

# THE IMPACT OF SCIENCE AND TECHNOLOGY ON SOCIETY

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## ABSTRACT

As we prepare to enter the twenty-first century, civilization is in its greatest age of technological change. Society is in the midst of the massive task of absorbing science and technology on a scale never before experienced. Modern technology has given society new powers but also the responsibility to use science and technology in a way that enhances the quality of life.

Throughout history, science and technology has been pressed onward like a glacier, overturning everything in its way and grinding all opposition into dust. In early nineteenth century England, for example, a band of unhappy workers known as Luddites challenged the Industrial Revolution by roaming the countryside smashing machinery and burning factories. From their narrow viewpoint, machines were enemies taking away jobs and freedom and harming people. But the Luddites were soon overcome by the benefits brought by the same machinery they opposed. Their movement failed, much the same as their more modern successors did, such as the glassblower who opposed glassmaking machinery. We know now that they were largely mistaken about the broader significance of industrial technology. Though the Industrial Revolution created new and serious human problems for some people in society, it was a great advance in the history of civilization. Technology

continues to grow because of people themselves. Human beings, have tested the fruit of knowledge, cannot suppress their desire for it. They forever to expand knowledge of their environment, probably because of the excitement of learning and their belief that more knowledge will help them control their environment. This paper takes a closer look at how science and technology enhance or affect society as a whole with the main focus on Thailand.

## 1. INTRODUCTION

To begin with, we must acknowledge the innumerable blessings bestowed on us by science and technology. That is, nobody will dispute the enormous value that science and technology provide. If we look around at communications in the present day, we see radio, telephone, fax machines, television, video, satellites and so on, all of which have arisen from scientific and technological advances. Other obvious areas of development are in the medical world, where so many contagious diseases have now been virtually eradicated. Cholera is now quite rare, in Asia it is almost extinct. Bubonic plague no longer exists. Smallpox has all but vanished. We no longer have to fear these infectious diseases. Even brain operations are getting easier. Sophisticated examination and diagnosis are more and more accessible. Then we have electricity and countless labor-saving devices. The field of biology has seen the development of genetic engineering, which may produce a new or specially adapted species of plants and animals. In short, it is almost impossible to list all those technological advances we have with us today.

But when we really take a close look into the matter, we find that science, and in particular technology, has created a great many problems for humanity as well. At present, there is even a fear that the human race, and indeed the whole world, may face destruction at the hands of this technological progress. It might be a very instantaneous kind of destruction, at the flick of a

switch, or it could be a slow and gradual kind of destruction, such as the gradual deterioration of the environment, which is a very critical problem at this point in time.

Even within the immediacy of our everyday lives, we are threatened by dangers. We can't be sure whether our food has been soaked in chemicals or not. Sometimes plants and animals, our food supply, are treated with hormones to boost their growth. Pigs are given special additives to make their meat turn a pretty red colour. Poisonous substances are sometimes used in foods as preservatives, flavour enhancers or dyes, not to mention the uncontrolled use of pesticides. Some of the people who sell these foods wouldn't dare eat them themselves?

## 2. BENEFIT-CREATING TECHNOLOGY OR BENEFIT-SEEKING TECHNOLOGY

That application of science which effects the changes in the natural world, changing it into a so-called artificial world, is that which we call 'technology'. However, technology is dependent for its existence on the knowledge obtained through science. Technology is the tool, or channel, through which humanity has worked to manipulate nature in the pursuit of material comfort, but at the same time, the dangers which threaten humanity are also contingent on this technology. Technology is thus both an instrument for finding happiness and a catalyst for danger.

Now in answer to all this, scientists can counter that the word 'science' refers to Pure Science. Pure Science seeks only to discover and tell the truth, it is concerned only with the search for knowledge. Whatever anybody wants to do with this knowledge is their business, it is no concern of science. Pure Science tends to shake off responsibility in this regard.

