Volume 1 **ISSN Pending**

ACADEMY OF STRATEGIC MANAGEMENT JOURNAL

The official Journal of the

Academy of Strategic Management

William T. Jackson, Editor
The University of Texas of the Permian Basin

Academy Information
is published on the Allied Academies web page
www.alliedacademies.org

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Whitney Press, Inc.
Printed by Whitney Press, Inc.
PO Box 1064, Cullowhee, NC 28723
www.whitneypress.com

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LETTER FROM THE EDITOR

We are pleased to present the first issue of the *Academy of Strategic Management Journal* (ASMJ). While the field of strategic management has been addressed in other journals under the umbrella of the Allied Academies, this will be the first journal within the organization dedicated specifically for that purpose. We especially would like to express our sincere appreciation to the Roden family for their generous support of the *Journal*.

The Academy of Strategic Management is an affiliate of the Allied Academies, Inc., a non-profit association of scholars whose purpose is to encourage and support the advancement and exchange of knowledge. To this end, the ASMJ will be a primary vehicle. The editorial mission of the *Journal* is to advance the field of strategic management and the relationship this area has on the success of any organization. Thus, the journal publishes high quality, theoretical and empirical manuscripts pertaining to this field of knowledge. Not only is our intent to advance the discipline, but also to publish articles that have value to practitioners and scholars around the world.

The manuscripts contained in this initial volume have been double blind refereed. The acceptance rate for manuscripts in this issue, 25%, conforms to our editorial policies.

Our editorial review policy maintains that all reviewers will be supportive rather than destructive, helpful versus obtrusive, mentoring instead of discouraging. We welcome different points of view, and encourage authors to take risks with their research endeavors.

The editorial policy, background and history of the organization, addresses and calls for conferences are found at www.alliedacademies.org. In addition, the web site is continuously being updated and provides information concerning the latest information on the association.

Thank you for your interest in the organization. I look forward to hearing from you at any time.

William T. Jackson, Editor
The University of Texas of the Permian Basin

Manuscripts

AN AGENCY COMPARISON OF THE KEIRETSU AND THE JAPANESE INDEPENDENT FIRM

Peter Wright, The University of Memphis
Stephen P. Ferris, University of Missouri - Columbia
Atulya Sarin, Santa Clara University

ABSTRACT

In this study, we suggest that the independent Japanese firm may be more shareholder oriented and suffer from less agency conflict than the keiretsu affiliated firm. Further, we reason that a number of factors - - executive ownership, blockholder investments, institutional equity stakes, and debt financing - - may enhance the degree of principal orientation and reduce agency costs in the independent but not the keiretsu company. The empirical findings are generally supportive of our expectations.

INTRODUCTION

Agency theory has been applied to the analysis of numerous organizational relationships and in various contexts. The concern of agency theory has been the conflicts that arise between agents and principals. When this theory is applied to the study of firms, this conflict becomes that between managers and the shareholders. Conflicts of interest are inherent in all contractual arrangements involving principals and agents. Whereas many of the studies of agency theory have focused on firms based in the United States, in this study we analyze a sample of Japanese firms. In our analysis, we question whether the Japanese keiretsu (or business group) experiences more agency conflict due to a lower shareholder orientation relative to a set of independent Japanese firms. We emphasize, however, that the contribution of our work is not the replication of previous findings. Although it may be beneficial to replicate agency-oriented North American studies in other environments, such efforts provide only limited insights. A comparative analysis of agency conflicts between keiretsu affiliated and independent Japanese firm has not been undertaken previously in the literature.

A keiretsu represents a horizontally and vertically connected group of businesses with interlocking board members who are senior managers of member companies. Such an organizational structure allows the keiretsu companies to influence the behavior of the membership. Companies within the keiretsu can additionally exert influence because they have minority but significantly valuable mutual ownership in each other. Keiretsu members are also reciprocally impacted because they often engage in joint ventures with each other as well as signing multilateral purchase agreements.

We speculate that lower levels of shareholder orientation and heightened agency problems in the keiretsu may emanate from a behavioral emphasis on the viability of the keiretsu community. Moreover, we emphasize that the concern of the community revolves around the protection of the

weakest members of the business grouping. Whereas we presume that agency costs may arise from a collectivist predisposition in the keiretsu structure, we alternatively assume that agency conflicts may result from a self-serving motive in the Japanese independent firm. Consequently, as discussed subsequently, we contend that the Japanese independent firm does have the potential to be governed in the best interests of shareholders, but not the keiretsu company.

For the purpose of this study, we contend that more security analysts may be enticed to follow firms that are shareholder oriented, with lesser potential for agency conflict. That is because the common stocks of such firms are easier to market to potential investors (Chung & Jo, 1996; Gross, 1982). Indeed, security analysts serve as facilitators in the marketing and sales of stocks to customers. Hence, "an important responsibility of security analysts who are employed by brokerage houses is to help their organizations generate transactions with customers" (Chung & Jo, 1996, 496). Buyers of common stocks would prefer that analysts follow those firms that are shareholder oriented, with lower agency costs, since as investors they will benefit from holding the securities of such high quality firms. Moreover, because analysts provide information on the activities of managers and forecast firm performance, they can also reduce information asymmetries that may exist between investors and corporate insiders (Chung & Jo, 1996; Ferris & Sarin, 2000). Thus, as more analysts follow a firm, more information is available about the company, reducing the ability of managers to exploit private information for self-gain. In this sense, analysts also serve as external monitors of management, encouraging those activities that force a greater convergence between managerial and shareholder interests.

Hence, we use the extent of analyst following as a proxy for a shareholder-oriented firm with lower potential for agency costs. For reasons which will be provided, we contend that analyst following will be significantly related to factors that enhance shareholder orientation and lower agency conflicts for the independent firm, but not for the keiretsu company.

The remainder of this paper is organized into several sections. Initially, we present a literature review that leads to our hypotheses. Subsequently, we describe our research methodology, explaining our process for sample construction and our utilization of cross-sectional regression models. We then report our results, provide a discussion for their interpretation, and elaborate on the implications of our work. Finally, we provide our concluding remarks, identify the limitations of this study, and discuss directions for future research.

LITERATURE REVIEW AND HYPOTHESES

In the ensuing sections we review the related literature and develop our empirical hypotheses. Each hypothesis is preceded by an examination of the literature specifically related to that hypothesis. As suggested earlier, our proxy for a shareholder-oriented enterprise with less potential for agency conflict is the number of security analysts following the enterprise. Consequently, all of our hypotheses are framed in the context of a company's analyst following.

The existing literature suggests a number of factors that can effect the degree of a firm's shareholder orientation and its potential for agency conflict. The factors that we will subsequently examine include managerial equity ownership, blockholder equity investments, institutional equity ownership, and the extent of debt financing. We speculate, however, that these factors will have an

impact in the context of a self-serving, but not a collectivist agenda. The collectivist regime of the keiretsu group makes the survival of the total keiretsu system its overwhelming priority. Consequently, the efforts of the collectivity become focused on buffering the membership against external threats. An emphasis on the protection of the collectivity against outside thrusts, however, will not only guard against external threats, but may also dilute the impact of various shareholder orientation and agency-related factors. Hence, we do not expect that analyst following will be significantly associated with factors that enhance shareholder orientation and lower agency costs for the keiretsu company. Alternatively, we expect that analyst following will be significantly and positively related to these factors for the independent firm. Further elaborations on these contentions are provided subsequently.

MANAGERIAL OWNERSHIP

One technique to control potential agency conflict and enhance shareholder orientation within the firm is the granting of equity stakes to managers. A number of authors have concluded that shareholder orientation intensifies and agency problems become less relevant with higher levels of managerial ownership (e.g., Bethel & Liebeskind, 1993; Jensen & Meckling, 1976; Kroll, Wright, Toombs & Leavell, 1997; Oswald & Jahera, 1991). In these studies, researchers contend that agency costs decline as managerial ownership rises, since the interests of senior management and shareholders will begin to converge. Consequently, the degree of Japanese managerial ownership is anticipated to be related to the extent of shareholder orientation and reduced potential for agency conflict (Hwang, Snider & Bird, 1995; Kaplan, 1994; Prowse, 1992).

We argue, however, that managerial equity ownership may not significantly constrain the agency conflict present in the collectivist internal regime of a keiretsu. That is because keiretsus are unlikely to be managed primarily for the benefit of any one of their member's shareholders or owner-managers. Rather, the security orientation of the keiretsu's interlock promotes strategies that emphasize the safety and survival needs of the total membership (Kester, 1992; Sheard, 1994). Keiretsu membership, consequently, may be costly for each firm's owners and owner-managers because membership involves a constant stream of implicit insurance premium payments for the organization's economic safety net. This discussion is consistent with Shimizu's (1980) argument that the practice of give-and-take prevalent in the Japanese culture is meant to ensure the safety and survival needs of the collectivity, even if this practice is detrimental to the interests of any one entity.

The preceding contentions are compatible with other assertions regarding the potential detrimental impacts of the collectivist predisposition of interlocks [possible alliances for a conspiratorial elite (Jay, 1967; Ornstein, 1984), a conduit for amalgamation of private information not available to outsiders (Burt, 1980), or detrimental collusion among organizations (Dooley, 1969)]. Our conjecture, consequently, is that the keiretsu organizational structure may have a lower level of shareholder orientation and inherently involve agency problems across member firms because of the collectivist predisposition of its interlocking boards. With such an arrangement, member companies of keiretsus and their executives/ board members may be more concerned with the viability of the collectivity and less likely to be owner or owner-manager driven relative to any

one firm (Kester, 1992; Rohlen, 1973; Sheard, 1994; Smith, 1997), thereby, nullifying the impact of managerial ownership.

Further, a lower level of shareholder orientation and a significant potential for agency conflict may prevail in the keiretsu structure because of mutual purchases and joint ventures. These activities are also designed to protect the interests of the collectivity rather than those of the individual enterprise. Consequently, less shareholder orientation and greater agency conflict resulting from the collectivist nature of a keiretsu may not be resolved with higher levels of managerial equity ownership.

For the independent Japanese firm, however, reduced shareholder orientation and significant agency costs may result from the activities of a self-serving internal regime. Equity holding by executives in this setting broadens the set of managerial self-interests to include those of the owners. Therefore, a greater level of equity ownership by the senior management of the independent Japanese firm is likely to be associated with an increased owner orientation and reduced agency conflict. Given our earlier reasoning, we expect that the equity holdings of senior management will be significantly and positively related to the level of analyst following of the independent firm, but not the keiretsu enterprise. Since we are limited to data on chairmen and presidents, we frame our following hypothesis with reference to them:

H1: The equity holdings of corporate chairmen and presidents will be positively related to the number of stock analysts following the independent firm, but not for keiretsu companies.

BLOCKHOLDERS

Blockholders are individuals, groups, or families who own large amounts of a firm's equity. Blockholders, in some cases, may be passive investors (McConnell & Servaes, 1990; Wright, Ferris, Sarin & Awasthi, 1996). In this situation, they may be less effective in promoting a firm's shareholder orientation or confronting agency problems. Mintzberg (1983) has referred to such passive investors as detached owners. Alternatively, Shleifer and Vishny (1986) and Bethel and Liebeskind (1993) have argued that blockholders may be effective in increasing the level of shareholder orientation and lowering agency costs. Moreover, empirical studies by Holderness and Sheehan (1985), Mikkelson and Ruback (1985, 1991), and Barclay and Holderness (1990) have found that equity blockholding is directly related to owner orientation, but inversely related to agency costs.

In Japan there is a stronger tendency for managers to dominate corporate affairs than in the United States (Smith, 1997; Yoshimura & Anderson, 1997). Consistent with our previous discussion, this tendency is particularly pronounced in the context of interlocks, as the management of each firm in a keiretsu structure is coordinated with that of other member firms (Gerlach, 1992; Johnston, 1995). Hence, the impact of concentrated ownership may not be significant in boosting owner orientation or reducing agency problems for a keiretsu firm. In this setting, the decisions of the collectivity may be based on nonmarket considerations, such as the well-being of a weaker partner or the "needs of the multi-firm community as a whole" (Lincoln, Gerlach & Ahmadjian, 1996, 69). Note that, under these circumstances, the management of each of the keiretsu's

companies presumably has the support of a collectivist interlock where pressures exerted by blockholders could be resisted. Therefore, because the keiretsu structure may have the capability to resist a strong shareholder orientation, we do not hypothesize that blockholder equity ownership will be associated with stock analyst following.

Independent Japanese companies, however, may have a greater potential to be owner oriented with reduced agency conflict. While blockholder ownership may be ineffective in controlling a collectivist regime, such significant external ownership may be highly effective in constraining a firm's self-serving internal regime (Bethel & Liebeskind, 1993; Shleifer & Vishny, 1986). Since an independent firm's management lacks the support of a collectivist interlock where pressures exerted by blockholders could be resisted, we anticipate that equity blockholdings in independent companies will enhance the level of owner orientation and reduce agency costs. Thus, we expect blockholder ownership to be directly related to analyst following for independent companies, but not for the keiretsu firms:

H2: The equity holdings of blockholders will be positively related to the number of stock analysts following the independent firm, but not for keiretsu companies.

INSTITUTIONAL INVESTORS

Institutional investors include pension and retirement funds, mutual funds, insurance companies, and other money managers. Although select observers have argued that institutional ownership may not be a positive influence on the level of shareholder orientation of corporations (Chaganti & Damanpour, 1991; Drucker, 1986; Graves & Waddock, 1990; Mitroff, 1987; Porter, 1992), others have theoretically and empirically concluded that institutional investors increase owner orientation and reduce the potential for agency conflict (Allen, 1993; Barclay & Holderness, 1990; Hansen & Hill, 1991; Hill & Snell, 1989; McConnell & Servaes, 1990; Mikkelson & Ruback, 1985, 1991; Wright et al., 1996). Moreover, Brickley, Lease, and Smith (1988) document that institutional investors boost owner orientation and lower agency conflict by opposing managerial decisions that are harmful to shareholders. Additionally, Huddart (1993) asserts that there is no substitute for the activities of large external equityholders to confront agency costs and promote shareholder interests.

We likewise subscribe to the notion that institutional ownership of corporate equity may enhance owner orientation and lessen agency conflict. In Japan, however, the predisposition of managers to dominate corporate affairs, particularly within the keiretsu, may offset the impact that institutional investors could otherwise exert (Gerlach, 1992; Johnston, 1995). Consistent with Lincoln and colleagues (1996), we emphasize that the strategies of the collectivity may be based on such considerations as the requirements of the total community or the troubled member companies rather than the needs of an individual enterprise. Thus, large external shareholders may not be capable of effectively confronting the abusive predispositions of a business group's collectivist regime. Consequently, we do not anticipate the level of institutional ownership will be systematically related to analyst following within the keiretsu.

Institutional investors, however, may be influential with respect to the Japanese independent firms since an independent firm can be shareholder oriented with a reduced potential for agency

conflict. Indeed, the empirical implication of a number of works is that concentrated external equity stakes may be effective in enhancing a firm's shareholder orientation and controlling the firm's self-serving internal regime (e.g., Barclay & Holderness, 1990; Bethel & Liebeskind, 1993; Kroll, et al., 1997; Wright, et al., 1996). Moreover, the executives of the independent Japanese firm can not rely on a collectivity of interlocking senior managers to resist the impact of institutional investors. Therefore, we expect the number of analysts following a firm may be directly related to the degree of institutional equity ownership in independent firms, but not for the keiretsu companies. We expect this for Japanese as well as foreign institutional owners:

H3a:	*The equity holdings of Japanese institutional investors will be directly related to the number of analyst following the independent firm, but not for keiretsu companies.*
H3b:	*The equity holdings of foreign institutional investors will be directly related to the number of analyst following the independent firm, but not for keiretsu companies.*

DEBT FINANCING

Because of the fixed expenses associated with debt financing, the free cash flow available to managers declines as leverage increases. This has the potential to increase shareholder orientation and reduce agency conflict since less funds are subsequently available for managers to undertake nonvalue-maximizing projects (Gibbs, 1993; Jensen, 1986). In this context, Gibbs (1993) and Jensen (1986) have argued that increases in discretionary funds (i.e., free cash flow) lower a firm's level of shareholder orientation and boost agency problems while reductions in such funds will promote the interests of owners and reduce agency conflicts. Moreover, with higher financial leverage, newer debt issues will require increasingly restrictive covenants (Chung & Wright, 1998). These covenants serve to reduce the potential for managerial abuse. Additionally, Gibbs (1993) and Jensen (1986) assert that management possesses incentives to minimize the bankruptcy risk that higher corporate leverage may elicit. The implication of this assertion is that with higher leverage, executives will be less able to engage in self-serving behavior because of greater bankruptcy risk.

In Japan, however, debt levels within a keiretsu are determined by the need for funds consistent with keiretsu goals (Aoki, 1988; Hoshi, Kashyap & Scharfstein, 1991; Smith, 1997). In this setting, the debt level for any one member firm may be decoupled from any considerations of an optimal capital structure. Whereas shareholder orientation may not be able to influence a firm's debt decision, safety considerations could significantly affect debt policies. If a keiretsu member is financially distressed, loans may be rolled over and new financing arranged (Hoshi, et al., 1991). Additionally, keiretsu partners may be supportive by purchasing exclusively the outputs of the troubled firm at above market prices (Fruin, 1992; Lincoln, et al., 1996). Further, Franko (1996) observes that stronger keiretsu participants have a great deal of financial slack, thus, diminishing the importance of corporate debt policy. The degree of debt financing, consequently, may be unrelated to the interests of owners or the agency problem of keiretsu members. Hence, we do not anticipate that debt levels of these enterprises will be associated with analyst following.

For independent firms, however, we anticipate debt financing will increase shareholder orientation and reduce the potential for agency conflict (Jensen, 1986; Phan & Hill, 1995). More specifically, the higher financial leverage will reduce the free cash flow of Japanese independent firms, and thus constrain senior executives from implementing detrimental strategies. Also, with higher corporate debt, senior managers may be less predisposed to engage in self-serving practices because of increased bankruptcy risk (Gibbs, 1993; Jensen, 1986). Thus, we expect the debt levels of the independent Japanese firms may be positively associated with analyst following. Based on the preceding discussion, we specify the following hypothesis:

H4: The extent of debt financing will be directly related to the number of analyst following the independent firm, but not for keiretsu enterprises.

SAMPLE CONSTRUCTION AND METHODOLOGY

Because of the extensive hand collection of data necessary for completion of the empirical methodology, our sample is constructed from several sources for a two-year sample period, 1998-2000. More specifically, our choice of the sample period follows the timing of the fiscal year for most Japanese firms and begins on April 1, 1998 and terminates on March 31, 2000. Requiring all of our sample firms to have the same fiscal year allows us to estimate the year-end market value of the firm at the same point in calendar time. We obtain 1,112 pooled time-series, cross-sectional observations, across 556 different firms.

Our sources of data include the Japan Company Handbook, the Pacific-Basin Capital Markets (PACAP) database and the Institutional Brokers Estimate System (IBES) Summary File. The 556 different firms represented in our database represent the intersection of these three different databases. Data on managerial ownership, blockholders, and institutional investors are obtained from the Japan Company Handbook. The calculation of financial measures is based on data contained in the PACAP database. The number of analysts monitoring a specific firm is obtained from the IBES Summary File. We exclude financial companies and public utilities from our sample to avoid the confounding effects of regulation. The Japanese Industry Code, which is similar to the U.S. Standard Industrial Classification (SIC), is used to identify the firms operating in regulated industries.

To classify firms as members of a keiretsu, we use several sources. Our first source is the list of firms identified as keiretsu members by Nakatani (1984). A variety of other researchers such as Hoshi, Kashyap and Scharfstein (1991) and Prowse (1992) have also used Nakatani (1984) to classify the keiretsu status of Japanese firms. We then verify this initial keiretsu classification of our sample firms with the listings contained in Miyashita and Russell (1994) and Ohsono (1995). Our use of several sources allows us to avoid potential bias in our empirical results due to a misclassification in the firm's keiretsu status. We classify 134 firms in our sample as keiretsu members and 422 firms as independent enterprises. But because we pool our data on a time-series basis, we obtain 268 data observations for keiretsu firms and 844 observations for independent firms.

Our empirical methodology involves estimating a pooled time-series, cross-sectional regressions relating analyst following to a set of firm financial and ownership variables. Consistent with the implication of the arguments of Chung and Jo (1996), Ferris and Sarin (2000), and Gross (1982), we utilize the number of analysts following a firm as our proxy for the degree of shareholder orientation and reduced agency conflict within the firm. We include two control variables in our regression analysis of the difference in shareholder orientation between the keiretsu and independent firm. The first is the firm's market value since analyst following tends to be positively influenced by firm size (Moyer, Chatfield & Sisneros, 1989). We also include a set of two-digit Japanese Industry Code dummies to control for possible industry effects in our results.

To ensure that our empirical methodology is consistent with the hypotheses as specified, we introduce a number of interactive variables into the regression analysis. The interactive variables are the product of a dummy variable for the firm's independent status and the particular variable of interest. To the extent that this interactive variable is statistically significant, it indicates that the independent firm experiences a significantly different level of a particular variable than the keiretsu firm. The statistical significance of a particular interactive variable thus becomes the test of any specific hypothesis.

Because of the potential for multicollinearity among the independent variables, we perform several diagnostic tests. First, we notice that our regression results fail to produce a profile that is consistent with high multicollinearity. Gujarati (1992) notes that high R-squares simultaneous with few significant t-statistics serve as a classic sign of multicollinearity. Indeed, our results are the opposite, with low R-squares and a number of significant coefficient estimates. Estimation of a set of pairwise correlations between the independent variables produced no correlation coefficient in excess of 0.43, far below the 0.80 value suggested as an indicator of multicollinearity (Gujarati, 1992). Finally, we estimate a set of auxiliary regressions, which involves regressing each of the independent variables against the remaining independent variables. We then test each for the corresponding R-squares for statistical significance. The uniform insignificance of these R-squares provides further evidence of the relative lack of multicollinearity in the sample.

RESULTS

In Table 1 we report the means and medians of the independent variables used in our regression analysis. In this table we also present statistical testing of the significance of the difference in these variables between the keiretsu and independent firms. Specifically, we provide Student t-tests for the difference in means as well as a Wilcoxon z-statistic for the difference in medians.

In Table 2 we present the findings of our pooled time-series, cross-sectional regression which relates the number of analysts to the various independent variables. The testing of our hypotheses regarding an independent firm will focus on the statistical significance of the interactive variables. The interactive variable between independent status and analyst following is significantly and positively associated with managerial ownership, while the noninteractive variable is insignificant. Together, these results support our first hypothesis that managerial equity ownership is related to analyst following, but only for independent firms.

Table 1: Descriptive Statistics

	All Firms		Independent Firms		Keiretsu Firms		Probability Values	
Independent Variables	Mean	Median	Mean	Median	Mean	Median	t-statistic[1]	Wilcoxon[2] Z
Managerial Ownership	6.83%	5.19%	6.94%	5.25%	4.74%	3.81%	0.02	0.00
Blockholders	14.02%	7.98%	13.49%	8.10%	14.99%	8.78%	0.39	0.45
Japanese Institutional Investors	15.26%	14.22%	14.89%	13.57%	16.69%	16.33%	0.00	0.00
Foreign Institutional Investors	4.49%	2.99%	4.61%	3.09%	4.16%	2.59%	0.61	0.58
Debt Financing	23.10%	19.60%	21.20%	19.70%	21.10%	19.30%	0.87	0.94
Market Value	339.70	144.10	349.60	140.70	293.80	185.70	0.07	0.09

[1] t-statistic represents the probability that the difference between means of the independent and the keiretsu firm is zero.
[2] Wilcoxon represents the probability that the difference between medians of the independent and keirestu firm is zero.
[3] In millions of dollars.

Table 2: Relationship of Analyst Following with Select Variables: Aggregate Sample

Item	Independent Variable	Estimated Coefficient	t-statistic
Managerial	MGR	0.112	1.222
Equity Holdings	MGR x INDEP	0.039	2.509**
Blockholder	BLOCK	-0.061	-1.017
Equity Holdings	BLOCK x INDEP	0.004	0.459
Japanese Institutional Equity	JAPINST	0.037	1.239
Holdings	JAPINST x INDEP	0.025	2.766**
Foreign Institutional Equity	FORINST	0.041	0.967
Holdings	FORINST x INDEP	0.019	2.399**
Debt Ratio	DEBT	0.271	1.028
	DEBT x INDEP	0.983	2.719**
Firm's Market Value	MKTVALUE	0.943	3.762**
Adjusted R^2: 0.31			F-Statistic: 12.52

**P<.01
INDEP is a dummy variable that assumes a value of 1 if the firm is an independent, otherwise it is 0.
For purposes of brevity in reporting, the industry dummy variable coefficients are not reported.

We fail to observe statistically significant coefficients for either the interactive or noninteractive blockholding variables. We interpret these findings as consistent with the argument that blockholders may be passive investors in their firms (McConnell & Servaes, 1990; Wright, et

al., 1996). Thus, our empirical results do not support hypothesis 2. We find that the impact of the interactive variable between independent status and analyst following is significantly and positively related to institutional investors for both Japanese and foreign investors. The noninteractive terms are insignificant for both measures for institutional equity ownership. These findings are supportive of hypotheses 3a and 3b.

Our results also provide support for the role of debt in reducing agency conflict within the independent firm. We find that the interactive term between the firm's independent status and the firm's debt ratio (total debt standardized by the firm's total assets) is significant and positive, indicating a direct relation between analyst following and debt financing for the independent firm. The coefficient for the noninteractive measure of debt financing, however, is insignificant. Thus, our findings also support hypothesis 4.

Table 3: Relationship of Analyst Following with Select Variables: Matched Industry and Size Sample

Item	Independent Variable	Estimated Coefficient	t-statistic
	Intercept	3.712	5.892**
Managerial	MGR	0.117	0.973
Equity Holdings	MGR x INDEP	0.058	2.498**
Blockholder	BLOCK	-0.072	-1.029
Equity Holdings	BLOCK x INDEP	0.004	0.459
Japanese Institutional Equity	JAPINST	0.047	1.227
Holdings	JAPINST x INDEP	0.033	2.813**
Foreign Institutional Equity	FORINST	0.041	0.899
Holdings	FORINST x INDEP	0.025	2.419**
Debt Ratio	DEBT	0.312	1.371
	DEBT x INDEP	0.123	2.659**
Firm's Market Value	MKTVALUE	0.712	4.112**
Adjusted R^2: 0.29			F-Statistic: 13.87

**P<.01
INDEP is a dummy variable that assumes a value of 1 if the firm is an independent, otherwise it is 0.
For purposes of brevity in reporting, the industry dummy variable coefficients are not reported.

Although the data set is a pooled time-series, cross-sectional sample, there is a large imbalance between the number of independent firms relative to keiretsu-affiliated firms. Consequently, as a robustness test of our regression model in the presence of such a skewed sample, we construct a set of matched pair subsamples for further analysis. Specifically, for each keiretsu firm we identify an independent firm operating within the same industry based on Japanese industry codes. We then further match on firm size, selecting from among the possible industry matches that firm whose total asset value in closest to that of the keiretsu firm. This procedure results in a

matched sample of 134 keiretsu and 134 independent firms. We also construct another set of matched pair subsamples on the basis of industry classification and risk. Given the wide acceptance of modern portfolio theory and the capital asset pricing model, we use the firm's beta as the measure of risk on which to match firms.

The regression results from our matched pair subsamples are presented in Tables 3 and 4. The findings are qualitatively the same as those obtained in Table 2. We find that managerial and institutional equity holdings as well as the use of debt are significant factors in explaining the extent of shareholder orientation and the control of agency conflict within the independent Japanese firm, but not the keiretsu company. Similar to the findings for the aggregate sample, blockholders do not appear to increase shareholder orientation or reduce agency conflict within the firm.

Table 4: Relationship of Analyst Following with Select Variables: Matched Industry and Risk Sample

Item	Independent Variable	Estimated Coefficient	t-statistic
	Intercept	3.987	5.128**
Managerial	MGR	0.129	1.117
Equity Holdings	MGR x INDEP	0.061	2.517**
Blockholder	BLOCK	-0.072	-1.417
Equity Holdings	BLOCK x INDEP	0.002	0.853
Japanese Institutional Equity	JAPINST	0.057	1.207
Holdings	JAPINST x INDEP	0.041	2.548**
Foreign Institutional Equity	FORINST	0.041	0.793
Holdings	FORINST x INDEP	0.032	2.398**
Debt Ratio	DEBT	0.207	1.219
	DEBT x INDEP	0.342	2.687**
Firm's Market Value	MKTVALUE	0.418	3.892**
Adjusted R^2: 0.32			F-Statistic: 13.95

**P<.01
INDEP is a dummy variable that assumes a value of 1 if the firm is an independent, otherwise it is 0.
For purposes of brevity in reporting, the industry dummy variable coefficients are not reported.

DISCUSSION AND IMPLICATIONS

Various works have advanced the virtues of the keiretsu organization. To some observers the merits of the Japanese grouping are so compelling that the keiretsu has been promoted as a model of success and worthy of adoption by the U.S. firms (Anchordoguy, 1989; Aoki, 1990; Furguson, 1990; Goto, 1982; Smith, 1990). Other studies, however, have questioned the merits of the keiretsu structure. Although empirical examinations of the keiretsu are limited (Lincoln, et al., 1996), the keiretsu has nevertheless been criticized on grounds that it penalizes the strong members

of the group by equalizing their prospects with those of the weaker firms (Hoshi, et al., 1991; Smith, 1997). Other scholars have also criticized keiretsu decision-making as driven by noneconomic factors, thereby detracting from the interests of shareholders of member firms (Kaplan & Bernadette, 1994; Kester, 1992; Lincoln, et al., 1996; Lincoln, Gerlach & Takahashi, 1992). These arguments suggest that keiretsu shareholders may not be as well off as those of independent enterprises.

