Innovation Orientation, Environment and Performance: A Comparison of U.S. and European Markets
Author(s): Franklyn A. Manu
Source: *Journal of International Business Studies*, Vol. 23, No. 2 (2nd Qtr., 1992), pp. 333-359
Published by: Palgrave Macmillan Journals
Stable URL: http://www.jstor.org/stable/154904
Accessed: 16/04/2011 03:36

INNOVATION ORIENTATION, ENVIRONMENT AND PERFORMANCE: A COMPARISON OF U.S. AND EUROPEAN MARKETS

Franklyn A. Manu*
Loyola College

Abstract. Much attention has been paid to the importance of innovation in ensuring the survival and growth of companies. For U.S. companies a key issue is to what extent findings for the U.S. market can be extrapolated to non-U.S. markets to provide a basis for designing innovation strategy. Similar innovation orientation types were identified in both markets using a sample of consumer businesses from the PIMS database. A number of similarities and differences in associated environments and performance levels were also identified. A major finding was that a high degree of product innovativeness leads to generally poor financial and market share performance in both markets but high rates of market share growth. Another major finding was that having pioneered in a market leads to effective performance. Results for the associated environments were more mixed in the sense that there was not a perfect correlation in the environments associated with the types in both markets.

One of the most significant trends in business today is the growth in the internationalization of business and markets. This trend has led to a greater need for analysis of the role and effectiveness of strategies in different geographic markets. Such an analysis requires an assessment of whether particular strategies are associated with particular market characteristics, as well as with particular kinds and levels of performance. An important issue that arises for U.S. businesses in this regard is the extent to which relationships identified in U.S. markets are generalizable to non-U.S. markets. Some empirical and other evidence suggest that differences in the market environments of different countries may influence types of strategies developed by companies, as well as the impacts of those strategies [Douglas & Craig 1983; Douglas and Rhee 1989; Freeman 1974; Schneeweis 1983]. This has

---

*Dr. Franklyn Manu holds degrees from the University of Ghana and New York University. His research interests are in the areas of international strategy and marketing in developing countries.

I am deeply indebted to Dr. Susan Douglas of New York University who made invaluable suggestions during the conduct of this study. Financial support was provided by the Marketing Science Institute, Cambridge, Massachusetts. My thanks also go to the Strategic Planning Institute, Cambridge, Massachusetts for providing access to the PIMS database.

Received: February 1991; Revised: August & November 1991; Accepted: November 1991.

implications for the ability of U.S. businesses to leverage successful strategies for U.S. markets to non-U.S. markets.

The particular aspect of strategy chosen for investigation has to do with innovation, specifically the innovation orientation of a business. Innovation orientation, as used in this context, is a multiple construct having to do with innovative output (new products and processes), innovative effort (R&D) and timing of market entry. As an orientation it encompasses the total innovation programs of companies and is strategic in nature because it provides direction in dealing with markets. It is therefore a very important strategic issue. In fact Miller [1986] described innovation as a major dimension of strategic content on the basis of a review of literature dealing with strategy. A comparison of this major dimension of strategy across U.S. and non-U.S. markets can provide insights on the applicability of strategies developed for the U.S. Given suggestions of differences in national market conditions it is not so clear that identified relationships in U.S. markets on innovation will necessarily hold in other markets. If they do not hold then guidelines have to be provided for competing in those markets because managers cannot rely on their received knowledge and experience of U.S. markets. For example, the popular notion that innovation is vital to company growth and survival may not apply in markets that do not reward such behavior. Additionally it is important to specify what kind of innovation the strategy deals with since different national markets may require a focus on different aspects of innovativeness.

The basic premise of this article then is that differences in the characteristics of different national market environments suggest that innovation orientation is unlikely to have similar impacts or influences. Given the importance of innovation it is important to understand how it relates to markets and environments outside the U.S. This will provide guidelines for appropriate strategies in those markets.

The previous discussion and proposed investigation suggest the following research questions:

1. Can similar types of innovation orientation be developed for businesses in U.S. and non-U.S. markets?
2. Are there similarities in the environments and performance levels associated with the innovation orientation types across U.S. and non-U.S. markets?

In the next section of the paper previous research relating to innovation orientation is reviewed to provide a basis for this study. The conceptual framework and research methodology are then described, followed by a discussion of the results of the study and its implications. In the final section conclusions are stated and suggestions made for future research.

PREVIOUS RESEARCH ON INNOVATION ORIENTATION

One main objective of strategy is to enable an organization adapt to its environment [Miles & Snow 1978]. This includes such business-level objectives

as the development of specific products and services, entry into new markets, and the establishment of major R&D projects [Cohen & Cyert 1973]. Innovation is thus a means of an organization's adaptation to its environment, and is generally considered vital to survival and growth [Cooper 1984; Kamm 1987]. Differences in the outlook or orientation of different companies towards innovation have resulted in the development of strategic archetypes based on classifications of those differences.

Ansoff and Stewart [1967] developed a typology of strategies based on the timing of entry of a technologically intensive firm into an emerging industry. This timing of entry represents an aspect of innovativeness, with earlier entry indicating a greater degree of innovativeness. In this typology "First to Market" strategy is the most innovative, followed by "Follow the Leader," "Application Engineering," and "Me-Too" strategies in that order. The underlying implications of this timing of market entry for R&D, marketing, and manufacturing form the basis of this typology. The typology indicates the role played by timing of market entry in influencing strategy and as such it is a major component of innovation orientation.

Freeman [1974] also developed a classification of strategic options available for firms faced with changes in their technological environments. This typology relates to the innovative efforts of firms and their focus, primarily in terms of R&D expenditures. Based on posture towards R&D expenditures, "Offensive," "Defensive," "Imitative," "Dependent," "Traditional" and "Opportunist" firms were identified.

Miles and Snow [1978], Snow and Hrebiniak [1980] and McDaniel and Kolari [1987] based their notion of innovation orientation on the key dimension of the rate at which organizations changed their products and markets in response to changes in the environment. They focused on the self-perceptions of top managers in the industries they studied to identify the archetypes of the typology, and their associated characteristics. Viewing this as subjective, Hambrick [1983a], offered an operationalization based on actions relative to the competition. His classifying variable was relative percent of new products which is the difference between a business's percent of new products and that of its three largest competitors. Contrary to some of his arguments, however [1983a, p. 8], he used an absolute percent of new products variable in parts of his analysis. Based on these operationalizations four types of organization were identified. Prospectors have a strong concern for product and market innovation and attempt to pioneer in those areas. Defenders have narrow product-market domains, conduct little or no new product/market development and pay a great deal of attention to improving efficiency of operations. Reactors are unable to respond effectively to their environments and only make adjustments when forced to do so by environmental pressures. Analyzers are a hybrid of the first two types, Prospectors and Defenders.

Cooper [1984] focused on the new product programs of successful and unsuccessful firms. Each firm's product innovation programme was characterized

by a number of dimensions describing the programme orientation, types of products, types of markets, technology type, and programme commitment. Five strategy types were identified as follows: Technologically Driven; Balanced; Technologically Deficient; Low-Budget Conservative; and High-Budget Diverse. The general conclusion of the study was that, while both the strategy adopted and the type of industry had an influence on programme performance, a firm's characteristics did not.

