# IMPACT OF TECHNOLOGY ON MARKETING: THE PAST AND THE FUTURE

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## INTRODUCTION

Society's impact on marketing is an area to which marketing scholars have paid considerable attention since the emergence of macromarketing as a school of thought. Among other topics, issues such as comparative marketing, legal and regulatory issues and socioeconomic change have been explored by researchers. One area that has remained largely unexplored is the impact of technology on marketing.

Technology is undoubtedly one of the most important and crucial ways in which society impacts on marketing. Much of our modern way of life is made possible by the rapid development of new technologies. At any given point in history, marketing practice too has been shaped to a great extent by the existing level of technology. For instance, the invention and rapid diffusion of railways, television and the telephone has had a significant impact on the practice of marketing over the past century. It is surprising, therefore, to find very few research papers on the impact of technology on marketing. An analysis of

the papers presented at the three conferences on historical research in marketing reveals the lack of a focus on the history of technology and its relationship to the history of marketing practice (Hollander and Savitt 1983; Hollander and Nevett 1985; Hollander and Nevett 1987 (forthcoming)). While the conferences are an important step in filling the gap in historical research in marketing (Savitt 1980), the topic of this paper appears not to have been adequately understood by scholars so far.

This purpose of this paper is to understand the role of technology in the development of marketing activities in the past, as well as to analyze the likely impact of technology on the future of marketing practice. The first part of the paper utilizes a history of technology approach toward understanding the changing role of marketing in society as a function of technology, while the second part extends the logic of history to the likely impact of some future technological developments on the marketing system.

It must be noted that the definition of technology is rather broad. Technology is the "....methods man has discovered and utilized to improve the conditions of his existence." (Daumas 1962, p. 1). Thus technology includes a host of techniques of sustenance (agriculture, hunting etc.), settlement techniques (eg. construction), equipment or production techniques (eg. potter's wheel, industrial machinery), aesthetic techniques (eg. fine arts, personal beauty), physical techniques (eg. yoga, karate, aerobics), techniques of transportation (eg. roads,

automobiles), techniques of expression (eg. printing, photography), military techniques (eg. fortification, ballistics), and techniques of measurement (eg. clocks, metric system). While we do not claim that this list is either mutually exclusive or collectively exhaustive, it is certainly indicative of the types of technological changes we will be discussing in this paper.

The paper first identifies and defines three broad functions of the marketing system. Next, three "Ages" of human history are presented. Finally, changes in marketing practice over the ages, and the likely impact of technology on marketing practice in the future are traced as a consequence of future technological advances.

## FUNCTIONS OF THE MARKETING SYSTEM

Three broad functions of the marketing system have been identified (Table 1). Brief descriptions of the functions and their importance are examined below:

[ INSERT TABLE 1 HERE ]

The first function to be studied is production. The nature of goods and services exchanged has changed tremendously over the ages, resulting in significant shifts in marketing practice. From agricultural goods to industrial products, and now to a wide

variety of services, the objects of exchange have changed in terms of quantity, style and complexity. In addition, mass production technologies have made the existence of a modern marketing system possible by allowing large scale specialization of human resources.

The second function of the marketing system is distribution. This includes the social actors involved in market transactions, including middlemen, consumers and producers, although the paper will tend to focus a little more on the middleman. Changes in technology have brought about a number of changes in the composition and behavior of social actors involved in exchange over the ages. Closely related to the social actors is the institutional framework of exchange relationships. Marketing institutions have changed dramatically, with technology playing a critical role in this regard. For example, Pearson (1985) traces the evolution of the modern merchant, and comments on the importance of the railroad to this process in the American West:

> "The railroad provided a distribution structure with rail stations and stationmasters that allowed for ordering, shipping, receiving and storage of goods. The railroad established a system of rules and mores concerning transactions which determined forms of negotiation, methods of payment, and terms of sale" (p. 189).

The second component of the distribution function is physical distribution. Changes in transportation and storage technologies have contributed to the growth of marketing

activity. Indeed, at various points in time the bottleneck in the development of marketing was not production, but transportation.

The third broad function of marketing is facilitation. This function includes the communication of marketing related information, the creation of possession and the completion of the transaction. Technological developments in the field of communication have played a key role in shaping marketing practice. For instance, the invention of printing opened up new channels of communication which were previously not available.