Given these conflicting views in the literature (as well as an absence of comparative analyses of the Japanese independent and keiretsu firms), this study provides original evidence that the independent Japanese firm can be more oriented towards shareholder interests than the keiretsu affiliated company. We have proposed that agency conflict in the keiretsu may result from its collectivist nature. The collectivity, in this setting, is driven by an interconnected web of business relations (Fruin, 1992; Lincoln, et al., 1996; Yoshimura & Anderson, 1997) which emphasizes the viability of the keiretsu community. The concern of the community with survival issues, however, does not elicit behavior that promotes the best interests of shareholders of the member companies. Rather, the concern of the collectivity revolves around the protection of the weakest members of the business grouping. Under these circumstances, market forces and capital flows may be seriously distorted, at a cost to the owners of capital.

Our study contains a number of implications concerning the assumptions underlying agency related issues when applied to Japanese firms. Moreover, we suggest that analyses of agency relationships in non-U.S. settings may provide alternative insights with respect to potential responses to these assumptions. The assumptions we address are those of the economic person, self-interested behavior, and opportunism. Our conjecture is that responding to these assumptions (via incentive and control prescriptions, as suggested in the related literature) in some situations may not be productive.

Note that implicit in agency theory is the assumption that individuals have an economically dominant personal value structures (or the conception of the desirable). Related research in agency theory has examined various factors that address this "economic person" assumption (e.g., Amihud & Lev, 1981, 1999; Agrawal & Mandelker, 1987; Kroll, et al., 1997). Such studies provide prescriptions that are designed to inhibit agency conflict and enhance shareholder orientation in response to this assumption. As suggested earlier, however, agents of a keiretsu may be influenced by an emphasis on group safety rather than an economic value. In conformance with this suggestion, it has been argued that "collectivities are more consequential in forming the choices of individuals than the individuals themselves" and those choices are likely to be driven by noneconomic, peer pressures within collectivities (Etzioni, 1988, 181).

Under these circumstances, attempts by principals to provide economic incentives to agents within keiretsus, such as the granting of equity stakes (Agrawal & Mandelker, 1987; Amihud & Lev, 1981, 1999; Kroll, et al., 1997), may be ineffective. Consistent with our contention, Leibenstein (1987) has warned that stressing pecuniary rewards in some situations may be counterproductive, leading to "X-inefficiency" and losses. Alternatively, responding appropriately to the assumption of the economic person may be justifiable regarding agents within independent companies. Thereby, providing financial incentives to these agents may be beneficial for shareholders of unaffiliated Japanese companies. In this setting, agency problems are presumably the domain of a self-serving

internal regime. Consequently, the granting of executive equity ownership, in essence, broadens the interests of the managers to also include personal interests as owners.

Moreover, responding to agency theory's assumption of self-interested behavior may not be appropriate in all situations. More specifically, note that the concerns of an individual agent are presumably intertwined with those of the larger collectivity in the business grouping, hence, self-interest may be transformed into group interest (Fukuyama, 1995). Thus, each manager may forego self-interest for the mutual interests of the collectivity. Under these circumstances, the impact of large external owners, financial incentives or debt levels may be negligible. Related to this contention, Lincoln and colleagues (1996) point out an "intriguing puzzle" contained in the keiretsu phenomenon. That is, why do the strongest companies remain in the group? In our view, however, if group interests conceivably prevail over self-interests, the retention of strong firms in a keiretsu may not be a puzzle. Alternatively, responses to agency theory's assumption of self-interested behavior may be relevant to the Japanese independent firm's agents. In these firms financial incentives, external control pressures, or debt levels may be influential.

Further, agency theory's assumption of opportunism, and its negative impact upon the principal, may take a unique form in some Japanese settings. Opportunism is often perceived as self-interest seeking with guile (Williamson, 1975). Thus, the expectation is that economic actors may disguise, mislead, or distort, as they partner in an exchange. Agency theory anticipates that opportunism will prevail partly because of moral hazard - - effort shirking by the agent which can affect the probability distribution of possible outcomes (Jensen & Meckling, 1976). To the extent that shirking may occur within the weaker members of the keiretsu, the principals of those companies receive protection from such shirking because resources of the stronger member firms are reallocated to the weaker participants. Thus, even if opportunistic behavior is assumed by the managers of the weaker participants, such behavior is compensated by the supportive actions of the collectivity (Fruin, 1992; Lincoln, et al., 1996). Consequently, shareholders of the vulnerable members of the keiretsu may not suffer the full extent of their agents' opportunism via shirking.

As is evident, however, the principals of the strong member companies may be confronted with double jeopardy - - the potential shirking of their own managerial agents in addition to that of the weaker member firms. Potential opportunism within the business group, consequently, may be harmful for the principals of the strong members but not necessarily the principals of the weak partners. Responding to the assumption of opportunism, therefore, may be of lesser consequence regarding the weaker members of the keiretsu. Responding to agency theory's assumption of opportunism, however, may be contemplated with respect to the stronger members of the keiretsu as well as the Japanese independent company. Nevertheless, whereas external control pressures, incentives, or debt levels may be effective in confronting opportunism in the independent firm, for reasons provided earlier, such methods may be ineffective for the keiretsu structure. Below, we offer our concluding remarks, stipulate the limitations of our study, and discuss directions for future research.

CONCLUDING REMARKS, LIMITATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

Consistent with our arguments and results, we conclude that agency costs can be reduced and shareholder orientation enhanced in the independent firm via incentives such as executive ownership, as well as other mechanisms, such as pressures exerted by concentrated external shareholders, or reduced financial slack. Alternatively, we can not conclude the same for the keiretsu structure. That is because the nature of the keiretsu structure is conducive to lower levels of shareholder orientation and heightened agency problems.

Our study entails a number of limitations. First, we made no attempt to distinguish between types of blockholders. Some blockholders may be passive while others may be active as investors. For instance, blockholders whose profession consists of the administration of their own investments may assume a leading role in influencing the decisions of senior executives (Woodruff & Grover, 1994), and blockholders who are descendents of a firm's founder may be primarily passive owners (McConnell & Servaes, 1990; Shleifer & Vishny, 1986; Wright, et al., 1996). Hence, even though our findings indicate that blockholders do not affect analyst following, blockholders are not necessarily lacking in influence. Consequently, our findings regarding this set of investors may not be generalizable.

Second, we did not examine the nature of the relationship between institutional investors and the firms in which they have investment stakes. Pound (1988), for example, has contended that under some circumstances institutional investors may detract from the interests of shareholders. Because of the potential of financially beneficial relationships with an enterprise, institutions may be motivated to vote with management on select issues that are detrimental to owners. Pound has referred to this possibility as the conflict-of-interest hypothesis. Additionally, Pound (1988) has suggested his strategic alignment hypothesis, asserting that management and institutional investors may periodically find it mutually profitable to cooperate in some arenas to the detriment of principals. Consequently, although our results suggest that institutional investors are directly related to analyst following of the Japanese independent companies, institutional owners may in other situations - - because of their advantageous relationships with management (Pound, 1988) - - not beneficially impact corporate outcomes. Thus, these results similarly may not be generalizable.

Third, an argument has been made that stock ownership programs may not unambiguously provide senior managers with incentives to enhance shareholder wealth. That is, beneficial and innovative firm strategies may conceivably be less frequently implemented as executive equity ownership levels increase because of the possibility of wealth undiversification (Gibbs, 1993; Wright et al., 1996). Thus, although we find that managerial equity stakes are positively associated with the level of analyst following for independent Japanese firms, such ownership may not always be related to desirable outcomes.

Future research may address some of the limitations discussed in the preceding paragraphs. Relating blockholders to analyst following may provide further insights if they could be classified as either active or passive investors. Examining the association of institutional ownership with analyst following may alternatively provide interesting results, if institutions could be categorized by the nature of their relationship with the enterprises in which they have equity investments (Pound,

1988, 1992). Studying the possibility of managerial wealth undiversification and its relation with analyst following may similarly prove enlightening if executive equity ownership could be measured as an actual percentage of personal wealth portfolios. Such a study may require obtaining data via a questionnaire.

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TRANSFORMING GOVERNMENT: MANAGEMENT CHALLENGES OF THE E-GOVERNMENT REVOLUTION

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ABSTRACT

This article examines the evolution of e-governance and the key challenges facing government officials and public sector managers. In order to understand the scope of the e-government revolution, major developments are reviewed. Then, attention turns to the process of renewing and transforming government, highlighting the challenges that must be addressed to effectively manage transformation efforts. As part of the change process, public sector managers will be required to create a culture that is capable of meeting the personal and professional needs of information technology (IT) workers. At a time when IT has become central to making government e-enabled, retaining and recruiting qualified IT workers has become a critical problem. The article concludes by outlining change strategies that can be employed by the public sector to keep up with the e-commerce transformation in the private sector.

INTRODUCTION: THE DAWN OF E-GOVERNMENT

Back in 1997, a report from KPMG Consulting stated that the public sector was facing a "crisis of expectations" - a widening gap between the capabilities of government to provide services and the needs and demands of citizens. In short, all public sector agencies had to face a looming reality; namely, that "the same old ways" would simply have to be transformed in a challenging new environment, moving from a resource or agency-based perspective to more of a customer or needs-based approach. Successful leaders in the public sector were thus challenged to focus on "What do our customers need and how can we provide it?", as opposed to "What can we do with what we got?" (KPMG Consulting, 1997, 14). E-government is certainly a buzzword today - and properly so. In the observation of Tim Bergin, an American University Professor of Computer Science: "The purpose of government is to collect taxes, provide infrastructure like roads and highways, supply people with information and to serve as the intermediary, and you can do it all online" (Caterinicchia & Haubold, 2000, 32).

E-COMMERCE AND "THE LAST BASTION OF INEFFICIENCY"

With e-government, as Mark Roberti so acutely framed the issue, e-commerce has finally reached "the last bastion of inefficiency" - the government (Roberti, 2000, 1). As Tom Davis (R-Va.) observed: "When you think of government, what do you think about? You think of chads?" (quoted in Matthews, 2001, 1). Former House Speaker Newt Gingrich (2001) brought the matter home in the fact that nationwide, not just in Florida, the error rate in the 2000 Presidential election was 1.6%,

asking one to "imagine if your gas station or your ATM was that unreliable on every transaction" (p. A26). Speaker Gingrich (2000) speaks hopefully of the potential power of e-government, stating that: "Technology, and the efficiency it brings, contains the seeds of a transformation that would dramatically reduce bureaucracies, expand freedom, and shrink the role of government" (p. A26).

In the eyes of OMB Watch (2001), "the idea of electronic government continues to gain currency among the American public, despite a clear definition or set of standards to follow" (p. 1). The benefits of e-government include: cost-effective systems that can reduce information gaps and unnecessary duplication of information; greater connectivity among existing resources; reduced complexity, while enhancing or improving the quality and range of services offered; and more accountable government, whose responsiveness can be better measured (OMB Watch, 2001).

Much of the e-government spending thus far has been directed at putting citizen services online and making government - and governmental services - available on a 24/7 basis. Much effort has also been directed at selling online to citizens, thereby entering government into the realm of e-commerce itself in a large way. In fact, in a groundbreaking study, sponsored by the Pew Internet and American Life Project and Federal Computer Week, Judi Hasson and Graeme Browning (2001) conducted the first comprehensive review of online sales activities for the federal government. They found that the federal government has at least 164 websites that sell items directly to the public. Yet, as Hasson and Browning (2001) observed: "For all its success in establishing a digital marketplace, the (federal) government seems to be going about the job in a haphazard fashion…as there are few rules and even fewer standards for conducting business" (p. 3). Quite surprisingly, the federal government's online sales exceed those of Amazon.com and eBay…combined (Brown, 2001)!

THE NEXT AMERICAN REVOLUTION

We are in the early stages of what has been labeled the American "dot.gov revolution," in which "electronic government can fundamentally recast the connection between people and their government" (Council for Excellence in Government, 2001, 2). Yet, what does the American public think of and want from e-government? Is e-government spending in the United States being spent in the manner the public desires?

Perhaps the best barometer to date of the American public's mood thus far is a report entitled e-Government: The Next American Revolution, released in 2001 by the Council for Excellence in Government. This organization brought together hundreds of leaders from the public, private, and non-profit sectors to discuss the future of e-government and what it will mean to the country. As part of this groundbreaking study, the organization commissioned the Hart/Teeter organization to conduct the largest nationwide poll of both the general public and government officials on e-government. The poll has a margin of error of approximately 4%.

The poll clearly shows that there is strong public support for efforts to apply technology to make government "faster, better, cheaper," as approximately three-quarters of the general public expressed a desire for e-government to be a high priority on the governmental agenda. Perhaps even more important is a telling statistic culled from the organization's report. This is the fact that, in general, those who have had the opportunity to interact with e-government have almost double the degree of trust in government than those who have not used e-government. While this may be a

factor of the higher educational and income levels associated with Internet users as opposed to non-users, it highlights the importance of making e-government - if not Internet access in general - available to all (Council for Excellence in Government, 2001).

In the survey, the Hart/Teeter organization posed a question asking "What will the most important benefit of e-government be?" They gave respondents, both citizens and their public officials, four options. The results are given in Table 1:

Table 1

The most important benefit of e-government will be?	Public Officials	General Public
Allowing for greater public access to information	34%	23%
Making government more accountable to its citizens	19%	36%
Making government more efficient and cost effective	17%	21%
Providing more convenient government services	23%	13%

Source: Council for Excellence in Government (2001, 6)

What can be seen is a clear dichotomy in the views of governmental leaders and the general public. Public officials placed a greater emphasis on making services and information available to their constituents than did the constituents themselves. Thus, while much of the dollars spent thus far on e-government has been directed towards enabling citizens to do things such as pay taxes and fees online and to view public hearings or communicate with their elected officials via email, the public does not seem to desire these benefits of e-governance as much as others. Instead, from the results of the survey, the electorate seems to want e-government not to make information "faster, better, cheaper," but rather, to make government itself "faster, better, cheaper." In analyzing the survey results, the governed appear to have a much greater desire than their government officials to make the public sector - and its leadership - more cost-effective, efficient, and accountable through the tools offered by online technologies.

Indeed, governments all around the world examining how they can best make use of the Internet to migrate from traditional, paper-laden and bureaucratic procedures to the Digital Age. Just as with their counterparts in the private sector, public sector officials and managers are looking at every process to examine how it can be made "faster, better, cheaper" with the introduction of new technologies. As of late last year, 220 countries have their own websites, and in the U.S. alone, there are currently more than 20,000 websites offering governmental information on the federal, state and local levels (Kaplan, 2001).

However, implementing e-government has been found to be more complex than the transition occurring in private enterprises (Hunter & Jupp, 2001). David Agnew, Executive Director of the e-business consulting firm Digital4Sight, observed: "We're still in a stage where in major industrialized countries, we're bumping up to the halfway mark" (quoted in Trimble, 2001, 2). Indeed, in the United States, Matthews (2000a) acknowledged that, "the public is comparing e-government with e-commerce and finding the former to be substandard" (p. 1). This is namely because government agencies are not able to satisfy the public's demand for "faster, better, and cheaper" services (Matthews, 2000b, 1).

TRANSFORMATION OF GOVERNANCE

The move to e-government is quickly becoming a catalyst for change in the way government does business. Don Tapscott (2000) observed: "Industrial Age government is almost as obsolete as the Industrial Age corporation. We just can't see it as clearly yet" (p. 172). What we are witnessing today - and working through - is nothing less than "the transformation of governance - reexamining what a global, networked economy will mean to how democratic institutions work… (and) the relationship between the citizen and the state," with the big question today being, in the words of Von Hoffman (1999): "What does it mean to be an e-state, an e-government, or an e-citizen?" (p. 5). David Agnew of Digital4Sight, observed: "Governments for a long time have been wrestling with how you become more customer-centric and customer-focused" (quoted in Trimble, 2001, 2). This paradigm-shift, a shift from process to citizen centricity, is the overriding force in the push for better government - with e-government being a means to that end. As Bowles (2001) acknowledged: "Information technology is no more and no less than a powerful tool that can dramatically transform government…(but) it is the time-tested concept of good governance that remains" (p. A1). However, this view of citizens as "customers" and the central focus of governmental efforts may be the biggest transformation of all (Von Hoffman, 1999).

PUBLIC SECTOR MANAGERS ON THE PRECIPICE

As a result of the increased momentum toward a transformed government, public sector managers are finding themselves facing a number of challenges. To create a culture that is customer centric, encourages innovative thinking, and rewards entrepreneurial behavior among government workers, public sector managers will be required to develop change strategies that create a high-performance work environment while at the same time removing the traditional obstacles of bureaucratic organizations. Transformation does not come easily or quickly. Kotter (1995) notes that the most general lesson to be learned from successful transformation efforts is that "the change process goes through a series of phases that, in total, usually require a considerable length of time. Skipping steps creates only the illusion of speed and never produces a satisfying result." (p. 59). Indeed, public sector managers are at the edge of a slippery slope, and they must find a way to carefully navigate through the uncertainty of change.

An initial challenge for public sector managers will be to convey a sense of urgency in an effort to rally the troops (Kotter, 1995). Public sector managers will be required to focus beyond the short-term, downside possibilities of change (e.g., loss of control, drop in morale, dip in short-term results) and drive workers from their comfort zone. To some extent, such an urgency currently exists and open discussion of the realities of the Internet economy and its implications for the public sector has begun. Speaking of the role of government in Internet Age, Former Speaker of the House Newt Gingrich put forth a challenge that would have seemed paradoxical and unapproachable just a few years ago, as he observed that government needs to "find a way to behave with the agility of tech companies" (quoted in Swisher, 2000, B1). Gingrich believes that, overall, "The government had better reorganize itself fast, because most people are finding it irrelevant as the language of politics and government is increasingly isolated from the language of everyday

life…(as) the Internet economy will drown out the government class if it does not learn to adapt" (p. B12).

Another problem that should create a sense of urgency is the looming "human capital" crises, as described by Professor Steve Kelmen (2001a) of the John F. Kennedy School of Government at Harvard. He cites as evidence two converging trends. First, it has been forecast that over half of the federal workforce will become eligible for retirement over the next five years. Compounding this coming problem is the fact that government is not seen as an attractive work environment, especially for IT workers, who have, until the recent economic downturn, been in extremely high demand in the private sector.

The demographics are startling - and disheartening. Many "Baby Boomer-age" federal workers will become eligible for retirement in the next few years, after they reach 25 years of service. This will mean that the civilian workforce in the federal government - which, according to the Office of Personnel Management, stands just under three million workers at present - could lose half its ranks through retirements of individuals in this cohort (Eisenhart, 2001).

As Blum (2001) humorously put it: The "great sucking sound" emanating from the nation's halls of power can't be blamed on politicians' hot air or noxious double-talk. Today, thousands of federal workers are leaving government jobs for digital futures" (p. 24). Why? Some of the explanation comes from the explosive growth of the high-tech industry in the Metropolitan Washington/Northern Virginia area. In fact, over half of all Internet traffic is routed through the region. Also, there is the combined attraction of private sector riches for federal employees, along with the fact that high-level government workers tend to be very attractive to high-tech employers. As Angelo Ioffreda, Director of Internal Communications for America Online observed, "Politicos tend to be very bright and well-educated" (quoted in Blum, 2001, 25).

In the short-term, Kelmen (2001b) does see that the end of the euphoria stage of the Internet-based New Economy - with the diminution or evaporation of stock options -could, in fact, make the public sector a stable environment to attract IT workers. Yet, Kelmen (2001a) believes that the government's personnel problem extends beyond the IT workforce, as he believes that to become an attractive environment for new workers, government must become a "high-performance workplace." This involves issues other than salary, meaning that the problem cannot be solved by simply raising compensation levels. In general, Kelmen (2001a) believes that government must offer workers an environment that is more capable of fulfilling public sector employees' needs, both personally and professionally.

A BLUEPRINT FOR CHANGE

A second challenge for public sector managers will be to create a blueprint for change. Transformation efforts often fail because a picture of the future, or vision, is never clearly communicated. Without a vision, transformation efforts can deteriorate into disjointed initiatives that pull in opposite directions (Collins & Porras, 1996). One of the leading thinkers on the subject of the next generation of government, Andrei Cherny, has recently published an examination of what government in the 21st century should be, titled The Next Deal: The Future of Public Life in the Information Age (Cherny, 2001). In an interview with Wired magazine, Cherny called for the

application of "new economy innovation to government" (quoted in Clark, 2001, 80). Cherny observed that: "We have a top-down government that is basically a black hole for energy and a quicksand for idealism. A generation that gets impatient when a Web page takes more than a few seconds to appear is not going to waste its time on a government that's not able to produce real solutions to problems" (quoted in Clark, 2001, 80).

Government as a "learning organization" should be part of the vision for the future. Hamel and Sampler (1998) wrote that in an e-commerce environment: "Companies that are quick to try, quick to learn, and quick to adapt will win. Those that learn the fastest, and keep learning, will stay ahead. Companies that take months to assess what they've learned, whose internal processes don't run on Internet time, will get left behind" (p. 92). Which of these best describes government today? Most inside and outside the public sector would most likely respond that the latter is most descriptive. Yet, As Hamel and Sampler (1998) observed, the Internet "is a noose for mediocrity" (p. 92). In an increasingly knowledge-based economy, we will need a knowledge-producing, learning government.

TOWARD AN ALIGNED GOVERNMENT

A third challenge for public sector managers will be to communicate the vision regularly and to empower workers to act on the vision (Kotter, 1996). To empower means to remove obstacles to change and eliminate systems or structures that undermine the vision. First and foremost, there is the notion of bureaucracy. Simpson (2000) observed that: "Bureaucrats can be a difficult lot, jealous of their turf and generally reluctant to make binding commitments or do anything quickly with people they don't know well" (p. B1). Yet, the demands of the e-marketplace will challenge our fundamental notions of what it means to be in the public sector, from the highest elected and appointed officials to the front-line employees in all agencies at all levels of government.

Truly empowered workers are encouraged to take risks and explore nontraditional approaches to problem-solving. Those outside of the public sector would be surprised at the number of entrepreneurial individuals within government - both in the United States and abroad - who are trying to implement techniques to make the e-government value chain "faster, better, cheaper," even without incentives - financial or otherwise. These are truly remarkable leaders, in that they have employed the ability to "think outside the box" without tangible or even intangible rewards to do so. Performance appraisal systems must be changed to reward employees for engaging in new ways. To make the e-government culture work across entire agencies - let alone across the public sector itself, the rewards and incentives must ultimately be there. As Susan Hanley, Consulting Director of Bethesda, Maryland-based Plural, Inc., squarely addressed the issue: "If you are asking people to do something differently, you're going to have to create appropriate rewards and incentives so that they will do what you want them to do" (quoted in Eisenhart, 2001, 38).

Likewise, employee development and training programs will need to be modified to support the ideals of e-government. E-government needs e-workers. Monroe (2000) observed that in the public sector, just as is true across the private sector, the preponderance of the best ideas to improve both the efficiency and effectiveness of governmental operations will come not from information technology specialist, but rather, from the people "in the trenches." He remarked that "the people

doing the day-to-day work have a familiarity with the foibles and flaws of government operations that a chief information officer can never acquire" (p. 6). This being the case, Monroe (2000) believes that governments at all levels will need a technologically-literate workforce, and as such, they should take seriously proposals such as the Federal Workforce Digital Access Act, proposed by Representative Elijah Cummings (D-Md.). Representative Cummings proposed that the federal government should take a step mirroring actions beginning to be taken by Ford and other leading companies to provide free computer systems and Internet access to workers. Above all, public sector managers will be required to pay more than lip service to change efforts

For all the promise of e-government, transformation efforts will fail until government systems, structures, and practices, particularly in the area of human resources, are aligned. A simple fact is that governments all across the board may not be ready to move - mainly from a personnel, not a technological, standpoint - into an e-enabled environment. This challenge for government was forecast as far back as 1997. As KPMG Consulting (1997) predicted, one of the biggest challenges for government in the 21st Century would be to recruit, train, and retain good employees. The federal government, as pinpointed by Eisenhart (2001), currently has no overall strategy for knowledge management, instead having an unequal - and largely ineffective - agency-by-agency approach.

CREATING A CRITICAL MASS

A fourth challenge for public sector managers will be to sustain transformation efforts by creating a critical mass of workers who are emboldened by the changes. To do this, they will be required to orchestrate short-term wins and make visible performance improvements. Without clear signs that changes are producing results, enthusiasm for change efforts will wane. Public sector managers can take action today in creating immediate, visible results by aligning intangible rewards to behaviors that foster e-government. Success stories should be trumpeted - shouted and shared both within government and in public sector trade groups and in the wider media (especially media that reaches beyond the public sector audience itself).

Take the area of e-procurement. Policy manuals for purchasing often can be measured in the number of binders they take up. These guidelines, along with the legislation and regulation behind them, will need to be updated - if not completely revised and "downsized" for the New Economy. When cumbersome, manual purchase order processes are replaced with purchase cards and catalog buying, the process savings can often be greater than the value of the goods and services being acquired. As such, incentives should be in place to provide proper recognition and positive feedback. When procurement executives save millions of dollars by switching some items to acquisition through reverse auctioning, they should be recognized. When a state uses a combinatorial auction to best allocate contracts for the benefit of the government and the involved parties, they should herald the accomplishment. When agencies band together at any level to overcome the NIH - "Not Invented Here" - Syndrome and form demand aggregation groups to drive prices down for buying personal computers or coal, they should be applauded. When a local government puts its tax lien auctions online and reaches beyond "the usual suspects" to generate significantly more revenue in the process, it should be congratulated. When the military partners with the private sector to

improve recoveries on surplus and unneeded items of all sorts, we should all be pleased. Repeatedly, one of the themes echoed throughout presentations on the future of acquisition workforce at the federal level is that the move to e-procurement will enable more routine processes to be automated, enabling purchasing professionals to work on more value-added and higher-value transactions. As Schwartz (2000) stated, all this will allow buyers to focus on the most important things, while allowing the acquisition process itself to be much leaner.

Improved metrics will allow responsible individuals and teams to be rewarded for increased asset recoveries or decreased acquisition costs with financial bonuses, while most importantly maintaining the transparency and accountability of e-procurement processes. True performance-based management in the public sector will only occur if incentives are aligned with desired actions, and if employee innovations that improve citizen or business services can be properly rewarded

Press releases and news stories should be generated. Awards should be given, both within government and by trade groups, such as is occurring with the e-Gov organization today. All of this might generally have formerly been looked upon as a public relations or internal communications issue, but in actuality, it is a strategic imperative today. Indeed, such intangible ways of promoting dynamic successes in improving the workings of e-government will likely be the principal means through which to reinvent the government culture to better face the gigatrends changing governance today.

CONCLUSION

Following - and building upon - the trends in the private sector, many have suggested that a more entrepreneurial government is needed to fully leverage the power being brought about by the Internet Revolution. This will mean promoting entrepreneurial leaders within government at all levels and forging partnerships with those persons and companies that can help the public sector take advantage of the opportunities present today. Further, these leaders will be required to successfully meet the challenges of transformation; namely, to convey a sense of urgency, create a blueprint for change, empower workers to act, and orchestrate short-term wins and visible successes. Former Speaker of the House Newt Gingrich observed that government leaders need to bring a more entrepreneurial approach to governance, being willing to take chances and learn from mistakes.

He also believes that the American people are more in this mindset and will be willing to embrace change and politicians who adopt the "Silicon Valley model" as a way of doing things, as opposed to the Washington way of doing things (cited in Swisher, 2000). In a research monograph, produced for the PriceWaterhouseCoopers Endowment for the Business of Government, the lead author of this article developed the notion of the "TQM Voter" (Wyld, 2000). This is based on the premise that Colvin (2000) observed to reflect the triumph of what he termed the "business culture," which can be seen in almost every facet of society - including government. As such, individuals are expecting their governmental leaders to look to business for ideas and expertise. How many millions of workers have been exposed to quality concepts at work? Anecdotal evidence would certainly suggest that a majority of today's employees have worked - in some form or fashion - with quality tools and methods on the job. Thus, it would be reasonable to conclude that we are likely to see the

emergence of the "TQM Voter." Holding to the principles of Total Quality Management, voters will increasingly encourage - and expect - government to benchmark the best practices of business and apply them to governmental operations. Taxpayers will want to see government - at all levels - be e-enabled. Former Speaker of the House Newt Gingrich observed that government's "e-customers will begin to carry (internet-inspired) attitudes into their relationship with bureaucracy, and as e-voters, they will favor politicians who work to make their lives easier, and therefore more convenient" (quoted in Swisher, 2000, B1). As such, we will be moving towards an era where truly, political officials and governmental managers may be evaluated by the outcomes they produce (in terms of speed, efficiency, savings, increased revenue, etc.), rather than producing paperwork and more bureaucracy.

As e-business continues to become business and simply the way things are done, it is felt that, more and more, both elected officials and public sector managers will be judged on how they leverage e-commerce technologies in operating government. We may be entering an era where the public will be looking for a more efficient, continuously improving government. According to Borrus (2000), the overall economy could benefit due to the fact that "as the cost of delivering government declines, governments might be better able to hold the line on tax increases, despite population growth" (p. 76).

