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Science is analyzed as a special case of marketing—the marketing of ideas in the form of substantive and methodological theories. The marketing mix, target markets, and marketing objectives are developed for the scientific arena, and a formal analysis of a relativistic/constructionist view of science is used to support the approach. This view is contrasted with the positivistic/empiricist perspective of science currently dominant in marketing and other social sciences. Recommendations are offered for improved methods of developing knowledge.

Is Science Marketing?

FOR more than 30 years, marketing scholars have debated whether or not marketing is a science (e.g., Alderson and Cox 1948, Bartels 1951, Baumol 1957, Buzzell 1963, Converse 1945, Hunt 1976, O'Shaughnessy and Ryan 1979, Taylor 1965). The typical approach has been to offer a formal definition of science or describe prototypic methods used in science and then compare marketing's key features and/or its developmental progress against these standards. Despite these fairly intense analyses, a consensus regarding the scientific status of marketing has not yet been achieved. Some believe that marketing is a science, while others believe that although scientific procedures are employed in marketing, on the whole, marketing is an art. In contrast to these two segments, many other marketing scholars seem to be withholding judgment, perhaps awaiting more compelling arguments one way or the other.

Although well-intentioned, we believe the debate regarding whether or not marketing is a science has been largely unproductive. For the most part, we attribute the current confusion to the somewhat naive conceptions of science that have informed the controversy. In particular, we consider the typical beliefs about how scientists do scientific work and how scientific progress is achieved to be inconsistent with current views about such issues in the disciplines of philosophy, sociology, and history of science. That is, in asking, "Is marketing a science?," marketing scholars have been comparing theory development and testing in marketing to inappropriate standards which have little to do with the conduct of scientific inquiry in any field.

This article presents a relatively new and more useful conception of science than has been considered to date in the debates regarding marketing's scientific status. To do so, we turn the tables in this long-standing debate by asking the more fundamental and interesting question, "Is science marketing?" In this article we consider whether science can be effectively analyzed as a special case of marketing—the marketing of ideas.[1]

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[1]For this purpose, we adopt the currently popular definition of marketing as "human activity directed at satisfying needs and wants through exchange processes" (Kotler 1980). This is consistent with the arguments of Bagozzi (1975) and Hunt (1983) that exchange is a key, unifying concept for the field. We suspect that most marketing scholars accept this definition.

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The article has two major sections. In the first we analyze common scientific practices in terms of conventional elements of marketing strategy. Specifically, we consider the elements in the marketing mix, target markets, and marketing objectives. Although we can consider only a few of the major concepts in marketing, the examples in this brief analysis provide initial support for our contention that science can be viewed as a special case of marketing. In the second section, we discuss a relativistic/constructionist perspective derived from recent work in science studies that provide a conceptual rationale for analyzing science from a marketing perspective. We point out key differences between this emerging approach to science and the traditional positivistic/empiricist view that still pervades marketing (see Hunt 1983) and other social sciences (see Koch 1981). Again, due to space restrictions, we focus only on major points of departure from the traditional view and cite major works to which readers can refer for additional information.

Marketing Scientific Theories

What makes a scientific theory successful? Simply stated, a successful theory is one which is treated seriously and studied by a significant portion of a research community. Such theories may even be employed by practitioners as a framework for analyzing important problems. In other words, a successful theory is one that has been adopted by a substantial market segment, just as is the case of a successful consumer good. We argue that to successfully achieve an adequate level of adoption, scientists must (at least implicitly) develop and carry out a marketing strategy to promote their theories. In this section, we consider some of the concepts and strategies involved in this process. First, we describe scientific theories in terms of the four basic elements of the marketing mix—product, channels of distribution, promotion, and price. Then we discuss the idea of market segmentation for theories. Finally, we consider the marketing objectives for scientific work.

Theories as Products

In the broadest sense, the major products of science are ideas. Scientific ideas consist of invented constructs and hypothesized relationships among them. A system of such ideas about a phenomenon may be called a substantive theory. Scientists also create ideas about methods of obtaining, analyzing, and interpreting data. These are methodological theories of measurement, sampling, and data analysis. Regardless of the type of idea or theory, it should not be forgotten that the entire theory product is invented or constructed by one or more scientists, just as ideas for consumer products are invented or constructed.[2] Like ideas for consumer products and the products themselves, substantive and/or methodological theory products must also be marketed.

At some point in the development of a theory the scientist usually produces a manuscript that describes the idea. The manuscript may also present empirical data that illustrate the idea and/or provide tentative support. A manuscript is a tangible representation of the invented system of ideas. Marketing a theory as a tangible manuscript is both easier and more effective than promoting an intangible set of ideas, for at least four reasons. First, the theory product can be stored by potential adopters for use (study) at a more convenient time. Second, because the manuscript is always available, potential adopters can reexamine and reflect on the theory and possibly come to appreciate its value. Third, the relative permanence of a manuscript allows wider dissemination of the theory to a secondary, pass-along audience (e.g., students). Finally, a tangible manuscript may be used to establish the scientist/marketer as the inventor of the theory or as the first to borrow the theory from another area and apply it in a new field.

Over its life cycle a theory may undergo a number of modifications in response to a variety of potential marketing problems. Customer complaints regarding measurement difficulties or lack of conceptual clarity, and competitive theory products marketed by other scientists, are among the many problems a new theory may face in trying to capture a viable market share of scientists. Perhaps the most serious problem occurs when a test of a theory fails to predict adequately. This means that the theory is not meeting the needs of the largest segment of researchers—those concerned with prediction and methodological and empirical rigor. If the research community cannot be convinced that the empirical test procedures were faulty, either the inventor scientist or another scientist who has adopted the theory may change specific characteristics of the theory product in response to such problems. However, the modified theory is seldom renamed, as this might lose loyal customers. Many of these modifications are made to seem minor and the change process may be quite gradual, often so much so that the changes are not always recognized by the target market of scientists. However, it should be emphasized that *any change* in a theory creates a modified product—i.e., a different theory. For instance, researchers made a number of seemingly minor con-

[2]Clearly, an understanding of the processes and/or accidents by which new theories are created is critical for an understanding of science. While we will not review the extant literature on the creation of scientific or other products, i.e., "marketing R&D," interested readers should see Zaltman, LeMasters, and Heffring (1982) and Stein (1974, 1975).

ceptual changes in the Fishbein-type expectancy-value models during the period of major interest in the marketing literature (1969–1975), yet only the most knowledgeable consumers were aware that these changes created different theories (e.g., Cohen, Fishbein, and Ahtola 1972).

Product Attributes. As with consumer products, several key attributes of a theory have a large effect on marketing success. A major characteristic concerns the topic, issue, problem, or phenomenon that is addressed. A theory may concern an issue of major importance, a "big" problem, or a relatively "small" issue of little theoretical or practical importance (Olson 1982). In some ways it may be easier to market the latter type of theory. For instance, the most widely adopted theories tend to be those that are easiest to understand and research empirically, especially in long periods of normal science (Kuhn 1970). If research on a theory requires special equipment (e.g., polygraphs for the study of brain waves) or special subject populations (e.g., managers or purchasing agents), that theory is not likely to be widely researched. In contrast, theories that are easily researched with conventional measurement procedures (e.g., self-report rating scales) and easily accessible samples (e.g., students) are more likely to achieve higher adoption rates.

A second important attribute of a theory concerns the professional credentials and status of the inventor or the borrower. Scientists who are well-known and respected, based on their previous contributions to a field, have a better chance of successfully introducing a new theory than do less well-known researchers. The credibility of the scientist/marketer may add a halo effect to the theory product. Inventors or borrowers who do not enjoy a strong reputation in their fields (e.g., doctoral students) may need to attract established researchers ("celebrity scholars") to help market their theories.

Third, theories that are borrowed and adapted from more established, familiar fields seem to be more easily marketed than theories gleaned from unconventional areas or that are constructed "from scratch." For example, it is probably easier to promote theories for use in marketing that are borrowed from psychology and economics rather than from areas such as anthropology, religion, or art.