With the exception of the Cooper [1984] study, the above studies focused on innovativeness as a single variable construct. They were based on such factors as timing of market entry, rate of new product introductions, or responses to the innovation efforts of competitors. The Cooper study itself ignored the issue of timing of market entry which may have major implications for the competitive and cost effects of innovativeness. These operationalizations did not take into account possible interactions between different aspects of innovativeness, and also did not consider the broad scope of what constitutes innovativeness. This scope relates to products, markets, processes, technology and market entry as well as the effort behind them. In order to fully understand the ramifications of innovative orientation it is important to include as many of these dimensions as possible. A focus on a single dimension of innovativeness may ignore other potentially important dimensions.

Only the Cooper [1984] study, which was based on a sample of Canadian companies, dealt with innovation in non-U.S. markets. Most of the research relating to innovation orientation has been conducted either in the U.S. or on U.S.-based companies. Since innovation orientation is a form of adaptation to an environment the issue for a company operating in non-U.S. markets is to what extent findings in the U.S. market are generalizable to those markets. To assume the universal validity of such strategic archetypes without explicit investigation is similar to assuming the universal validity of concepts and measures developed in the U.S. [Douglas & Rhee 1989]. The available evidence on innovation internationally suggests a conditioning influence for market environments. Franko [1976], for example, found European innovations to be biased toward material-saving processes, ersatz material substitutes, and goods oriented toward low-income consumers. American innovations, on the other hand, were typically focused towards goods and processes that had an appeal to the unique high-income, labor-short American market. He attributed these patterns of innovations to differences in incomes and relative factor costs. Pavitt [1969] also found the demand for new technology to be lower in the European than in the U.S. market.

In addition comparative marketing studies have demonstrated that marketing environments are associated with differences in marketing strategy [Bartels 1968; Boddewyn 1981]. This view forms the basis of the argument for local adaptation in developing international marketing strategy [Buzzell 1968; Keegan 1969]. Douglas and Craig [1983] also suggested that differences in market structure, market size, the degree of market fragmentation and differences

in the character and degree of competition imply that relations that hold in the U.S. do not necessarily hold in countries outside the U.S.

Related to the issue of the conditioning role played by market environments is the point that companies of different national origin often pursue different strategies [Brandt & Hulbert 1977; Franko 1976; Mazzolini 1975; Pavitt 1969]. These so-called national strategies may be developed in part as a response to national market conditions, with the companies involved subsequently attempting to leverage those strategies internationally. In this instance, too, the market environment plays a conditioning role in the development of strategies. To the extent that companies of different national origin pursue different strategies, because of their adaptation to national market conditions, it can be expected that different market conditions will play a conditioning role in the development of innovation orientations. This conditioning role of the environment probably explains the finding of Schneeweis [1983] that R&D and introduction of new products are not very important in explaining ROI levels in Europe as in the U.S.

Given this evidence is it likely that companies operating in different parts of the world will exhibit similar kinds of innovation orientation? If similar orientations are indicated then an important issue that arises is what kinds of environments they are associated with and to what extent they have similar impacts in terms of performance.

CONCEPTUAL FRAMEWORK

The study follows the environment-strategy-performance paradigm. This paradigm suggests that a company's performance is a function of differences in market conditions and the strategy pursued [Lenz 1981]. In a sense there must be an appropriate alignment between strategy-making behavior and the nature of an environment to ensure effective selection of strategies [Miller & Friesen 1983]. Empirical evidence for this viewpoint is provided by Jauch, Osborn and Glueck [1980], Cooper and Schendel [1976], and Paine and Anderson [1977]. Miles and Snow [1978], on the other hand, suggested that in any industry the various innovative types in their typology would exist, and with the exception of Reactors, be equally effective. Extrapolating to non-U.S. markets the inference is that businesses need not worry about the particular characteristics of those foreign markets because they would be successful so long as they exhibited the respective competencies. This can only be partially correct because whether or not a particular competence is appropriate depends on the requirements of the environment. Differences in income, consumption patterns, tastes, attitudes toward innovation, and lifestyles, all affect the size and growth of markets for new products. They determine a market's acceptance of innovation as well as its rate, and thus, its strategy and performance impacts. Lower levels of income in Europe, for example, restrict the ability of innovators to charge higher prices to cover their product development and introduction costs.

This effect may be worsened by the generally smaller and more fragmented markets of Europe which reduces the ability of a firm to amortize its costs over a wider base. These two effects are likely to result in a much worse impact on the financial performance of innovators in Europe than in the U.S. Thus, it is very unlikely that different innovative types would be equally effective even though they may all exist within the foreign market environment. This viewpoint is consistent with the environment-strategy-performance paradigm of industrial organization and provides the framework for this study.

Specific variables relating to each of the three components—strategy, environment and performance—were chosen on the basis of a literature review of previous research and the objectives of this study described in preceding pages. The literature is not described in detail here but chosen variables are indicated and fully described in the Appendix.

As indicated earlier, innovation orientation as a strategy consists of a number of intertwined elements that have to do with outputs, inputs and timing. In output terms innovation has been measured primarily with statistics on new products, new processes and patents while in input terms the key statistics have been R&D expenditures and numbers of scientists and engineers as a proportion of the work force [Freeman 1974; Nelson & Winter 1977; Pavitt 1982]. New products and R&D expenditures are the measures chosen for this study. They facilitate comparability across industries, especially when they are measured as a proportion of sales. The new products measure reflects the results aspect of innovative effort as indicated by R&D expenditures.

The third component of innovation orientation has to do with timing of entry. There are usually three categories of timing involved in descriptions of innovation: pioneer or first to market; quick second or early follower; and late follower [Ansoff & Stewart 1967; Kamm 1987]. The particular aspect of timing used in this study has to do with the position of a business with respect to these dimensions at the time of its initial entry into a particular product market. To the extent that a firm is one of the first to develop a particular product or service it can be classified as being more innovative.

A number of variables relating to the environment have been used in innovation strategy research. Industry and market concentration have been found to influence both profitability and behavior of firms. In terms of innovation, high levels of concentration may make it easier for firms to appropriate the returns from new product development effort. On the other hand, they may feel less compelled to engage in innovation because concentration acts as a barrier to entry. Since there are very few absolute barriers to entry the former effect is likely to prevail. Other factors that have similar effects are product development times and patent protection which may be viewed as measures of innovative opportunity [Angelmar 1985; Ravenscraft 1983]. Other environmental variables relating to innovation strategy have to do with competitive pressure in the form of frequency of product changes,

market share instability and competitors' new product intensities [Hambrick 1983a; Miller 1988]. Businesses may choose to be either product or process innovative in the face of intense competition.

Another set of variables relating to innovation strategy have to do with industry and market growth. Key factors here have been growth rates, stage in product life cycle and stability of growth rates [Hambrick 1983a; Moore & Tushman 1982; Thietart & Vivas 1984]. Growth rate is one indicator of the attractiveness of a market or industry, and the stability associated with this rate reflects environmental uncertainty.

The last component of the framework is performance. It has been measured in a number of ways including success rates, contribution to corporate sales and profits, and the extent to which profits from new products exceeded their costs of development [Collier 1977; Cooper 1984; Hopkins 1980]. For the purposes of this study two broad categories of measures relating to marketing (market share; relative market share; market share growth; return on sales) and financial (ROI; Cashflow on Investment-CFOI; gross margin; cash flow from operations) performance are used. Both categories of measures have been studied extensively in previous research on strategy and performance in both domestic and international markets [Buzzell & Gale 1987; Douglas & Craig 1983]. Multiple measures are used because innovation has differing impacts in the short and long term, and on different measures of performance.

