

Evaluating SBU Heterogeneity: Comparing the Miles and Snow Strategic Framework Against Alternative Quantitative Modeling Approaches

Wayne S. DeSarbo, Pennsylvania State University

C. Anthony Di Benedetto, Temple University

Michael Song, University of Missouri, Kansas City

Manuscript submitted to the Proceedings of *Organizational Strategy, Structure, and Process: A Reflection on the Research Perspective of Miles and Snow*, conference co-sponsored by Cardiff University and the Economic and Social Research Council, Cardiff, Wales.

December 2008

Evaluating SBU Heterogeneity: Comparing the Miles and Snow Strategic Framework Against Alternative Quantitative Modeling Approaches

ABSTRACT

The Miles-Snow (1978) strategic typology has been widely adopted in the marketing and management strategy literatures and has stood the test of time. According to this model, SBUs of different strategic types compete and succeed by consistently implementing certain types of strategies. The classic typology includes Prospectors, Analyzers, Defenders, and Reactors. Despite its value as a strategic decision model, the Miles-Snow typology leaves some research issues relatively unexplored. A better understanding of the performance outcomes of different strategic choices is desirable, as is a clearer linkage between market environment, SBU capabilities, and strategic choices. This article summarizes recent research by the authors concerning the development of new classification methodologies used to derive strategic typologies empirically and in an optimal fashion, explicitly including environmental attributes, SBU strategic capabilities, and performance measures. Two studies are summarized: the derivation of a descriptive typology from a three-country empirical study (U.S., China, and Japan), and a predictive model of typology formation using a U.S. dataset. Despite some similarities to the original Miles-Snow each of our derived solution clearly out-performs the traditional Miles and Snow typology in terms of objective mathematical/statistical criteria.

Key Words: Strategic Types, Combinatorial Optimization, Finite Mixture Models, Miles & Snow Strategic Types

Evaluating SBU Heterogeneity: Comparing the Miles and Snow Strategic Framework Against Alternative Quantitative Modeling Approaches

In their seminal publication, Miles and Snow (1978) defined the strategy of a strategic business unit (SBU) as a set of decisions by which the SBU aligns its managerial processes with its environment. SBU managers will differ on how they will respond to the environment and develop appropriate strategy, and Miles and Snow (1978) therefore advocated classifying SBUs on the basis of their patterns of decisions – a form of heterogeneity. These classifications have become known as the familiar Miles-Snow typology of strategic types: *Prospectors*, *Analyzers*, *Defenders*, and *Reactors*. The first three types compete and succeed by consistently implementing an appropriate strategy: *Prospectors* constantly seek out and develop new markets and products, *Defenders* maintain secure niches in stable markets, and *Analyzers* sometimes defend existing markets but occasionally enter a new market with a “second-but-better” strategy. The fourth type, *Reactors*, do not consistently implement any particular strategy.

The Miles-Snow typology has been extensively applied throughout the strategy, management, and marketing literature, and is generally supported (Snow and Hambrick 1980; Hambrick 1983, 1984; McDaniel and Kolari 1987; McKee et al. 1990; Shortell and Zajac 1990; Conant et al. 1990; Webster 1992). Although it was originally developed on a limited number of industry case studies, it has proved to be applicable and relevant in a wide variety of industry settings. In fact, it has been praised in the literature for its parsimony, its ease of application across many different industries, and its pragmatic validity (that is, the typology corresponds to actual strategies observed across several industries and countries (Hambrick 2003)). Miles and Snow (1994) themselves present an application to the North American cigarette industry of the

1990s, in which Philip Morris, R.J. Reynolds, American Brands, and Liggett and Myers behaved respectively as *Prospectors*, *Analyzers*, *Defenders*, and *Reactors*.

Despite its value as a descriptive model of heterogeneous strategic decision making, the Miles-Snow typology raises a number of research issues that have remained relatively unexplored. First, the research results on performance outcomes of SBU strategy have been equivocal. Miles and Snow (1978) originally asserted that SBUs that follow any of the three “archetypal” strategies (*Prospectors*, *Analyzers*, and *Defenders*) would outperform *Reactors*, but did not empirically test performance. Some empirical studies have found that *Prospectors* outperform *Defenders* (Zajac and Shortell 1989; Hambrick 1983), but these studies have been conducted in a narrow range of industries and it is unclear if the results are generalizable. Second, the link between the market environment and strategy is generally not considered, even though the Miles-Snow typology would seem to suggest that depending on environment, certain strategies would be favored over others (Hambrick 1983). Third, the original model did not account for SBU capabilities or attributes (Hambrick 1983). While Conant et al. studied the relationship between marketing capabilities and strategic type, there are many other SBU capabilities that need to be included in a comprehensive model. Taking these three points together, it is clear that more research into the relationships between capabilities, strategic type, and performance across a wide range of industries is required.

As a starting point for studying such heterogeneity, we turn to the Resource-Based View of the firm (RBV). According to the RBV, SBUs will deploy resources and capabilities strategically, which allows them to exploit their own distinctive competencies (Barney 1991; Barney and Zajac 1994) and thereby create long-term, sustainable competitive advantage (Barney 1991; Wernerfelt 1984; Davidow and Malone 1992; Day 1990, 1994). The

sustainability of the advantage comes from the fact that SBU's specific capabilities are rooted in the SBU's routines and practices, and therefore are difficult for competitors to imitate (Dierckx and Cool 1989). It is those SBUs that best develop and manage their capabilities through time that will show the highest levels of performance (Penrose 1959; Hitt and Ireland 1985; Day 1990). Based on the RBV view, we assert that a typology should account for differences across SBUs, that is, SBU heterogeneity.

