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**Knowledge Creation and Sustainable
Development:
A Collaborative Process between Thai
Local Wisdom and Modern Sciences**

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The Indigo plant is abundant in the northeast region; while in the South, people use another kind of plant to produce blue color. It expresses the skills and craftsmanship of the people who make the textiles. Each piece of the textile also contains history and culture of the people who makes and uses it. It reflects their values and beliefs in the goodness of people and the products they create which is an intrinsic quality no less important than the beauty lying within each handcraft. I, therefore, also extend my gratefulness to all the village people in each case study who were so kind and willing in tirelessly showing and explaining to me their work with cheerful hospitality. A heartfelt thank you for their continuing efforts to nurture Thai culture, for every Thai, without demanding any recognition. To observe dedicated scientists working along side villagers with mutual respect was a quite new experience that enriched the feeling of humanity in caring and sharing beyond oneself despite differences in many ways. This offers examples of creative dialogue from different perspectives using the differences to promote harmony in society. My gratitude extends to the many prominent Thai social thinkers, development practitioners, NGO workers, scientist researchers, NGO workers and villagers for co-creating the innovative mission who helped inspire the investigation of this dissertation.

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INTRODUCTION

a. GLOBAL CONTEXT

a1. Personal Departure: From Mass Communication to Public Communication of Science and Technology (PCST)

With a background in Mass Communication (Chiang Mai University, Thailand – a bachelor of Arts, and Illinois State University, U.S.A. – Master of Science in Communication), I pursued a career in scientific institutions in the of Public Relations Policy and Operations for almost twenty years (1982-2002) – fourteen years at Thailand’s first Science Museum in Bangkok as Head of Public Relations and International Relations, and almost six years at the National Science and Technology Development Agency (NSTDA) as a Public Relations Manager.

The emerging importance of communicating science and technology to the public that expanded more than Public Relations activities called my attention upon the practice of my career. In a little more than a decade, the Public Communication of Science and Technology (PCST) has become an accepted and increasingly specialized field and discipline within the academic realm in Thailand. This imported Western concept of PCST as well as Science and Technology themselves, stimulated me to consider both whether and how PCST could be put into practice in Thai society given that Thai culture and context differ significantly from those of the West.

Participating for the first time in PCST International Network activities in the 4th International Conference on PCST in Melbourne in 1996, I was intrigued to witness the wide range of activities in the field of PCST. I was accepted as a member of the Scientific Committee of PCST International Network in the 6th PCST International Conference in Geneva in 2001 as a correspondent for Thailand. Through this network I have met world scholars and professionals in the field of PCST and discovered the theoretical approach of Professor Pierre Fayard, the initiator of the PCST International Network, on strategies and communication and his focus on cultures and cultures of strategy. Subsequently, in late 2000, I decided to pursue a deeper academic and practical understanding of PCST in Thailand and was accepted as a candidate for doctoral study in the LABORatoire de recherche sur la Communication & l'Information Scientifique et technique– LABCIS, Institut de la COMMunication et des nouvelles TECnologies – ICOMTEC, Université de Poitiers, where Professor Pierre Fayard is the Chair Professor and Director of this research team of the ICOMTEC.

Interestingly, the issue of culture within the practices of Science and Technology and PCST has grown considerably in recent years. The 7th International Conference on PCST, Cape Town, South Africa had the theme of “Science Communication in a Diverse World”. And the 8th PCST held in Barcelona focused on the theme of “Scientific Knowledge and Cultural Diversity”. My personal interest in Asian handicrafts, especially textile led me to volunteer as a coordinator for ASEAN Handicraft Promotion And Development Association (AHPADA) a not-for-profit regional organization attached to the Association of Southeast Asian Nations or ASEAN. Working for

AHPADA, I became more aware and appreciative of the cultural diversity gleaming through the finesse of handicrafts. This was the moment I experienced a strong meeting of the East and the West, or Art and Local Wisdom meeting Science and Technology.

a2. Thailand and the Economic Crisis in 1997

Thailand has enjoyed a certain level of social and economic progress and integrated into the global economy through modernization since 1960s from the time when the first National Economics Development Plan (1961-1965) began. Being an agricultural-based economy, agricultural development in Thailand, was both a synonym for, and a strategy in, the process of rural development during the 1960s and 1970s. Then, it was followed by a shift in the mid-1980s away from agriculture to manufacturing and services sectors.

Throughout the last forty years, Thailand has experienced ups and downs of its economic growth. Starting at 8 percent during the 1960s, the growth in its GDP was gradually reduced to 6.9 percent in the 1970s and 5.3 percent during 1980-1986. Then, the trend moved up again to a historical record of a double-digit growth of 10.7 percent during 1986-1991 before descending again to 7.9 percent during 1986-1996. The economic crisis after that saw Thailand with a negative growth, from 0.40 percent in 1997 to minus 8 percent in 1998 (Hanpongpanth, 2001, Khattiyoes, 2003)).

There were problems in agricultural/rural sector in those periods. Unequal distribution of income and growth among urban and rural communities drove the latter into poverty, and rural development was given top priority since the 1970. Earlier policies on agricultural/rural

development emphasized areas with a high concentration of resource allocation and development potential. It was because agricultural was the mainstay of the majority of the Thai population, and development effort was focus mainly on economic growth. Only from the Fifth Development Plan (1982-1986) that social dimension was officially addressed and integrated into the Plan. Hence, the change of the name – from National Economic Development Plan to National Economic and Social Development Plan.

The government identified rural development as a primary sector in which to target poverty. In the Sixth Plan (1987-1991), the poverty reduction policy addressed income distribution and the development in rural areas. In the Seventh Plan, the poverty issue was incorporated in the policy by enhancing the quality of life, for instance, free medical care program for the poor and education tuition fee waiver scheme as well as other social welfare programs.

These top-down and economic-oriented development efforts from the government together with globalization forced the rural sectors to depend more and more on outside support and to move away from their traditional life style of self-reliance, including their social and cultural values. This problem was also accompanied by the degradation of natural resources and the environment. It was seen that the rural sector was having big problems in itself. However, amid the 1997 crisis, the agricultural and rural sector has demonstrated its innate strength of Thai society to respond to the dire situation in term of increased production and in its ability to absorb high levels of reverse rural-urban migration that could be as high as 1.2 million. This figure represented 16 percent of the country's total unemployment in January 1998 (Hanpongphandh, 2001).

This dissertation takes the point of departure for the study around the “Bursting of the Bubble Economy” in 1997 that its major impact has transpired Thai society in many levels and aspects to decide for the future. For the first time in Thailand’s modern era, the rural community proved without doubt that the strength and the heart of the country are still its rural people and traditional culture. The rural sector was the shock-absorber that welcomed millions of people from the big cities who, having lost their jobs in a sudden and unexpected manner, chose to go back to their home towns and their families. It was there that they could take refuge and find physical and mental comfort.

Though big business in the urban areas had to close down, the rural sector survived due to its richness in natural resources as well as its social capital deeply rooted in the Thai culture. Moreover, it (the rural sector) was able to absorb the influx of great numbers of jobless people. There was no chaos or riots in the country, and demonstrations were peaceful and orderly. In the media, beside the reports and critiques on how the government went about solving the dire situation in the business and financial sectors, stories of how jobless people, together with their families upcountry, tried to make a living out in this new situation were also portrayed. Many turned to activities that their families practiced in everyday life, and perhaps injecting a little more creativity into them. For example, some tried producing bottled fruit juice or snacks from local and indigenous fruits. Some turned to handicrafts such as basketry, weaving and making gift items from silk and cotton. Other simply helped their families with the farming chores. Knowledge in cooking, handicrafts and agriculture was so common in Thai life. This local traditional knowledge was reclaimed

and revitalized out of economic necessity, while the family and community were also healing the minds of their unlucky family members.

The crisis began in the first year of the implementation of the Eighth National Social and Economic Development Plan (1997-2001). So, there was a need to revise the plan in order to deal with the national crisis. It was refocused to citizen participation and was a major step toward the mobilization of people from all walks of life to play a more active role in the process of national development. In the year 2000 Thailand was ranked 47th, or the lowest in term of science and technology competitiveness, by the International Institute for Management Development (IMD). Scientific communities were criticized for their inability to help the country in time of need, forcing them to re-think and re-direct their thoughts and actions.

a3. Turning Crisis into Opportunities for the Grassroots Level: A Revisit to Local Wisdom

At the same time that the government was trying to solve the problems in business and financial sectors, the rural sector was also given more importance. The government began to realize the more potential of the rural sector in absorbing jobless people from the big cities. Various projects were initiated to generate jobs and incomes in the rural sector. For example, the Social Investment Fund (SIF)¹ was a four-year project (1998-2002) funded by a 4.8 billion U.S. dollar loan from the World Bank. The Village Revolving Fund was a national

¹ Social Investment Fund – SIF was born out of the Social Investment Project - SIP that was designed to alleviate social impacts due the economic crisis. SIP was later separated into Social Investment Fund (SIF), and Regional Urban Development Fund (RUDF). The availability of SIP allowed NGOs to acquire fund to create projects aimed at meeting the poor's basic needs.

scheme for a one million baht lending fund to each of around seventy-two thousand villages across Thailand. And the famous government's One Tambon (or sub-district), One Product (OTOP) initiative is another major scheme to promote community or grassroots economy. This OTOP idea was borrowed from Oita – a Japanese village that creates unique products for the village as tourist attraction in order to generate better income among villagers, but adapted to the Thai context at national scale. Later, these innovative efforts will be elaborated on further.

At that point, National Science and Technology Development Agency (NSTDA), the Ministry of Science, Technology and Environment revised its strategy to meet the country's need to promote Small and Medium Enterprises (SME), and helped reform in the public sector as well as the rural sector. It was nothing unusual to see science and technology in collaboration with public and business sectors. But interestingly, in 1997 NSTDA initiated a small task force called "Science and Technology for Rural Community and Sustainable Development Program" in response to the Government's policy that stressed the urgency for developing grassroots economy.

This program saw that Local Wisdom was the key to promote grassroots or community economy. "...A careful input of science and technology could add rationality (to Local Wisdom) and also maintain and nurture it to grow with dignity." (*Report on Research, Development and Engineering for Economic Utilization on Community Economy Development*, National Science and Technology Development Agency, 2002). Local knowledge, widely known as 'indigenous knowledge or IK, has received great attention in the international community beyond the field of social science and

anthropology to development and science and technology. There are many definitions and debates on IK which will be discussed more extensively later in the dissertation. Here is a rather universal one.

The concept of indigenous knowledge or local knowledge (IK) refers to the complete bodies of knowledge, know-how, practices, and representations that are maintained and developed by people with long histories of close interaction with natural environment. These sets of understanding, interpretations and meaning are part of a cultural complex that encompasses language, naming and classification systems, ways of using resources, rituals, spirituality and worldview².

a4. Public Communication of Science and Technology (PCST): Beyond S&T?

A central goal in public communication of science and technology (PCST) is aimed at filling the gap between progress in science and technology on one side and culture and society on the other side. Communicating science to the public is a rather old story in the European cultural patchwork (Fayard, 1994). However, in a less developed country like Thailand, modern science and technology from the West is an imported concept and practice.

At this present moment when Local Wisdom is given high importance, PCST needs to consider the reality of Local Wisdom along side science and technology, in a mutually respectful manner, not trying to convert people to science. This calls for a new way of thinking.

² http://SciDev.net/dossiers/indigenous_knowledge/ikintro

The explicit characteristic of science and technology and the tacit one of Local Wisdom make the task complicated. Nevertheless, new strategy was exemplified by the Farmers First approach³. At the early stages, the efforts were aimed at documenting traditional knowledge in order to use it for more appropriate agricultural extension and sustainable development (Chamber et al., 1989) while showing concern for the environment and the continuation of the development program. Much of the work on communication within the rural context was done by specialists in various disciplines such as development communication, extension, anthropology and education. However, the work was largely concentrated on using indigenous channels such as folk media and social gatherings to promote innovation coming from outsiders (Mundy and Compton, 1995).

³ Concept of Farmers First Approach emphasizes the need to listen and learn from the people and to make local people active partners in the research and development process. This approach appeared in the late 1980s represented a reversal for agricultural researchers and extension bodies that saw failure in their work in low acceptance of the 'new' solution (brought in from outsiders) among farmers. (Roth,G. 2001 <http://www.nuffic.nl/ciran/ikdm/9-3/roth.html> Retrieved 10 December 2004)

b. HYPOTHESIS

The way Local Wisdom (LW) acts as a root and *social engine* for Thailand in facing global challenges and issues linked to the so-called Knowledge-Based Society, and in particular to promote and create operational knowledge originating from local issues and enriching itself with modern science and technology (MST), can be considered an alternative strategy for Public Communication of Science and Technology – PCST in Thailand. From a broader comparative point of view (to be investigated deeper after this doctoral dissertation), this perspective may provide insights and guidelines for other cultures and countries, as well as leading to further study.

b1. Hypothetical Ground of the Dissertation

If we accept the validity of the three PCST global aims as defined by Pierre Fayard (Fayard 1992) namely, *Political, Cognitive and Creative* as follows:

Political: *Bridging the gap between scientific community and lay people in society.* The amount of accumulative knowledge and rapid progress of MST has widened the gap between scientific community and lay people. It is important to get closer scientists (or specialists) and majority or lay people (non-specialists), not limited only to the happy few, in order to share knowledge and power between them.

Cognitive: *Making available specialized knowledge for non-specialized audience.* This second aim is closely linked to the Political one. To achieve the first aim, specialized knowledge of MST has to be made available to non-specialists through accessing and transforming

this knowledge into a useful format that is relevant, and makes sense, to the non-specialist.

Creative: *Empowering people* so that non-specialized people can use “available knowledge” in their everyday life for their purposes and necessities.

Then, it may be possible to conclude that the way LW is presently used in the Thai context, e.g. providing useful operational knowledge, is achieving these three global aims of PCST through the process of Knowledge Creation.

Modern use of LW in the Thai society, especially at the community level, is continually seeking to enrich itself as well as to contribute to MST and modern Thailand in an impressive way. Its achievement in meeting the global aims of PCST can be seen in:

- **Political:** Bringing scientists/specialists and non-specialists (or lay people) within a village community and who comprise a significant majority of the Thai population, to work together in a co-intelligent manner
- **Cognitive:** Creating useful adapted knowledge through access and transformation processes, with questions and solutions originating from and responding to local issues, and
- **Creative:** Enabling or empowering people to use this useful adapted knowledge in their everyday life, and remarkably beyond the context of origin.

Collaborative creative dialogue between modern scientific and technological knowledge (MST) and Thai Local Wisdom (LW), itself originates from a transformation process providing useful adapted knowledge. This movement provides a mechanism for Thailand to

become a Knowledge Society/Knowledge-Based Society, and ultimately promotes Sustainable Development (SD). This mainly *implicit* way of acting might be turned *explicit*, making it possible to issue models and methodologies from analyses of case studies in which this “collaborative dialogue” took place.

Classical PCST strategies to promote scientific culture in order to achieve the global aims, as specified above have been developing in Thailand for less than a decade. However, one can observe another way through which specialized knowledge of MST is available and used by non-specialists in search of solutions of problems and issues in their everyday lives. This different way, or “alternative strategy”, does not appear as a struggle between traditional knowledge (indigenous knowledge – IK or local wisdom – LW) and modern science and technology. It emerges as a creative transformation process, with the outcome of a new knowledge – adapted, operational and useful.

Local Wisdom (LW) plays a major role within this process, not so much as a “capital asset”, or intellectual capital, or knowledge heritage or a sum of knowledge from the past, but mainly as a type of “*method*” to tackle issues within Thai society. Such a “method” has specific values that are rooted within Thai culture. It affects the way Thai people relate among themselves, with nature and the cosmological entity.

For centuries, LW functioned as both social and intellectual capital of Thai people in general – from urban to rural communities. The traditional Thai way of life emphasized knowledge for living and blending with nature. So, LW was reflected in all aspects of Thai life, for example, in the architecture of traditional houses and temples, rice

farming, weaving and dyeing of fabric, production of silk, the use of traditional herbal medicine, and in Thai cuisine. It is a context and geographically specific knowledge generated by local people and relevant to local inhabitants.

Modern Thailand remains predominantly a country of rural communities, where the great majority of its sixty two million people live. Though modernization and globalization have reached even the remote corners of the Kingdom through mass media, transportation, and information and communication technologies – ICT, LW has managed to exist in some forms and activities, despite political marginalization. Its resurgence during the economic crisis in 1997 proved it to be strongly embedded, latent resource within Thai society and culture even in contemporary society.

Not only for democratic logic or economic one but also for its potential to act as the Thai *roots* and *social engine* to transform the community into “Knowledge-Based Society”, LW provides a method and perspective for dealing with local problems and solutions in a collaborative and creative way. It is creative because transformation and new knowledge are required. The characteristics of LW and Thai society and culture, in effect, allow Thai people to be active and take responsibility for their destiny into their own hands. They can benefit from integrating their own knowledge and wisdom with the modern (and alien) one while maintaining their self-confidence, self-respect and other Thai values with a positive outlook to the challenges brought by unrelenting modernization and globalization.

What are the characteristics of Thai society and its culture, especially for ‘village community’? Thai culture values strong family ties and relationships with relatives and friends, as well as

collaboration among, and compassion for, each other. Freedom is also an indispensable dimension of Thai life. So, it means at the same time, self reliance or self dependence (or self dependability) is highly valued. Interdependency (or inter-dependability) sets one free from domination by outside forces when things occur to individuals or the community. Yet, Thai people are peace loving, harmony loving, caring and helpful within strong networking communities. Thai society is also flexible and open-minded, with a unique capacity to accept and benefit from a diversity of cultures.

Seri Phongphit (2003), the President of The Village Community Foundation and an internationally renowned as one of Thailand's prominent social thinkers, stated that the impact of modern development (which was based on an unequal development perspective) caused a great loss to village life, the worst being the loss of self-confidence. Poor people in the countryside were looked down upon as unable to break the vicious circle of 'Ignorant-Poverty-Sickness'. They seemed to go nowhere despite advice and financial assistance from the Government, politicians, academics, business people, and NGOs. They also lost the basic foundation of traditional community life which is the relationship among themselves, their relationship with nature, and that between themselves and supernatural forces. People have lost the spirit of self-dependability and their valuable worldview of living in harmony with others and nature. He believes that going back to the Thai root, using Local Wisdom, being proactive and creative, is the only way for village communities to regain their dignity and the ability to live well in the modern world (Phongphit 2004).

The issue identified in the “culture of strategy”⁴ in Pierre Fayard’s work in 2003 on “Knowing, Acting & Being: Insights about Japanese Culture of Strategy from a Western Approach” is inspiring to look at Japan’s success. An Asian neighbor, Japan succeeded greatly in matching its traditional culture and values with modernity. The fact that Japan and Thailand share the same main influence of Buddhism within their respective societies is a good basis on which to consider applying the Japanese framework of SECI Model of Knowledge Creation and the concept of *Ba* in understanding the Thai context.

The *SECI Model* of Knowledge Creation by Ikujiro Nonaka and the concept of *Ba* introduced by Ikujiro Nonaka and Noburo Konno, interpreted by Pierre Fayard through the enunciation of *Strategic Knowledge Community* (SKC), are applicable to a better understanding of the process and structure of this alternative strategy; one that spawned the enriching and transforming of two different knowledge systems, giving birth to a new adapted one.

Nonaka describes *Knowledge Creation* as a spiraling process occurring through a continuous and dynamic interaction between tacit and explicit knowledge. It can occur at various levels – individual, group, organizational and inter-organizational. Knowledge Creation undergoes a social process of conversion by passing through the four phases of the SECI Model: Socialization, Externalization, Combination and Internalization.

Knowledge Creation processes take place in a shared dynamic context called *ba* (a Japanese word roughly means “place”) which favors the interaction between actors who share common aims. *Ba*

⁴ Culture of strategy refers to a strategy towards Knowledge Society by making explicit comparing of one’s culture to others’ through its interactions with space, time and others in order to fully and inclusively involves oneself and master the situation.

provides a platform for advancing individual and/or collective knowledge. *Ba* voluntarily emerges through care, love, trust, commitment, and mutual respect.

b2. Principle Components of the Hypothesis:

Local Wisdom of Thailand – LW.

Modern Science and Technology – MST.

Public Communication of Science and Technology – PCST.