The review of literature and conceptual framework provide a basis for addressing the research questions posed in the introduction. They suggest a conditioning impact for national market factors and thus we would not expect innovation orientation to have the same features or be associated with similar environments or levels of performance.

These issues are examined, within the context of the PIMS database, through the development of a taxonomy of innovation orientation using consumer businesses operating in the U.S. and in European markets. The environments and performance levels associated with the different groups in the two geographic areas are also compared.

METHODOLOGY

Database

The paper examines the above issues using a sample of businesses drawn from the PIMS (Profit Impact of Market Strategy) database. Instructions for responding to the Strategic Planning Institute survey define a product business as one that:

- sells a distinct set of products or services
- to an identifiable group of customers
- in competition with a well-defined set of competitors.

This database results from an ongoing survey of the environments, competitive characteristics, strategy and performance of businesses in a number of countries undertaken by the Strategic Planning Institute. The particular component of the database used in this study is the SPI4 which provides data averaged over four-year periods for the different variables.

The international portion of the database indicates the national or regional locations of the headquarters and served markets of businesses. These locations are in the categories U.S., the U.K., Europe and Other Countries. It should be noted that served markets are not necessarily international. Served markets, as defined by reporting managers of the businesses, may cover a region in a country, all of a country, or several countries. However, there are no served markets that cover the U.S. and countries in Europe together. It is only in the case of Europe that there exists an international served market in a real sense because served markets there may go across national boundaries.

Two subsamples were chosen since a basic objective was to compare innovation in U.S. and European markets. The first subsample was made up of 350 businesses serving the U.S. market with corporate headquarters in the U.S. A second subsample consisted of 123 businesses operating in European markets, of which 44 had their corporate headquarters in the U.S., and 79 in Europe. The businesses operated in consumer durable and non-durable markets.

Data Analysis

Data analysis was conducted in two phases with each related to one of the research questions posed earlier on. Phase 1 dealt with the issue of identifying similar innovation orientation types in U.S. and non-U.S. markets. Phase 2 compared the environments and performance of the types across the two markets.

For each subsample variables relating to innovation orientation, environment and performance were chosen on the basis of the previously discussed literature review and conceptual framework. These variables and their definitions in the PIMS database are described in the Appendix.

All observations in the subsamples were standardized to have mean zero and unit standard deviation. This was done to alleviate the problem of different measurement units for the various variables. With standardization comparison of variable scores for different groups is facilitated because they are all transformed into the same unit of measurement.

Phase 1. As indicated earlier, Phase 1 of the data analysis aimed at identifying similar innovation orientation types in U.S. and European markets. The approach to doing this was through taxonomy development, specifically, a taxonomy of innovative orientation. Cluster analysis was performed separately for each subsample (i.e., U.S. and European markets) of observations based on variables identified as relating to innovation orientation in order to come up with this taxonomy.

The goal of the cluster analysis, then, was to identify a taxonomy of innovation orientation based on the derived clusters. The cluster method used comes from the Analysis of Quantitative Data (AQD) package provided by the Strategic Planning Institute. The particular method involved a hierarchical algorithm using the minimum squared error method [Schlaifer 1981] which has been indicated as producing better results when euclidean measures of similarity are used, as is the case in this approach [Punj & Stewart 1983]. Schlaifer [1974] also indicated the minimum square error approach as a good method for forming homogeneous groups.

Due to limitations in the software package available on the AQD system provided by SPI, the clustering routine could not be applied to the total number of observations in the U.S. market sample. The routine was thus applied to a random sample of 350 observations in the U.S. market. For the European market all observations were used.

Criteria used in choosing an appropriate number of clusters to serve as a basis for identifying different innovation orientation types were as follows:

1. The interpretability and practicality of the derived clusters in terms of the concept of innovation orientation discussed earlier;
2. The drop in the overall root-mean-square prediction error at different merger levels.

This approach follows Galbraith and Schendel [1983] and Douglas and Rhee [1989].

The first criterion was based on an examination of the mean scores on the cluster variables for the various cluster solutions. The second criterion was applied by examining the dendrograms (a chart indicating the cluster process) and levels of the overall root-mean-square prediction error as computed after the merger of observations into a cluster. On the basis of these two criteria the four cluster solutions were chosen. The scores on the cluster variables for the two markets and comparisons of the groups are shown in Table 1A-B.

It must be borne in mind when following the discussion, and also in reading the figures in the tables, that the numbers represent the mean scores of the different cluster groups relative to the average for the sample as a whole. Thus the cluster comparisons are made in terms of their relative differences from that average. It should be noted that a negative score indicates that a particular group is below the average while a positive score shows that it is above the average for all the businesses in that particular market (the subsample). With respect to the order of market entry variable though, a negative score indicates relative late entry while a positive score describes relatively early entry.

Phase 2. In order to examine the effects of the geographic location of the served market on the different innovative orientations, each type in the U.S. was compared to its counterpart in the European market. The statistical approach used was a series of *t*-tests comparing the mean scores of each group across a number of environmental and performance variables. It

TABLE 1A
Profiles of Innovation Orientation Types
(Mean Scores on Cluster Variables)

U.S. Market

Cluster Variable	Product Innovators (#44)	Process Innovators (#24)	Late Entrant Non-Innovators (#123)	Original Pioneers (#159)
Order Of Market Entry	-0.1891	-0.0911	-0.8849	0.7506
Relative % New Products	1.7104	0.6239	-0.2888	-0.3441
Percent New Products	1.9491	0.2968	-0.4063	-0.2699
Product R&D	0.0085	1.2635	-0.468	0.1689
Process R&D	-0.1713	2.6879	-0.3979	-0.0505

European Market

Cluster Variable	Product Innovators (#16)	Process Innovators (#9)	Late Entrant Non-Innovators (#24)	Original Pioneers (#74)
Order Of Market Entry	-0.4641	-0.3429	-1.4335	0.6070
Relative % New Products	1.9725	-0.3409	-0.5061	-0.2209
Percent New Products	1.6840	0.4046	-0.4031	-0.2826
Product R&D	0.6042	0.3807	-0.2147	-0.1073
Process R&D	-0.0140	2.8144	-0.1678	-0.2849

should be noted in these comparisons that the focus is on relative positions within geographic served markets. For example, the relative position of Product Innovators in the European market is compared with the relative position of Product Innovators in the U.S. market. The comparisons basically reflect the magnitude of the differences in relative positions. The profiles of the environments and performance of the clusters are shown in Table 2.

RESULTS

The Innovation Orientation Clusters (Types)

A key finding was the high degree of similarity in results for the two geographic markets, especially in terms of the innovation profiles of the identified innovative types. There were differences though in the market characteristics associated with the types across the two geographic areas.