Fourth, theories which contain familiar, common, everyday concepts, words, meanings, and relationships (e.g., needs, attitudes, personality) may be easier to market successfully than theories which require learning new words, meanings, and relationships (e.g., shaping, aesthetic response, semantic relatedness, coherence analysis, negative reinforcement). Familiar concepts which are learned in childhood and are frequently used in everyday language may be considered as highly important concepts to be researched and understood. However, in other cases, new words and meanings can be useful for marketing theories, since knowledge of them may give a scientist admission to the cognoscenti of a research community.

Fifth, theories that are consistent with current political and social values are easier to market (Barnes 1977, Gould 1982). For example, a theory advocating gender differences in cognitive abilities is difficult to market in the current environment, even with impressive empirical support (see Stanley and Benbow 1982). In addition, since political and social values often determine funding priorities, theories dealing with problems for which ample research support is available are more easily marketed to potential scientist adopters.

The sixth (and purposefully last) product attribute is the preliminary empirical evidence that can be marshalled to support a theory. Strong empirical support is a highly desirable attribute that will enhance the marketability of a theory. However, strong empirical evidence is neither necessary nor sufficient for the successful dissemination of a theory. A number of theories have been fairly widely adopted, despite poor (or even no) initial empirical support (e.g., early atomic theory or Freudian personality theory). Of course scientists differ in the extent to which they are concerned about the "fit" between data and theory; thus, the importance of empirical support for a theory is likely to vary for different scientists (see Mitroff and Kilmann 1978).

Test Marketing. Quite often, scientists test market their theories before attempting a full-scale introduction via journal publication. Their major goal is to gauge the reactions of potential adopters of the theory and to identify and correct any glaring flaws before the theory is introduced on a major scale. One way to do this is by circulating working papers among colleagues and friends in the "invisible college" (see Crane 1972). In addition, colloquia and seminars may be presented to colleagues and students and their reactions sought. At least three results are possible. First, and least likely, the theory product may be judged to be irretrievably flawed. This seldom occurs, since most test market presentations are made to other scientists who not only share the same world view as the inventor, but are also social friends who respect the inventor. Normally, such groups are reluctant to totally reject the theory product. However, test market presentations to less hospitable groups occasionally do produce such an extreme rejection. Second, in equally rare cases, the product may be viewed as a major accomplishment with no serious problems and judged to be ready for introduction.

Instead, the results of test marketing are likely to suggest a variety of modifications to the theory. These may involve adding or deleting constructs, clarifying and redefining constructs, or changing the theoretical

relationships between constructs. At a minimum, cosmetic changes may be made in the theory's packaging (words and labels used) or suggestions may be made for repositioning the product. As with traditional consumer products, the scientist/marketer must consider whether changing the theory according to the recommendations derived from test marketing will improve the chances of successfully marketing the product.

Channels of Distribution for Theories

There are many channels by which scientific theories may be disseminated to potential adopters. The various channels of distribution have different levels of effectiveness and may be differentially appropriate at different stages in the development and testing of the theory. In the early stages of development, most theories are disseminated via presentations at colloquia and conferences, and through informally distributed working papers. While conference and colloquia presentations are especially valuable in that they provide direct feedback to the scientist/marketer, not many scholars are likely to adopt a theory distributed in this way. For one thing, relatively few scholars can be exposed to the theory through these inefficient channels. Before widespread adoption can be anticipated, most theories must pass the muster of the gatekeepers in the discipline (the reviewers and editors of prestigious journals) and thereby achieve both legitimization and widespread exposure. A theory that is evaluated poorly in test marketing may go no further than being published in a conference proceedings, if at all. The theory may languish there for several years before finally fading away or being resurrected by another scientist who happens to stumble across it. Occasionally a theory is published first in a proceedings and later in a journal, but this is generally considered bad form unless major changes have occurred in the manuscript.

Some marketers begin the dissemination process by submitting the manuscript directly to the key channel, a major journal. If the manuscript is rejected from a number of major journals, the inventor/marketer may attempt to disseminate the theory through other channels, perhaps less prestigious or highly specialized journals. Using these channels to distribute a theory reduces the probability that the theory will enjoy rapid acceptance, although publication per se does enhance the chances for eventual success. Publication in even an obscure or specialized journal may still reach the most interested target market of researchers who may then be influential in further disseminating the theory throughout the research community. Alternatively, if the theory cannot be published in a major journal, some marketers may try to publish the theory in book form or as a chapter in a book. However, this channel is not readily or equally available to all scientists. Thus, the more likely outcome is that the marketer will present the theory at one or more conferences and publish a paper in a proceedings, if available. Of course, the chances of successfully marketing the theory decrease with the use of more restricted, less prestigious channels of distribution.

Promotion of Theories

Throughout the life cycle of a theory, from creation to test marketing to publication in a major journal to the widespread adoption and use of a theory by the research community, promotion is a key factor in successfully marketing a theory. As with consumer goods, a variety of promotional techniques can be used. Interestingly, and contrary to popular beliefs, theories that do not provide impressive empirical results, produce a potential resolution to a major problem in the field (Kuhn 1970, Popper 1959), or generate novel predictions (Lakatos 1978), can still be marketed successfully.

Although strong empirical results are very useful in promoting a theory, they are not absolutely necessary. For example, personality research in marketing in the 1960s and early 1970s seldom surpassed the relatively trivial hurdle of obtaining statistically significant correlations between measures of personality and a variety of other factors (Kassarjian 1971). Yet personality theory enjoyed wide popularity. Because the weak empirical results were usually attributed to methodological problems, most researchers did not conclude that the underlying theory was wrong. In fact, many marketing researchers still believe in personality theory despite the generally disappointing empirical results. Recently, new methods have produced more impressive empirical support for personality theory (see Epstein 1979, 1980), although a resurgence of interest has not yet occurred in marketing.

It is also possible to successfully market a theory that makes no unusual or novel predictions and is in fact quite similar to other theories. Of course, a scientist's promotion task will be easier if the theory product has unique features (e.g., it generates novel predictions) or it has desirable attributes of a compelling logic coupled with strongly supportive data. However, as long as the new theory is relatively consistent with the world view of at least a segment of the field, it can be successfully promoted. A new theory that is based on a different set of metatheoretical assumptions than those held by most members of a research community can be difficult to successfully promote and market. This is similar to situations in consumer goods marketing in which discontinuous in-

novations that are inconsistent with consumers' social values and behavior patterns are often hard to sell.[3]

In addition to "direct advertising" via publication in journals, books, and proceedings, a theory can also be promoted through publicity and personal selling. Publicity for a theory includes notices of forthcoming articles in journals, abstracts of published articles printed in other journals, and notices of working papers in association newsletters. Occasionally, a scientist/marketer can get other scientists to cite the new theory, perhaps while still in working paper form. Scientists may be able to generate discussion of their theory in nonscholarly publications such as *Marketing News* or *Psychology Today*. Finally, if dissertation research testing the theory wins awards or other recognition, the resulting publicity can be very helpful in the overall marketing effort. Publicity may perform a useful informational or reminder role, but is likely to be less persuasive than other forms of promotion. However, a "bandwagon effect" for a theory might be enhanced through this kind of promotion.

Personal selling is an important element of the promotional strategy for theories. Personal selling occurs during formal or informal presentations of the theory as well as in direct one-on-one discussions with potential adopters. Moreover, salesmanship is an important aspect of dealing with editors and reviewers in the revision process. Direct selling can be an effective method of persuasion since the scientist/marketer can address counter-arguments of the potential buyer head on and can offer ad hoc hypotheses to cover many of the perceived weaknesses in the theory. Finally, a personal selling strategy can be particularly effective with one's doctoral students.