SBU heterogeneity can be modeled in a number of ways: differences in SBU capabilities, how effectively they exploit these capabilities, what their performance levels are, and so on. The Miles-Snow typology is one conceptual model of SBU heterogeneity based on the decisions made by SBU management. While generic and applicable to virtually all industries, it is not designed to be optimal with respect to performance, or indeed to any one criterion. We present two alternative approaches for modeling SBU heterogeneity according to two different objective criteria. In doing so, we find results that differ from the theoretical Miles-Snow typology. Our results do not, however, negate the Miles-Snow typology; in fact, they can be viewed as hybrids or derivatives of the "pure" strategic types originally presented by Miles and Snow (1978).

Our research objective is to alternative quantitative methodologies to empirically derive strategic typologies. Rather than classify each SBU into one of the Miles and Snow strategic types, we wish to empirically derive strategic types in an optimal fashion according to an underlying response model. In particular, in our methodologies we explicitly model the interrelationships between environmental attributes, SBU strategic capabilities, and actual performance differences across derived strategic types. We report the main findings of two empirical studies. Study 1 is an empirical study across three countries (U.S., China, and Japan) in which we derive a descriptive, "mixed-type" typology. Our empirical typology is a derivative

of Miles-Snow model, yet exceeds the latter in explanatory ability (for further details on Study 1, see DeSarbo et al. 2005). In Study 2, we extend Study 1 using the U.S. data set to develop a predictive model examining associations between two batteries of variables (strategic capabilities and performance) (for further details on Study 2, see DeSarbo et al. 2006). Again, the derived typology shows similarities to the original Miles-Snow typology, but the results can be applied in predictive fashion. Thus, depending upon how one construes SBU heterogeneity, one can derive strategic types which are “optimal” as compared to the generic Miles and Snow typology.

THEORETICAL BACKGROUND

Strategic Capabilities

Strategic capabilities have been defined as “complex bundles of skills and accumulated knowledge that enable SBUs to coordinate activities and make use of their assets” (Day 1990). Many capabilities have been described in the marketing and strategic management literature as having critical impacts on SBU performance and success. These include: technology, market linking, marketing, information technology, and management-related capabilities (Day and Wensley 1988; Conant et al. 1990; Jaworski and Kohli 1993; Day 1990, 1994).

Technology capabilities include technology development product development, production and manufacturing process, and logistics. These capabilities allow the SBU to improve production efficiency, reduce costs, differentiate its offerings, and thereby increase competitiveness (Day 1994). *Market linking capabilities* include market sensing, channel and customer linking, and technology monitoring. With these capabilities, the SBU is more able to detect market environment changes early, respond quickly to customer needs, and exploit its technology strengths (Day 1994). *Marketing capabilities* include segmentation and targeting

skills and capable price setting and advertising, as well as skill at integrating the marketing activities. Marketing capabilities allow the SBU to take advantage of market sensing and technology capabilities and to develop effective marketing programs (McDaniel and Kolari 1987; Conant et al. 1990). *Information technology capabilities* let the SBU diffuse market information across all relevant functional areas; this increases strategic flexibility (Day 1994; Bharadwaj et al. 1999) and makes the product development process more effective (Narver and Slater 1990; Song and Montoya-Weiss 2001). Finally, *management-related capabilities* include skill in human resource management, financial management, profit and revenue forecasting, and the like; all of these have impacts on profit performance and increase the effectiveness of SBU execution (Walker et al. 2003). Clearly, SBU's differ in the amount of such different capabilities they possess, as well as the relative effectiveness of these capabilities on performance.

Strategic Capabilities and the Miles-Snow Typology

In its earliest presentation, the Miles-Snow typology considered relationships between strategic types and strategic capabilities (Miles and Snow 1978; Walker et al. 2003).

Prospectors require technology capabilities (strength in product R&D and engineering) in order to succeed; they also need solid market research and strong ties to the distribution channel to ensure that the products they develop meet customer needs (Hambrick 1983; McDaniel and Kolari 1987; Shortell and Zajac 1992). To accomplish this, *Prospectors* should have strong IT capabilities to permit cross-functional integration at levels needed for effective product development (Moenaert and Souder 1996; Griffin and Hauser 1996; Bharadwaj et al. 1999). Successful prospecting, therefore, requires consistently strong technology and IT capabilities.

On the other hand, *Defenders* succeed not by expertise in new product and market development, but by protecting their domains, through offering higher quality, superior services, or lower prices. For them, market linking and marketing capabilities may be the most critical to continued success (Hambrick 1983; Conant et al. 1990; Walker et al. 2003). *Analyzers* often behave like *Defenders* but will, on occasion, seize the opportunity to do some prospecting (often as a “second but better” competitor) (Walker et al. 2003); therefore, they require high levels of all capabilities.

This discussion is not to suggest that some capabilities are not important, but rather to show that the relative importance of capabilities differs depending on the SBU’s chosen strategic type. A *Prospector*, for example, would be best off to continue to build the capabilities that help the most in building up its ability to prospect successfully. Indeed, it has been noted that “*Prospectors* tend to want to continue prospecting...*Defenders* will likely keep on defending, while *Analyzers* build upon prospecting and defending capabilities” (Hambrick 1983).

Strategic Capabilities and the RBV

The traditional Miles-Snow typology as presented above is consistent with the resource-based view of the firm (Barney 1991, Wernerfelt 1984). According to the RBV, performance is driven by the interrelationships between the SBU’s existing capabilities and the prevailing environmental factors. To improve performance, managers should choose to develop those capabilities that add the most to their core competencies, given their limited financial resources. Hence, as predicted by Hambrick (1983), *Prospectors* will keep on prospecting, and so on. In the case of *Prospectors*, the most critical capabilities are technology and IT.