Science tends to accuse technology of using the knowledge gained by science for its own ends, but technology hasn't used this knowledge exclusively to its own ends. Technology was

initially aimed at bringing benefit to humanity, but nowadays we have two kinds of technology. One is the technology that is used to create benefit, while the other is used to seek benefit. What we need is technology that is used to create benefit, but the problems of the present time exist because modern technology is of the kind that seeks benefit.

If we can constrain ourselves to creating benefit, the repercussions arising will be few and far between. But whenever technology is used to seek benefit, problems arise, as we can see in the present time. Therefore we must clearly distinguish between technology for the creation of benefit and that which is used to seek benefit.

All in all, the benefits created by science appear to the mass of people through their technological manifestations. Humanity must, however, learn to choose between technology for creating benefit and technology for seeking benefit. (Bhikkhu P.A. Payutto, 1993: 9-17)

### 3. FEATURES OF TECHNOLOGY

The dominant features of technology are change then more change. Technology forces change on people whether they are prepared for it or not. In modern society it has brought so much change that it creates what is called future shock, which means that change comes so fast and furiously that it approaches the limits of human tolerance and people lose their ability to cope with it successfully. Although technology is not the only cause of change, it is the primary cause. It is either directly or indirectly involved in most changes that occur in society

Another feature of technology is that its effects are widespread, reaching far beyond the immediate point of technological impact. Technology ripples through society until every community is affected by it. The shock waves push their

way into even the most isolated places. People cannot escape it. Even if they travel to remote places like the Grand Canyon, technology is still represented by vapor trails from airplanes flying overhead, microwave communication signals from satellites moving at the speed of light, and a haze from air pollution often preventing a view of the other side.

An additional feature of technology is that it is self-reinforcing. As stated by Toffler, : “Technology feeds on itself. Technology makes more technology possible.”( Toffler, 1971:26)

#### 4. PHASES OF TECHNOLOGY AND THE SOCIAL SYSTEMS THEY CREATE

Looking at technology in very general way, five broad phases of technology have developed. One phase at a time tends to dominate the work of a nation, and in so doing it has a major influence on that nation and creates its own distinct type of social system. In history, nations have tended to move sequentially through each phase, beginning with the lowest technology and moving higher with each step, so the five phases of technology roughly and moving higher with each step, so the five phases of technology roughly represent the progress of civilization throughout history. Although one phase of technology tends to dominate a nation’s activities at a particular time, other phases often will be practiced at the same time. The five phases are discussed in the following paragraphs.

##### 1) Nomadic Society

In a nomadic society people live primarily by hunting, fishing, picking berries digging roots, and otherwise taking what nature has provided. Rather than doing more by planning and cultivating, they merely take what is available. Their technology of spears, fishing hooks, digging tools, and baskets, while ingenious is poorly developed. Often they move as nomads to

wherever a good natural harvest is available.

## 2) Agrarian Society

An agrarian society is one which agricultural activities dominate work and employ the largest proportion to the force. Eventually, and agrarian society may develop in which people domesticate plants and animals for specific uses. Many nations in the modern world are still primarily agrarian. More than 50 percent of their labor force is busy providing food for the population. These nations tends to remain at an agrarian level until they can develop enough productivity to release many of their labor force farm and employ them in other productive occupations.

## 3) Industrial Society

In the 1800s the United States began a mechanical revolution that transform it into an industrial society by the early 1900s. An industrial society is one in which the building and processing of material goods dominates work and employs the largest proportion of the labor force. It is the nature result of the great Industrial Revolution, which originated in Britain, and it symbolically represents the materialism that social critics sometimes condemn.

## 4) Service Society

A service society is one in which the majority of the labor force is employed in service industries, such as retailing, banking, health care, and insurance, that provide non-product values (service), rather than in direct production work, such as manufacturing, farming and construction. In the United States, 70 percent of services account for approximately one-half of gross national product and each family dollar spent. In a service society the production of material goods is no longer the primary user of labor or the central economic and social problem.