The second component of facilitation is the possession of goods and services. Increasing sophistication of the financial system has always facilitated the growth of the marketing system and encouraged the expansion of marketing activities. For instance, convenient availability of consumer credit in the United States has had an important role in the development of the marketing system in this country.

Finally, the marketing system serves as the mechanism through which society has today, by and large, chosen to match the needs and wants of consumers with the resources available to it. This is done through the transaction aspect of facilitation. For example, in primitive times production and consumption were not separated as they are today. From the point of view of marketing, this age was a "null" era for there were no market transactions, although exchange did exist within the tribe/family. In this paper marketplace transaction rather than generic exchange will be treated as a function of marketing.

## AGES OF HUMAN HISTORY

Before the advent of modern civilization, man was largely nomadic, living with family and tribe. These families/tribes were almost entirely self consistent. Food was gathered by hunting, fishing or collecting wild grain. With production and consumption merged within the social unit, this period was, as mentioned earlier, a null era from the point of view of marketing. Market transactions of any reasonable volume were nonexistent.

The practice of marketing can be traced to the very beginning of modern civilization as it first developed along the lower valleys of the Nile, Tigris, Euphrates and Indus rivers around 4000 B.C. (Forbes 1967, p. 24). These civilizations grew out of what has been labeled the "Neolithic Revolution," and are roughly coincident with the first use of metals by man. It took another two thousand years for the first civilization to develop in Europe in the second millennium B.C. As agriculture developed, limited specialization of human resources became possible and trade was necessitated. The Agricultural Age as we have termed this era lasted for approximately six thousand years. Indeed, many pre-industrial economies even today are still in an agricultural age, with farming accounting for much of the employment and the gross national product.

The year 1700 A.D. roughly marks the beginning of the Industrial Age. Although a number of technological developments

did take place in the seventeenth century, it was not until the middle of the eighteenth century that the pace of industrial development increased significantly. The expansion of mechanization, first with the help of traditional sources of power such as wind and water, then with the help of the steam engine and later oil and electricity in rapid succession led to improvements in the effectiveness and efficiency of the marketing system.

Following World War II, some highly developed countries moved into what is called the Postindustrial Age. The year 1950 A.D. is chosen to represent the evolution of the postindustrial society. It is marked by a minute percentage of the labor force being employed in agriculture, a substantially larger but shrinking proportion of the labor force employed in manufacturing, and a large and growing proportion of the labor force employed in the "services" sector.

## IMPACT OF TECHNOLOGY ON MARKETING: AN ASSESSMENT

Our contention in this paper is that throughout the history of man, technology has had a major impact on the nature of marketing practice. Further, this impact has not been uniform across the marketing system. In each age, the impact of technology has been felt differentially on the production, distribution and facilitation functions of marketing.

The paper proposes that in the earlier part of the agricultural and industrial ages, the impact of technology was greatest on the production function. As new technologies were developed, they were first applied to the problem of production. As man became better and better at producing goods, this concern shifted to the distribution of goods. Thus the next phase of technology development was focused on distribution technologies. Finally, once this problem of distribution was no longer a major concern, attention shifted to the facilitation of transactions through the development of communication, finance and other functions related to the creation of possession utility.

This logic is further extended to apply to the future. It is argued that the development of technology in the postindustrial age will follow the same cycle of production - distribution - facilitation, although the time lag between the periods is likely to be considerably shortened.

[ INSERT TABLE 2 HERE ]

An important point to note is that there is (and always has been) tremendous variance in the level of technology attained by different societies. Thus while the United States is entering the postindustrial phase, a majority of Third World countries are still in the agricultural phase and are struggling to enter the industrial age. Therefore, while the paper treats the problem as if there are precise cutoff dates for each age, this is done

solely for the purpose facilitating analysis.

Within countries too, agricultural, industrial and postindustrial sectors of the economy exist concurrently. Thus when it is said that a country is in the postindustrial age, it must be remembered that an agricultural and an industrial sector also exist. Different countries may be at different stages in the development of these sectors. For example, In India, the main problem facing the agricultural sector is not production but distribution. Approximately 20% of India's food production is eaten by rats every year. At the same time, there is a substantial industrial sector in the country, the main problem for which is still production.

Agricultural Age - 4000 B.C. to 1800 A.D.

As civilization developed, specialized human resources became a reality. This in turn led to the beginning of economic exchange activities. Soldiers were perhaps the first example of a specialized human resource. However, the extent to which society could support specialized human resources was limited by the amount of food surplus that could be generated. The bottleneck was existing production technology.