There is also the possibility that some SBUs will be better managed than others. For example, among *Prospector* SBUs, there may be some managers who consistently support and invest in technology and IT capabilities, that is, those capabilities most important to performance in their industry; these SBUs will attain the highest performance levels. Other managers may misallocate their investments and consequently not consistently support the most critical capabilities. Therefore, not all *Prospectors* will perform the same; among *Prospectors*, one would expect a range of performance levels depending on how well the SBU's resources have been managed. The same can be said for all other strategic types as well. One therefore would expect a more complex relationship between strategic type and performance than that theorized by Miles and Snow (1978) who did not account for differences in managerial decision-making skill.

Environmental Uncertainty and the Miles-Snow Typology

Strategic selection is generally thought to be conditional on environmental conditions (Hofer and Schendel 1978; Porter 1980). Under high levels of environmental uncertainty, an SBU may be required to respond rapidly to unforeseen changes (Lawrence and Lorsch 1967; Miller and Friesen 1978, 1983; Covin and Slevin 1989). Similarly, different strategic types may be more appropriate under certain environmental circumstances (Hambrick 1983). Here, the environment (as considered by managers) may include factors such as financial and capital market predictability, level of government intervention, industry competitiveness, suppliers' actions, and so on (Hrebiniak and Snow 1980). For example, the following environmental circumstances are generally thought of as being particularly well suited to the selection of a *Prospector* strategy: early stage in product life cycle, undeveloped or underdeveloped market

segments, emerging technology, few established competitors, evolving industry structure, and high industry concentration (Walker et al. 2003). The opposite conditions favor a *Defender* strategy, while a “middle ground” on these dimensions constitutes an *Analyzer* strategy.

No empirical research has yet examined all of the above interrelationships (strategic type, capabilities, environmental uncertainty, and performance). This is, of course, not to be taken as a criticism of Miles and Snow (1978). Their objective was to identify generic strategic types, not to build a comprehensive model relating strategic choices to performance consequences. Some limited research has examined the impact of some environmental components on strategic choice (Hambrick 1983), or have assessed the relative performance of strategic types in specific industry settings (Zajac and Shortell 1989). In general, this literature stream tends to be supportive of the initial contention of Miles and Snow (1978) that the archetypal strategic types outperform *Reactors* (Conant et al. 1990; Dyer and Song 1997). Nevertheless, there is still much more work to be done to obtain a fuller understanding of the effects of the environment and SBU capabilities on strategic choice and performance.

The next section describes our scale development and data collection that we will use for our empirical approaches for deriving strategic types. We do not begin our analysis with any *a priori* expectations about the strategic types (i.e., whether they should match the Miles-Snow types, how many types there should be, etc.). We allow our methodology to objectively and empirically determine *both* the number of strategic types as well as the memberships in both studies presented below. In each case, once we have identified the strategic types in the empirically derived “best” solutions, we then explore the interrelationships between strategic type, environment, and performance as discussed above. Our analysis thus permits us to identify strategic typologies that yield rich insights about the strategic types that exist across the

industries represented in our sample. Comparisons with the Miles and Snow typology will also be made.

SCALE DEVELOPMENT

Our constructs are defined based on competitive capability theory (Conant et al. 1990; Day 1990, 1994). Most of the capabilities we studied did not have pre-validated scales in the marketing or management literature, therefore a multi-step instrument development procedure was undertaken to ensure validity and reliability of the operationalized constructs (Churchill 1979). (For more details on scale development, please see DeSarbo et al. 2005.)

In Step 1, we identified relevant measurement scales from the marketing and management literatures, grouped them into the five capability types, and in some cases, created additional items. Scales were refined through focus group interviews with managers. In Step 2, professors and doctoral students knowledgeable in measurement development sorted the scale items into the capability scales following the procedure of Davis (1989). At this stage, construct convergence and divergence was examined using inter-rater reliability, and items frequently misclassified were dropped from the pool. Cohen's kappa (Cohen 1960; Jarvenpaa 1989) was also used to assess inter-rater reliability.

Step 3 was the pre-testing stage; 32 managers across two SBUs participated at this stage as well as 41 EMBA students. The results were factor analyzed and scale reliabilities were re-assessed. As a result of the pre-test, minor changes were made at this stage, and the capability scale items were finalized. In Step 4, the instrument was validated cross-culturally (for application in Japan and China). Double-translation/back-translation procedures were used to develop the Japanese and Chinese questionnaires (Song and Parry 1996). We conducted field

research in Japanese and Chinese firms to establish content validity and construct equivalence across all three countries, and to assess the extent of cultural bias and response format bias effects (Song and Parry 1996).

The above process resulted in five capability scales. The market linking and technological capabilities scales were based on those of Day (1994), the marketing capabilities scales was derived from Conant et al. (1990), and new scales were derived (using the procedure described above) for information technology and management-related capabilities. In addition to these scales, three six-item scales were used to assess environmental uncertainty. These three scales measured technological, market, and competitive environmental uncertainty (Moorman 1995). An eleven-item scale was used to classify each SBU into its Miles-Snow strategic type; this scale was previously validated and used by Conant et al. (1990). Finally, performance was assessed according to several measures: self-reported profit, return on investment, return on assets, average return on investment over the past three years, customer retention, retention of major customers, sales growth rate, and margins, sales, and ROI relative to objectives (some of these were adapted from Moorman 1995). The specific scales that were used appear in DeSarbo et al. (2005).

