Marketing's Role in the Change to the Metric System

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Practically all the nations of the world use the metric system of weights and measures. Yet the United States continues to offer goods, produced according to nonmetric standards, in the world markets in competition with metric products from other countries.

The marketing aspects of the metric problem are now more important than ever: efforts to increase export trade; Britain's decision to move to the metric system; and widespread utilization of electronic data processing equipment, which uses the decimal system in calculations.

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THE British Government's announcement on May 24, 1965, of a decision to switch to the metric system of weights and measures during the next ten years has far-reaching impact.

Canada now also has plans for studying a change to the metric system. If that nation follows Britain, then the United States will be the only major power using the nonmetric system of weights and measures.

Britain's action has a dual effect: first, in endangering sales by the United States of nonmetric goods to Britain; and second, in giving Britain a marketing advantage over the United States in world trade with other metric countries.

The Basic Question

The question is no longer, "Should we change to the metric system?" Instead, the question is, "How soon can we change to that system; and how should the conversion be accomplished?"

There have been attempts to establish the metric system in the United States since the early days of the country. Back in 1790 Thomas Jefferson asked Congress to consider switching from the English to the metric system of weights and measures.

However, proponents of the change in general have viewed the advantages of the metric system from the standpoint of benefits to the scientific or technical user of weights and measures. Only now has it become a *marketing issue*—with the United States increasingly a factor in international trade. Overseas customers want goods packaged, specified, and measured in familiar terms, that is, by the metric system.

From a marketing standpoint, the principal *advantage* of changing to the metric system is for international trade. In fact, impetus for the British decision came from a marketing effort to increase that country's export business. The chief *disadvantages* are the changeover cost and the confusion that might arise during the changeover period.

Yet if the changes are planned on an orderly basis to take place over a period of time, the cost and confusion can be kept to a minimum.

Another consideration is the amount of record keeping handled by electronic data processing equipment. General-purpose computers are designed to operate with decimals which are also the basic element of the metric system. Although a computer can be programed to make computations and conversions within the present measurement systems, it is far less complicated to handle metric measurements using decimals. Furthermore, much of a

computer's work involves calculations in dollars and cents, requiring decimal operations.

The Metric System

The metric system is a decimal system of weights and measures based on the meter and the kilogram. It is easy to convert cents into dollars by moving a decimal point, and centimeters into meters. By contrast, multiplication or division is required to go from inches to feet to yards to miles, or from grains to ounces.

Another advantage of the metric system is the direct relationship between the units of length, capacity, and weight. A meter is a unit of length; a liter is a unit of capacity equal to a cubic decimeter (1/10 of a meter); and a kilogram is a unit of weight equal to the weight of a liter of water.

The standard prefixes used throughout the system are:

mega	= 1,000,000	deci	= 1/10
myria	= 10,000	centi	= 1/100
kilo	= 1,000	milli	= 1/1,000
hecto	= 100	micro	= 1/1,000,000
deca	= 10		

In the metric system there are a smaller number of units than in the present system, and this is helpful in learning and remembering the terms and comprehending the system.[1]

A commission of Frenchmen developed the metric system in the late 1700s, and many countries adopted it before 1900. At the time when the system was created, there was a great deal of confusion in the European countries as to methods of measurement. There were no general standards, and each local area had its own system in use. Interestingly enough, France was slower than most European nations in bringing it into common use; it did not become popular there for 40 years.[2] After World War II, the use of the metric system expanded further, to China, Egypt, and India.

The metric system has a significant advantage over the English system, which has three separate capacity measurements in use:

Cubic—in cubic inches, cubic feet, and cubic yards

Dry—in pints, quarts, pecks, and bushels

Liquid—in fluidrams, fluidounces, pints, quarts, and gallons

Also, the English system is complicated by the existence of three different kinds of weights: *Avoirdupois weight*, used for common purposes; *Troy weight*, used for weighing precious metals, such as gold and silver, and gems; and *Apothecaries weight*, used for preparing medical prescriptions.