## 5) Knowledge Society

Knowledge is such a distinct phase of technology that, when it dominates a nation's activities, it creates a different type of social system. A knowledge society is one in which the use and transfer of knowledge and information, rather than manual skill, dominates work and employs the largest proportion of the labor force. Work becomes abstract, the electronic manipulation of symbols.

Examples of people in knowledge jobs are news editors, accountants, computer programmers, and teachers. Even a transplant surgeon, who must use a delicate manual skill, is primarily working from a knowledge or intellectual base. Examples of knowledge industries are newspaper publishing, television, education, book publishing, telecommunications, and consulting.

A knowledge society's technology is primarily electronic in nature and is heavily dependent on the computer and the semiconductor silicon chip. The power of these devices rests on their ability to process, store, and retrieve large amounts of information with very great speed. By the early 1980s technical advances ushered generation of computers called the second generation. The second generation was made possible by the development of the micro-processor-called a computer on a chip that has vastly greater computing power than those that were first developed in the early 1970s.

However, despite the fact that computer technology is still so primitive in its ability to integrate with the average person's daily tasks, the second generation has made its mark and paved the way for the third. With the arrival of the 1990s, the third generation soon will be fully with us. The third generation will be better educated and more 'affluent' than its predecessors. Some believe it will be literate articulate, and completely

integrated with its human partners in every arena of human endeavor.(Price, 19 : 530-531.)

## 5. TECHNOLOGY AS A SOCIAL FORCE

Throughout history, technology has been pressed onward like a glacier, overturning everything in its way and grinding all opposition into dust. In early nineteenth century England for example, a band of unhappy workers known as Luddites challenged the Industrial Revolution by roaming the countryside smashing machinery and burning factories. From their narrow viewpoint, machines were enemies taking away jobs and freedom and harming people. But the Luddites were soon overcome by the benefits brought by the same machinery they opposed. Their movement failed, much the same as their more modern successors did, such as the glassblower who opposed glassmaking machinery. We know now that they were largely mistaken about the broader significance of industrial technology. Though the Industrial Revolution created new and serious human problems for some people in society, it was a grate advance in the history of civilization.

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## 6. SOCIAL CONSEQUENCES OF TECHNOLOGICAL CHANGE

Technological advances bring both benefits and costs to society over long historical epochs, civilization has been carried to supreme heights of material progress and accomplishment by technology and science. Economic growth-driven by the engine

of technological progress-has conferred wide benefits on humankind: supporting large populations at higher levels of living, extending expected life spans, and expanding a whole range of human potentialities that were the subject of science fiction novels not too ago.

### 1) Social Costs

In the same way that a lifesaving engineering gene may have side effects, technology also has had social side effects, when they are negative, they become social costs. While a nation's political infrastructure lacks the capability to monitor and pass judgment on the overall good or bad impact of every scientific advancement, society values many provide mechanisms that evaluate new technologies. On the political front, courts and legislatures can regulate the use of certain was banned by technologies. When coupled with a mobilization of public constituencies, similar political forces have checked and curbed the use of technology in business.

There are other social costs to technology as well. Pollution, congestion, depleted natural resources, overpopulation, and the use of technology in settings such as developing nations where conditions for safe use may not exist all raise serious questions about the balance between technology and society. Business is an important actor in creating and resolving these dilemmas. Production marketing, and strategic planning decisions should not be made in a vacuum that ignores such social costs. The responsibility of business to current and future stakeholders in society requires careful attention to these costs.

### 2) Biotechnology-A New Frontier

Another good example of the problems and opportunities associated with new scientific and technological breakthroughs is the modern era of genetic engineering, also called

biotechnology. Genetic engineering has a history over a century old, rooted in agriculture. In the nineteenth century the botanist, Gregor Mendel, pioneered the science of genetics. Ever since, genetic scientists have clones and propagated crops that have helped farmers produce more food per acre that is of better quality and less labor-intensive.