DATA COLLECTION

The data were obtained from a mail survey of companies listed in *Ward's Business Directory*, *Directory of Corporate Affiliation*, and *World Marketing Directory*. We drew a proportionate stratified random sample of 800 firms from each of the three countries: U.S., Japan, and China. In the first stage of data collection, we sent a one-page survey to all selected firms. Managers were asked to select an SBU/division for participation and to provide a contact

person. Of the original 2400 firms contacted 392, 429 and 414 in U.S., Japan and China respectively provided the required SBU level contacts. In the second stage, we sent a personalized cover letter and questionnaire assessing strategic type to each SBU manager, using a three-wave mailing (Dillman 1978). This procedure resulted in 308, 354 and 352 SBUs from U.S., Japan, and China respectively. We asked two questions assessing respondent's confidence in their ability to answer the questions, and eliminated questionnaires received from individuals stating a low level of confidence in their responses. In the third stage, another questionnaire was sent to the SBU managers, this time assessing strategic capabilities, performance, and environmental variables. At this stage, 216, 248, and 245 responses were received from U.S., Japan, and China respectively; this constituted our final sample, and represented response rates of 27.0, 31.0, and 30.6 percent in U.S., Japan, and China respectively.

A wide range of industries was represented in the final sample, including: chemicals and related products; electronics and electrical equipment; pharmaceuticals and medicines; industrial machinery and equipment; telecommunications equipment; semiconductors and computer-related products; and others. We compared early to late respondents on capability variables using a series of MANOVA analyses, finding no significant differences. We concluded that non-response bias was not a problem.

The SBUs were classified into the four Miles-Snow strategic types using the Conant et al. (1990) scale and a modified "majority-rule decision structure": for an SBU to be classified into one of the four Miles and Snow strategic types, there must be at least seven "correct" answers out of the 11 items. This procedure resulted in the following classification of the total sample of 709 SBUs: 234 *Prospectors*, 220 *Analyzers*, 168 *Defenders*, and 87 *Reactors*.

STUDY 1

Methodology

Study 1 derives a descriptive “mixed-type” strategic typology to account for SBU heterogeneity. That is, we develop a typology strictly from empirical analysis which can be interpreted as a variation on the “pure” Miles-Snow strategic types. This study employs a modified NORMCLUS constrained, multi-objective classification methodology on all three country samples, using four batteries of items (strategic type, strategic capabilities, environment, and performance). We programmed NORMCLUS to optimize the inter-relationships between these four different variable batteries. We formed four batteries of items: the 11 strategic type items, the 27 strategic capability items, the 18 environment items, and the 11 performance variables. For details on the methodology used here in Study 1, see DeSarbo et al. (2005). We performed the analysis in $K=1,2,3,4,5,$ etc strategic types and utilized objective model selection heuristics to determine the most parsimonious number of strategic groups.

Results

Using nested model Pseudo-F tests, we determined that choosing $K=4$ strategic types provided the best overall fit, so we proceeded with the optimal four-type solution. Our results also show that our empirically-derived strategic typology clearly dominates the Miles-Snow typology in terms of the specific objective function being optimized. This suggests that using the proposed strategic typology in a contingency context may provide insights over and above those obtained through traditional Miles-Snow analysis.

Table 1 indicates how each of the four derived strategic types correspond to the P-A-D-R Miles and Snow framework based on the 11-item Conant et al (1990) strategic type questionnaire, and also shows the classification by country. As seen in Table 1,

- *Type 1* is composed of about 52 percent *Prospectors* and 32 percent *Analyzers*, and is primarily Japanese and Chinese SBUs.
- *Type 2* is about 55 percent *Defenders*, with the remaining 45 percent *Reactors*, and comprises SBUs from all three countries.
- *Type 3* is a hybrid of *Analyzers* (43%), *Prospectors* (26%), and *Defenders* (27%), and is composed only of U.S. SBUs.
- *Type 4* is split between *Prospectors* (46%) and *Analyzers* (54%), and comprises SBUs from all three countries.

Each of these types has its own relative strengths in terms of capabilities (not depicted in Table 1). For example, two types are composed primarily of *Prospectors* and *Analyzers* (Types 1 and 4), yet Type 4 is highest among all groups in both marketing and management capabilities, while Type 1 is lowest. Type 1 is highest of all groups in technology and IT capabilities, and Type 4 is second highest. In market linking capabilities, Type 4 outcores Type 1 (while Type 2 is higher than both). Thus, Types 1 and 4 are both *Prospector/Analyzers* but have different profiles: Type 4 is strong in marketing, management, technology, and IT; while Type 1 relies on capabilities in technology and IT, and is weaker in marketing, market linking, and management. Similar observations were made about the other types. The *Defender/Reactor* type (Type 2) has strengths in marketing and market linking capabilities, but is weaker in technology and IT capabilities. Type 3 comprises *Analyzers*, *Defenders*, and *Prospectors*, is strong in market linking and management capabilities, but is among the weakest in all other capabilities. In

general, Types 2 and 4 face much higher levels of market, competitive, and technological environmental uncertainty than any of the others.

The types also differ in terms of their performance levels. Types 2 and 4 are the best performers on almost every performance variable. Average 3-year ROI for Types 2 and 4 are 19.52 and 16.80 respectively, while for Types 1 and 3 the comparable means are - 1.66 and 0.06 (Type 1 shows a negative 3-year ROI). Similar results are obtained for many other performance measures, although Type 1 did show strong profit margin performance (Types 4 and 1 were highest in profit margin at 33.1 and 29.1 respectively).

