of low competitive intensity and in terms of return on capital and profit margin under conditions of low technological turbulence.

Table 4: Results of Multiple Moderated Regression Analysis TMT Risk Taking, Market Orientation and Performance

	Performance Variables					
Independent Variables	Revenue Growth	Return on Capital	Profit Margin	Customer Retention	Return on Investment	ROC (Archival)
High Competitive Intensity [(a)]						
Market Orientation	.45**	.44**	.37*	.60**	.55*	.42*
TMT Risk Taking	.13	-1.35*	-.53	-.15	-.40	-.54
Interaction Term	.17	1.59**	.62	.28	.74	.65
R^2	.22	.34	.14	.32	.28	.17
Adjusted R^2	.15	.28	.07	.26	.22	.10
F-value	3.28*	5.87**	1.86	5.30*	4.44*	2.38**
Low Competitive Intensity [(b)]						
Market Orientation	.52**	.49**	.49*	1.08*	.64*	1.26*
TMT Risk Taking	-.11	-.71	-.61	.61	-.21	-1.40
Interaction Term	-.23	.08	.72	-.72	.12	-2.07*
R^2	.31	.25	.25	.25	.24	.27
Adjusted R^2	.26	.20	.20	.20	.18	.22
F-value	6.18*	4.81*	4.24*	4.74*	4.32*	5.53**

[(a)]n=42 , [(b)]n=45. *p<.001 **p<.01 [+]p<.05

DISCUSSION

The results of this study provide support to the assertion that TMT risk taking plays an important role in the market orientation-performance relationship (Jaworski and Kohli, 1993). However, it is clear that the positive impact of the TMT risk taking on company performance is contingent on environmental conditions. This is rooted in the industry/organization (I/O) approach

to strategic management, which emphasizes external conditions as key drivers of organizational strategy. Based on the results of this study it can be concluded that it may be perfectly appropriate to be risk averse under stable environmental conditions and concentrate on the "served market" where competitive advantage can be maintained by focusing on customer satisfaction (Slater and Narver, 1998). To the extent that risk taking has a negative coefficient for many of the performance measures under conditions of low market turbulence, low technological turbulence and low competitive intensity, it appears that perhaps sticking to a well crafted conservative plan may be the best way to remain market oriented under such conditions. In other words, the key in such conditions is not to seek "blue ocean" market space, but instead to focus on the more mundane, yet profitable 'red ocean" space. In addition, since risk taking negatively moderates the market orientation-performance relationship as measured by return on capital (archival data) it makes one believe that deviating far from current successful practices based on the chance that new products and/or services may be successful may hurt profitability because these deviations come at a cost that may not be recouped.

On the other hand a number of positive moderator effects that were noted, particularly under conditions of high market turbulence and high technological turbulence provide support for the need for TMT risk taking in order to optimize the impact of market orientation on company performance. The impact of TMT risk taking behavior, on market orientation-performance relationship under conditions of high competitive intensity however appears to be minimal, since support was noted only in terms of one performance measure, growth in revenue. A possible explanation for this could be that in situations of competitive slugfests financial performance is very often a victim. Thus, even though the revenue of firms may increase because management is wiling to take high-risk decisions, the payoff in form of improved profitability is not there, because of firm's inability to appropriate the gains. Over all, it appears reasonable to conclude that in order to successfully implement a market orientation, it is necessary to have a TMT that is willing to take risks as market turbulence, competitive intensity and technological turbulence increase. It appears that in order to maintain a competitive advantage in an increasingly turbulent environment, it will be necessary to move away from satisficing existing customer needs to satisfying latent needs (Slater and Narver, 1998) which often times may require making riskier decisions. The mandate for the TMT in such conditions is not to be beholden to the served markets, instead to identify possible disruptive innovations that may be more attractive to the marketplace in the future.

The study's results must, however, be interpreted with caution because of the low response rate. While the time trend extrapolation test supported the representativeness of the sample, this is a limitation of the study. Replicative studies are necessary before one can be completely convinced of the study's findings.

Market orientation is an important impetus for strategic decisions. It forces the organization to systematically look outside the firm for key trends that may impact the firm. As a behavioral and cultural imperative, it is too important to ignore. However, it is also vital to note that rather than

march like lemmings to the siren song of market orientation, the organization's TMT must first conclude as to when and when not to be risk-shy to obtain full advantage of external information signals. It is only under specific market conditions that it pays to be risk-taking and embark on the quest for blue oceans.

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APPENDIX A
Scale Items

Environmental Conditions

1. In our kind of business, customers product/service preferences change quite a bit over time.
2. Our customers tend to look for new products/services all the time.
3. We are witnessing demand for our products/services from customers who never bought them before.
4. New customers tend to have product/service needs which are different from those of our existing customers.
5. We cater to many of the same customers that we used to in the past.
6. Competition in our industry is cutthroat.
7. There are many "promotion wars" in our industry.
8. Anything that one competitor can offer, others can match readily.
9. Price competition is a hallmark of our industry.
10. One hears of a new competitive move almost every day.
11. Our competitors are relatively weak.
12. The technology in our industry is changing rapidly.
13. Technological changes provide big opportunities to our industry.
14. A large number of new product/service ideas have been made possible through technological breakthroughs in our industry.
15. Technological developments in our industry are rather minor.

Market Orientation

Customer Orientation

1. Showing commitment to customers
2. Creating services/products that offer value for customers
3. Understanding customers needs
4. Having customer satisfaction a major objective
5. Measuring customer satisfaction
6. Providing customers with follow up calls/services

Competitor Orientation

1. People in charge of various services/product divisions discuss competitor information
2. People in charge of various services/ product divisions respond rapidly to competitors' actions
3. Top managers discuss competitors' strategies
4. Top managers target opportunities for competitive advantage

Inter-functional Coordination

1. Various service/product divisions/departments work close together to meet customer's needs
2. Various units share business information with each other
3. Business strategies are integrated between different units
4. All units work together in offering value to the customers
5. Different units/departments share resources with each other

Long-Term Focus

1. Adopting long term focus in matters of profits
2. Requiring rapid pay back of new products/services
3. Aiming for positive profit margin in the long run
4. Discovering and implementing new value for customers
5. Trying to overcome any deficiency relative to competitors

Survival and Growth/Profit Emphasis

1. Profit performance is measured for each unit/department
2. Top managers emphasize improved performance
3. All units/departments are required to be profitable
4. Emphasis on earning revenues to cover long range expenses
5. Satisfying all key constituencies in the long run

Performance

1. Overall increase in revenue of different units
2. Return on capital
3. Overall profit margin of various units
4. Return on investment made in new products/services
5. Ability to retain customers
6. Developing innovative new products/services
7. Analyzing competitive offerings and offering imitative new products/services
8. Defending existing products/services from competitive attacks