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marketing science, and to decide whether and how new knowledge is to be used in administration. As Levitt phrases it:

The highest form of achievement is always art, never science.... Business leadership is an art worthy of [the manager's] own respect and the public's plaudits.

ENDNOTES

2. This series included more than a dozen titles by various authors, such as James L. Fri, Retail Merchandising, Planning, and Control (New York, Prentice-Hall, Inc., 1925) and Norris A. Brisco and John W. Wingate, Retail Buying (New York, Prentice-Hall, Inc., 1925).

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9   Marketing, Science, and Technology

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INTRODUCTION

This paper organizes the current debate concerning the status of marketing as a science within the framework of currently accepted notions of science and technology. We propose a recognition of science in marketing and in marketing technology that forces an integration of two fields. This contrasts with current attempts to recognize "pure" theory and "applied" marketing.

MARKETING AND SCIENCE

The nature of science is fuzzy as writers adopt different viewpoints. These viewpoints will be discussed, not to settle the problem as to the nature of science, but to gauge the current status of marketing as a field of study.

A Science as Any Ordered or Teachable Body of Knowledge

In ancient Greece, any ordered and teachable body of knowledge was viewed as science. Later, in Europe, the term "science" came to embrace all branches of analytical and empirical study, though the word "philosophy" was espoused as a synonym. This view prevailed until the eighteenth century.

Marketing is a science in the original Greek sense of the word since it has a body of knowledge that can be taught.

Science as the Natural Sciences

In the late eighteenth century, the viewpoint emerged of science as a set of empirically provable propositions to be contrasted with religion or revealed truth. Darwinism led to a more pronounced distinction and science became even more identified with the natural sciences of physics and chemistry, etc. This view was so accepted that Sir Francis Galton in 1877 moved
that the section covering the so-called social sciences be excluded from the
British Association for the Advancement of Science. Obviously, marketing
is not a natural science.

Science as a Method of Inquiry for
Imposing Order and Testing for Truth

As those concerned with the study of animal and human behavior sought
a firm basis for knowledge, they turned to the methods of the physical
sciences. Out of this search came the "positivist movement" associated with
John Stuart Mill and Auguste Comte.

What defines science is the natural science method of imposing order and
testing for truth. Since all problems are not open to the methods of the nat-
ural sciences, this view ruled out certain subject-matter from science, e.g.,
economics.

The Vienna Circle developed the "principle of verifiability" which, with
later modifications (Ayer 1964) held that a statement is only factually signifi-
cant when we know how to verify what it asserts. The impossibility of ob-
taining absolute verification led to the "principle of falsifiability" to distin-
guish non-scientific from scientific propositions (Popper 1965). If there were
no observations that might conceivably falsify the proposition, it lay out-
side the realm of science. The progressive elimination of rival hypotheses
was the method by which science advances.

An alternative view of how science advances was subsequently proposed
by Kuhn (1962). Kuhn claimed that scientific change is either consolidatory
in the sense that it occurs within the framework of an overall master-theory
or paradigm or it is revolutionary in that some currently accepted paradigm
is first challenged and then overthrown in favor of an entirely different con-
ceptual viewpoint. This view was criticized on the ground that scientific
change is never as revolutionary as Kuhn claims; the change from one
paradigm to another never amounts to an entirely different world view
(Toulmin 1972). Kuhn, more recently, has retreated from his central distinc-
tion between the "consolidatory" change that occurs within the boundaries
of a paradigm and the "revolutionary" change that involves a complete
change in paradigm. He now views change as occurring through an un-
ending sequence of smaller "revolutions."

If science is the method of inquiry known as the scientific method then
there is science in marketing and such a view of science is often misconceived
as the science for marketing. Science for marketing involves both subject
matter and method.

Science as a Distinct Body of Knowledge Organized
on the Basis of Explanatory Principles.

In addition to the claim that a science must use the scientific method,
Hempel (1965) has made claims for the universality in science of a particular
type of explanation. Hempel's approach (1965) to constructing a scientific
explanation is a refinement of the so-called deductive model first elaborated
by John Stuart Mill. This approach (also known as the covering law ap-
proach or the deductive-nomological type of explanation) accounts for a particular
event by showing it follows from some particular law or principle. The ob-
jective of theory is to provide a set of such laws to account, as a matter of
deduction, for some empirical generalization.

A more flexible view of scientific explanation than that of Hempel et al.
is associated with Wisdon (1952), Toulmin (1961) and Hanson (1965). They
view explanation as simply providing a network of connections between
events so the explanandum is related to familiar occurrences. In either case
the goal of science is the organization and classification of knowledge on
the basis of explanatory principles obtained through the application of sci-
entific method. This is the view we favor since it has general acceptance at
the present time. It presupposes each science has a distinct domain and
concepts.