Discussion

The four strategic types we derived are quite different from the Miles-Snow typology, and we can draw some additional insights in terms of strategic capabilities, environmental factors, and performance that would have been otherwise obscured. Types 1 and 4 are both primarily *Prospector/Analyzer* types, but differ in terms of marketing, management, and some market-linking capabilities, and Type 4 also faces more challenging environments. Types 2 and 3 have more *Defenders*, but Type 2 outperforms Type 3 in marketing, market linking, technology, and IT capabilities and faces a more uncertain environment. We find that *Analyzers* do not constitute a separate type, but tend to be 'like' *Prospectors* (Types 1, 3, and 4) or *Defenders* (Type 3).

Our solution provides additional depth of understanding of the Miles-Snow strategic types. For example, Miles and Snow established the distinct group called *Prospectors*; we find *Prospectors* who are stronger in marketing, market linking, and management, *Prospectors* who

are weaker in marketing and market-linking, and *Analyzers* that share characteristics with both types of *Prospectors*.

To summarize the above, we compile the following descriptive characteristics of all of our empirically-derived strategic types:

- *Type 1: Asian prospecting SBUs with technology strengths.* Primarily Miles-Snow *Prospectors* and *Analyzers*; maintain their competitive edge by using their strengths in technology and IT capabilities. Relatively weak in marketing, market linking, and management, but do not operate in uncertain environments. SBUs here tend to do well in one-year profit performance.
- *Type 2: Defensive SBUs with marketing skills.* Primarily *Defenders* and *Reactors*. Defend their established positions through superior marketing, market linking, and management capabilities. Weak in technology and IT capabilities. Though they operate in uncertain environments, they are among the leaders on most performance categories. This derived strategic type includes a mix of SBUs from all three countries.
- *Type 3: U.S.-based SBUs with market linking and management strengths.* A mix of Miles-Snow types, with about one-half *Analyzers*. All are U.S.-based. This group is strong in market linking and management capabilities, but weaker in marketing, technology, and IT. Even though they face low environmental uncertainties, these firms are low in performance on all measures.
- *Type 4: Balanced prospecting firms.* About evenly split between *Prospectors* and *Analyzers*, and an even mix of Japanese, Chinese, and U.S. firms. Members of this derived group are highest in marketing and management capabilities and are also among the leaders in technology and IT capabilities, with a potential weakness in market-linking capabilities. Despite their highly uncertain environments, these firms perform extremely well on all performance variables.

Our results suggest that there are two clear paths to higher performance, and both are pursued by firms of all three countries. Type 4 SBUs have balanced marketing, technology, IT, and management capabilities. The Miles-Snow model would suggest that *Prospectors* require strengths in technology and IT, yet also need efficient information on customer for product development; this is consistent with the balance of capabilities seen in Type 4. Similarly, Type 2 consists of Miles-Snow *Defenders* (and *Reactors* that behave like *Defenders*). These SBUs would require strategic capabilities in marketing and market linking for top performance; this is consistent with our Type 2 findings. There were also two paths to lower performance: strength in technology with deficiencies in marketing, market linking and management (Type 1), and relative strengths in market linking and management, but weaknesses in technological and marketing capabilities (Type 3). Each of these shows deficiencies in some capabilities that are not fully compensated for by strengths in other capabilities.

STUDY 2

Methodology

Study 2 is an extension of Study 1 in that we develop a *predictive* model to examine causalities between two batteries of variables (strategic capabilities and performance) and relationships between them. This study uses a finite-mixture structural equation approach for modeling heterogeneity of strategic capability, performance, and interrelationships between these. We used the U.S. data only in Study 2. The procedure used here derives latent strategic types in which firms are homogeneous in terms of their underlying model parameters. Here too, we optimize an objective function with model selection heuristics to select the number of derived

strategic types as well as their membership. For details on the methodology used in Study 2, see DeSarbo et al. 2006.

Results

As in Study 1, goodness-of-fit heuristics (here information measures) were used to determine the optimal number of strategic types, and the optimal solution was found to contain K=4 derived strategic types. The optimal empirical typology dominated the Miles-Snow typology in terms of the likelihood based information heuristics and fit values. Thus, while insights can be gained about the capability-performance relationships by examining the original Miles-Snow strategic typology, an even more accurate picture can be obtained from the empirically-derived typology in terms of exploring heterogeneity as a function of strategic capabilities and performance.

First, we categorized the SBUs into the four traditional Miles-Snow types as in Study 1, and determined relationships between capabilities and profit performance (see Table 2). As Table 2 shows, for *Prospectors* and *Analyzers*, technology capabilities are most strongly related to both profit performance, while for *Defenders*, the capabilities most related to profit performance are marketing and market linking. These findings are consistent with Miles-Snow expectations, though a few findings were surprising. For example, technology capability was significantly related to ROI for *Defenders*, but IT and market linking were not (not shown in Table 2). Additionally, technology skills were related to profit performance for *Analyzers*, but marketing skills were not. Our conclusion here, though, is consistent with Miles-Snow: the profit performance drivers differ somewhat across Miles-Snow strategic types. We also found (not shown in the table) that the three archetypal strategic types outperformed the *Reactors*: raw

(unstandardized) profit performance of *Prospectors*, *Analyzers*, and *Defenders* were 14.71, 7.34, and 5.81 respectively, while the average profit for reactors was –8.48. Interestingly, this finding was not confirmed for ROI performance, which did not differ substantially across the four types.