Ikujiro Nonaka's SECI Model of Knowledge Creation and the Concept of *Ba*

Pierre Fayard's Strategic Knowledge Community Model – SKC

Concept of Co-Intelligent

Knowledge Society, Knowledge-Based Society – KBS

Sustainable Development – SD

Sufficient Economy Philosophy (bestowed by the King of Thailand) – SEP

The Ninth National Economic and Social Development Plan

c. RESEARCH QUESTIONS:

Within the emergence or rising issues of *the Knowledge-Based Society* and *Sustainable Development*, this study seeks to ask questions and to search for answers:

1. To what extent do LW and MST work together within a co-intelligent or a complimentary, fashion without asserting primacy

over one another, towards improving the well-being of Thai people, especially, the rural population who are the majority of Thai society?

2. How can the relevance and mechanisms of public communication in the collaborative processes of LW and MST be identified? Is the potential strong or significant? Given the importance of communication within the collaborative creative dialogue between LW and MST, how to best formulate these processes in order to provide a model for this alternative strategy?

3. What strategy (ies) communication should take to enhance the collaborative processes of knowledge creation, as well as in sharing and disseminating new adapted knowledge?

4. Additionally, to what extent can “the SECI Model for Knowledge Creation”, and “Strategic Knowledge Community – SKC” – a western adaptation and translation to make the concept of *Ba* understandable and available can be adapted to analyze and systematize the spontaneous and planned practices of “collaborative creative dialogues” between LW and MST in favor of development? How are the issues of “sustainable development and knowledge-based society reflected in this transformation process?

Accordingly, the study aims:

- To explore and identify the *role and mechanism of LW* in the collaborative creative dialogue between LW and MST
- To investigate how the SECI Model, the concept of *Ba* and SKC can facilitate the understanding of *co-creation of knowledge* in this collaborative creative dialogue between LW and MST in the Thai context.

- To make explicit an *alternative strategy for PCST* in Thailand taking into account the deep rooted knowledge of LW and its role and mechanism in the Thai society.
- To develop a *communication model* out of this collaborative creative dialogue between LW and MST for a knowledge-based society and sustainable development logics based on the case studies.

d. METHODOLOGY

1. Comparative analysis of nine main case studies will be done using important components specified in the hypothesis section to understand the reality and logic of the collaborative creative dialogue between LW and MST.

2. A “set of criteria” will be proposed in order to analyze and compare case studies, and to identify the different steps and issues of the so-called “collaborative process between LW – as a method, and MST – as a provider of complementary knowledge and also know-how. It is to offer a landscape of interaction between LW and MST. It will guide the investigation to shape each case study in order – as far as possible – to allow comparisons between them and to systematize analysis and recommendations.

3. Collection of data in each case study is seeking for:

- Types of LW and Modern S&T knowledge to match
- What are the needs or problems in a particular LW situation?
- How the needs and problems are identified?

- How the needs are fulfilled and the problems resolved?
- At what moment does modern S&T come in to play a role? Why and how?
- Who makes possible the availability or the access to requisite knowledge?
- Who are the actors in LW and Modern S&T when bridging takes place?
- Is there mediator or “go-between” from either side to make possible the bridging? How does he/she function?
- How is the contribution whether from LW or MST recognized/ rewarded/ or appreciated?
- How is the adapted knowledge practiced and used (for the community-society-nation)?
- How are sharing and disseminating activities performed?

4. Four areas of LW have been selected for the case studies on the basis of richness of the LW component, and plausible integration with MST, in the Thai context. These four areas are: Agriculture and Food, Folk/Traditional Medicine, Handicrafts, and Community Micro Enterprise. Case studies in each area represent the dynamism of LW and MST in the collaborative and transformation processes. It produces new and useful adapted knowledge from local issues. This path and perspective can set a model for other communities and can benefit development of the country as a whole.

5. Every case study will be investigated based on existing projects, by using documents, personal communication (formal and informal) with people involved and relevant to the issues of the study. A certain

number of field trips will be done for observation of the activities and interviews of people in action on location in order to develop insights and inside information. Additionally, follow-up telephone contact will be made as needed

Interviews with policy makers of the government sector, national research institutes and NGOs which work with local communities will be arranged to better understand the country's realities at macro level.

e. CASE STUDIES

I. Agriculture and Food:

1. Rice Varieties Improvement, Pichit Province/ Central
2. Creative Rice Products, Pathumthani Province/ Central
3. Herbal Uses and Integrated Farming, Rayong Province/ East
4. Soil Replenishing "From Sky to Earth Project", Burirum/
Northeast

II. Traditional Medicine:

5. Folk/ Traditional Medicine and Local Healers of Lanna (the North), Chiang Rai Province/North
6. Alternative Medicine and Herbal Product Development of Chaophya Abhaibhubejhr Hospital, Prachinburi/ Central

III. Handicrafts:

7. Indigo Dyed Textile of Mae Theeta, Sakon Nakorn/
Northeast
8. From a Weed to Innovative Furniture, Pathumthani/ Central

IV. Community Enterprise:

9. “Kanom Jeen” Noodle Dough: A Community Micro Enterprise, Nakorn Sri Thammarath/ South

f. DISSERTATION OUTLINE

The introductory section gives the rationale of the study. It also lays out an overview of the study with theoretical and social considerations, hypothesis, research questions, objectives, methodology and a dissertation outline.

The body of the dissertation comprises three main sections: a theoretical and conceptual investigation section, a section for case studies, and a section for comparative analysis with conclusions and recommendations. Altogether, there are five parts and twelve chapters.

Part One reviews Modern Science and Technology (MST) and Public Communication of Science and Technology (PCST) in the global sense and in the context of Thailand. It also explores the arrival and taking root of MST and PCST from the West to Thai society. Strategic, social and cultural issues in PCST in both contexts will also be discussed.

Part Two elaborates on traditional knowledge and its communication within Thailand, taking historical, societal and political dimensions into consideration. It explores various differences in terminology used for traditional knowledge. The resurgence of Local Wisdom (LW), the more widely used term in Thailand, and the different approaches to Local Wisdom are explained.

Part Three focuses on discussion of global concepts of Knowledge Society/ Knowledge-Based Society toward Sustainable Development – all of which are integral in development activities. The frameworks of Knowledge Creation – the *SECI Model*, the concept of *Ba* and the *Strategic Knowledge Community* (SKC) will be explained in order to lay a foundation for these tools in shaping the investigation on the “collaborative process between Local Wisdom and Modern Science & Technology” of the Case Studies in Part Four.

Part Four introduces the nine case studies governed by a set of criteria to enable their analysis and comparison.

Part five offers an analysis, and a conclusion on the condition and factors that would allow collaborative creative dialogue to grow. The role of communication and Public Communication of Science & Technology in all phases of the dialogue process is formulated into a model. Recommendations for Public Communication of Science & Technology - PCST to assume a new, challenging role is given.

PART ONE

Modern Science and Technology (MST) and Public Communication of Science and Technology (PCST) In Global Sense and in Thailand

This part reviews Modern Science and Technology (MST) and Public Communication of Science and Technology (PCST) in the global sense and in the context of Thailand. It also explores the arrival and taking root of MST and PCST from the West to Thai society. Strategic, social and cultural issues in PCST in both contexts will also be discussed.

CHAPTER 1

Modern Science and Technology (MST) and Public Communication of Science and Technology (PCST): the Western Model

This chapter provides a background for understanding the historical and epistemological perspectives of Modern Science and Technology as well as the origin of the Western model of popularization of science and technology.

1. Historical and Epistemological Perspectives of Science and Technology

The word *science* has its origins in the Latin verb *scire*, meaning *to know*. Historically, the inspiration in the quest for knowledge of nature and the universe we live in was based on faith and belief. Natural disasters and natural phenomena kept men in awe and fear of life threatening incidents and unexpected natural phenomena. Religious beliefs provided solace to their frustration that there were gods who took care of the world. Later, science quested for the truth of nature and the universe by theorizing that the laws of nature are immutable and on a premise of cause-and-effect. For example, in ancient times, people believed that there were certain gods in the sky that could cause thunders, storms and heavy rains. They worshiped

these gods and tried to please them in different ways, offerings, ceremonies, and in some cultures even sacrifices, in exchange for their blessing and protection. On the other hand, science tried to find the causes of these natural phenomena – be it, natural electricity, moisture, air pressure, currents in the air and so on.

Originally, both religious belief and science were born out of awe and fascination for nature. What then sets the science of today apart from that credulous and primitive point in ancient religious and super natural beliefs?

In Europe, during the Middle and the Dark Ages, scientific theories and discoveries often resulted in conflicts between the scientific thinkers and religious regimes. For example, Galileo (1564 – 1642), at the age of seventy, was put on trial and almost executed for his theory that the earth revolved around the sun which contradicted Christianity’s teaching of that time. The suppression of inquisitive scientific minds in the Dark Ages gave way in the 16th century to the Renaissance. The engine of the Renaissance was the “scientific methods” which included objectivity, measurability, experimentation, discovery and innovation.

The American Heritage Dictionary (1985) gives the meaning of “scientific method” as *n. The totality of principles and processes regarded as characteristic of or necessary for scientific investigation, including rules for concept formation, conduct of observations and experiments, and validation of hypotheses by observations or experiments.* In this new perspective of the pursuit of knowledge, man could better and more deeply understand nature. To an increasingly extent, man could better predict future events, and even exert control over nature to a certain degree.

From that position of the scientific method of discovery, knowledge was dichotomized into that based on objectivity and that dependent on subjectivity. Objective knowledge tried to take scientists out of the real

world and made them observers looking in from outside. Nature was simplified into dependent and independent variables. Thus, rules of nature were specified in the form of hypothesis, theory, fact and knowledge. The latter type, knowledge based on subjectivity, was called art and humanities. Creativity, purpose and values played the ultimate roles in this domain of human feelings and fine mind (Suwanwela, 2003).

Art and humanities provided its domain of the common or majority of, people in society. This kind of knowledge was flexible and subject to individual interpretation of nature. It tended to be largely bound by cultural and religions. Science was limited to small circles of knowledgeable people who could create new knowledge and access this objective knowledge via the scientific method. Scientific knowledge maintained its essence and existence with provable truth using this scientific method. It was possible for other investigators to ascertain the same truth of scientific explanation. “Scientific knowledge thus rests on the bedrock of empirical testability” (Hunt, 1991). Empirical replication depends on a comparison of objective observations by different researchers studying the phenomenon.

Science chose to find the truth of nature by bits and pieces, or compartmentally. Because it was impossible to take everything into consideration in one study, scientists reduced or eliminated irrelevant factors, this reductionism approach of science was believed to make science efficient (Fayard, 1988). It was a step-by-step acquiring of or producing knowledge of the world by “establishment of generalizations governing the behavior of the world” (Chalmers, 1990).

The two concepts of science embody two different valuations of scientific life and of the purpose of scientific enquiry. According to the first concept, science is above all else an imaginative and exploratory;

activity and the scientist is a person taking part in a great intellectual adventure. The alternative concept suggests that science primarily a critical and analytical activity and the scientist is pre-eminently a person who requires evidence before he or she delivers an opinion. When it comes to evidence, the scientist is hard to please (Medawar, 1990).

In the first concept, truth takes shape in the mind of the observer: it is his imaginative grasp of what might be true that provides the incentive for finding out, so far as he can, what is true.

According to the second concept, truth resides in nature and is to be obtained only through the evidence of the senses: apprehension leads by a direct pathway to comprehension, and the scientist's task is essentially one of the discernment.

Fayard (1988) also points out that "truth" in scientific knowledge is a kind of a map of a territory. What is studied is just a representation or a part of the whole truth which is much bigger. It is not the total reality. In this way, science is only a transitory truth, not the absolute one. Thus, this knowledge can be falsified later with clearer or better evidence. This is in line with Karl Popper's famous "Falsificationism" which states that a theory is scientific not because it has proved its truth but because it offers the chance for observers and other experimenters of proving its falseness. In other words, scientific knowledge progresses by eliminating mistakes and not by an increasing of truths (Popper, 1956).

In science, all knowledge claims are tentative, subject to revision on the basis of new evidence. Although science cannot provide one hundred percent certainty, it is nevertheless the most, if not the only, objective mode of pursuing knowledge (Hunt, 1991, cited in Malhotra 1994). This pursuit is dependent upon the imagination as well as the critical and

analytical skills of the scientist. It is generally accepted that the goal of the pursuit is the discovery of truth.

Preoccupied with experimentation, proving, falsification and other things within the scientific method, scientists separate themselves from the rest of the society. Science becomes a specialized knowledge obtained through specialized methods and rituals within a specialized community (of scientists). Ironically, most people who believe in science may not understand science or the essence of the intellectually scientific process to create this 'knowledge'. Lay people get in touch with science through the application of this knowledge called "technology".

The American Heritage Dictionary (1985) gives a definition of "technology" which most lay people can relate to, as: "1.a. *The application of science, esp. to industrial and commercial objectives.*" From sunrise to sunset and from birth to death, our lives are surrounded by technology which provides modern life with convenience and efficiency in all aspects of our life. However, both science and technology are ingrained not only in the economic realms such as industry, agriculture, health, energy, environment, education, communication and transportation, but also in arts and entertainment.

During the nineteenth and twentieth centuries, scientific discoveries such as electricity, magnetism, and organic chemistry revolutionized innovations in Europe and the United States. At the same time, science and technology showed up in the battle fields of World Wars I and II. WWI was dubbed "the Chemists' War" when Germany introduced the use of chemical weapons. This war shattered the dream of the unification of Europe. Then, WWII found itself at "the Physicists' War" with the use of nuclear bombs, the innovative most destructive weapon ever invented,

used to force Japan to surrender. Afterward came the beginning of “the Cold War” between the United States and Russia.

Attitudes of people after WWII varied with mixed feelings toward science and technology from optimistic and trusting turning into pessimistic and skeptical or even to overtly cynical and oppositional. In some places, science and technology found themselves among public indifference or in the worse scenario, of increasingly outright hostility toward them. However, science and technology continued to develop rapidly. The changing nature of science and technology raised public concern that they did not only solve problems but also created them. For the most part, key concerns were on improving general levels of science education in order to support industrial and economic growth.

Modern science was seen as a product of European culture (Durant, 1994) resulting from the Scientific Revolution in the sixteenth and seventeenth centuries. Thus, “European Enlightenment” gave rise to a “Scientific Culture”. This culture was largely inspired by the striving and achievement of earlier scientific revolutionary generations of great scientists such as Galileo, Descartes and Newton.

Principally, scientific and technological culture, or in short – scientific culture, is the culture born out of European Enlightenment of the eighteenth century. Durant, in his *Public Understanding of Science and Technology: A European Audit* (1994) concluded that *...science and European culture are so intertwined – that it is hard to know how to speak adequately of the one without referring extensively to the other.*

Science became an integral part of the “high culture” of the eighteenth and nineteenth centuries. It was the stuff of polite conversation among the gentry, and it was positively fashionable among the emerging bourgeoisie.

Science in the past was limited within the scientific community who created it and within the circles of scientifically enthused people as such.

Today's science and technology have been constructed on two main values that propel their progress. They epistemologically govern the scientific activities in the search for knowledge; indicating the path and perspective of progress in science and technology:

“Nature is to be mastered”, this Cartesian perspective sees the success of humankind in mastering or conquering nature. This western value is based on the belief that God created humankind to rule the world. God also created nature and all things in nature to serve human needs and desires. Man demystifies nature in order to manage it, and to manipulate it for his benefit. This value is said to be the driving force of western science and technology in outstripping the ancient Asian science and technology of the great Chinese and Indian civilizations¹.

The second value posited that human-beings' happiness depended on consuming material goods; the more, the happier. This materialistic and consumeristic value came along with industrial development. It was essential in western history to overcome natural hardships such as weather conditions and scarcity of food and amenities. These pressing conditions motivated people to find solutions. Hence, to solve problems of unpleasantness and scarcity was to produce material goods in great

¹ Suwanwela (2003) gave in his keynote address on The Unity of Science and Humanity: Lessons from Ancient Asian Science, that “...The science and innovations in ancient Indian and Chinese civilizations are not generally understood and appreciated, even though they preceded the Greek and Roman beginnings of Western scientific development. The intellectual pursuit then was very impressive. Scientific methods were used; critical observation, experimentation, reflection and debates prevailed. For instance, six thousand years ago Aksapada wrote about how to establish the true identity of a fact, and Kasapaya propounded the atomic theory. Sushruta, three thousand years ago used dissection of human cadaver in the study of medicine. Ancient Chinese innovations such as the pictorial Chinese written language which provide communicability among people with different spoken languages could not be surpassed by now ...Science and humanity were holistic views of self and surrounding universe...” (20th Pacific Science Congress, 17-21 March 2003, Bangkok)

quantity to supply these needs. This was to be achieved by mass production through industrialization.

These two values were pointed out and explained by Phra Dhamma Pidok², a Thai monk highly revered for his profound knowledge of Buddhism and society. He pointed out that these two values reinforced each other in that people envisioned that they could exploit nature to serve human needs. According to this perspective, only when man could manipulate nature to overcome the hardships of life and to eliminate scarcity, could everyone enjoy convenience and prosperity (Payutto, 1998). Consequently, science and technology in the past era were in service to industrialization. Presently, the progress of MST allows the human race, in the “Information Era” to move the world at the speed of light.

2. Primary Communication of MST: Its Roles and Devices

Communication comes from the Latin word “Communis”, which means “common”.

When we try to communicate, it means we want to share information or feelings or attitude or whatever in order to establish commonness in that certain matter between us and others.

In this section, the researcher explores the primary roles and devices of communication of scientific and technological knowledge in two main perspectives that give the reason for the birth of Public Communication of Science and Technology (PCST).

² Phra Dhamma Pidok or P. A. Payutto is the first Buddhist monk to receive a world honorary award on “*Education for Peace*” from the UNESCO in 1994.

2.1 Communication within the Scientific Community – From Scientists to Scientists

The main purpose for scientists to communicate among colleagues in the scientific community about science and technology is to give existence of the knowledge newly created. It is to make what he or she has studied and experimented known to others. As Davinci stated centuries ago, Science has to be communicated. Or as a statement in the Yearbook of the College of France (72nd year) wrote, “...No body of knowledge can be formed without a system of communication, registration, accumulation and movement, which is in itself a form of power.”³ Hence, communication plays an important role within science, for the sake of creating power in science. The communicability of science in the scientific community uses specific language, be it biology, physics or chemistry, as well as another device –experimentation. Through the concept of experimentation, they share the same frame of reference and specialized language, ensuring mutual understanding.

When one looks back in time at scientific knowledge creation, it was the product of a collective human enterprise to which scientists made individual contributions which were purified and extended by mutual criticism and intellectual cooperation. Content or knowledge should be “consensible” and should therefore strive to achieve maximum “consensuality” (Marhotra, 1994). A consensible message is one which has the potentiality for eventually contributing to a consensus, and a consensual statement is one which has been fully tested and is universally agreed. Consensibility is a necessary condition for any scientific communication, whereas only a small proportion of the whole body of

³ “Aucun savoir ne se forme sans un systeme de communication, d’enregistrement, d’accumulation, de deplacement, qui est en lui-meme une forme de pouvoir.” Annuaire du College de France (72eme annee), cited in Fayard (1988).

science is definitely consensual at any given moment (Ziman, 1978, cited in Marhotra, 1994).

The argument above visualizes the work of scientific knowledge creation among scientists and within scientific circles. To reach consensus, (or dissension), over a knowledge product, the scientist needs to communicate. When scientists communicate with other scientists they use the same language based on the same frame of reference. They refer to the experiments. In doing so, the receivers can reconstruct the concept discussed in their own mind and understand how the experimentation was done or functioned. Only when the scientists share the same or common language which has one meaning, can they understand, and make themselves understood, within the same community.

The role of scientific institutions is to capitalize, to register, to accumulate, and then, to transmit the knowledge created to give the life or to make it exist. Since knowledge is power, scientific knowledge limits its boundary within scientific community. It locks itself up in a fortress away from the general public. Science in an early age was seen as taking sides with political power leaving the public disqualified and out of their political process (Fayard, 1988).

In this modern era of rapid progress in science and technology, S&T are divided into sub-communities or sub-divisions with more specific specialization, for example, nuclear physics, astrophysics, and nanophysics, etc. Pierre Fayard used to give an example of “neuro-embryogenesis”, and would ask if any lay person could guess what it was all about. So, common language to share or to enable peer review is essential. Scientists have their own ways and means in communicating among themselves, either through working together in a research team, in meetings and conferences, including through their scientific journals or via

academic exchanges in cyberspace. To put it another way, they share a specialized knowledge, with a specialized language and via specialized media within their specialized community.