Production

Four major technological advances are generally attributed as key events in the production of agricultural goods. These are the invention of the plough, irrigation, potter's wheel and spindle (Derry and Williams 1961).

The most fundamental invention that aided the development of agriculture was the plough, for it was the availability of an assured food surplus that really launched modern civilization (Faucher 1962, p. 82). A wide variety of cash as well as food crops were cultivated during this period. The major crops, however, were the pulses and the cereals. Both crops were easy to cultivate and store.

Irrigation was another major technological advance in this period. The "Shaduf" of the Egyptians was perhaps the first device to be used by man for irrigation purposes, and its use can be traced back to at least 1500 B.C. (Derry and Williams 1961, p. 52). The ox driven water wheel was invented around 200 B.C. Damming was quite common by the middle of the second millennium B.C. Networks of canals were also common in the lower valleys of the Tigris and the Euphrates.

The wheel was invented sometime around 3500 B.C. However, it is interesting to note that initially widespread application of the wheel was not in transportation but rather as the potter's wheel, to aid in the production of pottery. Pottery became

particularly important at this point in time because the cereals and pulses which came to form a large portion of the diet in this age required slow cooking in a container that could withstand heat.

The spindle was invented at least as far back as 1,900 B.C. The importance of the spindle can be gauged from the fact that until the fifteenth century A.D. it was the only mechanical aid to spinning (Derry and Williams, 1961, p. 79). The production of cloth was greatly facilitated by the spindle, the invention of which marked an change in the effectiveness of textile production.

Distribution

As the technology of production improved, it became possible for man to produce larger and larger surpluses of food and other items of need. Around the time of the rise of the Roman empire, the focus of technology development shifted gradually to the area of transportation and storage of the surplus available. Deshayes (1962) and Duval (1962) report that while the Romans may not have made progress in the application of science to mechanization or to agricultural production, they did make substantial progress in the area of transportation (p. 208 and p. 258 respectively).

While the invention of the wheel was followed quite quickly by its fusion with animal motive power, it could not be put to practical use in the distribution of goods due to a lack of

proper roads. The first great road system known to mankind was built by the Romans. In addition, the Romans also developed better types of horse-shoes that provided an improved grip (Derry and Williams 1962, p. 195). They also invented the milestone and perfected the technology of building bridges. Land transportation, however, was still a distant second to water transportation in terms of cost efficiency. For instance, during this period, transporting a load of hay by land just 30 miles doubled its cost, while a shipload of wheat sent across the Mediterranean added only 25% to its cost.

Tremendous improvements were made in shipping during this period. The Romans perfected the technology of building ports and perfected the rudder. Larger ships were also built. While the average size of a ship during the Greek period was about 130 tons, the average Roman ship could carry 340 tons, and the largest ships could carry more than 1,300 tons. A fleet of 120 ships was engaged in regular trade between India and the Red Sea.

Overall, the main contribution of this period was to expand trade through the development of physical distribution technologies. So impressive were these developments that in the Moslem era (seventh to thirteenth centuries A.D.) there was in place a service for the transportation of snow from Syria to Egypt (Wiet 1962, p. 352). The result of the transportation revolution was to increase the size of the hinterland of the city. The growth of cities and trade fed on each other as a direct consequence of improvements in physical distribution

technologies. Greater specialization was achieved, with production and consumption being separated to a fair extent for the majority of city dwellers.

Facilitation

With production and distribution technologies relatively well developed, the crucial problem by the fourteenth century A.D. was the creation of possession and the facilitation of trade. This period is also marked by the increasing political power of the merchant. Merchants supported the power of the crown in order to overcome the problem created by feudal lords and their armies that imposed taxes and impeded the movement of goods. Their success in this strategy paved the way for the facilitation of trade.

Although advertising is believed to have emerged around 1000 B.C. in Babylon where the first advertisements bearing pictures of goods for sale have been found, Foster (1967) believes that the invention of the printing press around 1450 A.D. was a major step in the development of communication in general and advertising in particular. Handbills and newsletters were the new channels of advertising that became available to traders in addition to channels such as the town crier. In 1665, the London Gazette became the first regular newspaper to be published in England.