Work currently being done in marketing contributes to the develop-
ment of a science defined as the "organization and classification of knowl-
edge on the basis of explanatory principles." Whether enough has been
done to constitute a science of marketing is doubtful. The question arises
whether marketing has theoretical concepts, techniques, distinct domain,
etc. from the other academic disciplines. It may be that marketing is simply
the basic disciplines given a coherence by their relevance to marketing
decision-making.

Science as a Set of Distinct Problems
Plus a Method of Solving Them

What distinguishes science on this view is a distinct set of problems and
a method of solving them. This view had had some vogue in the social
sciences but little support from philosophers of science since the solutions
to problems do not always necessitate explanation.

Applying Scientific Criteria to Marketing

There are two scientific criteria to which marketing fails to conform in
the sense of an established, distinct body of knowledge organized on the
basis of explanatory principles. In the first place there is no general agree-
ment on concepts and paradigms. Secondly, there are no paradigms show-
ing cumulative progress in the explanatory powers of the discipline.

In regard to the first criterion, academics in marketing tend to have
backgrounds in related disciplines and look on marketing as an area in which
to apply their area's expertise. This is evident (say) in the number of dif-
frent orientations followed in empirically investigating multiattribute at-
titude models in marketing (Wilkie and Pessemier 1973) or the widely
divergent perspectives brought in investigating distribution channels. Thus,
Stern (1971) has fathered a research orientation that combines concepts from
sociology, cultural anthropology, social psychology, and organizational
behavior while Bucklin (1966) has promulgated an approach relying mainly on economic concepts. There seems to be no movement toward a synthesis, merger or conciliation of these approaches. Thus, as Bucklin (1978) says, the behavioral orientation has focused on power for the sake of understanding power itself rather than distribution systems. Bucklin claims the behavioral approaches do not address legitimate marketing issues, thus showing the domain issue to be controversial. There are numerous arguments concerning the legitimate subject matter of marketing (Angelmar and Pinson 1975; Arndt 1978; Bagozzi 1975, 1976; Bartels 1974; Hunt 1976a, 1976b; Kotler 1972; Kotler and Levy 1969a; Luck 1969, 1974; Sweeney 1972; Tucker 1974). Anyone reading this literature must conclude that there is disagreement concerning even the basic focus of marketing.

An observation made by Lazer (1958) some years ago is still relevant, namely, that the masterworks of marketing theory—the paradigms—have yet to be delineated. Those who believe this controversy will be resolved shortly are overly optimistic since marketing academicians are primarily engaged in technique rather than conceptual development (Longman 1971). This situation is different from that in the more advanced disciplines where theoreticians rather than technicians are exalted (Lazer 1958).

The second criterion is related to the first since explanatory power presupposes agreement as to the subject matter to be explained. It is common for diverse marketing investigations of the same phenomena to result in conceptual confusion (in spite of technological sophistication) rather than clarification. The subsequent effect is an abandonment of the area in favor of other challenges. To return to a previous example, Wilkie and Pessemier (1973) identified a number of issues that remain open despite the demise of multiattribute model research. This is unfortunate since multiattribute models frequently serve as a framework for the emerging area of information processing, which is otherwise inhibited by a lack of knowledge of the basic relationships among multiattribute variables (Ryan and Holbrook 1979). Personality research (Kassarjian 1971) provides another example of a subject being abandoned because of conceptual confusion. Psychographics is a poor replacement since it is a technique that lays no claim to theory development. The prevalence of bandwagons, referred to by one writer as “the fad of the month club” (Jacob 1978), does not signal cumulative progress. Thus, despite a good deal of effort to develop a science of marketing, the claim to science is at present vacuous.

**Marketing and Technology**

**Management as Technology**

Marketing as an academic discipline seeks to apply the scientific method and to build up a body of “theory.” However, marketing management is a user and not a producer of explanatory systems. Marketing management in fact falls under the heading of “technology” to which science contributes but does not determine.

**Science vs. Technology**

Science can be distinguished from technology on the basis of its goals. Science aims at truth, better theories and explanation, while technology seeks more effective solutions to practical problems (Skolimowski 1972). Science is concerned with knowing that something is the case, while technology is concerned with how to do something.

Polanyi (1962) views technology as concerned with the design of systems that can succeed or fail. Since success/failure (effectiveness/ineffectiveness) are judgmental decisions, they are not scientifically determined. The operational principles involved are essentially “rules of rightness.” Rules, unlike laws, can be effective or ineffective in terms of purpose which varies according to user, but cannot, as is the case with explanation, be judged true or false.