The new era of genetic engineering includes new techniques that enable scientists to combine knowledge from various areas of science, such as biochemistry, genetics, microbiology, and ecology. Scientists can now identify and manipulate molecules in genetic material with revolutionary applications in agriculture, medicine, and industry.

One of the biggest worries surrounding biotechnology and genetic engineering is the uncontrolled escape of synthetically developed materials. For example, an engineered bacterium intended to build disease immunity into a plant might also accidentally kill off a beneficial insect.

## 7. BUSINESS APPLIES TECHNOLOGY

As soon as new knowledge exists, people want to apply it in order to reap its benefits. At this point business become important, because business is the principle institution that translates discovery into application for public use. Printing manufacturing, housing, education, and television are all dependent on business activities to make them work productively. Society depends on business to keep the stream of discovery flowing into useful goods and services for all people. Less developed nations have learned that scientific discoveries mean very little to them unless they have competent business systems to produce for their people what science has discovered. In a similar manner, developed nations have learned that an innovative business system helps translate technological developments into useful goods and services for their people.

## 8. SOME ECONOMIC EFFECTS OF TECHNOLOGY

### 1) Higher Productivity

Perhaps the most fundamental effect of technology is greater productivity in terms of quality and quantity. Productive gain is the main reason that most technology is adopted. In a hospital the objective may be qualitative, such as maintaining a life with electronic monitoring equipment regardless of costs. In a factory the goal may be quantitative in terms of more production for less cost. While great strides have been made we are still in the experimental stage of introducing new electronic technologies into the factory.

### 2) More Emphasis on Research and Development

As Technology has advanced, research and development (R&D) has become a giant new ideas, and development concerns their useful appreciation. Effective management of R&D is important because it brings social benefits through increase productivity. With the world's exploding population and the needs of less-developed nations, society requires the material and social gains that R&D can provide. Society also depends on R&D to find ways to reduce pollution and otherwise improve the quality of life( Port, 1989: 15-17).

### 3) Upgraded Job Skills

With the advance of technology, jobs tend to become more intellectual and otherwise upgraded. The job that once required several day laborers now requires a skilled crane operator, and the job that was done by clerk now calls for a computer expert. The nature of technology is that it creates jobs that many people are not yet prepared to fill. The bargain that technology strikes with workers is to take away one job and offer them another one, usually requiring higher ability, for which they may not be

qualified. It places a burden of training and education on the employee, the firm, and the nation. The poorly educated, the aged, and other marginal employees are the first to be isolated, and they usually are the ones least able to adjust. Society faces the immense task of motivating and aiding these persons, for without help they become the long-term unemployed and the “untrainable”

#### 4) More Scientific and Professional Workers

Historically, scientists have worked in small laboratories at their own pace, usually in an academic setting, but more and more they are working for big organizations, both private and public. Most certainly they perform best in a work culture different from that of the assembly line. Creative and intellectual workers—sometimes referred to as “individual contributors”—expect relatively high job freedom. They are motivated by opportunities that offer change, growth and achievement. They are often less motivated by expectations of higher formal authority than by their own professional interests and perceptions of opportunities. Their orientation, toward their professional and the world outside their organization, is cosmopolitan rather than local. Although they are a part of the company work culture, they are just as much a part of a separate scientific culture operating beyond their organization’s boundaries. Under these conditions they may have an organizational rootlessness that tends to increase job mobility.

Business is adjusting its supervisory practices to meet the needs of such knowledge-based workers. Some companies have established dual promotion ladders so that distinguished technical people can rise to ranks receive salaries that are equivalent to those of upper level executives. Flexible work schedules are allowed. Profit sharing is provided to give creative persons a financial stake in the ideas they create and to discourage rootlessness. Attendance at professional meetings

and writing professional articles is supported. In further response to intellectual workers' cosmopolitan interests, they are allowed to teach part time or are given special assignments with schools, colleges, and universities.