The development of information and communication technologies (ICT) and communication networks multiply the opportunities for distant interactions. This brings the scientific communities even closer to a global sharing and exchange of knowledge and experiences. ICT and the internet also make possible the accessibility to information at any point on earth (or even in space) and time.

Science also strengthens and enlarges itself by cultivating knowledge among science students and science enthusiasts. Science teachers and scientists have to use this particular, specialized language with their students, and the students have to master the language of science in order to learn. Both sides have to use the same language. The “happy few” (or elite public) who are fascinated by science and so enthusiastically participated to welcome themselves into the world of science have only minor difficulties in getting the message. Scientists can still continue using their specialized language to communicate.

2.2 Outward from the Scientific Community: From Scientist to Non-specialists – A Science Popularization Perspective

Risk is there, when scientists have to communicate outside their community. Receivers may not share the same frame of reference, or the device of “experimentation”. Then, the message can be misinterpreted or misunderstood. This is the main problem in communicating science to the public.

The nineteenth century was, as Schiele (1994) called it, “the golden age of science popularization” for Canada, and might hold true for the United States and for European countries too, as shown by the history of diversified activities in those countries. For many reasons, science made efforts to move closer to the people than ever before. One of the main reasons was the rapid progress and increase of the accumulative knowledge of science during Industrial Revolution. This provided the impetus to foster science education to create a workforce equipped with knowledge and skills in industries as well as a shared vision for the modern and technologically driven world.

At around the same time, in the United States, science and technology were also popularized by scientists with the mode of anti-superstition or to preach “religion of science” (Lewenstien, 1994). It was at the initial stage to have a more rational public. And for as much important purpose, popularization of science and technology aimed to provide details of modern technological world for people who wanted to improve their own skills and employment opportunity. This reinforced American ideology of “self-made man”. The American public was convinced that learning about science and technology provided one common route to self-improvement.

Thus, in the late nineteenth and twentieth centuries, science popularization was increasingly took place in a wider cultural activities, for example, public lectures, conferences, extension or night classes, exhibitions and museums (Lewenstein, 1994; Durant 1994; Schiele, 1994). The initiatives came from scientists; as Durant put it that “the late nineteenth century was the age of the scientist-popularizers”.

Different countries came up with their specific ways and focuses, including unique terms in providing science popularization. Throughout history, governments, the scientific community and educational institutes

were in favor of scientific literacy and pursued persuasive campaigns for appreciation, awareness and understanding in science and technology. Various terms and expressions were used such as: popularization of science or in France the movement for science vulgarization and cultural scientific action (Action Culturelle Scientifique), and scientific culture. In Australia the preferred term was public awareness of science. In the UK, the term “public understanding of science⁴” was used, but for more recent and less ambiguous term is focus on science and society. In Quebec, Canada science popularization was renamed “scientific and technical culture”, and more recent scientific and technological culture. Most recent, in 1989, international collaboration gave rise to an international network on Public Communication of Science and Technology (PCST)⁵ to share experiences and to better the practice among professionals and researchers about PCST from different cultures. To date, PCST is used as a neutral name governing all aspects of any concept and activity in communicating science and technology to various publics.

Presently, communicating scientific and technological knowledge to the public is recognized as a strategic necessity, especially in Europe and North America, because of the increasing and rapid development of science and technology. This recognition together with, humanistic, democratic and intellectual motivations for PCST to play the role in a society though sounds justifiable and generous by itself; it does not ensure the effectiveness or efficiency of the practices to reach the goals.

⁴ Committee on the Public Understanding of Science – COPUS discussed this term in the House of Lord-Science and Technology-Third Report. Sir Robert May called it (public understanding of science) “*a rather backward-looking vision*” It is argued that the words imply a condescending assumption that any difficulties in the relationship between science and society are due to entirely to ignorance and misunderstanding on the part of the public. They found that “...*science and society implies dialogue, in a way that “public understanding of science” does not*”. <http://www.parliament.the-stationery-office.co.uk/cgi-bin/htm> Retrieved 24/11/2000

⁵ The first PCST international conference was held in Poitiers, France. After that a bi-annual conference is organized, the latest one PCST 8th was held in Barcelona, Spain. <http://www.pcnetwork.org>

2.3 Renewal of Scientific Popularization

“It seems that popularization more exists by the intentions of those who are the agents of this popularization, and not by the needs of those who are supposed to receive the impact”.

Baudouin Jurdant,

Reve de science et de culture, Politique d’aujourd’hui, Oct-De.1974⁶

2.3.1 The Motivations

In France, in the 1970s, the movement for scientific culture found itself divided into two basic currents in the renewal of scientific popularization (Fayard 1994). The first current focused on challenging the confiscation of scientific and technological knowledge limited within scientific communities. Knowledge was far reaching for the public; since knowledge was equated with power, so was science. Communication’s social role was to open up the closed circles, in Fayard’s word “fortress”, and allow a dialogue between science and society. In other European and North American countries, the motivation appeared less militant. The second current faced the challenge of the late twentieth century’s rapid pace in scientific and technological progress. These two currents aimed toward widespread sharing of knowledge in order to give power to the public and transform the society.

⁶ “...Il semble que la vulgarization ne doive son existence qu’aux intentions de ceux qui en sont les agents, et non aux besoins de ceux qui sont censés en recevoir l’impact.”

Baudouin Jurdant, p.10, Reve de science et de culture, Politique d’aujourd’hui, oct.- dec. 1974, cited in Fayard, 1988.

Scientific knowledge exists within the scientific community or institutes, or educational institutes, because it is communicated among people in those circles, gaining strength for its existence. They share the same mission or activity or will to search for understanding of nature by using scientific method. References to experimentation allow them to create and share a common language. This common language somehow is far from common in the sense of “ordinary”. It is a specialized language, jargon or lexicon limitedly shared within the scientific community.

In the early period of science popularization which was carried mainly by scientists, enthusiasm to give knowledge to the public was in a direct approach – to transmit. That was based on the assumption that the public lacked scientific knowledge so it had to be filled in with scientific knowledge – the more, the better. Popularization was to simplify and explain a body of scientific and technological knowledge so that it could be understood by non-specialists. This approach, known as “Deficit Model” had a problem in itself, as the quotation above. Because the communicators focused on their own messages and activities, but effectiveness of public communication of science and technology had to be measured at the receiver level.

Aristotle, in his Rhetoric Communication given some three hundred years ago, points that the key factor in communication process is the person at the end of the communication process. People have learned for a long time about communication process but we still have communication problem. Especially, when it comes to science popularization, good intention seems insufficient.

Moreover, the one-way and direct approach of Deficit Model is not only inefficient, but also created a negative reaction called “Perverse Effect” (Fayard, 1992, 1994). It makes the public even more convinced that

science is great, the scientists are so intelligent, and they (the public) know nothing. So, they make a conclusion that science is for smart persons only. They want to avoid science in order not to appear ignorant. The more of popularization, the further it seems to push away the public from science.

2.3.2 The Renewal: the Approach, and the Popularizer

The role of communication now and then is to share knowledge, to enable or empower the public to participate in the transformation of society shaping by the rapid progress of science and technology. It is a way to balance power between scientists and non-specialists.

These necessities without required efficacy open an innovative perspective for the renewal of scientific popularization in two ways: first on the *approach* for the popularization itself, and second on *people* who took the role of popularizers.

Approach:

- *How to give existence to a scientific knowledge outside scientific community by communication without the experimental possibility or the same reference for non-specialists or lay people representing majority of people?*
- *How to move away from traditional communication mentality in scientific popularization – that was, “from those who know to those who don’t know”?*

These two questions share the same goal – to get scientific and technological message across to greater public, not elite public who are already interested in science and always have the means to acquire knowledge and information at their convenience.

On the first question of solving the problem of the absence of experimentation or sharing the same reference with scientists, the proposed strategy is – choosing everyday life situation in order to meet the public on the basis of its own interests and needs for information. The main task is to identify accurate public questions instead of focusing on transmitting the message.

And on the second relative question, this traditional direct approach of scientific popularization, or the “Deficit Model”, rushes the popularizers to start the operation from pre-existing scientific content. The content is mostly designed to promote or celebrate science and technology as they are created by the scientific institutions. Doing so, the popularizers do not pay attention to establishing a “relation” with the public and the distance or gap between scientific community and the public remaining large, or even widened, lending itself to the “Perverse Effect⁷”. Then, the answer to this second question is – to shift to an indirect strategy, to establish a *relation* with the public *first* before providing the contents, taking into account the main task of identifying accurate public questions. Initially, to establish a relation is to learn about the public social dimension, their problems, their needs and their interest.

For the renewal movement, there is an inescapable conclusion – the language and content of the popularizer have to address the real questions the non-specialist is asking and, as far as possible, the experiment. Gaston Bachelard (1967, cited in Fayard, 1994) asserts that “The meaning of the problem is the true sign of a scientific mind. For the scientific mind, all knowledge is answering questions. If there is no question there can be no scientific knowledge.”

⁷ Perverse Effect refers to the impact that science may fascinate people, however, it makes people think that science is meant for only wise people. Consequently, it moves people further from science.

Popularizer:

In the early age of scientific popularization *scientists* themselves made great contributions. There were famous scientists who enjoyed getting closer to the public through their public lectures, writing articles for magazines and newspaper and other public activities. Though in the beginning, much of the effort was aimed at intellectual elites before spreading to the general public. For example, in the second half of the nineteenth century Thomas Huxley and John Tyndall were lecturing both to the gentry and to ordinary working people (Durant, 1994).

In the United States, around the same period, Lewenstein (1994) identifies some activities of scientific popularization that included leading scientists writing clearly and persuasively about science for the public and many other scientific activities based on activities in Great Britain. The emerging needs of science museums in Europe and the U.S. growing out of expanding collections of specimens, and other materials brought homes by active researchers, provided a new opportunity for presenting science to a broader public.

After the Second World War, the Great Britain saw a shift away from the tradition of the “*scientist-popularizers*” towards new forms of “*professional scientific popularizers*” (Durant, 1994). In the Great Britain in 1974, the Association of British Science Writers was established which marked the emergence of professional science popularizers. They performed the function of mediator or “go-between” for the scientific community and the public. Media development such as newspapers, magazines, radio and television provided good opportunities for science journalists, science writers and science broadcasters.

Lewenstein (1994) relates that after the important role played in the scientific and technological achievements in winning the Second World

War, there was public demand for more information about science and technology in the United States. In 1960, the National Association of Science Writers created a new organization – the Council for the Advancement of Science Writing which continues to this day to support a range of activities intended to improve the quality of science journalism.

The emergence of these professional scientific popularizers in both countries grew largely out the field of journalism to – *science journalism*. However, in France the scenario was a bit different. Fayard (1994) explained the innovative way that scientists and journalists tried to transform French society after the Second World War. In response to the militant movement of 1970s, they tried to create a balance of power between the scientists and society as well as to promote of a veritable information culture. Previously, no form of communication to bridge the gap between science and society had existed. Then scientists and journalists deviated in one way or another from their initial vocation ...*scientists turned popularizers, people in communication applying their know-how to subjects they were not familiar with* (just as the scientists were not familiar with communication). He called this synergy *quadruple competence* which allowed them to imagine new practices. It was the moment for *scientific organizers* or *animateurs scientifiques* as central figures in the link between discourse and action in scientific popularization efforts. In that period the French considered that “action” was the main pragmatic innovation and the only way to bridge the gap between scientific and common sense.

3. From Popularization to Public Communication of Science and Technology

To set off on a project with any serious intention to succeed, one must have clear aims or goals. Public communication of science and technology

holds three “political aims” or global goal for PCST, as Fayard (2002) provides, namely: *Political, Cognitive and Creative* ones.

Political: Bridging the gap between the scientific community and non-specialized people. Because the production of specialized knowledge requires specific organization of languages, institutions, practices, ways of verification, etc; the world of scientific production is isolated from the community as a whole. The amount of accumulative knowledge and the rapid progress of MST have widened the gap between scientific communities and lay people. It is important for scientists (or specialists) to get closer to society at large, (to the majority lay people, or non-specialists). Hence, PCST aims to rebuild community links bridging the gap between science and society in order to share knowledge and power between them.

Cognitive: Making available specialized knowledge for non-specialized audiences. PCST seek to make specialized knowledge of MST available to for non-specialized audiences in order to achieve the first aim, the political one. It, then, provides access and facilitates transformation processes of MST knowledge into useful knowledge that is relevant, and makes sense to the non-specialists.

Creative: Empowering or enabling non-specialized people to use available knowledge. PCST strives to foster knowledge and capability in non-specialized audiences. The adapted knowledge should enable or empower so that non-specialized people can use “available knowledge” within their everyday life purposes and necessities.

As science and technology are moving ceaselessly and rapidly, with greater impact on everyday life, public information and education are prerequisites for public participation in the social undertakings of science. Socio-ethical problems are arising and science and technology can no

longer superciliously decide by themselves the direction or perspectives to take. The democratization of society also requires public debates on significance of science and technology for society. Science and technology are no longer able to maintain their authoritative role over what should happen in science and technology for their utilitarian sake. Scientists find themselves increasingly obliged to communicate with different groups of stakeholders in society possessing different levels of knowledge. They have to take into account public interests and concerns about the implications of scientific and technological progress. “Scientific culture” has become a tool to allow people to understand the fast-changing world and to be able to react to the challenges posed by it.

The next chapter will look at the spreading of MST and PCST in a different part of the world – Thailand.

CHAPTER 2

Modern Science and Technology (MST) and Public Communication of Science and Technology (PCST) in Thailand

Since the genesis of so-called “Modern Science and Technology” in the 16th century, modernization has brought both this new knowledge and its products to Thai society. This chapter will investigate its impacts on Thai society from the beginning up to the present era.

1. The Arrival and Rooting of Modern Science and Technology (MST) in Thailand

Considering that Thailand, as an independent nation, has existed for more than a thousand years, the terms “wittayasart” or “science”, and “teknoloyee” or “technology” are relatively new comers to the Thai language – having emerged less than two centuries ago. These new kind of knowledge from the West were modern science and technology that had flourished and made possible the Industrial Revolution in the western world. The gradual adoption of Western science and technology in Thailand dates back to the middle of the 19th century, and was concurrent with the opening up of the Thai economy to the West through trade.

This does not necessarily mean Thailand had no “knowledge” of her own. It is vital to investigate the existing knowledge of the country before and after the arrival of such knowledge from the West. However, local knowledge and its practice in this respect will be discussed in later chapters.

Towards the end of the nineteenth century (during the Chakri Dynasty), a passion for the outward trappings of Western culture manifested itself in Thailand. The country was then known to the outside world as ‘Siam.’⁸ Historically, it was the characteristic of the Thai, especially among the upper classes, to be fascinated with the new and different goods and products from exotic and far away places. For example, in the Ayutthaya period (13th-18th centuries) hand-made Indian textile of exceptional quality were made-to-order, with Thai design using Indian weaving art and painting skills, for royal family and the elites. It was the same for “benjarong”, or “five-colored hand painted porcelain”, which was ordered from China.

Undoubtedly, European commodities that flooded the markets of Bangkok got a warm welcome. After trade treaties were signed with various countries, there was an influx of merchants and missionaries, diplomats, and specialists employed by the government. These foreigners took up residence in the capital and set a highly visible example on everything from dress and food to architecture and interior decoration. However, cognitively western science and technology made a strong impact in the field of medicine. In the reign of King Rama III (1824-1851) western medicine⁹ was reintroduced by missionaries. The effort was

⁸ Siam was changed to “Thailand” in 1939, in the reign of King Rama VII

⁹ In 1504, in the reign of King Narai the Great, western style medicine arrived for the first time in the kingdom with Portuguese merchants. The western style hospital called “Ayutthaya Hospital” was established and administered by a group of French missionaries. All missionaries were banished from the kingdom at the end of Ayutthaya period.

spearheaded by an American physician by the name of Dr. Dan B. Bradley. He introduced, for the first time in the kingdom, the practice of vaccination against smallpox as well as the use of quinine as a cure for malaria.

The reign of King Rama IV (1851-1868) saw an acceleration in the adoption of various aspects of western civilization. The King spent twenty seven years in the monkhood¹⁰ before ascending the throne. This period had given him the chance to read and study widely, not only the Pali scriptures of Buddhism but also western languages, culture and sciences, especially astronomy. King Rama IV or King Mongkut was praised as “The Father of Thai Science”. He precisely calculated the total eclipse in 1868 and predicted well in advance its path and the exact moment of totality. This happened in an era that superstition was prevalent in Thai society at all levels.

King Mongkut also embarked on a whole series of reforms of both the administration and infrastructure, such as building roads, canals and ships. A series of treaties was signed between the King and, first the British in 1855, and then with other western countries. Bangkok became an international capital as embassies, business houses and banks were established. Upon the death of King Mongkut, his son, King Rama V (or King Chulalongkorn, 1868-1910) carried on the task of transforming Siam into a modern, progressive nation.

King Chulalongkorn continued his father’s diplomatic policy towards Europe. His reigns saw the development of postal and telegraph services, railways, and by 1893, tinkling electric trams were running around Bangkok years before they appeared in Europe. The Grand Palace was

¹⁰ As Buddhism is the major religion of Thailand, there is a strong tradition for a man to enter the monkhood once in his lifetime in order to grant merit to his parents. Usually, at the age of 18 years’ old, one will do so. After leaving the monkhood, he is free to marry.

electrified in 1884 and the whole city by 1887. The first modern hospital, “Siriraj Hospital” and the first (modern) medical school within the hospital were established in 1888. He abolished slavery and established ministries in the western style to replace the previous monolithic administration.

This was mainly political, as both King Mongkut and King Chulalongkorn were shrewd rulers who watched with alarm as neighboring countries were colonized by the British, Dutch, and French, often on the pretext that they were “uncivilized” and that internal confusion demanded a European sense of order. To avoid such a fate, they deliberately set out to ‘Westernize Siam’, not only through fundamental reforms in foreign trade and government administration, but also in other ways that affected traditional Thai culture in almost all aspects. The period of these two reigns was so critical and dynamic, with drastic, yet sophisticated changes, but it saw the country safely through the age of imperialism when the Colonial powers carved up Asia on all sides.

After the end of the colonial period and the period after 1930, the world changed dramatically. There were many important events – to mention but a few, the Great Depression, the Second World War, decolonization, the Cold War, the Vietnam War, oil crises, the revival of world markets, and globalization of production and finance.

After the Second World War, there was an urgent need to reconstruct countries devastated by the war as well as countries that had suffered indirectly impacts from it. International organizations such as the World Bank (or International Bank for Reconstruction and Development) and the United Nations were established in 1945 for the purpose of economic reconstruction and development, and there were many others. Development was measured by the state of industrialization to produce ‘economic growth’ for national prosperity. For this kind of development,

science and technology were (and still are) driving forces. Thailand participated in this international trend of development as one of the “underdeveloped or developing nations”, or in the “Third World” group.

From the 1950s to the 1970s, Thailand received a great deal of American economic and financial aid, advice, training and education. Many high ranking government military officials and even businessmen were trained and educated in the United States.

Even in this new millennium, Thailand is striving to keep up with the world as modernization and globalization have swept over her.

While modern international science and technology gave rise to both new products and new knowledge, the open nature of Thai society allowed almost unlimited introduction of these new products, regulated only by market forces. However, the introduction of new knowledge is limited by the lack of skilled local personnel capable of acting as the transfer agents, and by underdeveloped infrastructure. This imposed an imbalance in the import into Thai society of science and technology *knowledge* versus science and technology *products* (Yuthawong, 1997).

2. Development of MST and PCST in Thailand

Fayard (1994) stated that “scientific culture” was a strategic tool that could be used to understand the world and react to the challenges it presents. He continued that “...This means making an effort to understand how other people “do science”, how they popularize it and what it tells us about the way they perceive science and technology in their society”. In the previous chapter, the author provided the landscape of scientific activities in some of the main countries in Europe and in the United States. The reader may conclude that modern science and technology is the

product of European culture. In order to facilitate understanding of scientific culture in Thailand, the author will use the above framework, hoping to shed some light on it.

How does the Thai society do science?: In Thailand, MST has been an imported concept, alien to traditional Thai life. Considered in a broad sense, science and technology are the constitution of knowledge about nature and about how to apply the principles of nature for human benefit. In this sense, Thailand has had “science and technology” all through its history, although in form different from today’s modern science and technology.