[1] *Weights and Measures in the United States* (New York: National Industrial Conference Board, Inc., Special Report Number 24, 1926), p. 6.

[2] Jeanne Bendrick, *How Much and How Many* (New York: McGraw-Hill Book Co., 1947), pp. 156-157.

The Change in Britain

Prior to Britain's decision to adopt the metric system, the British Standards Institution made a survey of 50 B.S.I. committees responsible for the standard policy in 50 major industries. Comments were sought on the desirability of the change and its timing. The report subsequently issued indicated "that changes are inevitable and that they should be directed toward the introduction of the metric system as the primary system of weights and measures in the United Kingdom within the shortest practical time."[3]

As to the changeover in Britain, here are some observations:

1. The action was taken mainly for marketing reasons—to increase export sales.
2. The changeover will be gradual, requiring up to ten years.
3. The time required to make the change will vary from industry to industry.
4. The change in certain industries such as automobiles, aircraft, and petroleum may have to be deferred until a change is made by parallel industries in the United States.
5. Some sectors are already metric—notably pharmaceuticals, scientific instruments, and the photographic industry.
6. Although most machine tools made in Britain are on inch-dimensions, two-thirds of exports go to metric countries.[4]
7. The Royal Institute of British Architects indicates that the building industry plans to phase its change to the metric system over the next ten years. It is hoped that the variety of sizes to which components are made will be reduced in number.[5]
8. The British Standards Institution is strongly urging British industry to adopt metric screw threads as the standard in new designs.[6]

[3] "Will Britain 'Go Metric'?", *Magazine of Standards*, Vol. 35 (March, 1964), p. 78.

[4] "Metric Machine Tools," *Statist* (August 20, 1965), p. 514.

[5] D. Rowntree, "Building Industry Aims To Go Metric Over Ten Years," *Guardian* (December 6, 1965), p. 3.

[6] "Action On Screw Threads," *Financial Times* (November 24, 1964), p. 12.

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Metric System in International Trade

Considering some of the problems of international trade in nonmetric goods, controls and measurement devices in the English system are not very useful to a consumer in a country using the metric system. As an example, he has little interest in how many miles per hour his car is going or the temperature of his refrigerator in Fahrenheit degrees. He wants to know the kilometers per hour and degrees Celsius.

Replacement parts are also a significant consideration. Such simple items as nuts, bolts, and screws become major problems when the product is manufactured according to English measurements and sold in a country on the metric standard, and vice versa. Metric screws are made with a specified number of threads per millimeter instead of threads per inch, and so are different from those used in the United States.

So far, code authorities in metric nations have not established restrictions on consumer products having nonmetric parts; but it is conceivable that they could. Of course, U.S. manufacturers could produce special products built to metric specifications for export, and eventually may have to do so. But this would complicate production and increase costs, and would be practical only after a high volume had been attained.

The same kinds of problems arise in selling component parts in the export market. Such items as controls without metric calibrations are not marketable.

A closely allied problem is that of foreign aid and education. Programs such as the Peace Corps, involving instruction to peoples in other nations, are affected by the communication problem between the two systems.

Metric System and Data Processing

The common measuring devices used in the United States, such as rulers, scales, and speedometers, use the English system. However, almost all of the general-purpose counting and calculating equipment in use employs the decimal system. This includes adding machines, calculating machines, slide rules, and computers.

The inconsistency is obvious. Output from the common measuring devices cannot be used as direct input into the calculating equipment. With all but special-purpose equipment designed for specific applications, an extra operation is necessary to convert from one measurement denomination to another—such as ounces to pounds, or inches to feet.

In the manufacture of a product, the engineering specifications may call for so many inches of wire or so many ounces of plastic compound; but the component parts or the raw materials are purchased in feet of wire or pounds of compound.