It is believed that now more than ever, voters, many of whom have been exposed to quality, best practices, and benchmarking in their own work, will be looking to government to employ the same tactics. Over the next decade, voters will reward innovation in e-government - and perhaps even be tolerant of some level of failure in the process. One will recall that the Council for Excellence in Government found the disconnect between what the public and their elected officials desired from e-government, with the public wanting government to be made more accountable and cost-effective.

To cite just one example, according to Brenda Willard, Acquisitions Director for the State of Minnesota's Materials Management Division, her state's legislators were very supportive of their pilot program to test reverse auctions for goods. However, they were very resistant to have auctions that might interfere with "plum" areas - such as services and construction (cited in Morehead, 2001). Looking into the future, the TQM Voter will look to public officials to provide them with clear information on e-government accomplishments (which also helps in providing the intangible rewards just discussed for those actively implementing the concepts) and make decisions on these officials based on their e-government track record, which will be assessable through clearly defined metrics.

We are thus at an inflection point where e-government strategy is becoming government strategy. In short, the TQM Voter will expect implementation of technologies to make government operate "faster, better, cheaper" - and hold public officials accountable for their strategies and results across the board. Thus, the challenge is present for government officials and public sector managers to effectively manage the transformation process and to recruit and retain the workers who will be the key "e" - as in employees - in the e-government revolution.

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EASY TO DESIGN - DIFFICULT TO IMPLEMENT: AN EMPIRICAL SURVEY OF THE STRATEGIC MANAGEMENT PRACTICES OF LARGE COMPANIES

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ABSTRACT

This paper describes the results of an empirical study carried out in Finland. The aim of this study was to evaluate the elements of the implementation phase of strategic management in large corporations. The general picture formed in the study is clear: formulation systems work, but implementation systems do not.

First, the survey identified problems in organizing and coordinating strategy implementation. The respondents typically considered that the strategy formulated was not sufficiently concretized into clear programs. In addition, coordination of strategy implementation was also found inadequate and resistance to major changes was common. Communication was another major problem: strategy information did not flow from the creators of strategy to the implementers. Additional problems were related to rewarding and controlling systems. The rewarding system and strategic performance were not considered to be adequately connected. And as far as the reporting system is concerned, it could be noted that too often it did not support the control of implementation.

Therefore, the main conclusion of the paper is that strategic management in practice is not a consistent process or even a process of processes, but it breaks up and limps badly in the implementation stage.

INTRODUCTION

Andrews (1971) simplified strategic activity into a two-phase model, from which an apparatus of strategic management shaped itself in the 1980s. The two main parts were strategy formulation and strategy implementation. Both of these phases can be divided into several sub-phases, as typical best-selling textbooks both in America (Thompson & Strickland, 1999), and in Europe (Johnson & Scholes, 1999) show. Normally, the phases mentioned above are separate and follow each other. This separation has both raised theoretical criticism (see e.g., Kippenberger, 1998; Feurer & Chaharbaghi, 1995; Nicholls, 1994; Edwards & Peppard, 1994) and created practical problems in linking the two parts together again, as, for example, in the case of Xerox (Tyson, 1998, 16). Therefore, these phases often overlap in real-life companies, too (see e.g., Feurer, Chaharbaghi & Wargin, 1995).

Nevertheless, if we examine the large literature on the topic, we can see that formulation is the part, which is both widely used and to which most companies are relatively satisfied with.

However, implementation (organizing, communication, motivation, reporting, etc.) is an area, which has presented quite a few problems (see e.g., De Feo & Janssen, 2001; Macmillan & Tampoe, 2000; Beer & Eisenstat, 2000; Heracleous, 2000; Michlitsch, 2000; Corboy & O'Corrbui, 1999; Mintzberg, Quinn & Ghoshal, 1998; Thompson & Strickland, 1998; Lorange, 1998; Al-Ghamdi, 1998; Lares-Mankki, 1994; Atherton, 1993; Eisenstat, 1993; Floyd & Wooldridge, 1992; Hambrick & Cannella, 1989; Galbraith & Kazanjian, 1986; Pearce, 1985).

This paper describes the results of an empirical study carried out in Finland. The aim of this study was to evaluate the elements of the implementation phase of strategic management in large corporations. The primary target group consisted of the largest corporations in Finland, starting with Nokia and ending with the 600th largest company. This investigation was executed using a questionnaire, which was answered mainly by CEOs or Presidents in charge of strategic development. In total 108 acceptable answers (16.2 %) were received.

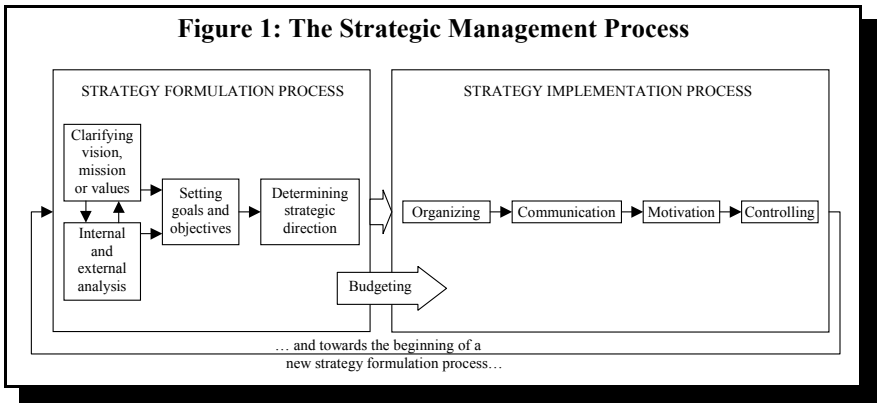
THE RESPONDENT COMPANIES

The average respondent company employed approximately 3,500 people and was over 75 years old. Thus, a typical large Finnish corporation has had a long life, and as a matter of fact there were 22 corporations that were at least 100 years old. On the other hand, only less than one in every four companies had had their current structure over 20 years, while most of their organizational structures were 5 - 20 years old. The majority of the respondents operate in a mature field, while a third of them have their basis in a growth-oriented business. The majority of them had also used outside experts or consultants in developing their strategic planning processes, even though only fewer than 15 % had employed them in actual, ongoing planning processes.

THE RESEARCH FRAMEWORK PRESENTED

Our research project studied the whole area of strategic management, which includes both strategy formulation and strategy implementation as Figure 1 shows. However, in this paper we will focus only on the latter, i.e. strategy implementation and the problems discovered in this area.

Figure 1: The Strategic Management Process



THE IMPLEMENTATION SYSTEM DOES NOT WORK EVEN TODAY

Normally these corporations formulate their strategies once a year in an explicit process that takes 1 - 3 months. The process winds up and down in the organization following the "wriggling snake" model presented in management by objectives handbooks in the 1960s. It results in documents, which usually look either one or three years ahead. In addition, the corporations employ on average five different analysis techniques and seven different frameworks or "theories" during their planning processes. However, the formulation process is not rigid, while phases of analysis and specification overlap and the process goes back and forth every once in a while.

Let us now define two basic approaches to strategic planning discovered in our research: comprehensive and non-comprehensive. By a comprehensive approach we mean the employment of a number of analysis techniques and a set of different "theories" (like balanced scorecard, quality management, process re-engineering, benchmarking, etc.) in the process and thus more time spent in the formulation phase. On the other hand, a non-comprehensive approach results in processes, which are carried out without the extensive use of analysis techniques or "theories".

The general picture is clear: formulation systems work, but implementation systems do not. In the following chapter we will present some of the typical problems found in our research results. The conclusions represent the managers' own evaluations of the state of their systems and may thus give a more positive picture of the situation than is actually the case.

First the good sides of the strategy to be implemented. Management, especially top management, considers themselves very committed and the strategy itself is normally seen as executable and convincing. Usually the organizational structure is also consistent with the strategy even though almost half of the respondents revealed that personal roles within the process are not defined clearly enough. Nevertheless, the formulated strategy was not seen to conflict too much with their personal values. In addition, the typical strategy formulation process has a solid connection to the following budgeting process, even if this connection is not always considered sufficient.

ORGANIZING AND COORDINATION

First, the respondents typically see that the strategy formulated is not sufficiently concretized into clear programs in practice (figure 2). In addition, coordination of strategy implementation is also considered inadequate (figure 3). This is especially true in companies that have had their current structure only 5 years or less: in those cases only a third of respondents thought that the coordination efforts had been adequate. On the other hand, companies that had a comprehensive approach to strategic planning when formulating their strategy felt their implementation to be better coordinated than is the case in those corporations that had not employed a comprehensive approach. In fact, a majority of the corporations that had applied at least 9 different "theories" in their formulation process believed that their implementation process is sufficiently well coordinated, while a majority of others felt that their coordination efforts are inadequate. However, a clear majority of somewhat smaller companies believed that their implementation is well enough coordinated, whereas majority of larger corporations had noticed inadequacies in this area.

Figure 2: Problems in Concretizing Strategy

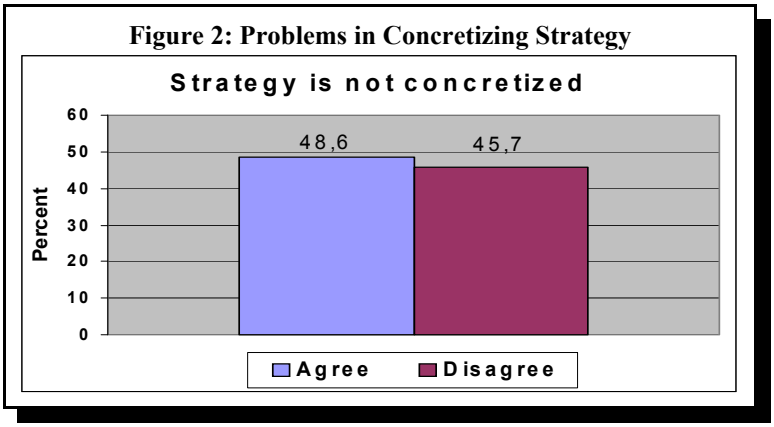
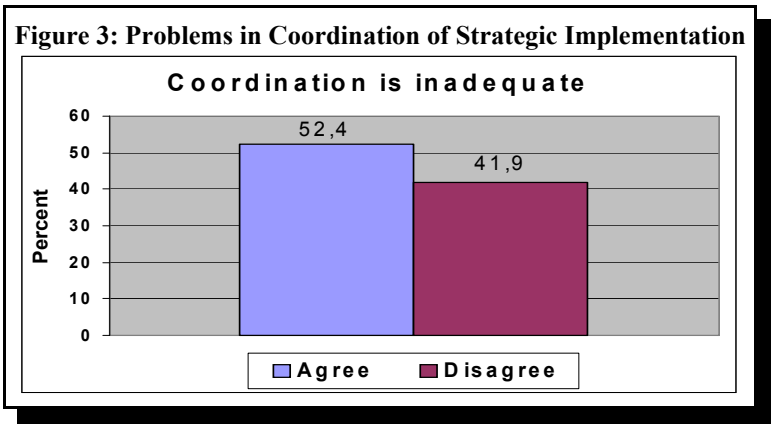


Figure 3: Problems in Coordination of Strategic Implementation

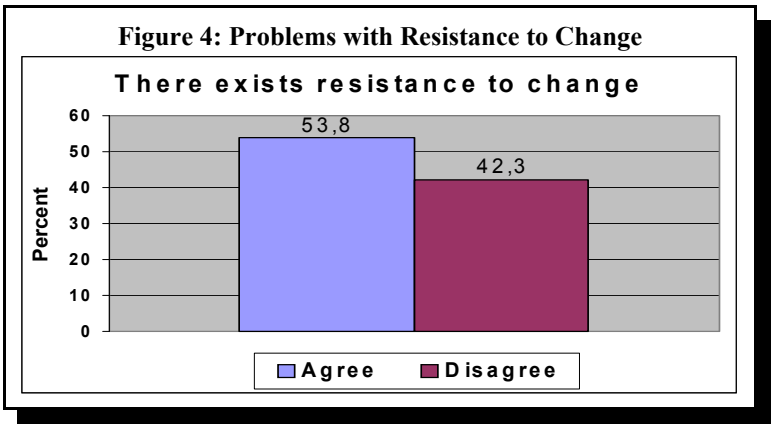


These two problems and also the good sides of the strategy mentioned earlier lead us to certain conclusions, which are not very surprising. First, it seems that Finnish managers do indeed know how to formulate good strategies. However, they see severe problems as to the realization of the strategy. These problems seem to be visible both in new organizations that have not yet found a stable form, and in large and complex organizations. Nevertheless, it seems that the use of a comprehensive approach in the formulation process reduces the amount of problems encountered in the implementation phase. This may be due to an expected, additional characteristic: Companies using several "theories" normally also spend more time in the formulation phase. This way they obviously go through their plans more thoroughly than corporations that use only a few "theories".

In addition, there commonly exists resistance to any major changes (figure 4). The majority of the respondents felt that resistance exists to the implementation of strategy. What is the reason for this resistance is beyond the scope of our research, but the symptom was very clear. It is interesting to note that only a third of corporations that have been 5 years or less in their current form had not encountered such resistance, while majority of older corporations could implement their strategy without resistance. There is some reason to believe that there normally exists more resistance in young organizations. They are continuously on the move, and eventually this may bring about genuine resistance towards such perpetual change. Resistance to change was also

considered more extensive if the strategy process involved participants from the business line level or, according to indicative results, if the formulation process wriggled up and down in the organization. Nevertheless, this could possibly mean two things. First, there is no resistance because the organization does not have enough information about the strategy. Secondly it could mean that such resistance exists, but it remains unnoticed because lower levels of the organization are not heard in the process.

Figure 4: Problems with Resistance to Change



COMMUNICATION

Communication is a major problem: strategy information does not flow from the creators of strategy to the implementers (figure 5). This is true despite the fact that the respondents considered that the created strategy was sufficiently comprehensible and was not cloaked in excessive secrecy. Our results suggest that insufficient flow of strategy information was a problem especially in companies where only 1 - 3 hierarchy levels took part in the planning process. This could be seen as an indication of the need to involve the lower levels of the organization in the creation of strategy, too. This communication problem can be regarded as a structural issue because the respondents saw the strategy itself as comprehensible and not too secret, but still the necessary information did not flow down in the organization.

REWARDING SYSTEM

The rewarding system and strategic performance are not considered to be adequately connected (figure 6). This was especially true in companies where at least four hierarchy levels took part in the formulation process. Our findings also imply that it was considered a major problem in corporations where the process went up and down in the organization or where the planning process was carried out bottom up. However, respondents that followed the traditional top down model in their processes did not seem to consider this a problem, which might, of course, be due to the fact that the managers themselves were the respondents. This could indicate that the rewarding systems do not sufficiently remunerate people for the realization of strategy, which may cause problems in attitudes towards implementation. On the other hand, majority of the respondents thought that their

rewarding systems were comprehensive and coordinated with strategic goals and measurement systems.

Figure 5: Problems in the Flow of Information

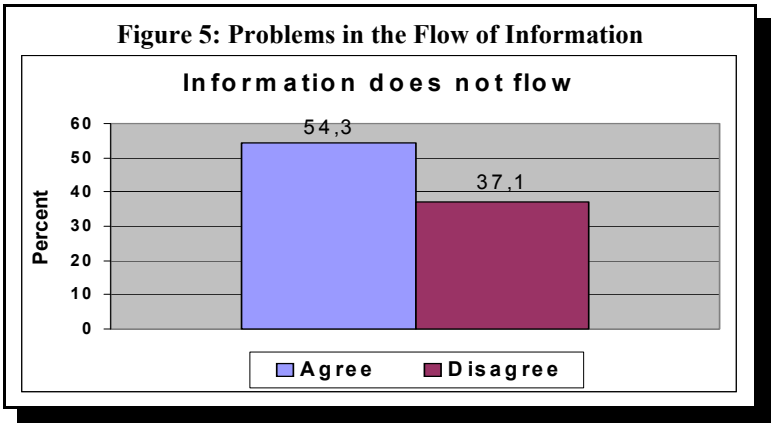
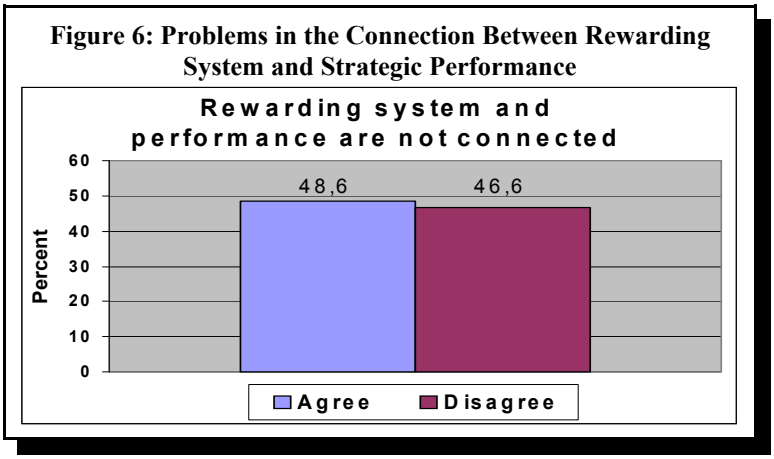


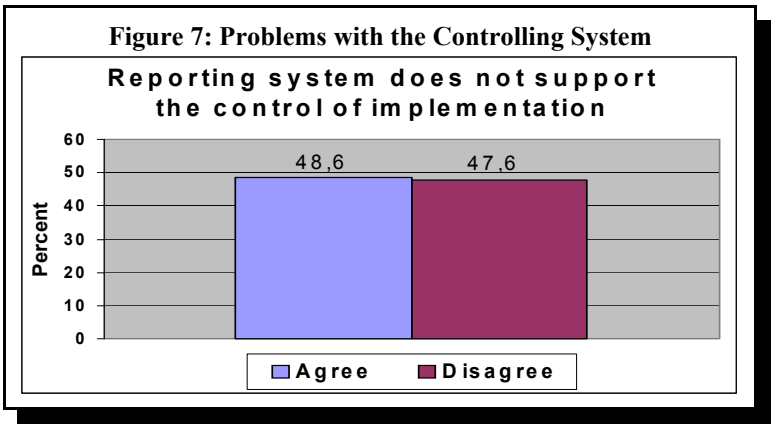
Figure 6: Problems in the Connection Between Rewarding System and Strategic Performance



CONTROLLING SYSTEM

As far as the reporting system is concerned, we can note that too often it does not support the control of implementation (figure 7), which is what it should do. Once again, this might suggest that managers have not been able to see just what they should be measuring in order to make sure that the formulated strategy is also implemented. Still, majority of corporations controls the implementation of strategy with a specific reporting system, which is usually based on an exact measurement system. Unfortunately this reporting system seems to be formed primarily for the needs of budgeting and not so much for the needs of strategy, which is a common problem in companies everywhere (Kaplan & Norton, 2001). It is still interesting to note that majority of companies that did not follow an explicit process in their formulation efforts also did not control the implementation of strategy with a specific reporting system, nor did they use an exact measurement system.

Figure 7: Problems with the Controlling System



Another troublesome issue is that almost half of the respondents believed that not enough attention is paid to implementation problems. This was considered a problem especially in companies that go through their planning process in a month or less, in which case over ¾ of the respondents saw this as a problem. However, the respondents also claimed that the more approaches had been employed in the formulation process, the more often these implementation problems were being reacted to.

We believe that this could be an indication of the fact that both the formulation and the implementation of strategy should be taken seriously. Companies that spend enough time and effort in formulating their strategies and that are willing to look at their strategy from several perspectives are probably also more willing to spend more time on the implementation phase, too. Thus, they may also be more willing to confront the problematic issues raised during the implementation, not simply ignoring them. All in all: The more care and effort in strategy formulation, the fewer problems in implementation.

RELATED STUDIES

A study along similar lines was conducted in the UK in 1996 (Al-Ghamdi, 1998). In this research nine implementation problems that had been experienced in the majority of companies were identified. One of the most common problems identified in the study was that the coordination of implementation activities was not effective enough, which is almost identical to our problem number 3 in figure 8 below. The second common problem in this study that could be linked to our problem number 3 was that key implementation tasks and activities were not defined in enough detail. Another significant problem that was discovered in the research was that information systems used to monitor implementation were inadequate. This relates closely to our problem number 6.

In addition, the UK research revealed several problems related to communication, which was identified as a significant problem in our research, too. The research also raised questions that could be seen as related to the concretization of strategy, which was the term used in our research. On the other hand, it is interesting to note that neither resistance to change nor the issue of rewarding systems appeared in the UK results, while in our case they were regarded as major issues.

In another study, Michael Beer and Russell A. Eisenstat (2000) identified six common barriers to the implementation of strategy. They found that the most common obstacle was an ineffective senior management team. Due to the nature of our study, it is quite understandable that this problem was not considered to be so significant in our case. However, their second most common problem was poor vertical communication, which is practically identical to our most common problem (number 1). Other common problems that were noted as significant in the Beer and Eisenstat study were unclear strategy and conflicting priorities, and poor coordination across functions, businesses or borders, which was seen as resulting from the former problem. Both of these relate to our problems 3 and 4. Still, it must be noted that resistance to change and the issue of rewarding systems did not appear in these results, either.

Martin Corboy and Diarmuid O'Corrbui (1999) have also described seven main pitfalls in successful strategy implementation. The first issue on their list is "The strategy is not worth implementing". A related problem was included in our research, too, but due probably to the fact that the creators of strategy were also the respondents in our research this was not seen as a major issue. Nevertheless, the second item on their list states "People are not clear how the strategy will be implemented." It is easy to see that this is closely related to our problem number 3. Other problems that Corboy and O'Corrbui found notable were related to the comprehensibility of strategy, clarity of individual roles and commitment. In our study these were also included but they were not found that significant. However, there is still no mention of resistance to change or the issue of rewarding systems.

Loizos Heracleous (2000) has approached the implementation problems from a more theoretical perspective and presents ten reasons why strategy implementation efforts can fail. The list includes issues like the vagueness of the strategy and insufficient communications, which can also be found at the top of our list. In addition, the list raises questions about insufficient input from the lower levels of the organization in the formulation of strategy and the commitment of top and middle management as well as employees. These were issues that did not stand out that prominently in our research.

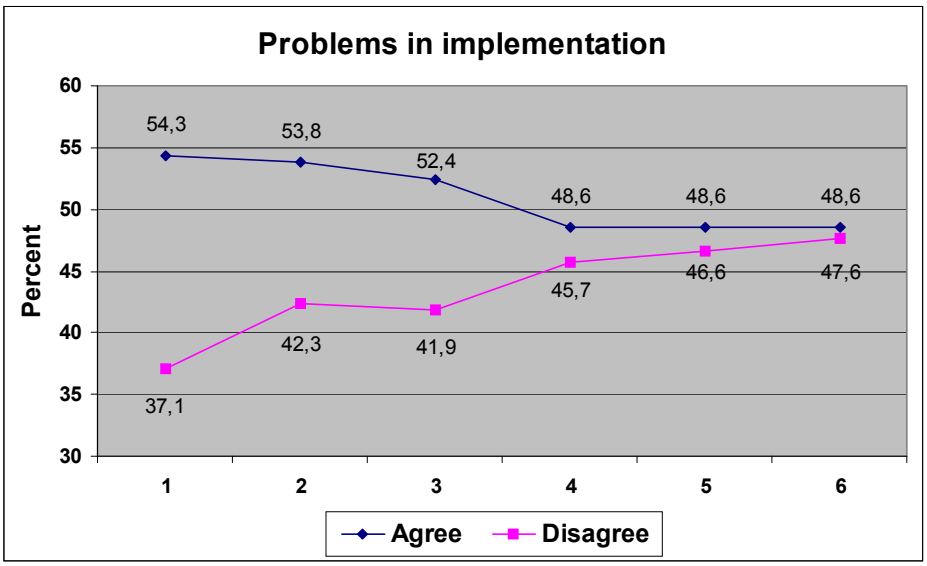
However, this list also includes two noteworthy issues that the previously mentioned studies had not emphasized and which were still considered significant in our research: resistance to change and rewards for implementing the strategy. The fact that these issues were not mentioned in other more empirical studies raises the question whether Finns are more reluctant to change and more reward-oriented than other nations, or did other researchers not focus on these questions? After all, every second manager in our research felt that resistance to change exists in his/her organization and that their rewarding systems were not sufficiently connected to strategic performance. This outcome leaves us perplexed.

CONCLUSION

In conclusion we may note that a number of serious problems still exists in the implementation of strategy. In this paper we presented some of them, namely those that managers of large Finnish corporations found to be most significant in their own organizations. However, we believe that these problems are also significant issues in other countries, too, and should be taken

seriously by managers who work in strategic planning. The following figure summarizes the problems we found to be the most significant.

Figure 8: Major Problems in the Implementation of Strategy



1.	Information does not flow from the creators of strategy to the implementers
2.	There exists resistance to change
3.	Planning, controlling and coordination of strategic implementation are inadequate
4.	Created strategy cannot be concretized into clear programs
5.	Rewarding system and strategic performance are not sufficiently connected
6.	Reporting system does not support the control of implementation

The first major issue identified in our survey was problems in organizing and coordinating strategy implementation. The respondents typically see that the strategy formulated is not sufficiently concretized into clear programs (figure 8, point 4). In addition, the coordination of strategy implementation is also inadequate (point 3), resistance to any major changes is common (point 2). Communication is another major problem: Strategy information does not flow from the creators of strategy to the implementers (point 1). Additional problems were related to rewarding and controlling systems. The rewarding system and strategic performance were not considered to be adequately connected (point 5). And as far as the reporting system is concerned, we can note that too often it does not support the control of implementation (point 6), which is precisely what it should do.

The commonness of these problems indicates that adequate time and effort should be devoted to the formulation of strategy. Our belief is that this would result in fewer problems in the implementation phase.

Strategic management, therefore is not in practice a consistent process or even a process of processes, but it breaks up and limps badly in the implementation stage. Moreover, the wisdom that would facilitate the implementation of strategy is still missing. The formulation of strategy and also the budgeting process may well constitute a consistent process even in large organizations, but after that the consistency vanishes. Even so, there does exist consistency in the implementation phase, too. But this is visible only on a sub-function level. So we may identify an organizing system, a communication system, a motivating system and a control system, but not a consistent total implementation system.

The results of our empirical survey should be taken even more seriously than the percentages would suggest. The respondents, who were CEOs and Presidents of Business Development, were the strategists themselves and they judged their own systems and creations. In addition, it must be noted that the respondents probably also represented an "elite" of companies; companies that take their strategy process seriously and aim to develop it, too. Things are almost certainly not done so well among the firms who did not respond, or so we assume.

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COGNITIVE COMPLEXITY WITH EMPLOYEES FROM ENTREPRENEURIAL FINANCIAL INFORMATION SERVICE ORGANIZATIONS AND EDUCATIONAL INSTITUTIONS: AN EXTENSION AND REPLICATION LOOKING AT PAY, BENEFITS, AND LEADERSHIP

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ABSTRACT

The purpose of the present study was to partially replicate and extend prior work by Carraher and Buckley (1996). They examined the relationship between mean group levels of cognitive complexity and differences in the number of observed dimensions of pay satisfaction as measured by the PSQ. Utilizing a sample of 1,901 teachers we found that mean group differences in cognitive complexity could explain about 78% of the observed variation in the dimensionality of the PSQ but that cognitive complexity was relatively unrelated to the number of dimensions observed for a measure of employee attitudes towards benefits. Additionally, with a sample of 1,647 workers from entrepreneurial financial information services organizations we found that mean group differences in cognitive complexity could account for over 69% of the variance in the number of dimensions observed for the Least Preferred Coworker Scale. This has reinforced the idea that cognitive complexity is an important and mostly overlooked variable that may have an important effect upon outcomes in organizational research both with entrepreneurial and non-entrepreneurial samples.

INTRODUCTION

Cognitive processing is one of the central topics of interest for selection (Bobko, Roth & Potosky, 1999), training (Warr & Bunce, 1995), compensation (Carraher & Buckley, 1996) and employee-job matching purposes (Van Vianen, 2000) both domestically and internationally (Culpepper & Watts, 1999) and yet its influence on instrument construction has largely been ignored in the literature (Roberts & Stankov, 1999). Work on cognitive complexity, on the other hand, goes back more than 45 years to Kelly's theory of personality (1955) but so too has its potential influence on instrumentation issues been largely ignored (Carraher & Buckley, 1996). In general, cognitive complexity is a construct intended to indicate how an individual conceptualizes of his or her environment. It is based on Kelly's (1955) theory of personality which is founded on the premise that each individual has available a certain number of personal constructs or dimensions for

"cognizing" and perceiving of events in their social world. It emphasizes the nature of constructs and the differences among individuals in the types and number of constructs that they employ when evaluating their external environment. We are interested with the conceptualization of cognitive complexity as concerned exclusively with the differentiation of the number of dimensions of judgment used by an individual rather than with other aspects of differentiation (Bieri et al., 1966) and how mean group differences in cognitive complexity could influence the observed dimensionalities of psychological instruments. Research on cognitive complexity has been reviewed by Stish (1997) and Streufert (1997).