The development of MST in Thailand has been trying to follow the trend in the west. However, past the governments did not make a serious effort to build the capacity of MST among local (native) personnel or consider local needs and necessities. Investment in R, D&E was considered a luxury for a developing country like Thailand. This was the normal mentality in the past in other developing countries, too, as the report on *Building Scientific Capacity: A TWAS Perspective* wrote: “...Indeed the prevailing belief was that developing countries would be foolish to invest a great deal of money in the development of science and technology because it would be more efficient to purchase already existing technology that had been developed in the North. Science, in short, was viewed as a luxury that developing countries could not afford”. Today this perception has been largely discredited. Developing nations have learned that technologies produced elsewhere may not serve their needs and that efforts to create their own appropriate technologies depend, in large measure, on their

ability to nurture strong vigorous scientific communities at home (TWAS report on Building Scientific Capacity: A TWAS Perspective, 2004).¹¹

Being ranked 47th, or the lowest in the year 2000, in terms of science and technology competitiveness by International Institute for Management Development (IMD), Thailand took this as a sign that it needed more commitment from the Thai government and scientific communities to adjust its national policy and National Social and Economic plan (it occurred during the Eighth Plan 1996-2001).

The current Ninth Plan (2002-2006) sees science and technology development as one of seven strategies. It points out the undesirable factors or conditions inherent in Thai society and culture that pose social and economic problems. Among them are: superstitious beliefs and being without proper reasoning or rationality. Its openness to the influx of imported cultures as well as technologies renders Thai society a “consumer-at-convenience” lacking its own effort for local creativity and innovation.

In coping with these undesirable characteristics, the Ninth Plan makes various recommendations. Besides education system reform, Thailand needs to put more effort in promoting awareness and understanding of science and technology among youth and the public. This can be done through activities that encourage youth and the public participation in their communities. Diffusion of science and technology knowledge and

¹¹ TWAS – Third World Academy of Sciences, has changed its name to the Academy of Sciences for the Developing World. Its acronym and mandate to recognize and reward scientific excellence in the South still remain the same. Jacob Palis, TWAS Secretary General, and the Academy’s founders explained that they had no intention of hiding the source of their concern and inspiration. But today the world is different. The term ‘third world’ made sense twenty years ago. But since ‘the second world’ (countries that belonged to the former Soviet bloc) no longer exists, ‘the third world’ no longer reflects the current global situation, hence the change to new name.
<http://www.twas.org> , retrieved 10 January 2005.

advancement through mass media, is recommended to obtain a wider reach as well as more emphasis on both quality and quantity.

The government is assisting existing scientific institutes in building their capabilities through R, D &E via increased budget allocation. For example, the National Science and Technology Development Agency's (NSTDA)¹² budget on R, D&E has increased to 2,226 million baht in 2003 in comparison to 1,989.3 million baht in the year 2000. (See detailed charts in Annex). In 2003, the Ministry of Science and Technology established a new organization called the National Innovation Agency (NIA)¹³ in order to leverage technological and innovation capability by facilitating collaboration among governmental and private organizations using technical and financial assistance to induce networking of enterprises. In 2004 the National Nanotechnology Center was established as the newest member of NSTDA.

There is growing interest from the public themselves in the positive development of Thai society, and science and technology are among factors they believe to provide that condition. In 1999, the Ministry of Science and Technology held for the first time, "Public Congress on Science and Technology 2020" to have public opinion and to learn about public expectation for future development in science and technology. More than one thousand participants from every walk of life were invited to brainstorm for a vision of Thailand in the year 2020. Their proposed recommendations to prepare for the desired future of the country included:

¹² National Science and Technology Development Agency (NSTDA) was established by the Act of Scientific and Technological Development of 1991. It has been chartered under the Ministry of Science and Technology and operates autonomously through the guidance and policies of its governing board. Presently, NSTDA consists of five main units which are: the Central Office, the National Center for Genetic Engineering and Biotechnology (BIOTEC), the National Metal and Materials Technology Center (MTEC), the National Electronics and Computer Technology Center (NECTEC) and the National Nanotechnology Center (NANOTEC).

¹³ National Innovation Agency (NIA) was originally the initiative of NSTDA. Presently, it is an autonomous agency attached to the Ministry of Science and Technology.

- People should have accessibility to relevant and accurate information and knowledge to meet their needs and demand in a timely fashion.
- Thailand should be self-reliant in technology grown out of local resources.
- Thailand should be able to use her own science and technology, and use science and technology to leverage indigenous technology and local wisdom.
- The government should promote scientific and logical thinking and action by the Thai people

The Ministry of Science and Technology, together with NSTDA as a secretariat, has offered this kind of public congress on science and technology every two years. Obviously, it is increasingly important that lay people, or non-specialists, should be able to understand aspects of science and technology that touch their life. Scientific communities should find ways to allow economic planners and the whole society to benefit from their expertise and knowledge. Communicating scientific and technological information to and for the public must become a national agenda.

The impact of the economic crisis over the past eight years has redirected the vision of Thailand in all aspects, including MST development and the resurgence of Local Wisdom or local traditional knowledge. Certainly, the country needs to be more self-reliant, and less dependent, on imported technology. At the same time, she has to balance the integration of locally developed science and technology and Local Wisdom with ‘imported’ western science and technology.

How does the Thai society popularize science and technology?:
 Popularization of scientific and technological knowledge in various forms

has been performed throughout the country for a long time. However, those activities have never been labeled PUS, PAS, or PCST, terms unfamiliar to Thai people. The “Public Relations” model appears to be the dominant practice whether executed by the government or private organizations. This model focuses on the outcome of good corporate image. Within the past few years more effort has been made to provide knowledge of science and technology through different programs. However, they are mainly in the direction of the “Deficit Model” or direct strategy – from “the ones who knows” to “the ones who don’t know”, regardless of whether the public want to know or not.

Popularization of modern science and technology in Thailand can be dated back to 1868. King Rama IV (1851-1868) ordered that messengers announce to his citizen his confidence in calculating the prediction on the phenomenon of the total eclipse of the sun to be seen on 18th August, 1868, at Wagaw sub-district, Prajuab Kireekhan Province. He aim was to show them that the total eclipse of the sun was merely a natural phenomenon, nothing to be afraid of. It was a remarkable point in history because in the old days Thai people were superstitious and held strong super natural beliefs. In the reign of King Rama V (1868-1910), there was a visit of a comet. Usually, in ancient times the visit of a comet was considered an omen of bad luck for Thai people. To prevent chaos and to lessen public worries, the King provided them with knowledge via public announcements to help them to understand the event scientifically and not to panic.

A foremost step in the modern formal national effort in science popularization was the declaration of the National Science Day on 18th August 1983. It was to commemorate King Rama IV (1851-1868) who was praised as “Father of Thai Science” for his proficiency in mathematics

and astronomy in calculating of the total solar eclipse in Thailand some 115 years earlier. Later, the government designated 18th -24th August as National Science Week. This week is celebrated with science festivals all over the country. The activities, however, follow the model of science week and science festival in the western countries.

The Center for Educational Museums,¹⁴ the site of the first Science Museum was established in 1975 under the supervision of the Non-Formal Education Department (NFE), the Ministry of Education. Later, this first Science Museum changed to a Science Center. During 1992-2004, NFE established another twelve science centers at regional and provincial levels across the countries. Another place in the field of science museums was initiated by the Ministry of Science and Technology in 2000 when the National Science Museum was opened to the public. The Ministry plans to open more such regional museums around the country.

Scientific institutions have increasingly recognized the necessity to communicate and educate the public about their sciences. They initiate various programs that go beyond the communication objectives of PR. There are also foundations and associations on science and technology established as part of efforts to have academic peers gather to popularize their works and diffuse relevant knowledge beneficial to society.

For example, there is the Science Society of Thailand, and attached to the Science Society of Thailand are the Science Writers and Publishers Forum and the Science Communication Section, as well as the Thai Academy of Science and Technology Foundation. National Science and Technology Development Agency was the first public agency to initiate “Public

¹⁴ Center for Educational Museums has changed its mission to focus only two main services, the science center, and the planetarium since 1995. After that, its name was changed to “National Science Center for Education”

Understanding of Science, Technology and Innovation Program”, which later grew into a permanent department.

Science communication was formally addressed as a practice, or discipline among academics for the first time in 1998 when Chulalongkorn University, in Bangkok offered Science Communication as an elective subject for undergraduate students. It is also working on offering a Science Communication Program at Master’s degree level. Naresuan University, in Phitsanulok, a regional university famous for technical studies in many areas of science and technology opened its graduate program in Science Communication in 2003.

Private sector firms such as oil and telecommunication companies have shown their interests in supporting science activities, especially for youth because it promotes a good image of corporate social responsibility. They are a good resource for seeking funding of scientific activities and campaigns. Non-Governmental Organizations or NGOs, are also playing an increasingly role in campaigns concerning environmental issues and socio-ethical issues of science and technology putting their activities in conflict with the government or relevant business enterprises. They receive most of their funding from abroad. This fact arouses suspicion and criticism that they serve foreign interest rather than act for the benefit of the country. NGO conflicts with the government on science and technology related issues are regarded as an obstacle to development.

The media have been recognized for their important roles in communicating science to the public on global issues like Y2K, GMOs, Mad-Cow Disease, Green House Effects, and AIDS, as well as other topics raised by globalization. As there have never been professional science journalists or science reporters before, some civic scientists recognize the need for closer cooperation with them in the hope of “enabling the media

to report accurately and encouraging more space and time for scientific news and information for the public”. Generally, science reporters do not have science background, or training in science communication practice. Reporting tends to focus on political aspect of the issue rather than the matter of science itself. Problems between the local scientific community and the media are not different from those occurring in the west, but the problems are even serious and persistent, because there is no structure or policy to encourage the interaction between them.

The report on “The Role of Science and Basic Research to the Future of Thailand” by Montri Chulawattanatol (1999), a professor in Chemistry and renowned Outstanding Scientist of Thailand, showed that for more than a decade Thai people have been interested in science. However, the respondents in the study stated that there was not enough coverage and dissemination of information on science and technology. They felt that science did not sufficiently assume its important role in the development of the country and was somehow mildly degrading of the Thai society. They saw that Thai people depended and consumed products of technology in great quantity, but had no knowledge of science and technology involved in the products.

The recommendations from 530 respondents participating in the discussion group on foreseeing the role of science and basic research to the future of Thailand in this same study showed that they wanted scientists/researchers and the media to communicate with society regularly and accurately in order to allow the public to be well-informed regarding research work that could benefit society and also the new technology’s pros and cons. They urged the government to promote public understanding of science and to develop efficient monitoring system on public understanding of science. The public believes that every part of

society shares responsibilities for the future development of Thai science and technology.

The Report on Building Scientific Capability in Developing Nations (2004), in the “Science and the Public” section shares the same view:

Action Point: Science for all is a conviction that should motivate governments, voluntary organizations, educators and scientists alike to ensure that the message of science reaches every human being, including policy makers and politicians.

(TWAS Report 2004)

How does the Thai society perceive science and technology?: For a society to have the capability for the development and application of science and technology, it should have a proper attitude toward these important tools. Thailand and many other non-western countries have the attitude that modern science and technology have their origins in, and still belong to the West. This attitude creates alienation from science and technology. TWAS also points out that for science and technology to be used wisely and effectively, everyone, children and adults, the educated and the illiterate, the public, politicians and policy makers must have an appreciation of science and its power to transform the quality of life.

In Chapter One, the importance and relevance of promoting “Scientific Culture” within the western countries was discussed. It is clearly apparent that it (scientific culture) is ingrained or embedded within that society because of the origin and history. However, if one looks at science and technology in terms of a concept and system which focuses on the use of reasoning, curiosity-generated observation and experimentations in a systematic investigation, of thinking in conjunction with action, of

readiness to be proven wrong, one sees that Thai society is still a long way from having scientific culture.

Phra Dhamma Pidok, a highly respected Buddhist monk, 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 in the scientific perspective (Yuthavong, 1997). This statement still holds true today judging from the reflections of many parties concerned with the future of Thai society. Many prominent social thinkers see Thai society as submerged and drifting along with the strong currents of modernization and globalization that are inevitably tagged with diffused concepts of capitalism and consumerism.

In conclusion, Thailand has recognized MST as a key role in the development of the country in the past decade, despite the low level of scientific culture within Thai society. Awareness, understanding and appreciation of the contributions of MST to society definitely need to be widely communicated to various stakeholders in the society.

Abdus Salam, the founder of the Abdus Salam International Centre for Theoretical Physics (ICTP) gave his opinion in 1988:

“...The globe of ours is inhabited by two distinct species of humans – the developed and the developing. What is it that makes these two species of humans? Is it color, creed or religions? Is it cultural heritage?

The answer in all cases is NO. What distinguishes one species from the other is the ambition, the empowerment and the élan, which basically stems from their differing mastery and utilization of present-day science and technology”.

(cited in TWAS Report 2004)

The same report summarizes that today's world consists of 192 countries, of which fewer than forty are classed as 'developed' countries in which people enjoy high standards of personal health and wealth. Moreover, the level of development in terms of the economic well-being and the health of its population of the majority of the remaining one hundred fifty or so nations, many of which are located in the South, vary widely.

The summary also pays high attention to the Millennium Development Goals (MDG) announced by the United Nations in 2000. These MDG call for the elimination or reduction of poverty and hunger, universal education, gender equality, improving the health of mothers and children, combating diseases, sustainable use of environmental resources, and development of fair and open trading regulations and global partnerships (www.un.org/millenniumgoals). And TWAS sees that "the only viable and proven way to achieve these Millennium Development Goals is through the application of science and technology".

Everything has its price; so too MST. Presently, the world has seen the negative impact of science and technology, especially in the social and environmental issues. Many instance of MST, though having good intentions, have had unforeseen outcomes. Certainly, science and technology when judiciously applied can provide a way for achieving the United Nations' Millennium Development Goals. However, in order to 'judiciously apply' sound judgment on the use of MST in development efforts or programs, social and cultural issues have to be taken into account, especially in the democratic environment of any country in which public participation and decision is encouraged.

3. Social and Cultural Issues of PCST in Thai Society

This study posits that Thailand, as one of the developing nations agrees with a large part of the above discourse, but not totally. This rationale is based on the awareness of the social and cultural differences of the West and Thailand. It is more reasonable and beneficial to allow the synergy of available knowledge systems in each society to enter a collaborative process rather than to eliminate either one. This open perspective will affect the way PCST adapts itself in responding to the uniqueness of Thai society so as to achieve its global political aims.

Fayard (2002) concurs that though modern science and technology are global, when it comes to public communication of science and technology, the local and cultural dimensions play a major role. History has shown that when a society evolves, changes occur in the ways of producing scientific knowledge and the availability of communication tools, and as a consequence, ways of doing PCST change, too.

PCST would do well to find a new challenge that would be useful in putting itself to a test in the Thai context where science and technology are needed in a different manner than in the West, and in the past.

The next chapter will look at the traditional knowledge embedded in the Thai society since the establishment of the nation, long before the arrival of modern knowledge of science and technology. It will also provide some insights on how modern science and technology have affected the local knowledge system of Thai society.

PART TWO

Traditional Knowledge and Its Communication Within Thai Society: A Historical Perspective

CHAPTER 3

Traditional Knowledge Issues in Thai Society

This chapter deals with establishing a background for understanding how the Thais have lived, and explaining features that influenced their way of life from before modernization and globalization through their entry into these unavoidable contemporary currents.

These historical and cultural perspectives on the Thai nation and its people will provide insights into the role of knowledge in Thai society, be it traditional or modern. Thailand is the only country in Southeast Asia that was never colonized and it has never suffered revolutions, or civil wars, like its neighbors. This fact is a remarkable indication that Thailand has adeptly managed to face historical the challenges and issues and to maintain its sovereignty and national characteristics until the present day.

The first section gives a history of the founding of the Thai nation. The next section presents religious and cultural influences on traditional knowledge that shaped the way – individuals lived, worked, assumed social roles and sustained the uniqueness of being Thai through out history. The last section will offer an investigation of

traditional knowledge within Thai society prior to the arrival of modern knowledge, including how later, modern western knowledge penetrated Thai society and its impact on the economic, social and cultural dimensions of the country.

1. History and Geography of Thailand

Historically, the birth of the Thai nation took place with the establishment of the kingdom of Sukhothai or “Dawn of Happiness” in 1238 A.D. in a land of ancient settlements belonging to other ethnic groups. Archeological findings during the 1960s at Ban Chiang in northeastern Thailand, unearthed settlements that flourished over three millennia before Christ. Evidence pointed to a remarkably sophisticated society practicing animal husbandry, plant cultivation, pottery and metal work. However, the fate of these ancient indigenous people is unknown.

Equidistant between the great ancient civilizations of China and India, the rich lands of Thailand called “Suvannabhumi” or the “Golden Land”, attracted various ethnic groups from many points. One of them that arrived and settled in the land from the fifth till the ninth century, before the arrival of the Thais, was the Mons from the north-east India. They were the first to establish an organized state in the Chao Phaya Valley at Nakhon Pathom – in the central plains of the country. They are believed to be the first to adopt the Buddhist doctrine. Later, from the tenth to the twelfth centuries, the Khmers displaced the Mons. They advanced throughout the northeast of Thailand and eventually settled at Lopburi to the northeast of Nakhon Pathom.

Later both Mon and Khmer were under the influence of India. The Indian brought along their court Brahmins, and their rituals which were welcome by the Khmer royalty. Both the Mon and Khmer developed sophisticated irrigation and cultivation methods using great rivers to water the paddy fields. These methods were afterward to be adapted to great advantage by the Thais. The Thais also inherited the cultural legacy of Mons and Khmers including Brahmanism and the concept of a god-king.

Meanwhile, the Thais were migrating south from southern China and establishing their own principalities in the north. By the thirteenth century the Thais had become a strong force ruling from the north to the central plains and southward to Nakhon Sri Thammarath. After fighting with the Khmer empire, Thai princes founded an independent kingdom at Sukhothai. It was a flourishing kingdom at the junction of the Yom and Nan Rivers which flowed onto the central plains. It was at this point in time that the Thai alphabet was developed and Buddhism was consolidated as the national religion. It was a period of peace and prosperity as the stone inscription from this period recorded that ... *nai naam me pla, nai na me khaow* or "...in the water there is fish; in the field there is rice. And *kraii krai ka chang, ka; kraii krai ka ma, ka*, or "one who wants to sell elephants, one can do it, and one who wants to sell horses, one can do it."

Geographically, Thailand is strategically situated in the heart of Southeast Asia and is a gateway to Indochina. Thailand borders Laos in the north and northeast; Myanmar in the north and west; the Andaman Sea in the west; Cambodia and the Gulf of Thailand in the east; and Malaysia in the South.

2. Religious and Cultural Influences on the Thai Life

Through its long history, Thailand's cultural values have been influenced not only by Buddhism¹ but also by many other religions and sects existing in the region before the advent of the Thai kingdom such as Animism, Brahmanism and Hinduism.

Buddhism: Originating in India, Buddhism gradually spread throughout Asia. The history of Buddhism cannot be separated from the history of Eastern culture and Eastern society (the same as science and technology in Western culture). Of all the influences that molded the culture of Asia, Buddhism was the most profound. For more than 2,500 years Buddhist principles and ideas have colored the thoughts and the feelings of the people of the East (Piyatassi Thera, 2000).

Many researchers believe that to gain a true insight into the Thai culture, character and worldview require recognizing Buddhism as the key determining factor in Thai cultural development (Burapharat, 2003, citing Blanchard, 1958; Klausner, 1987; Mole, 1973).

There are two main sects of Buddhism in Thailand²: the *Theravada* and the *Mahayana*. Buddhism first appeared in what is today Thailand around the third century BC when missionaries of the Theravada sect

¹ Main documents and information on Buddhism are mainly from these sources:

- Piyadassi Thera. 2000 Buddhism: "A Living Message" World Class Publishing Co.,Ltd. Bangkok
- Payutto, P.A. 2001 Buddhadhamma (The First Edition) Dhamma Sapha Publishing. Bangkok
- Phongphit, S. 1988 *Religion in a Changing Society: Buddhism, Reform and the Role of Monks in Community Development in Thailand*. Hong Kong: Arena Press.
- Personal communication with Wacharee Phanwuthikorn, a teacher of Theravada Buddhism (2004-2005).
- <http://en.wikipedia.org/wiki/Buddhism> Retrieved 5/2/2005.
- <http://www.buddhanetz.org> Retrieved 5 October 2004

² Wikipedia provides information of Buddhism by Country. It presents the percentage of Buddhist population of each country by gathering data and statistic from various sources such as US State Department's International Freedom Report 2004, CIA Factbook, and from www.census.gov (2005). It estimates that in 2005 Thailand with the population of 65,444,371, has the percentage of Buddhists at 94%, resulting in the number of Buddhists at 61,517,708.

were sent by the Indian Emperor Asoka to preach the faith in this land. Much later – Mahayana, the other major Buddhist sect, was also introduced but is found in only a few places.