Next, as mentioned above, we ran our constrained latent structure regression model in $K=1,2,3,4,5,\dots$ strategic types and selected $K=4$ strategic types as the most parsimonious solution based on objective model selection heuristics. We then examined the estimated means of exogenous and endogenous variables by derived strategic type for this solution. The analysis of exogenous variables sheds more light on strategic type interpretation. As shown in Table 3, Strategic Type 1 has the highest estimated standardized mean in technology capability (1.244), and is also second-highest in market linking, IT, and management capabilities (0.131, 0.093, and 0.191 respectively). Strategic Type 2 is highest in marketing, market linking, and management capabilities (0.776, 0.320, and 0.441), while Strategic Type 3 is highest in IT capability (0.109) but low on other capabilities. Finally, strategic Type 4 is higher in market linking and management capability than Strategic Type 3 (–0.083 and –0.119 respectively). Analysis of the endogenous variable means indicates that Strategic Type 1 is the strongest performer on profit, followed by Type 4 and Type 3. Strategic Type 2 is the poorest performer (Though not shown, similar patterns were seen using ROI as the performance variable).

Table 3 also allows us to explore how the Miles-Snow typology compares to our empirically-derived “mixed-type” typology via the cross-tabulation of firm membership. Here, it is seen that Strategic Type 1 (the best performer) is made up of about one-third *Prospectors* and one-third *Analyzers*, with fewer *Defenders* and *Reactors*. Strategic Type 4, the second-best performer, had about the same distribution of Miles-Snow types as Strategic Type 1. The

remaining two Strategic Types (2 and 3), the lowest performing ones, are comprised of almost one-half *Analyzers*, with proportionately less *Defenders* and *Prospectors*.

Taking all of this information together, we can finally develop rich descriptors of each of the four empirically-derived strategic types.

- *Type 1: New Product/Market Seekers with Technology Strengths.* A hybrid group which contains many *Prospectors* and *Analyzers*, and several aggressive *Defenders*. Members of this strategic type have strengths in technology, in particular new product development, as well as strengths in IT that supports new product development, cross-functional integration, and technology knowledge creation. Type 1 is capable of attaining short-term profitability and also to translate new product success into superior longer-term ROI performance.

- *Type 2: Defensive Firms with Marketing Strengths.* This type is made up mostly of *Analyzers* and *Defenders*. This type excels in marketing capabilities, including information gathering, segmenting and targeting markets, pricing, and advertising. This type is strong in management capabilities, including financial management, human resource planning, marketing planning, and logistics. Despite these capabilities, this type is outperformed by other SBUs on both short- and long-term ROI measures.

- *Type 3: Second-But-Better Firms with IT Strengths.* Most closely aligned with *Analyzers*, who use second-but-better strategies and capabilities in IT (in particular, IT to support new product development, cross-functional integration, and technology knowledge creation) to compete. Second only to Type 1 on IT capabilities. Profit performance is low, however, surpassing only Type 2 in profit and ROI.

- *Type 4: New Product/Market Seekers with Market Linking and Management*

Strengths. Like Type 1, this derived group is comprised mostly of *Analyzers* and *Prospectors*, with many *Defenders* as well. Type 4 is weaker in both IT and technology capabilities relative to Type 1, and is in the middle of the pack on other capabilities. The biggest differences between Types 4 and 3 is relative strength in market linking and management capabilities. Type 4 is the second-best performing type in terms of both short-term profit and long term ROI.

CONCLUSIONS

We have revisited the Miles-Snow (1978) strategic typology in the light of recent theoretical discussions as to the inclusion of conceptually relevant variables, and have also developed and applied two new, alternative approaches to model SBU heterogeneity and empirically derive “new” typologies according to different objective mathematical criteria. As described earlier, one methodology derived a descriptive model of strategic type across three countries and multiple industries, while the next derived a more prescriptive-oriented model across many industries but within only the U.S. sample. In both cases, the classification procedures were used to derive typologies empirically from data pertaining to strategic type, strategic capabilities, environmental uncertainty, and performance. The methodologies provided parsimonious, flexible groupings of entities in accordance with established empirical and statistical criteria. Goodness-of-fitness tests were used to determine how well the derived classification scheme compared to the Miles-Snow typology (used here as a benchmark), and in both cases we found that our empirically-derived typologies more accurately captured the data associations and better explicated the interrelationships among the variables in portraying SBU heterogeneity.

We augment the scope of the original Miles-Snow typology by considering the roles of different batteries of variables: strategic firm capabilities, environmental uncertainty, and performance. All of these have been discussed in past research (Hambrick 1983; Zajac and Shortell 1989; Conant *et al.* 1990), but have not been included together in deriving or testing a typology. In their original study, Miles and Snow (1978) suggested that there might be a complex framework of interrelationships among firm capabilities, environmental uncertainty, and strategy. They did not, however, explicitly model the roles of the environment or strategic capabilities (Hambrick 1983). In the Miles-Snow model, it is implied that the SBU's strategic type shapes its capabilities (that is, *Prospectors* keep on prospecting, etc.). It has been argued that more complex relationships among all of these relationships exist (Hambrick 1983). We do find that there is an intricate framework of interactions, an understanding of which is important to managers since there are implications for SBU performance.

Nevertheless, our findings do not necessarily negate the original Miles-Snow typology. Instead, the strategic types we derive in these two studies are probably best described as *second-order derivatives* of the pure and conceptually distinct Miles-Snow types being considered as first-order 'primitives.' Empirically-derived strategic types do not fall neatly into the tightly-described Miles-snow groupings, perhaps because they are so context-dependent. For example, in Study 1, we found two types that are essentially *Prospector-Analyzer* splits (Types 1 and 4), but which differ in terms of marketing and management capabilities as well as on performance. The empirically derived strategic types provide a more accurate representation of strategic behavior for the industries included in the sample, and provide insights into how firms cope with environmental uncertainty given their available capabilities. In different contexts, different numbers of strategic types may emerge, and their compositions may likewise also be different.