A more complicated example is in the case of calculating the cost of sheet steel going into a part. The specifications may call for the thickness expressed in gauge of steel or in a part of an inch, and the length and width may be in inches or even in feet. The base may be expressed in dollars per pound (or ton). Costing requires several conversion calculations not necessary if all measurements were in metric terms.

The advantages of the metric system when using a computer are self-evident.

Present Efforts

Certain metric measurements are in such general use in the United States and so commonplace that the average consumer does not consider them strange.

For instance, the *carat*, used for weighing diamonds or other precious stones, is standardized at 200 milligrams, or 1/5 of a gram. Photographic film is bought in 8-millimeter, 16-millimeter, or 35-millimeter sizes. Radio stations use the metric system in defining the wave lengths assigned to them. The Olympic track and field events have influenced U.S. sports to the extent that at least one sport—namely, diving—has standardized on that system with 1-meter board and 3-meter board events. News reports include references to Army combat units using 75-millimeter guns.

The metric system is used for measuring electric current, and utility customers pay their bills for the kilowatt hours of electricity consumed. Eye glasses are prescribed and ground based on metric tables. A housewife usually thinks of calories in terms of apple pie and ice cream, whereby actually a calorie is a metric measurement of the energy-producing characteristics of food. By definition, it is in fact the amount of heat required to raise the temperature of 1 gram of water 1 degree Centigrade. The U.S. government uses the system in Coast and Geodetic Surveys, in all tariff operations, in coining money, and in weighing foreign mail.[7]

Even the legal definitions of the Bureau of Standards of the U.S. yard and pound are expressed in metric terms. Based on international standards: 1 yard = 0.9144 meters; and 1 pound = 0.45359237 kilograms.

Some manufacturers show both the English and metric measures on the package. For example, a Campbell's Soup label shows "10½ oz. net weight—298 grams."

The National Aeronautics and Space Administration (NASA) Centers have converted entirely to the metric system for their scientific work and publications.

[7] *The World Book Encyclopedia* (Chicago: Field Enterprises Educational Corporation, 1962), Vol. 12, p. 363.

Effects of the Change

While the changeover of weights and measures will not be easy, it is certainly not as difficult as making a basic change in a nation's currency, as in Australia. That nation is now in the process of changing over its currency to the decimal system, and has issued new money which will replace the former pounds and shillings. This is a prodigious undertaking because it must be done in a minimum of time.

By contrast, a change in weights and measures can be made gradually industry by industry, or by materials, or by type of measurement. Admittedly, the change to the metric system will be a costly one to those industries needing new machine tools and production and packing equipment. It will involve duplicate inventories during the cost changeover period, and the need for carrying replacement parts in English measurements for some time to come.

Congressman Robert McClory of Illinois has said that conversion would cost American industry about $50 billion, but that it would be worth it.[8] He believes that sum would be recovered in sales to foreign countries now reluctant to buy American goods measured in nonmetric fashion.

Effects on Consumers

At first glance, it might appear that the effects on the consumer of the changeover would all be negative. One can envision such obstacles as:

- changing road maps that show distances between towns in miles.
- revising real-estate deeds that describe property in feet and acres.
- changing records of demographic statistics, such as height and weight.
- correcting cooking recipes, and even the sizes of cooking utensils and measuring cups.
- learning to use new postal rates and freight rates.
- fitting products made according to metric measurements into buildings with architectural drawings made on the traditional basis—windows, for example.

From a statistical standpoint, time series data would likely be interrupted. For example, where a present statistical series has size categories in pounds, a new series in kilograms would not break at the same places.

In sports, present records could become meaningless to most people since the new distances would not necessarily be related to the old. Also, what about a game like football? Would the same game now be played on a 100-meter field, with first down and 10 meters to go?