PAY SATISFACTION AND BEYOND

In 1979, Heneman and Schwab theorized that pay could meaningfully be broken down into 4 distinct categories: (1) the methods organizations use to determine actual pay levels (pay systems), (2) the hierarchy of pay levels among differing jobs within organizations (pay structures), (3) actual levels of pay received by employees (pay levels) and (4) the types of pay received by employees (pay forms). However, as with prior reviews of the literature (Nash & Carroll, 1975; Schwab & Wallace, 1974), they largely ignored the necessity of measuring pay satisfaction in a multidimensional fashion and recommended the continued use of the Job Descriptive Index and the Minnesota Satisfaction Questionnaire to measure pay satisfaction. These two instruments were (and still are) unidimensional with respect to the measurement of pay satisfaction. In 1985, they further hypothesized that when concerned with pay satisfaction, the four posited facets of pay should be measured with five independent dimensions - satisfaction with pay level, benefits, raises, structure, and administration. They developed an instrument to measure these five dimensions and then administered it to three heterogeneous groups of 355 white-collar employees and 1,980 nurses. The results from both confirmatory factor analyses and exploratory principal components analyses led them to refine the instrument and to conclude that pay satisfaction should be measured in 4 dimensions - combining pay structure and administration into a single dimension. The final result was an 18-item instrument hypothesized to measure pay satisfaction in 4 dimensions that they called the Pay Satisfaction Questionnaire (PSQ). Prompted by their results, they called for additional research on pay satisfaction and on their new instrument (Heneman & Schwab, 1985).

Since this call for more research on the PSQ, much additional research has been conducted. Ash, Lee, and Dreher (1985); and Ash, Dreher, and Bretz (1986, 1987); have examined several of the psychometric properties of the PSQ while over a dozen studies utilizing over forty data sets have explored the dimensionality of the PSQ (see Carraher & Buckley, 1996; for a list of dimensionality studies). Noticeable in the research on the dimensionality of the PSQ has been the inconsistency in the number of dimensions found for the PSQ. There has been strong support for both three and four dimensional solutions when using exploratory factor analysis - and four or five dimensions when using confirmatory factor analysis - with some support for as few as one dimension (Orpen & Bonnici, 1987). To date, most of the studies designed to explain these discrepancies have explored job-related contextual factors such as job classification and unionization. However, the results of these studies have not been conclusive (Scarpello, Huber, & Vandenberg, 1988). An alternative reason offered in order to explain these differences is that they might have been due to

mean group differences in an individual difference variable such as cognitive differentiation, intelligence, or cognitive complexity (Lance & Scarpello, 1989). With three samples of 1,969 teachers, Carraher and Buckley (1996) used principal components analysis and confirmatory factor analysis to explore the dimensional structure of the PSQ and the influence that mean group differences in cognitive complexity could have on the observed dimensionality of the PSQ. They found that mean group differences in cognitive complexity could account for 76 to 80% of the variations in the observed dimensionality of the PSQ and argued that mean group differences in cognitive complexity may also influence the observed dimensionalities of other instruments such as measures of job and benefit satisfaction. It is the purpose of the present study to replicate and extend the work of Carraher and Buckley (1996) by testing whether mean group differences in cognitive complexity could influence the observed dimensionality of other types of self-report instruments previously linked to cognitive complexity - the Pay Satisfaction Questionnaire of Heneman & Schwab (1985), the Least Preferred Coworker Scale (LPC) of Fiedler, Chemers, and Mahar (1976) and the Attitudes Towards Benefits Scale (ATBS) of Hart (1990).

The link between mean group levels of cognitive complexity and the LPC scale extends back over 25 years. In 1969, Hill proposed that high-LPC individuals were more cognitively complex than low-LPC individuals. Research by Mitchell (1970), Foa, Mitchell, and Fiedler (1971); Evans and Dermer (1974); and Vecchio (1979) have supported the notion that low-LPC scores are more closely related to low levels of cognitive complexity than are high-LPC scores. The possible link between the ATBS and cognitive complexity was suggested by Carraher and Buckley (1996). They claimed that mean group differences in cognitive complexity are more likely to influence the observed dimensionality of measures which break pay satisfaction constructs into a larger number of dimensions than is done by the PSQ as is done with the ATBS. Thus, it is expected that we will find that the observed dimensionalities of the PSQ, LPC scale, and the ATBS will all be strongly influenced by mean group differences in cognitive complexity for both entrepreneurial and non-entrepreneurial samples.

METHOD

Samples & Setting

The data (n=1,901) for the ATBS and PSQ (sample 1) were collected from teachers in the same SouthWestern state as was sampled by Carraher and Buckley (1996) but at a later point in time. While subject participation was voluntary, it was encouraged by the superintendent of each district and the state teachers union. The data (n=1,647) for the LPC scale were collected from individuals employed by entrepreneurial financial information services organizations (sample 2). Subject participation in the project was once again voluntary, but was strongly encouraged by upper-level management. Information in both instances was self-reported by the subjects on the questionnaires but in the first case questionnaires were completed over a two-week period of time and then mailed to the researchers while in the second case respondents came to a central location and completed the questionnaires in the presence of the researchers. In the first sample (teachers) the response rate was 65% while in the second sample (entrepreneurial) the response rate was 95%.

Measures

In the first sample, on the questionnaire respondents provided general background information and completed Hart's Attitudes Towards Benefits Scale (1990), the Pay Satisfaction Questionnaire of Heneman and Schwab (1985), and the Rep Test of Bieri et al. (1966). In the second sample, on the questionnaire respondents completed the Least Preferred Coworker Scale of Fiedler, Chemers, and Mahar (1976) and the Rep Test of Bieri et al. (1966) in addition to providing their age and sex.

The Pay Satisfaction Questionnaire (PSQ) uses a five-point Likert-like response format with responses varying from (1) "Very Dissatisfied" to (5) "Very Satisfied." Reliability of the PSQ has been estimated by both the coefficient alpha and test-retest methods. Using the coefficient alpha method, Heneman and Schwab (1985) found reliability estimates ranged from .81 (Raises) to .95 (Pay Level & Benefits). Ash et al. (1987) found the one-month test-retest reliability estimates to range from .77 (Benefits) to .58 (Raises). In the current sample the coefficient alpha reliability estimates range from .74 (Raise) to .96 (Level).

The Attitudes Towards Benefits Scale (ATBS) is a 6-item measure of attitudes towards benefits (Hart, 1990). It is hypothesized to measure three components of attitudes towards benefits: (1) satisfaction with benefits, (2) level of importance of benefits, and (3) the ease of replacement of benefits. Most of the items use 7-point Likert-like response formats with scale points varying for each question. Carraher, Hart, Buckley, & Sawyer (1992) found one-month test-retest reliability coefficients of .90 to .95 for the three sub-scales.

The Least Preferred Coworker (LPC) Scale of Fiedler, Chemers and Mahar (1976) consists of 18 8-point semantic differential scales (i.e., pleasant-unpleasant, friendly-unfriendly, etc.) upon which one rates their least preferred coworker or in Fiedler's words "the person with whom you had the most difficulty in getting a job done" (1967, p. 41). The favorable side of each scale is scored as an 8 while the unfavorable side is scored as a 1. Scores on the LPC scale can range from 18 (very low LPC) to 144 (very high LPC). Rice (1978) reported test-retest reliability coefficients ranging from .01 to .93 with a median test-retest reliability estimate of .67.

The Rep Test (Bieri et al., 1966) consists of a 10 X 10 grid. Each of the 10 columns is identified by a different role type from the subjects' social environments (i.e., self, person you dislike, mother, boss, etc.). The 10 rows contain bipolar constructs related to personality traits (i.e., outgoing-shy, adjusted-maladjusted, decisive-indecisive, etc). After each subject has listed the initials of the persons who represent the ten role types, he or she is instructed to use a 6-step Likert-type scale with scale points from +3 to -3 to rate all 10 individuals on the first construct. Following this the subject rates all 10 individuals on the second construct and so on through all 10 rows. Scores on the Rep Test can range from 450 (very low cognitive complexity) to 40 (very high cognitive complexity). For the Rep test, Vacc and Vacc (1973) have reported a 4-week test-retest reliability of .82.

ANALYSIS AND RESULTS

Of the total respondents in Sample 1, 18% were males and 82% were females and they ranged in age from 23 to 61 years with a mean of 39.04 years. Mean years of education past high school was 5.02, mean years of organizational tenure were 7.63, and mean salary was $23,850 (Mdn = $23,250). In Sample 2, 59% were males while 41% were females and their mean age was 27.26 years of age.

In line with Carraher and Buckley (1996) high and low complexity groups were formed and subjected to principal components analyses (PCA). For each sample twenty sub-groups were formed and twenty analyses were performed on each of the instruments. Sub-groups began as a median split (highest and lowest 50%) and new groups were formed at each 5th percentile to the extreme 5th percentiles (highest and lowest 5%). The parallel analysis (PA) criterion of Horn (1965) was the retention rule utilized to determine the number of components to retain. It is a sample-based adaptation of the eigenvalue greater than one criterion and has been found to be the "most frequently accurate method" in usage (Zwick & Velicer, 1986, pg. 440). The number of components for each sub-group for the three instruments are shown in Table 1.

TABLE 1: Number of Dimensions for Samples According to Levels of Cognitive Complexity

# of Dimensions				# of Dimensions			
Top	PSQ	ATBS	LPC	Bottom	PSQ	ATBS	LPC
05%	5	2	3	05%	1	2	1
10%	4	2	4	10%	1	2	1
15%	4	2	3	15%	1	2	1
20%	3	2	3	20%	2	2	1
25%	3	2	3	25%	2	3	2
30%	3	2	3	30%	2	3	2
35%	3	2	2	35%	2	2	2
40%	3	2	2	40%	2	3	2
45%	3	2	2	45%	3	3	2
50%	3	2	2	50%	3	3	2
Variance in Perceived Dimensionality Accounted for by Cognitive Complexity (r^2) =		.788	.101	.6917			

The results of a 6-sample multiple-sample confirmatory factor analysis (CFA) with a four-factor oblique solution for the PSQ (the four factors are those hypothesized by Heneman and Schwab, 1985) and regular CFA with the same hypothesized solutions are shown in Table 2. In order to include all five levels of observed dimensionality - and to replicate Carraher and Buckley (1996) as closely as possible - the six groups included are the median split, extreme tenth

percentiles, the lowest 30th percentile and the highest fifth percentile (i.e., the only sample with a five-factor solution). Carraher and Buckley (1996) had performed a 5-sample multiple-sample CFA - which we also replicated but do not report here due to our greater number of observed dimensions in the current sample [Carraher and Buckley observed only 4 dimensions in their combined sample - and the only sample that they included that we do not is the lowest 5th percentile which they included as it was the only group within their sample that had a one-factor solution]. As done by Carraher and Buckley, due to problems with the multiple solutions problem prevalent with traditional CFA (see Carraher, Buckley & Cote, 1999) UniMult (Gorsuch, 1993) was used to determine initial estimates of the start values for LISREL 8 (Jöreskog & Sörbom, 1993).

As should be clear from Table 1, five levels of dimensionality were observed for the PSQ - from 5 dimensions for the highest cognitive complexity group to 1 for the lowest. Two levels of dimensionality were observed for the ATBS and four levels of dimensionality were observed for the LPC. The results indicate that mean group differences in cognitive complexity could account for 78.8% of the observed variation in the dimensionality of the PSQ, 69.17% of the differences in the observed dimensionality of the LPC and 10.1% of the differences in the dimensionality of the ATBS (.101 is not statistically significant at the .10 level).

Turning to Table 2, the fit statistics for the multiple-sample CFA indicate that the hypothesized solution does not provide an adequate fit for the sub-samples examined for the PSQ (goodness of fit indexes range from .50 to .87; adjusted goodness of fit indexes range from .34 to .78; root mean squared residuals range from .18 to .05; and the measure of the overall fit of the models in all groups has a x^2/df = 13.11. While not shown, similar results were found for the 5-sample multiple-sample CFA grouping used by Carraher and Buckley (1996) and as found by Carraher and Buckley (1996), the four-factor solution is most appropriate for the moderate levels of complexity and less appropriate for those with high and low mean levels of complexity. Also, as reported by Carraher and Buckley (1995; 1996), in general, when estimating the optimal number of dimensions to be retained for each sub-sample, LISREL includes one more dimension for each group than does the PA criterion.

DISCUSSION

Bieri et al. (1966) argued that their conceptualization of cognitive complexity was intended to reflect the relative differentiation of an individual's system of dimensions for construing behavior. It relates directly to whether an individual tends to perceive social behaviors, attitudes, and beliefs in a multidimensional fashion. It appears from the results of this study that the observed dimensionality of the LPC and the PSQ scales may also be related to individuals' tendencies or predispositions to conceptualize of their social environments in multidimensional fashions but that this does not seem to be true for the ATBS. Thus, researchers should recognize that mean group differences in cognitive complexity may be able to account for much of the variation in the number of dimensions with which individuals perceive of some instruments but not with other instruments.

TABLE 2: Four-Factor LISREL Results According to Levels of Cognitive Complexity						
Items	Highest			Lowest		
	05%	10%	50%	50%	30 %	0 %
	F1 F2 F3 F4	F1 F2 F3 F4	F1 F2 F3 F4	F1 F2 F3 F4	F1 F2 F3 F4	F1 F2 F3 F4
Psq1 My take home pay	.87	.84	.84	.83	.90	.94
Psq5 My current salary	.87	.84	.97	.83	.86	.94
Psq10 My overall level of pay	.92	.87	.85	.86	.90	.99
Psq14 Size of my current salary	.90	.86	.90	.83	.87	.94
Psq2 My benefit package	.89	.86	.88	.78	.79	.95
Psq6 Amount the company pays towards my benefits	.91	.77	.97	.79	.81	.97
Psq11 The value of my benefits	.91	.89	.99	.79	.84	.95
Psq15 The number of benefits I receive	1.07	1.01	.95	.85	.88	.94
Psq3 My most recent raise	.84	.82	.89	.70	.73	.97
Psq4 Influence my supervisor has on my pay	.16	.28	.42	.56	.63	.98
Psq7 The raises I have typically received in the past	.91	.76	.77	.73	.75	.97
Psq16 How my raises are determined	.76	.88	.74	.69	.80	.96
Psq8 The company's pay structure	.61	1.06	.76	.75	.80	.89
Psq9 Information the company gives about pay issues of concern to me	.48	.05	.52	.69	.73	.97
Psq12 Pay of other jobs in the company	.24	.38	.59	.54	.61	.89
Psq13 Consistency of the company's pay policy	.69	.51	.76	.62	.68	.89
Psq17 Differences in pay among jobs in the company	.29	.29	.61	.54	.64	.92
Psq18 How the company administers pay	.45	.69	.54	.63	.70	.88
Goodness of Fit Index (GFI)	.50	.62	.87	.83	.79	.56
Adjusted Goodness of Fit Index (AGFI)	.34	.50	.83	.78	.72	.41
Root Mean Squared Residual (RMSR)	.18	.15	.06	.05	.06	.11
Multiple Sample Results:						
Groups % Contribution to Overall x^2	17.13	17.50	13.48	15.29	13.87	22.74
Overall x^2 for 6-Sample CFA = 12,898.87 with 984 degrees of freedom $p < .001$ $x^2/df = 13.11$						

The results of this work further suggest that additional basic research should be performed in order to facilitate the development of new theories about the interplay between individuals' conceptualization processes and instrumentation. It is possible that the reason that mean group differences in cognitive complexity did not influence the number of dimensions observed for the ATBS is because the dimensions of the ATBS tend to be relatively stable across groups and also relatively orthogonal (Calongne, 1999; Gorsuch, 1983).

Another significant implication of the current study is that we may need to be aware of the mean group levels of cognitive complexity of samples when working with self-report instruments. In research we often develop tunnel vision in our areas of study and believe that we know how a population should perceive of variables of interest. For instance, suppose that you are given a questionnaire that asks you to rate the usefulness of anthraquinone-glycidyl methacrylates, phenonlsulfonphthalein, acrylated azo, poly (2-vinylanthoquinones), chromorange GR, coumaric acid, fluorescein, erythrosine B, and vinyl malachite green (copolymerized with N-vinylcarbazol) as polydyes? While individuals in industrialized societies deal with polydyes nearly every day of their lives, it is unlikely that most populations of interest would see this questionnaire as containing three clear dimensions (see Carraher, 1990). Shouldn't it be clear that the first three items are all good for use as polydyes, the second three make just moderate polydyes, and the last three are poor polydyes? Additionally, this questionnaire should have a perfect test-retest reliability coefficient ($\underline{r} = 1.00$) as the properties of these polymers will not change over time; however, the terminology used in this questionnaire is unfamiliar to most non-polymer chemists and therefore the reliabilities, validities, and number of observed dimensions will likely change from sample to sample. This can happen in organizational research just as well as in the more "hard" sciences. We need to seek to understand how various populations of interest naturally perceive of subjects being examined rather than try to impose how we believe they should conceptualize of those subject areas.

It is our expectation that the more closely related the sub-scales of an instrument, the more likely the observed dimensionality will be influenced by mean group differences in cognitive complexity. Thus, it would be useful for researchers to examine the tendency of instruments to have consistent dimensionalities under various mean levels of cognitive complexity. It is also our expectation that the more items included per hypothesized dimension, the less likely that mean group differences in cognitive complexity would likely influence the observed dimensionality for an instrument (e.g., Guadagnoli & Velicer, 1988) and along with this, the lower the internal consistency of the items included within hypothesized scales, the greater will be the influence that mean group differences in cognitive complexity should have on the observed dimensionality of a scale (Blackburn, 1981; Dreher & Mai-Dalton, 1983). As suggested by Gorsuch (1983) it is best to include at least six questions per dimension as it is generally difficult to replicate dimensions with fewer than six salient variables per factor (Scarpello & Carraher, 1997). Therefore, we suggest in the future that the designers of instruments include at least six internally consistent questions per hypothesized dimension.

It is also possible that individual differences variables other than cognitive complexity may be able to influence the observed dimensionality of an instrument. For instance, it has been shown that an individual's ability to resist organizational stress influences their overall coping abilities - which could then influence how individuals conceptualize of other organizational phenomenon such as satisfaction with pay or one's job (Blevins, 1999; Shaw & Gupta, 2001; Sullivan & Bhagat, 1992). Additionally, given that it has been found that individuals with different cognitive styles also have differing preferred styles and modes of observing their environment (Hsi-Peng, Huei-Ju, & Lu, 2001; Myers & McCaulley, 1985; Carraher, 1993), we believe that it is possible that dominant cognitive type or preferred learned style also could potentially influence the number of dimensions with which one perceives conceptual instruments. At minimum, as suggested by Lance and

Scarpello (1989), some research should examine whether mean group differences in cognitive differentiation or intelligence may also influence observed dimensionalities.

An additional area for research is to examine what organizationally-related or demographic variables may be able to serve as a proxy for cognitive complexity or may covary with cognitive complexity. For instance, using the matching model of organizational and occupational choice (Hollenbeck, 2000; Vandenberg & Scarpello, 1990) it is likely that occupations requiring higher levels of cognitive complexity (Desmarais & Sackett, 1993) are likely to attract individuals who possess higher levels of cognitive complexity. Thus, it is possible that ones occupation may serve as a proxy for mean group levels of cognitive complexity. Given the findings of Scarpello et al. (1988) and Lance and Scarpello (1989), it may be useful to examine whether one's job classification might serve as a proxy for cognitive complexity. Alternatively, it is also possible that differences in age (Trevor, 2001), organizational tenure (Cable & Parsons, 2001), job tenure (Chowdhury & Geringer, 2001; Goodwin, 1991), marital status (Gorman, 2000; Kraimer, Wayne & Jaworski, 2001), compensation systems (seniority vs merit systems; Balkin & Montemayor, 2000; Li, 1985), organizational hierarchical levels (Cotton & McKenna, 1994; Goodwin & Ziegler, 1998) and/or work and team structures (job rotation vs no job rotation, etc.; Burke & Moore, 2000; Cotton, 1977; Hollenbeck, LePine & Ilgen, 1996) may have influenced the conceptualization processes of the individuals in Scarpello's studies - and therefore their potential influence on observed dimensionalities should be explored.

The present research does have limitations. One possible weakness is that the characteristics of the present samples may limit the generalizability of the results. In Sample 1 an inordinate number of the subjects were unionized, female, and married. All of the subjects were also college educated and from a single organizational level. While these last two characteristics are by design, there are very few populations of interest other than teachers that will possess all of these characteristics together. Future research might want to examine the influence that the gender composition of a sample (Keaveny & Inderrieden, 2000) and the inclusion of more than one organizational level within a sample (Jaques, 1961) may have on the relationship between mean group levels of cognitive complexity and the number of dimensions observed for various instruments.

A second potential limitation of the current study is that the subjects from both samples were from more than one organization. Organizational variables may have introduced error in to the samples, thus lowering the estimate of the percentage of variance in the observed dimensionality accounted for by the differing levels of cognitive complexity. Given the degree of state control of the compensation system and the group homogeneity for the sample of teachers, it is unlikely that this has been a significant problem with Sample 1 - and given the r^2 observed in Sample 2, it is also unlikely that much error was introduced by organizationally-related variables in Sample 2. However, future research should examine the degree to which sample homogeneity may influence the amount of variance explained by mean group levels of cognitive complexity for self-report instruments.

A third potential limitation, which is fortunately avoided with the current sample, is having a small sample size. For example, of the forty samples used in research on the PSQ, over half (22) have a sample size of less than 200 (see Carraher & Buckley, 1996). Given the lower stability of

factor structures from small samples, it is likely that the smaller the sample size, the greater will be the influence that cognitive complexity may have on the number of observed dimensions for that study (Gorsuch, 1983).

The purpose of the present study was to explore the possibility that cognitive complexity might account for observed differences in the number of dimensions with which individuals conceptualize of pay satisfaction, their attitudes towards benefits, and their least preferred coworker. It was found that mean group differences in cognitive complexity could account for the observed differences in the number of dimensions with which individuals perceive of the LPC scale and the PSQ; but, surprisingly, they could not account for the variations in the dimensionality of the ATBS. Finally, it was suggested that other individual differences variables such as cognitive differentiation or intelligence might also influence the observed dimensionality of self-report instruments and future research on cognitive complexity and individual differences is recommended.

AUTHOR NOTES

We would like to thank Daniel Wren, Jorge Mendoza, John Daniel Morris, Paul Nystrom, Naga Sivasubramaniam, William Whitely, Chester Schrieshiem, and Larry Williams for their valuable comments on earlier editions of this paper - and to the Oklahoma Education Association and Wesley Learned for providing support for this project.

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CEO TRUSTWORTHINESS: A SOURCE OF COMPETITIVE ADVANTAGE

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ABSTRACT

This study developed and tested a resource-based model of CEO trustworthiness as a source of competitive advantage. We found strong empirical support for a positive relationship between CEO trustworthiness and firm performance. In addition, this relationship was moderated by organizational and environmental variables lending strong support for the resource-based perspective.

INTRODUCTION

Seeking to understand why some organizations are more successful than others, strategy researchers focus on identifying sources of competitive advantage. Recently, researchers have begun to systematically examine leadership at the top of organizations (Gupta, 1988). The emerging concept representing leadership at this level is known as "strategic leadership." Hambrick (1989) identifies strategic leaders as those who have overall responsibility for an organization, are concerned with external as well as internal spheres of influence, and are surrounded by ambiguity and complexity.

During the last decade, numerous researchers have stressed the importance of personal character and interpersonal trust to organizational leadership effectiveness (e.g., Badaracco & Ellsworth, 1989; Bennis, 1989; Granovetter, 1985; Zaleznik, 1989). Based upon over ten years of study, Kouzes and Posner (1993) suggest that credibility and trust form the foundation upon which organizational leaders and constituents create the future. Other social scientists agree, though with different terminology, stressing the importance of executive integrity (Locke, 1991), principle-centeredness (Covey, 1992), and reciprocal trust (Bennis, 1989) to interpersonal influence and organizational performance. Theoretical arguments and studies are beginning to emerge which suggest that leader trustworthiness may be a key determinant of strategic leadership effectiveness and organizational performance (e.g., Barney & Hansen, 1994; Badaracco & Ellsworth, 1989; Kouzes & Posner, 1993). The purpose of this paper is to explore the importance of leader trustworthiness from a resource-based perspective.

THEORETICAL BACKGROUND & HYPOTHESES

Resource-based models of competitive advantage are based on two assumptions: (1) that strategic resources may vary across organizations, and (2) that these resources may not be perfectly mobile (Rumelt, 1984; Wernerfelt, 1984, 1989). Therefore, resource heterogeneity can be long

lasting. Therefore, the resource-based view focuses on the impact of idiosyncratic firm attributes on a firm's competitive performance.

Although a firm's resources include all assets, organizational processes and routines, capabilities, knowledge, and so forth, not all resources are strategically valuable. According to the resource-based perspective, the potential of any resource to be a source of competitive advantage depends upon its strategically-relevant value and its rareness among competitors (Barney, 1991; Rumelt, 1984). Resources that enable the firm to conceive and implement strategies that improve its efficiency and effectiveness are generally considered valuable (Barney, 1991; Wernerfelt, 1984). However, the strategic relevance and ultimate value of any resource may be expected to vary with internal and external environmental conditions (Barney, 1995; Miller & Shamsie, 1996). Therefore, the resource-based view suggests that the potential for strategic leader trustworthiness to be a source of competitive advantage depends upon its context-specific value and its rareness.

Leader Trustworthiness

Simply stated, trustworthiness is an attribution based on the judgement that a person is worthy of trust. Gambetta (1988) defines trust as a particular level of subjective probability with which an agent assesses that another person or persons will perform a particular action--both before he can monitor such action and in a context which affects his own actions. Hart (1988) similarly describes trust as a subjective attitude, based on inconclusive evidence, that a person or thing will not fail in performance. As a result, the determination of trustworthiness is provisional and situational (Gabarro, 1978; Whitney, 1993).

The development of trust depends upon what is known. People come to know another by reputation and attribute personal characteristics based on interpretations of messages received from a variety of sources (Good, 1988). Dunn (1988) observes that trust may rest on close familiarity or massive social distance. The greater the social distance, the more a person must rely on indirect sources and representations. Research reported by Pastor and Mayo (1994) and McCauley and Kuhert (1992) provide support for attributions concerning leadership despite social distance. These studies suggest that trust is based upon available information from various sources and the determination of worthiness along some set of criteria.

Recent studies of trust in organizations indicate that trust is a multidimensional construct activated and sustained by a multidimensional set of conditions (Butler, 1991). The literature suggests that there are general and role-specific criteria for trustworthiness (Hart, 1988; Whitney, 1993). In a general sense, trust is contingent upon the perception of personal integrity and competence (Bennis, 1989). Honesty is widely accepted as a basic aspect of integrity and as a condition for trust. Unless a person is considered truthful, forthright, and consistently reliable in word and deed, integrity is questioned and trust is withheld (Badaracco & Ellsworth, 1989; Kouzes & Posner, 1993). But, honesty alone is not enough. The intentions behind the person's actions must be perceived as benign (Ring & Van de Ven, 1994). Trust requires the confidence that others will not take unfair advantage by exploiting another's vulnerabilities (Barney & Hansen, 1994).

In addition to integrity, a person must be perceived as competent in order for trust to emerge (Butler, 1991). Different roles require different capabilities. Despite honesty and good intentions,

one cannot expect performance without the competencies required of the role. Therefore, competence is a prerequisite of trust, but the individual competencies can be expected to vary across roles and circumstances (Gabarro, 1978). Simply stated, leader trustworthiness is the generalized degree to which a person satisfies the criteria for trust as a leader from his/her constituents.

Leader Trustworthiness as a Valuable Resource

Support for the value of leader trustworthiness as a critical resource begins with the premise that effective strategic leadership depends upon the degree to which strategic leaders are able to influence managers, employees, and external stakeholders and elicit their cooperation in achieving and maintaining the organization's internal and external alignments. The importance and pervasiveness of interpersonal trust as the foundation upon which cooperation is predicated is often acknowledged in the social sciences, but seldom examined empirically. However, several studies do provide evidence that trustworthiness is a key determinant of leader influence and willingness on the part of others to cooperate (e.g., Frost & Moussari, 1992; O'Reilly, 1984; Peppers, 1994).

Leader trustworthiness may be an essential component in gaining the support necessary to build an organization capable of effective decision making and strategy implementation. Internally, strategic leadership and followership begin at the top of the organization, within the top management team (TMT). Theorists suggest that strategic decision-making teams need leadership and that the leader of such a team must gain the trust of the immediate team members in order to be effective (Eisenhardt, 1989; Korsgaard, Schweiger, & Sapienza, 1995). Leader trustworthiness sets in motion the reciprocity of trusting behavior (Zand, 1972) which creates a climate of trust within the TMT. Major organizational decisions, such as changes in corporate strategy, structure, or production technology, require the support of the TMT. Obtaining the necessary support often requires the application of social influence beyond the authority of one's formal position. This is especially true when time pressures and other circumstances require a leader to make decisions without team consensus (Eisenhardt, 1989; Woolridge & Floyd, 1990).

Empirical research examining individual and group outcomes associated with leader trustworthiness and/or trust reveal a positive relationship between leader trustworthiness and a variety of positive work-related attitudinal and behavioral outcomes. Researchers report evidence of individual attitudinal outcomes such as decision commitment (Korsgaard et al, 1995), attachment to the group (Korsgaard et al, 1995), commitment to the organization (O'Reilly, 1984), commitment to work, organizational values, and the vision (Kouzes & Posner, 1993), job involvement (Kouzes & Posner, 1993), and job satisfaction (Halverson, 1994). Halverson (1994) reports evidence of a direct negative association between trust in leader and intention to quit. These studies suggest that leader trustworthiness is related to the motivation to remain with the organization and perform in support of it. Other studies provide evidence suggesting that leader trustworthiness impacts subordinate job performance (Halverson, 1994) and organizational citizenship behaviors (Podsakoff, MacKenzie, Moorman & Fetter, 1990; Deluga, 1994). Research also indicates that leader trustworthiness is related to group outcomes such as teamwork (Kouzes & Posner, 1993; O'Reilly, 1984), communication and problem-solving effectiveness (Zand, 1972).