Similarities and differences in the composition of the two sets of clusters were ascertained through an examination of their scores on the cluster

TABLE 1B
Comparison of Innovation Orientation Types on Cluster Variables in U.S. and European Markets (Mean Scores)

	U.S.	Europe	Significance (*t*-test)
(a) *Product Innovators*			
Cluster Variable			
Order of Market Entry	-0.1891	-0.4641	NS
Relative % New Products	1.7104	1.9725	NS
Percent New Products	1.9491	1.6840	NS
Product R&D	0.0085	0.6042	0.10
Process R&D	-0.1713	-0.0140	NS
(b) *Process Innovators*			
Cluster Variable			
Order of Market Entry	-0.0911	-0.3429	NS
Relative % New Products	0.6239	-0.3409	0.01
Percent New Products	0.2968	0.4046	NS
Product R&D	1.2635	0.3807	0.10
Process R&D	2.6879	2.8144	NS
(c) *Late Entrant Non-Innovators*			
Cluster Variable			
Order of Market Entry	-0.8849	-1.4335	0.001
Relative % New Products	-0.2888	-0.5061	0.10
Percent New Products	-0.4063	-0.4031	NS
Product R&D	-0.4680	-0.2147	0.01
Process R&D	-0.3979	-0.1678	0.05
(d) *Original Pioneers*			
Cluster Variable			
Order of Market Entry	0.7506	0.6070	0.05
Relative % New Products	-0.3441	-0.2209	NS
Percent New Products	-0.2699	-0.2826	NS
Product R&D	0.1689	-0.1073	0.10
Process R&D	-0.0505	-0.2849	0.05

variables. At the four-cluster solution chosen for each of the two subsamples two types of innovative groups emerged. The first group typically rated high on new product introductions and product R&D expenditures but much less so on process R&D. This first group is fairly similar to the Prospectors identified by Miles and Snow [1978] and the Offensive type of Freeman [1974] in that they are both research intensive and have relatively high rates of new product introduction. They are labeled Product Innovators.

The second innovative group typically scored high on process R&D expenditures, slightly lower on product R&D, and much lower on new product introductions. This second group appears fairly similar to the Defenders identified by Miles and Snow [1978] and the Imitators of Freeman [1974]

in that their high process R&D expenditures may indicate a focus on the engineering task and production efficiency. They are labeled Process Innovators.

A third group was identified across the two subsamples. The major characteristics of this group were their relatively late entries into their markets and their extreme non-innovativeness. This suggests that they are closest to the Reactors of Miles and Snow [1978], the Dependents of Freeman [1974] and the Me-Toos of Ansoff and Stewart [1967]. They are labeled Late Entrant Non-Innovators.

The fourth group was characterized by the fact that those businesses had typically pioneered in their markets at the time of their initial entry. They most closely relate to the Applications Engineers of Ansoff and Stewart [1967] and the Traditionalists of Freeman [1974]. As such they are labeled Original Pioneers.

Comparisons of the Innovative Types: U.S. Market Product Innovators and European Market Product Innovators.

Innovative Orientation. Contrary to expectation there exists a significant (0.10 level) difference in the relative positions of the two groups with respect to product R&D expenditures. The European market Product Innovator group ranks first in terms of these expenditures whereas the U.S. market group ranks third in its sample. This may indicate the ability of the U.S. market group to introduce many new products without necessarily engaging in a high level of product R&D. It may also imply the introduction of new products by the U.S. group that are essentially minor modifications of existing ones and thus do not require a high product R&D effort.

Environment. Significant differences exist in the market growth associated with these two groups of Product Innovators even though they both experience the highest rates in their markets. These differences are in terms of real market growth (0.05 level) and served market size (0.05 level). Not surprisingly, a similar situation occurs with respect to their respective product life cycles. While both groups operate in the earlier stages the difference between them and the other groups in their markets is greater for the European market group, and significant at the 0.1 level.

For the competitive situations in their environments key differences exist in industry instability and competitors' rate of new product introductions. Both groups face relatively lower levels of industry instability, but this is more marked for the European market group, and is significant at the 0.1 level. The U.S. market group has about the same level of industry instability as the Late Entrant Non-Innovators in their market. The opposite situation holds for competitors' new product introductions. The U.S. market group has by far the highest rate of competitor's new product introductions (more than one standard deviation from the mean) whereas the European market group is second in its market. In the European market Process Innovators

face the greatest pressure from competitors' new product introductions. This difference is significant at the 0.05 level, and suggests product innovativeness as a response to competitive pressure in the form of a high rate of new product introductions for the U.S. market. In the European market, on the other hand, it gives rise to process innovativeness presumably aimed at achieving efficiency in operations to counter competitive pressure. If product innovativeness is considered a higher level form of innovation than process innovativeness then the U.S. market Product Innovators may be said to respond to competitive pressure by being more innovative. The presumed objective of operational efficiency for the European market Product Innovators is supported to an extent by their comparatively higher relative process R&D expenditures in relation to the U.S. market group.

Differences exist in terms of the innovative opportunity in their environments with respect to frequency of product changes and development time for new products, at the 0.05 and 0.1 levels respectively. Whereas European market Product Innovators have fairly infrequent product changes their counterparts in the U.S. market face much more frequent changes. The U.S. market group also faces much shorter product development times in their markets than does the European market group. In fact, the latter group is just around the average in its market. Product Innovators in the U.S. market therefore face greater product dynamism in the form of frequent product changes and shorter product development times. The longer product development times may be a contributing factor to the observation that a high rate of new product introductions by competitors in the European market is associated with process innovativeness. Since it takes a long time to develop new products businesses may opt for operational efficiencies in the short run in the face of competitive pressure. Another contributing factor may be the fact that U.S. market Product Innovators typically have greater product and process patent protection than their European market counterparts, even though this difference is not statistically significant.

Performance. The only performance variable that provides a significant difference is gross margin at the 0.05 level. The European market group has a substantially larger margin than the other groups in its markets compared to the U.S. market group. In fact, Product Innovators in the U.S. outperform only Late Entrant Non-Innovators in terms of gross margin. Thus, there is a high degree of similarity in the performance levels associated with product innovativeness in both U.S. and European markets.

These findings indicate that although a similar strategic innovation orientation type (Product Innovator) may be identified in both U.S. and European markets, key differences exist in some of the environments and performance levels associated with them. These differences may be either in terms of their positions relative to other groups in their markets, or in terms of the type of association. The key differences have to do with product R&D expenditures, market growth rates, competitors' new product introductions, product dynamism and gross margins.

TABLE 2
Comparison of Environments and Performance Levels of Innovation Orientation Types in U.S. and European Markets (Mean Scores)

	U.S.	Europe	Significance (*t*-test)
(a) Product Innovators			
1. Environment			
1a. Market Growth/Product Life Cycle Stage			
Industry Long-Term Growth	0.6482	0.0223	NS
Real Market Growth	0.0932	0.8123	0.05
Served Market Size	0.0547	0.6294	0.05
Life Cycle Stage	-0.3105	-0.8791	0.10
1b. Competition			
Industry Concentration	-0.3319	-0.0344	NS
Served Market Concentration	-0.1021	0.1952	NS
Industry Instability	-0.0713	0.6519	0.10
Served Market Instability	-0.1859	0.0310	NS
Total Market Share Instability	0.1559	0.0780	NS
Competitors' % New Products	1.1476	0.1592	0.05
1c. Innovative Opportunity			
Product Patent Protection	0.3394	-0.0391	NS
Process Patent Protection	0.4480	-0.1405	NS
Frequency of Product Changes	-0.2659	0.3474	0.05
Development Time for New Products	-0.4102	0.0506	0.10
2. Performance			
2a. Financial Measures			
Gross Margin	0.0123	0.7395	0.05
Return on Investment	-0.4756	-0.2934	NS
Cash Flow on Investment	-0.5704	-0.6436	NS
Cash Flow from Operations	-0.6021	-0.6506	NS
2b. Marketing Measures			
Market Share	-0.3972	-0.4711	NS
Relative Market Share	-0.3269	-0.4861	NS
Market Share Growth	0.3946	0.5017	NS

U.S. Market Process Innovators and European Market Process Innovators

Innovative Orientation. Key significant differences exist with respect to relative percent new products (0.01 level) and product R&D (0.1 level). Whereas Process Innovators in the U.S. market have a high rate of new product introductions relative to their leading competitors (second only to Product Innovators), their European market counterparts are substantially below the average for those markets. The European market group has a rate higher than only that for Late Entrant Non-Innovators.