However, in spite of all of these problems, after the consumer became familiar with the metric system *there would be definite advantages.* Consider, for example, prices of ordinary household items. Today the American housewife has to be a walking calculating machine to determine precisely which is the best value. A recent price check of a popular brand of detergent showed the following comparisons by size of box:

Package sizes	*Price*
1 lb. 4 ozs.	$0.32
3 lbs. 1 oz.	0.77
5 lbs. 4 ozs.	1.31
16 lbs. 1 oz.	3.85

How much is saved by purchasing the larger size? The housewife could hardly be expected to make the following calculations in her head:

Package size			*Price per pound*	*Saving per pound over small-size package*
In pounds and ounces	*In pounds*	*Price*		
1 lb. 4 ozs.	1.25	$0.32	25.6 cents	.....
3 lbs. 1 oz.	3.0625	0.77	25.1 cents	.5 cents
5 lbs. 4 ozs.	5.25	1.31	25.0 cents	.6 cents
16 lbs. 1 oz.	16.0625	3.85	24.0 cents	1.6 cents

If the product were packaged in fairly even multiples of "metric sizes," it would at least be somewhat easier to calculate the price savings. At a 30-cent price for the smallest package, here is how it would work out:

Package size			*Price per kilogram*	*Saving per kilogram over small-size package*
In grams	*In kilograms*	*Price*		
500	0.5	$0.30	60 cents	.....
1,000	1.0	0.59	59 cents	1 cent
3,000	3.0	1.74	58 cents	2 cents
6,000	6.0	3.30	55 cents	5 cents

Note that the price per kilogram can be determined directly by dividing the price by the size, whereas with the present system the size must be converted to pounds first before making the division.

Children in school, the consumers of the future, would certainly learn the metric system easier than the present system, and then understand more readily the relationships between various lengths, capacities, and weights.

What To Do

Here are some things that people in marketing ought to do:

1. Become familiar with the metric system.
2. Start using the terms so that they become a part of everyday vocabulary.

[8] Barry Schweid, Washington (AP); *The Bridgeport Post* (Bridgeport, Connecticut), (August 3, 1965), p. 17.

3. At meetings and seminars on marketing, include a discussion of the use of the metric system in marketing.
4. Include study of the marketing aspects of the metric system and the conversion problem in college courses in marketing.
5. Work with trade associations and industry groups to convert existing standards or develop new ones in metric terms.
6. Consider the use of metrics in internal accounting and production records.
7. Show the metric equivalents along with the traditional measurements on price lists and specification sheets.
8. Make sure that salesmen and all who come in contact with customers using metric measurements know how to convert to that system and can discuss customer requirements in metric terms.
9. Expand the use of both the metric measure and the English measure on packages.
10. Study the possibilities of building items for export produced to metric measurement, using metric controls.

Implications

The metric system is being studied in several federal agencies; and there is a bill pending in Congress to authorize $2.5 million for a 3-year study of the feasibility of converting to the metric system.

Continuing efforts by the United States to increase international trade, Great Britain's decision to change to the metric system, and the advantages of the metric system for computorized record keeping makes it imperative to appraise the situation quite seriously.

To marketing practitioners and teachers, here is an unparalleled challenge to make a major contribution to the growth and business efficiency of the United States.

The problems of transition are many; but solutions must be found which will benefit consumers, meet the needs of science, facilitate international trade, help industry and agriculture, and aid the nation as a whole.

MARKETING MEMO

Inherent Problems in the Teaching of Marketing . . .

The structure of the discipline-oriented university and the structure of the mission-oriented society tend to be incongruent. Moreover, as the disciplines making up the university become more complex and elaborate in response to their own internal logic, the discrepancy between the university and society grows. The university becomes more remote; its connection with society weakens; ultimately it could become irrelevant. The growth of this discrepancy appears to me to be a central problem in the relation between the university and society. It poses major difficulties for the university professor, especially in the natural sciences, who views his responsibility as a citizen broadly.

—Alvin M. Weinberg, "But Is The Teacher Also a Citizen?," *Science*, Vol. 149, August 6, 1965, pp. 601-606, at p. 601.