Price of Theories

The scientist who adopts a new theory must pay a price that involves time and money as well as psychological and behavioral costs. Part of the price of adopting a new theory involves the time spent learning the new theory and its methods, as well as the associated opportunity costs. The adopter of a new theory may also incur financial costs in purchasing new equipment (e.g., a physiology lab) or in education/training costs (e.g., attending seminars on causal modeling). Other costs include the psychological effort and disruption involved in changing one's existing beliefs and established research behaviors. A major component of the price of adopting a new theory involves the behavioral effort of actively researching the theory, writing about it, and performing the behaviors necessary to get the results published in major journals.

Like consumer products, theories vary in price. Low-priced theories are those that are consistent with the world view and existing research skills of the target market of scientists. Adopting such theories is relatively inexpensive, as learning time is short and belief and behavior changes are minimal. That is, the price is within easy reach of many potential consumers. Thus, the scientist/marketer who prices his/her theory at the low end enhances the chances that the theory will penetrate the mass market.

In contrast, theories that are radically different from the established world view of the research community and/or from the research procedures common in a field carry a higher price tag. Adopting such theories may require considerable learning time, extensive belief changes, and major changes in research behavior. Therefore, such high priced theories need to be marketed carefully and well. The marketing effort is facilitated if the scientist can articulate the benefits to be provided by the new theory. Because these benefits have to be perceived as substantial to justify the high price, some scientists substantially oversell their substantive or methodological theories in order to attract consumers (see Churchill and Perrault 1982). For example, it appears that structural equations methodology has been substantially oversold in the social sciences (see Cliff 1983, Fornell 1983).

A variety of situational factors can influence the success of a high priced theory, primarily by making it seem worth the cost to early adopters. First, it is helpful if the world view incorporated in established theories is recognized as problematic by a segment of the research community. In fact, Kuhn (1970) argues that a scientific revolution cannot take place *unless* the traditional view is recognized as failing *and* an alternative theory is available. Second, the availability of research funds to investigate the new theory is a powerful motivator for pursuing a new theory product. For example, funding for research on the effects of advertising on children lowered the price of entering this new area. Third, in some situations researchers may be bored with the traditional approach and, therefore, are willing to incur the cost of adopting more provocative theories. Similarly, some researchers may simply feel they can make little marginal contribution to the traditional view and are seeking to invest in new theories with greater payoff potential. In sum, there are particular situations when high priced theories are

[3]Strictly speaking, no scientific theory is constructed of totally new concepts created in isolation from earlier concepts and theories. Previous research and theorizing certainly has an impact on the scientist/inventor who is trying to create a "new" theory. However, some new theories are seen as more creative and less continuous with previous work than are others. We are merely arguing that it is more difficult to market the more discontinuous theories. This discussion should not be taken to imply that scientific work is cumulative in the sense that a sequence of theories will ultimately lead to a valid general theory.

more likely to be adopted by a research community. From a marketing strategy perspective, these situations are strategic windows that the scientist/marketer can use to advantage in introducing an expensive theory product.

A final consideration regarding the price of a theory concerns the fact that not all researchers can afford to pay the price required for adoption of a new theory. A prime determinant of what price an individual scientist can afford to pay is his/her place in the tenure decision process. Younger pre-tenure scholars may not feel they can afford a high priced theory. They may need less expensive theories that have a fairly high probability of producing rapid benefits, such as easily publishable journal articles. High priced theories, by their very nature, tend to offer benefits with a longer time horizon. Moreover, a fairly high degree of risk is associated with most high priced theories, and many pre-tenure scientists may not wish to incur such risks. Therefore, more senior, post-tenure scholars may be more willing to invest in higher priced theories. Occasionally, beginning scholars, such as doctoral students, who have relatively little time and effort invested in traditional theories and methods, may adopt higher priced theories, especially if encouraged to do so by their post-tenure mentors. However, in these cases, the theory is probably already in the growth stage of the product life cycle, or at least appears to be a theory with a high probability of success, based on its attributes.

Target Markets for New Theories

A research community can be segmented in a number of ways. As just discussed, scientists can be divided in terms of their position in the career life cycle. Three distinct groups can be identified: doctoral students, pre-tenure scholars, and post-tenure scholars. The latter group might be further divided by rank into associate and full professors. Theory products will differentially appeal to these groups and, as noted, these groups can afford to pay different prices for theories and are willing to incur different levels of risk. Of course, different marketing strategies may be required for each of these segments.

A prime target market for a scientist's theory is his/her own doctoral students, although the students of other scholars are of interest as well. Usually these potential customers are seeking exactly what the marketer has to offer: a new theory or method in need of empirical research in a discipline-related context. Ideally, the theory should be somewhat new in order to establish that the dissertation is a "contribution" to the field. As mentioned above, this target market may react less negatively if the theory deviates substantially from the accepted view in the field, partly because its members have not yet become fully committed to that perspective. Additionally, doctoral students constitute an important target market because they (1) often become apostles for the theory once they have invested the time to learn it and begin to research it, (2) are entering the most active stage of their research careers and may help market the theory through their writings, and (3) may be more easily persuaded as they have little investment in competing theories.

The second important target market for a new theory is the group of active research scholars in the field. This group can be further segmented into pre- and post-tenure researchers, and each of these segments can be further divided into adopter categories of opinion leaders, followers, and laggards. Of these, the opinion leaders are critically important. A single study on a new theory by an opinion leader may be sufficient to create widespread interest. Opinion leader scientists are also likely to be mentors for high quality doctoral students who can be encouraged to research the theory. In addition, opinion leaders can often directly influence other active researchers to consider studying and using the theory, thereby increasing its adoption rate and eventual market share. Finally, studies by opinion leaders are more likely to be featured in textbooks which also helps to establish the theory.[4]

The scholars least likely to adopt a new theory are those who remain loyal to a previous theory, particularly if it is their own or one in which they have invested heavily. In fact, members of this group are more likely to criticize the new theory and attempt to remove it from the market. Such attempts may well take the form of "replications" which are intended to discredit the new theory. Often these attempts are partly successful since most theories have numerous problems in the early stage of development. For example, because constructs used in the theory have surplus meaning, parts of the theory can be interpreted in a manner which reveals inconsistencies and ambiguities. It may be fairly easy to show that the theoretical concepts have different meanings than intended by the inventor/marketer, thus adding to the confusion regarding the theory. Second, since the skeptical researcher now controls the method in a replication, he/

[4]Once a theory has achieved "textbook status," it tends to become part of the discipline's body of "knowledge." Regardless of whether the measures are subsequently invalidated or empirical results ever show impressive relationships, such theories are seldom purged entirely from the literature. Over time the theory may lose followers and interest as new theories are offered which are perceived to be better or deal with what seem to be more important or interesting problems. Although some laggard researchers will continue to investigate the old theory, only occasionally will this work be published in a major outlet. When it is, it may still be employed in textbooks for the purpose of giving a fresh reference to an old chapter and for exemplifying the supposedly cumulative nature of scientific inquiry. In fact, Kuhn (1970) argues that textbooks rewrite the history of theories in order to make science appear to be cumulative.

she can usually generate results inconsistent with the new theory. For example, the design could include too few subjects to allow sufficient statistical power to detect the effect, or a research setting involving many uncontrolled sources of variance could be used to "wash out" an effect. In sum, an antagonistic scientist can often demonstrate that a new theory's predictions are poorer than previously reported, or even that "disconfirming" effects are obtained. Finally, because all research requires a myriad of subjective decisions, the competitor scientist can usually argue that at least some of the original methodological decisions were inappropriate and thus produced data that were biased in favor of the theory. In such controversies, comments, replies, and rejoinders can continue back and forth to the limits of the tolerance of editors, reviewers, and the research community.