### 5) Greater Capital Requirements

Another effect of technology is its insatiable demand for capital. Large amounts of capital are required to build the enormous production systems that save labor time and provide other benefits of technology. At the turn of the century, an investment of \$1,000 for each worker often was adequate in a factory, but modern investments in pipelines and petroleum refining exceed \$ 200,000 for each worker.

Technology is costly but essential for business, thereby creating a problem for managers. The failure to maintain current, up-to-date technology can mean a loss of competitiveness. Both productivity and product quality can suffer. Such expenditures do not tell the entire story however. New technology requires other expenditures to keep the labor force up to date with the machinery and technological changes. This, in turn, requires managers to select their technology carefully, train people properly, and encourage the continuous improvement of employees' understanding about the best ways to make use of technological capability.

## 9. BUSINESS RESPONSIBILITY FOR TECHNOLOGICAL CHANGE

In one important sense, business has only responded to expressed or potential public demands for more and better technology, in a private enterprise society, people register their wants through the marketplace, voting with their purchasing dollars. These free market demands have encouraged business to push greater technological growth through the introduction of

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new products and services. The enormous popularity and demand for today's many electronic inventions-whether video games, videocassettes, pocket calculators, laptop computers, or digital recordings- illustrate the powerful dynamics of combining modern technology with a private enterprise system.

The idea of a broad institutional partnership for humane technological advance belongs in the thinking of business leaders, as well as in the minds action of all those in society who have a stake in the technological future (Frederick, Post, and Davis, 1992)

## 10. RESTRAINTS ON TECHNOLOGICAL GROWTH

### 1) Pollution

Pollution is an unavoidable consequence of industrial production since waste by-products are produced along with useful things. In addition, many useful consumer products (e.g., automobiles) are themselves responsible for much pollution; and sooner or later, all manufactured goods wear out and are discarded as useless. The biosphere-the land, air, water, and natural conditions on which all life on earth depends-can absorb and break down many of these industrial contaminants without harm to people, animals, or plants. But the biosphere is not an infinite sponge, and the buildup of harmful chemicals in the ecosystem poses a threat all life and the planet itself.

### 2) The Industrial Resources Base

A second, closely related factor limiting technological growth is the possible depletion of the world's industrial resource base. This base is composed mainly of minerals, various forms of energy, water supplies, a skilled labor force, and human knowledge. Some studies have questioned whether the globe's supplies of reasonably priced minerals, energy, and water are

sufficient to support unlimited industrial and technological expansion.

### 3) Social Institution

A third factor limiting technology is social values and institutions that may be inconsistent with the full productive potential that is present in technology. Many societies, perhaps most of those that adopt modern technology, encounter similar but less dramatic problems in arriving at a fit between their traditional social institutions and the new trends of technological development.

## 11. SCIENCE AND TECHNOLOGY IN THAILAND: THEN AND NOW

Archeological evidence confirms the realities of life of the prehistoric people who inhabited the region known as Thailand today, and their level of technological development. Artifacts dating as far back as 3000 BC found at Ban Chiang in the Northeast of Thailand show that Thai people used sophisticated methods of rice agriculture, metallurgy and pottery-making. David Wyatt observed in *Thailand: a Short History* that Southeast Asian people had long known, among other things, how to make articles from bronze and copper.

After World War 2, various ideological and political forces prompted governments to implement policies for the pursuit of what has been widely referred to as “development.” Initial schools of thought envisioned a linear and single path to development, or modernization, that involved the mass adoption of Western science and technology. It presumed that Western technology was appropriate for developing countries and that once adopted, those countries would proceed along the same path as Western countries. However, this notion was not always true; it was evident that even though many countries adopted

Western technology they persisted in an underdeveloped state by Western standards. Moreover, it did not explain why some countries developed while others did not. As a result, reactionary schools of thought emerged to assert that technology from the West is inappropriate for developing countries, and that such countries should rather build up an indigenous capability. Yet again, there are examples of countries that followed these inward-looking policies that were not successful in achieving development dictated by Western standards.