The rules followed in any technology are always more vague and imprecise than scientific laws. They cannot be transmitted by prescription since no complete prescription exists. Thus, the articulate contents of science are universally taught, whereas the nature of the rules for doing technological research inhibits their spread throughout the world.

As technology develops, the effect is a change in techniques, processes and other practical procedures. Such a development may or may not be initiated, accelerated or even helped by scientific theories and concepts (Toulmin 1972). In fact, different technologies depend on science to different degrees. Thus, aerodynamics is crucially dependent on science, while such activities as brewing are still very much at the art stage. In any case, technological innovations are judged on whether they work and whether they are free from objectionable side effects.

Bunge (1972) contrasts technological research with that in science. While research in science seeks “laws” to explain kinds of events, technological research seeks “stable norms” or rules, that is, the set of action-steps that should be taken if some predetermined goal is to be achieved. Bunge argues for what he calls “grounded rules,” which are rules that receive some support from the findings of science. Every effort, he argues, should be made to explain why some rule is likely to be effective, as such explanation is what “distinguishes the prescriptive arts from contemporary technology” and makes for the more reliable achievement of goals. Thus, science is the basis of a “grounded technology.” Bunge distinguishes “substantive” from “operative” technological theories in that the former are made up of grounded rules, while the latter are not grounded in the findings of science.
Marketing Management as Technology

The questions we ask in marketing management are essentially "how to" questions; they are technological questions, e.g., "How do we determine what those in the market currently seek?"

Marketing management is concerned with plans or rules specifying the steps to be taken to solve such problems. Scientific findings are none the less relevant. Causal "laws," for example, link sets of antecedents to sets of consequences. Such "laws" etc. can be relevant to technology in the prediction and analysis of the various consequences arising from various strategic options.

Technology in marketing has not been the sole preserve of practitioners. Ehrenberg's "laws" (1972), for example, are technological rules and not scientific laws as they are empirical regularities unbuttressed by explanation.

Science and technology form an interacting system: science gives underpinnings to technology while technology provides problems for science to solve. Of course, technological rules [e.g., the marketing concept (Keith 1960)] may be implicitly explanatory though science may still explain the conditions under which some set of consequences is more likely to arise. An understanding of the interplay and interdependence of science and technology provides the basis for understanding the synergistic relationship between the academic community and marketing practitioners. This interplay has been requested by academics (Kernan 1973) and practitioners (Cook 1974).

Science, Technology and Marketing

Marketing's Status

The marketing literature is only consistent in demonstrating the disagreement on the status of marketing as a science. There are those who maintain marketing is already a science (Kotler 1972; Hunt 1976a, 1976b; Bagozzi 1976; Robin 1970). There are those who believe it has the potential to be a science (Dawson 1971, Mills 1961, Bartels 1951, Taylor 1965, Alderson and Cox 1948, Levy 1976). In contrast there are those who claim marketing is not a science (Owenfeldt 1961, Brown 1948, Sweeney 1972, Longman 1971) and will never be (Hutchinson 1952, Vaile 1949). The disagreement has been exacerbated by two major sources of confusion that are partially recognized by current writers (Hunt 1976a, 1976b; Bagozzi, 1976, Angelmar and Pinson 1975, Levy 1976).

Marketing Can Never Be a Science

The first source of confusion arises from a failure to distinguish between:

1. Marketing as a field of human endeavor. This is marketing technology where the aim is to delineate more effective rules for achieving management's goals.

2. Marketing as a study of market and marketing phenomena. This is science in and of marketing.

Hunt (1976a, 1976b) describes normative marketing as a description of what ought to be and positive marketing as concerned with factual and explanatory propositions. He argues that those who deny marketing can ever be a science ignore this positive dimension. He claims this to be an untenable position given the abundant and visible efforts of academics to explain and predict.

Hunt's two dimensions of marketing capture a flavor of our distinction between marketing technology and science in marketing; a major distinction is his emphasis on process and our emphasis on objectives. We endorse Hunt in refuting the arguments of those who claim that marketing, when viewed as a study of market and marketing phenomena can never be a science.

Marketing Is a Science

The second source of confusion arises over the basis for classification as a science. Though there are historical views that lend support to categorizing marketing as a science, such views corrupt the basic goals implicit in the mature sciences, namely, the development of explanatory systems regarding the phenomena of interest. They bestow title unearned and ultimately unrewarding. Still other views as to the nature of science find no support at all in the literature. Thus Robin (1970) argues for a normative science, though as Hunt points out, such a view runs counter to prevailing views of science that collectively exclude value statements.