The market for a new theory can also be segmented in terms of psychological characteristics. Scientists have differing views about what counts as important, interesting theory, and these values and beliefs influence their evaluations of a new theory. Based on such attributes, Mitroff and Kilmann (1978) have identified four types of scientists. Two of these are particularly relevant for segmenting scientific markets. The analytical scientist (AS) is mainly concerned with tightly controlled, highly rigorous research designs intended to test well-specified hypotheses deduced from theory. This group seems to be the largest segment in marketing and in most other fields. In contrast, the conceptual theorist (CT) is more concerned with abstract ideas, how they fit logically together, and with their heuristic, generative power for creating other ideas. This group is small in both marketing and in most other disciplines. Obviously, the characteristics of a new theory will strongly influence which of these groups will be more attracted. The CT group may be more likely to adopt a new theoretical perspective if it is quite different from existing perspectives and offers promise for dealing with important, complex phenomena and problems. CT's tend not to be concerned about a lack of empirical support, especially early in a theory's development. On the other hand, an AS is not likely to adopt a new theory until it has been developed to the stage where methods and measures can be relatively unambiguously applied to test specific aspects of the theory. Moreover, the preliminary data should look promising.

Marketing Objectives

Although the marketer of a scientific theory probably has objectives or goals in mind for that theory, and for his/her career as a scientist, these goals are not often explicit. For purposes of discussion, we have roughly categorized scientists' objectives into three groups: noble, curiosity, and self-serving goals. Conceptually, these three classes are mutually exclusive; however, more than one type of objective can be achieved with the same marketing strategy.

Noble objectives are those most commonly associated with science. Included are such lofty goals as seeking knowledge, attempting to understand a phenomenon, and contributing to a discipline or to society as a whole. Normally such goals are considered to be beyond reproach. Note, however, that these goals can only be accomplished by a scientist who markets his/her work to the scientific community (or gets someone else to do the marketing). A theory can make no contribution if the work is kept hidden in a file drawer. Thus, scientists must market their theories to achieve even noble goals.

Curiosity objectives refer to seeking answers to one's personal questions about the subject of inquiry. Curiosity goals are closely related to noble goals, and they differ primarily in the degree to which the work is performed for self versus others. Doing research for the fun of it and the sheer joy of learning new things are not unknown as motivators in science. However, if the scientist needs no cooperation from others, contents him-/herself with the findings, needs no cooperation from others, and shares them with no one, marketing is not involved. Only when the theory and the findings are exchanged with someone else does the marketing process for the theory become relevant.

Self-serving objectives are well-known within scientific communities but are not widely recognized among the general public, nor are they usually considered by professional philosophers of science. Self-serving goals lead researchers to perform scientific work primarily for the purpose of personal gain. The rewards for being a successful scientist can be substantial: promotions, job security, money (in the form of salary, grants, and consulting fees), release time from other duties, prestige and recognition in the field, and specific awards and honors. While these gains are usually intended for scientists who pursue noble goals, they often are awarded to those who seek mainly self-serving goals. Occasionally, scientists who pursue only self-serving goals, especially in a blatant manner, are recognized as such and may be denied at least some of the sought rewards. The research community may infer that a particular researcher is seeking only self-serving goals based on the researcher's verbal reports of objectives, and from practices such as producing a large number of marginal theory/research papers, or relabeling and publishing the same paper in multiple channels.

Clearly, different goals may lead researchers to adopt different marketing strategies. For instance, some scientists who pursue noble goals may naively believe that overt marketing effort is unnecessary and even demeaning, since an obviously superior theory will

"sell itself." Of course, sophisticated marketers can easily recognize this perspective as a sign of a strong product orientation and not a particularly viable strategy for long-term success. It is also clear that different goals may lead to the same strategy, i.e., development and marketing of a high quality theory product with a high quality marketing plan. Moreover, scientists may have multiple goals which are consistent. Perhaps it would be worthwhile to study scientists' goals, their hierarchical relationships, and their impact on scientific progress. However, the main point here is that accomplishing scientific objectives depends on the quality of the marketing strategy and the effort exerted.

Summary

In the first part of this article we have demonstrated that basic marketing concepts and principles can account for many aspects of scientific activity. Thus far our arguments that science is marketing have been informal. We have shown that many aspects of science involve social exchanges, and in particular, the exchange of ideas in the form of theories. Therefore, as the discipline most concerned with exchange processes, marketing provides a relevant perspective for understanding science. In addition, we have shown how certain marketing concepts are or could be used by scientists to develop effective marketing strategies that could influence other scientists to adopt their theories.

In the remainder of the article we develop our claim that science is marketing along more formal lines. We attempt to show how current views on the nature of science also lead to the conclusion that much of the activity of science involves marketing processes. The key theoretical ideas used in our arguments constitute a set of metatheoretical assumptions about the nature of scientific knowledge and how that knowledge is achieved. Many of these ideas are radically different from those that underlie the philosophical perspective currently prominent in marketing and other social sciences.

Metatheoretical Assumptions about Science

Scholars have proposed a variety of philosophical perspectives regarding science (see Brown 1977, Suppe 1977). These points of view are characterized by major as well as subtle differences and by a profusion of terminology (logical positivism, logical empiricism, instrumentalism, realism, falsificationism, relativism, etc.). We attempt to sidestep much of the resulting controversy and semantic confusion in the remainder of this article. First, we briefly describe the reigning philosophical approach in marketing which we call the Positivistic/Empiricist (P/E) perspective (see Anderson 1983 for a more detailed review). Then, we contrast this view with a newer, more useful philosophy of science which we call the Relativistic/Constructionist approach (R/C). Our intent is to introduce these ideas at a broad, general level and avoid becoming mired in technical jargon and subtle details. Thus our coverage of these issues is necessarily an overview.

The Positivistic/Empiricist Approach

The philosophy of science that presently dominates marketing is a descendent of logical positivism, commonly called logical empiricism (cf. Broadbeck 1982, Hunt 1983).[5] The term "positivism" usually refers to a type of strict empiricism in which only those knowledge claims that are based directly on experience (i.e., empirical observations) are considered important, useful, and/or scientifically meaningful. Coupled with this strong emphasis on empirical data, positivism relies heavily on formal symbolic logic as a tool of analysis. Thus, positivists claim that through formal logical analysis of theories and by means of unbiased observations, the truth of any (meaningful) proposition can be determined absolutely.

Logical empiricism is a somewhat more moderate version of positivism developed to avoid the induction problem—namely that no universal proposition can be conclusively verified by any set of observations, no matter how large. Thus logical empiricism tends to favor a view that although scientific propositions cannot be conclusively verified, they can be "increasingly confirmed," again using careful observations (e.g., in experiments) and the rules of formal logic. In this view, for instance, theoretical terms derive their meanings through "correspondence rules" that "connect" them to direct experience (empirical observations). These observations give meaning to the theoretical terms. The logical empiricist point of view dominates current marketing research in that much of our research methodology and approach are based on these philosophical assumptions.

Popper (1959) proposed a "falsification" strategy to avoid the inductive problems of the confirmation approach of logical empiricism. However, as interpreted by many philosophers and marketing scholars, falsification is merely a somewhat more sophisticated brand of logical empiricism (cf. Calder, Phillips, and Tybout 1981, 1982; Lynch 1982).[6] This approach to science, termed "naive falsificationism" by Lakatos (1970), requires that a researcher consider a theory as

[5]Suppe (1977) and Brown (1977) provide thorough historical analyses of how these positions have evolved.

[6]However, other, less well-recognized aspects of Popper's thinking are fairly consistent with the perspective we are advocating (see Brown 1977, Chapter 5).

false if a key deductively-derived hypothesis is rejected by empirical observations.[7]

In sum, the P/E approach that currently underlies research in marketing emphasizes (a) the development of axiomatic theory through the use of deductively-derived hypotheses which are manipulated via formal rules of symbolic logic, and especially (b) objective empirical observations that give meaning to the theoretical propositions and are used to rigorously test them, perhaps even falsify them. Thus, many people consider the P/E approach to be rational (in the formal logical sense).