Theravada Buddhism (the teaching of the elders, or the established form) has been the dominant spiritual force in Thailand since its adoption by the kings of Sukhothai. It is at the core of the tolerance that has characterized Thai history, has played a major part in molding the national character, and is seamlessly woven into the people's lives.

Buddhism eventually faded in India but not before it had taken root in Ceylon (Sri Lanka). Meanwhile pilgrims traveled north through Tibet and China spreading the word. Here it developed into the more elaborated Mahayana which relies on ritual and the concept of the Bodhisatva, an enlightened being who chooses to help those still suffering in ignorance rather than entering Nirvana.

The Thai people in general do not distinguish too much between these two sects of Buddhism. Primarily, Buddhist principles have influenced Thai intellectual thought and encouraged scientific inquiry into the nature of things. Phongphit (1988) sees that Buddhism was transmitted to Thailand not as 'pure' philosophy, but as a way of life with concrete cultural expressions. Unfortunately, in the modern era, the essence or principles of Buddhism is receiving less attention than the traditions and its forms of art and architecture.

Buddhist morality is underpinned by the principles of harmlessness and moderation. Mental training focuses on moral discipline (*sila*), meditative concentration (*samadhi*), and wisdom (prajna or panna). The highest freedom is attained only through self-realization and self-awakening to Truth. Self-realization can come only to one who is free to think out his own problems without let or hindrance. It is a way of

moral, spiritual and intellectual training leading to complete freedom of mind.

Buddhism advocates the search for truth³, but not as just speculative reasoning, or theoretical structure, or the mere acquiring and storing of knowledge. It emphasizes the practical aspect of the teaching – the application of knowledge to life, looking into life not merely at it. Wisdom gained by understanding and development of the qualities of mind and heart is wisdom par excellence. It is a saving knowledge.

In the world's history, Buddhism is the first teaching that deliverance can be attained independently of an external agency, that deliverance from suffering, conflicts of life or unsatisfactory, must be eliminated and approached by each individual himself through his own action. The Buddha is only a teacher who points the way and guides the followers to their individual deliverance. Piyadassi Thera (2000) makes any analogy regarding this aspect of Buddhism as being like a sign board at a crossroad, it indicates directions but it is left to the wayfarer to tread along the way watching his steps. The board certainly will not take him to his desired destination without his own effort to progress.

Accordingly, the attainment of deliverance is to follow the Noble Eightfold Path which consists of:

1. Right Understanding of the Four Noble Truths
2. Right Thinking, following the right path in life

³ Buddha, after his Enlightenment, began to preach what he had learned, starting with the Four Noble Truths. They may be simply describes as:

- Dukkha: The reality and universality of suffering. Suffering has many causes such as loss, sickness, pain, failure, and the impermanence of pleasure.
- Samudaya: The cause of suffering which is attachment or desire rooted in ignorance.
- Nirodha: Suffering ceases with the final liberation of Nirvana. The mind experiences complete freedom, liberation and non-attachment. It lets go of any desire or craving.
- Marga: There is a path that leads out of suffering, known as the Noble Eightfold Path.

3. Right Speech, no lying, criticism, condemning, harsh language
4. Right Action or Conduct by following the Five Precepts⁴
5. Right Livelihood by supporting oneself without harming others
6. Right Effort by promoting good thoughts and conquering evil thoughts
7. Right Mindfulness or Consciousness by becoming more aware of one's body, mind and feelings
8. Right Concentration by meditation to achieve a higher state of consciousness

In Buddhism, consciousness and meditation cannot be separated, as seen through the word “*karn chareon sati*” – the practice for the development of consciousness or mindfulness which implies concentrating continually on one's own consciousness. This effort will allow one to see more clearly into a situation and internal states (of the mind) in dealing with what is happening, and how one should react taking into account the reality of the situation, other people and one's own feelings (in order to maintain one's equilibrium of action and mind).

From practical Buddhist's viewpoint, the mind or consciousness is the most important factor in people's self-development. One's behavior is controlled by that person's mind or consciousness. This idea of Buddhism matches the concept of empowerment, that people make their own choices and the focus of control for their actions is internal.

Another important aspect of individual self-development that must accompany consciousness according to Buddhism is creative thinking

⁴ These are rules to live by describing behaviors to avoid: Refrain from harming or killing other living creatures, from stealing, from sexual misconduct, from incorrect speech (such as lying and harsh language), and from intoxicants which lead to loss of mindfulness. These are self-training rules, not divine commandments (Payutto, 2001).
Buddhism has specified as many as 84,000 doctrines governing all aspects of truth in life and principles.

or critical thinking. It enables individuals to identify problems and influence their environment. Buddhism encourages individuals to make use of human *wisdom power* for the analysis and reflection to get to the root causes of problems, to consider optional courses of action by using as many types of available information as possible, and to choose the most suitable option to pursue.

Piyadassi Thera (2000) states that the first two factors of the Noble Eightfold Path, namely – Right Understanding and Right Thought, are the way to cultivate wisdom. A man can be intelligent, erudite and learned, but if he lacks right thoughts, he is, according to the teachings of Buddha, a fool, not a man of understanding and insight.

There are two factors in attaining and reinforcing the right thoughts. Payutto (2001) points out that one factor is external and the other is internal. The external one is hearing or learning from others based on the principle of '*kalayanamitara*'. This principle allows an individual to seek compassionate friends and persons who are qualified to give him the right information, guidance and advice. However, the internal indispensable factor is '*yonisomanasikarn*'. It is analytical reflection, critical reflection, and systematic attention that one must utilize to understand things within one's mind profoundly and without personal feelings or attachment.

Buddhadas Bhikkhu declares that Buddhism rests on reason and insight in his following teaching:

“Buddhism does not demand conjecture or supposition; it demands that we act in accordance with what our own insight reveals and not take anyone else's word for anything. If someone comes and tells us something, we must not believe him without question. We must listen to his statement and examine it. Then if we find it reasonable, we may

accept it provisionally and set about trying to verify it for ourselves. This is a key feature of Buddhism which distinguishes it sharply from other world religions.”

(Buddhadas Bhikhu 1956, Santikaro Bhikku trans., 1988)

He adds further that to achieve right thinking and right decision-making, Buddhism lays out principles of morality. It provides behavioral guides for “right action” which stress the importance of nonviolence, moderation, charity, and self-control. It urges people to be good, behaving in accordance with the general principles of community life and in such a way as to cause no distress to themselves or others.

One main teaching of Buddhism concerns the relationship between individuals and their society. Theravada Buddhism stresses the effects of the individual’s actions and behavior on the group or society as a whole. Phongphit (1988) points that Buddhism emphasizes that:

“...man’s being is not self-contained, but finds expression in the relationship with other human beings. Moreover, the realization of existence derives from the universal unity with all creatures...Man cannot live on his own and only for himself. By living for others, he lives his life ‘fully’. Paradoxical as it may seem, it requires getting rid of one’s ‘ego’ in order to be oneself. The personal and social dimensions have to become one, like two sides of the same coin.”

Buddhism is of holistic teaching. It is a way of moral, spiritual and intellectual training leading to complete freedom of mind. And the guiding principles of Buddhism are compassion and wisdom.

While Buddhism is the national religion, Thais have always enjoyed religious freedom. All faiths are allowed to practice their religion in

Thailand and co-exist in harmony⁵. By law, the king is a Buddhist and upholder of all religions. All of the Thai kings have energetically supported the faith through temple building and various reforms, and all have been ordained as monks.

Buddhism has provided inspiration for most of the country's art and crafts, ceremonies, and festivals, but Buddhism is not the only Thai belief affecting the thoughts and the Thai way of life. Others influences are animism, Brahmanism, and Hinduism.

Animism: Far older than Buddhism, and equally powerful at the village level, is the conviction that a host of supernatural beings control such vital matters as bountiful rainfall, adequate crops and the fortune or misfortune of individuals. Faith in such beings was not replaced by Buddhism but effortlessly absorbed by it, often in ways perplexing to outsiders more anxious to categorize than are the tolerant Thais.

The Thais are heirs to an ancient animistic culture and animistic beliefs. These are reflected through rites and traditional celebrations at all social levels. They are ingrained deeply in the psyche of Thai people though tempered by Buddhist teachings which arrived later in the region. Animism is the belief that inanimate objects are imbued with some numismatic power or are the dwelling places of a deity or spirit.

⁵ One may raise a question concerning this claim due to the recent turmoil, violence and terrorism (long unrest and heating up again in mid 2004) in the three most Southern provinces (with the highest concentration of the Muslim inhabitants) of Thailand. In a personal communication with Phanwuthikorn, a teacher of Theravada Buddhism explained that it is not the issue of religions, but rather a historical and political factors from certain domestic and international terrorist groups who take fundamentalist perspectives or it could be just a reaction from the oppressed (the Muslims) to unjust governance. It is not a fight between religions. Though terrorists' attacks happen many times, it is rare to see the Buddhist population in Thailand accuse or act against the Muslim communities in retaliation (unlike the incidents in Indonesia). At the community level both Buddhist and Muslim people consider themselves as being Thai. And they have quite a harmonious relationship.

For example, spirits are believed to dwell in rivers, as '*Phra Mae Kongka* or Mother Goddess of the River'; in the fields, as '*Phra Mae Thoranee* or Mother Goddess of the Soil'; in the rice, as '*Phra Mae Posop* or Mother Goddess of the Rice'. Many trees, especially large trees, are believed to be the dwelling place for angels, nymphs and other spirits. These spirits may be kind, mean or dangerous. Most forest trees contain a female ghost named *Nang Maai* or Tree/Wood Nymph, generally considered benevolent.

For animate things like human beings or animals, there is also a spirit called *kwan* to provide mental equilibrium for them. When someone is very frightened and falls ill, it is said that one is *kwan haai* or has lost one's *kwan*. A ceremony to pacify and invite *kwan* back will be held. Even a water buffalo, an important animal in the old days for Thai farmers, has a *kwan*. After the harvest season, which used to be once a year, they held a ceremony to thank the animal and its *kwan* for the after hard toil in the fields, and to keep both healthy and happy.

Animistic rituals vary from region to region, but share the same values and beliefs based on the concept of supernatural forces that humans have to both thank and appease them for well-being and good fortune.

Brahmanism: Brahmanism is not only a social caste system of India but also a religious practice. Brahmin is the highest caste, originally composed of priests. Actually, Buddhism was originally a reaction to this practice, offering equality to all castes and an opportunity for anyone to develop oneself and attain enlightenment. However, Brahmanism also answered deep-felt needs in ancient hierarchies and continues to play a significant role, particularly in rituals concerning royalty, but also in others at the more popular level, such as weddings.

Hinduism, including its gods, also from India, permeated the Khmer kingdom and was once embraced in Thailand as evidenced by Khmer religious architecture.

Long attuned to the rhythms of the solar cycle and the arrival of the monsoon rains, Thailand has an abundance of beliefs and legends which sprung up around this ancient cycle giving force to many festivals the whole year round. Every month sees at least one festival. The love for celebration continues from ancient times to the present day. Some celebration are nationwide, others confined to one province or locality. Some are spectacular, others more modest. Most are characterized by good humor, religious devotion and offer colorful insights into local lifestyles and culture.

This diversity of religions and belief has influenced the overall development of Thai society. For example, rites and rituals are derived from animism, Brahmanism and Hinduism. Knowledge of massage, yoga, medicine is of Ayurvedic origin from India, herbal medicine from China, astrology were also from India, and Islamic influences are seen largely in the south. During earlier times, the Indian and Chinese civilizations influenced many aspects of Thai culture and society. The intermingling of diverse influences and practices shows that pluralism is a characteristic of Thai culture.

2. Thai Cultural Characteristics and Behavior:

Burapharat (2003) has done extensive investigation on the Thais cultural characteristics and behavior to understand the cultural dimension of communication and etiquette in the Thai work team. Hence, it is useful to raise and adapt from her study some of the

general features of cultural characteristics and social behaviors of the Thais which are:

- The culture of assimilation – the Thais have demonstrated the ability to adapt and adjust to new or foreign influences to reinforce their way of life. They have great tolerance towards other cultures.
- The Thais have a collectivistic culture when compared with Western countries, though she concludes that the Thais seem to have both qualities of collectivism and individualism.⁶
- Generally, the Thais care about not hurting the feelings of others, are grateful to people who do things for them, and respect the elderly. They seldom complain, and some are reluctant to take credit for achievement.
- The Thais are not aggressive by nature, but are gentle. They are most likable in their nature, given to calmness, friendliness and politeness.

Some common characteristics normally used by Thais themselves to describe their behavior and their values are: *Mai Pen Rai*, *Nam Jai*, *Kreng Jai*, and *Kwam Sanook*.

- *Mai Pen Rai* is the phrase often heard from the Thais. It can be defined as “Don’t worry, it doesn’t really matter”. It is used when facing a minor problem or when something unfortunate happens, and since what has happened cannot be reversed one should just go on with one’s life. This phrase is usually accompanied with the phrase ‘*Jai yen yen*’ or ‘cool heart’ which can mean “take it easy, don’t worry too much, there will be a solution.”
- *Nam Jai* or ‘water from the heart’ means a sincere consideration for others. It is a concept encompassing spontaneous warmth and compassion or voluntary extension of help to someone one knows or even to a stranger without expecting anything in return.

⁶ Hofstede (2001, cited in Burapharat 2003) defines collectivism and individualism as follows:

Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty.

Individualism stands for a society in which the ties between individuals are loose: Everyone is expected to look after him/herself and her/his immediate family only.

- *Kreng Jai* reflects a reluctance to disturb other people by any action that is for one's own benefit.

The concept of the heart is an important one in Thai life with the language containing a plethora of compounds of *jai*. Other examples are *Hen Jai* – to see the heart means to sympathize, *Poom Jai* – to be proud of, and *Noi Jai* – to feel somewhat hurt by another's action that does not take one's feeling into consideration.

In general, one can say that Thais believe all social relationships must be pleasant, smooth and not contain any overt conflict.

- *Kwam Sanook* refers to a sense of pleasure, enjoyment or happiness that must be present in either leisure or work. This feeling is reflected in festivals and arrays of community social activities that people gather to do together. However, this character of cheerfulness is criticized by outsiders as an unconstructive trait when seeing that the Thais may drop even a task that may be profitable if it does not prove to be enjoyable or fun.
- When talking about pleasure and enjoyment, the Thai special characteristic of 'smiling' comes forward. Exell (1960 cited in Burapharat, 2003) said he can differentiate the Thais from other people in Southeast Asian countries, such as Malay, Burmese, and Chinese, by their smiles; he said the Thais are always smiling. Thai people have often been popularly regarded as gentle people in the "land of smiles". The Thai smile has been interpreted as expressing many things – good humor, kindness, forgiveness, friendly inclination, politeness, a way to smooth interaction, willingness to listen, agreement, or self-confidence. But it can also mean one's opposition, doubt, offence, sadness, hurt or insult.
- The pseudo-sibling relationship such as *Pii* (older brother/sister) and *Nong* (younger brother/sister) is a common characteristic in Thai society. It is a kind of *kinship* relationship between individuals who are not blood related. It shows how people establish social interconnectedness through the use of words specifying

acceptance of others as one's relatives (sister, brother, aunt, uncle, grandmother, grandfather, etc.). It is more often found in informal social relationships and more in the village community context.

3. Government and Political Life

Looking back to the establishment of the Sukhothai Kingdom in 1238, one sees a long history of the paternalistic ruling style of Sukhothai lasting about one hundred forty years before it became a vassal state of Ayutthaya. While the Lanna Kingdom (the Land of Million Rice Fields) in the north was protected by high mountains and continued to flourish as a separated state.

Ayutthaya was founded in 1350 and grew to the mightiest empire that the area had ever seen. It was ruled by thirty three kings of five dynasties over four hundred years. Ayutthaya Empire expanded to include most of Thailand as well as the Khmer capital of Angkor. The size of the empire obliged it to adopt a strictly hierarchical structure that persists today.

At the top was the king who had supreme authority – a divine king, or god-king, over all subjects and with absolute ownership of all lands. After the Thais defeated Angkor, they brought back Brahmin priests who had been in charge of court rituals and ceremonies. These rites appealed to the Thais love of ceremony and the priests were present in the Ayutthaya court. The coronation ceremony was known as the 'aphisek' a practice based on the rites of Arayan rulers of India.

Ayutthaya's zenith was in the seventeenth century when the city walls were over sixty kilometers in circumference. The city's wealth and status had long been coveted by the Burmese to the east. Ayutthaya was a famous international port that traded with Portugal,

England, France, Holland, China, Japan, and Malaysia. It marked the Thais first contact with the Europeans who, upon returning to their home countries spread tales of its wonders.

For example, Joost Schouten, a manager of the Dutch East India Company's trading post from 1633 to 1636 wrote, "...Ayutthaya is the royal capital and the residence of the King, nobles, and royal servants. This entire city is on a small island in Chao Phraya River. The surrounding area outside the city walls is of flat land in all direction. Around the city lies strong stone walls of the two-mile circumference, ...the city is beautiful with more than three hundred fair Temples and Cloisters, all curiously built, and adorned with many towers, pyramids, and pictures without number, many of its buildings and Towers being entirely gilded". And he also talked about inside of the city walls that, "...there are wide road cut straight and long. It is densely inhabited. Great and smaller canals and waterways allow easy transportation for ships and boats to access everywhere right to one's doorstep, ...the city is well-planned and in ideal location. There is abundance of goods necessary for life...as far as I know, there are no any other kings in this region of the world to have such a magnificent and prosperous metropolis as the King of this kingdom, ... Ayutthaya is strategically located and secured. It is not easy for the enemy to invade and seize the city. Because every year the flood will arrive outside the area of the city wall which will force the enemy to retreat." (Plainoi and Reungwiset, 1995)

However, after the reign of King Narai the Great, all European traders and the ones working for the Royal service were expelled from

the kingdom for political reasons⁷. And henceforth, Europeans were unwelcome in Siam for almost two hundred years.

Since Ayutthaya Empire was too big to rule by a paternalistic system as in the Sukhothai period, it established a ruling system and developed it through some four hundred years to set a model for later kingdoms. It systematically created two main important institutions within the Thai culture: the King institution and the Bureaucracy one. These two institutions have evolved or adapted to the conditions of different eras.

While the Kingship followed the concept of god-king with absolute power which derived from the Khmer, the Bureaucracy in the early stage was based on a complex concept of civilian military hierarchy, a system that was highly centralized. All the administration had to be in accordance with the royal and the capital policy.

An enduring characteristic of the Bureaucratic system in Ayutthaya, that left its legacy on the psyche of modern Thais, was the immense power over its citizen. It was done on the basis that lay citizen had one's duty to the bureaucracy. Every citizen was required to perform free labor, or pay in money or agricultural products in lieu of working for the authority. This formal hierarchy used a system of "*Sakdina*" (*sakdi* means ranking with a nuance of power implied, and *na* means rice fields), thus power over the rice fields. A man's rank was stipulated by the amount of land he owned. As Ayutthaya expanded its territory, the conquered lands were given to nobles according to the extent of their involvement in the conquest.

⁷ Historically, some foreigners in the Kingdom, especially the Europeans tried to overthrow the Thai kings, usually conspiring with Thai traitors.

Later, common traditions, ceremonies, festivals and entertainment that citizens of all ranks could practice together created bonds across social ranks, for example, the Water Festival to celebrate the Thai Lunar New Year, Floating Festival on the twelfth full moon, and Calling The Wind Royal Ceremony presided over by the king in the first lunar month to chase away waters flooding the rice fields. People, from the King and the royal family to lay citizens all participated in such events.

Importantly, Buddhism was the social engine for this melting of social ranks as a temple was the center of the community where all in society came to make merit. It was a venue for performing ceremonies and celebrating festivals in addition to being a place of learning. There are no social rankings in Buddhism. People are equally able to better themselves spiritually and socially. The kings of the later Ayutthaya period showed a prominent role in creating religious ceremonies, for example, the ceremony to light the candle in offering worship to the Buddha's relics and his footprint at imaginary "Namta natee River". Many of the ceremonies are still found in modern day Thailand.