Process Innovators in the U.S. have the highest expenditures for product R&D by a substantial margin over other groups whereas their counterparts

in the European market rank second. This suggests that Process Innovators in the U.S. market are innovative in general, given their relatively high rates of new product introductions and high process and product R&D expenditures.

Environment. The only significant difference is product patents protection at the 0.1 level. European market Process Innovators have the highest such protection in their markets whereas the U.S. market group has one of the lowest. The European market group has either been unable to take advantage of this protection, or their competitors have such strong protection that the group would not benefit from a focus on many new products.

There are other differences that are not statistically significant. For example, the European market group typically operates in higher growth markets and industries in its markets relative to the other groups than the U.S. market Process Innovators. Also European market Process Innovators face the highest pressure from competitors' new product introductions by a substantial margin whereas their U.S. market counterparts face about average pressure from that source.

Performance. The only statistically significant difference at the 0.01 level is gross margin for which the U.S. market Process Innovators have the highest performance in their markets, whereas the European market group has the lowest in their markets by a substantial margin. Although not statistically significant the U.S. market group also has comparatively higher performance in terms of both market share, relative market share, and ROI in their markets than the European market groups.

A similar conclusion to that reached in the comparison of Product Innovators may be made in this instance. Although a similar strategic innovation type may be identified in both U.S. and European markets some differences exist in their associated environments and performance levels. The results indicate differences in terms of both their positions relative to other innovative types and the type of association in relation to relative new product introductions, product R&D, product patent protection and gross margins.

U.S. Market Late Entrant Non-Innovators and European Market Late Entrant Non-Innovators

Innovative Orientation. Significant differences exist between the two groups in terms of the components of innovative orientation except in the case of absolute new product introduction. Although significant differences exist in terms of standardized scores (reflecting differences in magnitude), there is consistency in terms of their positions relative to other groups in their markets.

Environment. The only significant differences in their environments relate to rate of competitors' new product introductions (0.05 level) and development time for new products (0.1 level). In terms of the latter, whereas the U.S. market group has the least frequent changes in its markets the European

TABLE 2
(continued)
Comparison of Environments and Performance Levels of Innovation Orientation Types in U.S. and European Markets (Mean Scores)

	U.S.	Europe	Significance (*t*-test)
(b) Process Innovators			
1. Environment			
1a. Market Growth/Product Life Cycle Stage			
Industry Long-Term Growth	-0.0388	0.2862	NS
Real Market Growth	-0.1141	0.4240	NS
Served Market Size	0.2491	0.2882	NS
Life Cycle Stage	-0.1430	0.0562	NS
1b. Competition			
Industry Concentration	0.0754	0.0494	NS
Served Market Concentration	0.2175	0.0433	NS
Industry Instability	0.3039	0.2819	NS
Served Market Instability	-0.0711	0.0436	NS
Total Market Share Instability	0.1724	0.1419	NS
Competitors' % New Products	-0.0199	0.7994	NS
1c. Innovative Opportunity			
Product Patent Protection	-0.1491	0.5994	0.10
Process Patent Protection	0.0769	0.6930	NS
Frequency of Product Changes	-0.2782	-0.5334	NS
Development Time for New Products	0.1948	0.4050	NS
2. Performance			
2a. Financial Measures			
Gross Margin	0.2831	-0.7398	0.01
Return on Investment	-0.0924	-0.2878	NS
Cash Flow on Investment	-0.0730	-0.0226	NS
Cash Flow from Operations	0.0134	-0.0172	NS
2b. Marketing Measures			
Market Share	0.3657	-0.0801	NS
Relative Market Share	0.2530	0.0269	NS
Market Share Growth	-0.0838	-0.3352	NS

market group has a frequency second only to Process Innovators. The U.S. market group also faces the least pressure from competitors' new product introductions by a large margin whereas the European market group has just about average pressure from that source in their markets. The European market group thus appears to face more dynamic and competitive environments.

Although not statistically significant, the U.S. market group also has the lowest growth rates in its markets, whereas the European market group has a comparatively higher level of growth in relation to other groups in their markets. For the competitive situation, differences exist in concentration and served market instability. The European market group has substantially

TABLE 2
(continued)
Comparison of Environments and Performance Levels of Innovation Orientation Types in U.S. and European Markets (Mean Scores)

	U.S.	Europe	Significance (*t*-test)
(c) Late Entrant Non-Innovators			
1. Environment			
1a. Market Growth/Product Life Cycle Stage			
Industry Long-Term Growth	-0.0818	-0.0887	NS
Real Market Growth	-0.1107	0.0986	NS
Served Market Size	-0.0851	-0.0523	NS
Life Cycle Stage	0.1204	0.0274	NS
1b. Competition			
Industry Concentration	-0.0276	-0.2405	NS
Served Market Concentration	0.0914	0.3532	NS
Industry Instability	-0.0863	0.0075	NS
Served Market Instability	0.0270	0.1559	NS
Total Market Share Instability	-0.1511	-0.1824	NS
Competitors' % New Products	-0.3176	-0.0453	0.05
1c. Innovative Opportunity			
Product Patent Protection	-0.1554	-0.2980	NS
Process Patent Protection	-0.2395	-0.2493	NS
Frequency of Product Changes	0.2360	0.1082	NS
Development Time for New Products	0.2450	0.0000	0.10
2. Performance			
2a. Financial Measures			
Gross Margin	-0.2380	-0.2502	NS
Return on Investment	-0.1047	-0.4928	0.05
Cash Flow on Investment	-0.0474	-0.5272	0.05
Cash Flow from Operations	0.0016	-0.6285	0.01
2b. Marketing Measures			
Market Share	-0.3254	-0.7010	0.05
Relative Market Share	-0.2843	-0.5936	0.05
Market Share Growth	0.0661	0.2201	NS

higher relative served market instability than the U.S. market group which is just around the average in its market. The European market group also has the highest served market concentration and lowest industry concentration in relation to other groups while the U.S. market group is at average levels in terms of both those elements.

Performance. The results indicate significant differences with respect to ROI (0.05 level), CFOI (0.05 level), cash flow (0.01 level), market share (0.05 level), and relative market share (0.05 level). The U.S. market group has the second lowest level of performance with respect to ROI, market share and relative market share; an average level of cash flow and about

average CFOI. The European market group has the lowest level of ROI, market share and relative market share, and the second lowest level of CFOI and cash flow. In sum, the European market group exhibits relatively poorer performance in its markets.