The possession function was given a big boost by the development of the financial system. Although the first coins were struck by the Hitites of Asia Minor around 1500 B.C., banking as we know it today really emerged during the fourteenth century A.D. The double entry system of bookkeeping was also invented around 1340 A.D. in Genoa (Gille 1962, p. 569). The Italians were by far the leaders in the development of the modern financial system, and consequently also led the growth in trade during this age. The inefficient barter system was by now replaced by the use of money as the medium of exchange. Although the rise of finance capitalism was witnessed during the Roman empire (Beard 1938), the expansion of finance capitalism took place during this period.

The degree of specialization achieved in this age was quite high. Mulvihill (1987) presents an interesting discussion of the work of Ibn Khaldun, a Middle Eastern scholar in the fourteenth century. Ibn Khaldun recognizes that:

> "The unit of history is not man, but the social organizations needed for the production of goods. Through cooperation, the needs of a number of persons....can be satisfied." (Mulvihill 1987 p. 1).

The greater specialization of human resources led to an increase in the use of market transactions. The marketing system was entrusted with the function of matching human needs with the resources of society to a much greater extent than ever before.

Thus the facilitative aspects of the marketing system were impacted upon by the development of new technologies toward the

end of the agricultural age. These inventions marked an improvement in the effectiveness of the performance of facilitation related functions, chiefly communication and finance.

## Industrial Age - 1700 A.D. Onwards

The industrial revolution in England marks the beginning of the Industrial Age (Daumas 1964, p. 7). Although there is some debate over the exact dates of the revolution, the paper defines the industrial age as beginning around the eighteenth century. It is demonstrated in this section that technology development in the industrial age followed the same basic sequence of production -distribution - facilitation that occurred in the agricultural age.

### Production

The Industrial Age marks the beginning of an even greater specialization of human resources. This was made possible by the large scale mechanization of production processes. At first, improvements were made in the waterwheel and the windmill, which had been in use for quite some time (Stowers 1958, p. 200). However, these devices rarely yielded more than 10 horsepower. and usually yielded less. The largest waterwheel, built in 1682 to supply the fountains at Versailles, generated 75 horsepower.

(Derry and Williams 1961, p. 311).

The development of the steam engine is an important event for the industrial revolution. The first useful steam engine was built in 1698 A.D. and used to pump water for large buildings and water wheels. It took another 100 years to build high pressure steam engines for common use. By the end of the eighteenth century, however, steam engines had been put to a variety of uses for production purposes in many industries including textiles.

The development of the high pressure steam engine required a greater degree of precision than ever known to man before. The machine tool industry, therefore, became a very important part of the industrial revolution at this stage. As greater precision was achieved, the mass production of machines became possible. In 1776, general precision levels achieved were in the range of one-sixteenth of one inch. By 1856, machines capable of measuring to one-millionth part of an inch were being used (Derry and Williams 1961, p. 343).

A number of other developments in production technology also occurred in the early part of the industrial age. Inventions such as the spinning machine, screw-cutting lathe, boring-mill, threshing-machine, power-loom, paper-making and wood-making machinery were all introduced in the second half of the eighteenth century (Singer et al 1958).

The objects of exchange in the early part of the industrial

age added industrial goods to the list of products from earlier ages. In addition, a wider variety of consumer goods was now available as it became possible and worthwhile for large segments of the population to specialize and fulfill their needs through the exchange process. For instance, as mechanization expanded, a market for steam engines developed. In turn, this demand led to the development of better machine tools. These producer goods were utilized to produce an assortment of consumer goods, which had not been available ever before, at least in such quantities.

## Distribution

The distribution functions of marketing were greatly aided by the developments in transportation technology beginning in the nineteenth century. The most important of these developments are discussed in this section.

Wooden sailing ships gave way in this period to steam driven iron ships. These were not only much bigger but also much faster than earlier ships. However, the diffusion of the new ships was slow and in 1840, 90% of the world's tonnage was still in wooden ships and most of the iron ships were still sailing ships. It would take another sixty years for steam powered ships to become the dominant segment in total shipping tonnage. The growth of shipping was advanced by the expansion of lighthouses and lightships from 1,570 in 1850 A.D. to 9,424 in the year 1900.

The other important development was the growth of railways.