Explanatory systems explain classes of phenomena or types of events. The question arises as to marketing's discriminative domain and focus of interest. Kotler (1972) proposes the "transaction" and Bagozzi (1975) the "exchange" as the basic phenomena of interest. Hunt (1976a, 1976b, 1978) takes the "transaction" as the base on which to build. He supports his claim for marketing as a science on the following grounds:

1. The positive dimension of marketing pursues the objectives of science.
2. Marketing has a unique focus in the "transaction."
3. The positive dimension of marketing has led to the discovery of uniformities and regularities among phenomena.
4. Positive marketing uses scientific method.

In regard to marketing having a unique focus in the "transaction" we differ with Hunt. We would also modify statement (3) to read "explanations of observed uniformities and regularities among collective phenomena" so as to capture the differentia of science to distinguish it from technology. Given Hunt's criteria and focus on the transaction, the objectives of any science of marketing must center on the transaction and explanations must relate to the transaction. It is not clear that science has occurred or is occurring.
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Kotler’s and Bagozzi’s proposed paradigm are basically refinements of Alderson’s (1965) “Law of Exchange” which reads:

Given that X is an element of assortment A1, and Y is an element of assortment A2; X is exchangeable for Y if, and only if, three conditions are met:

a. X is different from Y.
b. The potency of assortment A1 is increased by dropping X and adding Y.
c. The potency of assortment A2 is increased by adding X and dropping Y (p. 84).

Such a statement postulates the quasi-necessary conditions for exchange. They are logical pre-requisites rooted in the axioms of economics given the need to maximize some utility function. To elevate them to a “law” is to mock scientific endeavor and ignore the essence of the elements of scientific explanation in relating antecedents to consequents. Furthermore, to assert that this so-called law has been a major focus of empirical investigation is either to fly in the face of the facts or to stretch the meaning of exchange to be a synonym for marketing. To choose “exchange” as the central focus for study is to embrace social psychology under the rubric of marketing since the exchange of perceptions, meanings and sentiments is the essence of social psychology. In fact every type of interaction leads to some form of exchange. Of course, Alderson’s law, along with so many of his ideas, has been more talked about than been the focus of empirical inquiry. Far from marketing having a building block, it is unusual to find a literature review in marketing that does not complain of the absence of a common thread.

Marketing as a Potential Science

Although we refute the claims for marketing as a science, we do not dismiss the possibility of marketing having the potential to be a science. This is not because we endorse the arguments currently put forward in support. On the contrary, we believe many of these views are based on antiquated views of science. As a consequence, they provide easy targets. Thus, Hutchinson (1952) rejects the “potential science” claim on the ground that those making the proposal (Alderson and Cox 1948, Bartels 1951) select their own definitions of science. We agree. Taylor (1965) and Mills (1961), for example, base their claim on marketing’s use of scientific method. Dawson’s argument is more complex, but still misconceived. He argues that there is manifest pressure on all sides to regard marketing as a “normal science.” Pressure has resulted in a disinclination to define the domain of marketing or to question its paradigms in favor of an obsessive concern with solving practical marketing problems. His own view a la Kuhn is that the current stage in marketing’s development signifies a “crisis” which, in the absence of the pressure for practical results would trigger a revolution in paradigms.

This adoption of Kuhn’s view of scientific advance is misapplied. It presupposes marketing is already a normal science with established paradigms. No such paradigms in fact exist.

We are sympathetic to the need (Lazer 1962, Longman 1971) to redirect our attention from a primary concern with technology to developing fruitful paradigms (Alderson 1957, Kotler 1972, Bagozzi 1975). The question arises as to where to start. The first step is to determine the central phenomenon of interest as theories, methods and other elements of a paradigm are anchored to such a base. There are rival candidates (e.g., “wants” or “adaptation” to the “transaction” and “exchange”). However, what must be borne in mind is the central distinction between science and technology. The technology of marketing cannot be ignored in the search for a central focus for the “rules of rightness” to operate around a focal point.

CONCLUSION

We believe that the forces working to elevate the status of marketing to that of a science will continue unabated. At this point in time the current status of marketing (Hunt 1976a, 1976b) as a science are premature. Such lofty but empty claims invite ridicule rather than respect, breed complacency, and will not achieve our (Brown 1978) long sought goal. More important, such claims give rise to a compartmentalization as suggested by Levy (1976). This is dysfunctional to the overall goal of advancing both technology and science in marketing.

REFERENCES