U.S. Market Original Pioneers and European Market Original Pioneers

Innovative Orientation. There are statistically significant differences with respect to order of market entry (0.05 level), product R&D (0.1 level) and process R&D (0.05 level). In terms of order of market entry though, relative positions remain the same. For product R&D, although the U.S. market group has the second highest such expenditures, the European market group has the second lowest. The latter group also has the lowest process R&D expenditures, while the U.S. market group has a level close to the average for their market. These differences suggest the notion of the U.S. market group engaging in some form of product modification as evidenced by relatively high product R&D expenditures. In terms of relative percent of new product introductions, although not statistically significant, we find the U.S. market group with the lowest such rate in their markets whereas the European market group has the second highest rate in theirs.

Environment. A number of statistically significant differences exist in the environments associated with these two groups. Whereas the U.S. market group has about average rates of market growth, the European market group has the lowest rates of growth in its markets by a fairly large margin. The levels of significance are 0.05 for real market growth, short and long term, and 0.10 for served market size.

In terms of competitive situations and innovative opportunity no statistically significant differences exist. The only notable difference in comparative positions has to do with pressure from competitors' new product introductions. The European market group faces the lowest such pressure while the U.S. market group is only slightly below the average for their markets. This, and the comparatively higher market growth, may be the rationale for the product modification engaged in by the U.S. market group.

Performance. No statistically significant differences are observed but some differences in comparative positions are indicated. While the European market group has the highest market share, the U.S. market group is second to the Process Innovators in their markets. The U.S. market group also has the lowest increases in market share while their European market counterparts have the second lowest such increase.

DISCUSSION

A taxonomy of innovation orientation was developed that held across the U.S. and European markets. This is a contribution for two reasons. In the first place, even though this study uses a multidimensional conceptualiza-

TABLE 2
(continued)
Comparison of Environments and Performance Levels of Innovation Orientation Types in U.S. and European Markets (Mean Scores)

	U.S.	Europe	Significance (*t*-test)
(d) Original Pioneers			
1. Environment			
1a. Market Growth/Product Life Cycle Stage			
Industry Long Term-Growth	-0.1102	-0.0012	NS
Real Market Growth	0.0771	-0.2592	0.05
Served Market Size	0.0883	-0.1542	0.10
Life Cycle Stage	0.0144	0.1744	NS
1b. Competition			
Industry Concentration	0.1018	0.0794	NS
Served Market Concentration	-0.0752	-0.1620	NS
Industry Instability	0.0406	0.1043	NS
Served Market Instability	0.0413	-0.0626	NS
Total Market Share Instability	0.0477	0.0251	NS
Competitors' % New Product	-0.0689	-0.1169	NS
1c. Innovative Opportunity			
Product Patent Protection	0.0489	0.0322	NS
Process Patent Protection	0.0497	0.0269	NS
Frequency of Product Changes	-0.0670	0.0248	NS
Development Time for New Products	-0.1054	-0.0602	NS
2. Performance			
2a. Financial Measures			
Gross Margin	0.1379	0.0112	NS
Return on Investment	0.2265	0.2583	NS
Cash Flow on Investment	0.2056	0.3129	NS
Cash Flow from Operations	0.1633	0.3466	NS
2b. Marketing Measures			
Market Share	0.3064	0.3390	NS
Relative Market Share	0.2722	0.2943	NS
Market Share Growth	-0.2030	-0.1391	NS

tion of innovation, types similar to single variable conceptualizations are generated. This type of conceptualization however does indicate the linkages between various aspects of innovativeness. The similarity of the innovative types developed in this study to existing typologies provides an indication of their relevance for strategic analysis.

The second contribution lies in the implications of this existence of similar innovative orientation types across U.S. and European markets. A major implication is similar to a key postulate of the Miles and Snow [1978] typology: in any given geographic market or environment these different innovative types may be present. In terms of international strategy this suggests a firm moving from one geographic location to another (at least

between the U.S. and European markets) will encounter similar strategic types with respect to innovative orientation. This implies a lack of a conditioning influence by environmental factors and provides further confirmation of the universality of the types.

In addition, differences in terms of market characteristics indicate the lack of a one-to-one correspondence in the environments associated with a particular innovative type across the two geographic locations. Thus, for aspects of an environment such as concentration and stability, businesses pursuing a similar innovation orientation are likely to be faced with different associations in the two geographic locations. This makes it difficult to predict some of the market characteristics competitors are going to be associated with. For other aspects of environments, such as growth and competitive pressure in the form of new product introductions, greater similarity exists across U.S. and European markets for similar innovative types. This makes it easier for businesses to predict what market characteristics their competitors are going to be associated with. The problem in all of this is that environments are multidimensional in nature, thus the lack of a one-to-one correspondence on all the features of environments used in this study makes the provision of guidelines that would be relevant for both geographic locations very difficult.

In terms of the performance levels associated with the different innovative types, some relationships are consistent across the board. Product Innovators typically exhibit the poorest financial performance but the greatest increases in market share growth. The poor financial performance may be attributed to the high costs of developing and introducing new products [Blois 1985; Farris & Buzzell 1979; Haas 1987; Moore & Tushman 1982]. The high market share growth associated with this strategy may be due to the newness of products which enables them compete effectively against established brands [Porter 1980]. Both findings are consistent with Hambrick's [1983a] results for Prospectors.

For Late Entrant Non-Innovators performance is generally poor in both markets. Businesses pursuing this strategy, having entered their markets late, lack enduring advantages or the resources to compete against the strengths of established businesses. Surprisingly though, in the European market case, this group shows the second highest increase in market share, a finding for which there is no obvious explanation.

Original Pioneers experience the best performance in both geographic locations, reflecting the long term advantages of pioneering brands. The strong relationship between the Pioneer groups and superior marketing performance confirms the findings of Robinson [1988], Robinson and Fornell [1985], and Urban et al. [1986]. These studies indicated the superior market share associated with pioneering in a market.

For Process Innovators there is no consistency in performance results between the U.S. and European markets. For example, in the U.S., they have superior

absolute and relative market shares, whereas in the European market they have around average market shares. These inconsistencies do not lend themselves to ready interpretation. In the U.S. Process Innovators also have a high rate of product introductions and product R&D expenditures which should lead to poor financial and marketing performance based on results for Product Innovators. A potential explanation is that their production efficiencies more than offset the projected negative consequences of product innovativeness. This is reflected in the superior gross margins of the U.S. market group. The relatively lower margins and poorer performance of the European market group may be attributable to intense competitive pressure from high rates of competitors' new product introductions. Although not explicitly tested for, these observations suggest the conditioning impact of the environment as indicated by Douglas and Rhee [1989]. The general conclusion reached is that emphasis on process innovation leads to generally positive, if not spectacular, marketing performance. This particular group does not exhibit any consistently greater financial performance contrary to what is suggested by Miles and Snow [1978] and Hambrick [1983a].

The major implication of these findings is that, *in general*, certain performance levels are associated with each innovative orientation type which vary only in terms of magnitude across geographic location. Some relationships too do not show any consistency across the two markets as in the case of Process Innovators. For the former, while the strength of the relationship may vary, the direction is typically the same. This variation in the strength of the relationship leads to differences in relative positions of the innovative orientation types. It may create, in fact, situations similar to those caused by differences in the direction of the relationship, which may also lead to differences in relative position. Results from the study clearly indicate that different types of innovation orientation are associated with different kinds and levels of performance. This suggests a difference from the Miles and Snow [1978] contention that different orientations would be equally effective with the exception of their Reactor type.