Without including the capability and environment variables, one would miss the complex interrelationships between these variables and strategic type, and the performance implications. Our procedures therefore allow us to capture a layer of understanding over and above the classic Miles-Snow strategic types. As a result, we note that SBU managers need to consider both environment and capability when developing strategy, as there is a clear relationship between these batteries of variables. It is clear that one needs to be specific with respect to the context of heterogeneity to be examined. The Miles and Snow typology has been demonstrated to be inferior to specific contexts where model optimal solutions can be derived that mathematically optimize some objective mathematical criteria.

This study can be extended several ways. Further studies should seek to validate the empirically-derived typologies using data sets obtained from a different set of industries. Since the derived strategic types are very context-dependent, we expect that these different settings will result in different groupings. Nonetheless, it would be interesting to determine if the types derived from different industry settings bear some resemblance to the original Miles and Snow strategic types (or to our empirically-derived types). If empirically derived strategy types in other settings are also second-order derivatives of Miles-Snow types, it supports our contention that the Miles-Snow typology is indeed a powerful model of strategic behavior with important SBU performance implications.

Future research can also replicate the studies in different countries with different cultural characteristics. In Study 1, we included three countries (U.S., China and Japan), and although there were differences among the strategic types with respect to country representation, the best performing types included firms from all three countries. Thus, we have some evidence that managers from these countries 'think alike' when responding to capability and environmental

settings. The top-performing types also resemble classic Miles and Snow types, providing some evidence that the Miles-Snow model generalizes at least across these three countries. Further research could determine if these results are empirically generalizable across a larger number of national and cultural settings.

REFERENCES

- Barney, Jay. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**: 99-120.
- Barney, J. B. and Zajac, E. J. 1994. Competitive organizational behavior: Towards an organizationally-based theory of competitive advantage. *Strategic Management Journal* **15**: 5-9.
- Bharadwaj, Anandhi S., Bharadwaj, Sundar G., and Konsynski, Benn R. 1999. Information technology effects on firm performance as measured by Tobin's Q. *Management Science* **45** (7): 1008-1024.
- Churchill, G. A., Jr. 1979. A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*. **16**: 64-73.
- Cohen, J.A. 1960. A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* **20**: 37-46.
- Conant, Jeffrey S., Mokwa, Michael P., and Varadarajan, P. Rajan. 1990. Strategic types, distinctive marketing competencies and organizational performance: A multiple-measures-based study. *Strategic Management Journal* **11**: 365-383.
- Covin, J.G. and Slevin, D.P. 1989. Strategic management of small firms in hostile and benign environments. *Strategic Management Journal* **10**(1): 75-87.
- Davidow, W.H. and Malone, M.W. 1992. *The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century*. New York, Harper Collins.
- Davis, Fred D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* **13**(3): 319-339.
- Day, George S. 1990. *Market Driven Strategy: Processes for Creating Value*. New York: Free Press.
- Day, George S. 1994. The capabilities of market-driven organizations. *Journal of Marketing* **58**(4): 37-52.
- Day, George S. and Wensley, Robin. 1988. Assessing advantage: A framework for diagnosing competitive superiority. *Journal of Marketing* **52**(2): 1-20.

DeSarbo, W.S., Di Benedetto, C.A., Song, M. and Sinha, I. (2005). Revisiting the Miles and Snow strategic framework: Uncovering interrelationships between strategic types, capabilities, environmental uncertainty, and firm performance. *Strategic Management Journal* **26** (1): 47-74.

DeSarbo, W.S., Di Benedetto, C.A., Jedidi, K., and Song, M. (2006). Identifying sources of heterogeneity for empirically deriving strategic types: A constrained finite mixture structural equation methodology. *Management Science* **52** (6): 909-924.

Dierckx, I. and Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science* **35**(12): 1504-1511.

Dillman, D.A. 1978. *Mail and Telephone Surveys: The Total Design Method*. Wiley: New York.

Dyer, Barbara and Michael Song. 1997. The impact of strategy on conflict: A cross-national comparative study of U.S. and Japanese firms. *Journal of International Business Studies* **28**(3): 467-493.

Griffin, Abbie and Hauser, John R. 1996. Integrating R&D and marketing: A review and analysis of the literature. *Journal of Product Innovation Management* **13**(2): 191-215.

Hambrick, Donald C. 1983. Some tests of the effectiveness and functional attributes of Miles and Snow's strategic types. *Academy of Management Journal*. **26** (March) : 5-25.

Hambrick, Donald C. 1984. Taxonomic approaches to studying strategy: Some conceptual and methodological issues. *Journal of Management* **10**(1): 27-41.

Hambrick, Donald C. 2003. On the staying power of defenders, analyzers, and prospectors. Working paper, Pennsylvania State University.

Hitt, M. A. and Ireland, R. D. 1985. Corporate distinctive competence, strategy, industry and performance. *Strategic Management Journal* **6** 273-293.

Hofer, C.W. and Schendel, D. 1978. *Strategy Formulation: Analytical Concepts*. West: St Paul, MN.

Hrebiniak, L.G. and Snow, C.C. 1980. Industry differences in environmental uncertainty and organizational characteristics related to uncertainty. *Academy of Management Journal* **23**(4): 750-759.

Jarvenpaa S. 1989. The effect of task demands and graphical format on information processing strategies. *Management Science* **35**(3): 285-303.