At the institutional level, several theorists have suggested that trustworthiness and trust among exchange partners offer a number of advantages. First, trust minimizes transaction costs (e.g., Barney & Hansen, 1994; Gulati, 1995; Ring & Van de Ven, 1992; Zajac & Olsen, 1993). Second, trust allows unique access to exchange opportunities (Barney & Hansen, 1994; Gulati, 1995), and valuable strategic flexibility in turbulent environments (Gulati, 1995; Williamson, 1985). Ring and Van de Ven (1992) point out that cooperative trust-based arrangements with other firms may provide access to new technologies or markets, economies of scale in research, production and/or marketing, and access to competencies from sources outside the firm. Organizations are able then to share risks and combine strengths to overcome weaknesses. In summary, the literature strongly suggests that leader trustworthiness is valuable to organizations.

Leader Trustworthiness as a Rare Resource

According the resource-based perspective, a valuable resource must also be rare for it to be a source of competitive advantage. Barney (1991) points out that exactly how rare a valuable resource must be in order to have potential for generating a competitive advantage is a difficult question. He suggests that "in general, as long as the number of firms that possess a particular valuable resource (or a bundle of valuable resources) is less than the number of firms needed to generate perfect competition dynamics in an industry, that resource has the potential of generating a competitive advantage" (Barney, 1991, 107).

Although empirical examinations of leader trustworthiness in the context of strategic leadership are extremely limited, numerous published criticisms citing anecdotal evidence from the popular press highlight a lack of trustworthiness among business leaders (e.g., Bennis, 1989; Zaleznik, 1989). A few studies report evidence that mid-level managers and workers are often disillusioned with business leaders and skeptical of top management's integrity and management practices (Kouzes & Posner, 1993; Harris et al., 1991;Wanous, Reichers & Austin, 1994). Although trustworthy leadership is not rare in the sense that it becomes depleted with use, these observations suggest that leader trustworthiness is a scarce resource that is sufficiently rare in modern business organizations to be examined as a potential source of competitive advantage. Therefore, assuming strategic leader trustworthiness to be valuable and sufficiently rare, it may lead to competitive advantage for the overall firm. This suggests the following relationship:

Hypothesis 1: CEO Trustworthiness will be positively related to organizational performance.

Contextual Contingencies Influencing the Trustworthiness-Performance Relationship

Factors in two contextual domains determine the strategic value potential of any resource: (1) the internal organization and (2) the environment external to the firm (Barney, 1995). In this section, we discuss factors from both domains to explore moderators of the trustworthiness-performance relationship.

Barney (1995) suggests that in order for any firm resource to be a source of competitive advantage, the organizational context must enable the firm to exploit the resource in creating value for the firm. Given the nature and development of trust and its outcomes, two characteristics appear particularly relevant to maximizing the value of trustworthy leadership: organizational size and the tenure of the leader.

Organizational size is routinely examined in organizational studies as an important structural variable linked to many aspects of organizational design and functioning. Research indicates that large organizations are very different from small organizations along several dimensions of structure. Studies consistently show size to be related positively to the structural characteristics of complexity (e.g., Child, 1977), decentralization (e.g., Miller & Droge, 1986; Miller, Droge & Toulouse, 1988) and formalization (e.g., Miller, Droge & Toulouse, 1988).

Several theorists suggest that the potential impact of individual leaders is limited by the structural correlates of size. For example, some argue that top-level designated leaders have limited potential to impact organizational outcomes in large organizations due to structural inertia which inhibits adaptation and limits decision discretion (e.g., Hannan & Freeman, 1977). Others argue that the formalization that arises in larger organizations substitutes for personal leadership (e.g., Orpen & Hall, 1994). As organizations become larger, structural forces may constrain the impact of leadership efforts. Where complex and rigid structures impose constraints that acquire their own momentum in channeling organizational activity, the organization's capability for capitalizing on leader trustworthiness may be limited.

The structural context within large organizations, therefore, may be less conductive to exploiting leader trustworthiness as a source of competitive advantage than that of smaller organizations. Smaller organizations are generally more flexible because they do not require elaborate structural mechanisms to function effectively. Leadership can remain more personal and the dysfunctional outcomes of size (i.e., departmental differentiation, sub-optimization, resistance to change) are less pervasive (Jelinek, 1986). As a result, smaller organizations may be more capable of capitalizing on the potential of leader trustworthiness to create value for the firm.

This proposition is consistent with research providing evidence of stronger relationships between organizational outcomes and other leader characteristics such as locus of control (Miller & Toulouse, 1986) and the need for achievement (Miller & Droge, 1986; Miller, Droge & Toulouse, 1988) in smaller as opposed to larger organizations. Therefore, organizational size may be expected to moderate the relationship between leader trustworthiness and organizational performance. The following hypothesis expresses the proposed moderating effect:

Hypothesis 2:	*CEO trustworthiness and organizational performance will be more positively associated as organizational size decreases.*

The nature and development of trust and its outcomes suggest that time is a necessary factor related to an organization's ability to exploit the value potential of trustworthy leadership. A primary characteristic of trust is that it is provisional and must be earned. The cognitive and affective aspects of trust are not instantaneous responses that can be induced at will with respect to oneself or others.

Rational individuals cannot simply decide to believe that they trust someone if they do not (Gambetta, 1988). Trust depends upon the accumulation of knowledge from various sources and "good reasons" supporting the worthiness of another to be trusted (Whitney, 1993). The situational nature of trust requires the satisfaction of role-specific criteria (Gabarro, 1978). Building a reputation as a trustworthy leader requires time in office to demonstrate personal integrity and the leadership competencies needed by the organization.

Once trust begins to grow, additional time is needed for the individual attitudinal and behavioral effects to impact group and organization-level outcomes. Even the most trusted and influential leaders must have adequate time to shape cultural norms through policies and practices which reinforce trustworthiness as an organizational value. The positive effects of cooperative relations with various stakeholders emerge as relationships and opportunities develop over time. As suggested by Kotter (1982), organizational experience allows trustworthy leaders time "to develop a network of cooperative relationships among those people they feel are needed to satisfy their emerging agendas" (p. 161).

The logic of the tenure contingency is supported by Miller and Friesen (1984) who suggest that time is required (as much as five years) for CEOs, in general, to have an impact on structural changes. This contention has received empirical support. Miller, Droge, and Toulouse (1988) report evidence of stronger relationships between CEO personality and structural dimensions in organizations where CEOs had tenure in excess of five years. Additional support for the importance of tenure is provided by empirical results reported by Slater (1989) indicating a positive relationship between the organizational tenure of SBU general managers and business unit performance, regardless of the competitive strategy being pursued. Therefore, CEO tenure may be expected to moderate the relationship between strategic leader trustworthiness and organizational performance.

Hypothesis 3: *CEO trustworthiness and organizational performance will be more positively associated as CEO tenure increases.*

A second domain determining the value of any resource as a source of competitive advantage is the external environment (Barney, 1995; Miller & Shamsie, 1996). Miller and Shamsie's (1996) description of knowledge-based resources and their advantages point to environmental uncertainty as an important contingency for the value of trustworthy leadership. Similarly, Barney and Hansen (1994) argue that the value of trust and trust-based relations is limited to environments that provide incentives for opportunistic behavior (Barney & Hansen, 1994). Thus, environmental uncertainty may be a key contingency.

Miller and Shamsie (1996) suggest that the level of environmental uncertainty determines whether or not certain types of resources will create strategic value for the firm. They define knowledge-based resources as those that are "subtle and difficult to understand" which are protected from duplication by competitors "because they involve talents that are elusive and whose connection with results is difficult to discern" (p. 522). Miller and Shamsie argue that knowledge-based resources allow organizations to succeed by helping firms adapt their products to market needs and deal with competitive challenges. Economic rents accrue to such resources in part because rivals are

ignorant of why a firm is so successful. Therefore, knowledge-based resources are most beneficial in environments which are changing and unpredictable (Miller & Shamsie, 1996).

Trustworthy leadership and the complex network of outcomes described earlier combine to enhance strategic unity and adaptability. This is consistent with Miller and Shamsie's (1996) description of knowledge-based resources. Competitors should find perfect imitability difficult, if not impossible, not only because of causal ambiguity (Barney, 1991; Reed & DeFillippi, 1990) and the social complexity of the phenomena (Dierickx & Cool, 1989), but also because of the unique historical conditions (Barney, 1991) and path dependencies (Arthur, 1989) shaping the trust-related contributions to organizational performance.

According to the rationale employed by Miller and Shamsie (1996), the strategic value of trustworthy leadership rests in its cumulative effects which enable the organization to function more efficiently and effectively in uncertain environments. Facing an unpredictable and changing environment, organizations must be open to change and adapt in order to maintain appropriate alignments with their environments. Several outcomes derived from trustworthy leadership facilitate organizational responsiveness and adaptability. Certainly an internal organization that is responsive to leadership efforts facilitates adaptation as do effective problem-solving, teamwork, and communication outcomes. A climate of trust facilitates creativity and risk-taking which are helpful during periods of transition. Response flexibility is also enhanced by trust-based relations with external stakeholders. For example, exchange relationships with suppliers which are based on trust, rather than detailed contingent contracts, allow for expedient modifications in the agreements which may be essential in responding to changes in consumer preferences or innovations in production technologies. These adaptability capabilities are strategically relevant in changing environments. In stable environments, adaptability has limited utility.

Barney and Hansen (1994) argue that when competitive dynamics minimize vulnerabilities and the potential for opportunism, neither trust nor the more costly contractual forms of exchange governance are required. The nature of unpredictable change seems to suggest that any market characterized by uncertainty would be characterized by exchange vulnerabilities. For example, as firms seek to adapt products and practices to meet changing conditions, consumers and other exchange partners would be highly dependent on information provided by the firm, and therefore, vulnerable in assessing the merits of evolving offerings. A trustworthy provider would seem at an advantage in such an environment.

From the arguments presented above, leader trustworthiness and the organizational capabilities deriving from it appear to have more strategic relevance in environments that are relatively uncertain than in environments that are relatively stable. Therefore, one would expect environmental uncertainty to moderate the relationship between leader trustworthiness and organizational performance. The following hypothesis represents the proposed effect:

Hypothesis 4:	*CEO trustworthiness and organizational performance will be more positively associated as environmental uncertainty increases.*

METHODS

Sample and Procedures

A multi-industry random sample of non-diversified publicly-owned firms located in the southeastern region of the United States was drawn from Compact Disclosure's SEC Database. A total of 168 firms received invitations to participate in the study. Only firms reporting a single four-digit SIC code, employing at least 100 employees, and headquartered within a seven-state region in the southeast were included.

Both primary and secondary data were collected for the study. Published data sources included Compact Disclosure's SEC Database and company proxy statements. The collection of primary data occurred in two phases. The CEOs of the firms in the sample were the targets of the first phase of data collection. A letter of introduction was sent to each CEO requesting the firm's participation in the study. Sixty-nine CEOs were interviewed. The resulting CEO response rate was 41 percent.

Utilizing a semi-structured interview format, CEOs were asked to describe the role of trust or trustworthiness in their leadership and to identify practices in which they engaged or endorsed within their companies that they felt fostered trust in their leadership from those inside and/or outside the organization. In addition, CEOs provided ratings on scales for environmental uncertainty and organizational performance. The CEOs were also asked to identify the names of the top executives from four functional areas: marketing, production/operations, finance, and human resources. These positions were pre-selected in an attempt to prevent bias on the part of the CEO in TMT participants and because they represent diverse perspectives which are generally found in organizations fitting the sample criteria for the study.

Next, a pre-tested questionnaire was mailed to 281 management team executives identified in the CEO interviews. The TMT members were asked to respond to measures of CEO trustworthiness, CEO accomplishment, environmental uncertainty, and company performance. Surveys were returned from 189 executives for an overall TMT response rate of 67 percent.

For inclusion in the test sample, we required that a firm complete the CEO interview and return at least two completed TMT questionnaires. Of the sixty-nine firms from which CEOs were interviewed, fifty-six returned multiple TMT questionnaires. The number of TMT respondents associated with the 56 firms was 174. On average, three TMT executives per firm completed and returned questionnaires. Overall, the organizational response rate was 33% with fifty-six of the 168 firms invited to participate actually qualifying for inclusion in the test sample.

The firms in the study represented 45 industry groups at the 4-digit SIC level. The CEOs in the sample were male between the ages of 34 and 68 years with an average age of 51.8 years. To test for potential response bias, a comparison of non-responding firms with participating firms was conducted. A random sample of 56 firms was drawn from the firms that had not accepted the invitation to participate in the study. The non-responding group was then compared with the study group to determine if any systematic differences existed between the two groups in terms of size and performance. There were no significant differences between the two groups in terms of total assets,

number of employees, average return on investment, sales growth, CEO age, or number of industries represented.

Variables and Measures

Organizational Performance.

This variable was defined as growth and profitability relative to competitors and was measured using a four-item, comparative performance scale used by Agle and Sonnefeld (1994). Respondents were asked to indicate on a five-point Likert response scale the degree to which their firm's performance on each of four financial performance indicators (sales, market share, earnings, and return on investment) compared to that of their competitors' since their CEO took office. This variable demonstrated good reliability (Cronbach alpha = .89) as well as acceptable external validity based on archival performance measures for a subset of the firms. The total scores for each firm's respondents were averaged to obtain a performance measure for their respective firms.

CEO Trustworthiness.

An 18-item measure of leader trustworthiness was constructed by combining three 6-item scales developed by Kouzes and Posner (1987; 1993) to measure the degree to which the CEO was perceived to be a person of integrity and possess the competencies required of a strategic leader. A principle component analysis with varimax rotation confirmed the three components developed by Kouzes and Posner. Table 1 shows the results of the factor analysis. Three items loaded on two factors. Using the highest loadings, seven items represented the integrity component, six items represented the competence component, and five items captured the vision inspiration component. A Cronbach alpha of .94 indicated sufficient internal consistency of the measure. The total scores of the respondents from each firm were averaged to provide a CEO trustworthiness score for each firm.

Organizational Size.

In this study, we used number of employees to operationalize organizational size. The number of employees reported in SEC documents for 1995 was obtained from the Compact Disclosure database. To correct for the non-normal distribution of the number of employees in the sample, the natural log transformation was utilized as the measure of size in hypothesis testing.

CEO tenure.

Tenure was measured as the number of years between the end of 1995 and the date the CEO was appointed to office. The CEO appointment date was obtained from company proxy statements. To normalize the distribution for purposes of hypothesis testing, the natural log transformation was utilized as the tenure variable.

Table 1
Factor Analysis of Leader Trustworthiness Measure [a,b]

Leader Trustworthiness	Component		
	1	2	3
Item 1	.213	.172	**.725**
Item 2	.213	.268	**.774**
Item 3	.161	.445	**.679**
Item 4	**.760**	.182	.004
Item 5	.490	.115	**.523**
Item 6	.185	**.763**	.352
Item 7	**.757**	.137	.383
Item 8	**.511**	.400	.416
Item 9	.238	**.683**	.282
Item 10	**.694**	.213	.345
Item 11	**.795**	.006	.331
Item 12	.139	**.878**	.008
Item 13	.574	**.583**	-.001
Item 14	**.661**	.338	.168
Item 15	.280	**.774**	.254
Item 16	**.791**	.262	.211
Item 17	.520	.185	**.595**
Item 18	.143	**.777**	.213

[a] N = 172.
[b] Principal Component Analysis with Varimax Rotation

Environmental Uncertainty.

Consistent with the theoretical arguments presented, an uncertain environment is a changing and unpredictable environment (Miller & Shamsie, 1996). While industry-based archival measures provide the broadest scope of analysis, they are limited by their inability to account for intra-industry variation (Boyd, Dess & Rasheed, 1993). Boyd and his associates (1993) suggest that combining data from several firms to create an industry-level index such as sales volatility may be misleading due to basic issues of industry definition or the heterogeneity of firms. Scherer (1980) observed that these measures "are sometimes too broad relative to the economist's ideal industry definition, and sometimes they are too narrow" (p. 60). Therefore, given the potential diversity of the sample within SIC classifications, the potential intra-industry differences in the level and nature of uncertainty, and

the level of analysis of the study, industry-level archival measures of uncertainty were judged inappropriate for this research.

Following operationalizations used by Miller and Droge (1986), we used a seven-point Likert scale on five items that characterize environmental uncertainty. The internal consistency across all respondents (Cronbach alpha = .61) was below that reported in earlier studies (e.g., Miller, 1988; Miller, Droge & Toulouse, 1988), but adequate for exploratory investigations. Confirmatory factor analysis was conducted to assess the underlying structure of the uncertainty measure. Principal components analysis with varimax rotation confirmed the two factors determined in earlier research (i.e., Miller, 1988; Miller, Droge & Toulouse, 1988). Therefore, the average total score for each firm's respondents was used as the measure of environmental uncertainty for each of the respective firms.

RESULTS

Descriptive statistics and the correlation matrix for the variables used in the study are presented in Table 2. Although CEO Tenure and Trustworthiness are significantly correlated ($r = -.497$, $p < .01$), there does not appear to be any substantial multi-collinearity amongst the data.

Table 2
Descriptive Statistics: Means, Standard Deviations, and correlations Among Variables [a,b]

Variable	Mean	s.d.	1	2	3	4
Organizational Performance	15.16	3.37				
CEO Trustworthiness	74.07	8.73	0.318*			
Organization Size [c]	7.03	1.55	-0.077	-0.016		
CEO Tenure [c]	1.65	1.05	0.131	- 0.497**	0.159	
Environmental Uncertainty	20.65	5.19	- 0.353**	-0.180	-0.153	0.107

[a] N = 56
[b] Level of Significance reported for two-tailed tests: ** $p < .01$ * $p < .05$
[c] Natural log transformation

Hypothesis 1 states that CEO trustworthiness will be positively associated with organizational performance. The regression results presented in Table 3 support the hypothesis. The data indicated a positive relationship between CEO Trustworthiness and Organizational Performance ($t = 2.46$, $p < .01$). This suggests that as the perception of leader trustworthiness increases so does organizational performance.

Hierarchical moderated regression was used in testing Hypotheses 2, 3, and 4. All interaction terms were calculated using centered data to minimize collinearity among predictor variables. Hypothesis 2 states that CEO Trustworthiness and Organizational Performance will be more positively associated as organizational size decreases. In the first step of the analysis, CEO Trustworthiness and Organizational Size were regressed on the dependent variable, Organizational

Performance. As shown in Table 3, the model was significant ($F = 3.15$, $p < .10$) and only the parameter estimate for trustworthiness was statistically significant ($t = 2.44$, $p < .01$). An adjusted R^2 of .0725 indicates that the model explained 7.25 percent of the variance in Organizational Performance.

Table 3
Regression Results on Firm Performance

Variables	Hypothesis 1	Hypothesis 2		Hypothesis 3		Hypothesis 4	
	Single Step	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
CEO Trustworthiness	0.123	0.122**	0.120**	0.196**	0.141**	0.102*	0.106*
Organization Size		-0.156	-0.188				
CEO Tenure				0.123 †	0.842*		
Environmental Uncertainty						0.283**	-0.223*
Trustworthiness x Size			0.060 †				
Trustworthiness x Tenure					0.122**		
Trustworthiness x Uncertainty							0.020 †
Adj R^2	0.084	0.073	0.110	0.182	0.250	0.161	0.188
F	6.070*	3.151 †	3.258*	7.128**	7.123**	6.272**	5.239**
ΔR^2			0.037		0.068		0.027

** p<.01
* p<.05
† p<.10

In step two of the analysis, the interaction term was added to test the moderating effects of organizational size. The results indicated significance of the full model ($F = 3.26$, $p < .05$) with an R^2 of .1097. Parameter estimate t-tests indicated significant main effects for CEO Trustworthiness ($t = 2.43$, $p < .01$) and moderating effects of Organizational Size ($t = 1.79$, $p < .05$). However, the moderation was in the opposite direction from that hypothesized.

Hypothesis 3 states that CEO trustworthiness and organizational performance will be more positively associated as CEO tenure increases. Once again, we first regressed the main effects (CEO Tenure and Performance) in a restricted model. As can be seen in Table 3, the model was significant ($F = 7.13$, $p < .01$) and explained 18.22 percent of the variation in Organizational Performance. The data indicated significant parameter estimates for CEO Trustworthiness ($t = 3.62$, $p < .001$) and CEO Tenure ($t = 2.73$, $p < .01$).

In Step Two, the interaction term was entered into the model to test the moderating effects of CEO Tenure. The model was significant ($F = 7.12$, $p < .001$) in predicting Organizational Performance. Significant parameter estimates were indicated for the interaction term ($t = 2.41$, $p < .01$), CEO Trustworthiness ($t = 2.48$, $p < .01$) and CEO Tenure ($t = 1.83$, $p < .05$). The addition of

the interaction term in Step Two increased the adjusted R^2 from .18 to .25 indicating that the moderating effects of CEO Tenure explained an additional 7 percent of the variance in Performance. Thus, our data supports Hypothesis 3.

Hypothesis 4 addresses the moderating effects of environmental uncertainty. Hierarchical moderated regression was once again employed to test for moderating effects (see Table 3). The restricted model in Step One indicated that the model was statistically significant in predicting Organizational Performance ($F = 6.27$, $p < .01$). The tests of parameter estimates indicated significance for CEO Trustworthiness ($t = 2.09$, $p < .05$) and Environmental Uncertainty ($t = -2.43$, $p < .01$).

The interaction term was added in Step Two to test the moderating effects of environmental uncertainty. The model was significant ($F = 5.239$, $p < .01$). The improvement in the explanatory power of the model ($R^2 = .188$ along with the significance of the positive parameter estimate for the interaction term ($t = 1.66$, $p < .10$) provide evidence supporting the hypothesis of the positive moderating effects of environmental uncertainty on the relationship between CEO trustworthiness and organizational performance. As uncertainty increases, trustworthiness appears to become more strongly associated with organizational performance as hypothesized.

DISCUSSION

The purpose of this study was to address the general question of whether or not trustworthy leadership by the CEO can be a source of competitive advantage. In addressing this question, a resource-based model of leader trustworthiness as a determinant of organizational performance was examined. Overall, three of four hypotheses were supported by our data. More specifically, we found that CEO trustworthiness was positively related to firm performance. This relationship was stronger when the CEO tenure was longer and in uncertain environments. We also found that it was stronger in larger organizations, contrary to our hypothesis and the extant literature. The following discussion expands on these findings and discusses their implications for the strategic leadership and resource-based perspective literatures.

Value Creation

CEO Trustworthiness.

The leader trustworthiness-performance relationship implies that who the leader is makes a difference. This finding is consistent with recent CEO succession studies providing evidence of relationships between other leader characteristics and organizational outcomes (e.g., Lant, Milliken & Batra, 1992; Smith, Carson & Alexander, 1984). In addition, the findings are consistent with recent empirical studies of trustworthiness and/or trust-based relations at the institutional level providing evidence of derived benefits related to organizational competitiveness and economic performance (e.g., Dyer, 1994; Gulati, 1995; Parkhe, 1993).

This research also supports recent arguments presented in the academic and popular press positing the importance of personal character and integrity in organizational leadership to superior

economic and competitive performance (e.g., Badaracco & Ellsworth, 1989; Bennis, 1989; Covey, 1992; Locke, 1991; Whitney, 1993; Zaleznik, 1989). Consistent with the strategy literature, which emphasizes the substantive impact of the CEO as an important component of strategic leadership (e.g., Gupta, 1988; Noel, 1989), one would expect the CEO's character to be reflected in the organization's strategic choices. It seems unlikely that a CEO would be perceived by constituents as trustworthy if the organization's actions were inconsistent with the criteria of integrity, goodwill and competence. To the degree that trustworthy leadership at the top creates a trustworthy organization, the inherent values should be reflected in the way the organization conducts business.

Although far from conclusive, the results imply that when organizations are led by trustworthy strategic leaders, rare and valuable activities occur within the firm. This is consistent with Barney and Hansen's (1994) conceptual argument that trustworthy leadership can yield competitive advantages to the firm.

Value Enhancers

Organizational Size.

Although it was hypothesized that the strength of the relationship between CEO trustworthiness and organizational performance would be reduced as organizations increased in size, the moderating effect of size detected in the analysis was positive. This suggests that as organizations become larger, having a trustworthy strategic leader is more beneficial in terms of competitive advantage than it is in smaller organizations. The regression coefficients generated from the data in this sample indicated the relationship between CEO Trustworthiness and Organizational Performance in organizations with more than 2448 employees was 2.27 times stronger than the relationship in organizations with fewer than 520 employees.

Based on structural complexity and constraints observed in larger organizations, it was anticipated that strategic leader trustworthiness would be more valuable in smaller organizations where leadership is generally perceived to be more personal and formal bureaucratic structures inhibiting action less pervasive. The positive impact of size suggested by the data, however, offers new and interesting possibilities. The results indicate that overcoming the forces of inertia inherent in large organizations due to formal structural mechanisms perhaps is made possible when constituents have trust in organizational leaders and the strategic choices they propose. Size creates difficulties in control, coordination, and communication (Hall, Haas & Johnson, 1967). Perhaps it is only when inspired constituents are able to believe in their leaders that they are motivated and willing to fight against the structural barriers that inhibit cooperation and performance. This interpretation is consistent with a conceptual framework concerning potential constraints to CEO discretion and organizational response outcomes developed by Hambrick and Finkelstein (1987).

Hambrick and Finkelstein (1987) discuss internal constraints to executive discretion and response outcomes in terms of constituents' "zone of acceptance," a concept originally developed by Barnard (1938) as a means of describing the willingness of subordinates to follow directions. They explain that powerful managers, by force of personal reputation, face only limited barriers in exercising discretion because they are able to act where many others would not have the opportunity.

Therefore, CEOs deriving power from their reputations as inspiring persons of integrity and competence may have fewer constraints to action in larger organizations than do less powerful CEOs. This would enable trustworthy leaders of large organizations to initiate and achieve adaptive responses necessary for superior performance.

CEO Tenure.

Based on the importance of time to the conditional determination of trustworthiness and its associated outcomes, CEO tenure was also hypothesized to intensify the strength of the relationship between CEO trustworthiness and firm performance. The hypothesized positive moderating effect of CEO tenure was supported by the data. This finding supports Kotter's (1982) observation that organizational experience allows leaders time to develop a network of cooperative relationships. The results also provide empirical support for Slater's (1989) proposition that the tenure of a trustworthy CEO should be related to the organization's ability to exploit trustworthy leadership as a resource.

Main effects were also revealed for CEO tenure in the full model. This implies that there are performance benefits due to time in office that are independent of perceived trustworthiness of the CEO. This finding is consistent with research evidence reported by Slater (1989) indicating a positive relationship between the tenure of general managers and organizational performance regardless of strategy (i.e., the substantive content of strategic leadership).

Environmental Uncertainty.

The positive moderating effects of environmental uncertainty were supported as hypothesized. The evidence suggests that as uncertainty increases, strategic leader trustworthiness is more strongly related to organizational performance. This is consistent with the recent resource-based proposition by Miller and Shamsie (1996) that adaptive capabilities derived from knowledge-based resources are more valuable in environments requiring change. It appears that organizations operating in dynamic environments are able to function more efficiently and effectively when led by trustworthy strategic leaders than when they are not.

SUMMARY AND CONCLUSIONS

This study developed and partially tested a resource-based model of strategic leader trustworthiness as a source of competitive advantage. The results provide empirical support for the importance of organizational and environmental contingencies to the strategic value of leader trustworthiness. Analyses produced evidence of positive moderating effects of CEO tenure and environmental uncertainty consistent with the hypotheses concerning these relationships. Examination of organizational size as a moderator indicated that the moderating effect was positive rather than negative as hypothesized. Even though the direction of the moderation was the opposite of the direction hypothesized, empirical evidence of size as a moderator of the trustworthiness-performance relationship supports the resource-based perspective. Organizational size, CEO tenure

and environmental uncertainty appear to be important contingencies to the value of leader trustworthiness as a source of competitive advantage.

The results also indicate that leader trustworthiness has value creating capabilities that extend beyond the contextual variables examined in the study. The observed main effects for CEO trustworthiness in testing the contingency variables suggests that there are performance benefits linked to leader trustworthiness that persist across organizations and, specifically, across the situational variables examined in the study.

It is interesting to note that the results also suggest that subtle differences in perceived trustworthiness are important. Based on the scale used to measure leader trustworthiness, average trustworthiness should be represented by a score roughly equal to the scale mean of fifty-four. The trustworthiness scores for the CEOs in this study were all fifty-four or above. Therefore, no CEO in the study was considered below average in terms of leader trustworthiness. This constitutes a restriction of range in the data which generally makes detection of empirical relationships difficult. Despite range restriction, a significant relationship was observed between CEO trustworthiness and organizational performance. This suggests that only high levels of leader trustworthiness create value for the firm.

Limitations of the Study

While these results are interesting and encouraging, it is important to acknowledge several potential limitations of the research. One limitation arises from the cross-sectional nature of the data. Although the models examined in the study imply causal order, inferences concerning causality cannot be supported based on the cross-section data used in the analyses. For example, we do not know if CEO trustworthiness causes certain organizational outcomes resulting in superior firm performance as suggested by the models or if successful competitive performance causes leaders to be perceived as trustworthy. It is certainly reasonable to assume that superior organizational performance would serve as evidence of leader competence which is an essential component of leader trustworthiness. Future research should employ a longitudinal design in order to test for causality.