The Relativistic/Constructionist Approach

In the P/E perspective of science, certain factors are excluded from consideration, including the effects of (a) social interaction and influence among scientists, (b) the idiosyncratic beliefs and values of individual scientists, and (c) scientists' subjective interpretations of observational data. These factors are not a part of the unbiased observations and formal symbolic logic of the P/E approach; thus they are usually rejected from consideration as irrelevant for an understanding of scientific progress. However, in terms of the R/C perspective advocated below, these factors are of critical importance in understanding how scientific knowledge develops.[8]

This article is not the place to present a complete discussion and defense of the R/C approach to science. Others have done so effectively (see Collins and Cox 1976, Feyerabend 1975, Knorr-Cetina 1981, Kunn 1970, Munévar 1981). Instead, in the rest of the article we identify and briefly discuss some key distinctions between the P/E view of science and the R/C perspective. A summary of these distinctions is provided in Table 1.

[7]It should be noted that Laudan (1965) clearly demonstrates the impossibility of falsification.

[8]We cast the differences between these approaches in simple dichotomous terms in order to distinguish them and make our points more clearly. However, a variety of finer, more subtle distinctions can be drawn. See Brown (1977) for a review of the issues involved in this controversy.

TABLE 1
Major Differences between Positivistic/Empiricist and Relativistic/Constructionist Views of Science

Positivistic/Empiricist Science	Relativistic/Constructionist Science
Science discovers the true nature of reality.	Science creates many realities.
Only the logic of justification is needed to understand science.	The processes by which theories are created, justified, and diffused throughout a research community are needed to understand science.
Science can be understood without considering cultural, social, political, and economic factors.	Science is a social process and cannot be understood without considering cultural, social, political, and economic factors.
Science is objective.	Science is subjective.
Scientific knowledge is absolute and cumulative.	Scientific knowledge is relative to a particular context and period of time in history.
Science is capable of discovering universal laws that govern the external world.	Science creates ideas that are context-dependent, i.e., relative to a frame of reference.
Science produces theories that come closer and closer to absolute truth.	Truth is a subjective evaluation that cannot be properly inferred outside of the context provided by the theory.
Science is rational since it follows formal rules of logic.	Science is rational to the degree that it seeks to improve individual and societal well-being by following whatever means are useful for doing so.
There are specific rules for doing science validly (e.g., falsification).	There are many ways of doing science validly that are appropriate in different situations.
Scientists subject their theories to potential falsification through rigorous empirical testing.	Scientists seek supportive, confirmatory evidence in order to market their theories.
Measurement procedures do not influence what is measured.	Nothing can be measured without changing it.
Data provide objective, independent benchmarks for testing theories.	Data are created and interpreted by scientists in terms of a variety of theories, and thus are theory laden.

Reality Is Relative

A key difference between the two approaches to science concerns the assumed nature of reality and how scientists relate to reality through their theories and observational evidence (see Hooker 1975). Researchers with a P/E orientation usually take a realist point of view. Although there are various types of realism, most P/E researchers appear to believe that an external world exists (usually one world in one way), and that it is possible to come closer to knowing the true nature of that world through empirical observations obtained through rigorous methods and analyses. Theories, then, are treated as general statements about the real world. The goal is to develop theories that come increasingly closer to being true statements about reality. Alternatively, researchers with an R/C orientation conceive of many possible realities, each of which is relative to a specific context or frame of reference. According to this view, scientists *construct* "realities" by developing a degree of social agreement about the meanings of their theories and empirical observations (e.g., Collins 1975, Collins and Cox 1976, Elkana 1978, Feyerabend 1975, Gilbert 1976, Munévar 1981).

Science Is a Social Process

Science is an activity performed by interacting human beings, and thus obviously is a social process. We believe these social interaction processes are very important for understanding science. In fact, the exchanges that take place during these social processes constitute a major reason for our contention that science is marketing.

Until recently, few philosophers of science have considered the social interaction and social influence processes involved in scientific progress. P/E philosophers tend to ignore such social factors or even claim that such processes are unimportant (or "irrational") and, thus, not worthy of study. Instead they continue to be concerned with rather formal logical models for the justification or testing of theories. That is, P/E philosophers have focused on how theories are presumed to be verified, corroborated, or falsified, and presumed to be converted to scientific knowledge.

In contrast, philosophers with an R/C orientation have been willing to consider the (less formal) social processes in science. For example, Kuhn (1970) noted the importance of social influence in evaluating alternative theories: "The superiority of one theory to another is something that cannot be proved in debate. Instead, I have insisted, each party must try, *by persuasion,* to convert the other" (p. 198, emphasis added). Mitroff (1974), in his analysis of the Apollo moon scientists, found that certain scientists are so highly committed to their theories that they resist all persuasive attempts to change their beliefs and continually try to convert other scientists to their point of view. Recently, sociologists of science have been actively investigating how social interaction processes affect the development of social consensus regarding a scientific method, a theory, or even the appropriate interpretation of empirical evidence (e.g., Collins 1981, Latour 1980, Pinch 1981). Developing a high degree of social concensus among scientists is a major objective of marketing strategies for scientific theories.

Science Is Subjective

The presumed objectivity of science is a key characteristic of the P/E approach that currently dominates marketing and related social science disciplines. However, this aura of objectivity has been steadily eroding for years across all sciences, including physics (see Zukav 1979). All pretensions to objectivity (in this narrow sense) disappear on adopting an R/C perspective on science.

P/E approaches tend to treat scientists' perceptions or sense impressions naively as providing objective, unbiased representations of the real world. Thus, empirical observations (manifestations of scientists' sense impressions) are treated as objective data that are independent of any theory. In contrast, the R/C perspective recognizes that even so-called direct perceptions are not objective but are influenced by a multitude of factors, including relevant past experiences and training. For this reason different scientists may examine the same data and perceive entirely different meanings (Stent 1975).

Here we consider the process by which scientific meaning is developed. There are two aspects of this process, one psychological and the other sociological. No less a scientist than Einstein (1936) has noted the psychological aspects quite clearly:

> Out of the multitude of our sense experiences we take, mentally and arbitrarily, certain repeatedly occurring complexes of sense impressions . . . and we attribute to them a *meaning*—the meaning of the bodily object. Considered logically this concept is not identical to the totality of sense impressions referred to; but it is an *arbitrary creation* of the human (or animal) mind. . . . The second step . . . we attribute to this *concept* of the bodily object a *significance,* which is to a high degree *independent* of the sense impression which originally gives rise to it. This is what we mean when we *attribute* to the bodily object 'a *real existence*' (p. 60, emphasis added).

The sociological aspect refers to the social interaction and persuasion processes used to generate a degree of social consensus regarding the scientific meaning of an observation or a theory. Marketing strategies are used to influence both the psychological (individual level) and social (group level) aspects of the meaning development process.

Our point here is that all meanings—including the specific, technical meanings that constitute much of

scientific knowledge—are subjectively determined. Moreover, an R/C approach to science explicitly recognizes that meaning is never absolute. Meaning is always meaning *in context,* i.e., relative to some frame of reference (Mischler 1979). In science, theories are an important source of context. If the context changes (perhaps because the theory is changed during a paradigm shift), so does the meaning of the relevant empirical observations. P/E approaches tend to deny this subjective aspect of science by claiming that the rules and procedures for doing science produce objective, absolute meanings. The R/C perspective recognizes the inherent subjectivity in science and accounts for it in a relativistic, context-dependent manner.

Science Is Rational

Contrary to the protests in the P/E literature (e.g., Suppe 1977), the preceding discussion does *not* lead to the conclusion that science is irrational. Individual scientists can reasonably be assumed to attempt to achieve their objectives in a rational way. That is, scientists borrow or create those theories which they believe can accomplish their noble, curiosity, or self-serving goals. Their beliefs may be found on the basis of what the "hot topic" is in a discipline, whether a particular theory fits well with their values and predilections, or how easily a theory can be marketed, among other factors.