Relating these findings back to the conceptual framework, the main implication is that the environment-strategy-performance paradigm is borne out in both geographic locations. The differences in performance indicate a need for an appropriate alignment of these strategies with market conditions for effective performance.

For U.S. businesses interested in European markets the results of this study indicate the potential complexities associated with trying to extend their domestic strategies abroad. Even though companies may be pursuing similar generic strategies abroad great care must be taken to understand their implications. Further consideration must also be given to the requirements of the market environments in which they operate. The consistent relationships indicted above can only be used as a starting point because there is not a one-to-one correlation across geographic location. Selection of an innovation

strategy should be a function of the characteristics of the market environment as well as the type of performance desired.

CONCLUSION

This study examines and extends findings on the environments and performance levels associated with innovation orientation to European markets. Similar innovation orientation types were identified for both U.S. and European markets which suggests that geographic market location is not an influencing factor in the adoption of these orientations. However, the existence of some differences in environments associated with the types suggests a need for closer examination of these links. Specifically, the issue of whether particular kinds of environments give rise to particular types of innovation orientation should be further investigated. The role of an environment as a contingency factor influencing effectiveness of different innovation orientations should also be examined. This could be done, for example, by first developing a typology or classification of environments and then examining the performance associated with different innovation strategies. This is necessary because this study only deals with association between innovation orientation, environment and performance. It does not specify cause-effect relationships.

While the environment-strategy-performance framework is borne out, the paradigm would be enriched for comparative analysis if further work were done on establishing the equivalence of environmental and other variables across geographic locations. For example, studies should be conducted to identify the relative importance of different environmental variables in determining the effectiveness of different innovation strategies.

The different innovation orientations are clearly associated with different kinds and levels of performance. Product innovativeness results in high market share increases but at the expense of very poor financial performance, especially in terms of cash flow. This reflects the lag between expenditures and income generation associated with high rates of new product development and introduction. Businesses following this strategy in both U.S. and European markets must have the financial resources to bridge this lag. Relatedly the findings indicate that the effectiveness of this strategy is restricted to enabling businesses to gain market share rapidly.

Findings for Original Pioneers and Late Entrant Non-Innovators indicate the benefits of entering markets early. Thus, timing of market entry is a key influence on level and type of performance in both geographic locations, the exception being market share growth for Process Innovators which has a differential impact across markets. This suggests a conditioning influence for market characteristics. Findings for Process Innovators also reflect this conditioning influence. These findings clearly indicate that the innovative types are not equally effective within and across geographic locations. They also give a clear indication of the appropriateness of each type.

A concern with this study derives from software limitations of the AQD package. For instance, MANOVA or multiple group discriminant analysis could not be used to test for differences across blocks of variables describing components of the framework. Thus, differences were tested across one variable at a time, a procedure that may not capture the intricacies of such components as environment and performance. There is therefore a need to examine these issues with multivariate analysis which may shed further light on the linkages between various items comprising the components of the framework.

The study is based on the SPI4 version of the database which has data in four-year blocks. It is virtually impossible to link the various four-year blocks of data for individual business units. Thus, the study is cross-sectional in nature. Given the potential longer term ramifications of some innovations it may be useful to investigate these issues with longitudinal analysis to capture the time dimension of innovation strategy.

Finally, businesses from the database are mostly larger, more successful and operating in growing or mature industries. The European sample is also much smaller. These businesses then may not be representative of the full range of businesses operating in U.S. and European markets. Caution must therefore be exercised in extrapolating these results to other types of businesses. More extensive investigation with a wider variety of businesses would be most useful. In particular further research on organizational contingencies associated with the effectiveness of innovative types is needed.

APPENDIX
Definitions of Selected PIMS Database Variables Describing Components of Conceptual Framework

INNOVATION ORIENTATION

Order of Market Entry

At the time the business first entered the market whether it was:

(i) one of the pioneers in first developing such products or services (=3);
(ii) an early follower of the pioneer(s) in a still growing, dynamic market (=2); or
(iii) a later entrant into a more established market situation (=1).

New Products

A new product is described as follows in the PIMS database: "... may either replace existing products or be added to the product line within the served market. They differ from improvements and product-line extensions in that they are characterized by one of the following: relatively long gestation periods, major changes to the manufacturing facilities, separate pro-

motional budgets, or separate product management" (*PIMS Data Manual*, January 1978, p. 3-8). Two variables exist in the database describing new products:

(i) *Relative New Products*: Percent of total sales accounted for by products introduced by a business during the three previous years minus percent of total sales accounted for by products introduced during the three previous years averaged for the three largest competitors.

(ii) *Percent New Products*: Percent of total sales accounted for by products introduced by a business during the three previous years.

R&D Expenditures

All expenses incurred to

(i) improve the existing products or services of a business or to develop new products or services, including improvements in packaging as well as product design, features and functions; or

(ii) improve the efficiency of manufacturing and distribution processes.

ENVIRONMENT

Market Growth/Product Life Cycle Stage

(i) *Served Market Size/Growth*: A number of variables indicating short-run, and inflation-adjusted growth rate of total sales in the served market and industry: (a) served market size (SR);(b) industry long-term growth;(c) real market growth.

(ii) *Product Life Cycle Stage*–Introductory Stage: Primary demand for product just starting to grow; products or services still unfamiliar to many potential users (=1); Growth Stage: Demand growing at 10% or more annually in real terms; technology or competitive structure still changing (=2); Maturity Stage: Products or services familiar to vast majority of prospective users; technology and competitive structure reasonably stable (=3); Decline Stage: Products viewed as commodities; weaker competitors beginning to exit (=4).

Competition

(i) *Industry Concentration*: The percentage of sales in the industry accounted for by the four largest competitors.

(ii) *Served Market Concentration*: The percentage of sales in the served market accounted for by the four largest businesses competing in the served market.

(iii) *Industry Instability*: The average percentage difference in the growth rate of the industry from an exponential trend.

(iv) *Served Market Instability*: The average percentage difference in the growth rate of the served market from an exponential trend.
(v) *Total Market Share Instability*: The sum of the market share changes for the focal business and the three largest competitors.
(vi) *Competitors' Percent New Products*: The simple average of the percentage of total sales accounted for by products introduced during the three preceding years for the three largest competitors.

Innovative Opportunity

(i) *Patents and Trade Secrets*: Whether a business benefits to a significant degree from patents, trade secrets, or other proprietary methods of production or operation pertaining to products or services (Yes = 1; No = 0).
(ii) *Development Time for New Products/Services*: For a business and its major competitors what the typical time lag is between the beginning of development effort for a new product and market introduction. Less than 1 year=(1); 1-2 years (=2); 2-5 years (=3); More than 5 years (=4) Little or no new-product development (=5).
(ii) *Frequency of Product Changes*: Whether it is the typical practice for the business to change all or part of the line of products or services offered "Annually" (=1), "Seasonally" (=2), "Periodically, but at intervals longer than one year" (=3) or with "No regular, periodic pattern of change" (=4).