However, recent experience suggests that countries require a balance of technologies but also calls into question the notion of development as being defined by Western standards. This may be viewed as part of the globalisation phenomena. In academic circles this has given rise to the questioning of the right of Western intellectuals to speak for humanity. It has also allowed for the emergence of genuine questions about global culture. Ultimately, the globalisation phenomena gives developing countries the opportunity to search out their own goals and definitions of development that derive from their own cultural and social values and norms. Within this global environment, it may be possible for some real “universal” goals of development to emerge that are based not only on Western experiences but which also consider the experiences of non-Western countries (Yuthavong and Wojcik, 1997).

## 12. THAILAND AS PART OF THE “GLOBAL VILLAGE”

It is clear that Thai society is changing rapidly. While several sources of this change are internal, an important part of the change comes from external sources. Internally, change has resulted from such factors as the increase in population, the changing characteristics of employment, and urban migration. External sources may have either direct influence on the society or intermingle with the internal sources to cause a major change. An important factor is the global trend for increased interaction

among societies, caused on the one hand by the trends towards freer trade resulting from multilateral trade agreements, and on the other hand by easier communication resulting from advances in telecommunication and information technology, and transportation in general. The external factors are the same all over the world, and therefore the changes in Thai society are in many ways typical of those taking place in other societies that are open by nature. The openness of the Thai society, combined with traditional advantages in low labour cost and natural resources have attracted outside investment, which is significantly spurring the growth in the economy, but at the same time fueling the rapid changes which are occurring at an increasingly greater pace.

The changes in the mode of production and services in the Thai economy are paralleled by perhaps even greater changes, at the individual level, on the Thai people as consumers. Always receptive to external influence, the Thai people are rapidly and deeply affected by the new waves of change, to the extent that such change may wipe out traditional cultures and unique characteristics of the society. Will the society be transformed from one shaped by its unique history and position in the world, into one with a “universal” culture, monotonously common in the global village? Will a positive situation emerge, whereby the unique society is maintained, but constantly evolving to reap the benefits of globalisation without losing its identity? Science and technology, with both their universal and location-specific characteristics, will have a large role to play in the future transformation of Thailand.

### 13. THE GOOD AND BAD EFFECTS OF SCIENCE AND TECHNOLOGY ON THAI SOCIETY

The trends of change in the Thai society resulting from science and technology have both desirable and undesirable components. Some of the consequences of the development and application of science and technology are direct, as for example

optical fibre links, while others are indirect and result from interactions with other aspects of the society, as in human migration resulting from industrialization. In the attempt to fulfil the vision for Thailand's future, measures should be taken that would as much as possible allow the desirable components to be realized, while at the same time thwart the undesirable components. It may not be possible to achieve the goals completely: some changes will bring both good and bad news together.

For example, information technology will make available both new educational tools and new tools for crime. It is therefore a matter of creating a wholesome balance in development and in the use of science and technology. In order to try to create such a wholesome balance, we might compile a list of desirable and undesirable effects of science and technology in some of the sectorial areas discussed in this book. The tables below contain short lists for industry, agriculture, health and communication. These are general effects for developing countries such as Thailand only, and are subject to exceptions in many specific cases. Nevertheless, they may show some important conclusions for us to set the courses for optimal development.

#### 14. THE PLACE AND ROLE OF SCIENCE AND TECHNOLOGY IN THAI SOCIETY

For a society to have the capability for the development and application of science and technology, it should have a proper attitude towards these important tools. Many people in non-Western countries such as Thailand have the attitude that science and technology have their origins in, and still belong to, the West. This attitude creates alienation towards science and technology. We should look at the facts. The content of science and technology as we know them today owe their origins to the ancient Greeks and the Europeans of the Renaissance era, but we should examine the origin of science and technology, not in terms of content, but in terms of concept

and system. In so doing, we find that science and technology should be the heritage of all mankind, because the essence of science and technology--use of reason, curiosity-generated observation and experimentation, making of tools--are the traits of every human society. Thailand, as well as other civilized societies old and new, possesses this universal trait irrespective of “modern” science and technology. Carl Sagan(1980) used to mention that the scientific world view works so well, explains so much and resonates so harmoniously with the most advanced parts of our brains that in time....virtually every culture on the earth, left to its own devices, would have discovered science.