Ayutthaya first fell to the Burmese in 1569 and under Burmese vassalage for fifteen years; the second time was in 1767 and the city was burned down. The Burmese destroyed the temples and palaces carrying off the Siam national treasures and over thirty thousand slaves.

After the Ayutthaya Empire there was a brief 15-year period in which the capital was at Thonburi. King Taksin, a half Thai and half Chinese nobleman freed the country by driving the Burmese out off Ayutthaya. His name was "Sin" and he rose to prominence as the governor of Tak province and thus became known as "Tak-sin". He

established his capital at a new location, Thonburi, across the river from what was to later become Bangkok.

Then, a new chapter began when King Phraphuttayotfa Chulalok found the present “Chakri Dynasty”. Since royalty was considered divine, the Chakri monarchs later came to be known as Rama, from the Hindu epic the Ramayana in which the hero, Rama is an avatar of Vishnu. Thus, the first king became known as Rama I (1782-1809).

On 6th April of 1782 King Rama I (1782-1809) formally established his new capital. Its name reflected his conception of its grandeur with one hundred sixty seven letters, longest place name in the world. The Thais call it in an abbreviation of “Krung Thep” or the City of Angel and never refer to their capital as “Bangkok”. Bangkok is used only by foreigners presumably intimidated by the long formal title.

In many aspects, Bangkok was built on the image and model of Ayutthaya, for example, the palace, royal chapels, and temples reflect the concept of divine kings. The first three reigns continued to see the Chinese as major engine of commercial growth. The Europeans who had been unwelcome in Siam since the end of King Narai the Great (1658-1688), began to arrive in Bangkok seeking trade treaties. However their arrival did not receive a warm welcome during this re-establishing of trade relationship. And later on King Rama III (1824-1851) allowed Christian missionaries to enter the kingdom through the Burney Treaty in 1826.

Then, a truly remarkable monarch ascended the throne as King Rama IV (1851-1868), known as King Mongkut to foreigners. He guided Siam safely through the early age of imperialism when the European powers were colonizing other Asian countries on all sides of

Siam. Here began the taking up and rooting of the modern knowledge of science and technology from Europe as elaborated in Chapter Two.

4. Traditional Knowledge Before Modern Knowledge of Science and Technology

From the establishment of the first Thai Kingdom in the 13th century to the arrival and taking root of modern science and technology the 20th century, Thailand managed to maintain its sovereignty and increase its prosperity. There was no seven centuries void in local knowledge. Knowledge from India and China was borrowed, adapted and assimilated into the Thai context and transformed into a new adaptive and unique Thai knowledge.

Historically, Thailand was quite a prosperous and sophisticated nation with long traditions and a time honored culture. Traditional knowledge was shaped by the people who used it. Generally, knowledge in Thai life is related to daily life blending a concern with nature and pursuit of the four basic needs of human life: *food*, *clothing*, *shelter* and *medicine*.

This section will draw conclusion from the previous content and try to give examples and explanations as to how different hierarchical context within the royalty, the religion, the nobles and elite, and lay people affects the way knowledge is created, used, disseminated and sustained. There are roughly three interrelated areas of knowledge that help provide a better picture of knowledge and traditional Thai life; e.g., crafts, agriculture and traditional medicine.

Crafts: Craft is considered as symbols of status. In Sukhothai, Ayutthaya and the northern kingdom of Lanna, much creative energy was put in the creation of Buddha images and the construction and decoration of temples to enshrine them. At the same time, the kings and other royalty needed crafts for their palaces, and in ceremonial and personal lives. Refined crafts for religious and royal prospered tremendously in the Ayutthaya period (Warren and Tettoni, 2001).

To supply these needs, there was a large organized body of artisans under the royal patronage called “chang-sib-moo”⁸ or “artisans of ten categories”. This was likely the tradition in Ayuttha which was continued during to the early Bangkok period. It is recorded that all these artisans who survived the last war with Burma were called on to continue their work with the establishment of the new capital at Bangkok. For much of the nineteenth century, the kings, his courts and various high officials lived amid settings of great traditional splendor. However, these artisans were never regarded as artists in the Western sense but rather superior manual laborers. The royal families

⁸ Ten classic crafts according to historical chronicles (Warren and Tettoni 2001)

1. Drawing which includes lacquer painters, muralists, manuscript illustrators, engravers and draughtsman.
2. Engraving which includes ornamental, architectural and sculptural wood-carvers, precious metal inlayers, jewelers and seal-engraves.
3. Turning – lathe workers, carpenters and joiners, ivory carvers and cabinet workers, often working together with other specialists.
4. Sculpting – not in stone, as for Buddha images, but rather decorative fruit and vegetable carvers and makers of banana-leaf items used for ceremonies.
5. Modeling – bronze casters, dance mask-and-puppet-makers, stucco and clay figure modelers.
6. Figuring – makers of animal and mythological figures, dummies, possibly also puppets and masks.
7. Moulding – makers of clay and beeswax moulds, part of the work of bronze and metal casting.
8. Plastering – plaster craftsmen, bricklayers, makers of Buddha images out of brick, plaster and stucco.
9. Lacquering – involves the finishing of a variety of crafts, including lacquer-work, glass mosaic, mother-of-pearl inlay, and gilding.
10. Beating – metal beaters, closely related to, but distinct from, makers of monks’ bowls, jewelry and Buddha images.

and nobles were their prime customers. The popularity of western goods led to a decline in the number of artisans. Fortunately, ancient ceremonies and religious activities are helping some of the high crafts alive.

In the village life, the traditional Thai house was a superb piece of craftsmanship in itself. Local carpenters were highly skilled valued members of every community of any size. Houses were made in pre-fabricated parts which would be fitted together with wooden pegs. In ancient times, ostentation was regarded as a royal prerogative. For lay people, simplicity was the keynote both of domestic architecture and the people themselves.

In a village, the “wat” or temple was often built by the villagers and was maintained by them through donations of money or labor as a mean of earning merit. The Buddhist temple is usually as ornate as the houses are plain. It serves not only as a spiritual center to perform a diversity of ceremonies from birth to death and for special religious holy days, but also for the temporal gatherings of village fairs. In the ancient times, a temple was an educational institute where men had the privilege of being ordained and to study Buddhist principles and other kinds of art.

Thai village crafts, like those of other cultures, developed through the necessities in daily life on the basis of the classical principle that form follows function. The crafts depended on the availability of local materials and traditional skills. The time after agricultural chores, especially after rice harvesting and post-harvest activities such as drying, threshing, winnowing and storing, was usually devoted to growing secondary crops, repairing houses, and tools, and making handicrafts for personal use or for sale, before the cycle of rice

planting began again. Village life revolved primarily around rice planting.

In sum, anything related to royalty, or the nobles would lavishly be elaborated as a symbol of status. However, for village life, anything related to religious beliefs – Buddhism or Animism would also be of prime quality. Textiles in both silk and cotton were largely and exclusively woven by women. Weaving was regarded as a part-time activity for female family members. It was done to fulfill the basic needs of clothing and merit-making offerings to the monasteries. Textiles also play an important role in Theravada Buddhism. Though nowadays most of the monks' robes are factory-made, other offering textiles such as a head-covering for the future monk, a pillow for back-rest, and banners are woven locally for use in an ordination ceremony by village women as a means of earning merit.

An example of the quality and exoticism of Thai silk could be dated back to Ayutthaya period in the reign of King Narai the Great (1658-1688). Embassies were exchanged between the court of King Narai the Great and that of Louis XIV. The Thai delegation brought a vast assortment of presents for the French king and his family. Many of the presents were of foreign manufacturer, particularly Chinese and Japanese but a substantial number of those produced by Ayutthaya artisans, ranging from gold and silver tableware to brocaded silks. Interestingly, the exotic clothes that the Thai delegates themselves were wearing created sensation among the French court. It was explained that their clothes were made of a kind of weft *ikat* silk in subtle patterns that was then, as it is still today, a specialty of northeastern weavers and indication in Thai society of the rank of the wearer. These textiles were soon being copied by local silk

manufacturers, and, "...by 1873 had become so familiar that a French dictionary defined "Siamoise" as "a material of silk and cotton mixture in imitation of the silks worn by the Siamese Ambassadors sent to the court of Louis XIV" (Warren and Tettoni, 2001).

The diverse ethnic culture of Thailand also contributes greatly to the nature and history of the textiles produced. More and more, the world has begun to recognize Thailand as a source of high quality cotton and silk constructed by unique traditional and highly-skilled methods.

In the 17th century, the peak of the Ayutthaya period, Ayutthaya was a major regional trade emporium where goods from all over Asia, the Middle East and Europe gathered. Textiles from India were particularly popular, and they remained popular into the early Bangkok period. The way the Thais dealt with Indian textiles can be compared to the way that they handled a unique over-glazed enamel ware called 'Bencharong' or, 'five-colored', from China. The designs were provided directly by the Thais, following traditional motifs, and sent to India for printing or in some cases painting by hand. In the same way, the Thais imported from the Chinese these enamel wares with unique Thai designs ordered by the Thais exclusively for export to Thailand.

Agriculture: Thailand is a country rich in natural resources, and agriculture has greatly influenced its society and culture. The cycle of village activity revolves around the activities in the fields, which usually means the planting, tending and harvesting of rice. It remains essentially an agrarian society with the majority of its population based in the agricultural sector traditionally focusing on a subsistence approach to obtaining food and other necessities of life.

Thailand has a “Rice Culture”. Rice is consumed in every meal. When someone says “pai kin khao” or “going to eat rice”, it literary means “going to have a meal”. Rice has been cultivated in this country for more than a thousand years. Rice farming techniques and breeds of rice vary geographically. Beliefs and rituals concerning every aspect of rice are based on the reverence of, *Phra Mae Posop*, or Mother Goddess of Rice or the Goddess of Rice. In other words, rice represents greatness and the kindness of nature which provides life and continuity of mankind. It is vital to life. Gratefully, rice is revered as a sacred spirit. And it is common that Thai people treat rice with respect and it is important to treat it right. Many kinds of Thai rice are famous worldwide because of knowledge in strain selection and development.

Communicating the value and meaning of rice takes the form of folklore and folktales and ceremonies. The stories have different versions in different regions. They create rituals and ceremonies whose practices follow the beliefs in the folklores and tales as such. Knowledge of certain aspect of rice farming is inherently passed down through rituals and ceremonies to the young generation. For example, a pre-cultivation ceremony to have sufficient water and rain, an actual cultivation ceremony to ask permission from the sacred spirits or gods, who take care of that piece of land, a crop nurturing ceremony to produce a healthy crop and keep it safe from any harm, a harvesting ceremony to celebrate prosperous harvest, and then, a post-harvest ceremony to show gratitude to nature, supernatural forces, and anyone who has helped, even the buffaloes that work in the rice fields.

Every performance of the ceremony reinforces the villagers humility toward nature as “children of nature”, not “masters of nature”. This

attitude provides sustainability of nature and community to live in balance and harmony. Every ceremony shows not only cultural and spiritual dimensions of the community but also knowledge/wisdom of rice cultivation in all stages. It is not surprising that Thailand is famous for rice production and called “The Rice Bowl of Asia” (Sriwattanapongse, 1997).

Rice is the staple grain in Thai life. During the Ayutthaya period, agriculture developed in the central region surrounding Ayutthaya to the extent that people could grow rice in large enough quantities to export to Malacca, Europe, and China. In addition, other crop varieties, especially Thai tropical fruits such as mangoes, mangosteen, pomelo, longan, and durian were (and still are) well known as products of efforts in crop improvement. Agriculturists hold extensive knowledge of the natural factors influencing the production process, for example, knowledge about soil and soil management, water management, pest and disease control using herbs. In other words, agricultural practices in the old days were based on subsistent and organic farming approach – the Thai agriculturists developed intensive knowledge in the improving of indigenous species with no use of agricultural chemicals.

Traditional/Folk Medicine: Thailand has a rich history of traditional medical knowledge. Traditional techniques based on herbal medicines and massage therapy served as an effective means of treatment for most Thai people until the early twentieth century. Many methods of treatment both simple and complex were developed (Panich, 1997).

Historically, traditional medicine in Thailand has been very receptive to foreign medical systems. In early times, much knowledge was adopted from the Chinese and Indian civilizations in the form of herbal medicinal formulas, massage, yoga, and various health

philosophies. Later, it was blended with various folk beliefs and local practices.

The most prominent core concept in the practice of Thai traditional medicine is the theory of elements. Element theory is based on the belief that there are four elements harbored within the body: earth, wind, fire and water. Good health is achieved when there is balance and harmony among these four elements. Sickness is caused by the disruption of this balance. Various factors influence the balance of elements such as food intake, the weather or environment, extreme emotions such as anger or sorrow, suppressed bodily functions and many other variables.

Traditional treatment, hence, is focused on countering the unbalanced in elements so as to bring them back into harmony through the use of herbal medicine as well as ritual therapy taking into account personal history and relationships of the patient's family community and natural forces. Traditional medicine emphasizes good health through a preventive approach (Taoprasert, 2003). It consists of a highly individualized treatment. Panich (1997) pointed out that traditional medical treatment varied depending on the practitioner and his local resources, as well as the patient. "...This characteristic of Thai traditional medicine, while positive because of holistic approach to medical treatment, contributed to its decline as it hindered efforts at standardization".

Folk/traditional knowledge regarding medical treatment, whether a herbal formula or rituals, was usually guarded as an individual, or family, secret. This knowledge often died along with local healers unless the knowledge was passed on to an apprentice or descendants. Much traditional knowledge and know-how has been lost in this

manner. Though many traditional medical texts have been recorded on paper made from palm tree leaves called “bai laan”, they have rarely been used by or received much attention within the modern health care system. After the destruction of Ayutthaya in 1767, only 23 texts of herbal practice centered in the royal court have survived.

In the traditional village, health care was given by “mor ya” or “medicine doctor” as a contribution to the community and out of compassion for others, rather than as a service based on a business concept.

In 1504, western style medicine was introduced into the kingdom for the first time by Portuguese merchants. Later there was established a western style hospital called “Ayutthaya Hospital”. This hospital was administered by a group of French missionaries and French physicians. As the French physicians found favor in the royal court, the royal Thai physicians felt the pressure to unite and compile for the first time in the history of Thai medicine, a book of Thai drugs recipes called “Tamra Phra Osod Phra Narai” or the “Text of Royal Medicine for King Narai”. However, a number of French physicians were invited to contribute certain western drug recipes to this important document as well. Western medicine continued to flourish in Siam until the reign of the next king, King Ped Raja, who ordered the banishment of all missionaries and foreigner societies from the Kingdom for political reason.

After the fall of Ayutthaya in 1767 and the establishment of a new capital in Bangkok, a revival of the nation’s economic, cultural and public health systems began. King Rama I (1782-1809) gave instructions for the inscription of herbal drug recipes onto the walls of Wat (Temple) Phra Chetupon Wimonmangklaram, or Wat Po, a

Buddhist temple. There was also the establishment of a royal dispensary in the Royal Palace similar to the one in Ayutthaya.

In 1816 in the reign of King Rama II (1809-1824), a Royal Decree governing the roles of royal drug dispensers was promulgated, thus emphasizing the importance placed on drug dispensing as a highly sophisticated art. Those bestowed with the title of royal drug dispensers had to possess a high degree of honesty and integrity. It was, therefore, believed that these highly sought after titles probably remained within a few chosen families (Saralamp et al.1996).

Wat Phra Chetupon continued to be an important place in the history of traditional medicine. There was an attempt to replicate a number of drug recipes to replace those that were lost during the war with the Burmese. King Rama III (1824-1851) ordered the inscription of drug formulae onto marble tablets to be used to decorate the walls of the principle building as well as the surrounding walls. In addition to the drug recipes, these inscriptions also included the diagnosis as well as the cure for various ailments. Furthermore, numerous useful medicinal plants together with some rare species were planted within the temple compound. This move marked the first attempt to educate the general public on the attributes of Thai medicinal plants.

King Rama III's keen foresight of the value of this traditional knowledge and the threat of its loss resulted in his to organizing the first traditional medical conference in Thailand. He invited traditional medicine practitioners from all over the country to come to Bangkok to exchange and record their knowledge. Delegates were also sent to the countryside to collect information.

The reintroduction of western medicine also came in the reign of King Rama III (1824-1851). The effort was initiated by an American

physician – Dr. Dan B. Bradley, with the introduction of a vaccination against smallpox, and the use of quinine as a cure for malaria. This is considered to be the turning point in the history of Thai medicine.

In conclusion, knowledge manifestation in the four basic needs in life within traditional society varies according to social status of the users of that knowledge. Lay people hold a deep knowledge in craft and agricultural matters for use in their daily life as well as to serve royalty and the nobles. Cultural influences from India and China as well as other belief systems, shaped Thai traditions governing the four basic needs and other aspects in life such as work and leisure. Because of the richness and abundance of the land and good climate, agriculture has been thriving. Traditional and rural life used rituals and ceremonies to carry and pass on knowledge to new generations. Thailand was self sufficient and self reliant in the natural resources and knowledge, accumulated over hundreds of years, by the Thai people in all aspects of life.

5. Traditional Knowledge After the Arrival and Rooting of Modern Science and Technology

As stated previously, the arrival of modern science and technology took place in the late nineteenth century and the rooting in the early twentieth century. This was necessitated by the need to maintain the country's sovereignty in the face of the Colonial powers. The national strategy and changes affected traditional knowledge in many ways. Traditional Thai knowledge was dichotomized on one side with the notion of backward, and outdated – till it was marginalized and its practice discouraged. While modern science and technology on the other side, was accepted with alacrity as modern and more “civilized”.

Thai crafts were replaced by mass produced goods. Houses and buildings were constructed in the western style. The elites were a model for consumption of western goods and European fashion. Only crafts that were relevant to ceremonies remained. Though most villagers still made their own clothes, the trend was decreasing. Because the factory clothes were cheaper, labor and time were allocated for growing rice to meet export market demand. The shift from subsistence farming to commercial agriculture was widely felt within the Early Bangkok Period (1782-1850) of the expansion of rice agriculture in the central region.

Sriwatanapongse (1997) observed that although “hi-tech” innovations contribute to major developments in modern agriculture, we should be aware that rice farming has been practiced in Thailand for over five thousand years. Through this period, planting, harvesting and threshing techniques have been developed to a fairly sophisticated degree. “...some of the most successful modern agricultural technologies have been achieved with input from traditional knowledge”. Many traditional practices can still be found today in some poorer regions.

Eventually, commercial agriculture adopted modern technologies such as agricultural machines and modern agribusiness management. Companies provide farmers with necessary supplies for farming, such as seeds and pesticides, on loan. Upon selling their harvest, they are expected to repay the debt. Unforeseen factors, such as unfavorable weather condition or market demand, can hinder their ability to pay their debt, causing them to fall even further into debt. This raises concerns regarding the increasing dependency of farmers on companies. As debt increases so does dependency. This contradicts

the goal of development that promotes independence. Ultimately, farmers should be able to implement new practices and technologies of their own accord and as needed.

From the First to the Fourth National Economic Development Plans⁹ (1962-1981) the stress was on the **economic** development. Agricultural output was raised through the expansion of cultivable land and through higher yields per *rai* (a *rai* = 0.14 ha). During these plans, agricultural development was given high priority. Emphasis was also placed on building agricultural infrastructure such as irrigation, electricity, communication, roads and dams. Agricultural machines, fertilizers and pesticides were widely introduced into the agricultural sector as were new strains of rice.

The movement of the “Green Revolution” began around this era. The term was used to describe the spectacular increases in cereal-grain production. Its important impact was best illustrated in helping to increase self-sufficiency and to overcome hunger and starvation among countries which had previously experienced widespread food shortages, such as India, Pakistan and the Philippines and many other countries of the South.

However, it did not have much success in Thailand where rice is not only to fill the stomach; taste and quality are equally important. Not only has Thailand been self-sufficient in rice production, it has long been a major exporter of rice. The modern rice varieties generally have low-quality grain in comparison with the Thai ones, and are unsuitable for the export market which requires high quality grain.

⁹ Since 1961, the development of Thailand has been guided by National Economic and Social Development Plans. They are a series of five-year plans prepared by the National Economic and Social Development Board (NESDB). NESDB is responsible for development planning but carries no regulatory power. Decisions are made by technocratic government agencies with only limited references to Parliament.

Farmers have also found that modern varieties cannot compete with traditional varieties which show resistance to both flood and drought.