Another limitation of the study is the potential for inflated correlations between variables due to common method variance. Although the moderating variables of size and tenure were represented by archival measures, the perceptual data comprising the measures of organizational performance, CEO trustworthiness, and environmental uncertainty were obtained from the TMT respondents from each firm. CEO responses were included in the calculation of the means used as the performance and uncertainty variables. Therefore, there is the possibility that the reported relationships among these variables were inflated due to same-source bias. The behavior-specific design of the trustworthiness measure was considered to limit the potential for this measurement error to some degree. The severity of inflation due to same-source bias is difficult to estimate. Crampton and Wagner (1994) concluded from the results of a recent comprehensive study concerning the effects of common method variance, that inflation between perceptual measures may be more the exception than the rule in organizational research. Future researchers, however, are encouraged to utilize other measures (i.e., archival measures) in seeking to examine the relationships revealed in this research.

A third limitation arises from the survey method of data collection. With survey data, there is always the potential for response bias. Although the CEO response rate of 41% was considerably higher than the typical 10-12% response rate for mailed surveys to CEOs (Hambrick, Geletkanycz & Fredrickson, 1993), the overall firm response rate was only 33%. It is unknown how the data that might have been provided by non-responding firms may have differed from that obtained from the firms that participated in the study. It is also not possible to determine how the responses of the non-responding TMT members might have differed from their counterpart TMT members who did respond. However, having multiple TMT respondents from each firm helped to assure the validity of the data collected. Over 73% of the firms participating in the study were represented by three or more members of the top management team.

Theoretical Implications

Despite these limitations, the findings of this study make several contributions concerning strategic leadership and the resource-based perspective of competitive advantage. First, the results support the view that strategic leaders, as individuals, can make a difference. The evidence adds to that from other studies (e.g., Lant, Milliken & Batra, 1992; Pfeffer & Davis-Blake, 1986), which call into question the theoretical view of population ecologists who question whether leaders at the highest level of organizations can have any significant impact on organizational outcomes. By identifying leader trustworthiness as valuable and rare, the findings contribute to the growing upper echelon literature which seeks to identify strategic leader characteristics associated with superior firm performance. Specifically, this study adds to strategic leadership theory by: (a) identifying trust as a potentially valuable leadership characteristic which had not been studied previously in this context, (b) identifying important contingencies to it's value, and (c) offering theoretical explanations for the relationship between the trustworthiness of the strategic leader and competitive performance.

For strategic management theorists and researchers, the study implies that strategic leadership can have both personal influence and substantive components as stressed by Zaleznik (1989) and others (e.g., Bennis, 1989). This suggests that understanding the determinants of successful competitive performance will require consideration of leaders along with the more traditional concerns for substantive decisions (i.e., strategies) and environmental factors.

The study also makes a contribution toward the development of theory concerning organizational performance from the resource-based perspective. Miller and Shamsie (1996) recently pointed out that there are very few reports in the literature of efforts to establish systematically if, when, and how specific resources influence organizational performance. They further criticized the prevalence of many generalizations about the merits of some resources which fail to consider the contexts within which these resources might be of value to an organization. Miller and Shamsie (1996) also stress the importance of moving beyond interesting conceptual work to the empirical identification of what constitutes a valuable resource, why and when. This study represents one step toward answering some of these questions by identifying strategic leader trustworthiness as a "valuable" resource with the potential to enhance competitive performance. The evidence suggesting that CEO tenure, organizational size, and environmental uncertainty increase the value of strategic

leader trustworthiness should encourage the pursuit of contextual contingencies affecting the value of other resources.

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A NEW TERRITORY OF DEVELOPING DYNAMIC MARKETING STRATEGY

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ABSTRACT

The process of developing and implementing strategies has been described over the years by various terms, including budget control, long-range planning, strategic management, and strategic marketing management. All these terms have similar meanings, yet most of these strategies are implemented by computerized information systems.

The study uses some well-known methods to develop marketing strategies that will improve the service quality of local chain retailer. Based on these strategies, a computerized strategic marketing information system can be implemented to help the owner of the local, medium and small size, chain retailer making better and right daily decision. Furthermore, the study tries to find out the key successful factors of implementing a service oriented marketing management information system.

We use the IDEF0 to combine with Back Propagation Network method to find out critical success factors for small size firms whose resources are limited. With the results, a low-cost marketing strategy can be used to achieve a sustainable cost advantage for those medium and small size firms, especially when they hope to enter the era of electronic commerce. Based on these strategies and computer information system, a system of developing dynamic strategy and continuous improvement for those medium and small size companies can be done.

INTRODUCTION

Generally speaking, large and medium enterprises are financially capable enough of maintaining marketing departments of their own, or at least can afford to hire professional consultants to conduct various marketing research projects. When necessary, they can also set up a rather complicated marketing information management system so as to help predict customers' needs. On the other hand, as for the small companies mostly in the form of independent street shops or stores, they add up to a dominant percentage, 80%, of all the companies in Taiwan. These small companies, where most of us actually shop around, are much more closely related to people's daily lives. However, these independent street shops and stores, including restaurants, beauty parlors and barber shops, pharmacies, travel agencies, inns and hotels, bookstores, computer retail stores, so on and so forth, are usually not able to proceed with any work of systematic marketing management. Under such circumstances, if we can develop a simple workable system that organizes the customers' information gathered by the POS systems to predict customers' needs and thus to assist the business runners in settling upon most profitable management strategies, then we can help not only dramatically enhance the business competitiveness but also provide with better services to really

touch customers' hearts. This is right the major purpose of our study here. To simplify the information gathering processes, the study picked out a financially independent modern pharmacy as our subject. In addition to offering qualified professional pharmacological consultation, this pharmacy also sells baby goods and nutrients. It used to be one of the contracted pharmacies with the National Health Insurance Bureau, and yet quit some time ago because the cost went too high due to the governmental failure of practicing the medicine-pharmacy division policy. So far, the pharmacy runner has been looking forward to fixing upon a new management strategy in order to get a clear picture of customers' needs so as to improve customer services, heading towards the end of making this pharmacy a permanent community drugstore. To do so, the accurate prediction and control of customers' needs is the very key point.

When a customer is making her/his decision as to whether or not to buy a certain product, the price may not be the most determining factor. As a matter of fact, besides the price, customers tend to take into consideration the function(s), brand, quality, and service as well. To successfully grasp business opportunities, enterprises may well go ahead and study the "crucial moment" of decision-making. Generally speaking, customers' decision-making procedure can be most easily recognized as including the following stages: need recognition, information search, evaluation, purchase, after purchase evaluation. If a business entity can offer suitable backup in time when customers are at their crucial moment of decision-making, it is most likely to earn business opportunities. To put it another way, settling on an appropriate set of marketing strategies (Bezerra, et al., 1996; Lederer, et al., 1996), conducting precise predictions as to customers' needs, actively adjusting management factors according to various needs, a company will see its own success. So far, although some researchers have defined IDEF upon enterprise system procedures (Lingzhi, et al.,1996), when it comes to research as to customers' needs, the discussions are usually too narrowly restricted to only one certain point without considering if the process itself is appropriate and if there are other possible ways of combining the key factors of success. In this research, the story will be a little bit different. We shall introduce IDEF0, which one can find in the IDEF methodology, into the description of the quest for the key factors of success so as to find out customers' dynamic needs most suitable for financially independent street shops.

IDEF comes from the ICAM (Integrated Computer-Aided Manufacturing) project conducted by the U.S. Army (Lingzhi, et al., 1996). Basically, the main purpose of ICAM is to take advantage of the advanced computer technology to enhance productivity. To do so, the ICAM project comes up with this IDEF method to systematically describe the characteristics of production as well as production-concerned issues and then organize all these characteristics into an easy-to-interpret diagram for the sake of integration. IDEF0 is one of the methods in the IDEF methodology, and it is mainly used to describe system functions. In our research here, it is adopted to accomplish another mission: to portray the stream of key factors of success for firms. In addition, in our research, we also follow the latest findings in the field of artificial neural network and choose suitable modules for different kinds of data according to their features. Putting data in the right modules they belong to, entering the data in the network, training the network to obtain relative weights, without any specific formula, we can get the answers we want no matter what kind of data is being entered that in some way has to do with those data already exist in the system. Making use of such a network structure, we shall try to make out what important factors there are that determine how customers

choose pharmacies when they need to purchase medicine. In the past, before predictions could be made, researchers had to gather huge quantities of data and analyze them in accordance with specific formula (Felitsyn, et al., 2002). Now, following the artificial neural network, without any particular formula required, we only need to come up with a certain number of training examples with obvious features. For our research subject, the so-called "training examples with obvious features" are those which can precisely indicate what the important factors are that influence customers of each kind. Besides the traditional static predictions, the network structure can also help us do dynamic predictions anytime anywhere. Thus, the system can help business runners actively strengthen the parts of services customers pay extra attention to and therefore make companies superior to the others in the same trades. To sum up, in this research, we shall try to find out the key factors of success for companies via IDEF0, and then we shall add the findings to the artificial neural network so as to proceed with the dynamic predictions and actively provide the business runners with the latest updates of customers' needs so that they can adjust their business management strategies accordingly in due course.

The rest of this paper is organized as follows. In Section 2, we shall review the literature concerned and offer an integrated overview as to the applications of IDEF0 and artificial neural network nowadays. Then, in Section 3, we shall show how we have built up the structure of our system to put IDEF0 and artificial neural network together into one piece. Subsequently, our experiment and experimental results will be illustrated in Section 4, followed by the conclusion in Section 5. Finally, in Section 6, we shall have some discussions as to the possible directions for our future research.

LITERATURE REVIEW

At the present time, companies are situated in an ever-changing world, and changes come to existence from both inside and outside of the companies. The external changes include reforms of national economical strategies, alterations of laws and orders, as well as changes of consumption trends and industrial structures (Huang, et al., 2002; Mohan, et al., 2002; O'keefe, et al., 1998; Peppard, 2000, Taylor, et al., 2002). On the other hand, the internal changes come from personnel changes and functional changes in various departments such as production, marketing, finance, research/development, etc. All those above make the companies in this modern era have no choice but to face up to the overwhelming impact environmental changes have on them. To make a company live on forever, the company owner must adjust the major management strategies and determine the business goal in accordance with those internal/external environmental changes. Upon adjusting the management strategies, market researchers have always put much of their attention to customers' needs. However, when doing predictions, researchers usually focus their discussions on only one certain point without giving thorough descriptions as to the whole process through which the customers' needs are surfaced and then organized. In our research here, we shall adopt the procedure-describing tool IDEF0, which the U.S. Army have developed and applied with great success, to portray the path through which we search for the key factors of success. In addition, we shall also bring in artificial neural network to help us with the dynamic analyses and dynamic predictions.

Up to the present time, the IDEF project has developed 15 analytic methods in total, named IDEF0~IDEF14 (Lingzhi, et al., 1996). Each analytic method has its own field of application. On the general basis, so far, IDEF-related researches have followed the six trends right below:

(1)	Most of the researches have been aimed at how to apply IDEF to different fields of study such as corporation reformation, information system design, cost evaluation, ISO9000 introduction, integrated circuit design, space arrangement, so on and so forth.
(2)	Some of the researchers have focused their attention on developing IDEF-related modules or reference modules upon various definitions.
(3)	Some have devoted to putting IDEF into real-life practice.
(4)	Some enterprises and companies have been developing CASE tools to back-up IDEF.
(5)	Some researchers have been evaluating IDEF and comparing it with other methods.
(6)	Some have been trying to integrate different IDEF methods into a whole.

As we mentioned earlier, IDEF0 is one of the analytic methods developed by the IDEF project, and it is implemented mainly to generate a function module to offer a concise analytic method with which the user can begin the problem-solving process. Conceptually, IDEF0 comes from the Structured Analysis and Design Technique (SADT) brought up by Doglas T. Rosss during the period 1969~1973 (Lingzhi, et al., 1996). Originally, the intention of SADT was to manage to clearly and precisely depict huge, complicated systems in the form of diagrams so that, with the graphic system blueprints at hand, the analysts could easily communicate in full depth with their clients. When it comes to IDEF0, the characteristic of decomposition of the function hierarchies is added to the analytic mechanism so that the whole system can be shown on one single diagram. For example, to begin with, IDEF0 can show the system with one main block, and then the main block is divided into several smaller blocks according to the system divisions, and then every smaller block can be further divided into even smaller blocks to depict the system divisions more clearly and completely, and this dividing process can go on and on until all the details are sufficiently covered. In this research, we propose to make use of IDEF0 to look for the key factors of success and thus to dynamically find the customers' needs most suitable for the management adjustment of financially independent street shops.

Besides using IDEF0 to depict the process of looking for crucial factors of success, we shall also take in the artificial neural network system to help us pick out the factors that the majority of customers most highly weight. Then, taking these the most weighted factors into consideration, the company managers can decide on some appropriate business strategies accordingly. Basically, artificial neural network is a calculation system including both hardware and software. It uses large numbers of artificial neurons to simulate the magical ability of the neural network of a living creature. An artificial neuron is a simple imitation of a biological neuron. It acquires information from the external environment or from other artificial neurons, does simple mathematical operations, and then it outputs the result to the external environment or other artificial neurons. Recently, the

artificial neural network technique has been employed to solve problems of different kinds, such as handwriting pattern recognition, data mining, robot control, as well as optimization computations. Although the artificial neural network is said to be able to cover all the domains of industry and engineering, business and finance, and well as science and information processing, it has been mostly focused on dealing with problems in industry, engineering, science, and information processing. In the history of the literature concerning business decision-making, the artificial neural network technique has actually been scarcely ever mentioned. Among the few-and-far-between researches, the latest are Willian's study of artificial neural network as the basis of strategy planning (Willian, et al.,1999) as well as Law and Au's application of artificial neural network to the prediction of Japanese travelers' needs when the destination is Hong Kong (Law, et al., 1999). In our research, we shall adopt the back propagation network (abbreviated as BPN), one method belonging to the supervised learning network branch of artificial neural network as our module to predict customers' consumption habits. In other words, we are going to predict how customers will choose the right pharmacies for themselves in terms of the important factors that they most highly weight. We believe that our predictions can serve as valuable references for the managers or decision makers of financially independent small-scaled street shops.

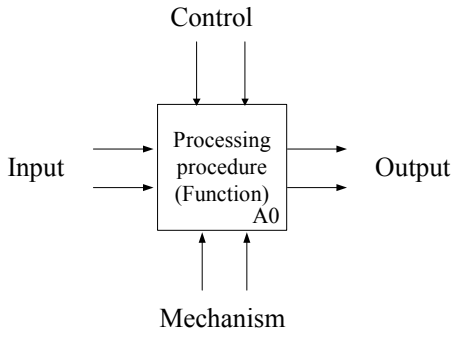
THE METHODOLOGY

In the past, when predicting customers' needs, researchers used to come to their results by means of time series or multiple regression. However, those analyses could not sequentially show the prediction procedure in full, and nor could them give dynamic prediction (Baxt, 1990; Bergerson, et al.,1991). Therefore, to improve the quality and adaptability of the prediction, in this research, we shall adopt IDEF0 to depict the dynamic prediction procedure as a whole. Besides that, we shall also take in the artificial neural network technique (Bergerson, et al.,1991) to adaptively deal with different customers differently, coming up with most suitable marketing strategy combination. The conceptual structures of IDEF0 and artificial neural network are as follows:

The Structure of IDEF0

As Figure 1 shows, the function module of IDEF0 is basically composed of five elements: input, output, control, mechanism, and function. The arrows in the figure are to show the direction of the information flow. In IDEF0, the data are rather broadly defined; in addition to general information, the data can also be any object or event that can be referred to by a noun. Usually, when one procedure is to be described, nouns have to be put down to the input part (namely the need: an example of the noun would be the product design), the output part (the result of the module operation: the production plan for example), the control part (the condition: the product quality requirements for example), and the mechanism part (the personnel for example).

Figure 1: IDEF0 function module



In this research, IDEF0 is used to depict the procedure of looking for the key factors of success for financially independent street shops (see Figure 2). The steps are illustrated in detail as follows:

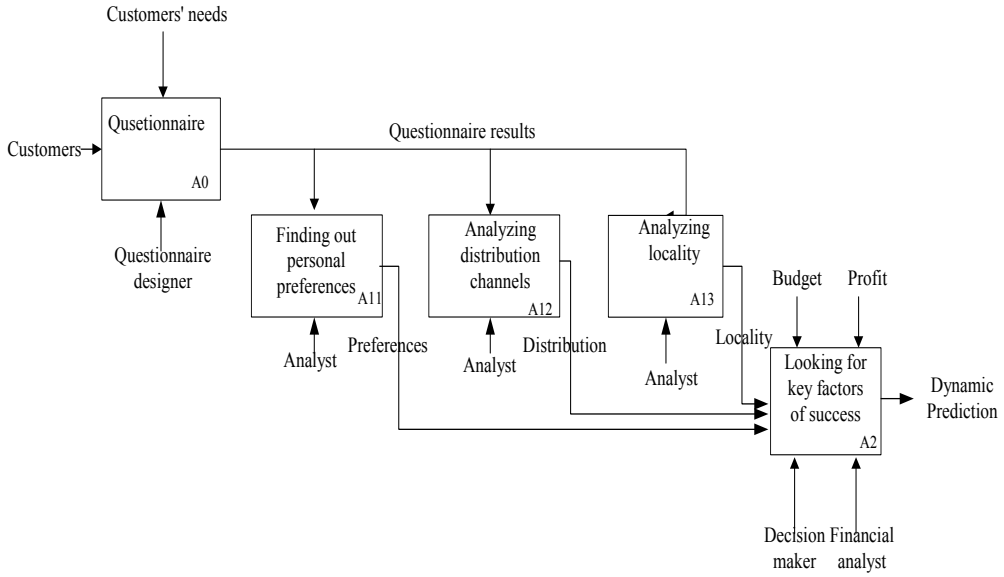
1.	*The procedure of questionnaire conducting:* First of all, the designer creates the questionnaire according to the customers' needs as well as the characteristics of the products and services the company provides. By means of this processing procedure, we can find the key factors having to do with the customers, and then we can put these key factors into other processing procedures as the control conditions.
2.	*The procedure of finding out personal preferences:* With the key factors derived in the questionnaire conducting procedure plus the customer preferences analysis done by a professional analyst, we can obtain the real personal preferences. During this procedure, the artificial neural network technique is applied to the analysis.
3.	*The procedure of analyzing distribution channels:* Distribution channels are of course different when it comes to different businesses and products. The President convenience store franchisees, for instance, attract customers by quickly satisfying their needs for everyday necessaries. To do that, they need the help from physical distribution centers equipped with giant trucks to transport products, and the frequency of goods deliveries can vary from district to district on a daily basis. However, all the varieties of commercial products are not distributed the same way; distribution channels are usually distinctly different from one another, each suiting the characteristics of the particular products it delivers. In our research, the subject is an individual pharmacy. Unlike convenience store franchisees that depend on physical distribution centers, an individual pharmacy does not need distributions of such high frequencies and heavy loads.
4.	*The procedure of analyzing locality:* There are usually different populations of consumers in different places. From the result of our questionnaire, we learn that such differences also apply in the needs for pharmaceutical supplies. In this procedure, the analysis result brought up by our analyst are to be entered along with the key factors acquired in the questionnaire conducting procedure. These inputs will be processed in this procedure, and the end product will be one of the key factors of success for the dynamic prediction of customers' needs.

5. *The procedure of looking for key factors of success:*
In this procedure, all the results of procedures 2, 3, and 4 are to be entered as the inputs. In addition, the reasonable budget and expected profit are also the conditions that have to be taken into account. As a result, we will be able to find the accurate combination of key factors of success for this pharmacy and give precise dynamic predictions of the customers' needs.

The Structure of the Artificial Neural Network

In this subsection, the application method of the artificial neural network system will be illustrated step by step. The following four passages will be devoted respectively to the introduction of the kind of artificial neural network module adopted in our research, the process of setting up the adopted module, the acquisition of the raw data, as well as the whole framework of the artificial neural network system constructed after derivation of the key factors affecting the choice of different pharmacies.

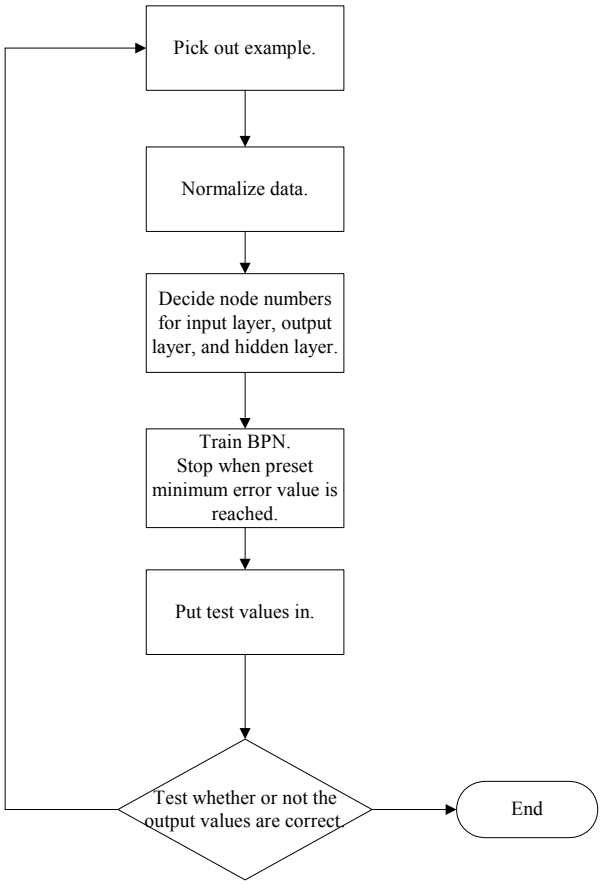
Figure 2: The IDEF0 prediction flowchart of customers' needs



1. *The artificial neural network module adopted*
Supervised learning network acquires training examples from the problem domain. Each training example has its input variable value and output variable value, learning the internal mapping rules from between the input variable value and the output variable value. After obtaining the mapping rules, in new cases where only input variable values are entered, the system can automatically derive the accurate output variable values via the rules. An artificial neural network system is composed of the input layer, the hidden layer, and the output layer. The input layer contains the input messages from the internal/external environment. This layer is composed of as many nodes as it can have, each node representing one variable. On the other side, the output layer is responsible for giving away the messages derived as the name suggests. Like the input layer, the output layer is also composed of one or more than one node. Finally, in the middle of the

	module, the hidden layer can consist of several hierarchical levels so that the interactions among the variables can be fully described in detail. The BPN system that we adopt in our research is right one of this kind of supervised learning network.
2.	*The establishment of the BPN system* The steps of the procedure of building up the BPN system are as follows, and shown in Figure 3. Step 1. Pick out representative, characteristic training examples at random. Step 2. Normalize the data. Step 3. Determine the numbers of nodes the input layer and the output layer have as well as the number of levels the hidden layer has. Step 4. Put the training examples into the BPN system. The training process stops when the minimum error value is reached. Here in this research, the training process will be put to a stop when the Root Mean Square Error stops changing. Step 5. Enter test data and observe if the output values are correct.

Figure 3: The procedure of building up the BPN system



THE DATA

The aim of the artificial neural network system we build up in this research is to predict the key factors affecting customers' decisions as to what kind of pharmacy to go to. The data we need came from anonymous questionnaires. In our experiment, we distributed 500 questionnaires in all, and 332 of them were returned with 25 copies turning out invalid. As a result, we sorted out the following eleven key factors affecting the choice of pharmacy: traffic, distance, decoration, kinds (of the medicine for sale), price, professional knowledge (of the pharmacist), introduction (of the medicine for sale), after service, promotion event(s), membership, as well as brands (of the medicine for sale). The eleven factors were then taken for nodes in the output layer. The four nodes in the input layer, on the other hand, were sex, age, educational background, and occupation that classified the customers. Consequently, the customers' needs could be more precisely predicted according to customer types. For example, when the customers were classified in terms of educational background, we found that junior high school graduates tended to weight professional knowledge (of the pharmacist), price, after service, and brands (of the medicine for sale) more than others. On the contrary, they did not seem to care much about traffic and distance.

In our research, all the data in both the input layer and the output layer were normalized. In other words, all the relative scores of the choices for every question in the questionnaire fell in the range between 0 and 1. For example, in the input layer, the item (node) "age" had six choices on the questionnaire sheet; therefore, the score range (1-0)=1 was equally divided by (6-1)=5. That is to say, the distance between a score and its next score was 1/5=0.2; namely, the score for the first choice was 0, the score for the second choice was 0.2, the score for the third choice was 0.4, …, and the score for the last (sixth) choice was 1. Traditionally, the number of nodes chosen for hidden layer is around of the half sum of the nodes among the output and input layer. Due to the total number of nodes of the output layer and input layer are 11+4=15, then the hidden layer was a mono-layer design with seven nodes in our research. The proposed artificial neural network system is composed of the input layer, the hidden layer, and the output layer; the model is shown in Figure 4.

THE EXPERIMENT AND RESULTS

In our research, we experimented on the number of the training examples employed to see how different numbers of training examples would influence the prediction result. To make a comparison, we randomly selected (1) 150 and (2) 75 questionnaires from the 307 valid pieces as the training examples, which were approximately 50% and 25% of all the valid questionnaires, respectively. In other words, the training examples all came from exactly the same source, and the only difference was the numbers of them. First of all, the raw data we obtained from the questionnaires were normalized and put to the BPN module so that the normalized data could serve as training examples and complete the training of the artificial neural network module. Then, again, we randomly selected 24 valid questionnaires (excluding those questionnaires picked out for training examples), but this time the 24 were to be used as the test questionnaires. Now, of course, the test questionnaires had to be entered in the artificial neural network system to proceed with the prediction. In our experiment, we found that the prediction result (namely the combination of weighted factors) of the 150 training examples was almost identical with that of all the 307 valid questionnaires. All the prediction results we obtained in our experiment are listed in Table 1.

Figure 4: The proposed artificial neural network model

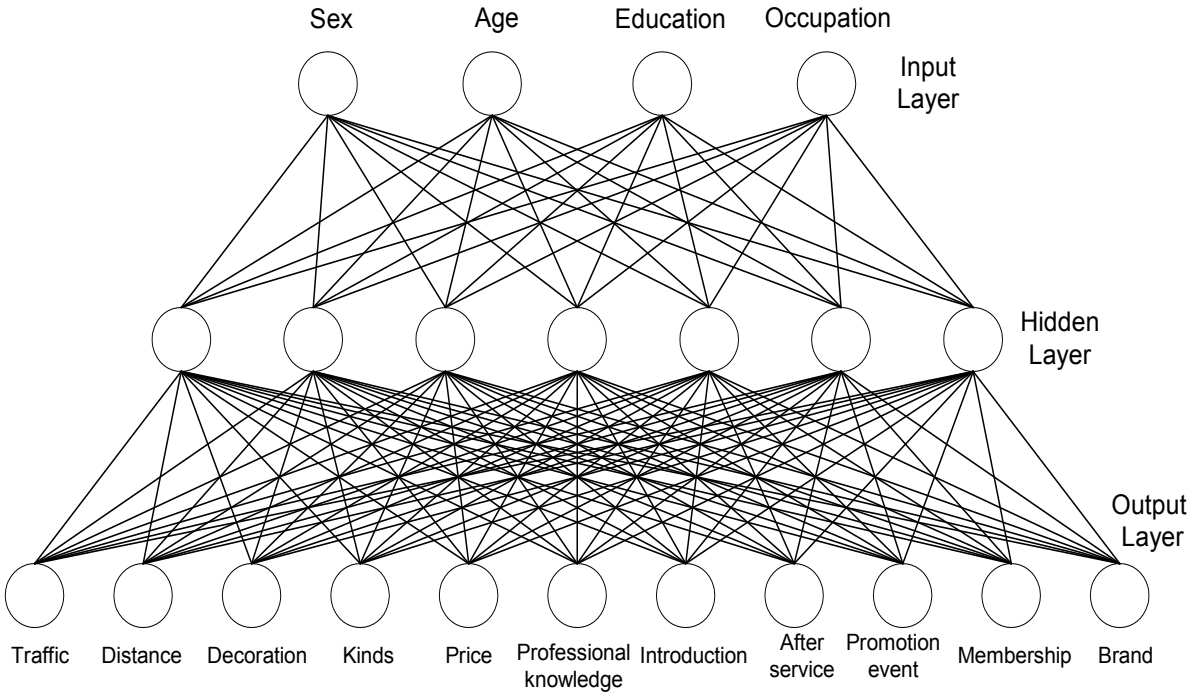


Table 1. Different numbers of training examples and their prediction results		
	Weighted factors	Un-weighted factors
75 training examples (Tested with 24 randomly selected questionnaires)	Kinds, price, professional knowledge, introduction, after service, promotion event(s), membership	Brands, distance
150 training examples (Tested with 24 randomly selected questionnaires)	Price, professional knowledge, introduction, after service	Promotion event(s), membership
24 test questionnaires	Price, professional knowledge, introduction	Decoration, promotion event(s)
307 questionnaires	Price, professional knowledge, introduction, after service	Promotion event(s), membership

To sum up, in our experiment, there are four facts worthy of attention.

1. The influence of the number of training examples:

The BPN system is mainly used for diagnoses and predictions. In order for the BPN system to work, the samples must be highly characteristic and representative. In other words, the BPN system remembers what the important factors are which affect the choice of pharmacy, and it remembers the factors according to the customer's sex, age, educational background, occupation, etc. For example, if the prediction is done for one who reports that the professional knowledge of the pharmacist does not matter at all when most people report that the professional knowledge of the pharmacist is an important factor, then the prediction will very probably be inaccurate because the samples are not sufficient in quantity. Therefore, to make the training examples highly characteristic and representative, a large number of questionnaires must be taken into account.