PERFORMANCE

Financial Measures

(i) *Gross Margin*: Value added less manufacturing and distribution expense and depreciation as a proportion of net sales.
(ii) *Return on Investment*: Net Income over the book value of average investment (ROI).
(iii) *Cash Flow on Investment*: Cash flow from ongoing operations over the book value of average investment (CFOI).
(iv) *Cash Flow from Operations*: Cash flow from ongoing operations as a proportion of revenue.

Marketing Measures

(i) *Market Share*: Sales of a business as a percentage of the served market (MS).
(ii) *Relative Market Share*: Sales of a business over the sales of the three largest competitors in the served market (RMS).
(iii) *Market Share Growth*: Growth rate of market for a business over relevant time period (MSC).

REFERENCES

Angelmar, R. 1985. Market structure and research intensity in high technological opportunity industries. *Journal of Industrial Economics*, 34: 69-79.

Ansoff, H.I. & J.M. Stewart. 1967. Strategies for a technology-based business. *Harvard Business Review*, November-December: 71-83.

Bartels, R. 1968. Are domestic and international marketing dissimilar? *Journal of Marketing*, 32: 56-61.

Blois, K.J. 1985. Matching new manufacturing technologies to industrial markets and strategies. *Industrial Marketing Management*, 14: 43-47.

Boddewyn, J.J. 1981. Comparative marketing: The first 25 years. *Journal of International Business Studies*, 12: 61-79.

Brandt, W.K. & J.M. Hulbert. 1977. Headquarters guidance in marketing strategy in the multinational subsidiary. *Columbia Journal of World Business*, Winter: 6-12.

Buzzell, R.D. 1968. Can you standardize multinational marketing? *Harvard Business Review*, 46: 102-113.

_____ & B.T. Gale. 1987. *The PIMS principles*. New York: The Free Press.

_____ & R. Sultan. 1975. Market share—A key to profitability. *Harvard Business Review*, January-February: 135-44.

Cohen, K.J. & R.M. Cyert. 1973. Strategy formulation, implementation, and monitoring. *Journal of Business*, 46: 349-67.

Collier, D.W. 1977. Measuring the performance of R&D departments. *Research Management*, March: 30-34.

Cooper, A.C. & D. Schendel. 1976. Strategic responses to technological threats. *Business Horizons*, 19: 61-69.

Cooper, R.G. 1984. The performance impact of product innovation strategies. *European Journal of Marketing*, 18(5): 5-54.

Craig, S.C. & S.P. Douglas. 1982. Strategic factors associated with market and financial performance. *Quarterly Review of Economics and Business*, 22(2): 101-12.

Douglas, S.P. & C.S. Craig. 1983. Examining performance of U.S. multinationals in foreign markets. *Journal of International Business Studies*, Winter: 51-62.

Douglas, S.P. & D.K. Rhee. 1989. Examining generic competitive strategy types in U.S. and European markets. *Journal of International Business Studies*, Fall: 437-63.

Farris, P.W. & R.D. Buzzell. 1979. Why advertising and promotional costs vary: Some cross-sectional analyses. *Journal of Marketing*, Fall: 112-22.

Franko, L.G. 1976. *The European multinationals*. Stamford, CT: Greylock.

Freeman, C. 1974. *The economics of innovation*. Manchester, UK: Penguin.

Galbraith, C. & D. Schendel. 1983. An empirical analysis of strategy types. *Strategic Management Journal*, 4: 153-73.

Haas, E.A. 1987. Breakthrough manufacturing. *Harvard Business Review*, March-April: 75-81.

Hambrick, D.C. 1983a. Some tests of the effectiveness and functional attributes of Miles and Snow's strategic types. *Academy of Management Journal*, 26, 1: 5-26.

_____. 1983b. An empirical typology of mature industrial-product environments. *Academy of Management Journal*, 26(2): 213-30.

Hofer, C.W. 1975. Toward a contingency theory of business strategy. *Academy of Management Journal*, 18: 784-810.

Hopkins, D.S. 1980. New product winners and losers. Conference Board Report No. 773.

Jauch, L.R., R.N. Osborn & W.F. Glueck. 1980. Short term financial success in large business organizations. *Strategic Management Journal*, 1: 49-63.

Kamm, J.K. 1987. *An integrative approach to managing innovation*. Lexington, MA: D.C. Health.

Keegan, W.J. 1969. Multinational product planning: Strategic alternatives. *Journal of Marketing*, 33: 58-62.

Lenz, R.T. 1981. Determinants of organizational performance: An interdisciplinary review. *Strategic Management Journal*, 2: 131-54.

Mazzolini, R. 1975. European corporate strategies. *Columbia Journal of World Business*, Spring: 98-108.

McDaniel, S.W. & J.W. Kolari. 1987. Marketing strategy implications of the Miles and Snow strategic typology. *Journal of Marketing*, 51: 19-39.

Miles, R.E. & C.C. Snow. 1978. *Organizational strategy, structure and process*. New York: McGraw-Hill.

Miller, A. 1988. A taxonomy of technological settings, with related strategies and performance levels. *Strategic Management Journal*, 9: 239-54.

Miller, D. 1986. Configurations of strategy and structure: Towards a synthesis. *Strategic Management Journal*, 7: 233-49.

_____ & P.H. Friesen. 1983. Strategy-making and environment: The third link. *Strategic Management Journal*, 4: 221-35.

Moore, W.L. & M.L. Tushman. 1982. Managing innovation over the product life cycle. In M.L. Tushman & W.L. Moore, editors, *Readings in the management of innovation*. Boston, MA: Pitman.

Nelson, R. & S. Winter. 1977. In search of a useful theory of innovation. *Research Policy*, 6: 36-76.

Paine, F.T. & C.R. Anderson. 1977. Contingencies affecting strategy formulation and effectiveness: An empirical study. *Journal of Management Studies*, 14: 147-58.

Pavitt, K. 1969. Technological innovation in European industry: The need for a world perspective. *Long Range Planning*, December: 8-13.

_____. 1982. R&D, patenting and innovative activities. *Research Policy*, 11: 33-51.

Porter, M.E. 1980. *Competitive strategy*. New York: Free Press.

Punj, G. & D.W. Stewart. 1983. Cluster analysis in marketing research: Review and suggestions for application. *Journal of Marketing Research*, 20(5): 134-48.

Ravenscraft, D.J. 1983. Structure-profit relationships at the line of business and industry level. *Review of Economics and Statistics*, 65: 22-31.

Robinson, W.T. & C. Fornell. 1985. Sources of market pioneer advantages in consumer goods industries. *Journal of Marketing Research*, 22(8): 305-17.

Robinson, W.T. 1988. Sources of market pioneer advantages: The case of industrial goods industries. *Journal of Marketing Research*, 25(2): 87-94.

Schlaifer, R. 1974. *AQD manual for statistical programs*. Cambridge, MA: Harvard University.

_____. 1981. *User's guide to the AQD collection*. Cambridge, MA: Harvard University.

Schneeweis, Thomas. 1983. Determinants of profitability: An international perspective. *Management International Review*, 23(2): 15-21.

Thietart, R.A. & R. Vivas. 1984. An empirical investigation of success strategies for businesses along the product life cycle. *Management Science*, 32: 645-59.

Urban, G.L., T. Carter, S. Gaskin & Z. Mucha. 1983. Market share rewards to pioneering brands: An empirical analysis and strategic implications. *Management Science*, 32(6), 645-59.

Venkatraman, N. & V. Ramanujam. 1986. Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review*, 11: 801-14.