While the steam engine had been in use for production for some time, it was applied to the development of modern forms of transportation for the first time in the early nineteenth century. By 1829, George Stephenson had developed the 'Rocket' and many of the problems of fitting the steam engine within the confines of the railway engine had been solved (Burlingame 1967). By the second half of the nineteenth century the railway mileage installed grew tremendously. By 1900, the U.S. had almost 200,000 miles of track, up from less than 10,000 in 1850 and England had nearly 22,000 miles up from 7,000 miles in the same period (Derry and Williams 1961, p. 385). Till the development of the railway, large parts of any region were inaccessible to cheap transportation and most trade activity was limited to within a 10-15 mile radius around water channels. The railways succeeded in opening up new areas and new markets for products.

Road transportation also developed very quickly during the nineteenth and twentieth centuries. The first steam powered carriages were built around 1830, but the greatest impact was reserved for the automobile using the internal combustion engine. Like the steam engine, this too was not originally developed for the purpose of transportation, but for pumping. Unlike the steam engine, however, its greatest application was in road transportation. By 1908, Henry Ford was ready with the Model-T which sold 15 million units in nineteen years of production. The distribution revolution was well under way.

Facilitation

Toward the latter half of the nineteenth century and onwards, the emphasis of technology development shifted to the facilitation of transactions. The telephone, telegraph and the radio were among the advances made in communications at this time. Also, the printing press was mechanized. Later, photography and cinematography were invented which further enhanced the process of communication (Kranzberg and Pursell 1967).

The availability of new techniques made possible an expansion in advertising activity. Mass advertising became a reality for the first time. The creation of possession became of prime importance in highly industrialized economies. A one price policy for many goods reduced the costs of transaction and served to enhance the efficiency of the marketing system.

The growth of the capital market greatly aided the development of industrial economies. The growth of consumer credit did not take place till the twentieth century, but when it did become available, it fueled the process of facilitating market transactions. These two factors together led to the creation of possession and the facilitation of marketing activities.

Therefore, the last part of the industrial age witnessed the shifting of the process of technology development to facilitation of transactions. With better communication and availability of

finance, possession of goods and services was greatly facilitated.

Postindustrial Age - 1950 A.D.

The paper argues that the historical analysis conducted in the last two sections can be extended to the future (i,e., the postindustrial age). From the point of view of technology, the electro-mechanical and chemical technologies (which were the hallmark of the latter part of the industrial age) are giving way to new technologies such as electronics and biogenetics (Sheth 1983a p. 6). These new technologies are having, and will continue to have, a profound effect on the development of the marketing system.

Production

As in the earlier two ages, the impact of technology is initially greatest in the area of production. The application of electronics technology to the production of services is perhaps the best example of this. From health care to financial services, and retailing to industrial services, technology is being applied to improve production. The result of this is visible in two ways.

Firstly, the overall quality of services has gone up tremendously. Automated Teller Machines have improved the level

of service banks can offer to customers. Instant cash and deposits, 24 hour banking and time saving are some of the benefits of this technology. In the health services sector, electronics and biogenetics technology have helped make available, among other benefits, a large number of new diagnostic tests. As a result, the quality of health care has improved significantly, leading to consistent improvement in the average life expectancy. These tests permit early diagnosis of many health problems, thereby lowering the mortality rate for many diseases. The production of many industrial services such as overnight document and package delivery services has also been made possible by the application of new technologies.

Secondly, while the new technologies have raised the overall quality (or mean) of services, they have also reduced the variance in the quality of services produced. The problem of lack of consistency in service quality has been reduced by the application of technology. The bank ATM, for instance, provides a service of consistent quality. In health care, the providers rely more and more on results of diagnostic tests, and less on their intuition. Thus they are more likely to provide consistent service. Document delivery and package delivery services are produced with the same consistency time after time.

There are still many problems in the area of service production that need to be developed. While some industries such as health care, banking, document delivery and fast foods have succeeded to some extent in developing production processes, there are many industries where production of services is still a

problem. Airlines, for instance, have yet to develop methods and technologies for producing their services in a safe and efficient manner. While the production of the aircraft itself was a problem in the industrial era, the main challenge confronting the airline industry in the postindustrial age is to develop operating systems (like the Air Traffic Control System), which ensure efficient and speedy transportation. A system that would make possible the delivery of a standardized level of service is today not available to the airline industry.

Distribution

As in the past, once the problem of production is sufficiently addressed, the focus of technology development shifts to the distribution of services. For instance, the fast food industry in the United States has, by and large, tackled the problem of producing quality services consistently. As the focus of this industry shifts to distribution, we see a substantial expansion of outlets. McDonald's, the industry leader is moving into non-traditional distribution locations such as office cafeterias, university campuses and airports. With the help of the ATM networks, banks are increasingly becoming able to provide a large number of locations at which banking operations can be carried out.