Rationality in science does not require the use of formal rules of symbolic logic. Nor must the objectives and standards for judging progress be absolute and fixed. In fact, it is quite clear from the history of science that standards and objectives vary across time and across research communities. Similarly, scientific rationality does not require that research be conducted under the guidelines of a single scientific method such as falsification. Feyerabend (1975) argues that many major discoveries in science could not have occurred by following "the" scientific method and persuasively argues against a single approach to science. In fact, Feyerabend recommends that "anything goes"—i.e., any methodology or theory, no matter how unconventional, can contribute to scientific progress.[9]

Theories Are Not Universal

A theory has meaning only within its own context, i.e., within its own set of metatheoretical assumptions (Hooker 1975, Mischler 1979). As these presuppositions change, so does the meaning of the theory. Moreover, a completely valid, causal explanation of a phenomenon (i.e., a true theory) cannot be produced since all rival alternative hypotheses can never be eliminated (i.e., falsified). In fact, scientists are seldom aware of all the existing hypotheses which could be used to explain a phenomenon, and, of course, scientists cannot know of hypotheses and explanations yet to be invented.

Much of the logic underlying the extensive use of experimentation, representative sampling, and inferential statistics in marketing research is based on the P/E goal of developing universal theories and laws. However, even statistical inferences drawn by scientists who believe in statistical theory are relative to the assumed populations of people, stimuli, measures, etc., being sampled. It is also clear from the history of science that no universal laws or theories have ever been advanced that meet strict P/E requirements (see Feyerabend 1975, Munévar 1981). In marketing, even simple strategic planning models have been shown to be restricted to particular situations (see Day 1977, Wensley 1981). Thus, the P/E view of science which pursues objectives, such as universal laws, seems misguided. In contrast, the R/C perspective explicitly recognizes the "boundedness" of theories and the relativistic meaning of observations, and seeks to specify the limits of their generalizability. In sum, theories are limited to (relative to) specific times and particular contexts.

Usefulness of Theories

Theories can be evaluated in terms of their truth content or their usefulness. P/E approaches usually focus on truth content. However, no defensible method for establishing the truth of a theory has ever been advanced (Peter 1983). Therefore, from an R/C perspective, usefulness seems to be a more appropriate criterion for evaluating a theory. Usefulness is a pragmatic criterion concerned with the difference it makes to follow the theory's recommendations. Here the emphasis is on the performance, or potential performance of a theory (Munévar 1981). Usefulness can be judged in terms of how effectively a theory enables the user to "get along" in the world or accomplish some specific task. For example, if application of a marketing theory leads to an increase in long run profits for a firm, then it may be inferred that the theory was a good one; that is, it was useful in that situation and context, given that objective. Note that the usefulness criterion of the R/C approach provides no direct evidence of the truth content of the theory; in fact, truth content is basically irrelevant from an R/C perspective (Olson 1982).

Theories can be useful in a variety of ways. For example, theories may include new concepts which

[9]The problem, of course, comes in marketing unconventional methods and theories to an unappreciative audience. Many researchers may be committed to a P/E perspective and major journals may reject unusual approaches to developing knowledge. Generating acceptance of new methods which challenge engrained beliefs and established research procedures is often difficult. In fact, this problem may generate the need for new channels (journals or books) to provide outlets for such radical work.

offer more interesting or precise descriptions of phenomena than previously popular constructs. Descriptions of certain consumer behaviors in terms of "attributions" or "semantic processing" seem so much more precise than "attitudes" or "perceptions." In fact, within the context of current cognitive theory, these are more precise terms. Theories can also be useful in a heuristic sense for generating other theories or ideas (Gergen 1978). Ultimately, though, a pragmatic humanist criterion seems critical, i.e., what does the theory do to increase societal welfare? Humanistic criteria are much more easily integrated into science from an R/C than from a P/E perspective.

Data Never Speak for Themselves

Many P/E philosophers and scientists seem to believe that data are independent of the theories they are used to test. That is, empirical observations are assumed to provide an objective benchmark against which to test and compare theories. Yet, philosophers of science have repeatedly shown that there is no pure observational language, i.e., *all* data are theory-laden (see Feyerabend 1975, Kuhn 1970, Lakatos 1978, Popper 1959, among others). This point is made clearer if we remember that data (empirical observations) are constructed just as theories are. Data do not exist in the "real world" waiting to be gathered. Rather, data are *created* through the measurement operations used by scientists to produce them. Clearly, the scientist selects the theory, hypotheses, research setting, test stimuli, subjects, measures, and statistics to be used. In fact, the entire production of research data is controlled by the scientist (Peter, in press).

The point is that scientists control the process of generating research data, and almost always have biases about what they want to find and how the data are interpreted. If "negative results" are found which are unpublishable, a new study nearly always can be conducted to produce "appropriate" results. Although such attempts will not always be successful in the short run, we suspect that long-term perseverance often yields the desired results, especially if combined with an effective marketing strategy to generate at least a minimum level of consensus as to the value of the work. However, if, after a number of trials, a researcher still cannot generate empirical support for a theory, the researcher rather than the theory may warrant condemnation. Alternatively, it may be that the methods required to provide the desired empirical observations and results are not yet available.

Recommendations

Our R/C view of science as the marketing of ideas conflicts sharply with what Mitroff (1972) calls the "fairytale description of science" (i.e., the P/E view) frequently advocated and apparently believed by many marketing scholars. We view the P/E accounts of objective theory testing and the reliance on strict methodological rules such as falsification as stifling creative science rather than facilitating it. The following recommendations are offered in the hope that the outdated P/E approach to science can be replaced by more creative, insightful, and useful styles of inquiry consistent with the R/C perspective.

Scientific Training

It is clear that far more effort is exerted in training scientists in methods of testing hypotheses rather than encouraging them to create important, provocative, meaningful, or useful theories. The typical doctoral program in marketing contains many courses intended to prepare students to test hypotheses, yet embarrassingly little attention is given to how to create hypotheses and evaluate their merits. In fact, creativity may be stifled in the rush to ensure that students have the requisite methodological and statistical skills to produce the empirical demonstrations demanded by the P/E approach to science. While it seems unlikely that creativity can be taught directly, more hospitable environments could facilitate such learning. Various scholars, including Davis (1971), McGuire (1973), Webb (1961) and Zaltman, LeMasters, and Heffring (1982), have suggested a number of ideas for generating interesting, insightful, useful research questions.

In essence, creative insights are a function of the amount, quality, and content of what the individual scientist thinks and does.[10] At present, the major efforts in marketing are devoted to designing research to test ideas borrowed from other disciplines, rather than creating and developing theoretical ideas about marketing phenomena and problems (Sheth 1982). Clearly, "replications" in a marketing context of research ideas gleaned from other fields has some value. However, it is unlikely that marketing will advance very rapidly or very far as long as we depend on other scientists, uninterested in our field, to carry the major responsibility for creating and developing the theories we use. We need to adapt and further *develop* the theories we borrow.

In addition, rather than starting research with a borrowed theory or construct, it may be more useful to begin with a marketing phenomenon or problem in which we are interested, and then attempt to develop our own theories about it. While insights from other fields may aid in investigating the phenomenon or problem, we should guard against letting them dom-

[10]For example, see Gruber's (1981) fascinating account of Charles Darwin's creativity.

inate any ideas we have on our own. Further, we should not constrain our search for additional insights to traditional areas of borrowing, such as economics, social and cognitive psychology, and statistics. Many disciplines such as history, anthropology, sociology, and clinical psychology have useful ideas to offer.

Values in Science

We must stop deluding ourselves and others that as empirical scientists, we are impartial to the outcomes of our research, that our research is objective, and that we are dealing with established facts rather than inferences of varying quality. Clearly, scientists are advocates for their theories, hypotheses, and data. Usually "positive findings" must be produced to persuade others and to successfully market scientific work. To argue that all "scientific" research should be designed to falsify specific hypotheses is misleading and dysfunctional for our progress. Empirical research is certainly valuable. However, data should not be viewed as providing an objective test of a theory's truth value. Empirical evidence may be more appropriately viewed as demonstrating the usefulness of a theoretical idea in a particular context.