To take more questionnaires into account as training examples is basically for the purpose of covering the data reported by most people consulted. This way, the accuracy rate of the prediction can be enhanced. However, if most of the training examples include data highly characteristic and representative, then precisely accurate predictions can be given even when there are not as many training examples employed as there usually are. Since questionnaires themselves are subjective by nature, it is quite a challenging task to design a questionnaire with definite, characteristic items. For instance, when designing a question item as to, say, the factor "traffic," the designer should refer the customers who would report "traffic" as not important to other items that help to more clearly identify under what circumstances the factor "traffic" is not important. To put it another way, to ask about this one factor "traffic," the designer should put several items instead of just one item regarding traffic in the questionnaire so as to collect data more definite and characteristic.

2. The influence of the locality of the examinees:

From the experimental results, we have learnt that the district a consumer lives in can also be an important factor affecting her/his decision as to which pharmacy to go to. To put it another way, when selecting an ideal location to open a new pharmacy, if the future business manager uses our system to find out what factors the customers in the selected district value most and determine the management strategies accordingly, then the future pharmacy will have higher probability of success. For example, to open a new pharmacy in a high-class neighborhood, the customers' most highly valued factor would probably be the professional knowledge of the pharmacist. In this case, if the new pharmacy can do the right things about it, then it can surely gain competitive advantage. Table 2 is a list of key factors reported by interviewees from different neighborhoods.

3. The possible extension of dynamic prediction:

Everything changes. As time and environment change, the preferences of consumers will also change by more or less. Consequently, prediction of customers' needs is the work that should not be done just once; it should be performed once every certain period of time to ensure that the business manager can keep the information to date. As we know, the BPN system does predictions. If we can extend it somehow, we can not only predict customers' needs at a certain point of time but also do predictions dynamically. To do that, when making purchases, customers can be asked to fill in forms as to their needs and suggestions, which can thus be entered in the artificial neural network

system as training data. This way, the system can save a lot of human resources that would otherwise be spent on collecting data. In addition, the prediction system can be kept up to date at any time, satisfying the need for dynamic predictions.

Table 2. Locations of pharmacies V.S. key factors

	Weighted factors	Un-weighted factors
Pharmacy 1	Professional knowledge, after service	Decoration, promotion event(s)
Pharmacy 2	Professional knowledge, introduction	Promotion event(s), membership
Regardless of locality	Price, professional knowledge, introduction, after service	Promotion event(s), membership

4. The main idea:

Generally speaking, most researchers in the domain of marketing strategy, when doing research, would fix their focus upon analyzing the different weighted factors reported by different consumer populations. However, the same thing does not seem to go with this research project here. The main idea of this research is to portray the business management procedure of the store (or company, or any form of business entity) in question via IDEF0 so as to find the key factors of success for this store, and then to take advantage of the learning and identifying abilities of the artificial neural network system so that a customer can immediately get her/his favored services in the store because the clerk can just enter the four variables of this particular customer in the system and get her/his preferences report right away without having to ask the customer what she/he may be helped with over and over again every time she/he comes in.

CONCLUSION

As far as business management strategies are concerned, the customers' needs have always been important indicators that show the direction for market researchers. In as early as 1999, Law and Au did an experiment on Japanese enterprises to find out customers' needs (Law et al.,1999). They put the products in public places and made the product designers hide aside listening to customers' comments on the products. However, such an experiment design could only point out customers' static needs at best; the dynamic prediction process remained under the surface. If the dynamic prediction process can be portrayed in the form of a flowchart, then the company can examine and demonstrate the accuracy of the prediction and thus can more flexibly get control over the combination of marketing strategies. To obtain this goal, in our research here, we have adopted the state-of-the-art IDEF0 method developed by the U.S. Army to dynamically depict the procedure of searching for the key factors of success for individual companies.

On the other hand, we have also taken in the BPN technique in artificial neural network, which have yet seldom contributed to the research of business decision-making or prediction of

customers' needs so far. In our experiment, the BPN has helped to predict what the customers of an individual pharmacy really need so as to offer objective, constructive information for the decision maker's reference when the business management strategies are to be decided. Basically, in our research, the key factors affecting customers' decisions on different pharmacies were found out and collected and trained into the BPN. Then, the test data were input in the system at random, and the key factors that most customers would think of as crucial to their decisions could be sorted out. At this moment, the business manager (or decision maker) could fix upon appropriate strategies according to the most crucially influential factors, which in turn would lead to the determination of the overall goal of business management. In this way, we have actually saved all the time and energy that otherwise would have been spent to collect massive quantities of data and to employ certain given formula if we had followed traditional prediction methods. In addition to that, the major advantage of our method is that it can be applied to the business management of most industries, especially those small companies that cannot afford expensive systems. Employing our simple, efficient, economical system, as long as the analyzer can enter the preset input and output variables and offer sufficient, representative training data, we are quite sure that the accuracy of the prediction results will be much higher than one would expect it to be. In other words, so long as the artificial neural network system user can collect the data as to the customers' needs and the characteristics unique to the industry that she/he is in, then she/he can successfully build up the artificial neural network system belonging uniquely to that business and thereby come to workable marketing strategies.

Upon collecting data as to the customers' needs, besides using traditional questionnaires or interviews, we can also turn alternatively to the unique characteristics of the certain kind of business for help. For example, managers of convenience stores can gather information about their customers' needs with the assistance from the POS system, or they can collect immediate customer responses via the management information (monitoring) system. Thus, the information about customers' needs that we can input in our prediction system will be more abundant and up to date.

In addition to supervised learning network, artificial neural network also has other analytic methods in the class of unsupervised learning network, such as the self-organizing map and the adaptive resonance theory. The former is mainly used for classification, while the latter can not only do classification but also generate a new category for the data currently under processing if none of the existing categories is suitable for them. Our future studies will be aimed at applying these two methods above to empirical work. For example, when predicting needs, we can trigger the automatic classifying mechanism for the classification of customers before we predict the needs of different kinds of customers differently. Thus, the managers will be enabled to make up different plans according to the needs of different customers. As a result, the competitiveness as a whole will surely be dramatically increased.

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MILES & SNOW STRATEGIC TYPOLOGY AND ITS CURRENT RELEVANCE: AN EMPIRICAL STUDY IN SINGAPORE

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ABSTRACT

This empirical research, done in Singapore, contributes to knowledge in the area of business strategy. There is currently a lack of literature concerning the strategy dynamics of successful companies in Singapore.

The primary goal of this study is to develop a theoretically based, economical framework for the examination of the relationships between environment; competency and strategy types and performance. Broadly, the research addresses the question whether there is one best business strategy based on core competencies for a given competitive environment.

The data that I obtained from objective primary sources was subject to a series of statistical analyses. Factor analysis was performed to determine the hidden constructs which could characterize a strategy type. A multiple regression model was developed to explore whether there was any relationship between performance and the firm's competency factor, while cluster and discriminant analysis were attempted with satisfactory results.

The dissertation includes description of the theoretical literature from which the research was conceived, the results obtained and the conclusions derived from the study. The primary contribution of this research was the development of a broadly applicable model which could be a useful platform for the future study of strategy and organizational performance.

INTRODUCTION

Business challenges today are becoming more varied, numerous, threatening and urgent. Firms need to respond effectively to these challenges, which include global competition, Internet-driven upheaval, industry restructuring and market transformation to sustain growth and even to survive in the ever-changing environment. As every firm needs to compete for a set of customers against a variety of competitors and interacts with many components of its environment (Abell, 1980), getting the right `formula' for achieving success in this increasingly competitive and hostile business environment is one concern held by many in this era of rapid change.

Singapore is one of the most competitive countries in the world. The Government has adopted a free market system for Singapore to attract foreign investors to bring in both capital and professional skills. In recent years, many foreign MNCs have made Singapore their headquarters for the Asia Pacific region and the Singapore Government has also actively encouraged local firms to move away from low value-added activities to skillbased businesses. As part of the Government efforts to develop local companies' technological capabilities, a S$1 billion fund has been

established. The Government is also encouraging local firms to expand their businesses beyond Singapore. This would require Singapore home-grown companies with such interests to develop new competencies and business management and marketing know-how for managing a global business to enable them to secure a reasonable foothold in the global marketplace. Some local firms with firm commitments to expand businesses beyond Singapore have since grown to considerable size and even set up branches overseas. A few of them have gone global in a different kind of way, leveraging on knowledge tapped globally, rather than merely growing outward from a domestic base. Such Singapore-based companies include corporations such as Creative Technologies, SingTel and Singapore Technologies. Thus, Singapore is an ideal place for study given the intensely competitive market, with many international and local companies vying for a share of the respective businesses.

PURPOSE OF STUDY

The purpose of this study is essentially to explore and examine the relationships between environment, competency and strategy types on organizational performance. Such relationships are the central focus in strategic management. The study will pay explicit attention to the impact of business level strategy and environmental influences on organizational performance, using the Miles and Snow strategic archetypes as the business strategy construct, the Porter's Five Forces framework as the environmental construct and Return on Investment (ROI) as the measure of organizational performance. The analysis will focus on the management perceptions of large and medium-sized Singapore-based companies and subsidiaries of multinational companies (MNC), through responses obtained from Chief Executives or Senior Managers of business organizations from different industry sectors.

SIGNIFICANCE OF RESEARCH

Public and privately held large and medium-sized enterprises play an important role in the growth of the Singapore economy. Together, they employ about 50% of the workforce and contribute around 40% of the total value added in the economy. Their continuing growth and success is crucial, especially with increasing competition from the region and uncertainties associated with multinationals. Identifying the strategic postures and distinctive competencies of successful enterprises provides an understanding of how these enterprises remain competitive and excel in the harsh operating environment. The findings of the research are likely to be relevant and applicable to local companies and foreign companies operating under similar environmental conditions.

Some Discussion of the Relevant Literature

According to eminent academics, who include among others, Chandler (1962), Ansoff (1965), and Mintzberg (1978), strategies define the purpose of organizations, the competitive domain of firms and the resource commitment these organizations make to achieve and sustain competitive advantage. Hence, developing an appropriate strategy that fits the marketplace is one

necessary ingredient for business success, which according to Miles and Snow is `achieving fit' between the firm and its environment. In operationalizing the business strategy concept, Miles and Snow (1978), Porter (1980) and Miller and Friesen (1984) as well as other researchers have done much in developing empirical and conceptual typologies of strategies.

Essentially, Miles and Snow proposed that organizations develop relatively enduring patterns of strategic behaviour that actively co-align the organizat.ion with its environment. They viewed the `adaptive cycle' characterizing this process as involving three sets of imperative strategic `problem and solution': (1) an entrepreneurial problem set centering on the definition of an organization's product-market domain; (2) an engineering problem set focusing on the choice of technologies and processes to be used for production and distribution; and (3) an administrative problem set involving the selection, rationalization, and development of organizational structure and policy processes.In an effort to solve the entrepreneurial, engineering and administrative problems, four corresponding archetypal strategies for the four strategic types of organizations - Defenders, Analyzers, Prospectors and Reactors - emerged from Miles and Snow's investigation.

The typology as proposed by Miles and Snow (1978) remains one of the most popular approaches for defining and measuring the effectiveness of business level strategy (Zahra & Pearce, 1990). It has been debated and supported by many researchers over the years (Hambrick, 1979, 1983; McDaniel & Kolari, 1987; Meyer, 1982; Reukert & Walker, 1987; Snow & Hambrick, 1980; Snow & Hrebiniak, 1980; Zahra, 1987). These studies have contributed significantly to the body of knowledge on strategic archetypes. One study by Hambrick (1983) considered profitability of efficiency and effectiveness strategies across multiple environmental contexts, while two other studies by Snow and Hreniniak (1980), and Hawes and Crittenden (1984) separately, considered the performance of the efficiency and effectiveness strategies in a single environmental context. It was noted in Hambrick's (1983) study that the defender strategy was found to have superior profitability in all environmental contexts identified, while another study by Hawes and Crittenden (1984) found the effectiveness or prospector strategy to have a higher perceived impact on profitability. Among the studies, the interaction between strategy, environmental context and profitability was a major thrust only in Hambrick's study.

Porter (1980) introduced techniques for analyzing the environmental forces and prescribed how firms may minimize their vulnerability to changes in the environment. According to Porter, successful strategy formulation, involving the identification and exploitation of a firm's competitive advantage, arises from an understanding of the five forces affecting the firm and its competitors in any given industry: threat of new entrants; threat of substitute products; jockeying for position among competitors; power of buyers; and power of suppliers. In Porter's framework, profit potential in an industry is directly related to the collective strength of these five forces, and a firm's ultimate performance in the industry is a function of the environment and the firm's positioning in the market that will reflect its ability to establish competitive advantage over its rivals.

Distinctive competence refers to things that an organization does especially well in comparison to its competitors (Selznick, 1957) and has been the focus of many studies (Bourgeois, 1980; Day & Wensley, 1988; Hitt & Ireland, 1984, 1985, 1986). The relationship between strategy types, distinctive competence and organizational performance has been examined in a number of prior studies (Hambrick, 1983; McDaniel & Kolari, 1987; Miles & Snow, 1978; Snow & Hrebiniak,

1980, Smith, Guthrie & Chen, 1986). Conant et al. (1990) suggest that strategy types, distinctive marketing competencies, and organizational effectiveness determine how a business performs. They found marketing competencies associated with prospector type organizations superior to those of analyzer, defender and reactor type of organizations.

Most prior research in this field had been focused on the strategy or environment independently as determinants of a firm's performance. Particularly in Asia, there is a lack of studies to help enhance our understanding and ability to predict `what performance outcomes could result from following specific strategies under different environmental conditions'. This study intends to build on the findings of Don Morgan Parks in the United States who sought in his earlier study to provide an understanding of the relationship between strategy, environment and performance The focus of Parks' study was on the interaction effects of strategy and environment on performance. His main research findings based on information obtained through structured field interviews with CEOs of 50 medium-sized manufacturing firms located in the major industrial areas of Texas, confirmed that his broad research question of whether there was one best business strategy in a given competitive environment could be answered affirmatively.

My study will go further with the extension of a new `distinctive marketing competencies' dimension. For Singapore, with the Government's new economic thrust focusing on enterprises, more medium to large Singapore-based companies are encouraged, through tax and other incentives to expand businesses regionally and even internationally, and the findings of this research will provide business organizations with insights and useful information for considerations.

THE RESEARCH APPROACH

The main focus is to gather insights on how strategy types are dictated or influenced by various environmental factors as well as by internal competency factors which interface with the environment (chiefly in the marketing area). I believe that while no standardized model of inter-action type can be found unless the matter is forced by a contrived statistical approach, it is possible to find some factors which may have more influence on one type of strategic approach as opposed to another. For this study, I will classify strategy types into two groups, viz the Adaptive/Defender and the Proactive/Prospector type classifications. It is to be noted that actors, customers, environmental constraints, owner, the world view of an organization and the reality facing it are all unique, and will vary from one organization to another, and possibly up to a point from one organization type to another. But too structured an explanation or a model as to how interactions prevail (with a definitive emphasis or with a prescriptive approach) could be an exercise in futility. The following hypotheses are developed for this study.

Defender Type

The Defender Type will be able to meet competition with better management of costs and marketing mix; Will be more reliant on internal strengths for their positioning in the marketplace to meet competition, assuming such lateral movements as appropriate; Defensive posture to hold turf does not mean they would lack confidence, for they have to operate in an increasingly competitive

environment. *In other words, Defensive posture depends on internal strengths, but external hyper-competitive environment affects it just as much.*

Prospector Type

The Prospector Type is more reliant on marketing strengths and is opportunity-seeking, which includes regionalization. Has an ability to flank competition in an increasingly competitive market; Will not be solely reliant on flanking, and will be competitor-centered with focus on product offerings, quality and value for the customers; Will exhibit relatively superior collection of distinctive abilities to deal with the environment and the marketplace. Such collection of superior abilities will likely result in superior organizational performance. *Therefore, a Prospector's mainstay is marketing, but that does not mean its internal processing strength is not important.*

Besides the above, which are unique for the two respective strategy types, the following are the general hypotheses based on the literature as reviewed: Competitive forces affect all firms more or less equally; The strategic posture of a firm will be governed by the environmental factors, its reflection on the firm and its world view in relation to the said environment; The firm's distinctive competences will be developed according to its strategic posture and its world view. Hence, the two types described earlier can be distinguished in terms of competency factors by way of a discriminant model.

RESEARCH DESIGN AND METHODOLOGY

The survey instrument developed for this research is a combination of Don Morgan Parks' work and those of Conant et al (1990) - which is similar in nature, but not the same. There are a total of 10 questions for gathering the data required. For determining the strategy types of organization, I have used the Miles and Snow (1978) strategic typology. Question 2 provided the firm's ranking of resources which contributed to its distinctive competency. Questions 3 to 8 captured how the organization responded to its environment using Porter's Five Forces competitive framework, while question 9 was designed to provide information on the firm's distinctive marketing competencies. Question 10 was on information relating to the financial performance (ROI, sales revenue, market share) of companies surveyed.

We were able to get 64 usable responses out of the 100 targeted medium to large companies in Singapore. In the Singapore context, this has often been the most difficult part of any market-based study. Most of the firms which responded to this survey had been personally approached. Though random sampling in the strictest sense was not done for this research, its purpose was still maintained, as the probability of companies being included in the sample was independent of any other factors, other than just getting them, through introduction from various contacts, to agree to respond to the survey questionnaire. The sensitive nature of the questions did not allow any other means to enable a sufficient response with reliable data for analysis. It is common knowledge that companies in this region are not very receptive to research investigations for fear that proprietary information provided may somehow be used against them, either directly or indirectly by their competitors. This apprehension remains even tough researchers often stress that

data collected will remain confidential and any released results of the study will be at the aggregate level and not identifiable with a particular company.

Singapore's economy is roughly divided between the State sector and MNCs with a small part strictly privately owned locally. Big companies such as SIA, Port of Singapore Authority (PSA) and DBS (the largest bank in Singapore) are all State-owned and do not respond to surveys of this type (though I tried). There are more than 1,000 organizations State-owned (due to historical reasons), and this was a further major constraint on the responses I received. Within these severe limits, the sample size or response received was not so small considering Singapore's small economy

DATA ANALYSIS AND RESULTS

Data obtained from the survey through interviews was subject to a series of statistical analyses. Measures of central tendency, such as the mean and median, as well as standard deviations, were obtained from the analysis, and the t-test among others was conducted as appropriate. Factor analysis was performed to determine the hidden constructs which could characterize a strategy type and its given environment. It was noted through cluster analysis that the sample did in fact divide and fall under the two strategy types. A multiple regression model was developed to explore whether there was any relationship between performance and the firm's competency factor. A discriminant analysis was also attempted.

The general profile of the surveyed companies is shown in Table 1. The companies are categorized into the four industry types: manufacturing, retail, engineering, services and others. The response obtained from the sample was adequate for analysis.

Table 1: Industry Categorization of Surveyed Companies

	Industry Category	Percentage of Respondent
1	Manufacturing	21.5%
2	Retail	10.8%
3	Engineering	24.3%
4	Services & others	43.2%

According to the perceptions of the respondents on the strategic orientation of their firms, the majority of companies surveyed belonged to the Prospector type, total 37 or about 57.8 per cent. The Defender's strategy type formed about 27 of the 64 companies or 42.2 per cent. The ranking of contribution of the distinctive competencies to their businesses are given in Tables 3 and 4.

Table 2: Strategy Types of Surveyed Companies					
Defensive/Prospective types		Frequency	Percent	Valid percent	Cumulative percent
Valid	Defensive group	27	42.2	42.2	42.2
	Prospective group	37	57.8	57.8	100.0
	Total	64	100.0	100.0	

The means for Distinctive Competencies are summarized in the following table:

Table 3: Distinctive Competencies (1 - Most; 2 - next; and 5 is least, etc.)			
Question	Distinctive Competencies	Defenders' Mean	Prospectors' Mean
Q2 (a)	Financial Management	3.00	3.54
Q2 (b)	Sales	2.96	2.38
Q2 (c)	Market Research	3.19	3.59
Q2 (d)	Product R&D	3.08	2.43
Q2 (e)	Industrial Engineering	3.96	3.91
Q2 (f)	Production	3.65	4.26

Table 4: Ranking of Distinctive Competency		
Rank	Defenders	Prospectors
1 - Most Important	Sales	Sales
2	Financial Management	Product R&D
3	Product R&D	Financial Management
4	Market Research	Market Research
5	Production	Industrial Engineering
6 - Least Important	Industrial Engineering	Production

Both groups ranked Sales as the most important distinctive competency. The Prospector group has an edge in both Sales and Product R&D capabilities, giving them the confidence to explore, while the Defender group emphasized Financial Management and Production. These perceptions were clearly indicated by the means. These results did reflect the nature of the Defenders and the Prospectors. It was also noted that the Defender group indicated a lower mean for market

research (i.e. more contribution to develop this competency). This may be because the Defender companies carefully searched out market segments that were most profitable to serve and then concentrated their efforts there.

RANK ORDER OF COMPETITIVE FORCES

An overview of the 5 competitive forces can be obtained from Question 8. The higher the mean scores, the more importantly the firm viewed its importance for the firm's success. The results showed that both strategy type companies viewed jockeying among competitors as the most important competitive force while that of the bargaining power of suppliers was the least important.

Table 5: Competitive Forces Viewed as a Group (Scale: 1-Least Important ... 5-Most Important)

Question	Key Content	Defenders' Mean	Prospectors' Mean
Q8 (a)	Competitive Forces: Threat of New Entrants	2.7353	2.7619
Q8 (b)	Competitive Forces: Threat of Substitute Products	3.0000	2.7143
Q8 (c)	Competitive Forces: Jockeying Among Competitors	3.5294	4.0952
Q8 (d)	Competitive Forces: Power of Buyers	3.1765	3.5238
Q8 (e)	Competitive Forces: Power of Suppliers	2.5588	1.9048

As previously mentioned and which can be seen from the Table above, Jockeying among competitors was the most important factor for both the Defenders and the Prospectors. Ranking of the competitive forces is as shown below:

	Defenders	Prospectors
Threat of New Entrants	Fourth	Fourth
Threat of Substitute Products	Third	Third
Jockeying among Competitors	First	First
Power of Buyers	Second	Second
Power of Suppliers	Fifth	Fifth

The results obtained in this question are consistent with the results obtained when the individual competitive force is examined. An embedded hypothesis that competitive forces were affecting all firms more or less equally was confirmed here. Both strategy types ranked the competitive forces in the same order and viewed the environment as equally competitive.

The above results as perceived by the respondents are subject to further tests to confirm that these samples indeed fell into two distinguishable groupings (Prospectors and Defenders) so that the hypotheses developed in regard to the two groupings could be meaningfully analyzed. The subsequent statistical analyses would be a more holistic one (with tests involving factor analysis, cluster analysis & discriminant analysis) rather than a discrete or incremental one.

Factor analysis is used in this research to confirm the hypotheses developed. The strategic approach of both the Defenders and Prospectors is the main focus of this empirical study and thus factor analysis can assist in accepting or rejecting the hypotheses. A total of 24 variables were examined to assist in the process of testing the hypotheses. The variables analyzed include Q3a, Q3b, Q4a, Q4b, Q5a, Q6a, Q6b, Q7a, Q7b, and Q9a-Q9o. While Q3 to Q7 focus on the five competitive forces - used as the construct for environment, Q9's focus is on the competencies of the firms. These questions are chosen to determine the necessary distinctive competencies needed to deal with the environment for each strategy type.

ANALYSIS OF RESULTS FOR FACTOR ANALYSIS

Table 6: Total Variance Explained

Factor	Defenders		Prospectors	
	Initial Eigen values		Initial Eigen values	
	Total	% of Variance	Total	% of Variance
1	8.361	34.839	8.089	33.705
2	2.882	12.007	3.056	12.733
3	2.494	10.391	1.815	7.563
4	1.605	6.689	1.689	7.036
5	1.454	6.060	1.567	6.527
6	1.320	5.499	1.229	5.122
7	1.156	4.819	1.178	4.907
Total %		80.304		77.593

The results of the analysis yielded 7 factors (with Eigen values greater than 1.0) for both the Defenders and the Prospectors. In the case of the Defensive group, 80.3 per cent of the variability can be explained by the 7 factors obtained. On the -other hand, the 7 factors obtained for the Prospective group explains 77.59 per cent of the total variability.

Table 7: Factor Analysis - Defenders			
The Defender Companies			
Factor	Question	Description	Factor Loading
1	Q9 (f)	Marketing planning process	.766
	Q9 (h)	Skill to segment and target markets	.790
	Q9 (1)	Effectiveness of public relation	.876
	Q9 (m)	Image	.752
2	Q9 (a)	Knowledge of customers	.706
	Q9 (c)	Knowledge of industry trends	.896
3	Q7 (b)	Inputs from other sources	.781
	Q9 (g)	Integration of marketing activities	.712
4	Q6 (a)	Power of buyers	.847
	Q7 (a)	Power of suppliers	.773
5	Q9 (n)	Effectiveness of cost containment	.831
6	Q3 (a)	Threat of new entrants	.784
	Q3 (b)	Regionalization	.874
7	Q5	Jockeying among current competitors	.796

From the above factor analysis, we could confirm that the hypotheses developed for defenders are supported. As Defenders tended to focus their marketing efforts on the buyers whom they could most profitably satisfy, they highly valued competencies that allowed them to identify the most attractive market segments to serve. Given their concentration of resources and competency in one or the few niches that they operate in, they may be able to profitably serve selected markets and customers better than Prospectors. Q7 (b) may reflect a characteristic of Defenders of beinge cost-effective. The results showing that the power of the buyer was loaded so high on factor 4 confirmed the fact that Defenders were often very dependent on only one or a few specific customers. They seemed also to be highly dependent on a few major suppliers, perhaps to get the most cost-competitive supplies. Factor 5 was characteristic of the Defenders, which typically concentrated on achieving efficiency and watching their operating cost. Defenders are also of the view that regionalization through offering existing products to new markets might be a good solution as leverage to counter loss in revenue due to increasing competition locally.

Table 8: Factor Analysis - Prospectors			
The Prospector Companies			
Factor	Question	Description	Factor Loading
1	Q5	Jockeying among current competitors	.71
	Q9 (f)	Marketing planning process	.804
	Q9 (g)	Integration of marketing activities	.832
	Q9 (h)	Skill to segment and target markets	.843
	Q9 (i)	Quality of service and offerings	.737
	Q9 (j)	Effectiveness of pricing program(s)	.788
2	Q6 (b)	Alternative buyers found in the region	.899
3	Q3 (a)	Threat of new entrants	.735
	Q4 (a)	Threat of substitute products	.776
4	Q9 (a)	Knowledge of customers	.856
	Q9 (c)	Knowledge of industry trends	.620
5	Q9 (1)	Effectiveness of public relations	.886
	Q9 (k)	Advertising effectiveness	.693
6	Q4 (b)	Beating competition	.763
7	Q5	Jockeying among current competitors	.796

The findings from the above factor analysis confirmed that Prospector companies tended to combine their marketing strengths with an outward focus on the market and customers and would use flanking as a strategy as and when appropriate to beat competition. Hence, the hypotheses developed for Prospector could be supported. Evidence also showed that Prospectors had strong competencies for marketing, particularly in marketing planning, segmentation skills and integration of marketing activities. As Prospectors operated on a broad product domain, they were not dependent on specific customers and were confident that alternative buyers could always be found. The threat of new entrants was high because Prospectors were often in markets that were attractive to many competitors due to the high growth potential. The high loading on knowledge of customer and industry trends showed that Prospectors were competitor-centered and marketing oriented with focus on constantly identifying and satisfying the needs of customers with value, quality and good product offerings. It was also evident that Prospector type having exhibited relatively more superior collection of distinctive abilities to deal with the environment/marketplace would probably result in superior organizational performance.

Cluster Analysis

The distinctive competencies of the responding companies and their interactions with the environment were cluster analyzed. The classification result is encouraging, as the predictive accuracy of the two clusters as identified is quite high. Cluster 1 identified 22 Defensive companies as against 27 perceived by the respondents, while Cluster 2 classified 38 companies as Prospective companies as against 37 classified by the respondents directly.

Table 9: Clustering of companies based on interactions with Environment & Competency

	Cluster	
	1	2
Threat of new entrants	3	4
Regionalization	4	5
Threat of substitute products	4	4
Beating competition	4	5
Jockeying among current competitors	4	5
Power of buyers	4	5
Alternative buyers found in region	4	5
Power of suppliers	4	4
Inputs from other sources	4	4
Knowledge of customers	4	5
Knowledge of competitors	5	5
Knowledge of industry trends	5	6
Awareness of organizational marketing strengths	4	6
Awareness of organizational marketing weaknesses	3	5
Marketing planning process	3	5
Integration of marketing activities	3	5
Skill to segment and target markets	4	6
Quality of service and offerings	4	6
Effectiveness of pricing program(s)	4	5
Advertising effectiveness	3	5
Effectiveness of public relations	4	5
Image	4	6
Effectiveness of cost containment	4	5
Control and evaluation of all and in particular marketing activities	3	5

Multiple Regression and Discriminant Analysis

The objective is to determine the magnitude of impact of each competency on ROI, and also to confirm whether the Prospectors will perform better than Defenders. A comparison is done between the regression model and the discriminant model in terms of the signs and the magnitude of the coefficients. The purpose of this analysis is to see whether there is a relationship between the competency factors of a firm, the environment factors, the strategy types and the performance of the firm.