Science and technology, therefore, do not belong to any particular human society, but are the results of human evolution, especially that of the brain, over more than a million years. The fact that some civilizations made more advances than others in the past few thousand years does not mean that they “invented” science and technology, but simply that the civilizations reached that crucial stage of development. The status of science and technology is in a real sense a major indication of societal achievements. In the broad sense, therefore, scientific culture -- defined as a culture of reason, of systematic investigation, of thinking in conjunction with action, of readiness to be proven wrong -- is a desirable culture for any society. Scientific culture is not the same as science-oriented culture. While a scientific culture has attributes akin to those of the scientific process in the broad sense, a science-oriented culture implies aspirations towards scientific achievements per se. A culture may therefore be scientific without being science-oriented. The status of a scientific culture is much more difficult to discern. This can perhaps be roughly assessed by the reflections in various activities in the society. The scientific culture has innate characteristics, which are reflected in various aspects of the society as might be briefly summarized in the following Table:

Table: The Scientific Culture: Innate Characteristics and  
Outside Reflections(Yuthavong. 1997:137)

Innate Characteristics

Outside Manifestations

Logical and systematic thinking  
Legal system, civil service system

Willingness to consider alternative views/actions  
Political system, administrative system

Unfailing attempt to solve problems  
Planning and development system

Orientation towards concrete actions/experiments  
Work ethic

Appreciation of natural and human beauty  
Environmental management, arts

As these indicators show, Thailand should not be considered a science-oriented society. This has some serious implications concerning the ability to compete in world trade, and measures should therefore be taken to achieve more science orientation in the society. Even more serious is the fact that the Thai society is still a long way from having a scientific culture. Bhikkhu P.A. Payutto(1993), a modern authority on Buddhism observes that Thailand only has a “technology-minded” culture, not a “scientific” culture. It is more attracted by the products of technology, rather than the process of thinking and learning. A re-orientation in the Thai society is needed to achieve a balance,

where science and technology can have an suitable slot, both because of their contributions to material wealth and their spiritual role in human culture.

## CONCLUSION

The rate of technological change-during the past century has been greater than all of the technological advances made in the previous two thousand years. As technology marches on into the twenty-first century, society is presented with the opportunity to capitalize on these innovations and the challenge to utilize technology in a way that reflects society's moral standards. Society must weigh the benefits of technology against its negative side effects to ensure that the mistakes of the past are not repeated so that innovation will continue to improve the quality of life.

However, since science and technology are a part of universal human culture, and at the same time also have many local characteristics, Thai society has a potential to grow its own science and technology, since it is an open society with a tolerant religious and general outlook. Both imported and indigenous science and technology can be important tools, providing development options for all people in the society.

To reiterate here again, science and technology have contributed a great deal to society as a whole. They have, so to say, tremendously improved the quality of life and altered the ways we do things. There are no disputes or doubts about the validity and usefulness of science and technology for human consumption and inventions. However, we must bear in mind that science and technology have some limits per se; they can never answer all problems of human life; they can never reach the bottom of the human mind; they can never go beyond the physical world. In certain cases, science and technology can pose dangers to our own existence and the existence of plants and animals, or even to the universe. In other words, science and

technology are not yet able to correct their own handiwork. To quote Sir Arthur Eddington(1929, p.282), “Science is incapable of leading mankind directly to the truth, or reality as such, it can only leads him to a shadow world of symbols.” Yet to quote Mack Plank(1984, p. 153), “Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature, and, therefore, part of the mystery that we are trying to solve.” So, in the final analysis, what we need is a kind of science and technology that is moderate, appropriate, constructive, and serves to develop understanding for the improvement of human being. We perhaps must radically change our ways of thinking if we are to survive on this planet.