Scientific Behavior

It should be clear that studying science as a social activity can produce new knowledge, not only about science but also about the behavior of scientists as well. For example, Mitroff's (1974) classic study of the Apollo moon scientists, Knorr-Cetina's (1981) investigation of laboratory physicists, Latour and Woolgar's (1979) description of biology scientists at the Salk Institute, and Zukav's (1979) insights into the conduct of research on quantum mechanics provide detailed descriptions of the social nature of science. These analyses clearly show that scientists are social beings with social needs, not automatons following a program of formal logical analysis. In addition, investigations of collaborative research practices (Over 1982), secretiveness and competitiveness for priority of discovery by researchers (Gaston 1971), referencing behavior (Gilbert 1977), and outright fudging of research results, such as the case of Cyril Burt and J. B. Watson (see Samelson 1980), provide insights about scientific progress and the social behavior of the scientists involved. Finally, studying the marketing plans of successful scientists could improve our knowledge of the effectiveness of various marketing strategies and tactics in producing scientific progress.[11]

[11]For example, see Feyerabend's (1975) analysis of the strategies followed by Galileo in marketing his radical views on astronomy.

Context-Specific Meaning

We need to investigate meaning in context rather than strive to produce universal laws and theories. Some procedures for such research are suggested by Mischler (1979) and Morgan and Smircich (1980). In fields such as sociology and organizational behavior, considerable work is currently being done on the development of new methods of context-specific inquiry (e.g., Knorr-Cetina and Mulkay 1983, Morgan 1983). At a minimum, consideration of these works points to the need to more fully observe and report research details in current approaches to research and to critically evaluate current research methods which were designed for seeking universal generalizations. In general, less emphasis on following normative rules of research conduct garnered from P/E accounts of science may aid in the development of better methods and theories.

Summary and Conclusions

We have shown that many aspects of scientific activity are consistent with basic marketing concepts and processes. We have implied that astute scientists could make good use of basic marketing principles to develop effective strategies for promoting their theories. In addition, we have shown that the "science is marketing" perspective is more consistent with the "new" R/C philosophy of science than with the outdated P/E orientation that currently dominates marketing research. We have also argued that adopting an R/C approach in marketing could produce more creative and useful theories.

While we believe that marketing provides a useful perspective for analyzing science, other views of science are useful as well. For example, science can also be analyzed as art and theater (Feyerabend 1968), rhetoric (Gusfield 1976), communication (Edge 1979), and cognitive psychology (Tweney, Doherty, and Mynatt 1981). Moreover, aspects of science are similar to mysticism (Capra 1975) as well as more formally organized religion (Feyerabend 1968). In some situations, even the positivistic/empiricist perspective may offer useful ideas about science. Future research on science might identify and create new perspectives, combine and compare alternative perspectives, and specify the contexts and situations under which one perspective may be more useful than another.

Finally, it is reasonable to ask what we have learned about the question, "Is marketing a science?" While we recognize that no defensible criterion for distinguishing science from nonscience has ever been found (Laudan 1982), we believe that the main task of science is to create useful knowledge. To the degree that marketing has done so, then it can be labeled a science. As marketing scientists we should be concerned

to make our discipline more effective in creating useful knowledge about our subject matter. We believe that such improvements are best achieved by adopting the relativistic/constructionist approach to science advocated here. Recognizing the social processes of science, the context specificity of scientific knowledge, and other features of the R/C program can give marketing scholars the freedom and confidence to create new conceptual schemes and perspectives. This is in contrast to following the outdated rules of the P/E approach that focus only on testing theories we already have. A creative science of marketing is more likely to flourish by taking a relativistic/constructionist approach.

REFERENCES

Alderson, Wroe and Reavis Cox (1948), "Towards a Theory of Marketing," *Journal of Marketing*, 13 (October), 137–152.

Anderson, Paul F. (1983), "Marketing, Scientific Progress, and Scientific Method," *Journal of Marketing*, 47 (Fall), 18–31.

Bagozzi, Richard P. (1975), "Marketing as Exchange," *Journal of Marketing*, 39 (October), 32–9.

Barnes, Barry (1977), *Interests and the Growth of Knowledge*, London: Routledge and Kegan Paul.

Bartels, Robert (1951), "Can Marketing be a Science?," *Journal of Marketing*, 15 (January), 319–28.

Baumol, William J. (1957), "On the Role of Marketing Theory," *Journal of Marketing*, 21 (April), 413–18.

Brodbeck, May (1982), "Recent Developments in the Philosophy of Science," in *Marketing Theory: Philosophy of Science Perspectives*, R. F. Bush and S. D. Hunt, eds., Chicago: American Marketing.

Brown, Harold I. (1977), *Perception, Theory, and Commitment: The New Philosophy of Science*, Chicago: University of Chicago Press.

Buzzell, Robert D. (1963), "Is Marketing a Science?," *Harvard Business Review*, 41 (January–February), 32.

Calder, Bobby J., Lynn W. Phillips, and Alice M. Tybout (1981), "Designing Research for Applications," *Journal of Consumer Research*, 8 (September), 197–207.

————, ————, and ———— (1982), "The Concept of External Validity," *Journal of Consumer Research*, 9 (December), 240–44.

Capra, Fritjof (1975), *The Tao of Physics*, Boulder, CO: Shambhala.

Churchill, Gilbert A., Jr. and William D. Perrault (1982), "JMR Editorial Policies and Philosophy," *Journal of Marketing Research*, 19 (August), 283–7.

Cliff, Norman (1983), "Some Cautions Concerning the Application of Causal Modeling Methods," *Multivariate Behavioral Research*, 18 (January), 115–126.

Cohen, Joel B., Martin Fishbein, and Olli T. Ahtola (1972), "The Nature and Uses of Expectancy-Value Models in Consumer Attitude Research," *Journal of Marketing Research*, 9 (November), 456–60.

Collins, H. M. (1975), "The Seven Sexes: A Study in the Sociology of a Phenomenon or the Replication of Experiments in Physics," *Sociology*, 9 (May), 205–24.

———— (1981), "Son of the Seven Sexes: The Social Destruction of a Physical Phenomenon," *Social Studies of Science*, 11 (February), 33–62.

———— and G. Cox (1976), "Recovering Relativity: Did Prophecy Fail?" *Social Studies of Science*, 6 (September), 423–44.

Converse, Paul D. (1945), "The Development of a Science of Marketing," *Journal of Marketing*, 10 (July), 14–23.

Crane, Diana (1972), *Invisible Colleges: Confusion of Knowledge in Scientific Communities*, Chicago: University of Chicago Press.

Davis, Murray S. (1971), "That's Interesting! Towards a Phenomenology of Sociology and a Sociology of Phenomenology," *Philosophy of the Social Sciences*, 1, 309–344.

Day, George (1977), "Diagnosing the Product Portfolio," *Journal of Marketing*, 41 (April), 29–38.

Edge, D. (1979), "Quantitative Measures of Communication in Science: A Critical Review," *History of Science*, 17, 102–34.

Einstein, Albert (1936), "Physics and Reality," *The Journal of the Franklin Institute*, 221 (3), reprinted in *Out of My Later Years*, A. Einstein (1956), New York: Citadel.

Elkana, Yehuda (1978), "Two-Tier Thinking: Philosophical Realism and Historical Relativism," *Social Studies of Science*, 8 (August), 309–26.

Epstein, Seymour (1979), "The Stability of Behavior: I. On Predicting Most of the People Much of the Time," *Journal of Personality and Social Psychology*, 37 (July), 1097–1126.

———— (1980), "The Stability of Behavior: II. Implications for Psychological Research," *American Psychologist*, 35 (September), 790–806.

Feyerabend, Paul (1968), "On the Improvement of the Sciences and the Arts, and the Possible Identity of the Two," *Boston Studies in the Philosophy of Science*, III, New York: Humanities Press, 387–415.

———— (1975), *Against Method*, London: Redwood Burn Limited.

Fornell, Claes (1983), "Issues in the Application of Covariance Structure Analysis: A Comment," *Journal of Consumer Research*, 9 (March), 443–48.