Jaworski, Bernard J. and Kohli, Ajay K. 1993. Market orientation: Antecedents and consequences. *Journal of Marketing*. **57**(3): 53-70.

Lawrence P.R. and Lorsch, J.W. 1967. *Organization and Environment*. Irwin: Homewood, IL.

- McDaniel, Stephen, W. and Kolari, James W. 1987. Marketing strategy implications of the Miles and Snow strategic typology. *Journal of Marketing* **51**(4): 19-30.
- McKee, Daryl L., Varadarajan, P. Rajan, and Pride, William M. 1989. Strategic adaptability and firm performance: A market-contingent perspective. *Journal of Marketing* **53**(3): 21-35.
- Miles, R. and Snow, C. 1978. *Organizational Strategy, Structure, and Process*. New York: McGraw-Hill.
- Miles, R. E. and Snow, C. C. 1994. *Fit, Failure, and the Hall of Fame: How Companies Succeed or Fail*. New York, Free Press.
- Miller, D. and Friesen, P.H. 1978. Archetypes of strategy formulation. *Management Science* **24**(11): 921-933.
- Miller, D. and Friesen, P.H. 1983. Strategy-making and environment: the third link. *Strategic Management Journal* **4**(3): 221-225.
- Moenaert, R.K. and Souder, W.E. 1996. Context and antecedents of information utility at the R&D/marketing interface. *Management Science* **42**(11): 1592-1610.
- Moorman, C. 1995. Organizational market information processes: cultural antecedents and new product outcomes. *Journal of Marketing Research* **32**(3): 318-335.
- Narver, J.C. and Slater, S.F. 1990. The effect of a market orientation on business profitability. *Journal of Marketing* **54**: 20-35.
- Penrose, E. T. 1959. *The Theory of the Growth of the Firm*, New York, John Wiley.
- Porter, M.E. 1980. *Competitive Strategy*. New York: Free Press.
- Shortell, Stephen M. and Zajac, Edward J. 1990. Perceptual and archival measures of Miles and Snow's strategic types: A comprehensive assessment of reliability and validity. *Academy of Management Journal* **33**(4): 817-832.
- Shortell, S.M. and Zajac, E.J. 1990. Perceptual and archival measures of Miles and Snow's strategic types: a comprehensive assessment of reliability and validity. *Academy of Management Journal* **33**(4): 817-832.
- Snow, C.C. and Hambrick, D.C. 1980. Measuring organizational strategies. *Academy of Management Review* **5**: 527-538.
- Song, X. Michael and Montoya-Weiss, Mitzi M. 2001. The effect of perceived technological uncertainty on Japanese new product development. *Academy of Management Journal* **44**: 61-80.

Song X.M. and Parry, M.E. 1996. What separates Japanese new product winners from losers? *Journal of Product Innovation Management* **13**(5): 422–439.

Walker, Orville C., Jr., Boyd, Harper W., Jr., Mullins, John, and Larréché, Jean-Claude. 2003. *Marketing Strategy: Planning and Implementation*, fourth edition. Homewood, IL: Irwin/McGraw-Hill.

Webster, F.E. 1992. The changing role of marketing in the corporation. *Journal of Marketing* **56**(October): 1–17.

Wernerfelt, Berger. 1984. A resource-based view of the firm. *Strategic Management Journal* **5**: 171-180.

Zajac, E. and Shortell, S.M. 1989. Changing generic strategies: likelihood, direction, and performance implications. *Strategic Management Journal* **10**(5): 413–430.

TABLE 1
 Study 1: Composition of the Four Types by Miles-Snow Type, Country Composition, and Performance

	Type 1	Type 2	Type 3	Type 4
Prospectors	52%	0%	26%	46%
Analyzers	32%	0%	43%	54%
Defenders	16%	55%	27%	0%
Reactors	0%	45%	4%	0%
Country Composition	5.2% US, 47.8% Japan, 47% China	23.2% US, 40% Japan, 36.8% China	100% US	30% US, 33.7% Japan, 36.3% China
Performance (3-year ROI)	-1.66	19.52	0.06	16.80

TABLE 2
Study 2: Profit Performance of Miles-Snow Strategic Types

Capabilities	Prospectors	Analyzers	Defenders	Reactors
Intercept	0.403	-0.026	-0.356*	-1.297
Marketing	0.069	0.182	0.239*	0.018
Technology	0.587*	0.512*	0.198	0.058
Market Linking	0.079	0.120	0.494*	0.056
Info. Technology	0.101	0.091	0.001	0.037
Management	0.000	0.079	0.096	0.000

Legend: Each cell depicts the profit coefficients for each capability.

All variables are standardized to have zero mean and unit variance for the entire sample.

*: These estimates are significant ($p < 0.05$).

For further statistical information please see DeSarbo et al. (2006).

TABLE 3
Study 2: Estimated Mean of Exogenous and Endogenous Variables by Derived Strategic Types, and Membership Cross-Classification

Variable	Type 1	Type 2	Type 3	Type 4
Marketing	-0.017	0.776*	-0.034	-0.351*
Technology	1.244*	-0.539*	-0.417*	-0.713*
Market Linking	0.131	0.320	-0.231	-0.083
Info. Tech.	0.093	-0.085	0.109	-0.172
Management	0.191	0.441	-0.324	-0.119
Profit	0.516	-0.532	-0.325	0.018
Cross-Classification:				
Prospectors	21	6	19	16
Analyzers	20	14	27	18
Defenders	18	8	18	15
Reactors	6	3	0	7

*: significantly different from zero, $p < 0.05$.

For more detail on interpretation of the endogenous variables, see DeSarbo et al. (2006).