Nonetheless, the cultivation of modern rice varieties to feed the flour industry has increased. The widespread use of a single modern rice variety brought disaster to the rice crop in Thailand several years ago, as it had no resistance to the brown plant hopper, a locust that seriously infested the crops. Consequently, the loss of crops resulted in food shortages. The biological uniformity of modern rice varieties is of great concern.

By the Fifth National Economic and Social Development Plan (1982-1986) Thailand had succeeded in raising agricultural output and in maintaining its status as a leading exporter of agricultural products. Nevertheless, after twenty years of agricultural development based mainly on the expansion of cultivated land, there were visible strains on the environment. The next Plan saw agriculture for accounting for less of the nation's GDP and exports, while the manufacturing sector was growing tremendously.

Table 1. Exports by selected major sector (percentage of total exports)

Item	1986	1990	1994
Manufacturing	55.35	74.67	81.12
Agriculture	34.02	16.96	11.39
Fishing	6.36	5.51	5.97
Mining	2.69	1.26	0.60
Forestry	0.27	0.13	0.05
Other	1.31	1.48	0.87

Source: Thailand Economic Information Kit, Thailand Development Research Institute, September, 1995. (Cited in Sriwatanapongse, 1997)

Though bottom-up planning and development of science and technology appeared in the Sixth Plan (1987-1991), rural poverty and disparity in income distribution persisted in Thailand. Then, in the Seventh Plan (1992-1996) the concept of sustainable development emerged. The goal of development was directed to the balance between economic growth, income distribution, human resource development, quality of life and the standard of living in rural communities. The Eighth Plan (1997-2001) adopted a participatory approach. The development goal shifted from economic growth to a holistic, people-centered development approach. The economic crisis in 1997 had proved the failure of economic growth model.

The Ninth Plan (2002-2006) has adopted the philosophy of a “sufficient economy” bestowed by His Majesty the King of Thailand as the guiding principle of national development and management. (To be further discussed later in Part Three)

This rapid development and the shift from subsistence farming to commercially orientated production have weakening the traditions and values embedded in agricultural practices. For example, the value of ‘being children of nature’ has faded and is being forgotten – soil, rivers, rice and plants are treated as economic factors and merely means to earn money. The western concept of ‘mastering the nature’ was adopted without awareness. Hence, natural resources have been exploited and abused for human profit resulting in environmental problems.

Capitalism has created conflicts of interest resulting in competition and losing social ties and cohesion. Money and material happiness have been placed over the social values of compassion and inter-dependability. Increases in space for agriculture and in the volume of

production require more labor and time in the field resulting in a loss of culture roots of traditional ceremonies to ensure the transferring of traditional knowledge in agriculture. Finally, both traditional agricultural practices and rites and ceremonies accompanying them are being lost. Unfortunately, unbalanced utilization of nature – without respect and gratefulness pushes Thai farmers to lose balance within themselves, among their community members and with nature. They lose their natural capital, intellectual capital and social capital. It is of prime importance to re-establish all these in village communities and to re-balance tradition and modernity for sustainable development.

The taking root of modern science and technology has also led to increasing marginalization of local knowledge in the area of traditional medicine. As Thailand has a strong tradition of the royalty, traditional medicine of the royal court has been conserved as the national traditional medicine. Folk medicine has been pushed further into the remote area, to surviving only among the rural poor.

As stated previously, the reign of King Rama IV (1851-1868) saw many changes involving the adoption of various aspects of western civilization as stated previously. More western trained doctors came along with trade missions between the kingdom and the western countries. There was the introduction of modern obstetrical practice into the health system. However, the majority of the public remain faithful to the old traditions and culture.

The reign of King Rama V (1868-1960), saw the establishment of the first modern hospital, Siriraj Hospital in 1888, combining both western and traditional medical practices and a medical school within the hospital. The school was to train western style surgeons and general practitioners. A course on traditional medicine was also

incorporated into its three year curriculum. However, in 1931, the teaching on traditional Thai medicine was discontinued in the medical school since the two doctrines were considered incompatible and, therefore, tended to confuse the students (Saralamp et al., 1996). Within this same year, the royal dispensary first set up during the reign of King Rama I (1782-1809) was changed into the Department of Health.

Subsequent development in Thai medicinal plants was directed entirely toward modern medicine from the start of the first medical school in Siriraj Hospital and the inception of the first Faculty of Pharmacy. With the establishment of the government Pharmaceutical Organization in 1940 and the Ministry of Public Health in 1942, serious attempts were made to examine the attributes of indigenous herbal drugs in order to transform them into modern drugs.

Even the modern re-introduction of traditional medicine has been due to the international trend to “green” or natural products. For example, in 1979 the Ministry of Public Health, in response to the World Health Organization’s Alma Ata Announcement to revive indigenous medicine, recommended a strategy on the development of primary health care.

Traditional medicine was acknowledged only in the aspect of herbal medical treatment focusing on herbal efficacy. In 1980, the National Economic and Social Development Board commissioned the Faculty of Pharmacy, Mahidol University in Bangkok to conduct a study on the strategies for the development of Thai medicinal plants. This resulted in recommended strategies for the development of Thai medicinal plants for use in primary health care, for use in traditional

and modern drug industries, for use as strategic supplies in case of war, and for export.

In this new millennium, Thai traditional medicine has been recognized in a more profound and holistic manner. The value of traditional medicine which places importance on health promotion and disease prevention is accepted in the national health policy. More detail and a remarkable example will be offered later through one of the case studies in Chapter 8.

In conclusion, though Thai traditional knowledge was marginalized for political reasons in the pursuit of modernization and globalization, its resurgence has been increasingly felt. The political movement of today may help will reestablish it in Thai society as much as it was formerly marginalized by such forces. The next chapter will explore the resurgence of this Thai traditional knowledge, popularly called “Local Wisdom”, in the Thai context so as to understand its role, activities and the actors involved within modern Thailand.

CHAPTER 4

Indigenous Knowledge and Local Wisdom

This chapter will give an overview of a knowledge system central to developing countries on the issue of cultural revival in the context of economic and political necessities. The oppositional movements of the South World to regain their cultural identity after de-colonization, and the international interest in including indigenous knowledge in development programs, have highlighted the debate on the cultural dimension of development worldwide. It will examine the definitions, meaning, role and status of the knowledge, including the main actors involved and their different views.

Since Thailand also possesses a long tradition of using this kind of knowledge for thousands of years, but chooses to call it “Local Wisdom”, this chapter will offer an explanation and insights on how Indigenous Knowledge (IK) and Local Wisdom (LW) are similar to or different from each other. However, it does not seek to defend the merits or efficacy of this traditional knowledge system in gaining more positive public image or equal footing in the realm of knowledge for development. Rather, it will focus on providing a collaborative path that IK and LW can employ in the development dialogue with the

more dominant knowledge of science and technology in development practices.

1. Indigenous Knowledge (IK)

1.1. Historical Perspective

IK has been used for centuries by local communities all over the world prior to the advent of modern science and technology, or to be more precise, before the invasion of colonial powers and the influx of Western knowledge and culture to other parts of the world. European colonists brought the new knowledge system of science and technology which came to dominate the existing knowledge systems of local people in the lands they conquered.

Cobern and Loving (2000) talked about the disintegrating effects of this coercive replacement of science and technology of the existing knowledge in those lands. They recognized that local people felt the disintegrating effects much more sharply than the European themselves had when they had to adapt to a scientific culture mentality. The movement toward scientific culture changed everything that had been used in the Dark Age, from values, and content of knowledge to patterns of action. The European perception of the material superiority of their own cultures over those of local people set the stage for enforced change. Needless to say science and technology were a tool for such change. The marginalization of the old knowledge systems was inevitable in the wake of negative labeling of such knowledge as backward and unacceptable.

From that point in time, knowledge was dichotomized into the new one of the colonial powers, “science and technology”, and the native or local one of the colonized countries “Indigenous Knowledge” or IK. This

dualism persists even after decolonization because of the growing importance of science and technology in a modern science-driven world.

Despite the mainstream practice to value global modern knowledge of science and technology for development, the pluralism of native, local or indigenous knowledge systems and cultures is increasingly recognized and prevailed. Current development strategies tend to ignore, to underestimate and sometimes to undermine, other knowledge systems in developing countries. They are often labeled as non-scientific and non-universal. Nevertheless, for the past few decades traditional knowledge systems have been studied, better understood and accepted with growing interest and appreciation, even among scientists and development practitioners worldwide.

There are terms for this knowledge which can be used almost interchangeably, for example, indigenous knowledge (IK), indigenous technical knowledge (ITK), ethno-ecology, local knowledge, folk knowledge, traditional environmental knowledge (TEK), local wisdom (LW), and even people's science.

What is meant by "indigenous knowledge" is by no means clear. There are different viewpoints and definitions. To many people, when we refer to indigenous knowledge or IK, it has the connotations of non-professional, local or native or even tribal knowledge of certain groups of rural people living as an underprivileged or impoverished part of a society, or a country, as opposed to modern society. It is even considered as the "knowledge base of the poor"¹⁰ However, it is increasingly recognized that IK can hardly be ignored in development contexts. Its applications in industry and commerce are sought after, especially, in the

¹⁰ (Indigenous Knowledge for Development : A Framework for Action, Knowledge and Learning Center, Africa Region, World Bank, November1998)
http://www.scidev.net/dossiers/indigeous_knowledge/ikdocs.html Retrieved 30/1/2003

area of herbal medicine. The inclusiveness of nature makes it appealing for the discourse on sustainable development through the promotion indigenous environmental wisdom.

1.2. Some Definitions of Indigenous Knowledge

“Indigenous knowledge is “the local knowledge – knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, healthcare, food preparation, education, natural-resource management, and a host of other activities in rural communities”.

(Warren, 1991)

Indigenous knowledge is “... the information base for a society, facilitates communication and decision-making. Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems”.

(Flavier et al.,1995)

“The concept of indigenous knowledge or local knowledge (IK) refers to the complete bodies of knowledge, know-how, practices, and representations that are maintained and developed by people with long histories of close interaction with natural environment. These sets of understanding, interpretations and meaning are part of cultural complex that encompasses language, naming and classification systems, ways of using resources, rituals, spirituality and worldview”.

http://www.scidev.net/dossiers/indigenous_knowledge/ikintro

1.3. What Are the Characteristics of Indigenous Knowledge?

Indigenous technologies, practices and knowledge systems have been studied extensively by development practitioners, and more so by social scientists and social anthropologists. However, it seems different actors perceive the missing dimensions within the studies done by the others. In “Indigenous Knowledge for Development: A Framework for Action”, it is noted that most studies are descriptive and concentrate primarily on the social or ethnological aspects of knowledge rather than on the technical ones. While in another instance, Brouwer (1999) finds that most publications on indigenous knowledge-based research refer to technology, but not the concepts underlying the practices. What then are the traits or features of indigenous knowledge we can draw upon encountering it?

Realizing that indigenous knowledge is special and distinguishable from other knowledge systems, here we shall highlight common characteristics of IK¹¹ before exploring its role, status and other dimensions.

- IK is local. It is rooted in a particular community. The knowledge is created, used and transferred by people living in that community. People share the same value, culture and social context. So, efforts to transfer it to other places mean de-contextualization of the knowledge which poses the risk of losing its effectiveness.
- IK is embedded in people who generate and use the knowledge. This tacit dimension of IK makes it difficult to codify.
- IK is mostly orally-transmitted. This knowledge is rarely recorded in written form. And because transmission is oral or through imitation and demonstration, or from tacit to tacit, human interactions are fundamental. Knowledge existing outside of written text makes it more difficult to rediscover. IK is experiential and practical rather than theoretical knowledge. IK is

¹¹ Adapted from Ellen and Harris (1996) and Eaowsriwong (2003)

derived from experience and practical engagement in everyday life. This practical aspect shows that IK is the product reinforced by experience of trial and error, and intelligent reasoning. Its failure or success has immediate consequences for the life of local people, as Hunn (1993, cited in Ellen and Harris, 1996) puts it – “tested in the rigorous laboratory of survival”.

- IK has a religious or spiritual worldview. Knowledge does not stand alone, but comes with a perspective on life or worldview, regardless of the religions system. This property means that IK reflects the basic values and beliefs of all religions, such as compassion, and thoughtfulness, not competition. It is different from modern knowledge of science and technology from which a religious worldview is left out or irrelevant.
- IK is constantly changing. Repetition aids in retention and reinforcement of IK. When new knowledge is added, or the situation changes, IK will be adapted and will transform itself within the knowledge production and reproduction processes. The degree of successful survival of IK lies in enriching itself with the new knowledge to benefit individuals or the community in order for the practice to continue.
- IK is based on a holistic approach of natural world. Humankind is considered a part of nature. The balance of the physical world and inner feelings and the mind is to be achieved. Relationships between human and human, humans and nature, and humans and supernatural forces are of great concerns. Natural tendency toward equilibrium is a central theme of IK. Thus, for community IK is more than *knowledge* or *know-how*.

1.4. Comparative Characteristics of Indigenous Knowledge and Modern Science and Technology

Having examined main characteristics of indigenous knowledge, it might be useful to offer a comparative view of them together with those of modern science and technology. However, this is not intended to show the supremacy of one over the other, rather it tries to raise awareness of those who may find themselves working in a context in which both

knowledge systems are present. The differences¹² are pointed out enriching, and seeking collaboration which is the main thesis of this study.

<i>Indigenous knowledge</i>	<i>Modern Science and Technology</i>
Local: IK is rooted in a particular community. It is a set of experiences generated by people living in the communities. It is context specific.	Universal or global knowledge: It is the knowledge generated in modern scientific institutions and some industrial firms. This knowledge has the same “universal truth” no matter where it is.
Tacit: IK is embedded in people who generate it and use it. Hence, it is difficult to capture and codify this kind of non-formal knowledge.	Explicit: The knowledge has been noted for its rigorous procedures of creation through observation, experimentation and validation. These procedures can be specified and codify easily.
Transmitted orally and culturally: IK is rarely recorded in written form. It is mostly transferred through imitation or demonstration within cultural context.	Transmitted in written form, academic and schooling system: As the knowledge is produced and carefully documented, it can be taught via a formal education system.
Practical and experiential rather than theoretical knowledge: IK is derived from experience and trial and error. It is tested through time in the “ <i>social laboratory of survival</i> ” of local communities.	Theoretical knowledge: Knowledge is derived from hypotheses and scientific methods. Studies have been made in laboratories or with scientific or mathematical models.

¹² In fact, Agrawal (1995) argues that the dichotomy between IK and modern science is not real and fruitless to assert such distinction in the absence of satisfactory verification criteria to distinguish science from non-science. It is the “location” of knowledge production that makes the difference. The different social, environmental, and political context makes the distinction between IK and modern science relevant.

<p>Founded within religious worldview, spirituality and social values: Spirituality is an important and inseparable dimension of IK. Nature is revered as mother or provider of all things.</p>	<p>No spiritual values: It separates attitudes, beliefs or cultural dimensions from the knowledge creation process. Nature is to be conquered or mastered.</p>
<p>Holistic approach: Humankind is considered part of the nature. The natural tendency toward equilibrium is the central theme of IK.</p>	<p>Compartmental approach: This system of knowledge breaks down matters for study into smallest components in order to reach into the deeper and hidden facts of what is being studied.</p>

1.5. Importance of Indigenous Knowledge within Development Practices

Few people question the productive role that science and technology have played in the development of modern life: from its contribution to good health and raising standards of living, to economic gains grounded in scientific and technological progress and to the way people pursue leisure and entertainment. Naturally, development from the modern perspective tends to equate the global gap in well-being with global imbalance of science and technology development. For example, the International Council of Scientific Unions (ICSU) asserted their intention to:

“...demonstrate to the world that having the capacity to understand and use science is economically, socially, and culturally profitable. Indeed, the very habitability of the planet will depend on global popular consensus. As such, the spread of scientific culture, of scientific ways of thinking, and of knowledge is tied to the fate of humanity”.

(“Proposed ICSU Programme on Capacity Building in Science” (1996)
 cited in Cobern and Loving (2000).

Cobern and Loving (2000) react to this statement calling it “...overstated and singularly one-sided”. And even a more recent view from the Academy of Sciences for the Developing World (TWAS) in 2004, which previously cited in Chapter Two, shows the same perspective toward development for developing nations. TWAS announces that the only viable and proven way to achieve the Millennium Development Goals announced by the United Nations, is “through the application of science and technology”.

However, in 1999, in Budapest, “UNESCO-ICSU World Conference on Science” stresses the importance of integrating traditional knowledge into science, especially in scientific education and research. Scientists acknowledged indigenous knowledge as a valuable source of information. The TWAS report 2004, stipulates that:

“...indigenous knowledge is increasingly viewed not as a separate source of knowledge but as an important contribution to our understanding of the natural world and the ways in which human beings interact with it”.

The recognition of the importance of indigenous knowledge raised by these two major scientific communities coincides with the world’s growing tendency towards a cultural dimension in development. It leads to increasingly vigorous debate on using indigenous knowledge not only out of economic necessity but also for cultural inclusiveness of local people and the nations. They also suggest to use it for the needs of development professionals and scientists in IK data which they see as the “...largest single resource not yet mobilized for the developing enterprise” (Libenstein, 2001). In summary, IK is recognized as important to both the local communities and the global community. Libenstein also

emphasizes that development is no longer the exclusive domain of modern science and technology. Indigenous knowledge finds itself among these discourses and with the associated problems.

Development practitioners see that IK, though readily shared among members of a community, is less easily shared across communities. The need of the scientific community, as well as the recognition of its commercial values, drives the effort to understand its process in order to tap it for exploitation, either for the good of local communities or for the benefit of modern society.

It is useful to explore the efforts made to understand the exchange of indigenous knowledge as identified in *Indigenous Knowledge for Development: A Framework for Action* (1998). It proposes six essential steps for the capture and exchange of indigenous knowledge.

- *Recognition and Identification:* Some IK may be embedded in a mix of technologies or in cultural values, rendering them unrecognizable at first glance to the external observers.
- *Validation:* This involves an assessment of IK's significance and relevance to solving problems, reliability, functionality, effectiveness and transferability.
- *Recording and Documentation:* This is a major challenge as the tacit nature of IK makes it difficult to codify the knowledge embedded in a person. It is important to find the appropriate tools to do so.
- *Storage:* The need is to have retrievable repositories. It is not limited to text document or electronic formats, but involves categorization, indexing, relating it to other information, making it accessible and conserving, preserving and maintaining it for later retrieval.
- *Transfer:* This step goes beyond merely conveying the knowledge to the recipient; it also includes the testing of the knowledge in the new environment. This step may involve intensive practical training, apprenticeships or demonstration.
- *Dissemination:* Once the transfers and adaptation process have been carried out successfully, dissemination of IK to a wider

community is possible. It can add a wider and deeper impact of the knowledge transfer to development dimension.

This paper postulates that these steps for exchange of IK are essentially a learning process. The community where an IK practice originates, the agent that transmits the practice, and the community that adopts and adapts the practice all learn during the process.

As much effort has been on moving toward a knowledge-based society, the importance of knowledge for economic and social development is increasingly vital. At the “2nd Knowledge for Development Conference (GKII)”, organized by UNDP, the World Bank and other organizations in March 2000, Kuala Lumpur, Malaysia, the final action plan includes a strong endorsement of the Indigenous Knowledge Program and specifically calls for the identification, development and dissemination of local knowledge in various forms, including local languages. It also calls for developing strategies for using indigenous knowledge in development (Liebenstein, 2001).

Not only is IK obviously relevant to the local community in which the bearers of such knowledge live and produce, but Gorjestani (2000) asserts that IK is a key element of the “social capital of the poor”. It provides self-reliance and self-sustenance to rural communities. The World Bank¹³ has also identified another two criteria for using IK in the development process. In order for development programs to be sustained within the limited facilities of rural communities, they have to meet the needs and fit the context. Integrating IK in development programs will make them

¹³ World Bank plays a crucial role in funding and providing loans for development programs worldwide.

<http://www.worldbank.org/afr/ik/basic.htm>. Retrieved December 5, 2003.

relevant to local people and provide a good foundation for success and sustainability of them even after the programs end (Ulluwishewa, 1993).

The Bank stresses that development agents (CBO, NGO, government, donors, local leaders, private sectors initiatives) need to recognize it, value it and appreciate it in their interaction with local communities. Before incorporating it in their approach, they need to understand it, and critically validate its usefulness for their intended objective. The World Bank sees IK as a part of global knowledge. In this context, it has value and relevance in itself as it can be preserved, transferred, or adopted and adapted elsewhere.