Gaston, Jerry (1971), "Secretiveness and Competition for Priority of Discovery in Physics," *Minerva*, 9 (October), 472–92.

Gergen, Kenneth (1978), "Toward Generative Theory," *Journal of Personality and Social Psychology*, 36 (November), 1344–1360.

Gilbert, Nigel G. (1976), "The Transformation of Research Findings into Scientific Knowledge," *Social Studies of Science*, 6 (September), 281–306.

———— (1977), "Referencing as Persuasion," *Social Studies of Science*, 7 (February), 113–122.

Gould, Jay (1982), "How Science Changes with the 'Political Climate'," *U.S. News and World Report*, 92 (March 1), 62.

Gruber, Howard E. (1981), *Darwin on Man: A Psychological Study of Scientific Creativity*, 2nd ed., Chicago: University of Chicago Press.

Gusfield, J. (1976), "The Literary Rhetoric of Science,"

American Sociological Review, 41 (February), 16–34.
Hooker, C. A. (1975), "Philosophy and Meta-Philosophy of Science: Empiricism, Popperianism and Realism," *Synthese,* 32 (November–December), 177–231.
Hunt, Shelby D. (1976), *Marketing Theory: Conceptual Foundations of Research in Marketing,* Columbus, OH: Grid.
———— (1983), *Marketing Theory: The Philosophy of Marketing Science,* Homewood, IL: Irwin.
Kassarjian, Harold H. (1971), "Personality and Consumer Behavior: A Review," *Journal of Marketing Research,* 8 (November), 409–18.
Knorr-Cetina, Karin D. (1981), *The Manufacture of Knowledge: Toward a Constructivist and Contextual Theory of Science,* Oxford: Pergamon.
———— (1982), "The Constructivist Programme in Sociology of Science: Retreats or Advances?," *Social Studies of Science,* 12 (May), 320–324.
———— and Michael Mulkay (1983), *Science Observed: Perspectives on the Social Study of Science,* Beverly Hills, CA: Sage.
Koch, Sigmund (1981), "The Nature and Limits of Psychological Knowledge," *American Psychologist,* 36 (March), 257–69.
Kotler, Philip (1980), *Marketing Management: Analysis, Planning and Control,* 4th ed., Englewood Cliffs, NJ: Prentice-Hall.
Kuhn, Thomas S. (1970), *The Structure of Scientific Revolutions,* 2nd ed., Chicago: University of Chicago Press.
Lakatos, Imre (1970), "Falsification and the Methodology of Scientific Research Programmes," in *Criticism and the Growth of Knowledge,* I. Lakatos and A. Musgrave, eds., Cambridge: Cambridge University Press.
———— (1978), *The Methodology of Scientific Research Programmes: Philosophical Papers, Vol. 1,* J. Worrall and G. Currie, eds., Cambridge: Cambridge University Press.
Latour, Bruno (1980), "Is it Possible to Reconstruct the Research Process?," in *The Social Process of Scientific Investigation, Sociology of Sciences Yearbook,* Vol. 4, K. Knorr, R. Krohn, and R. Whitley, eds., Dordrecht, Holland: Reidel.
———— and Steve Woolgar (1979), *Laboratory Life,* Beverly Hills, CA: Sage.
Laudan, Larry (1965), "On the Impossibility of Crucial Falsifying Experiment: Gruntaum on 'The Cuhemian Argument'," *Philosophy of Science,* 32 (July), 295–9.
———— (1982), The Demise of the Demarcation Problem," paper presented at a workshop on the Demarcation between Science and Pseudo-Science, Virginia Polytechnic Institute and State University, April 30–May 2.
Lynch, John G., Jr. (1982), "On the External Validity of Experiments in Consumer Research," *Journal of Consumer Research,* 9 (December), 225–39.
McGuire, William J. (1973), "The Yin and Yang of Progress in Social Psychology: Seven Koan," *Journal of Personality and Social Psychology,* 26 (June), 446–456.
Mischler, Elliot G. (1979), "Meaning in Context: Is There Any Other Kind?," *Harvard Educational Review,* 49 (February), 1–18.
Mitroff, Ian I. (1972), "The Myth of Objectivity or Why Science Needs a New Psychology of Science," *Management Science,* 18 (June), 613–618.
———— (1974), "Norms and Counter-Norms in a Select Group of Apollo Moon Scientists: A Case Study of the Ambivalence of Scientists," *American Sociological Review,* 39 (August), 579–95.
———— and Ralph H. Kilmann (1978), *Methodological Approaches to Social Science,* San Francisco: Jossey-Bass.
Morgan, Gareth, ed. (1983), *Beyond Method: Strategies for Social Research,* Beverly Hills, CA: Sage.
———— and Linda Smircich (1980), "The Case for Qualitative Research," *Academy of Management Review,* 5 (October), 491–500.
Munévar, Gonzalo (1981), *Radical Knowledge: A Philosophical Inquiry into the Nature and Limits of Science,* Indianapolis, IN: Hackett.
Olson, Jerry C. (1982), "Presidential Address–1981: Toward a Science of Consumer Behavior," in *Advances in Consumer Research,* Vol. 9, A. Mitchell, ed., Chicago: Association for Consumer Research, v–x.
O'Shaughnessy, John and Michael J. Ryan (1979), "Marketing, Science and Technology," in *Conceptual and Theoretical Developments in Marketing,* O. C. Ferrell, S. W. Brown, and C. W. Lamb, Jr., eds., Chicago: American Marketing, 577–89.
Over, Ray (1982), "Collaborative Research and Publication in Psychology," *American Psychologist,* 37 (September), 996–1001.
Peter, J. Paul (1983), "Some Philosophical and Methodological Issues in Consumer Research," in *Marketing Theory: The Philosophy of Marketing Science,* S. D. Hunt, Homewood, IL: Irwin, 382–394.
———— (in press), "On Ignoring a Research Education," in *Distinguished Essays in Marketing Theory,* S. Brown and R. Fiske, eds., New York: Wiley.
Pinch, Trevor J. (1981), "The Sun-Set: The Presentation of Certainty in Scientific Life," *Social Studies of Science,* 11 (February), 131–58.
Popper, Karl (1959), *The Logic of Scientific Discovery,* New York: Harper.
Samelson, Franz (1980), "J. B. Watson's Little Albert, Cyril Burt's Twins, and the Need for a Critical Science," *American Psychologist,* 35 (July), 619–25.
Sheth, Jagdish N. (1982), "Consumer Behavior: Surpluses and Shortages," in *Advances in Consumer Research,* Vol. 9, A. A. Mitchell, ed., Ann Arbor, MI: Association for Consumer Research, 13–16.
Stanley, Julian C. and Camilla P. Benbow (1982), "Huge Sex Ratios at Upper End," *American Psychologist, 37* (August), 972.
Stein, Morris I. (1974), *Stimulating Creativity,* Vol. 1, New York: Academic Press.
———— (1975), *Stimulating Creativity,* Vol. 2, New York: Academic Press.
Stent, Gunther S. (1975), "Limits to the Scientific Understanding of Man," *Science,* 187 (March), 1052–1057.
Suppe, Frederick (1977), *The Structure of Scientific Theories,* 2nd ed., Urbana, IL: University of Illinois Press.
Taylor, Weldon J. (1965), "Is Marketing a Science? Revisited," *Journal of Marketing,* 29 (July), 49–53.
Tweney, Ryan D., Michael E. Doherty, and Clifford R. Mynatt (1981), *On Scientific Thinking,* New York: Columbia University Press.
Webb, Wilse (1961), "The Choice of the Problem," *American Psychologist,* 16 (May), 223–7.
Wensley, Robin (1981), "Strategic Marketing: Betas, Boxes, or Basics," *Journal of Marketing,* 45 (Summer), 173–82.
Zaltman, Gerald, Karen LeMasters, and Michael Heffring (1982), *Theory Construction in Marketing,* New York: Wiley.
Zukav, Gary (1979), *The Dancing Wu Li Masters: An Overview of the New Physics,* New York: Bantam.