There are two important ways in which technology is affecting the distribution functions of marketing. One of these

is the reduction of time and space constraints in the distribution of goods and services. Home shopping through such means as telemarketing, home video shopping and catalogs, as well as the concept of one stop shopping were all made possible by the development of postindustrial technologies. The reduction of time and space constraints are bringing about dramatic changes in the retailing industry (Sheth 1983, Sheth 1983a, English 1985).

The second way in which technology is impacting on distribution is through the development of data and knowledge distribution technologies. Instantaneous transfer of data is now possible. Worldwide access to information is fast becoming a reality. In addition, a truly mass media has developed. With the help of television, marketers all over the country are able to reach vast numbers of people directly and simultaneously. Distribution is becoming globalized. Just like the development of shipbuilding and road making technologies in the middle part of the agricultural age, and the development of railroads and the automobile in the middle part of the industrial age, the development of data and knowledge distribution and other related technologies is reducing time and space constraints in the way of postindustrial distribution systems.

## Facilitation

The facilitation of transactions is the next step in the cycle. Technology is playing a big role in the facilitation

functions of the marketing system. The integration of the computer with the telephone is opening up many new possibilities for the facilitation of transactions. Different aspects of customer service such as maintenance/repair, installation and financing are all being impacted on by technological developments.

One such development is the use of computerized online order entry systems. As businesses move toward a Just-In-Time (JIT) mode of operation, the use of such systems is likely to increase. The end result of online order entry systems is to cut down on delays, thereby facilitating the consummation of transactions at a speed and convenience never experienced before.

The availability of consumer credit is a feature of the facilitation stage of the industrial period. However, at that time credit was restricted to big ticket items. In the postindustrial age the availability and use of consumer credit is expanding at a tremendous pace in many countries. The linking of the telephone and the computer is facilitating the widespread acceptance of consumer credit instruments such as bank cards, and instant credit approvals for many types of purchases.

The facilitation of possession is also enhanced by the use of bank ATM cards at retail outlets. Purchases can be debited directly to the customer's checking account from the point of purchase. Several industries are implementing programs of this nature today.

Technology is also impacting on the performance of the maintenance and repair functions. In the area of telecommunications, for instance, most maintenance and repair work is today carried out at the production facility. The need for a repairman to visit the home or office has been greatly reduced. Installation of telephone service today does not even require a visit from the service personnel of the provider.

The communication function of marketing is also experiencing a great revolution. With the help of word processors and personal computers, personalized written communication is made possible on a large scale. Mass media, such as television , is widespread in most parts of the world. The video cassette recorder is undermining politically imposed barriers to international communication. Marketing communication utilizes all these and other developments in communication technology to promote the facilitation of market transactions.

## Discussion

While the basic cycle of production - distribution - facilitation still holds in the postindustrial age, two trends are clearly emerging.

First of all, the cycle is becoming much shorter with each successive age (Figure 1). In the agricultural age, it was quite easy to identify periods when the production, the distribution

and finally the facilitation functions were impacted by technology. In the industrial age, it was a little more complex but still quite clear that the same three periods existed, although the time spans were much shorter. In the postindustrial age, however, the lead lag between the three periods almost disappears, and the impact of technology appears to affect all the functions almost simultaneously.

[ INSERT FIGURE 1 HERE ]

Secondly, differences between countries are getting narrower. The transfer of technology takes place much quicker than ever before. The globalization of higher education is one of the factors responsible for this situation. Thus it becomes possible for countries like South Korea and Taiwan to benefit from technologies developed in the United States, Japan and other Western nations almost simultaneously. As a result, market segments are becoming globalized at a fairly rapid pace.

## SUMMARY

This paper has proposed that technology impacts on marketing by shaping, influencing or controlling the nature of marketing practice. First of all, three major functions of marketing were identified. These three broad functions were production, distribution and facilitation. Next, history was divided into

three ages - the agricultural age, the industrial age and the postindustrial age. Finally, the paper examined the impact of technology on the different functions of the marketing system over the ages.

The paper presented the proposition that technology development follows a cycle of production - distribution - facilitation, and that the cycle repeats itself during every age. This proposition was supported by examining the history of technology, although it was noted that the pace of the cycle has quickened sharply from the agricultural to the industrial age, and again from the industrial age to the postindustrial age.

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