Interest in indigenous knowledge has been expressed by a growing number of academic disciplines. A decade ago most academicians working in the area of indigenous knowledge were in anthropology and geography (Warren, 1995). Today one finds important contributions to our understanding of IK from other scientific disciplines as well, e.g. ecology, soil science, medicine, forestry, animal science, aquatic resource management, agricultural education and extension, fisheries, information science, wildlife management and water resource management. IK is in national and international agenda and involves various actors in development efforts.

1.6. Different Views to Indigenous Knowledge

From the International Symposium on Indigenous Knowledge and Sustainable Development funded by the International Development Research Council (IDRC), held at the International Institute of Rural Reconstruction (IIRR) in Silang, the Philippines in 1992, there were some fifty scientists and development professionals participated. The six

underlying views of IK were reflected in the symposium worth considering herewith¹⁴.

The following are brief stereotypes of each group, namely those of the scientist, the development agent, the facilitator, the conservationist, the political advocate and the capitalist.

The Scientist: Parallel to, and intertwined with, the rapidly advancing body of international, scientific knowledge are bodies of local knowledge derived from the empirical trial-and-error of people struggling to survive over the centuries. Little of this wisdom has been recorded or validated by the scientific method. Most is localized, is transmitted orally, and is typically not codified. The scientist recognizes this and wishes to understand and incorporate all knowledge in the scientific corpus.

The Development Agent: This interest of IK comes from the development community. They accept the likelihood of frequent failures in their work if it does not incorporate indigenous needs, concepts and resources. So, the development community needs to understand local systems, especially local communication processes. The goal is to identify, verify and adapt IK and to promote it in areas where conditions are similar.

The Facilitator: IK is a resource that local people can use to further their own development. The role of agricultural extension personnel is to facilitate and stimulate farmers' experiments, encouraging the interchange of information among them. The role of the agricultural researcher is also transformed into one that responds to and supports the farmer's research agenda, rather than being independent of it.

¹⁴ <http://www.nuffic.nl/ciran/ikdm/1-2/articles/background.html> Retrieved 3/4/2003

The Conservationist: The emphasis is on environment and conservation is now widespread around the world. This stream focuses somewhat more heavily on minor, traditional groups. There is also a concern for the disappearing knowledge base of all societies under the onslaughts of industrialization, urbanization and western culture. It supports the pursuit of knowledge per se. It evinces an interest in preserving knowledge “in situ” for its own sake. An element of advocacy for retention of IK is important.

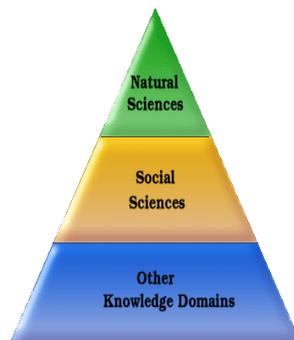
The Political Advocate: It derives from North-South conflicts and tensions. Political advocates espouse the protection of rights, the end of exploitation, and exploiters’ obligation to pay for past transgressions. They deny the scientists’ idea of sharing wisdom for mutual betterment, instead seeing any relationship as an intrusion by the stronger on the weaker. For instance, they advocate introducing patent rights for IK in order to prevent uncompensated expropriation by outsiders.

The Capitalist: This is an important element that was not represented among symposium participants, but the influence of which was widely felt. It sees IK as a resource to be tapped by outsiders in pursuit of profit. Seeds and western drug companies draw on the knowledge of local people to identify promising sites, species and uses of tropical plants to develop new drugs or crop varieties. Aspiring to the scientist’s quest for knowledge and free access to information, Western Universities and herbariums are often unwitting partners of the capitalist. The political advocate’s position is essentially a reaction against the activities of the capitalists and their scientist partners.

1.7. Main Concerns About Indigenous Knowledge

All these views, problems and concerns of IK in the global arena can be summed up in three issues of concerns among IK scholars and alternative development practitioners as follows:

1.7.1. IK suffers from scientism or the cultural hegemony of science in that science is placed at the epistemological pinnacle (Cobern and Loving 2000). “...Too often that science is used to dominate public square as if all other discourses were of lesser value”.



(Epistemological Pyramid by Cobern and Loving 2000, pp.62)

Liebenstein (2001) adds to this view that science and technology knowledge – knowledge generated in schools, universities, research institutes and industrial firms -- *still dominates development thinking and shapes politics, values and careers*. Many development professionals and academics in Asia, Africa and Latin America share this science and technology bias because these people usually have had their education in the North or the education pattern in their countries is copied from the North. He calls this a “colonial heritage” which still persists to the present day in the form of scientific ideals, in the ways that research assistance is given, and in the imitations of western patterns of prestige.

Liebenstein's view may help explain why the World Bank, although it has advocated the use of IK in development programs, looks at decisions from outsiders to justify whether certain local knowledge should be included or rejected in a development program. IK is to be validated using outsiders' standards and references i.e., science, before it can be accepted for integration in the program.

They view that IK is a tool in development programs to gain access to local communities so as to meet the needs of local people. Successful development programs are those initiated by "the ones who know" more and have a better kind of knowledge. IK is just the knowledge asset of the poor, – of less value than modern knowledge (of science). When development practitioners see that certain IK would not be useful for their intended purpose, IK must go. The usefulness of the development program is judged by outsiders, not local people, outsiders who know what is best for them.

As a reaction to this epistemological weakness of IK, some scholars try to emphasize that "...indigenous scientific knowledge and approaches are valid alternative scientific disciplines¹⁵ ..." For example, IK is presented in classroom materials in many states of the United States to promote Indian science education. In trying to raise the self-esteem of the Indian students, it goes to great length to adopt a triumphalist approach to the learning materials (Cobern and Loving, 2000). In a book entitled *Red Earth, White Lies: Native American and the Myth of Scientific Facts* (DeLoria, 1995, cited in Cobern and Loving, 2000), it presents the achievements and the beliefs of the group described as superior and anticipatory of the achievements and beliefs of modern Western science.

¹⁵ Indigenous Peoples, Indigenous Science, and Sustainable Development Project, the South Pacific Peoples Foundation (SPPF). <http://www.sppf.org.indscience/index.html> Retrieved 25/3/2003

For example, the Dogon of Mali supposedly studied Sirius B, which is invisible to the naked eyes, hundreds of years ago. The Egyptians supposedly foreshadowed the Theory of Evolution thousands of years ago.

However, it must be remembered that IK originated quite independently of science and technology, and generally also quite independently of Western culture. In light of this recognition, it would be more productive to view IK and modern/Western science and technology as two systems of knowledge that can supplement, rather than compete with each other. Accordingly, Cobern and Loving (2000) state that their position is “... to value the best thinking for a given situation and the wisdom to change one’s thinking when situations change”. This value not only opens a creative space for knowledge from any domain but it also allows the possibility of dialogue. What they advocate is **epistemological pluralism**, – accepting another knowledge system on its own merit, not using science as a reference, and the “ability to wisely discriminate amongst competing claims”. They believe that the issues of life typically cross epistemological categories, and the wisdom to run one’s life is crucial in this perspective.

2. The de-contextualization of IK. On one hand, many IK scholars (Agrawal, 1995; Ellen and Harris, 1996; Phongphit, 1986) view it as an important way to address the linking global and local knowledge and on the other hand of avoiding the tendency to try to turn local into global knowledge. This issue reflects the concern about the de-contextualization of IK. To take IK out of its location, or to de-localize it, runs the risk of leaving out the culture in which the knowledge originated and is used. The characteristic of being context-specific is lost. Knowledge is fragmented and reduced to its technical aspect or “know-how” as it is the most obvious element. Using partial IK in this manner means that we

ignore an important characteristic and thus weaken it. It leads, unavoidably, to enlarging its epistemological weakness when IK is unable to deliver the same efficacy in different contexts. This has been raised by Hunn (1993, cited in Ellen and Harris, 1996) that "...no two societies perceive or act upon the environment in the same ways. Science, by comparison, is a system of knowledge in rapid flux that seeks universal rather than local understanding. It is precisely the local embeddedness of IK which has made it successful".

However, the efforts from development practitioners, IK academics, IK regional and international resource centers seem to focus on systematically codifying, recording, documenting and storing it as a repository for later retrieval to be used in development programs (Brokensha et al., 1980; Libenstien 2000; Indigenous Knowledge for Development: A Framework for Action 1998). These efforts usually focus on using information technologies and systems. In a way this is an urgent and necessary agenda, because some IK is disappearing and some has already disappeared. Knowledge is embedded in older generations of people who are dying everyday which means knowledge inside them will be lost forever.

Codifying, documenting and storing IK may be worthwhile when done with awareness not to present it as a model or blueprint for general use. An anthropological approach could be useful in studying and codifying IK by trying to learn exactly what local people are doing, determining how their decisions are made, and discovering the wisdom held in their methods (Alcorn, 1995).

Although IK has proven its validity in many areas and many cases over the centuries, we have to be well aware that IK cannot offer solutions to all of today's pressing problems and fast pacing world. IK itself is going

through the process of constant change as it encounters new situations and new knowledge. For example, in agriculture, farmers have knowledge on managing their crops, but they will improvise in their methods each year depending on weather conditions. How well they can improvise depends on experience accumulated throughout life. We must be well aware that IK cannot be codified and transferred in an attempt to use it in general development programs just anywhere.

3. The issue of Intellectual Property Rights (IPR) for indigenous knowledge is receiving increasing attention worldwide. Indigenous people around the world have a broad range of knowledge with high potential for commercial value – whether it be of plants with medicinal properties, farming practices that prevent erosion or creative products such as music, textiles and crafts. There is a concern that most of the time, multinational corporations are the ones to realize this value. South World nations have opposed the bio-piracy of their IK resources and have tried to protect their right through oppositional movements in many world arenas.¹⁶ Bio-piracy refers to the exploitation of the biodiversity that exists in developing countries by multinational academics, institutes or companies to develop products without proper compensation to the traditional communities that first discovered the usefulness of such material. Bio-piracy is an example of the negative impact of science and technology.

Some examples of such acts of bio-piracy are the United States patent on the wound-healing properties of the herb tumeric, something that Indians had known about for centuries. The classic case from Thailand is

¹⁶ See more detail on Commercialization of Indigenous Knowledge <http://topics.developmentgateway.org/knowledge/highlights/viewHighlight.do~activeHighlightId=10349?intcmp=919> and <http://www.wipo.int/globalissues> and South-to-South Bio-piracy Summit <http://biowatch.org.za/>

of the Japanese patent on *Plaunotol*, the active ingredient from *Plau-noy* or *Croton sublyratus* – an indigenous plant used for curing ulcers that has been used widely in Thai folk medicine for centuries. A Japanese pharmaceutical company produces it as *Kelnac* – a modern medicine.¹⁷ There is heated debate over this issue. Collaborative efforts among the developing countries, national and international organizations have raised the issue of protecting these rights.

Several worldwide initiatives have been taken to provide local communities with tools that enable them to share and benefits from their heritage knowledge. For example, at the international policy level, the World Intellectual Property Organization (WIPO) establishes the WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklores (IGC). WIPO also works in close collaboration with the CBD, or Convention on Biological Diversity, FAO or Food and Agriculture Organization and its Commission on Genetic Resources, UNESCO and the World Trade Organization (WTO) and the newly established United Nations Permanent Forum on Indigenous Issues.¹⁸

Information and Communication Technology also plays an important role in sharing databases to protect traditional knowledge via various *prio art*¹⁹ databases such as: <http://ip.aaas.org/tekindex.nfs>, http://tcm.patent.com.cn/tcm_patent/englishversion/login/index.asp

Indian initiatives, from the government and NGOs, are quite impressive in their efforts at providing digital databases encompassing communities countrywide, such as National Register of Innovations and Unique

¹⁷ www.biothai.net, Retrieved 15/01/05

¹⁸ IK World Wide November/December 2002, Special Issues: Intellectual Property Right. <http://www.nuffic.nl/ik-pages/ikww> Retrieved 12/5/2003)

¹⁹ *prio art* refers to the existing knowledge of local communities in the public domain.

Traditional Knowledge²⁰ How to empower communities in the exercise and enforcement of their rights has become a major concern in the fight against misappropriation of their knowledge.

Globally, many aspects of local knowledge and practices which were in the past regarded as primitive or misguided are now accepted as appropriate and sophisticated. Growth in the appreciation of IK has been considerable during the past decades. Although the pace of acceptance was slow, we have seen IK being integrated in, or a part of, important issues in the areas of agriculture, environment, health, human rights, handicrafts, education, national policy, etc.

2. Local Wisdom In Thailand

2.1. What is the Local Wisdom of Thailand?/ How different is it from Indigenous Knowledge?

Basically, Local Wisdom and Indigenous Knowledge share the same main characteristics. However, the nuances are different as much as local knowledge, such as that of agriculture, natural resource management, and handicrafts, differs from place to place depending on its context. The dualism in distinguishing the knowledge of science and technology with the much older systems of knowledge has brought new names for old age knowledge. These new vocabularies originated with outsiders – not local people, whether it be academic, scientist or development practitioner. It seems that the Thai are proud of the word –**Local Wisdom** with a good reason. It is not just romanticism or nostalgia that has given rise to the resurgence of Local Wisdom in the modern Thai life.

²⁰ see <http://www.nifindia.org> and <http://www.sristi.org>

Thai word for ‘knowledge’ is ‘*kwam roo*’ and for ‘wisdom’ is ‘*panya*’, and the word for ‘local’ is ‘*phoom* or *phoomi* and *tongtin*’. *Phoom* can also mean insightful and smart. In this case, to talk about Thai local knowledge, the actual translation of ‘*phoom panya tongtin*’ is closest to ‘*local wisdom*’. The word ‘wisdom’ used in the case of Thai LW is both a matter of translation and also a reflection of how the Thais perceive this age old knowledge, i.e. that it is at the highest form of knowledge bound to geographical or community’s context suitable for each locality.

As Buddhism is the major religion of Thailand, its principles and philosophy have influenced Thai society in all levels. Buddhism distinguishes “intelligence” and “wisdom” the latter being is a higher form of perception and “knowing”.

Pantasen (2001) in his book *Buddhism Economy*, explains about how intelligence and wisdom work. Intelligence derives from knowledge acquired through ability to identify. On a higher level, knowledge is acquired through connecting various information using logic and operational rules. For example, when there are two piles of things, namely ‘*a*’ and ‘*b*’, the total amount of the things is “*a plus b*”. Then, more information is provided, *a* equals *two*, and *b* equals *five*. As a result, new knowledge of *a plus b*, is *seven*. This ability is related to intelligence.

The more intelligent a person is, the more he can find knowledge from complex information and complex rules. It is an analytical ability. The operational rule is constant. Everybody who has the same information, uses the same operational rule and more or less is at the same level of intelligence can analyze and reach the same result. The basis of this approach to analysis is called the ‘scientific method’. This kind of knowledge can be taught and transferred as one can learn it in an education institute (Pantasen, 2001).

Another kind of knowledge is as much important, it is knowledge specific to a person's experience. Only people who share the same experience can understand or communicate with each other. This knowledge can be told to others who do not have the same experience but the receivers will not have the same knowledge or empathy. It is knowledge that transforms itself into 'wisdom'. This dimension is pronounced in the "action-oriented" practice in order to dive oneself in for a real insightful available only through engaging oneself within action and participation.

Wisdom is accumulated experiences rooted within a true understanding of nature, of which self or humanity is also a part. Wisdom is insightful knowing of everything based on natural law. Wisdom can occur only by accumulated experiences and mind trained in consciousness. According to Buddhism, a Buddhist is a person who knows, is always alert and discovers the truth of nature by oneself. This way one will understand true nature of all things and has enough knowledge to eradicate unhappiness that is caused by both internal and external conflicts.

According to Buddhism, wisdom is more important than intelligence and analytical ability. The operational rule for scientific method, though well developed, can have a flaw and can be falsified later. On the other hand, wisdom tries to explore deeply into the core of nature and the actual state of things. For example, in the case of technology, 'intelligence' would enable us to find the best providing convenience or effectiveness of certain technology. Then, when we bring 'wisdom' into this scenario, it will raise questions from a Buddhism perspective:

Questions can be raised on whether or not technology should be applied by the society. Its objective(s) and its impact should be considered carefully. For example, whether or not it will stimulate human greed or

other negative traits; whether it would cause unfair natural resource exploitation and an imbalance in natural conditions, etc. This way, wisdom creates an ethical dimension for knowledge. Wisdom is not just knowledge in action. It is truthfulness, goodness and beauty. In other words, wisdom is knowledge that harbors the moral and the ethics of the community.²¹

However, Buddhism is not the only belief that influences the Thai way of life, especially at the local community level. More ancient, and equally powerful at the village level, is the conviction that a host of supernatural beings control many aspects of life such as bountiful rainfall, adequate crops and the fortunes, or misfortunes, of individuals. Faith in such beings was not replaced by Buddhism but harmoniously intermingled without conflict. Buddhism, Brahmanism, Hinduism and animism play an important role in making Thais place great value on being good to oneself and others, including all things in nature.

2.2. Development of Local Wisdom in Thai Society: Past, Present, and the Current Trend

Historically, after the arrival of western knowledge in the Ayutthaya period, Local Wisdom or Thai traditional knowledge was still highly valued and preferred among lay people. Only royalty, the nobles and elite who could access and use western knowledge or products, accepted it with enthusiasm. It is even today a trait of the Thais to welcome novelty. However, this set a model for lay people later on to follow their “masters, nobles or educated people”. Eventually, it became fashionable to adopt

²¹ An interesting question of: if there is, or where is the wisdom in science is raised among academics. For example, Snively and Corsiglia 2001, cited in Cobern and Loving2000, and Fayard personal communication with the author in 2004.

the upper classes' tastes among urban well-to-do families. However, for the villagers, Local Wisdom continued to play integral role in village life until strong outside forces of modern development came to transform them into a homogenous society as a part of modernity and globalization.

The rise and fall of Local Wisdom in Thai society occurred many times in Thai history. Critically, the first was caused by the political necessity to find a strategic way to portray the country's civilization as a measure against colonization by adopting western style in almost all aspects. Local Wisdom was marginalized and discouraged. It was clearly felt in the areas of the governmental administration system, traditional medicine and handicrafts. However, it was not suppression, but rather a voluntary process. Local Wisdom continued to prove its merit in the local rural community providing some freedom to grow itself.

The rise of traditional medicine was seen during the Second World War due to the shortage of modern medicine. However, the problem of drug shortages did not dissipate with the end of the war. The Thai government then took measures to rectify the situation by assigning the Government Pharmaceutical Organization the task of producing drugs from Thai indigenous plants. The study at that time produced a list of four hundred plants which had already been investigated. After the situation regarding the scarcity of modern drugs eased somewhat, the interest in medicinal plants diminished. Sporadic research activities on Thai medicinal plants, nonetheless, still took place in certain departments of the Ministry of Public Health and various academic institutions.

As previously discussed in PART ONE, modernity has brought changes in the fundamental living of the Thais from agrarian society toward industrialization and now towards globalization and Informational one. Local Wisdom of the Thais, however, has stood the test time that it still

proves its value at the core of Thai society. The evidence of the latest rise, or resurgence of Local Wisdom during the economic crisis shows better than words its deep rooted importance and its relevance to modern life. Its underlying values contain more than meets the eyes.

The rediscovery, and reinvention, of Local Wisdom in modern Thai society is finding more support than ever before. Local Wisdom receives attention from every level of society the knowers or knowledge bearers, the first hand users, the end product users, and even the policy makers. The vibrant return may be because of the characteristics derived from the Great Asian Civilizations of India and China, and its strong foundation in Buddhism. Its aspect of reflecting the great Asian scholarly ways of knowing makes Local Wisdom a combination of epistemic and Gnostic knowledge. However, this is somewhat problematic in that knowledge derived from these great traditions have been systematically absorbing and then replacing local folk knowledge (Ellen and Harris, 1996).

The marginalization and the resurgence of anything is always a negotiation of power. Interestingly, in the Thai context it has not been a fight, but rather a strategic way to find “liberty of action”²² and “economy of means” for Local Wisdom to stand the friction and make a respectful comeback for the benefit of all Thai people.

The next chapter will discuss Local Wisdom at work in present Thai society. It will also shed light on distinguishing or unique influences from religious beliefs, main actors and national policy in shaping the way Local Wisdom plays the role in Thai society at village level and the

²² Fayard (1996) explains these two terms as:
“Liberty of action” refers to measure of independence over one’s choice. And “economy of means” refers to optimization of means to get the most profit with the least resources.

national level, including communication of Local Wisdom in the context of village, urban and national communities.