Table 10: Comparison of Coefficients of Multiple Regression (model 8) and Discriminant Model

		Multiple Regression (Beta)	Discriminant Model
Q9 (j)	Effectiveness of pricing programs	1.605	.404
Q9 (n)	Effectiveness of cost containment	1.510	.128
Q9 (k)	Advertising effectiveness	.808	.392
Q9 (1)	Effectiveness of public relations	1.340	-.251
Q6 (b)	Alternative buyers found in region	.655	.100
Q9 (o)	Control and evaluation of all and in particular marketing activities	.878	.033

There are 3 positive matching factors (Q9j, Q9k, Q9n), and 3 matching negative factors (Q6b, Q91, Q9o). The range of values of the coefficients of the variables in the discriminant model is between -0.033 and 1.161. The range of values of the coefficients of the variables in the regression model is between -1.495 and 2.245. The matching variables are not among the more heavily weighted variables in their respective models. I cannot conclude from the result of this analysis that Prospectors have a higher tendency than the Defenders to perform better. It could be deduced from the study that the successful performance of companies is contingent on the `fit' that their strategies have with the environment. In the long run, it is expected that most of the organizations will eventually evolve to adopt the Prospector type of strategy.

CONCLUSIONS

The results of this empirical research are significant for several reasons. Firstly, the results provided support for the recent arguments of some strategy scholars regarding the importance of strategy, environment and competencies to firm performance. As importantly, the results confirmed the view that both large and medium companies in Singapore, as well as subsidiaries of major MNCs, aligned their strategic posture and formulated competitive strategies (adaptive/Defender or proactive/Prospector) in congruence with the requirements of their environment, and that there was a positive relationship between firms' performance and their distinctive competencies. The results

also showed that the character of firms was more dominated by `competencies' factors and provided support for the resource-based view of the firm which has been presented by many scholars and researchers in recent years (Barney, 1991; Peteraf, 1993; Robbins & Wiersema, 1995).

Throughout the whole empirical research, I have attempted to link the performance of a firm in a given environment to its nature and characteristics. This suited the Singapore context and its small economy. As the analysis of the data and the results have been discussed, for the sake of completeness, let me revisit the hypotheses and present in the following paragraphs a summary of my findings in the form of the following propositions:

- Competitive forces affect all firms more or less equally, but their response to them will be governed by the innate character of the firm and how it sees itself in relation to the competitive environment. It is interesting to note that both groups ranked distinctive competencies in the same order.
- I can conclude that the strategic posture will be mainly governed by the environmental factors and its reflection on the firm and how the firm views itself in relation to the environment surrounding it. The cluster analysis result reflected this proposition. Two clusters were formed - 22 (versus self-assessed 27) members in cluster 1 for Defenders and 38 (versus self-assessed 37) in cluster 2 for Prospectors.
- A firm's distinctive abilities to deal with the environment will mainly be developed in consonance with its strategic posture, such as whether it views itself as having a proactive (Prospector strategy type) or adaptive (Defender strategy type) nature. It was anticipated, as hypothesized by Conant et al, that those of proactive nature would possess a higher degree of distinctive competencies to deal with the environment.
- I can further deduce that the performance of firms, as measured by Return on Investment (ROI), will probably have some positive relationship with having a higher degree of distinctive competencies. A finding by Conant et al suggests that Prospectors will generally do better in terms of performance than Defenders. The slightly lower than ideal R square percentage and the matching variables not being among the more heavily weighted variables in their respective models (see table on comparison of coefficients of multiple regression and discriminant model), prevented a conclusion from the results of this analysis that Prospectors have a higher tendency than Defenders to perform better. Hence, the hypothesis that Prospectors will perform better than Defenders is supported only indirectly by earlier findings that Prospector firms with a higher scale in knowledge of customers, integration of marketing activities, and effective pricing programs, will tend to perform better. In earlier research by Miles and Snow (1978), it was found that all three more stable archetypal styles (Defenders, Prospectors and analysers) are equally likely to perform well, given that they respond to the challenges of the adaptive cycle in a consistent fashion.

The findings of this study are largely consistent with those of Don Morgan Parks' (1988) work. The majority of firms (37 out of 64 firms) surveyed have adopted a Prospector type strategy (Prospector and Analyzer), which may be because most of these enterprises are from the service industry sector which requires them to have a strong entrepreneurial orientation with particular focus

on marketing and sales and product R & D. The Prospector type strategy has proved effective for these organizations. For the other 27 firms which have adopted a Defender type strategy, it could be due to the fact that most of these enterprises are business organizations supporting MNCs which require them to be cost-efficient and focused. In the long run, however, as the environment changes, these firms may have to adopt other strategy types and move towards a more proactive strategy, such as Prospector and Analyzer types (Conant et al., 1990).

This study, in exploring the correlationship between environment, strategy types, competency and performance, attempts to contribute to research on strategic management. The results in the study will have implications for business strategy researchers in terms of suggestions for further research, as well as for business managers on how the findings could be put to practical use. For practicing managers, the empirical evidence from the study could provide useful suggestions on how appropriate approaches could be adopted to achieve superior performance, considering the environment, the strategy types and the competencies of the respective business organizations. As for strategy researchers, one possibility for further research could be to build on the findings of this empirical study by using other underlying dimensions for the Gestalt characterization of business strategy. New studies could also be carried out to test other characterizations of competitive conditions that could influence business level strategy, and which could help facilitate our understanding of the contingency relationships emphasized in this study.

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AN INTEGRATION ANALYSIS OF MATERIAL REQUIREMENTS PLANNING, JUST IN TIME, AND THE THEORY OF CONSTRAINTS

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ABSTRACT

This study will detail many strategic aspects of MRP, JIT, and TOC in the areas of planning, execution, and scheduling of production systems. Critical questions will be addressed such as which control schemes to employ, how and where to assign WIP inventory, how to coordinate WIP inventory, and how to introduce raw materials into the system. There are several components of the three strategies that actually complement each other and go hand in hand. Using certain aspects of these three philosophies will allow management to minimize WIP, which will transcend an outflow of positive benefits. The implications of using MRP as a planning tool, JIT as an execution tool, and TOC as a scheduling tool could be very advantageous when applied to the right application.

STATEMENT OF THE PROBLEM

Orlicky (1975) and Fogarty, Blackstone, and Hoffman (1990) note that variation between the master production schedule and actual production will emanate even when the schedule is not embellished. This disparity is brought on by a miscellany of unplanned events that transcend typical manufacturing operations. The development of production control systems would be simple except for the existence of these unplanned events.

These events consist of (but are not limited to) machine breakdowns, tool breakages, worker absenteeism, lack of material, scrap, rework, customers who change their minds on timing and quality, etc., and the fact that operations are interdependent. Development of random fluctuations and dependent events cannot be prevented, but they can, and should, be compensated for through strategic planning.

When dealing with manufacturing control systems, problems arise when the need to answer critical questions go un-addressed, such as:

1.	Which control schemes to employ,
2.	How to assign protective WIP inventory to the associated work centers,
3.	How to coordinate WIP inventory required for assembly of the products, and
4.	How to introduce raw material into the system.

IMPORTANCE OF THE RESEARCH

Aggarwal (1985) states: A revolution is occurring in operations management. During the last few years, three important approaches--material requirements planning (MRP), kanban (JIT), and optimized production technology (OPT) (or TOC)--have invaded operations planning and control in quick succession, one after the other. Each new system has challenged old assumptions and ways of doing things. These innovative methods are completely changing not only manufacturing processes but also operations management. Factory managers must decide which strategy to adopt to meet current and future needs. Installing any one requires several years to train company personal and millions of dollars of investment. Aggarwal goes on to state: During the remainder of this century and perhaps during the early part of the next, managers will be faced with the question of which one to choose to run their factories. Goldratt and Fox (1986) report: The Western manager is challenged to solve a very fundamental problem from this alphabet soup of solutions. To understand each of these new technologies, can by it self, be a time-consuming challenge. Deciding which is best is a formidable task. Figuring out how to put them all together seems beyond our reach. Since we don't have the time, resources or funds to do everything, everywhere, we had better be convinced that we are taking the actions that will leapfrog us back into the race. There is no longer margin for error and no time for risky experiments.

It will be of significant importance to the practitioner to discern the relative differences and the associated considerations that evolve around the strategic choice of an inventory control method and management philosophy. This review had the goal of minimizing the investment of time and capital required in making that choice.

PURPOSE OF THE RESEARCH

The purpose of this research will be two fold. The first objective will be to detail the many positive and negative aspects of MRP, JIT, and TOC as they apply to a manufacturing system. The second objective will be to bring about and develop a new concept of an integrative model of MRP, JIT, and TOC. This new model actually considers the most positive strategic aspects of each management philosophy and ties them together in a usable format. The format should assist strategic management in the areas of planning, execution, and scheduling of its own production process.

MATERIAL REQUIREMENTS PLANNING LITERATURE REVIEW

Starting in the sixties and on into the seventies, the basic elements of an integrated production planning and control system known as MRP were established. Orlicky (1975) states: In some rudimentary form, it (MRP) has no doubt existed as long as manufacturing. It has been evolving gradually, moving onto successively higher plateaus with every enhancement in data-processing capability. Material requirements planning had its origin 'on the firing line' of a plant. Practicing inventory managers and inventory planners have painstakingly developed it into its present stage of relative perfection.

MRP is a planning system that performs calculations to determine the net gross requirements for a stated dependent demand. Through the bills of materials, MRP explodes the top level of part number demand. It then considers inventory currently on hand along with current orders and balances the net requirements for production. Tersine (1988) claims MRP enables manufacturing organizations to maintain minimum levels of dependent demand items, yet it assures that production schedules for the independent items can be met. By attempting to produce and manufacture on an as needed basis, MRP makes an effort to drive excess WIP inventories to zero.

Contrary to Tersin's position, Fox's (1980) report on Booze, Allen, and Hamilton's survey, and a survey by Anderson, Schroeder, Tupy, and White (1982) have indicated that the majority of the firms that have attempted MRP implementation have had less than satisfactory results. Cox and Clark (1984) listed several technical problems with MRP systems in practice such as management of inventory levels. Whiteside and Arbose (1984) report that some critics believe that MRP is a $100 billion mistake. They go on to quote a study conducted at Chalmers University in Sweden that claims companies using MRP production and planning systems have preserved high levels of inventories as usual. Additional surveys by LaForge and Sturr (1986) and Cerveny and Scott (1989) substantiate these findings.

Many of the problems inherent to MRP can be based on the requirements that are placed on it. Ptak (1991) reports: MRP is not an execution tool. It only recommends actions that human planners must either ignore or carry out. Most importantly it is capacity insensitive. It does not check the feasibility of the master schedule. It is solely the processing logic to determine the requirements to fulfill this externally supplied plan (schedule). Chang and Yih (1994) and Spearman (1992) agree, due to capacity constraints (in MRP) lead times are over estimated and WIP inventory levels are further increased.

JUST IN TIME LITERATURE REVIEW

The first records of the JIT management philosophy stem from the efforts of Henry Ford and his assembly line operations. The Japanese in general and Toyota specifically have taken the approach and concepts of Ford and expounded on them. The JIT philosophy has led to the development of systems that intended to reduce the amount of required WIP inventory, and thus to remain competitive in the market.

The elimination of waste is the fundamental driving force of the JIT philosophy. Waste is considered to be anything beyond the absolute minimum resources of manpower, materials, or machinery required to add value to the product. Value is added to the product only with the effort of direct labor. Indirect labor adds cost but not value. Cost without value, is considered to be waste and should be minimized if not eliminated. Because of the limited natural resources of Japan, this philosophy is a natural strategic fit for the Japanese society.

After World War II, the United States began to lose ground on its competitive advantage. The first reaction was to copy the JIT management philosophy of Japan. The problem with this was the JIT philosophy is not just a software package that could be bought off the shelf and implemented. The JIT philosophy is considered to be a relentless never-ending crusade for the total

elimination of waste, and increasing respect for people. This idea cannot be limited to manufacturing alone, but must be extended throughout the entire organization.

Burnaham (1987) points out that JIT implementation has been successful in the United States when effectively implemented. The success can be attributed to an emphasis on learning new ways to train employees, on improving cooperation, and on determining role change needs. He also states there are a few major barriers to implementation such as the fear of change, the misplaced focus on labor savings, the use of efficiencies, and the lack of human relations development as a method of improvement. Another study conducted by Im and Lee (1989) revealed benefits based on the implementation of JIT. They summarize the possible improvements to production planning, shop floor control, master production scheduling, and material requirement planning.

Crawford, Blackstone and Cox (1988) surveyed companies that have implemented JIT and have identified benefits and problems associated with the implementation. This survey showed an average company-wide reduction of 41% in WIP inventory, with reductions in manufacturing cost of 17%, and reductions of lead-time by an average amount of 40%. The problems that were reported fell into several categories; resistance to change; lack of resources; lack of commitment; and lack of a solid base of performance measurements. They also listed problems as interfacing with existing MRP systems and line balancing.

Bartezzaghi and Turco (1989) reported on the impact of JIT as it applied to production performance. Gilbert (1990) randomly selected and surveyed a total of 250 U.S. manufacturing firms to determine the extent of JIT implementation. This study found there was a significant reduction in the investment of inventory associated with the implementation of JIT.

Schonberger (1982) and Schonberger and Gilbert (1983) have reported that major drawbacks exist in the implementation of JIT because they require a long time to implement successfully. Even though the system is relatively simple, implementation, which involves education, training, improved supplier relationships, etc., can be arduous.

THEORY OF CONSTRAINTS LITERATURE REVIEW

The Theory of Constraints was developed through the efforts of a physicist, Eliyahu Moshe Goldratt. The original name for the Theory of Constraints was Optimized Production Timetables, which was established in 1979. In 1982 the name was changed to Optimized Production Technology, again in 1984 to Synchronous Manufacturing, and finally in 1987 to Theory of Constraints. In this study OPT and TOC will be used synonymously.

Goldratt and Cox (1992), authors of the book "The Goal," demonstrate how methods of management in several areas of manufacturing can be improved. These areas have historically been managed by decisions based on traditional managerial cost accounting assumptions. They go on to state that since people have sufficient brainpower, they just need to look at reality logically. Challenging present assumptions is essential to strategic breakthroughs, yet few challenge these assumptions. In a study by Frazier and Reyes (2000), they describe how one manufacture, in a three-month implementation period, reduced WIP inventory to 1/3 of its original value, reduced raw material inventory by 30%, and on-time completion of projects increased by more than 20%. Umble and Umble (2001) report similar findings with reductions of 60% in WIP, on time deliveries at an

astounding 94.6% with sales increasing by 15%. Miller (2000) adds that with TOC, companies are more flexible, robust, and responsive than ever before.

The Theory of Constraints is based on a combination of logic and intuition directed toward the purpose of continuous improvement. The intuition required is based on an educated sense that is developed through experience. The logic is derived through utilizing Effect-Cause-Effect analysis with features that check accuracy, logic, and the actual existence of the cause and effects and their associated relationships.

According to Rack and Rack (1993): TOC is a thinking process used to analyze problems, create or choose appropriate solutions and get buy-in to achieve successful results. Although it is demonstrably very powerful, it is not difficult to understand. Because the process utilizes how man was designed to think, it works for almost everyone interested in tapping into his/her own abilities. The appropriate use of the thinking process significantly impacts the goal and is intrinsically rewarding to the one(s) using it.

Goldratt (1990) states that if you focus on everything under the realm of your responsibility you in fact focus on nothing. Therefore he states that you should focus only on a small portion of it; spreading attention equally to all portions of the area means no concentration whatsoever, no focusing. With this thought in mind, there must be areas that would require concentrated efforts. Those areas of needed concentration should be the areas that make up the weak link in the operation.

The main force behind TOC is based on a desire of continuous performance improvement by maintaining a process of ongoing improvement. The improvement is always concentrated on and stems from Goldratt's (1990) five steps of constraint management, which are as follows:

1.	Identify the system's constraint(s).
2.	Decide how to exploit the system's constraints.
3.	Subordinate everything else to the above decision.
4.	Elevate the system's constraint(s).
5.	If, in the previous steps, a constraint has been broken, go back to step one, but do not allow inertia to become the system's constraint.

These five steps are a simple framework for the thinking process.

Using the concept that a constraint is anything that limits the organization from achieving its goal, the steps to improve performance can be easily defined. An integral part of TOC consists of the following framework:

What to Change? - Find the core problems.
What to Change to? - Devise simple, practical solutions.
How to Cause the Change? - Cause others to invent or discover the ideas.

The three elements of change are techniques for verbalizing our intuition so we can check its soundness and communicate it clearly to others. Because formal education has been based on

the Aristotelian rather than the Socratic approach, one's logic skills are often not well developed in the above areas.

MRP, JIT, AND TOC COMPARISON LITERATURE REVIEW

The three management philosophies of MRP, JIT, and TOC were reviewed by Everdale (1984) based on his experiences in operations management. He resolves: "Suffice it to say that JIT proceeds one step further than OPT and does not synchronize operations and eliminates many `Murphy's' that OPT recognizes as constraints. However, OPT, like JIT does not address all the planning support activities of MRP, since OPT focuses primarily on Master Scheduling, Material Requirements Planning, and Capacity Planning, integrating these to a far greater degree.

Two other studies, evaluating the three management philosophies, performed by Plenert and Best (1986) and Sohal and Howard (1987) support the same conclusions. They state in their studies that JIT and OPT are both more productive than MRP, and OPT is more complete than JIT. Fogarty, Blackstone, and Hoffman (1990) have stated that the MRP approach to the problem of random fluctuations and dependent events is to eliminate the dependence by holding large amounts of safety stock at every work station. They go on to state that the JIT approach is to eliminate the random problems by exposing the problem and eliminating it. Both MRP and JIT believe that the ideal plant is balanced to the point that every work center has the same output potential.

TOC approaches the problem by accepting the fact that balanced plants just do not exist (Goldratt 1991). In this case, some work centers will have more or less production potential and the one with the least will be the system constraint. In this event, TOC breaks dependencies by establishing material buffers only at the constraints. Non-constraints will usually not have material buffers but will deal with the dependency through excess capacity buffers. Fogarty, Blackstone, and Hoffman (1990) point out that to add inventory at a non-constraint will cause an increase in lead-time and cause WIP inventory to increase with little tangible benefit.

Cook (1994) and Lambrecht and Segaert (1990) conclude that DBR (TOC) leads to significantly higher level of throughput when compared to the same system under a JIT/Kanban control system. Lockamy and Cox (1994) and Ronen and Spector (1992) state that TOC can be used to aid in focusing on system improvements and adoption of JIT. Thuannadee (2000) states that scheduling material flow from the bottleneck in some form of JIT style has the greatest effect on lowering WIP inventory levels. Miltenburg (1997) expounds on the various elements on MRP, JIT, and TOC and how they can be successfully embedded into each other.

INTEGRATION OF MRP-JIT-TOC

As stated in the introduction, one of the objectives was be to bring about and develop a new concept of an integrative model of MRP, JIT, and TOC. This new model actually considers the most positive strategic aspects of each management philosophy and ties them together in a very manageable format. The format should assist strategic management in the areas of planning, execution, and scheduling of its own production process.

There is no single method of management that best fits in all environments due to the many variations in production and the many positive and negative aspects of MRP, JIT, and TOC. Production variability in the 'real world' depends upon statistical fluctuations and not mean-value averages. Traditional MRP systems deal with the phenomenon of production variability by assigning inventory buffers and building excess inventory in front of all work centers. If an operation breaks down, final production is ensured by the protective capacity supplied by the excessive inventory buffers that were implemented at the down- stream locations. The problem with this is the amount of inventory that is required and the wide range of problems that are associated with excess inventory.

If the bill of materials and physical inventories were 100% accurate 100% of the time, MRP, through its checks and balances system, would no doubt be successful in driving duplicate and misplaced work-in-process inventories to zero. For this reason, an accurate and complete bill of materials and inventory database are two of the most significant MRP instruments available to the production manager in today's business environment. But because MRP itself is capacity insensitive, it would still do little to control the overall level of work-in-process inventory and the rate at which material was pushed into the system.

While MRP itself cannot execute a schedule, it can be an excellent mid- and long-range strategic planning tool. It can recommend quantitative production schedule requirements for a deterministic dependent demand based on an externally supplied independent demand. This independent demand is normally created and supplied by the market. The master production schedule used to produce the dependent demand must be produced by a finite scheduling system that takes into consideration demand capacity requirements and system process capacities at all resources. If the schedule does not consider production capacities, it runs the risk of prematurely releasing and advancing additional material, which will overload and bog the manufacturing process down; or it will starve the process by holding back the needed material that will ensure a continuous flow of production.

JIT deals with the phenomenon of production variability in a similar way. JIT still requires buffers, but also makes an attempt to eliminate the variability within the system by balancing the production process to the point where inventory buffer capacity requirements are near zero. It builds inventory at all work centers but holds the level of inventory to a minimum and allows the inventory to proceed only when there is a place for it to go. Spencer (1993) reports that if all of the inventory in a JIT system could be eliminated, it would outperform any other system. But until that can be achieved, the advantage of implementing protective capacity in the form of strategically positioned buffers is documental.

Attempting to remove all of the variability in the system is not cost effective. So to combat the variability in production, the protective buffer sizes are made positive in value to ensure continuous production. This increase in buffer size increases the level of WIP inventory. It is also a fact that some work centers will require more buffer protection than others, such as the system constraint or critical capacity resources (near constraints). If the constraint buffer is insufficient in size, and the constraint is starved for material to process, overall production will suffer and throughput will go down. If the size of the protective buffers at critical capacity resources are too small, and the resources operation is halted for a significant period of time, they may produce a

down-stream ripple effect and starve the constraint of needed inventory for production. Because these situations occur, the manager is faced with strategic decisions based on balancing the benefits of buffering; the cost associated with the increased level of inventory, and lost production.

On the other hand, TOC deals with the phenomenon of production variability by building protective capacity buffers only at the system constraint and possibly the critical capacity resources. It allows for the excessive production capacity of all other work centers to supply the protective capacity required to combat process variability. For this reason, protective capacity buffers are not required at non-constraints, and work-in-process inventories can be kept to a true minimum (or zero). TOC makes an attempt to reduce the process variability at the constraint, but does not concentrate much effort in eliminating variability at non-constraints. Here TOC makes an excellent contribution to the real time scheduling requirements of the system constraint. In formulating a strategic integration of the three management philosophies, the following information would be required:

1.	Current orders on hand and the sales forecasts. This information is essential in creating the independent demand.
2.	Accurate bill of materials, current engineering change notices, and new product introductions. This information is required to determine the dependent demand.
3.	Current work-in-process inventories and the forecasted inventory receipts. This information creates the inventory database.

The above information would be essential in creating the demand capacity requirements of parts and subassemblies that correspond to the independent demand. Demand capacity requirements and system process capacities should be input into a finite scheduling system to create a realistic master production schedule based on the systems constraint production capabilities.

From this, inventory control reports can be produced and used as feedback for the current inventory level. Also lead-time requirements can be formulated to generate forecast inventory receipts. Due date performance can be regulated and controlled, and shipping dates can be quoted by the sales department with greater accuracy.

Raw material should be released into the system according to the master production schedule, which should be at a rate of material consumption at the constraint. (See Diagram 1) The rate of material consumption at the constraint is the production drumbeat. If raw material is released upstream from the constraint at a rate that is faster than current constraint consumption, inventory will build. Likewise, if raw material is released upstream from the constraint at a rate slower than current constraint consumption, the constraint will be starved for needed material and overall throughput will suffer.

Regardless of the rate of material consumption at the constraint and the rate of new material release, the buffer in front of the constraint should always contain an appropriate amount of protective production capacity that will ensure continuous operation. This is referred to as the production buffer. (See Diagram 1) The size of this buffer should be measured in units of

production time. Also a company-wide focus on total quality management and preventive maintenance is essential in protecting throughput at the constraint.

This rate of material consumption at the constraint should regulate the rate of new material release and that in turn will control the buffer that operates in support of the constraint. All operations between the system constraint and the initial release of raw material should work when material is present. The rule here would be to integrate a JIT kanban type system between these stations that would allow for a predetermined amount of inventory to build at all station queues that operate in front of the constraint.

These operations would continue to build small amounts of inventory that would attempt to ensure a smooth flow of material to the constraint but not build excess inventory through continuous operation. This is referred to as the production rope. (See Diagram 1) The operations that follow the constraint should be allowed to work when work is present and sit idle when it is not. There would be no need to purposely build any inventory at those locations because they have excess production capacity and would normally stay ahead of the constraint production.

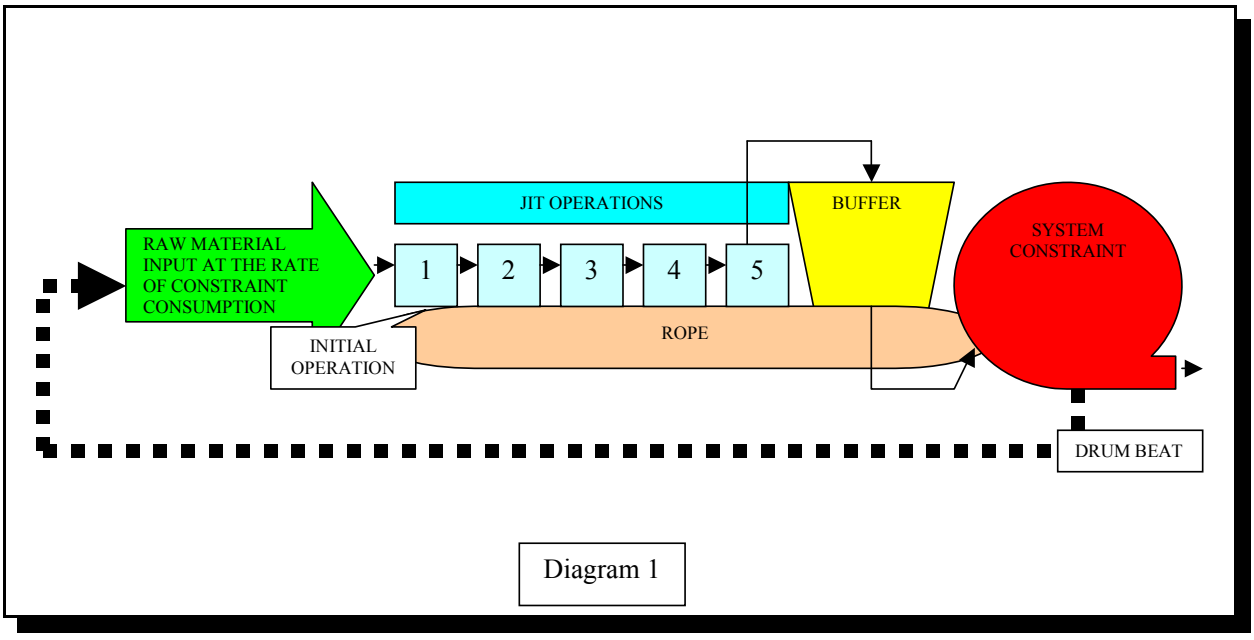

Diagram 1

TOC and JIT have many aspects that are similar. They both operate with a shared interest in continuous improvement, they both emphasize total quality management, and they strive for a reduction in WIP inventory. They do not strive for high efficiencies, as does MRP, since this only results in an increase in unnecessary WIP inventory.

No matter what the production situation, it would be virtually impossible for the total system to generate a finished product any faster than the slowest operation within that system. Because of this, releasing and pushing material into the system at a rate faster than constraint consumption only

serves to build unneeded and detrimental work-in-process inventory throughout the manufacturing process.

There are several components of the three strategies that actually complement each other. First, MRP is an excellent planning tool but does very little in the area of execution because it assumes infinite production capacity and will not deal with WIP inventory levels. MRP without JIT and TOC will never inject the appropriate level of raw material into the system. It will always be starved for or overloaded with material to process.

Second, JIT does not have the ability to plan a production schedule but it can and will control WIP inventory and keep it at a bare minimum at non-constraints. JIT cannot tell you what to make but it will tell you when to make it and how much to transfer to the next operation.

Third, TOC is the master scheduling tool. TOC used what is referred to as a drum-buffer-rope (DBR) scheduling operation. It recognizes the system constraint that limits production and schedules the introduction of raw materials into the system at the rate at which the constraint can consume them. The rope figuratively ties all of the work centers including the constraint together, and subordinates them to the constraint. This is where a true JIT pull system should be implemented. As the work center consumes a part from its buffer the JIT system will immediately replace it. And finally, a buffer needs to be assembled in front of the constraint to ensure production never stops.

CONCLUSION

This paper detailed many strategic aspects of MRP, JIT, and TOC in the areas of planning, execution, and scheduling of production systems. There were several critical questions addressed such as which control schemes to employ, how and where to assign WIP inventory, how to coordinate WIP inventory, and how to introduce raw materials into the system. It was demonstrated that there are several components of the separate management strategies that actually complement each other. Using the positive aspects of these three philosophies will allow management to minimize WIP, which will transcend an outflow of positive benefits.

The additional benefits of WIP inventory minimization include but are not limited to improvements to planning, control, and scheduling operations along with reduction in costs and lead time requirements. Additional benefits will consist of a higher rate of on time completions, increased sales, and processes that become more flexible, robust and responsive. The implications of using MRP as a planning tool, JIT as an execution tool, and TOC as a scheduling tool could be very advantageous when applied to the right application.

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